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DICTIONARY OF ORGANIC COMPOUNDS

VOLUME II

DICTIONARY OF ORGANIC COMPOUNDS

THE CONSTITUTION AND PHYSICAL AND CHEMICAL PROPERTIES OF THE PRINCIPAL CARBON COMPOUNDS AND THEIR DERIVATIVES, TOGETHER WITH THE RELEVANT LITERATURE REFERENCES

VOLUME TWO

ECCAINE — MYRTILLIN CHLORIDE

Edited by

SIR IAN HEILBRON, D.S.O., D.Sc., LL.D., F.R.I.C., F.R.S.

Professor of Organic Chemistry at the Imperial College of Science and Technology, London

AND

H. M. BUNBURY, M.Sc., F.R.I.C. *Barrister-at-Law*

Imperial Chemical Industries Ltd.

Assistant Editor

W. E. JONES, PH.D., B.Sc., A.R.I.C.

Authors

W. DORAN, M.Sc., A.R.I.C., J. L. DUNN, PH.D., B.Sc., D. H. HEY, D.Sc., PH.D., F.R.I.C., A. LOWE, M.Sc., A.R.I.C., A. McGOOKIN, PH.D., B.Sc., A.R.I.C., R. F. PHIPERS, PH.D., B.Sc.

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TABLE OF ABBREVIATIONS

A	Acid (A_2, two mols of acid).
A°	Angstrom unit. (10^{-8} cm.).
Abs. EtOH	Absolute alcohol.
AcOH	Acetic acid.
Ac_2O	Acetic anhydride.
AcOEt	Ethyl acetate.
Add.	Additive.
Addn.	Addition.
A.G.F.A.	Aktien-Gesellschaft für Anilinfabrikation.
Alc.	Alcohol, alcoholic.
Alc. NH_3	Alcoholic ammonia.
Alk.	Alkali, alkaline.
[α]	Specific rotation.
Amorph.	Amorphous.
Anhyd.	Anhydrous.
Aq.	Aqueous.
Atm.	Atmosphere(s), atmospheric.
B	Base (B_2, two mols of base).
Badische	Badische Anilin und Sodafabrik.
Belg. P.	Belgian Patent.
B.D.C.	British Dyestuffs Corporation.
Bibl.	Bibliography.
B.p.	Boiling point.
C_p	Constant pressure.
C_v	Constant volume.
Cal.	Calories.
Can. P.	Canadian Patent.
Col.	Colour, coloration.
Comb.	Combustion.
Comp.	Compound.
Conc.	Concentrated.
Corr.	Corrected.
Crit.	Critical.
Cryst.	Crystals, crystalline, crystallise.
$(COOH)_2$	Oxalic acid.
$(CH_2COOH)_2$	Succinic acid.
D	Density.
d	Dextrorotatory.
dl	Racemic. Optically inactive by external compensation.
Decomp.	Decomposed, decomposition.
Deriv.	Derivative.
Dil.	Dilute, dilution.
Diss.	Dissolves, dissolved.
Dist.	Distil, distillation.
D.R.P.	German Patent.
E.P.	English (British) Patent.
Et	Ethyl.
Et_2O	Ether (diethyl ether).
EtOH	Ethyl alcohol.
Fluor.	Fluoresces, fluorescence.
F.p.	Freezing point.
F.P.	French Patent.
Form.	Formation.
γ	10^{-6} gm. or 10^{-3} mgm. (microgrammes).
gm.	Gramme(s).
Hyd.	Hydrolyses, hydrolysed, hydrolysis.
i	Optically inactive by internal compensation.
I.C.I.	Imperial Chemical Industries.
I.G.	Interessen Gemeinschaft Farbenindustrie Aktien-Gesellschaft.
Insol.	Insoluble.
I.U.	International Unit.
Jap. P.	Japanese Patent.
k	Dissociation constant.
l	Laevorotatory.
Liq.	Liquid.
m	Meta (position).
Max.	Maximum.
Me	Methyl.
MeOH	Methyl alcohol.
Me_2CO	Acetone.
Min.	Mineral (inorganic).
Misc.	Miscible.
M.L.B.	Meister, Lucius, & Brüning.
mm.	Millimetres.
Mod.	Moderately.
Mol.	Molecule, molecular, molar.
M.p.	Melting point.
ms	Meso (position).
MW	Molecular weight (formula weight).
mgm.	Milligramme(s).
mμ	Millimicron. (10^{-7} cm.).
n	Normal (chain).
n_D	Refractive index (D line, etc.).
NaHg	Sodium amalgam.
NH_3	Ammonia, aqueous ammonia.
$NH_3.AgNO_3$	Ammoniacal silver nitrate.
o	Ortho (position).
Ord.	Ordinary.
Org.	Organic.
Ox.	Oxidise, oxidation.
p	Para (position).
P	Patent.
Part.	Partly, partial.
Pet. ether	Petroleum ether.
$PhNO_2$	Nitrobenzene.
PhOH	Phenol.
Ppd.	Precipitated.
Ppt.	Precipitate.
Pptn.	Precipitation.
Prac.	Practically.
Press.	Pressure(s).
ψ	Pseudo.
Py	Pyridine.
r	Racemic.
Red.	Reduce, reduction.
Ref.	Reference.
Russ.P.	Russian Patent.
S.C.I.	Societé pour l'industrie chimique à Basle.
Sec.	Secondary.
Sol.	Soluble, solution.
Spar.	Sparingly.
Sp. gr.	Specific gravity.
Sp. heat	Specific heat.
Suppl.	Supplement.
Sym.	Symmetrical.
Temp.	Temperature(s).
Tert.	Tertiary.
Undecomp.	Undecomposed.
Unsym.	Unsymmetrical.
UV.	Ultraviolet.
Vac.	Vacuum.
Vap.	Vaporisation.
Vol.	Volume.

JOURNAL ABBREVIATIONS

Journals not listed here are given their full titles in the text.

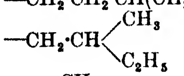
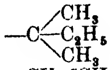
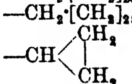
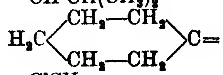
Acta Phytochim.	Acta Phytochimica (Japan).
Am. Chem. J.	American Chemical Journal.
Am. J. Pharm.	American Journal of Pharmacy.
Am. J. Sci.	American Journal of Science.
Anales soc. españ fis. quím.	Anales de la sociedad española de fisica y química.
Angew. Chem.	Angewandte Chemie.
Ann.	Annalen der Chemie.
Ann. chim.	Annales de chimie.
Ann. chim. applicata	Annali di chimica applicata.
Ann. chim. phys.	Annales de chimie et de physique.
Ann. phys.	Annales de physique.
Ann. Physik	Annalen der Physik.
Ann. Rev. Biochem.	Annual Review of Biochemistry.
Arch. Pharm.	Archiv der Pharmazie (und Berichte der deutschen pharmazeutischen Gesellschaft).
Arkiv Kemi, Mineral. Geol.	Arkiv för Kemi, Mineralogi och Geologi.
Atti accad. Lincei	Atti della reale accademia nazionale dei Lincei.
Ber.	Berichte der deutschen chemischen Gesellschaft.
Ber. deut. pharm. Ges.	Berichte der deutschen pharmazeutischen Gesellschaft.
Ber. ges. Physiol. exptl. Pharmakol.	Berichte über die gesamte Physiologie und experimentelle Pharmakologie.
Biochem. J.	Biochemical Journal.
Biochem. Z.	Biochemische Zeitschrift.
Biol. Zentr.	Biologisches Zentralblatt.
Brit. Chem. Abstracts	British Chemical Abstracts.
Bull. Chem. Soc. Japan	Bulletin of the Chemical Society of Japan.
Bull. Imp. Inst.	Bulletin of the Imperial Institute.
Bull. Inst. Phys. Chem. Research (Tokyo).	Bulletin of the Institute of Physical and Chemical Research, Toyko.
Bull. sci. acad. roy. Belg.	Bulletin de la classe des sciences, academie royale de Belgique.
Bull. sci. pharmacol.	Bulletin des sciences pharmacologiques.
Bull. soc. chim.	Bulletin de la société chimique de France.
Bull. soc. chim. Belg.	Bulletin de la société chimique de Belgique.
Bull. soc. chim. biol.	Bulletin de la société de chimie biologique.
Can. Chem. Met.	Canadian Chemistry and Metallurgy.
Can. J. Research	Canadian Journal of Research.
Chem. Abstracts	Chemical Abstracts (of the American Chemical Society).
Chem. Ind.	Die Chemische Industrie.
Chem. Met. Eng.	Chemical and Metallurgical Engineering.
Chem. News	Chemical News (and Journal of Industrial Science).
Chem.-Tech. Rundschau	Chemische-Technische Rundschau.
Chem. Trade J.	Chemical Trade Journal (and Chemical Engineer).
Chem. Umschau	Chemische Umschau (auf dem Gebiete der Fette, Oele, Wachse, und Harze). Now Fettchemische Umschau.
Chem. Weekblad	Chemisch Weekblad.
Chem. Zentr.	Chemisches Zentralblatt.
Chem.-Ztg.	Chemiker-Zeitung.
Compt. rend.	Comptes rendus (hebdomadaires des séances de l'académie des sciences).
Compt. rend. acad. sci. U.R.S.S.	Comptes rendus de l'Académie des Sciences de l'U.R.S.S.
Compt. rend. soc. biol.	Comptes rendus des séances de la société de biologie.
Dinglers polytech. J.	Dinglers polytechnisches Journal.
Fettchem. Umschau	Fettchemische Umschau.
Gazz. chim. ital.	Gazzetta chimica italiana.
Giorn. chim. applicata	Giornale di chimica applicata.
Giorn. chim. ind.	Giornale di chimica industriale.
Giorn. chim. ind. applicata	Giornale di chimica industriale ed applicata.
Helv. Chim. Acta	Helvetica Chimica Acta.
Ind. Eng. Chem.	IndustrialandEngineeringChemistry.
Jahresber. Fortschr. Chem.	Jahresbericht über die Fortschritte der Chemie.
J. Am. Chem. Soc.	Journal of the American Chemical Society.
J. Am. Pharm. Assocn.	Journal of the American Pharmaceutical Association.
J. Applied Chem., U.S.S.R.	Journal of Applied Chemistry, U.S.S.R.
Japan. J. Chem.	Japanese Journal of Chemistry.
J. Bact.	Journal of Bacteriology.
J. Biochem. Japan.	Journal of Biochemistry of Japan.
J. Biol. Chem.	Journal of Biological Chemistry.
J. Chem. Education	Journal of Chemical Education.
J. Chem. Ind. Japan	Journalof Chemical Industry (Japan). Now J. Soc. Chem. Ind. Japan.
J. Chem. Physics	Journal of Chemical Physics.
J. Chem. Soc.	Journal of the Chemical Society (London).
J. Chem. Soc. Abstracts	Abstracts of the Chemical Society (London).
J. Chem. Soc. Japan	Journal of the Chemical Society of Japan.
J. chim. phys.	Journal de chimie physique.
J. Chinese Chem. Soc.	Journal of the Chinese Chemical Society.
J. Gen. Chem. U.S.S.R.	Journal of General Chemistry, U.S.S.R.
J. Indian Chem. Soc.	Journal of the Indian Chemical Society.
J. Indian Inst. Sci.	Journal of the Indian Institute of Science.
J. Org. Chem.	Journal of Organic Chemistry.
J. Pharmacol.	Journal of Pharmacology and Experimental Therapeutics.
J. pharm. Belg.	Journal de pharmacie de Belgique.

J. pharm. chim.	Journal de pharmacie et de chimie.
J. Pharm. Soc. Japan	Journal of the Pharmaceutical Society (Japan).
J. Phys. Chem.	Journal of Physical Chemistry.
J. prakt. Chem.	Journal für praktische Chemie.
J. Proc. Roy. Soc. N.S. Wales	Journal and Proceedings of the Royal Society of New South Wales.
J. Russ. Phys.-Chem. Soc.	Journal of the Russian Physical-Chemical Society.
J. Soc. Chem. Ind.	Journal of the Society of Chemical Industry.
J. Soc. Chem. Ind. Japan	Journal of the Society of Chemical Industry (Japan).
J. Soc. Dyers Colourists	Journal of the Society of Dyers and Colourists.
Mem. Coll. Sci., Kyoto Imp. Univ.	Memoirs of the College of Science, Kyoto Imperial University.
Monatsh.	Monatshefte für Chemie und verwandte Teile anderer Wissenschaften.
Naturwiss.	Naturwissenschaften.
Org. Chem. Ind. U.S.S.R.	Promischlennosti Organitscheskoi Chimii, U.S.S.R.
Pharm. J.	Pharmaceutical Journal and Pharmacist.
Pharm. Ztg.	Die deutsche Pharmazeutische Zeitung.
Pharm. Zentralhalle.	Pharmazeutische Zentralhalle.
Phil. Mag.	Philosophical Magazine and Journal of Science.
Proc. Acad. Sci., Amsterdam	Proceedings of the Royal Academy of Sciences of Amsterdam.
Proc. Chem. Soc.	Proceedings of the Chemical Society (London).
Proc. Roy. Soc.	Proceedings of the Royal Society (London).
Proc. Imper. Acad., Tokyo	Proceedings of the Imperial Academy, Tokyo.
Quart. J. Indian Chem. Soc.	Quarterly Journal of the Indian Chemical Society.
Quart. J. Pharm. Pharmacol.	Quarterly Journal of Pharmacy and Pharmacology.
Rec. trav. chim.	Recueil des travaux chimiques des Pays-Bas.
Rev. chim. ind.	Revue de chimie industrielle.
Rev. prod. chim.	Revue des produits chimiques.
Sci. Papers Inst. Phys. Chem. Research, Tokyo	Scientific Papers of the Institute of Physical and Chemical Research (Tokyo).
Sci. reps. Natl. Tsinghua Univ.	Science Reports of the National Tsinghua University.
Sci. reps. Natl. Univ. Peking	Science Reports of the National University of Peking.
Sitzb. Akad. Wiss. Wien	Sitzungsberichte Akademie der Wissenschaften in Wien.
Trans. Faraday Soc.	Transactions of the Faraday Society.
Trans. Roy. Soc.	Transactions of the Royal Society (London).
Trans. Roy. Soc. Canada.	Transactions of the Royal Society of Canada.
Z. anal. Chem.	Zeitschrift für analytische Chemie.
Z. angew. Chem.	Zeitschrift für angewandte Chemie. Now Angewandte Chemie.
Z. anorg. allgem. Chem.	Zeitschrift für anorganische und allgemeine Chemie.
Z. Chem.	Zeitschrift für Chemie.
Z. Elektrochem.	Zeitschrift für Elektrochemie und angewandte physikalische Chemie.
Z. ges Naturwiss.	Zeitschrift für die gesamte Naturwissenschaft.
Z. physik. Chem.	Zeitschrift für physikalische Chemie.
Z. physiol. Chem.	Zeitschrift für physiologische Chemie (Hoppe-Seyler).

LIST OF SUBSTITUENTS

In the following table is given a list of the principal substituent groups as they are used in the dictionary.

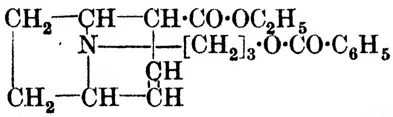
1	—F	Fluoro
2	—Cl	Chloro
3	—Br	Bromo
4	—I	Iodo
5	—NO	Nitroso
6	$—NO_2$	Nitro
7	—N═N⇉N	Azido, Triazo
8	—OH	Hydroxy (*followed by* $—OCH_3$ Methoxy, $—OC_2H_5$ Ethoxy, $—O·CH_2·O—$ methylenedioxy, $—OC_6H_5$ Phenoxy, $—O·CO·CH_3$, Acetoxy, *etc. in the order of the group attached to the oxygen*)
9	—SH	Mercapto
10	—SO	Thionyl
11	$—SO_2$	Sulphonyl
12	—SCN	Thiocyano
13	═O (in C—CO—C)	Keto
14	>NH	Imino
15	═N·OH	Isonitroso, Oximino
16	—S—	Thio
17	$—SO_3H$	Sulpho
18	$—NH_2$	Amino
19	$—NH·C_6H_5$	Anilino, Phenylimino
20	$—NH·C_6H_4·CH_3$	Toluidino
21	$—NH·CO·NH_2$	Ureido
22	$—NH·C(:NH)·NH_2$	Guanidino
23	—NH·OH	Hydroxylamino
24	$—NH·NH_2$	Hydrazino
25	—NH·NH—	Hydrazo
26	—N:N—	Azo
27	·N⋮N]·X	Diazonium, Diazo (X=OH, Cl, etc.)
28	—N═N— with Ö beneath (—N═N— with ↓O beneath)	Azoxy
29	—As:As—	Arseno
30	—NH·N:N— (*open*)	Diazoamino
31	—NH·N:N— (*cyclic*)	Azimino
32	$—CH_3$	Methyl
33	$—CH_2OH$	Hydroxymethyl, Methylol
34	$—C_2H_5$	Ethyl

35 —$CH_2\cdot CH_2\cdot CH_3$ *n*-Propyl
36 —$CH(CH_3)_2$ Isopropyl
37 —$CH_2\cdot CH_2\cdot CH_2\cdot CH_3$ *n*-Butyl
38 —$CH_2\cdot CH(CH_3)_2$ Isobutyl
39 —$C(CH_3)_3$ *ert.*-Butyl
40 —$CH_2\cdot[CH_2]_3\cdot CH_3$ *n*-Amyl
41 —$CH(C_2H_5)_2$ *sec.-n*-Amyl
42 —$CH_2\cdot CH_2\cdot CH(CH_3)_2$ Isoamyl
43  *active* Amyl
44  *tert.*-Amyl
45 —$CH_2\cdot[CH_2]_4\cdot CH_3$ *n*-Hexyl
46 —$CH_2\cdot[CH_2]_3\cdot CH(CH_3)_2$ Isohexyl
47 —$CH_2\cdot[CH_2]_5\cdot CH_3$ *n*-Heptyl, Oenanthyl
48 —$CH_2\cdot[CH_2]_4\cdot CH(CH_3)_2$ Isoheptyl
49 —$CH_2\cdot[CH_2]_6\cdot CH_3$ Octyl, Capryl
50 —$CH_2\cdot[CH_2]_7\cdot CH_3$ Nonyl
51 —$CH_2\cdot[CH_2]_8\cdot CH_3$ Decyl
52 —$CH_2\cdot[CH_2]_9\cdot CH_3$ Undecyl
53 —$CH_2\cdot[CH_2]_{10}\cdot CH_3$ Dodecyl
54 —$CH_2\cdot[CH_2]_{11}\cdot CH_3$ Tridecyl
55 —$CH_2\cdot[CH_2]_{12}\cdot CH_3$ Tetradecyl
56 —$CH_2\cdot[CH_2]_{13}\cdot CH_3$ Pentadecyl
57 —$CH_2\cdot[CH_2]_{14}\cdot CH_3$ Cetyl, Hexadecyl
58 —$CH_2\cdot[CH_2]_{15}\cdot CH_3$ Heptadecyl
59 —$CH_2\cdot[CH_2]_{16}\cdot CH_3$ Octadecyl
60 —$CH_2\cdot[CH_2]_{18}\cdot CH_3$ Eicosyl
61 —$CH_2\cdot[CH_2]_{24}\cdot CH_3$ Ceryl
62 —$CH_2\cdot[CH_2]_{28}\cdot CH_3$ Myricyl, Melissyl
63  Cyclopropyl (*followed by* Cyclobutyl, Cyclopentyl, Cyclohexyl, Cycloheptyl (Suberyl) *in that order*)
64 —$CH{:}CH_2$ Vinyl
65 —$CH{:}CH\cdot CH_3$ Propenyl
66 —$C({:}CH_2)\cdot CH_3$ Isopropenyl
67 —$CH_2\cdot CH{:}CH_2$ Allyl
68 —$CH{:}CH\cdot CH_2\cdot CH_3$ *α*-Butenyl
69 —$CH_2\cdot CH{:}CH\cdot CH_3$ *β*-Butenyl, Crotyl
70 —$CH_2\cdot CH_2\cdot CH{:}CH_2$ *γ*-Butenyl, Allylomethyl
71 —$CH_2\cdot[CH_2]_7\cdot CH{:}CH\cdot[CH_2]_7\cdot CH_3$ Octadecenyl
72 —$C{\vdots}CH$ Acetylenyl, Ethinyl
73 —$CH_2\cdot C{\vdots}CH$ Propargyl
74 —C_6H_5 Phenyl
75 —$C_6H_4\cdot CH_3$ Tolyl
76 —$CH_2\cdot C_6H_5$ Benzyl
77 —$CH_2\cdot C_6H_4\cdot OH$ (-*o*) Salicyl
78 —$CH_2\cdot C_6H_4\cdot OCH_3$ (-*p*) Anisyl
79 —$CH_2\cdot CH_2\cdot C_6H_5$ Phenylethyl
80 —$CH_2\cdot C_6H_4\cdot CH_3$ Xylyl
81 —$C_6H_4\cdot CH(CH_3)_2$ Cumyl
82 —$C_6H_2(CH_3)_3$ (1 : 2 : 4) *ψ*-Cumyl
83 —$C_6H_2(CH_3)_3$ (1 : 3 : 5) Mesityl
84 —$CH{:}CH\cdot C_6H_5$ Styryl
85 —$CH_2\cdot CH{:}CH\cdot C_6H_5$ Cinnamyl
86 —$C_{10}H_7$ Naphthyl
87 —$C_6H_4\cdot C_6H_5$ Diphenylyl, Xenyl
88 —$CH(C_6H_5)_2$ Benzhydryl, Diphenylmethyl
89 —$C_{14}H_9$ Anthryl, anthranyl
90 —$C_{14}H_9$ Phenanthryl
91 —$C(C_6H_5)_3$ Triphenylmethyl
92 —$CH_2\cdot CH_2$— Ethylene, Dimethylene
93 —$CH(CH_3)\cdot CH_2$— Propylene
94 —$CH_2\cdot CH_2\cdot CH_2$— Trimethylene
95 —$CH_2\cdot CH_2\cdot CH_2\cdot CH_2$— Tetramethylene
96 —$C(CH_3)_2\cdot CH_2$— Isobutylene
97 —$CH_2\cdot[CH_2]_3\cdot CH_2$— Pentamethylene
98 —$CH_2[\cdot CH_2]_4\cdot CH_2$— Hexamethylene
99 —$CH_2\cdot[CH_2]_5\cdot CH_2$— Heptamethylene
100 —$CH_2\cdot[CH_2]_6\cdot CH_2$— Octamethylene
101 —$CH{:}CH$— Vinylene
102 —C_6H_4— Phenylene
103 —$C_6H_3(CH_3)$— Tolylene
104 —CH_2— Methylene
105 =$CH\cdot CH_3$ Ethylidene
106 =$CH\cdot CH_2\cdot CH_3$ Propylidene
107 =$C(CH_3)_2$ Isopropylidene
108 =$CH\cdot CH_2\cdot CH_2\cdot CH_3$ Butylidene
109 =$CH\cdot CH(CH_3)_2$ Isobutylidene
110  Cyclohexylidene
111 =$C{:}CH_2$ Vinylidene
112 =$CH\cdot CH{:}CH_2$ Allylidene
113 $CH_3\cdot CH{:}CH\cdot CH$= Crotylidene
114 =$CH\cdot C_6H_5$ Benzylidene
115 =$CH\cdot C_6H_4\cdot OH$ (-*o*) Salicylidene
116 =$CH\cdot C_6H_4\cdot OCH_3$ (-*p*) Anisylidene
117 =$CH\cdot C_6H_4\cdot CH(CH_3)_2$ (-*p*) Cuminylidene
118 =$CH\cdot CH{:}CH\cdot C_6H_5$ Cinnamylidene
119 —$CH_2\cdot CO\cdot CH_3$ Acetonyl
120 —$CH_2\cdot CO\cdot C_6H_5$ Phenacyl
121 —$CH_2\cdot CO\cdot C_6H_4\cdot CH_3$ Tolacyl
122 $C_6H_5\cdot CH\cdot CO\cdot C_6H_5$ Desyl
123 —CHO Aldehydo, Formyl
124 ≡CH Methinyl
125 —$CO\cdot CH_3$ Acetyl, Aceto
126 —$CO\cdot CH_2\cdot CH_3$ Propionyl
127 —$CO\cdot CH_2\cdot CH_2\cdot CH_3$ Butyryl
128 —$CO\cdot CH(CH_3)_2$ Isobutyryl
129 —$CO\cdot CH_2\cdot[CH_2]_2\cdot CH_3$ Valeryl
130 —$CO\cdot CH_2\cdot CH(CH_3)_2$ Isovaleryl
131 —$CO\cdot CH_2\cdot[CH_2]_3\cdot CH_3$ Caproyl
132 —$CO\cdot CH_2\cdot[CH_2]_{13}\cdot CH_3$ Palmityl
133 —$CO\cdot CH_2\cdot[CH_2]_{15}\cdot CH_3$ Stearyl
134 —$CO\cdot[CH_2]_7\cdot CH{:}CH\cdot[CH_2]_7\cdot CH_3$ Oleyl
135 —$CO\cdot C_6H_5$ Benzoyl
136 —$CO\cdot C_6H_4\cdot OH$ (-*o*) Salicyloyl
137 —$CO\cdot C_6H_4\cdot OCH_3$ (-*p*) Anisoyl
138 —$CO\cdot CH_2\cdot C_6H_5$ Phenylacetyl
139 —$CO\cdot C_6H_4\cdot CH_3$ Toluyl
140 —$CO\cdot CH{:}CH\cdot C_6H_5$ Cinnamoyl
141 —$CO\cdot C_{10}H_7$ Naphthoyl
142 —$CO\cdot CO$— Oxalyl
143 —$CO\cdot CH_2\cdot CO$— Malonyl
144 —$CO\cdot CH_2\cdot CH_2\cdot CO$— Succinyl
145 —$CO\cdot C_6H_4\cdot CO$— Phthaloyl, Isophthaloyl, Terephthaloyl
146 —$COOH$ (—$CO\cdot OCH_3$, —$CO\cdot OC_2H_5$, etc.) Carboxy, (Carbomethoxy, Carbethoxy, etc.)
147 —$CO\cdot NH_2$ Carbamyl
148 >CO Carbonyl
149 —$C({:}NH)\cdot NH_2$ Guanyl
150 —CN Cyano
151 —$CO\cdot CH_2NH_2$ Glycyl
152 —$CO\cdot CH(NH_2)\cdot CH_3$ *α*-Alanyl
153 —$CO\cdot CH_2\cdot CH_2NH_2$ *β*-Alanyl
154 —$CO\cdot CH(NH_2)\cdot CH(CH_3)_2$ Valyl
155 —$CO\cdot CH(NH_2)\cdot CH_2\cdot CH(CH_3)_2$ Leucyl
156 —$CO\cdot CH_2\cdot NH\cdot CO\cdot C_6H_5$ Hippuryl
157 —C_4H_3O Furyl
158 —C_4H_3S Thienyl
159 —$CH_2\cdot C_4H_3O$ Furfuryl
160 =$CH\cdot C_4H_3O$ Furfurylidene
161 —$CO\cdot C_4H_3O$ Furoyl, Pyromucyl
162 —C_4H_3NH Pyrryl
163 —C_5H_4N Pyridyl

DICTIONARY OF ORGANIC COMPOUNDS

E

Eccaine



$C_{20}H_{25}O_4N$ MW, 343

Oil. Non-toxic anæsthetic.

B,HCl : cryst. from EtOH–Et_2O. M.p. 117°. Sol. H_2O.

B,H_2PtCl_6 : m.p. 69–70°.

Picrate : m.p. 139–41°.

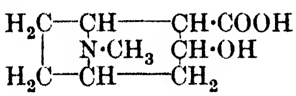
Methiodide : m.p. 194–5°.

v. Braun, Müller, *Ber.*, 1918, **51**, 251.

Ecgonidine.

See Anhydroecgonine.

Ecgonine



$C_9H_{15}O_3N$ MW, 185

l-.

Prisms + $1H_2O$ from EtOH.Aq. M.p. 198° decomp. M.p. anhyd. 205°. Sol. H_2O, EtOH. Insol. Et_2O. $[\alpha]_D$ −45·4°. $KMnO_4$ ⟶ nor-*l*-ecgonine.

Me ester : $C_{10}H_{17}O_3N$. MW, 199. Prisms from EtOH. M.p. 212° decomp. *Methiodide* : m.p. 164°. $[\alpha]_D^{20}$ −17·6°.

Amide : $C_9H_{16}O_2N_2$. MW, 184. Prisms or plates from EtOH. M.p. 198°. Sol. H_2O. Insol. Et_2O, Me_2CO, C_6H_6. *Hydrochloride* : m.p. 275° decomp. *Chloroplatinate* : m.p. 239° decomp. *Picrate* : needles from EtOH.Aq. M.p. 150°. *Methiodide* : m.p. 203°.

B,HCl : plates. M.p. 246°. $[\alpha]_D$ −57°.

B_2,H_2PtCl_6 : m.p. 226°.

Benzoyl : needles from H_2O. M.p. anhyd. 195°. $[\alpha]_D$ −63·3° in H_2O. *Me ester* : *see* β-Cocaine. *Et ester* : Homococaine, cocaethyline. Prisms from Et_2O. M.p. 108–9°. Similar to cocaine but less toxic. Not mydriatic.

dl-.

Plates $+3H_2O$ from EtOH.Aq. M.p. 93–118°, anhyd. 203° (212° rapid heat.).

Me ester : *hydrochloride*, m.p. 195°. *Methiodide* : m.p. 162°.

B_2,HCl : plates. M.p. 247°.

Chloroaurate : needles. M.p. 205°.

Willstätter, Bode, *Ann.*, 1902, **326**, 61, 76.
Willstätter, Wolfes, Mäder, *Ann.*, 1923, **434**, 111.
Liebermann, *Ber.*, 1888, **21**, 2351.
Liebermann, Giesel, *ibid.*, 3197.
Einhorn, Norwall, *Ber.*, 1893, **26**, 963.

ψ-Ecgonine

$C_9H_{15}O_3N$ MW, 185

d-.

Cryst. from EtOH. M.p. 254° (264°).

Me ester : $C_{10}H_{17}O_3N$. MW, 199. Cryst. from Et_2O. M.p. 115°. $[\alpha]_D^{20}$ +19·5° in H_2O. *B,HCl* : $[\alpha]_D^{20}$ +23·67° in H_2O.

B,HCl : prisms. M.p. 236°. $[\alpha]_D$ +1·6°.

$B,HAuCl_4$: m.p. 220° decomp.

Methiodide : leaflets from MeOH. M.p. 209°.

l-.

Me ester : m.p. 115°.

r-.

Cryst. from EtOH. M.p. 251° decomp. Sol. H_2O. Spar. sol. EtOH.

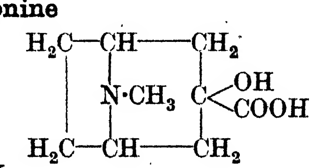
Me ester : prisms. M.p. 125–6°. *Methiodide* : needles from EtOH. M.p. 182–5°.

$B,HCl,\frac{1}{2}H_2O$: needles. M.p. 149°.

Chloroaurate : needles. M.p. 213° decomp.

Willstätter, Wolfes, Mäder, *Ann.*, 1923, **434**, 124.
Einhorn, Marquardt, *Ber.*, 1890, **23**, 468.
Willstätter, Bode, *Ber.*, 1901, **34**, 1457.

α-Ecgonine



$C_9H_{15}O_3N$ MW, 185

Cryst. from H_2O. M.p. 305° decomp. Sol. H_2O, EtOH.Aq.

Me ester: $C_{10}H_{17}O_3N$. MW, 199. Prisms from Me_2CO or AcOEt. M.p. 114°. Sol. H_2O, EtOH, $CHCl_3$. Spar. sol. Et_2O. *$B_2,H_2PtCl_6,2H_2O$*: m.p. 204°. *$B,HAuCl_4$*: orange-yellow leaflets from H_2O. M.p. 95–6°. *Methiodide*: needles from MeOH. M.p. 201–2°. *Picrate*: m.p. 189–91°.

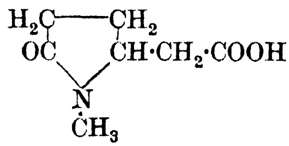
Benzoyl: cryst. from H_2O. M.p. 209° decomp. *Me ester*: *see* α-Cocaine.

B_2,H_2PtCl_6: m.p. 223–4° decomp.

$B,HAuCl_4,H_2O$: m.p. 183–4° decomp.

Willstätter, *Ber.*, 1896, **29**, 2216.

Ecgoninic Acid (N-*Methyl*-2-*pyrrolidone*-5-*acetic acid*)



$C_7H_{11}O_3N$ MW, 157

l-.

Prisms from AcOEt. M.p. 117–18°. Sol. AcOEt, Me_2CO, $CHCl_3$. Spar. sol. C_6H_6.

Me ester: $C_8H_{13}O_3N$. MW, 171. B.p. 275°/13·5 mm.

r-.

Leaflets from AcOEt–C_6H_6. M.p. 93–5°. More soluble than *l*-form.

Ag salt: needles from H_2O. M.p. 240° decomp.

Willstätter, Bode, *Ber.*, 1901, **34**, 519.
Willstätter, Hollander, *ibid.*, 1818.

Echicerin

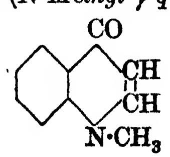
$C_{30}H_{48}O_2$ MW, 440

Constituent of *Echites scholaris*, Linn. Needles from EtOH. M.p. 157°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. $[\alpha]_D$ +63·75°. Na in pet. ether ⟶ amorphous acid, $C_{30}H_{46}O_4$. Sol. conc. H_2SO_4 to yellow sol.

Bromide: needles from EtOH. M.p. 116°.

Jobst, Hesse, *Ann.*, 1875, **178**, 58.

Echinopsine (N-*Methyl*-γ-*quinolone*)



$C_{10}H_9ON$ MW, 159

Alkaloid from seeds of *Echinops Ritro.*

α-.

Cryst. from EtOH. M.p. 152°. Sol. H_2O, EtOH, $CHCl_3$. Spar. sol. Et_2O.

B,HCl: m.p. 185–6°.

B,H_2PtCl_6: m.p. 210–12.°

Picrate: m.p. 223–4°.

β-.

Cryst. from EtOH. M.p. 135°.

Greshoff, *Rec. trav. chim.*, 1900, **19**, 360.
Späth, Kolbe, *Monatsh.*, 1923, **43**, 469.

Echitamidine

$C_{20}H_{26}O_3N_2$ MW, 342

Constituent of bark of *Alstonia congensis.* Plates from Et_2O. M.p. 244° decomp. (*B,H_2O*: m.p. 135°.) Sol. H_2O, EtOH. $[\alpha]_D^{16}$ −515° in EtOH. Conc. HNO_3 ⟶ blue col. ⟶ yellow col.

B,HCl: m.p. 179° decomp.

B,HBr: m.p. 181° decomp.

B_2,H_2SO_4: m.p. 169° decomp.

Picrate: m.p. 226·7° decomp.

Goodson, *J. Chem. Soc.*, 1932, 2628.

Echitamine (*Ditaine*)

$C_{22}H_{28}O_4N_2$ MW, 384

Principal constituent of bark of *Alstonia congensis.* Prisms $+4H_2O$ from EtOH. Loses $3H_2O$ at 105°. *B,H_2O*, m.p. 206°. Sol. H_2O, EtOH, Et_2O. Insol. pet. ether. $[\alpha]_D^{20}$ −28·8° in EtOH. Conc. H_2SO_4 ⟶ purple-red col.

B,HCl: m.p. 295°. *Acetate*:

$$C_{22}H_{26}O_4N_2(O{\cdot}COCH_3)_2,HCl.$$

M.p. 271°.

B,HBr: m.p. 183°.

Goodson, Henry, *J. Chem. Soc.*, 1925, **127**, 1640.
Hesse, *Ann.*, 1880, **203**, 144.
Harnack, *Ber.*, 1880, **13**, 1648.

Eicosane (*Didecyl*)

$$CH_3{\cdot}CH_2{\cdot}[CH_2]_{16}{\cdot}CH_2{\cdot}CH_3$$

$C_{20}H_{42}$ MW, 282

Leaflets from EtOH. M.p. 36–7°. B.p. 205°/15 mm. $D^{36·7}$ 0·7779.

Krafft, *Ber.*, 1886, **19**, 2220.
Carothers, Hill, Kirby, Jacobson, *J. Am. Chem. Soc.*, 1930, **52**, 5280.

***n*-Eicosanic Acid** (*Arachidic acid*, n-*nonadecane*-1-*carboxylic acid*, *eicosoic acid*, *eicosanoic acid*)

$$CH_3{\cdot}CH_2{\cdot}[CH_2]_{16}{\cdot}CH_2{\cdot}COOH$$

$C_{20}H_{40}O_2$ MW, 312

Constituent of *Cascara sagrada*, and of arachis (earth-nut, pea-nut) oil as glyceride. Plates from EtOH. M.p. 77° (75°). B.p. 203–

5°/1 mm. Sol. Et_2O, $CHCl_3$, hot EtOH. D^{100} 0·8240. n_D^{100} 1·425.

Me ester: $C_{21}H_{42}O_2$. MW, 326. M.p. 54·5° (46–7°).

Et ester: $C_{22}H_{44}O_2$. MW, 340. M.p. 50° (42°). B.p. 295–7°/100 mm.

Phenyl ester: $C_{26}H_{44}O_2$. MW, 388. M.p. 58·5°.

Anhydride: $C_{40}H_{78}O_3$. MW, 606. M.p. 77·5°.

Amide: $C_{20}H_{41}ON$. MW, 311. M.p. 108–9°.

Nitrile: $C_{20}H_{39}N$. MW, 293. M.p. 49·5°.

Bleyburg, Ulrich, *Ber.*, 1931, **64**, 2512.
Adam, Dyer, *J. Chem. Soc.*, 1925, **127**, 72.

Eicosanoic Acid.

See Eicosanic Acid.

Eicosanol.

See Eicosyl Alcohol.

Eicosanone-3.

See Ethyl *n*-heptadecyl Ketone.

Eicosanone-7.

See *n*-Hexyl *n*-tridecyl Ketone.

Eicosenic Acid

$CH_3\cdot[CH_2]_7\cdot CH{:}CH\cdot[CH_2]_9\cdot COOH$

$C_{20}H_{38}O_2$ MW, 310

Cryst. from EtOH. M.p. 50°. B.p. 267°/15 mm.

Bodenstein, *Ber.*, 1894, **27**, 3403.

Eicosoic Acid.

See Eicosanic Acid.

Eicosyl Alcohol (*1-Hydroxyeicosane, eicosanol, arachidic alcohol*)

$CH_3\cdot CH_2\cdot[CH_2]_{16}\cdot CH_2\cdot CH_2OH$

$C_{20}H_{42}O$ MW, 298

Wax. M.p. 65·5° (71°). B.p. 220°/3 mm Sol. hot pet. ether, hot C_6H_6. Ox. ⟶ arachidic acid.

Acetyl: m.p. 40°.

Adam, Dyer, *J. Chem. Soc.*, 1925, **127**, 71.
Levene, Taylor, *J. Biol. Chem.*, 1924, **59**, 905.
Haller, *Compt. rend.*, 1907, **144**, 597.

Eicosyl iodide (*1-Iodoeicosane*)

$CH_3\cdot CH_2\cdot[CH_2]_{16}\cdot CH_2\cdot CH_2I$

$C_{20}H_{41}I$ MW, 409

Cryst. from Me_2CO. M.p. 42–3°. Zn + HCl ⟶ eicosane.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 526.
Levene, Taylor, *J. Biol. Chem.*, 1924, **59**, 916.

Eicosylmalonic Acid.

See Heneicosane-1 : 1-dicarboxylic Acid.

Eikonogen.

See 1-Amino-2-naphthol-6-sulphonic Acid.

Elæomargaric Acid.

See Elæostearic Acid.

Elæostearic Acid (*Elæomargaric Acid*)

$CH_3\cdot[CH_2]_3\cdot[CH{:}CH]_3\cdot[CH_2]_7\cdot COOH$

$C_{18}H_{30}O_2$ MW, 278

α- or *cis*:

Leaflets from EtOH. M.p. 47°. Sol. EtOH, Et_2O, CS_2. n_D^{15} 1·5043. S or I ⟶ β-form. Adds Br_2 ⟶ β-tetrabromide. Esters rearrange to β-esters.

β- or *trans*:

Leaflets from EtOH. M.p. 67° (72°). Sol. hot EtOH, H_2O. Insol. Et_2O.

Me ester: $C_{19}H_{32}O_2$. MW, 292. B.p. 209–224°/10 mm. D^{12} 0·900. n_D^{12} 1·482.

Et ester: $C_{20}H_{34}O_2$. MW, 306. B.p. 232°/14 mm. n_D^{20} 1·502.

Bromide: m.p. 115°.

Böeseken, Hoogland, Smit, Broek, *Rec. trav. chim.*, 1927, **46**, 619.
Böeseken, Ravenswaay, *Rec. trav. chim.*, 1925, **44**, 241.
Kametaka, *J. Chem. Soc.*, 1903, **83**, 1045.

Elaidic Acid (Trans *isomer of oleic acid*)

$CH_3\cdot[CH_2]_7\cdot CH{:}CH\cdot[CH_2]_7\cdot COOH$

$C_{18}H_{34}O_2$ MW, 282

Plates from EtOH. M.p. 44–5°. Sol. EtOH, Et_2O. B.p. 234°/15 mm. $D^{79·4}$ 0·8505. n_D^{100} 1·4308. SO_2 or S ⟶ oleic acid. HI + P ⟶ stearic acid.

Me ester: $C_{19}H_{36}O_2$. MW, 296. B.p. 213–15°/15 mm. D^{25} 0·8702. n_D^{25} 1·446.

Et ester: $C_{20}H_{38}O_2$. MW, 310. B.p. 217–19°/15 mm. D^{25} 0·8664. n_D^{25} 1·445.

Chloride: $C_{18}H_{33}OCl$. MW, 300·5. B.p. 216°/13 mm.

Anhydride: $C_{36}H_{66}O_3$. MW, 546. M.p. 51°.

Amide: $C_{18}H_{35}ON$. MW, 281. M.p. 93–4°.

Nitrile: $C_{18}H_{33}N$. MW, 263. M.p. −1°. B.p. 213°/16 mm.

Dibromide: m.p. 29–30°.

Nitrosochloride: m.p. 99–100°.

Harries, Thieme, *Ann.*, 1905, **343**, 354.
Rankoff, *Ber.*, 1931, **64**, 619.
Phillipi, *Monatsh.*, 1929, **51**, 277 (*Bibl.*).

Elaidic Alcohol.

See Octadecenyl Alcohol.

Elaidyl Alcohol.

See Octadecenyl Alcohol.

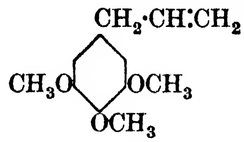
α-Elaterin.
Constituent of fruit of *Ecballium elaterium*. Prisms from EtOH. M.p. 223° (230°). Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Insol. H_2O. $[\alpha]_D^{25}$ −52·9°. Dark red sol. in conc. H_2SO_4. Physiologically inactive.

Power, Moore, *Pharm. J.*, 1919, [4], **29**, 501; *J. Chem. Soc.*, 1909, **95**, 1989.

β-Elaterin.
Constituent of fruit of *Ecballium elaterium*. Needles from EtOH. M.p. 190–5°. $[\alpha]_D^{25}$ +13·9°. More sol. EtOH than α-elaterin. Physiologically active.

See above references.

Elemicin (3 : 4 : 5-*Trimethoxy*-1-*allylbenzene*)

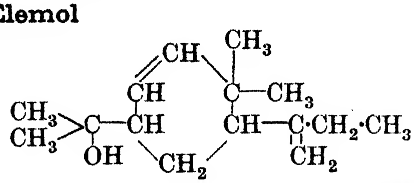


$C_{12}H_{16}O_3$ MW, 208

Constituent of Elemi oil. B.p. 144–7°/10 mm. D^{20} 1·063. n_D^{20} 1·5288. Ozone ⟶ trimethoxyphenylacetic acid. NaOH ⟶ isoelemicin (3:4:5-trimethoxy-1-propenylbenzene), b.p. 153–6°/10 mm., D^{20} 1·077, n_D^{20} 1·547.

Semmler, *Ber.*, 1908, **41**, 1918, 2556.
Mauthner, *Ann.*, 1917, **414**, 252.
Smith, *Proceedings of the Royal Society of Victoria*, 1919, **32**, 14.

α-Elemol



$C_{15}H_{26}O$ MW, 222

Constituent of Manila elemi oil. M.p. 47°. B.p. 142–3°/12 mm. D_4^{18} 0·9345. n_D^{18} 1·4980. Warm H·COOH ⟶ elemene. Se ⟶ eudalene.
Benzoyl: b.p. 160–4°/0·25 mm.
Phenylurethane: m.p. 112°.
Dihydro deriv.: m.p. 47°. B.p. 138°/12 mm. D_4^{15} 0·934. n_D^{15} 1·4925.

Ruzicka, Pfeiffer, *Helv. Chim. Acta*, 1926, **9**, 841.
Ruzicka, van Veen, *Ann.*, 1929, **476**, 70.

α-Elemolic Acid (*α-Elemic acid*)

$C_{30}H_{48}O_3$ MW, 456

Cryst. from Me_2CO.Aq. M.p. 215°. $[\alpha]_D$ −24·48°. Ox. ⟶ elemonic acids.
Me ester: $C_{31}H_{50}O_3$. MW, 470. M.p. 144–5°. B.p. 252–3°/0·2 mm.
Et ester: $C_{32}H_{52}O_3$. MW, 484. M.p. 132·5–133·5°. B.p. 263–5°/0·3 mm. D^{141} 0·9685. n_D^{141} 1·4836.
Acetate: m.p. 225°. $[\alpha]_D^{20}$ −40°.
Dibromide: m.p. 207°. $[\alpha]_D^{20}$ −17·14°.
Dihydro deriv.: m.p. 238° (246–7°).

Ruzicka *et al.*, *Helv. Chim. Acta*, 1932, **15**, 681.
Mladenovic, Lieb, *Monatsh.*, 1931, **58**, 69.

γ-Elemolic Acid

$C_{30}H_{50}O_3$ MW, 458

Cryst. from EtOH. M.p. 281°. $[\alpha]_D^{20}$ +68·76°.
Acetate: m.p. 180°.

See above references.

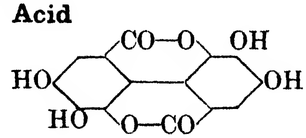
δ-Elemolic Acid

$C_{30}H_{46}O_3$ MW, 454

M.p. 217–19°.
Me ester: $C_{31}H_{48}O_3$. MW, 468. M.p. 112–13°. D^{118} 0·9958. n_D^{114} 1·4949.

Ruzicka *et al.*, *Helv. Chim. Acta*, 1932, **15**, 681.

Ellagic Acid

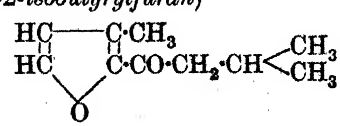


$C_{14}H_6O_8$ MW, 302

Occurs free and combined in galls. Needles + 2Py from Py. M.p. above 360°. Spar. sol. H_2O, EtOH. Insol. Et_2O. Sol. alkalis ⟶ yellow sols. $FeCl_3$ ⟶ green col. KOH fusion ⟶ hexahydroxydiphenyl. Zn dist. ⟶ fluorene.
Tetra-acetyl: m.p. 343–6° (317–19°).
Tetracarbethoxyl: m.p. 244°.

Perkin, Nierenstein, *J. Chem. Soc.*, 1905, **87**, 1415.
Nierenstein, *Helv. Chim. Acta*, 1931, **14**, 912.
Zetzsche, Graef, *ibid.*, 240.

Elsholtzione (*Isobutyl 3-methylfuryl ketone*, *3-methyl-2-isobutyrylfuran*)

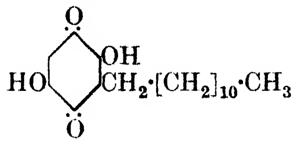


$C_{10}H_{14}O_2$ MW, 166

Constituent of *Elsholtzia cristata*. B.p. 210°, 91–4°/12 mm. D^{20} 0·9817. n_D^{21} 1·4842.
Oxime: m.p. 54°.
Semicarbazone: m.p. 171–2°.

Reichstein, Zschokke, Goerg, *Helv. Chim. Acta*, 1931, **14**, 1277.
Asahina, Murayama, *Arch. Pharm.*, 1914, **252**, 435.

Embelin (*Embelic acid*, 2 : 5-*dihydroxy*-3-n-*dodecyl*-p-*benzoquinone*)

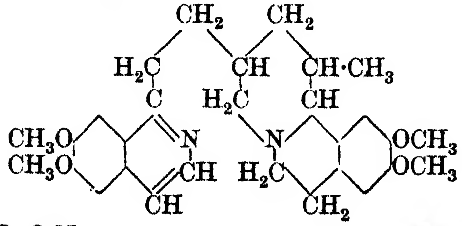


$C_{18}H_{28}O_4$ MW, 308

Constituent of *Embelia ribes*. Orange red plates from Et_2O–C_6H_6. M.p. 143° (with sublimation). Insol. H_2O. Reddish-violet sols. in alkalis. Gives coloured pptes. with many inorganic salts. Combines with primary amines. KOH.Aq. ⟶ 1-ketomyristic acid. Tautomerises. Anthelmintic.
Diacetyl: m.p. 54°.
Dibenzoyl: m.p. 97–8°.
Tetra-oxime: m.p. 175°.
Di-semicarbazone: m.p. 236°.
Di-phenylhydrazone: m.p. 189–90°.
Benzylidene deriv.: m.p. 112°.
Di-benzylidene deriv.: m.p. 142°.
Di-methylamine deriv.: m.p. 216°.
Di-aniline deriv.: m.p. 167–8°.

Hefter, Feuerstein, *Arch. Pharm.*, 1900, **238**, 15.
Hasan, Stedman, *J. Chem. Soc.*, 1931, 2112.
Kaul, Ray, Dutt, *J. Indian Chem. Soc.*, 1929, **6**, 577.

Emetamine



$C_{29}H_{36}O_4N_2$ MW, 476

From roots of *Pyschotria ipecacuanha*. Needles from AcOEt. M.p. 153–4°. Sol. EtOH, C_6H_6, $CHCl_3$. Spar. sol. Et_2O. Insol. H_2O, alkalis. Sol. conc. H_2SO_4. $[\alpha]_D^{20}$ +13·6.
B,2HCl: m.p. anhyd. 218–23°. $[\alpha]_D$ −17·5°.
B,2HBr: m.p. 210–25°. $[\alpha]_D$ −24·3°.
B,2HNO₃: m.p. 165–6°.
B,2H₂C₂O₄: m.p. 172°. $[\alpha]_D$ −6°.
Picrate: m.p. 173°.

Brindley, Pyman, *J. Chem. Soc.*, 1927, 1071.

Emetine (*Cephæline methyl ether*. See formula under Cephæline)

$C_{29}H_{40}O_4N_2$ MW, 480

Principal alkaloid from roots of *Psychotria ipecacuanha*. Amorphous powder. M.p. 74°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. C_6H_6. Insol. H_2O. $[\alpha]_D^{15}$ −32·7°. Sensitive to light.
B,2HCl: m.p. 235–55°. $[\alpha]_D$ +21°.
B,2HBr: m.p. 250–65°. $[\alpha]_D$ +15·2°.
B,2HNO₃: m.p. 245°.
B,H₂SO₄: m.p. 205–45°.

Staüb, *Helv. Chim. Acta*, 1927, **10**, 826.
Carr, Pyman, *J. Chem. Soc.*, 1914, **105**, 1591.
Späth, Liethe, *Ber.*, 1927, **60**, 688.

Emodin.
See Aloe-emodin, Frangula-emodin, *and* Natalol-emodin.

Enneamethylene.
See Cyclononane.

Ephedrine (2-*Methylamino*-1-*phenylpropanol*-1, α-*hydroxy*-β-*methylaminopropylbenzene*)

$C_6H_5 \cdot CH(OH) \cdot CH(NH \cdot CH_3) \cdot CH_3$

$C_{10}H_{15}ON$ MW, 165

l-.
Present in various species of *Ephedra*. Hydrated cryst. from H_2O. M.p. 40°. B.p. 225°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$. $[\alpha]_D^{20}$ −6·3° in EtOH.
B,HCl: m.p. 218°. $[\alpha]_D^{20}$ −36·6° (−34·9°) in H_2O.
B,HBr: m.p. 205°.
B,H₂PtCl₆: needles. M.p. 186°.
B,HAuCl₄: yellow needles. M.p. 128–31°.
N-p-*Nitrobenzoyl*: pale yellow prisms. M.p. 187–8°. $[\alpha]_D^{20}$ −51·77° in $CHCl_3$.

d-.
Plates from H_2O. M.p. 40–40·5°.
B,HCl: plates from EtOH. M.p. 217–18°. $[\alpha]_D^{20}$ +34·42° in H_2O. More easily sol. than *l*-form.
N-p-*Nitrobenzoyl*: yellowish leaflets from EtOH. M.p. 187–8°. $[\alpha]_D^{20}$ +51·12° in $CHCl_3$.

dl-.
Needles from Et_2O or pet. ether. M.p. 76°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6.

B,HCl: plates from EtOH. M.p. 188–189·5°.
$B,HAuCl_4$: yellow cryst. M.p. 115°.
B_2,H_2PtCl_6: reddish-yellow needles or leaflets. M.p. 199° (183°) decomp.
N-p-*Nitrobenzoyl*: pale yellow plates from EtOH. M.p. 162°.
Methiodide: needles. M.p. 228–9°.

Nagai, Kanao, *Ann.*, 1929, **470**, 157.
Emde, *Helv. Chim. Acta*, 1929, **12**, 365, 405.
Späth, Göhring, *Monatsh.*, 1920, **41**, 319.
Freudenburg, Braun, Schoeffel, *J. Am. Chem. Soc.*, 1932, **54**, 234.
Hoffmann–La Roche A.G., D.R.P., 554,553, (*Chem. Zentr.*, 1932, II, 1693).

ψ-Ephedrine (*Isoephedrine*)

$C_6H_5 \cdot CH(OH) \cdot CH(NH \cdot CH_3) \cdot CH_3$

$C_{10}H_{15}ON$ MW, 165

l-.

Prisms from Et_2O. M.p. 118–118·5°. $[\alpha]_D^{20}$ −51·93° in EtOH.
B,HCl: needles from EtOH. M.p. 182–182·5°. $[\alpha]_D^{20}$ −61·88°.

d-.

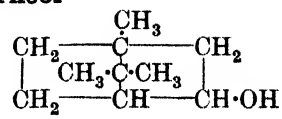
Occurs in leaves of *Ephedra vulgaris*. Prisms from Et_2O. M.p. 117–18°. $[\alpha]_D^{20}$ +51·24° in EtOH. Sol. EtOH, Et_2O. Spar. sol. cold H_2O.
B,HCl: prisms from EtOH. M.p. 182–182·5°. $[\alpha]_D^{20}$ +61·6° in H_2O.
Oxalate: needles from EtOH. M.p. 219°.
N-p-*Nitrobenzoyl*: yellowish cryst. from EtOH. M.p. 177°. $[\alpha]_D^{20}$ +140·8° in $CHCl_3$.
$B,HAuCl_4$: m.p. 126–126·5°.

dl-.

Needles. M.p. 118°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, Et_2O.
B,HCl: needles from EtOH. M.p. 164°.
Oxalate: prisms from EtOH. M.p. 218° decomp.
$B,HAuCl_4$: yellow prisms. M.p. 117°.
$(B,HCl)_2,AuCl_3$: yellow needles. M.p. 194°.
N-p-*Nitrobenzoyl*: prisms from EtOH. M.p. 165–6°.
Methiodide: cryst. from H_2O. M.p. 183°.

Späth, Koller, *Ber.*, 1925, **58**, 1268.
Nagai, Kanao, *Ann.*, 1929, **470**, 157.
Emde, *Helv. Chim. Acta*, 1929, **12**, 365.
Bossert, Brode, *J. Am. Chem. Soc.*, 1934, **56**, 165.

***l*-Epiborneol**

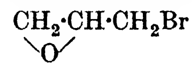


$C_{10}H_{18}O$ MW, 154

Cryst. from pet. ether. M.p. 181–182·5°. Ox. ⟶ *l*-epicamphor.
Acetyl: b.p. 114°/19 mm., $[\alpha]_D^{16}$ +15·63°. D_4^{14} 0·988.
Phenylurethane: needles from pet. ether. M.p. 82°.
Dinitrobenzoate: m.p. 103°. $[\alpha]_D^{15}$ +28·37.

Bredt, Pinten, *J. prakt. Chem.*, 1927, **115**, 52.
Bredt, Perkin, *J. Chem. Soc.*, 1913, **103**, 2222.
Bredt-Savelsberg, Bund, *J. prakt. Chem.*, 1931, **131**, 48.

α-Epibromohydrin (3-*Bromopropylene oxide*)

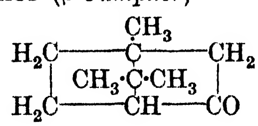


C_3H_5OBr MW, 137

B.p. 134–6°, 61–2°/50 mm.

Braun, *J. Am. Chem. Soc.*, 1932, **54**, 1250.

Epicamphor (β-*Camphor*)



$C_{10}H_{16}O$ MW, 152

l-.

M.p. 183·5–184° (corr.). B.p. 213°. $[\alpha]_D^{17}$ −58·21° in C_6H_6. Very sol. EtOH, Et_2O. Spar. sol. H_2O. Na + EtOH ⟶ *l*-epiborneol. Ox. ⟶ *d*-camphoric acid. Odour similar to that of *d*-camphor.
Oxime: needles from MeOH. M.p. 103–4°. $[\alpha]_D$ +100·5°.
Semicarbazone: needles from EtOH. M.p. 237–8° decomp.
Isonitroso deriv.: exists in two forms. M.p.'s 168–70° and 138–40°.

d-.

M.p. 182°. $[\alpha]_D$ +58·4° in C_6H_6.
Oxime: needles from MeOH. M.p. 103°. $[\alpha]_D$ −98·9°.
Semicarbazone: needles. M.p. 237–8°.

dl-.

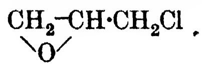
Cryst. from pet. ether. M.p. 180°.

Oxime: needles from MeOH. M.p. 98–100°.

Bredt, Perkin, *J. Chem. Soc.*, 1913, **103**, 2182.
Furness, Perkin, *J. Chem. Soc.*, 1914, **105**, 2026.
Bredt, Bredt-Savelsberg, *Ber.*, 1929, **62**, 2216.
Bredt, Drouven, Schumann, Scholl, *J. prakt. Chem.*, 1931, **131**, 132.
Asahina, Ishidate, Momose, *Ber.*, 1934, **67**, 1432.

Epicatechin.
See under Catechin.

α-Epichlorohydrin (3-*Chloropropylene oxide*)

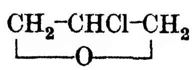


C_3H_5OCl MW, 92·5

B.p. 115–17°, 60–61°/100 mm. D_4^{20} 1·181. n_D^{20} 1·438. Insol. H_2O. Hot AcOH ⟶ acetochlorohydrin. Ac_2O ⟶ diacetochlorohydrin. Na or Na.Hg ⟶ allyl alcohol. HI ⟶ *n*-propyl chloride. EtOH + H_2SO_4 ⟶ 1-chlorohydrin 3-Et ether.
Polyepichlorohydrin: needles from EtOH. M.p. 109–10°.

Clarke, Hartman, *Organic Syntheses*, Collective Vol. I, 228.
Fairbourne, Gibson, Stephens, *J. Chem. Soc.*, 1932, 1968.
Braun, *J. Am. Chem. Soc.*, 1932, **54**, 1248.

β-Epichlorohydrin (2-*Chlorotrimethylene oxide*)

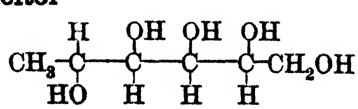


C_3H_5OCl MW, 92·5

B.p. 132–4°. More stable than the α-compound. Does not react with very dil. acids. PCl_5 ⟶ CH_2:CCl·CH_2Cl. Na or Na.Hg ⟶ allyl alcohol.

Bigot, *Ann. chim. phys.*, 1891, **22**, 468.

Epifucitol



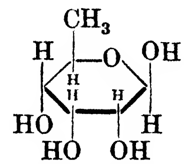
$C_6H_{14}O_5$ MW, 166

d-.
Cryst. from H_2O. M.p. 104°. $[\alpha]_D^{21}$ +2° in H_2O.
Di-benzylidene deriv.: needles from EtOH. M.p. 184°.

l-.
Cryst. from H_2O. M.p. 104°. $[\alpha]_D$ −2·3° in H_2O.
Di-benzylidene deriv.: cryst. from EtOH. M.p. 183°. $[\alpha]_D$ +39·7° in $CHCl_3$.

Votoček, Valentin, *Chem. Zentr.*, 1930, I, 2544.
Votoček, Kučerenko, *ibid.*

Epifucose



Probable structure

$C_6H_{12}O_5$ MW, 164

d-. (Epirhodeose).
Dextrorotatory syrup. HNO_3 ⟶ trihydroxyriboglutaric acid. NaHg (acid) ⟶ epi-*d*-fucitol. Epimeric with *d*-fucose (rhodeose).
Phenylosazone: m.p. 170°. Decomp. at 177–80°.
Methylphenylhydrazone: m.p. 136°.

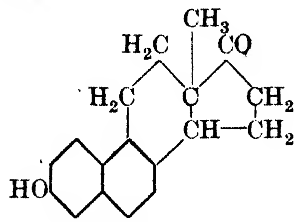
l-.
Yellow lævorotatory syrup. 12% HCl ⟶ methylfurfural. NaHg (acid) ⟶ epi-*l*-fucitol. Gives deep red col. with 1-naphthol in EtOH + conc. H_2SO_4. Epimeric with *l*-fucose.
Phenylosazone: m.p. 177–8° decomp.
p-*Bromophenylosazone*: m.p. 204°.
Methylphenylhydrazone: m.p. 137°.

Votoček, Krauz, *Ber.*, 1911, **44**, 362.
Votoček, Valentin, *Chem. Zentr.*, 1930, I, 2544.
Votoček, Červený, *Ber.*, 1915, **48**, 658; *Chem. Zentr.*, 1928, I, 267.
Votoček, Kučerenko, *Chem. Zentr.*, 1930, I, 2544.

Epiglucosamine.
See under Glucosamine.
Epiglucosaminic Acid.
See under Glucosaminic Acid.
Epihydrin Alcohol.
See Glycide.
Epinephrine.
See l-Adrenaline.
Epirhodeose.
See Epifucose.

ε-Acid (*Epsilon acid*).
See 1-Naphthol-3 : 8-disulphonic Acid.

Equilenine



Probable structure

$C_{18}H_{18}O_2$ MW, 266

Occurs in urine of pregnant mares. Needles from MeOH. M.p. 258–9° decomp. Spar. sol. EtOH. $[\alpha]_D^{16}$ +87°.

Acetyl : m.p. 156–7°.

Benzoyl : needles from EtOH. M.p. 222–3°.

Monobromide : needles from propyl alcohol. M.p. 225–7° decomp.

Oxime : needles from EtOH. M.p. 249–50°.

Semicarbazone : needles. M.p. 268°.

Picrate : orange prisms. M.p. 205–8°.

Girard *et al.*, *Compt. rend.*, 1932, **195**, 981; *Bull. soc. chim. biol.*, 1933, **15**, 562.
Sandulesco, Tchung, Girard, *Compt. rend.*, 1933, **196**, 137.

Equiline

$C_{18}H_{20}O_2$ (?) MW, 268

M.p. 238–40°. Sublimes in vacuo at 170–200°. $[\alpha]_D^{15}$ +308° in dioxan (1% sol.).

Semicarbazone : needles from Py. M.p. 265–7°.

Oxime : needles from EtOH.Aq. M.p. 221–3°.

Benzoyl : plates from EtOH. M.p. 197–8°.

Girard *et al.*, *Compt. rend.*, 1932, **194**, 1020.

Equol

$C_{15}H_{14}O_3$ MW, 242

Inactive phenol isolated from mare's urine. Cryst. from EtOH.Aq. M.p. 189–190·5°. $[\alpha]_{5461}$ −21·5°.

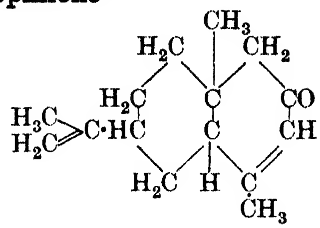
Di-Me ether : $C_{17}H_{18}O_3$. MW, 270. Cryst. from MeOH. M.p. 89°.

Diacetyl : cryst. from MeOH. M.p. 122·5°.

Dibenzoyl : cryst. from MeOH–$CHCl_3$. M.p. 187–9°. Forms liquid crystals.

Marrian, Haslewood, *Biochem. J.*, 1932, **26**, 1227.

Eremophilone



$C_{15}H_{22}O$ MW, 218

Constituent of oil from wood of *Eremophila Mitchelli*. Needles from MeOH. M.p. 41–2°. B.p. 171°/15 mm. D^{25} 0·9994. n_D^{25} 1·5182. $[\alpha]_{5461}$ −207° in MeOH. Does not reduce Fehling's nor give col. with $FeCl_3$. H_2O_2 ⟶ eremophilone oxide, m.p. 63–4°. Na + EtOH ⟶ dihydroeremophilol, b.p. 168–70°/14 mm.

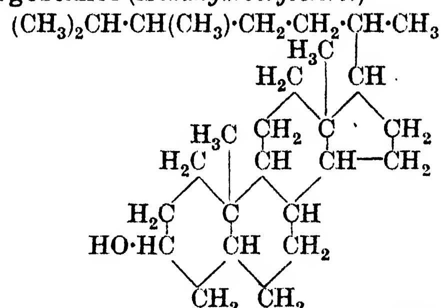
Semicarbazone : m.p. 202–3°. $[\alpha]_{5461}$ −293° in MeOH.

Hydroxymethylene deriv. : prisms from MeOH. M.p. 105°.

Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2744.

Ergamine (**Histamine**).
4-[ω-Aminoethyl]-glyoxaline, *q.v.*

Ergostanol (*Hexahydroergosterol*)



$C_{28}H_{50}O$ MW, 402

Needles from MeOH–Et_2O. M.p. 144–5°. $[\alpha]_D$ +15·94° in $CHCl_3$.

Acetyl : needles from MeOH–Et_2O. M.p. 144–5°. $[\alpha]_D$ +5·95° in $CHCl_3$.

Chloroacetyl : m.p. 200–1°.

Benzoyl : m.p. 163–5°.

p-*Toluenesulphonyl* : m.p. 150–1°.

Reindel, *Ann.*, 1928, **466**, 141.
Heilbron, Sexton, *J. Chem. Soc.*, 1929, 921.

Ergostenol (*Tetrahydroergosterol*)

$C_{28}H_{48}O$ MW, 400

α-.

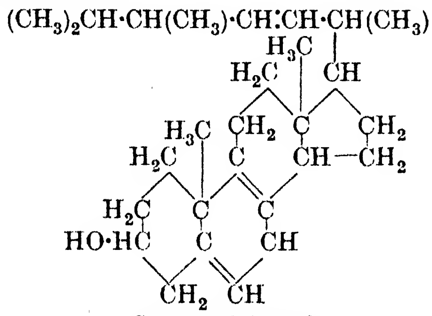
Leaves from MeOH. M.p. 130–1°. $[\alpha]_D$ +17·86° in $CHCl_3$.

Acetyl: leaves from EtOH. M.p. 110°. $[\alpha]_D$ $+5{\cdot}18°$ in $CHCl_3$.
Benzoyl: needles from MeOH–Et_2O. M.p. 118°.
p-*Toluenesulphonyl*: m.p. 162–3° decomp.

β-.
Plates from EtOH. M.p. 141–2°. $[\alpha]_D^{20}$ $+19{\cdot}4°$ in $CHCl_3$.
Acetyl: plates from EtOH. M.p. 111–12°. $[\alpha]_D^{20}$ $+13{\cdot}1°$ in $CHCl_3$.
Benzoyl: prisms from C_6H_6–EtOH. M.p. 158–60°. $[\alpha]_D^{20}$ $+18{\cdot}3°$.

Reindel, Walter, *Ann.*, 1928, **460**, 212.
Heilbron, Wilkinson, *J. Chem. Soc.*, 1932, 1708.
See also last reference above.

Ergosterol



Suggested formula

$C_{28}H_{44}O$ MW, 396

Occurs in yeast. Cryst. with H_2O of cryst. from EtOH, anhyd. from Et_2O. M.p. 163°. $[\alpha]_D$ $-133°$ in $CHCl_3$. Sol. $CHCl_3$, C_6H_6. Spar. sol. EtOH, Et_2O, AcOH, pet. ether. Ultraviolet irradiation ⟶ mixture of compounds including Vitamin D. $SbCl_3$ in $CHCl_3$ ⟶ violet col. Forms an insol. digitonide.
Me ether: $C_{29}H_{46}O$. MW, 410. Cryst. from AcOEt–EtOH. M.p. 151–2°.
Acetyl: plates from Et_2O–EtOH. M.p. 175–6°.
Benzoyl: cryst. from EtOH. M.p. 168°. $[\alpha]_D$ $-68°$.
Palmityl: leaflets from AcOEt. M.p. 107–8°.
Phenylurethane: prisms from EtOH. M.p. 185°.

Tanret, *Compt. rend.*, 1908, **147**, 75.
Windaus, Inhoffen, Reichel, *Ann.*, 1934, **510**, 248.
Dunn, Heilbron, Phipers, Samant, Spring, *J. Chem. Soc.*, 1934, 1576.

Ergotamine

$C_{33}H_{35}O_5N_5$ MW, 581

Constituent of Ergot alkaloids. Rectangular plates from Me_2CO.Aq. M.p. 213–14° decomp. Easily sol. Py, $PhNO_2$. Sol. Et_2O, $CHCl_3$, C_6H_6. Insol. pet. ether. Sol. NaOH.Aq. Insol. Na_2CO_3. $[\alpha]_{5461}^{20}$ $-181°$. $[\alpha]_{5790}^{20}$ $-159°$ in $CHCl_3$. Boiling MeOH ⟶ ergotaminine. Alc. KOH ⟶ ergine.

Smith, Timmis, *J. Chem. Soc.*, 1930, 1390; 1932, 1543.
Soltys, *Ber.*, 1932, **65**, 553.

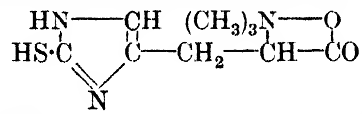
Ergotaminine

$C_{33}H_{35}O_5N_5$ MW, 581

Constituent of Ergot alkaloids. Plates from EtOH. M.p. 252° decomp. $[\alpha]_{5461}^{18}$ $+450°$, $[\alpha]_{5790}^{18}$ $+385°$ in $CHCl_3$. Easily sol. Py. Sol. $CHCl_3$, $PhNO_2$. Spar. sol. MeOH, EtOH, Me_2CO, AcOEt, C_6H_6. Insol. pet. ether. Insol. dil. alkalis or alkali carbonates. Formed when ergotamine is boiled with MeOH. Alc. KOH ⟶ ergine.

See above references.

Ergothioneine (*Thioneine, thiasine*)



$C_9H_{15}O_2N_3S$ MW, 229

Plates + $2H_2O$. M.p. 290° decomp. $[\alpha]_D$ $+116{\cdot}5°$. Gives ppt. with Meyer's reagent and $HgCl_2$, but not with picric or tannic acids. $FeCl_3$ ⟶ trimethylhistidine.

Akabori, *Ber.*, 1933, **66**, 151.
Barger, Ewins, *J. Chem. Soc.*, 1911, **99**, 2336.
Tanret, *Compt. rend.*, 1909, **149**, 222.

Ergotinine

$C_{35}H_{39}O_5N_5$ MW, 609

Occurs in *Claviceps purpurea*, parasitic on cereals. Prisms from Me_2CO.Aq. M.p. 239° decomp., sinters at 210°. $[\alpha]_{5461}$ $+459°$ in $CHCl_3$. Slightly sol. H_2O. Mod. sol. hot EtOH, C_6H_6. Alc. KOH ⟶ ergine. Blue-violet fluor. in acid sols. Sol. in H_2SO_4 + $FeCl_3$ ⟶ orange col. changing to blue. Hyd. (EtOH + H_3PO_4) ⟶ ergotoxine.

Barger, Carr, *J. Chem. Soc.*, 1907, **91**, 337.
Barger, Ewins, *J. Chem. Soc.*, 1918, **113**, 235.
Soltys, *Ber.*, 1932, **65**, 553.
Smith, Timmis, *J. Chem. Soc.*, 1931, 1888.
Jacobs, Craig, *J. Biol. Chem.*, 1935, **110**, 521.

Ergotoxine

$C_{35}H_{41}O_6N_5$ MW, 627

Prisms + $\frac{1}{2}C_6H_6$ from C_6H_6. Loses C_6H_6 and melts at 190–200°. $[\alpha]^{18}_{5461}$ −226° in $CHCl_3$. Sol. EtOH, MeOH, Et_2O, boiling C_6H_6, caustic alkalis. Insol. H_2O. Hot MeOH ⟶ ergotinine. Alc. KOH ⟶ ergine. Pptd. by alkaloid reagents.

B,HCl: plates. M.p. 205°.

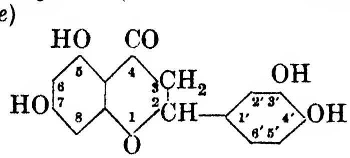
$B_2,H_2C_2O_4$: plates. M.p. 179° decomp.

B,H_3PO_4,H_2O: needles. M.p. 186–7° decomp.

$B,C_2H_5SO_3H,2C_2H_5OH$: m.p. 209°.

Smith, Timmis, *J. Chem. Soc.*, 1930, 1390.
Barger, Ergot and Ergotism, 1931. (Textbook.)
See also previous references.

Eriodictyol (*5 : 7 : 3′ : 4′-Tetrahydroxyflavanone*)



$C_{15}H_{12}O_6$ MW, 288

Occurs in leaves of *Eriodictyon californicum* Dene, and *Eriodictyon glutinosum* Benth. Plates from EtOH. M.p. 267°. Mod. sol. hot EtOH, AcOH. Spar. sol. boiling H_2O. Sol. alkalis and alkali carbonates.

Acetyl deriv.: m.p. 137°.

3′-Me ether: *see* Homoeriodictyol.

7 : 3′ : 4′-Tri-Me ether: $C_{18}H_{18}O_6$. MW, 330. Needles. M.p. 136°.

Shinoda, Sato, *Chem. Abstracts*, 1929, **23**, 4210.
Tutin, *J. Chem. Soc.*, 1910, **97**, 2054.
Power, Tutin, *J. Chem. Soc.*, 1907, **91**, 895.

Eriodictyonone.

See Homoeriodictyol.

Erucic Acid (*cis-Δ^{12}-Docosenoic acid.* Cf. Brassidic Acid)

$CH_3{\cdot}[CH_2]_7{\cdot}CH{:}CH{\cdot}[CH_2]_{11}{\cdot}COOH$

$C_{22}H_{42}O_2$ MW, 338

Present as glyceride in rape and many other vegetable oils. Cryst. from MeOH. M.p. 33·5–34°. B.p. 241–3°/5 mm. Nitrogen oxides ⟶ brassidic acid.

Me ester: $C_{23}H_{44}O_2$. MW, 352. B.p. 221–2°/5 mm.

Et ester: $C_{24}H_{46}O_2$. MW, 366. B.p. 229–30°/5 mm.

Amide: $C_{22}H_{43}ON$. MW, 337. M.p. 65–6°.

Anhydride: $C_{44}H_{82}O_3$. MW, 658. M.p. 47·5–48°.

Anilide: m.p. 65–6°.

Noller, Talbot, *Organic Syntheses*, 1930, X, 44.
Holde, Zadek, *Ber.*, 1923, **56**, 2052.

Erucyl Alcohol (*Docosenol, docosenyl alcohol, 1-hydroxydocosene*)

$CH_3{\cdot}[CH_2]_7{\cdot}CH{:}CH{\cdot}[CH_2]_{11}{\cdot}CH_2OH$

$C_{22}H_{44}O$ MW, 324

Cryst. from Me_2CO or MeOH. M.p. 34·5–35·5°. B.p. 240·5–241·5°/10 mm., 199°/0·2 mm. Sol. EtOH, AcOH, C_6H_6, pet. ether. Red. ⟶ docosyl alcohol.

Dibromide: m.p. 45°.

Phenylurethane: m.p. 86–86·5°.

Willstätter, Mayer, Hüni, *Ann.*, 1911, **378**, 101.
Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 527.
Bleyberg, Ulrich, *Ber.*, 1931, **64**, 2504.

Erythrene (*1 : 3-Butadiene, divinyl*)

$CH_2{:}CH{\cdot}CH{:}CH_2$

C_4H_6 MW, 54

Gas. B.p. −2·6°. Heated 10 days at 110–20° ⟶ butadiene caoutchouc (synthetic rubber, artificial rubber). Br in $CHCl_3$ ⟶ 1 : 4-dibromobutylene-2. Excess Br ⟶ 1 : 2 : 3 : 4-tetrabromobutane.

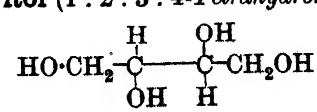
Tetrachloro deriv.: prisms. M.p. 72–3°. B.p. 130–40°/50 mm.

Thiele, *Ann.*, 1899, **308**, 337.
Harries, *Ann.*, 1911, **383**, 179.
Leyes, E.P., 329,748, (*Chem. Zentr.*, 1930, II, 133).
Ostromysslenski, Kjelbasinski, *Chem. Zentr.*, 1916, I, 875.
I.G., E.P., 307,945, (*Chem. Zentr.*, 1929, II, 217).
I.G., E.P., 291,748, (*Chem. Zentr.*, 1930, I, 1049).
I.G., E.P., 315,595, *ibid.*, 2161.

Erythrene-1 : 4-dicarboxylic Acid.

See Muconic Acid.

Erythritol (*1 : 2 : 3 : 4-Tetrahydroxybutane*)

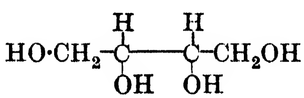


$C_4H_{10}O_4$ MW, 122

l-.
Needles from EtOH. M.p. 88°. $[\alpha]_D$ $-4.4°$ in H_2O, $+11°$ in 95% EtOH. Very sol. H_2O, boiling EtOH.
Di-benzylidene deriv.: m.p. 231°.
d-.
Needles from EtOH. M.p. 88·5–89°. $[\alpha]_D$ $+4.3°$ in H_2O, $-11.1°$ in 95% EtOH. Very sol. boiling EtOH.
Di-benzylidene deriv.: m.p. 231°.
dl-.
Cryst. from EtOH. M.p. 72°. Very sol. H_2O.
Anhydride: m.p. 40°. B.p. 59–60°/30 mm.
Tetra-acetyl: m.p. 53°.
Di-benzylidene deriv., m.p. 220°.

Pariselle, *Ann. chim. phys.*, 1911, **24**, 401.
Maquenne, Bertrand, *Compt. rend.*, 1901, **132**, 1566.
Bertrand, *Ann. chim. phys.*, 1904, **3**, 207.
Maquenne, *Ann. chim. phys.*, 1901, **24**, 406.
Ruff, *Ber.*, 1901, **34**, 1371.

***meso*-Erythritol** (1 : 2 : 3 : 4-*Tetrahydroxybutane*)



$C_4H_{10}O_4$ MW, 122

Occurs in *Protococcus vulgaris* and *Trentepohlia Jolithus*. Prisms. M.p. 121·5°. B.p. 329–31°, 294–6°/200 mm. Sol. H_2O, hot EtOH. Insol. Et_2O. Heat of comb. C_v 504·1 Cal. (501·7 Cal.); C_p 504·4 Cal. (502·6 Cal.) Hot conc. HCl ⟶ 1 : 4-dichloro-ψ-butylene glycol. Heat with P_2S_5 ⟶ thiophene. Me_2CO + HCl ⟶ di-isopropylidene-erythritol, m.p. 56°, b.p. 105–6°/29 mm. *Sorbose bacterium* ⟶ *d*-erythrulose.
1 : 4-*Di-Et ether*: $C_8H_{18}O_4$. MW, 178. M.p. 13·5°. B.p. 152°/35 mm., 144°/22 mm.
Tetranitrate: nitroerythritol. Plates from EtOH. M.p. 61°.
Tetra-acetyl: m.p. 89°.
Di-benzylidene deriv.: m.p. 201–2°.

de Luynes, *Ann. chim. phys.*, 1864, **2**, 399.
Ruff, *Ber.*, 1899, **32**, 3677.
Pariselle, *Ann. chim. phys.*, 1911, **24**, 399.
Prévost, *Compt. rend.*, 1926, **183**, 134.
Grinakowski, *Chem. Zentr.*, 1913, II, 2076.

Erythrol (3 : 4-*Dihydroxybutylene*-1)

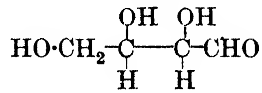
$CH_2{:}CH{\cdot}CH(OH){\cdot}CH_2OH$

$C_4H_8O_2$ MW, 88

B.p. 196·5°, 98°/16 mm., 91–2°/12 mm. D^{20} 1·04703. Ba permanganate ⟶ *dl*-erythritol.
Diacetyl: b.p. 202–3°.
Di-phenylurethane: m.p. 125–6°.

Prévost, *Compt. rend.*, 1926, **183**, 1292; 1928, **186**, 1209.
Pariselle, *Compt. rend.*, 1910, **150**, 1344.
Henninger, *Ann. chim. phys.*, 1886, **7**, 213.

Erythrose (1 : 2 : 3-*Trihydroxybutyraldehyde*)



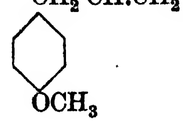
$C_4H_8O_4$ MW, 120

l-.
Liq. Very sol. H_2O, EtOH. Exhibits mutarotation. $[\alpha]_D$ $+21.5°$ (equilibrium value in H_2O). Reduces Fehling's in the cold. Ox. ⟶ *l*-erythronic acid ⟶ mesotartaric acid. NaHg ⟶ meso-erythritol. Hot HCl ⟶ lactic acid. Phloroglucinol ⟶ red. col.
Triacetyl: cryst. from EtOH. M.p. 134°.
Osazone: needles from C_6H_6. M.p. 163–4°.
Benzylphenylhydrazone: needles. M.p. 105·5°.
Diacetamide: m.p. 210° decomp. Sol. H_2O. Insol. EtOH, Et_2O.
d-.
Liq. $[\alpha]_D$ $-14.5°$ (equilibrium value in H_2O).
Osazone: needles from H_2O. M.p. 164°.
Phenylhydrazone: m.p. 116°.
Benzylphenylhydrazone: needles from C_6H_6–pet. ether. M.p. 105°.
dl-.
Osazone: m.p. 166–8°. Very sol. EtOH, Me_2CO, AcOH. Sol. Et_2O, hot C_6H_6. Pract. insol. H_2O.

Ruff, *Ber.*, 1901, **34**, 1365; 1899, **32**, 3672.
Wohl, *Ber.*, 1899, **32**, 3666.
Deulofeu, *J. Chem. Soc.*, 1930, 2603.

Erythroxyanthraquinone.
See 1-Hydroxyanthraquinone.

Esdragol (*Estragol, chavicol methyl ether, methylchavicol,* p-*allylanisole,* 4-*methoxy*-1-*allylbenzene*)



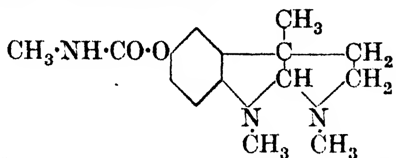
$C_{10}H_{12}O$ MW, 148

Constituent of many essential oils. B.p. 215–16°, 96°/12 mm. D^{15} 0·9755. n_D^{17} 1·5230.

$KMnO_4$ in AcOH ⟶ *p*-methoxyphenylacetic acid. Alc. KOH ⟶ anethole.

Klages, *Ber.*, 1899, **32**, 1439.
Tiffeneau, *Compt. rend.*, 1904, **139**, 482.
Eykman, *Ber.*, 1889, **22**, 2743.
Verley, D.R.P., 154,654, (*Chem. Zentr.*, 1904, II, 1354).

Eserine (*Physostigmine*)



$C_{15}H_{21}O_2N_3$ MW, 275

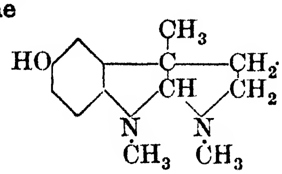
Occurs in calabar bean, *physostigma venenosum*. Two cryst. forms, m.ps. 86–7° and 105–6°. Sol. EtOH, Et_2O, $CHCl_3$. $[\alpha]_D$ −75·8°. Hot alkali in vacuo ⟶ eseroline.

N-Benzoyl: prisms. M.p. 115–16°.
B,2HBr: m.p. 224–6°.
B,2HAuCl₄: yellow leaflets. M.p. 163–5°.
B,H₂PtCl₆: orange-yellow needles. M.p. 180°.
Picrate: needles. M.p. 114°.

Polonovski, Polonovski, *Bull. soc. chim.*, 1925, **37**, 744.
Stedman, *J. Chem. Soc.*, 1921, **119**, 891.
Barger, Stedman, *J. Chem. Soc.*, 1923, **123**, 758.
King, Liguori, Robinson, *J. Chem. Soc.*, 1933, 1475.

Eserine oxide.
See Geneserine.

Eseroline



$C_{13}H_{18}ON_2$ MW, 218

Needles from C_6H_6. M.p. 129°. $[\alpha]_D$ −107°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. pet. ether. Methyl isocyanate ⟶ eserine. Ox. in air ⟶ rubreserine.

Benzoyl: leaflets from AcOEt. M.p. 155–6°.
B,HCl,1H₂O: needles from AcOEt–EtOH. M.p. 212°.
Picrate: m.p. 195°.

Salway, *J. Chem. Soc.*, 1912, **101**, 980.
Barger, Stedman, *J. Chem. Soc.*, 1925, **127**, 247.
Petit, Polonovski, *Bull. soc. chim.*, 1893, **9**, 108.
Straus, *Ann.*, 1913, **401**, 350.

Estragol.
See Esdragol.

Ethane

$CH_3 \cdot CH_3$

C_2H_6 MW, 30

Gas. B.p. −88·63°, −107·9°/385 mm. D^0 0·5719. Sol. EtOH, liq. oxygen. Spar. sol. H_2O. Vap. press. of liq. 14·1 mm. at −140°, 393·8 mm. at −100°, 1499 mm. at −75°. Heat of comb. C_p 370·4 Cal. Crit. temp. 32·1°. Crit. press. 48·8 atm. Decomp. at high temps. Ox. ⟶ C_2H_5OH ⟶ $CH_3 \cdot COOH$. Cl ⟶ chloroethane and dichloroethane.

Mermejo, Blas, *Anales Soc. españ. fís. quím.*, 1929, **28**, 228.
Frankland, *J. Chem. Soc.*, 1885, **47**, 236.
Sabatier, Senderens, *Compt. rend.*, 1897, **124**, 1360.

Ethane-dicarboxylic Acid.
See Methylmalonic Acid *and* Succinic Acid.

Ethane-1 : 2-disulphonic Acid

$HO_3S \cdot CH_2 \cdot CH_2 \cdot SO_3H$

$C_2H_6O_6S_2$ MW, 190

Needles from AcOH–Ac_2O. M.p. 104°. Sol. EtOH. Na salt forms series of hydrates.

Di-Et ester: $C_6H_{14}O_6S_2$. MW, 246. Prisms from EtOH or Et_2O. M.p. 77·5°. Very sol. $CHCl_3$, C_6H_6. Spar. sol. EtOH, Et_2O.
Dichloride: $C_2H_4O_4Cl_2S_2$. MW, 227. Needles from Et_2O. M.p. 95°. Decomp. by H_2O.

Kohler, *Am. Chem. J.*, 1897, **19**, 732.

Ethanesulphonic Acid (*Ethylsulphonic acid, sulphoethane*)

$CH_3 \cdot CH_2 \cdot SO_3H$

$C_2H_6O_3S$ MW, 110

Very stable, forming hydrated salts with common metals.

Me ester: $C_3H_8O_3S$. MW, 124. B.p. 197·5–200·5°.
Et ester: $C_4H_{10}O_3S$. MW, 138. B.p. 213–14°, 104°/14 mm. D_4^{25} 1·1461. n_D^{22} 1·42684.
Amide: $C_2H_7O_2NS$. MW, 109. Prisms from Et_2O. M.p. 60°.
Chloride: $C_2H_5O_2ClS$. MW, 128·5. B.p. 171°. $D^{22 \cdot 5}$ 1·357.

Böeseken, van Ockenburg, *Rec. trav. chim.*, 1914, **33**, 322.
Autenrieth, *Ann.*, 1890, **259**, 363.

Ethane-tetracarboxylic Acid

$(HOOC)_2 > CH \cdot CH < (COOH)_2$

$C_6H_6O_8$ MW, 206

Needles or plates from Et_2O. M.p. 167–9° decomp. Sol. H_2O, EtOH, Et_2O. Spar. sol. AcOH, C_6H_6. Heat ⟶ succinic acid + CO_2.
sym.-*Di-Me ester*: $C_8H_{10}O_8$. MW, 234. M.p. 158–60°.
Tetra-Me ester: $C_{10}H_{14}O_8$. MW, 262. Cryst. from Et_2O. M.p. 138°. Spar. sol. Et_2O. Insol. pet. ether.
sym.-*Di-Et ester*: $C_{10}H_{14}O_8$. MW, 262. Leaflets + $\frac{1}{2}H_2O$. M.p. 132–3° decomp. Sol. EtOH, Et_2O. Spar. sol. $CHCl_3$, CS_2.
Tetra-Et ester: $C_{14}H_{22}O_8$. MW, 318. Prisms. M.p. 76°.

Buchner, *Ber.*, 1892, **25**, 1157.
Mignonac, Rambeck, *Compt. rend.*, 1929, **188**, 1298.

Ethanol.
See Ethyl Alcohol.

Ethanolamine.
See 2-Aminoethyl Alcohol.

Ether.
See Diethyl Ether.

Etheserolene

$C_{14}H_{19}O_2N_2$ MW, 247

Prisms. M.p. 48°. Easily sol. org. solvents. Spar. sol. H_2O. Volatile in steam. $[\alpha]_D -98°$ in EtOH.
Nitroso deriv.: m.p. about 97°.
Picrate: m.p. 98°.
Methiodide: m.p. 179°. $[\alpha]_D$ −40° in H_2O.

Polonovski, Polonovski, *Bull. soc. chim.*, 1923, **33**, 973.
Stedman, Barger, *J. Chem. Soc.*, 1925, **127**, 252.

Ethine.
See Acetylene.

Ethionic Acid (*Sulphuric ester of isethionic acid*)

$HO_3S{\cdot}O{\cdot}CH_2{\cdot}CH_2{\cdot}SO_3H$

$C_2H_6O_7S_2$ MW, 206

Not known in free state. Concentration of aq. sol. ⟶ isethionic and sulphuric acids. The salts $Na_2C_2H_4O_7S_2,1H_2O$, $K_2C_2H_4O_7S_2,\frac{1}{2}H_2O$, cryst. from H_2O. $BaC_2H_4O_7S_2,1H_2O$ is pptd. from H_2O by a little EtOH.
Anhydride: *see* Carbyl sulphate.

Magnus, *Ann.*, 1839, **32**, 249.
Claeson, *J. prakt. chem.*, 1879, **19**, 253.
I.G., E.P., 378,895, (*Chem. Zentr.*, 1932, **II**, 3960).

Ethocaine.
See Novocaine.

***p*-Ethoxyacetanilide.**
See under *p*-Phenetidine.

Ethoxyacetic Acid (*Glycollic acid ethyl ether*)

$CH_3{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}COOH$

$C_4H_8O_3$ MW, 104

Liq. B.p. 156–7°/16 mm. $k = 2{\cdot}50 \times 10^{-4}$ at 25°. D_4^{20} 1·1021. n_a^{20} 1·417.
Me ester: $C_5H_{10}O_3$. MW, 118. B.p. 147–8°/734 mm.
Et ester: $C_6H_{12}O_2$. MW, 132. B.p. 152°/760 mm.
Phenyl ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 139°/18 mm.
Benzyl ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 155°/21 mm.
p-*Bromophenacyl ester*: $C_{12}H_{13}O_4Br$. MW, 301. M.p. 104·8°.
Chloride: $C_4H_7O_2Cl$. MW, 122·5. B.p. 123–4°.
Anhydride: $C_8H_{14}O_5$. MW, 190. B.p. 142–3°/125 mm.
Amide: $C_4H_9O_2N$. MW, 103. M.p. 80–2°.
Nitrile: C_4H_7ON. MW, 85. B.p. 136–7°/753 mm.

Rothstein, *Bull. soc. chim.*, 1932, **51**, 838.
Sommelet, *Compt. rend.*, 1906, **143**, 827; *Ann. chim. phys.*, 1906, **9**, 484.

Ethoxyacetone (*Ethyl acetonyl ether, ethylacetol*)

$CH_3{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_5H_{10}O_2$ MW, 102

Liq. B.p. 128°/760 mm. $D_4^{21{\cdot}7}$ 0·9204. Misc. with H_2O, EtOH, Et_2O, in all proportions. Reduces $NH_3.AgNO_3$ and Fehling's.
Oxime: b.p. 188°. Sol. H_2O.
Semicarbazone: m.p. 96°.
Phenylhydrazone: b.p. 165°/16 mm.

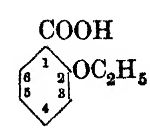
Fittig, Erlenbach, *Ann.*, 1892, **269**, 22.
See also last reference above.

Ethoxyallylene.
See Ethyl propargyl Ether.

Ethoxyaniline.
See Phenetidine.

Ethoxybenzaldehyde.
See under Hydroxybenzaldehyde *and* Salicylaldehyde.

***o*-Ethoxybenzoic Acid** (*Salicylic acid ethyl ether*)



$C_9H_{10}O_3$ MW, 166

M.p. 19·3–19·5°. Spar. sol. H_2O. Slightly volatile in steam.

Me ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 245°/760 mm.

Et ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 180–85°/113 mm.

Menthyl ester: m.p. 52–3°.

Kraut, *Ann.*, 1869, **150**, 2.
Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1742.

***m*-Ethoxybenzoic Acid** (*Ethyl ether of* m-*hydroxybenzoic acid*).

Needles from H_2O. M.p. 137°. Sol. H_2O, EtOH, Et_2O, C_6H_6. Sublimes in needles.

Et ester: b.p. 172–3°/50 mm.

Menthyl ester: b.p. 230°/18 mm.

Chloride: $C_9H_9O_2Cl$. MW, 184·5. M.p. 27–8°. B.p. 135–40°/16 mm.

Amide: $C_9H_{11}O_2N$. MW, 165. M.p. 139–139·5°.

Fritsch, *Ann.*, 1903, **329**, 71.
See also second reference above.

***p*-Ethoxybenzoic Acid** (*Ethyl ether of* p-*hydroxybenzoic acid*).

Needles. M.p. 195–6°. Slightly sol. hot H_2O.

Et ester: b.p. 148–9°/14 mm.

Menthyl ester: m.p. 76–7°. B.p. 230–5°/16 mm.

Chloride: b.p. 160°/20 mm.

Hydrazide: m.p. 124°. *Hydrochloride*: m.p. 216°.

Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1742.

2-*p*-Ethoxybenzoylbenzoic Acid.
See under 4′-Hydroxybenzophenone-2-carboxylic Acid.

α-Ethoxydi-1-naphthylmethane.
See under 1 : 1′-Dinaphthylcarbinol.

Ethoxydithioformic Acid.
See Xanthogenic Acid.

Ethoxyethylamine.
See 2-Aminodiethyl Ether.

Ethoxyethylbenzene.
See under Ethylphenol.

Ethoxyethylene.
See Ethyl vinyl Ether.

Ethoxyformanilide.
See under Phenetidine.

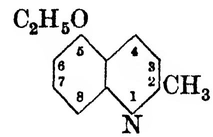
3-Ethoxy-*n*-heptane.
See under Ethyl-*n*-butylcarbinol.

***p*-Ethoxyphenylurea.**
See Dulcin.

Ethoxypropylene oxide.
See under Glycide.

Ethoxypropionic Acid.
See under Hydracrylic Acid *and* Lactic Acid.

5-Ethoxyquinaldine (2-*Methyl*-5-*ethoxyquinoline*)



$C_{12}H_{13}ON$ MW, 187

Pale yellow viscous oil. B.p. 290–2°/760 mm., 174°/11 mm.

Ethiodide: orange-yellow needles. M.p. 166°.

Picrate: pale yellow needles. M.p. 206–7°.

Braunholtz, *J. Chem. Soc.*, 1922, **121**, 169.

6-Ethoxyquinaldine (2-*Methyl*-6-*ethoxyquinoline*).

Plates from petrol, m.p. 71°. Plates + $1H_2O$ from EtOH.Aq., m.p. 58–9°.

B,HCl: colourless needles. M.p. 184–6°.

Ethiodide: yellow needles from EtOH. M.p. 182°.

Picrate: pale yellow needles. M.p. 192°.

See previous reference.

7-Ethoxyquinaldine (2-*Methyl*-7-*ethoxyquinoline*).

Pale yellow viscous oil. B.p. 307–8°/770 mm.

Ethiodide: yellow prisms. M.p. 216–18° decomp.

Picrate: pale yellow needles. M.p. 213°.

See previous reference.

5-Ethoxysalicylic Acid.
See under Gentisic Acid.

β-Ethoxystyrene.
See Ethyl styryl Ether.

Ethyl

C_2H_5 MW, 29

Obtained by thermal decomp. of lead tetraethyl. Reacts with Sb, Zn, Cd, Pb ⟶ a complex mixture of metallic alkyls. With Hg ⟶ mercury diethyl. With Na ⟶ sodium ethyl. With CI_4 ⟶ ethyl iodide.

Simons, Dull, *J. Am. Chem. Soc.*, 1933, **55**, 2696.

***N*-Ethylacetamide** (*Acetylethylamine, acetethylamide*)

$CH_3{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CH_3$

C_4H_9ON MW, 87

Oily liq. B.p. 205°. $D^{4.5}$ 0·942. Sol. H_2O, EtOH. HCl ⟶ C_4H_9ON,HCl, white needles, m.p. 60°.

Wallach, *Ann.*, 1873, **184**, 108.
Titherley, *J. Chem. Soc.*, 1901, **79**, 401.

Ethylacetanilide.
See under Amino-ethylbenzene, *and* Ethylaniline.

Ethyl acetate (*Acetic ester*)

$$CH_3{\cdot}CO{\cdot}OCH_2{\cdot}CH_3$$

$C_4H_8O_2$ MW, 88

F.p. −83·6°. B.p. 77·1°. D_4^0 0·9245, D_4^{20} 0·9003 (0·8990). Sol. 13 parts H_2O at 15°. Misc. with most org. solvents. n_D^{25} 1·37005. Mol. b.p. elevation 27·9°. NH_3 ⟶ acetamide.

Pabst, *Bull. soc. chim.*, 1880, **33**, 350.
Wade, *J. Chem. Soc.*, 1905, **87**, 1656.

Ethylacetoacetate (*Acetoacetic ester*)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CO{\cdot}OC_2H_5$$
$$\downarrow\uparrow$$
$$CH_3{\cdot}C{\cdot}(OH){:}CH{\cdot}CO{\cdot}OC_2H_5$$

$C_6H_{10}O_3$ MW, 130

B.p. 181°, 100°/80 mm., 88°/29 mm., 74°/14 mm. D^{20} 1·0282. n_D^{16} 1·42092 (1·41976). Spar. sol. H_2O. Misc. with most org. solvents. Sol. dil. alkalis, pptd. by CO_2. Forms Na deriv. and bisulphite comp. Gives violet col. with $FeCl_3$. NaHg ⟶ 2-hydroxybutyric ester. Conc. alkali ⟶ acetic acid + C_2H_5OH. Dil. acid ⟶ acetone + C_2H_5OH + CO_2.

Semicarbazone: needles from Et_2O. M.p. 129° decomp. Sol. hot H_2O. Boiling H_2O ⟶ 3-methyl-5-pyrazolone.

Phenylhydrazone: needles. M.p. 50°. Oxidised by air. Sol. EtOH. Alc. KOH or dil. HCl ⟶ 3-methyl-1-phenyl-5-pyrazolone.

Acetyl: *see* 2-Acetoxycrotonic Ester.

Anil: *see under* 2-Anilinocrotonic Acid.

Inglis, Roberts, *Organic Syntheses*, 1926, VI, 36.
Snell, McElvain, *J. Am. Chem. Soc.*, 1931, **53**, 2310.

1-Ethylacetoacetic Acid.
See 1-Acetobutyric Acid.

1-Ethyl-3-acetobutyric Acid

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH(C_2H_5){\cdot}COOH$$

$C_8H_{14}O_3$ MW, 158

B.p. 158°/9 mm.

Semicarbazone: cryst. from EtOH–Et_2O. M.p. 125°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 769.

Ethylacetomalonic Acid

$$\begin{matrix}CH_3{\cdot}CH_2 \\ CH_3{\cdot}CO\end{matrix}\!>\!C\!<\!\begin{matrix}COOH \\ COOH\end{matrix}$$

$C_7H_{10}O_5$ MW, 174

Di-Et ester: $C_{11}H_{18}O_5$. MW, 230. B.p. 130–1°/16 mm. $D_4^{19\cdot25}$ 1·0542. Very sol. Et_2O, EtOH.

Et ester-nitrile: $C_9H_{13}O_3N$. MW, 183. Liq. with unpleasant odour. B.p. 130°/35 mm. D^{20} 0·976. Sol. EtOH, Et_2O. Insol. H_2O, alkalis.

Auwers, Auffenberg, *Ber.*, 1917, **50**, 942.

Ethyl acetonyl Ether.
See Ethoxyacetone.

***sym*.-Ethylacetonylethylene.**
See 3-Heptenone-6.

Ethylacetylene.
See 1-Butine.

1-Ethylacrylic Acid (1-*Methylenebutyric acid*, 1-*butylene-2-carboxylic acid*)

$$CH_2{:}C(C_2H_5){\cdot}COOH$$

$C_5H_8O_2$ MW, 100

Oil with rancid odour. M.p. −16°. B.p. 83°/15 mm., 180°/760 mm.

Et ester: $C_7H_{12}O_2$. MW, 128. B.p. 137°.

Chloride: C_5H_7OCl. MW, 118·5. B.p. 38·5°/30 mm.

Amide: C_5H_9ON. MW, 99. Cryst. from C_6H_6. M.p. 83·5°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 761.
Mannich, Ganz, *Ber.*, 1922, **55B**, 3493.

2-Ethylacrylic Acid (1-*Butylene*-1-*carboxylic acid*, *propylideneacetic acid*, *α-pentenoic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}COOH$$

$C_5H_8O_2$ MW, 100

Exists in *cis* and *trans* forms, of which the *trans* is more stable. The nitriles in presence of NaOH or PhONa undergo mutual isomerisation.

Trans:

M.p. 10°. B.p. 108°/17 mm., 99°/10 mm., 71°/2 mm. Mod. sol. H_2O. D^{15} 0·992. $k = 1{\cdot}48 \times 10^{-5}$ at 25°.

Et ester: $C_7H_{12}O_2$. MW, 128. B.p. 157·6°/745 mm., 48°/11 mm. *Dibromide*, b.p. 117·5°/14 mm.

Chloride: C_5H_7OCl. MW, 118·5. B.p. 37°/11 mm.

Amide: C_5H_9ON. MW, 99. Plates. M.p. 148°.

Nitrile: C_5H_7N. MW, 81. B.p. 143–4°/760 mm., 73–4°/72 mm. n_a^{20} 1·4266. D_4^{20} 0·8266.

Cis:
B.p. 201–2°/760 mm., 101·5–102·5°/15 mm.
Nitrile: b.p. 127–8°/760 mm., 59–59·6°/72 mm. n_α^{20} 1·4211. D_4^{20} 0·8208.

Auwers, *Ann.*, 1923, **432**, 63.
Bruylants, Jmoudsky, *Bulletin de la classe des sciences académie royale de Belgique*, 1931, **17**, 1161.
Bourguel, Yvon, *Compt. rend.*, 1926, **182**, 224.

1-Ethyladipic Acid (*Hexane-1:4-dicarboxylic acid*)

$$\begin{array}{l} CH_3{\cdot}CH_2{\cdot}CH{\cdot}COOH \\ \qquad\qquad [CH_2]_2 \\ \qquad\qquad CH_2{\cdot}COOH \end{array}$$

$C_8H_{14}O_4$ MW, 174

M.p. 49° (48–50°). B.p. 225–6°/20 mm. $k = 4{\cdot}15 \times 10^{-5}$ at 24·2°. $CrO_3 \longrightarrow$ succinic acid.

Lean, Lees, *J. Chem. Soc.*, 1897, **71**, 1067.
Best, Thorpe, *J. Chem. Soc.*, 1909, **95**, 713.

Ethylal.
See under Formaldehyde.

Ethyl Alcohol (*Ethanol, hydroxyethane*)

$$CH_3{\cdot}CH_2OH$$

C_2H_6O MW, 46

F.p. −117·3° (−112·3°). B.p. 78·5°, 54·8°/275 mm., 39·8°/130 mm., 30°/79 mm., 22·1°/49·5 mm., 14·35°/31·1 mm., 8·1°/21 mm., 4°/16 mm. D_4^0 0·80645, D_4^{10} 0·7978, D_4^{18} 0·7907, D_4^{20} 0·7893, D_4^{25} 0·78513, D_4^{50} 0·76300, D_4^{70} 0·74620. n_D^{15} 1·36330, $n_D^{20.5}$ 1·36104, n_D^{25} 1·35954. Heat of comb. C_p 325·7 (328) Cal. Sp. heat 0·612 (16–40·5°). Crit. temp. 243°. Crit. press. 62·7 atm. Crit. vol. 0·0071. Mol. b.p. elevation 11·7°. Hygroscopic. Misc. with H_2O and most org. solvents. Dissolves $CaCl_2$, I, Br, P and S. Contraction in vol. and evolution of heat on mixing with H_2O. Na $\longrightarrow$ sodium ethoxide + H_2. Cl $\longrightarrow$ chloral alcoholate. $H_2SO_4 \longrightarrow$ ethyl hydrogen sulphate, diethyl ether, and ethylene. $PCl_5 \longrightarrow$ ethyl chloride. I + KOH $\longrightarrow$ iodoform. Ox. $\longrightarrow$ acetaldehyde $\longrightarrow$ acetic acid. Obtained anhydrous by azeotropic distillation with C_6H_6, or dehydrated with K_2CO_3, CaO, $CaSO_4$, etc.

Ethyl allocinnamate.
See under Ethyl cinnamate.

Ethylallocinnamic Acid.
See under Ethylcinnamic Acid.

Ethylallylamine

$$CH_2{:}CH{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH_3$$

$C_5H_{11}N$ MW, 85

Liq. with strong ammoniacal odour. B.p. 84°. Misc. with H_2O in all proportions.
B,H₂PtCl₆: yellow needles. M.p. 154°.

Rinne, *Ann.*, 1873, **168**, 262.
Liebermann, Paal, *Ber.*, 1883, **16**, 531.

Ethylallylcarbinol.
See 1-Hexenol-4.

Ethyl allyl Ether

$$CH_2{:}CH{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_3$$

$C_5H_{10}O$ MW, 86

B.p. 66–7°/743 mm. D_4^{20} 0·7651. n_α^{20} 1·3856.

Brühl, *Ann.*, 1880, **200**, 178.

Ethyl allyl Ketone.
See 1-Hexenone-4.

Ethylamine

$$CH_3{\cdot}CH_2NH_2$$

C_2H_7N MW, 45

B.p. 16·6°. D_4^0 0·7057. $k = 5{\cdot}2 \times 10^{-4}$ at 25°. Inflammable. Misc. with H_2O: salted out by NaOH. NaOCl $\longrightarrow$ *N*-chloro deriv. Cl in dil. aq. sol. $\longrightarrow$ *N*-dichloro deriv. Dissolves K and Cs with formation of their ethylamides.
B_2,1H₂O: m.p. −71·2°.
B,5½H₂O: m.p. −7·48°.
B,HCl: plates from EtOH. M.p. 108°.
B,HBr: needles or plates from EtOH. M.p. 159·5°.
B,HI: needles from H_2O. M.p. 188·5°. Spar. sol. EtOH.
B,HAuCl₄: m.p. 194–6°.
Picrate: yellow prisms from MeOH. M.p. 165°.
N-*Acetyl*: *see N*-Ethylacetamide.
N-*Benzoyl*: *see N*-Ethylbenzamide.
N-*Benzenesulphonyl*: m.p. 58°.
N-p-*Toluenesulphonyl*: m.p. 63°.

Hofmann, *Ber.*, 1882, **15**, 753.
Tafel, *Ber.*, 1886, **19**, 1926.
Werner, *J. Chem. Soc.*, 1918, **113**, 899.

Ethylamine-sulphonic Acid.
See Taurine.

Ethylaminoacetic Acid.
See Ethylglycine.

Ethyl 1-aminoacetoacetate (1-*Aminoacetoacetic ester*)

$$CH_3{\cdot}CO{\cdot}CH(NH_2){\cdot}CO{\cdot}OC_2H_5$$

$C_6H_{11}O_3N$ MW, 145

Not known in free state.
B,HCl: white needles from EtOH–Et_2O. M.p. 95° decomp. Hygroscopic. Very sol. H_2O, EtOH. Insol. Et_2O. Reduces Fehling's. Alkalis $\longrightarrow$ dimethylpyrazine-dicarboxylic ester.

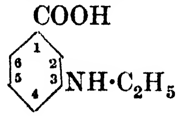
Picrate: m.p. 129° decomp.

Gabriel, Posner, *Ber.*, 1894, **27**, 1141.

N-Ethyl-o-aminobenzoic Acid.

See Ethylanthranilic Acid.

N-Ethyl-m-aminobenzoic Acid



$C_9H_{11}O_2N$ MW, 165

Needles. M.p. 112°. Very sol. EtOH, Et_2O. Spar. sol. cold H_2O.

Griess, *Ber.*, 1872, **5**, 1038.

N-Ethyl-p-aminobenzoic Acid.

Cryst. from C_6H_6. M.p. 177–8°. Sol. most org. solvents.

N-*Acetyl*: needles from H_2O. M.p. 180°.

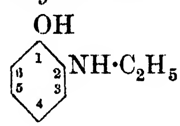
N-*Chloroacetyl*: plates from H_2O. M.p. 163–4°.

Houben, Freund, *Ber.*, 1909, **42**, 4822.

Ethyl o-aminobenzyl Ether.

See under *o*-Aminobenzyl Alcohol.

o-Ethylaminophenol (o-*Hydroxy-ethylaniline*, 1-*hydroxy-2-ethylaminobenzene*)



$C_8H_{11}ON$ MW, 137

Plates from C_6H_6. M.p. 107·5°. Very sol. EtOH. Sol. hot C_6H_6. Spar. sol. $CHCl_3$, Et_2O.

B,HCl: needles. M.p. 220°. Sol. H_2O, EtOH.

Me ether: *N*-ethyl-*o*-anisidine. $C_9H_{13}ON$. MW, 151. Colourless oil. B.p. 228–9°/728 mm., 117°/31 mm. *Hydrochloride*: plates. M.p. 193°.

Et ether: *N*-ethyl-*o*-phenetidine. $C_{10}H_{15}ON$. MW, 165. B.p. 234–6°/751 mm. D^{18} 1·021. Misc. in all proportions with Et_2O, C_6H_6, CS_2. Volatile in steam.

Foerster, *J. prakt. Chem.*, 1866, **21**, 346.

Diepolder, *Ber.*, 1898, **31**, 495.

m-Ethylaminophenol (m-*Hydroxy-ethylaniline*, 1-*hydroxy-3-ethylaminobenzene*).

Feathery cryst. from C_6H_6–pet. ether. M.p. 62°. B.p. 176°/12 mm. Very sol. $CHCl_3$. Sol. hot H_2O, EtOH, Et_2O, C_6H_6. Spar. sol. pet. ether.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, **63**, 423.

Badische, D.R.Ps., 76,419, 48,151.

p-Ethylaminophenol (p-*Hydroxy-ethylaniline*, 1-*hydroxy-4-ethylaminobenzene*).

Needles from H_2O. M.p. 103–4°.

Acetate: $C_{10}H_{13}O_2N$. MW, 179. M.p. 187°.

Galatis, *Ber.*, 1927, **60**, 1402.

Ethyl aminophenyl Ketone.

See Aminopropiophenone.

Ethyl-n-amylcarbinol (*Octanol*-3, 3-*hydroxyoctane*)

$CH_3·[CH_2]_4·CH(OH)·CH_2·CH_3$

$C_8H_{18}O$ MW, 130

d-.

Present in Japanese peppermint oil. B.p. 178·5–179·5°, 76°/16 mm. D_4^{30} 0·8247. n_D^{20} 1·4252. $[\alpha]_D$ +11·13° in EtOH.

Acid phthalate: plates from pet. ether. M.p. 66–8°. $[\alpha]_D$ +21·67° in EtOH.

l-.

B.p. 82°/24 mm. $[\alpha]_D^{27}$ −7·40° in EtOH.

1-*Naphthylurethane*: cryst. from EtOH.Aq. M.p. 79–80°. $[\alpha]_D^{30}$ −2·48° in EtOH.

dl-.

B.p. 176–177·5°. D_{15}^{15} 0·8286. n_D^{20} 1·42785.

Acid phthalate: plates from pet. ether. M.p. 62–3°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1944.

Levene, Walti, *J. Biol. Chem.*, 1931, **94**, 593.

Ethyl n-amyl Ether

$CH_3·[CH_2]_4·O·CH_2·CH_3$

$C_7H_{16}O$ MW, 116

B.p. 119–20°. Very spar. sol. H_2O. HI ⟶ *n*-amyl iodide + ethyl iodide.

Blaise, Picard, *Ann. chim. phys.*, 1912, **25**, 259.

Ethyl active-amyl Ether

$$CH_3·CH_2·\overset{CH_3}{CH}·CH_2·O·CH_2·CH_3$$

$C_7H_{16}O$ MW, 116

B.p. 107·5–109°/735·7 mm. D_4^{18} 0·759. $n_D^{19·9}$ 1·3900. $[\alpha]_D^{18}$ +0·61°.

Guye, Chavanne, *Bull. soc. chim.*, 1896, **15**, 302.

Ethyl tert.-amyl Ether

$$CH_3·CH_2·\underset{CH_3}{\overset{CH_3}{C}}·O·CH_2·CH_3$$

$C_7H_{16}O$ MW, 116

B.p. 102°. D^{18} 0·751.

Kondakoff, *J. Chem. Soc. Abstracts*, 1888, **54**, 802.

Ethyl *n*-amyl Ketone (3-*Keto-octane, octanone*-3)

$CH_3{\cdot}[CH_2]_4{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_8H_{16}O$ MW, 128

B.p. 165–6° (170°). D^{15} 0·8255. n_D^{22} 1·41556.

Semicarbazone: cryst. from EtOH.Aq. M.p. 112° (slow heat.), (117–117·5°).

Schimmel, *Chem. Zentr.*, 1912, I, 1717.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1936, 1944.

Ethyl *active*-amyl Ketone (5-*Keto*-3-*methylheptane, 3-methylheptanone*-5)

$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_8H_{16}O$ MW, 128

Colourless liq. with odour of mint. B.p. 161°. Prac. insol. H_2O. Does not form bisulphite comp.

Semicarbazone: m.p. 96°.

Guerbet, *Compt. rend.*, 1910, **150**, 184; *Bull. soc. chim.*, 1910, **7**, 211.

Ethyl *tert.*-amyl Ketone (4-*Keto*-3 : 3-*dimethylhexane*, 3 : 3-*dimethylhexanone*-4)

$CH_3{\cdot}CH_2{\cdot}C(CH_3)_2{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_8H_{16}O$ MW, 128

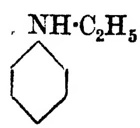
B.p. 150·5–152°. D^{20} 0·8285. More sol. in cold than in hot H_2O. NaOBr or $CrO_3 \longrightarrow CH_3{\cdot}CH_2{\cdot}C(CH_3)_2{\cdot}COOH$.

Semicarbazone: needles from ligroin. M.p. 98°.

Meerwein, *Ann.*, 1913, **396**, 252.

Parry, *J. Chem. Soc.*, 1915, **107**, 110.

Ethylaniline



$C_8H_{11}N$ MW, 121

B.p. 204·72°/760 mm., 187·5°/500 mm., 163·8°/250 mm., 136·8°/100 mm., 119·1°/50 mm., 102·5°/25 mm., 97·5–98°/18 mm., 83·8°/10 mm. Solidifies below −80°. Sol. most org. solvents. D_4^{20} 0·9625, D_4^{4} 0·9727, D_{15}^{15} 0·9643, D_{25}^{25} 0·9583. n_D^{20} 1·55593. $k = 4{\cdot}17 \times 10^{-10}$ at 19°. Heat of comb. C_p 1126·88 Cal., C_v 1125·60 Cal. Passed through red hot tube ⟶ indole. H ⟶ ethylcyclohexylamine. Br in CH_3COOH ⟶ 4-bromo-, 2 : 4-dibromo-, and 2 : 4 : 6-tribromo-ethylaniline. H_2SO_4 ⟶ ethylaniline *m*- and *p*-sulphonic acids. HNO_2 ⟶ ethylphenylnitrosamine. HNO_3 ⟶ *m*- and *p*-nitroethylaniline. Does not give violet col. with bleaching powder solution.

B,HCl: needles. M.p. 172–5° (176°). Sol. H_2O.

B,HBr: plates from EtOH. M.p. 165–6°. Sol. H_2O.

Oxalate: m.p. 112–14°.

N-*Acetyl*: *N*-ethylacetanilide. $C_{10}H_{13}ON$. MW, 163. M.p. 55°.

N-*Benzoyl*: *N*-ethylbenzanilide. $C_{15}H_{15}ON$. MW, 225. M.p. 60°.

N-p-*Toluenesulphonyl*: m.p. 87°.

N-p-*Bromobenzenesulphonyl*: m.p. 91°.

N-m-*Nitrobenzenesulphonyl*: m.p. 100°.

$C_8H_{11}N$, $C_6H_3(NO_2)_3$-1 : 3 : 5: red needles. M.p. 55–6°.

Picrate: m.p. 132° (137·5–138°).

Ullmann's Enzyklopädie der techn. Chemie, Vol. I, 445.

Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, **46**, 741.

Finzi, *Ann. chim. applicata*, 1925, **15**, 41.

Guyot, Fournier, *Bull. soc. chim.*, 1930, **47**, 203.

I.G., E.P., 334,579, (*Chem. Abstracts*, 1931, **25**, 964).

For methods of separation from diethylaniline, etc., see also

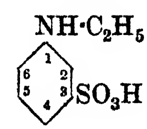
Piutti, *Ann.*, 1885, **227**, 182.

Blume, Klöffler, *Ber.*, 1905, **38**, 3276.

B.D.C., E.P., 270,930, (*Chem. Abstracts*, 1928, **22**, 1594).

I.G., E.P., 333,349, (*Chem. Abstracts*, 1931, **25**, 522).

Ethylaniline-*m*-sulphonic Acid (N-*Ethylmetanilic acid*)



$C_8H_{11}O_3NS$ MW, 201

Needles from H_2O. Decomp. at 294°. 100 parts H_2O diss. 2·15 parts at 15°. $k = 1{\cdot}58 \times 10^{-4}$. Alk. fusion ⟶ *m*-ethylaminophenol. Na salt + $2H_2O$, leaflets from EtOH.Aq. Ba salt readily sol. H_2O.

Badische, D.R.P., 48,151.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, **63**, 414.

Ethylaniline-*p*-sulphonic Acid (N-*Ethylsulphanilic acid*).

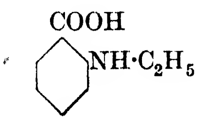
Plates from H_2O. Decomp. at 258°. 100 parts H_2O diss. 10·4 parts at 13°. $k = 1{\cdot}26 \times 10^{-4}$. Na salt + $3H_2O$, plates or prisms, readily sol. H_2O. Ag salt + $1H_2O$, plates, spar. sol. H_2O. Ba salt + $2H_2O$, plates.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, **63**, 416.
Bayer, D.R.P., 295,104, (*Chem. Zentr.*, 1916, II, 1097).

***N*-Ethylanisidine.**
See under Ethylaminophenol.

Ethylanisole.
See under Ethylphenol.

Ethylanthranilic Acid (N-*Ethyl*-o-*aminobenzoic acid*)



$C_9H_{11}O_2N$ MW, 165

Needles from EtOH.Aq. M.p. 153–4°. Blue fluor. in EtOH or Et_2O.

Me ester: $C_{10}H_{13}O_2N$. MW, 179. Oil with pleasant odour. B.p. 148–50°/45 mm.

Et ester: $C_{11}H_{15}O_2N$. MW, 193. Oil. B.p. 150–1°/16 mm., 142°/11 mm.

Amide: $C_9H_{12}ON_2$. MW, 164. Cryst. from hot H_2O. M.p. 128–9°.

Nitrile: *o*-cyanoethylaniline. $C_9H_{10}N_2$. MW, 146. Needles from ligroin. M.p. 32°.

Houben, Brassert, *Ber.*, 1906, **39**, 3237.
Karrer, Nägeli, Weidmann, *Helv. Chim. Acta*, 1919, **2**, 248.
Finzi, *Ann. chim. applicata*, 1925, **15**, 41.

Ethylarsenious oxide

$C_2H_5{\cdot}AsO$

C_2H_5OAs MW, 120

Oil. B.p. 158°/10 mm. Sol. Et_2O, Me_2CO, C_6H_6. Rapidly oxidised by air.

Steinkopf, Mieg, *Ber.*, 1920, **53**, 1014.

Ethylarsine

$H_2As{\cdot}C_2H_5$

C_2H_7As MW, 106

Liq. with disagreeable odour. B.p. 36°. D^{22} 1·217. Very spar. sol. H_2O. $C_2H_5I \longrightarrow$ tetraethylarsonium iodide. $CH_3I \longrightarrow$ ethyltrimethylarsonium iodide. $Br \longrightarrow$ ethyldibromoarsine. Poisonous.

Dehn, *Am. Chem. J.*, 1905, 33, 143.

Ethylarsine dibromide.
See Ethyldibromoarsine.

Ethylarsine dichloride.
See Ethyldichloroarsine.

Ethylarsinic Acid (*Ethylarsonic acid*)

$C_2H_5{\cdot}As{\cdot}O(OH)_2$

$C_2H_7O_3As$ MW, 154

Cryst. from EtOH. M.p. 99·5°. 100 parts H_2O diss. 70 parts at 27°, 112 parts at 40°. 100 parts 95% EtOH diss. 39·4 parts at 25°.

La Coste, *Ann.*, 1881, **208**, 34.
Auger, *Compt. rend.*, 1903, **137**, 927.
Dehn, *Am. Chem. J.*, 1905, **33**, 129.

1-Ethylbarbituric Acid (*Malonyl-ethylurea*)

```
C2H5·N—CO
     OC  CH2
     HN—CO
```

$C_6H_8O_3N_2$ MW, 156

Rectangular leaflets. M.p. 119–20°.

Biltz, Wittek, *Ber.*, 1921, **54**, 1038.

5-Ethylbarbituric Acid (*Ethylmalonyl-urea*)

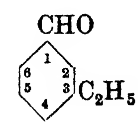
```
HN—CO
OC  CH·C2H5
HN—CO
```

$C_6H_8O_3N_2$ MW, 156

Prisms from H_2O or EtOH. M.p. 194° (190°). Sol. H_2O, EtOH.

Merck, D.R.P., 146,948, (*Chem. Zentr.*, 1904, I, 68); D.R.P., 165,693, (*Chem. Zentr.*, 1906, I, 515).
Fischer, Dilthey, *Ann.*, 1904, **335**, 357.

***m*-Ethylbenzaldehyde** (3-*Aldehydoethylbenzene*)



$C_9H_{10}O$ MW, 134

Oil. B.p. 212°/762 mm.

Mayer, English, *Ann.*, 1918, **417**, 88.

***p*-Ethylbenzaldehyde** (4-*Aldehydoethylbenzene*).

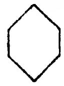
B.p. 221°, 109–10°/10 mm. Odour resembles cuminaldehyde.

Oxime: m.p. 29°.
Semicarbazone: m.p. 199°.
Hydrazone: m.p. 101°.

v. Braun, Engel, *Ann.*, 1924, **436**, 304.
Fournier, *Compt. rend.*, 1903, **136**, 557.

N-Ethylbenzamide (*Benzoylethylamine*)

$CO{\cdot}NH{\cdot}C_2H_5$



$C_9H_{11}ON$ MW, 149

Needles from H_2O or EtOH.Aq. M.p. 70–71°. B.p. 298–300°, 285°/745 mm. Spar. sol. hot H_2O.

B,HCl : viscous oil. Hyd. by H_2O.

Gattermann, *Ann.*, 1888, **244**, 50.
Blacher, *Ber.*, 1895, **28**, 2358.
Titherley, *J. Chem. Soc.*, 1901, **79**, 393, 403.
Reid, *Am. Chem. J.*, 1911, **45**, 43.

Ethylbenzanilide.

See under Aminoethylbenzene *and* Ethylaniline.

Ethylbenzene (*Phenylethane*)

$CH_2{\cdot}CH_3$

C_8H_{10} MW, 106

F.p. −93·9° (−94·4°). B.p. 136·15° (135·5°/760 mm.), 30°/10 mm. Solubility in H_2O, 0·0013 mols. per litre at 15°. D_4^0 0·88457, D_4^4 0·8809, D_4^{20} 0·86690, D_{15}^{15} 0·8720, D_{25}^{25} 0·8650 (0·8646). $n_D^{8·4}$ 1·50206, n_D^{14} 1·4990, n_D^{15} 1·49857, n_D^{20} 1·49594. Heat of comb. C_v 1089·8 Cal. CrO_3 or dil. $HNO_3 \longrightarrow$ benzoic acid and acetophenone. $CrO_2Cl_2 \longrightarrow$ phenylacetaldehyde, benzaldehyde, and acetophenone. $MnO_2 + H_2SO_4 \longrightarrow$ benzaldehyde and acetophenone. Cl (cold) $\longrightarrow$ α-chloroethylbenzene and αα-dichloroethylbenzene. Br (in the dark) $\longrightarrow$ 2- and 4-bromoethylbenzenes. Br (cold) $\longrightarrow$ α-bromoethylbenzene and αα-dibromoethylbenzene. HNO_3 (D 1·475) $\longrightarrow$ 2- and 4-nitroethylbenzenes, 2 : 4-dinitroethylbenzene, and 2 : 4 : 6-trinitroethylbenzene. HNO_3 (D 1·075 at 100°) $\longrightarrow$ α-nitroethylbenzene. $H_2SO_4 \longrightarrow$ ethylbenzene-*p*-sulphonic acid.

Picrate : light yellow cryst. M.p. 96·6°.

Béhal, Choay, *Bull. soc. chim.*, 1894, **11**, 207.
Radziewanowski, *Ber.*, 1894, **27**, 3235; 1895, **28**, 1139.
Cline, Reid, *J. Amer. Chem. Soc.*, 1927, **49**, 3153.
Z. Foldi, E.P., 319,273, (*Chem. Abstracts*, 1930, **24**, 2471).

Ethyl benzoate

$C_6H_5{\cdot}CO{\cdot}OC_2H_5$

$C_9H_{10}O_2$ MW, 150

F.p. −34°. B.p. 212·9° (211·7–211·9°)/760 mm., 142·2°/100 mm., 101·8°/20 mm., 87·2°/10 mm. D_4^4 1·0614, D_4^{15} 1·0509, $D_4^{17·3}$ 1·0496, D_4^{25} 1·0422, D_4^{50} 1·0191. $n_D^{17·3}$ 1·5068. $NH_3 \longrightarrow$ benzamide. HNO_3 (D 1·52 at 0°) $\longrightarrow$ ethyl *m*-nitrobenzoate. Na + EtOH $\longrightarrow$ hexahydrobenzoic acid. H(Ni) $\longrightarrow$ ethyl hexahydrobenzoate.

Fischer, Speier, *Ber.*, 1895, **28**, 3253.
Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 360.
Hofmann, Josephy, D.R.P., 292,543, (*Chem. Zentr.*, 1916, II, 113).
Finzi, *Ann. chim. applicata*, 1925, **15**, 41.

o-Ethylbenzoic Acid

COOH

C_2H_5

$C_9H_{10}O_2$ MW, 150

Needles from hot H_2O. M.p. 68°. B.p. 259°/760 mm. Sol. EtOH, Et_2O. Less sol. ligroin. Spar. sol. cold H_2O. Cl at 200° $\longrightarrow$ tetrachloromethylphthalide. $HNO_3 + H_2SO_4 \longrightarrow$ 4- and 5-nitro- *o*-ethylbenzoic acids. Electrolytic red. at Pb $\longrightarrow$ *o*-ethylbenzyl alcohol.

Et ester : $C_{11}H_{14}O_2$. MW, 178. B.p. 231°/763 mm.

Chloride : C_9H_9OCl. MW, 168·5. B.p. 219°/744·5 mm.

Amide : $C_9H_{11}ON$. MW, 149. Needles from hot H_2O. M.p. 151–3°.

Nitrile : *o*-cyanoethylbenzene. C_9H_9N. MW, 131. B.p. 212°.

Gabriel, Michael, *Ber.*, 1877, **10**, 2206.
Zincke, Frölich, *Ber.*, 1887, **20**, 2056, 2895.
Giebe, *Ber.*, 1896, **29**, 2534.

m-Ethylbenzoic Acid.

Needles from H_2O or dil. EtOH. M.p. 47°. Prac. insol. cold H_2O. Electrolytic red. at Pb $\longrightarrow$ *m*-ethylbenzyl alcohol.

Nitrile: *m*-cyanoethylbenzene. B.p. 116–17°/25°.

Voswinkel, *Ber.*, 1888, **21**, 2830.
Mayer, English, *Ann.*, 1918, **417**, 87.

p-Ethylbenzoic Acid.

Prisms from EtOH. Laminæ from H_2O. M.p. 110–11° (112–13°, 113·5°). Spar. sol. cold H_2O. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6.

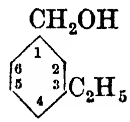
Et ester: b.p. 129–130°/15 mm.
Amide: laminæ from H_2O. M.p. 115–16°.

Fittig, Konig, *Ann.*, 1867, **144**, 290.
Aschenbrandt, *Ann.*, 1883, **216**, 218.
Kindler, *Ann.*, 1927, **452**, 102.

Ethylbenzoylacetic Acid.
See 1-Benzoylbutyric Acid.

Ethylbenzoylcarbinol.
See β-Hydroxybutyrophenone.

***m*-Ethylbenzyl Alcohol** (1-*Hydroxymethyl-3-ethylbenzene*)



$C_9H_{12}O$ MW, 136

Colourless oil with aromatic odour. B.p. 227°/758 mm.

Mayer, English, *Ann.*, 1918, **417**, 87.

***p*-Ethylbenzyl Alcohol** (1-*Hydroxymethyl-4-ethylbenzene*).
B.p. 115–17°/9 mm.

v. Braun, Engel, *Ann.*, 1924, **436**, 305.

Ethylbenzylamine

$C_6H_5{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH_3$

$C_9H_{13}N$ MW, 135

B.p. 199° (194°). Sol. EtOH, Et_2O. Spar. sol. H_2O. $D_{15}^{16.7}$ 0·9350. Heat of comb. C_v 1286·8 Cal., C_p 1288·6 Cal. $C_6H_5{\cdot}NCO \longrightarrow$ phenylethylbenzylurea, m.p. 81°.

Wallach, *Ann.*, 1905, **343**, 73.
Pinner, Franz, *Ber.*, 1905, **38**, 1548.
Mailhe, *Bull. soc. chim.*, 1919, **25**, 322.

Ethylbenzylaniline (*Benzylethylaniline*)

$$C_6H_5{\cdot}N{<}^{CH_2{\cdot}CH_3}_{CH_2{\cdot}C_6H_5}$$

$C_{15}H_{17}N$ MW, 211

Pale yellow oil. B.p. 285–6°/710 mm. slight decomp., 185·5–186·5°/22 mm. D_4^{55} 1·001, $D^{18.5}$ 1·034. Insol. H_2O. Sol. 5½ parts EtOH. Weak base. Nascent Br $\longrightarrow$ 2 : 4 : 6-tribromoethylaniline. $HNO_2 \longrightarrow$ 4-nitrosoethylbenzylaniline, m.p. 61–2°. $HNO_3 + H_2SO_4 \longrightarrow$ ethyl-4-nitrobenzylaniline + ethyl-3-nitrobenzylaniline. HNO_3 (D 1·5) + AcOH $\longrightarrow$ 4-nitroethylbenzylaniline. Intermediate for triphenylmethane dyestuffs.

Picrate: short prisms from $CHCl_3$–ligroin. M.p. 116–17° (111–12°).

Friedländer, *Ber.*, 1889, **22**, 588.
Stebbins, *J. Am. Chem. Soc.*, 1885, **7**, 42.

Ethyl benzyl Ether

$C_6H_5{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_3$

$C_9H_{12}O$ MW, 136

B.p. 189°, 78°/18 mm. D_4^{10} 0·9577, D_4^{20} 0·9490. n_D^{20} 1·4955. Volatile in steam. AcOH + $H_2SO_4 \longrightarrow$ benzyl acetate. P_2O_5 in boiling $C_6H_6 \longrightarrow$ diphenylmethane + ethylene.

Mettler, D.R.P., 116,181, (*Chem. Zentr.*, 1906, I, 615).
v. Braun, *Ber.*, 1910, **43**, 1351.
Senderens, *Compt. rend.*, 1924, **178**, 1412.

Ethyl benzyl Ketone (2-*Keto*-1-*phenylbutane*, 1-*phenylbutanone*-2)

$C_6H_5{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_{10}H_{12}O$ MW, 148

B.p. 225–6° (230°/755 mm.), 221–3°/737 mm., 111°/16 mm. D_4^0 1·002, $D^{17.5}$ 0·998. $CrO_3 \longrightarrow$ benzoic and propionic acids.

Semicarbazone: m.p. 135·5° (146°, 153°).

Ludlam, *J. Chem. Soc.*, 1902, **81**, 1189.
Senderens, *Ann. chim.*, 1913, **28**, 319.
Mailhe, *Compt. rend.*, 1913, **157**, 220.

Ethyl benzyl sulphide.
See under Benzyl Mercaptan.

Ethylbiuret.
See under Biuret.

Ethyl borate.
See Triethyl borate.

Ethylboric Acid

$C_2H_5{\cdot}B(OH)_2$

$C_2H_7O_2B$ MW, 74

White cryst. from Et_2O. Sublimes at 40°. Very volatile.

Mono-Et ester: cryst. Decomp. by H_2O.
Di-Et ester: $C_4H_{11}O_2B$. MW, 102. B.p. 125° decomp. Decomp. by H_2O. Combines with $B(OEt)_3 \longrightarrow EtB(OEt)_2{\cdot}B(OEt)_3$, b.p. 112°.

Frankland, *Ann. chim.*, 1862, **124**, 142.
Khotinsky, Melamed, *Ber.*, 1909, **42**, 3095.

Ethyl bromide (*Bromoethane*)

$CH_3{\cdot}CH_2Br$

C_2H_5Br MW, 109

Ethereal liq. F.p. −125·5° (−115·5°, −117·8°, −119°). B.p. 38·4°/760 mm. D_4^0 1·50138 (1·4973), D_4^{20} 1·4555 (1·45983, 1·4307). Solubility in 100 parts H_2O: at 0° 1·067, at 10° 0·965, at 20° 0·914, at 30° 0·896. Sol. EtOH, Et_2O, etc. n_D^8 1·4320, n_D^{15} 1·42756, n_D^{20} 1·42386. Heat of comb. C_v 329·5 (341·82) Cal., C_v 328·4 Cal. H_2O at 200° $\longrightarrow$ diethyl ether + ethylene. H_2O at 100° $\longrightarrow$ ethyl alcohol. Alc.

KOH ⟶ ethylene. Cl ⟶ 1-chloro-1-bromoethane + 2-chloro-1-bromoethane.

Weston, *J. Chem. Soc.*, 1915, **107**, 1489.
Holt, *J. Chem. Soc.*, 1916, **109**, 1.
Kamm, Marvel, *Organic Syntheses*, 1921, I, 6.

Ethyl bromophenyl Ketone.
See p-Bromopropiophenone.

Ethyl-γ-butenylcarbinol.
See 1-Heptenol-5.

Ethyl γ-butenyl Ketone.
See 1-Heptenone-5.

Ethyl-n-butylamine

$CH_3\cdot[CH_2]_3\cdot NH\cdot CH_2\cdot CH_3$

$C_6H_{15}N$ MW, 101

B.p. 108–9°.
B_2,H_2PtCl_6: cryst. from H_2O. D^{15} 1·826.

Brill, *J. Am. Chem. Soc.*, 1932, **54**, 2486.
Le Bel, *Compt. rend.*, 1897, **125**, 351.

Ethyl-sec.-n-butylamine

$CH_3\cdot CH_2\cdot CH(CH_3)\cdot NH\cdot CH_2\cdot CH_3$

$C_6H_{15}N$ MW, 101

dl-.
B.p. 97–8°/741 mm. D_0^0 0·7531, D_0^{20} 0·7358.
B,HCl: m.p. 118–20°.
B,HBr: m.p. 115–18°.
B,HI: m.p. 73–5°.
B_2,H_2PtCl_6: m.p. 118–20°. Sol. H_2O, Et_2O.
$B,HAuCl_4$: yellow hygroscopic cryst. M.p. 118–20°.

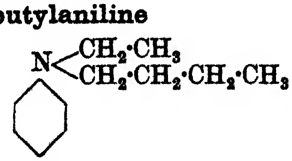
d-.
B.p. 98°. $[\alpha]_D^{15} = +18°$. D_4^{15} 0·7396. n_D 1·40428.
Dioxalate: m.p. 155–6°.

Bewad, *J. prakt. Chem.*, 1901, **63**, 197.
Mamlock, Wolffenstein, *Ber.*, 1901, **34**, 2504.
Leithe, *Ber.*, 1930, **63**, 804.

2-Ethyl-n-butylamine.
See 1-Amino-2-ethyl-n-butane.

Ethyl butylaminoformate.
See Butylurethane.

Ethyl-n-butylaniline



$C_{12}H_{19}N$ MW, 177

B.p. 237–42° (235–40°, 247°).

Picrate: yellow prisms from EtOH. M.p. 89–90°. Sol. hot EtOH, C_6H_6.

Fröhlich, *Ber.*, 1909, **42**, 1562.
Komatsu, *Chem. Zentr.*, 1913, I, 799.

Ethylbutylbenzylamine

$C_6H_5\cdot CH_2\cdot N<^{C_2H_5}_{CH_2\cdot[CH_2]_2\cdot CH_3}$

$C_{13}H_{21}N$ MW, 191

B.p. 238–40°.

Wedekind, Ney, *Ber.*, 1912, **45**, 1313.

Ethyl-n-butylcarbinol (*Heptanol*-3, 3-*hydroxy*-n-*heptane*)

$CH_3\cdot[CH_2]_3\cdot CH(OH)\cdot CH_2\cdot CH_3$

$C_7H_{16}O$ MW, 116

dl-.
B.p. 156·5–157°/750 mm.
Et ether: 3-ethoxy-n-heptane. $C_9H_{20}O$. MW, 144. B.p. 151°/750 mm.

d-.
B.p. 66°/18 mm. D_4^{20} 0·8227. n_D^{20} 1·4206. $[\alpha]_D^{20}$ +6·68°.
Et-H-phthalic ester: needles from ligroin. M.p. 47–8°.

Blaise, Picard, *Ann. chim.*, 1912, **26**, 287.
Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1943–4.

Ethyl-sec.-butylcarbinol (3-*Methylhexanol*-4)

$CH_3\cdot CH_2\cdot CH(CH_3)\cdot CH(OH)\cdot CH_2\cdot CH_3$

$C_7H_{16}O$ MW, 116

B.p. 149–50°. D^0 0·8518.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.

Ethyl-tert.-butylcarbinol (2 : 2-*Dimethylpentanol*-3, 3-*hydroxy*-2 : 2-*dimethylpentane*)

$CH_3\cdot C(CH_3)_2\cdot CH(OH)\cdot CH_2\cdot CH_3$

$C_7H_{16}O$ MW, 116

Liq. with odour of camphor. B.p. 132–5°, 42–4°/15 mm. D_4^0 0·84078, D_4^{20} 0·82462.
Acetyl: b.p. 157–9°/770 mm.

Faworsky, *J. prakt. Chem.*, 1913, **88**, 675.

Ethyl n-butyl Ether

$CH_3\cdot[CH_2]_3\cdot O\cdot CH_2\cdot CH_3$

$C_6H_{14}O$ MW, 120

B.p. 92·3° (91°, 91·4°), 91·7°/742·7 mm. D^0_0 0·7694 (0·7680), D^{25}_4 0·7447, D^{20}_{20} 0·7522. n^{25}_D 1·3798.

Cherchez, *Bull. soc. chim.*, 1928, **43**, 767.
I.G., F.P., 710,846, (*Chem. Abstracts*, 1932, **26**, 1614).
Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.

Ethyl sec.-n-butyl Ether

$$CH_3{\cdot}CH_2{\cdot}\underset{}{\overset{CH_3}{C}}H{\cdot}O{\cdot}CH_2{\cdot}CH_3$$

$C_6H_{14}O$ MW, 102

B.p. 81·2°. D^{25}_4 0·7377. n^{25}_D 1·3753.

See last reference above.

Ethyl *tert.*-butyl Ether

$$CH_3{\cdot}\underset{CH_3}{\overset{CH_3}{C}}{\cdot}O{\cdot}CH_2{\cdot}CH_3$$

$C_6H_{14}O$ MW, 102

B.p. 73·1°/760 mm. (68–9°, 69–70°, 73°), 70°/758 mm. D^0 0·7681, D^{20} 0·7519, D^{25}_4 0·7364. n^{20}_D 1·3794, n^{25}_D 1·3728.

Reboul, *Jahresber. Fortschr. Chem.*, 1881, 409.
Nef, *Ann.*, 1900, **309**, 138.
Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2095.

Ethyl n-butyl Ketone (3-*Ketoheptane, heptanone*-3)

$$CH_3{\cdot}[CH_2]_3{\cdot}CO{\cdot}CH_2{\cdot}CH_3$$

$C_7H_{14}O$ MW, 114

B.p. 149–50°, 147–8°/742·9 mm. Does not form bisulphite comp.
Semicarbazone: m.p. 99–100° (111°).

Ponzio, de Gaspari, *Gazz. chim. ital.*, 1898, **28**, 272.
Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1943.

Ethyl sec.-n-butyl Ketone (3-*Keto*-4-*methylhexane*, 3-*methylhexanone*-4)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{C}H{\cdot}CO{\cdot}CH_2{\cdot}CH_3$$

$C_7H_{14}O$ MW, 114

B.p. 134–5° (136–8°). D^{19} 0·8248. Does not form bisulphite comp.
Semicarbazone: m.p. 137°.

Hanriot, Bouveault, *Bull. soc. chim.*, 1889, **1**, 550.
Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.

Ethyl *tert.*-butyl Ketone (3-*Keto*-4 : 4-*dimethylpentane*, 2 : 2-*dimethylpentanone*-3)

$$CH_3{\cdot}\underset{CH_3}{\overset{CH_3}{C}}{\cdot}CO{\cdot}CH_2{\cdot}CH_3$$

$C_7H_{14}O$ MW, 114

Liq. with odour of camphor and mint. B.p. 125–6°. Sol. EtOH, Et_2O, etc. Mod. sol. H_2O. D^0_4 0·8303, D^{20}_4 0·8125, D^0_0 0·8258, D^{20}_0 0·8106. Does not form bisulphite comp. $CrO_3 \longrightarrow$ acetic and trimethylacetic acids. Br $\longrightarrow$ $CH_3{\cdot}CHBr{\cdot}CO{\cdot}C(CH_3)_3$, b.p. 67–9°/11 mm.
Oxime: plates from EtOH. M.p. 79–80°.
Semicarbazone: m.p. 144°.

Wischnegradski, *Ann.*, 1875, **178**, 104.
Markownikow, *Ber.*, 1900, **33**, 1906.
Faworsky, *J. prakt. Chem.*, 1913, **88**, 676.

Ethylbutylmalonic Acid.
See Heptane-3 : 3-dicarboxylic Acid.

Ethyl butyl sulphate (*Butyl sulphovinate*)

$$O_2S{<}\begin{matrix}O{\cdot}C_2H_5\\ O{\cdot}[CH_2]_3{\cdot}CH_3\end{matrix}$$

$C_6H_{14}O_4S$ MW, 182

B.p. 117–18°/20 mm. D^{18} 1·112. n^{18}_D 1·415.

Bert, *Compt. rend.*, 1924, **178**, 1182.

Ethyl n-butyrate

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}OC_2H_5$$

$C_6H_{12}O_2$ MW, 116

F.p. −93·3°. B.p. 119·9° (120–120·5°)/760 mm., 114·1°/752 mm., 66·8°/119·6 mm., 48·8°/50·2 mm. D^0_4 0·89970, D^{20}_4 0·87880, D^{40}_4 0·85760, $D^{119·5}_4$ 0·7704. $n^{17·95}_D$ 1·39302, n^{20}_D 1·40002.

Pelouze, Gélis, *Ann.*, 1843, **47**, 250.

2-Ethylbutyric Acid.
See 2-Methylvaleric Acid.

Ethylbutyrylcarbinol.
See 3-Heptanolone-4.

Ethyl cacodyl.
See Arsenic diethyl.

Ethyl cacodyl oxide

$$(C_2H_5)_2As{\cdot}O{\cdot}As(C_2H_5)_2$$

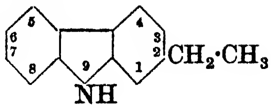
$C_8H_{20}OAs_2$ MW, 282

Liq. with disagreeable odour. B.p. 97–8°/10 mm. O $\longrightarrow$ diethylcacodylic acid (diethylarsinic acid).

Wigren, *Ann.*, 1924, **437**, 285.

Ethylcarbamic Acid.
Et Ester, *see* Ethylurethane.
Amide, *see* Ethylurea.

2-Ethylcarbazole



$C_{14}H_{13}N$ MW, 195

Prisms from AcOH. M.p. 225°.

Plant, Williams, *J. Chem. Soc.*, 1934, 1143.

3-Ethylcarbazole.

Prisms from toluene. M.p. 144°.

See above reference.

9-Ethylcarbazole (N-*Ethylcarbazole*).

Needles from EtOH. M.p. 67–8°. Sol. hot EtOH, Et_2O.

Picrate: crimson needles. M.p. 104–5° (97°). Sol. EtOH.

Graebe, Behaghel, *Ann.*, 1880, **202**, 24.
Atack, U.S.P., 1,494,879, (*Chem. Abstracts*, 1924, **18**, 2173).
Burton, Gibson, *J. Chem. Soc.*, 1924, **125**, 2504.

Ethyl carbonate.

See Diethyl carbonate, *and* Ethyl hydrogen carbonate.

Ethyl carbylamine.

See Ethyl isocyanide.

Ethyl chloride (*Chloroethane*)

$CH_3·CH_2Cl$

C_2H_5Cl MW, 64·5

F.p. −142·5° (−141·6°, −138·7°). B.p. 12·5° (13·1°)/760 mm., 12·5–12·6°/725 mm. Spar. sol. H_2O. Sol. EtOH, Et_2O, etc. D^0 0·9214, D_2^2 0·92295, D_6^6 0·91708. Heat of comb. C_p 334·11 (326·9) Cal., C_v 326·35 Cal. Crit. temp. 187·2°. Crit. press. 51·72 atm. Cl (cold) ⟶ mainly ethylidene chloride. Cl (hot, $+SbCl_5$) ⟶ ethylene dichloride. Br (hot, +Fe) ⟶ ethylbromide + ethylene dibromide. HI at 130° ⟶ ethyl iodide. NH_3 in EtOH ⟶ mono-, di-, and tri-ethylamines.

Groves, *Ann.*, 1874, **174**, 372.
Krüger, *J. prakt. Chem.*, 1876, **14**, 195.
Norris, Taylor, *J. Am. Chem. Soc.*, 1924, **46**, 753.
Dandt, U.S.Ps., 1,920,846, 1,920,246, (*Chem. Abstracts*, 1933, **27**, 4818).

Ethyl chloroacetate (*Chloroacetic ester*)

$ClCH_2·CO·OC_2H_5$

$C_4H_7O_2Cl$ MW, 122·5

F.p. −26°. B.p. 145–6°, 52°/20 mm. D_5 1·1749, D_4^4 1·1749, D_4^{20} 1·1585 (1·1520), D_4^{144} 0·9925. n_D^{20} 1·42274 (1·42162). Heat of comb. C_v 493·6 Cal. Decomp. on long boiling. NH_3 ⟶ chloroacetamide. NH_3 in EtOH ⟶ mainly glycine amide. KCN ⟶ ethyl cyanoacetate.

Conrad, *Ann.*, 1877, **188**, 218.
Imbert, D.R.Ps., 210,502, (*Chem. Zentr.*, 1909, II, 78), 212,592, (*Chem. Zentr.*, 1909, II, 1024).

Ethyl 1-chloroacetoacetate (*α-Chloroacetoacetic ester*)

$CH_3·CO·CHCl·CO·OC_2H_5$

$C_6H_9O_3Cl$ MW, 164·5

B.p. 193° part decomp., 105–10°/30 mm. Sol. EtOH, Et_2O, etc. Spar. sol. H_2O. $D_{17·5}^{14}$ 1·19. Hot dil. H_2SO_4 ⟶ chloroacetone. SO_2Cl_2 ⟶ ethyl 1 : 1-dichloroacetoacetate. NH_3 ⟶ 1-chloro-2-iminobutyric ester. KCN ⟶ 1-cyanoacetoacetic ester and 1-chloroacetoacetic ester cyanhydrin. $Ph·NH·NH_2$ ⟶ 4-benzeneazo-3-methyl-1-phenylpyrazolone-5. $NH_2·CO·NH_2$ ⟶ ethyl 5-methyliminazol-2-one-4-carboxylate. $NH_2·CS·NH_2$ ⟶ ethyl 2-amino-4-methylthiazole-5-carboxylate. Violet col. with $FeCl_3$. Forms Na, Cu, Mg and Ni derivs.

Schönbrodt, *Ann.*, 1889, **253**, 171.
Dey, *J. Chem. Soc.*, 1915, **107**, 1646.

Ethyl 3-chloroacetoacetate (*γ-Chloroacetoacetic ester*)

$ClCH_2·CO·CH_2·CO·OC_2H_5$

$C_6H_9O_3Cl$ MW, 164·5

B.p. 220° (210°) decomp., 115°/14 mm., 102°/12 mm. Turns yellow on standing. Prac. insol. H_2O. Sol. org. solvents. D_4^0 1·2292, D_4^{17} 1·2176, D_4^{20} 1·2157. n_D^{17} 1·4546. Dil. HCl ⟶ chloroacetone + EtOH + CO_2. $NH_2·CS·NH_2$ ⟶ ethyl 2-aminothiazole-4-acetate. Red col. with $FeCl_3$. Forms green Cu deriv., m.p. 168–9° decomp.

Alexandrow, *Ber.*, 1913, **46**, 1022.
Hamel, *Bull. soc. chim.*, 1921, **29**, 396.

Ethyl chloroethyl Ether.

See Chlorodiethyl Ether.

Ethyl 2-chloroethyl sulphide.

See 2-Chlorodiethyl sulphide.

Ethyl chloroformate (*Chloroformic ester, ethyl chlorocarbonate*)

$Cl·CO·OC_2H_5$

$C_3H_5O_2Cl$ MW, 108·5

B.p. 94–5° (93·1°). D_4^4 1·1596, D_4^{15} 1·14419, D_4^{20} 1·13519 (1·1377). n_D^{20} 1·39738 (1·39548).

NaHg ⟶ formic acid. $AlCl_3$ ⟶ ethyl chloride + CO_2. NH_3 ⟶ urethane. Dil. acids ⟶ HCl + CO_2 + ethylene. Reacts with many org. compounds giving carbethoxy derivs.

Rose, *Ann.*, 1880, **205**, 247.
Hochstetter, D.R.P., 282,134, (*Chem. Zentr.*, 1915, I, 464).
Cappelli, *Gazz. chim. ital.*, 1920, **50**, 8.

Ethyl chlorosulphonate (*Chlorosulphonic acid ethyl ester*)

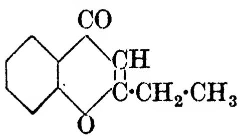
$Cl{\cdot}SO_2{\cdot}OC_2H_5$

$C_2H_5O_3ClS$ MW, 144·5

Fuming liq. B.p. 151–4° part. decomp., 93–5°/100 mm., 58°/20 mm., 52°/14 mm. D^0 1·379, D^{18} 1·263. Sol. Et_2O, $CHCl_3$, ligroin. Decomp. at boil to H_2SO_4, HCl, SO_2 and ethylene. Decomp. by H_2O and EtOH.

Behrend, *J. prakt. Chem.*, 1877, **15**, 28.
Bushong, *Am. Chem. J.*, 1903, **30**, 214.
Willcox, *Am. Chem. J.*, 1904, **32**, 450.

2-Ethylchromone



$C_{11}H_{10}O_2$ MW, 174

Needles from Et_2O–pet. ether. M.p. 18°. NaOH.Aq. ⟶ salicylic acid.

Heilbron, Hey, Lowe, *J. Chem. Soc.*, 1934, 1312.

Ethyl cinnamate

$C_6H_5{\cdot}CH{:}CH{\cdot}CO{\cdot}OC_2H_5$

$C_{11}H_{12}O_2$ MW, 176

Trans:
Occurs in storax. F.p. 12° (6·5°). B.p. 271°, 158·5–159°/24 mm., 144°/15 mm. $D_4^{11\cdot4}$ 1·0566, $D_4^{16\cdot8}$ 1·0519, D_4^{20} 1·0490, D_4^{25} 1·0469 (1·0457), D_4^{50} 1·0234, D_4^{75} 1·0018. $n_D^{12\cdot9}$ 1·56351, $n_D^{16\cdot8}$ 1·561, n_D^{20} 1·55982. H ⟶ ethyl 2-phenylpropionate. Br ⟶ ethyl 2-phenyl-1 : 2-dibromopropionate.

Cis: (Ethyl allo-cinnamate).
B.p. 125°/12 mm. $D_4^{11\cdot4}$ 1·0569, D_4^{20} 1·049. $n_D^{11\cdot4}$ 1·54833, n_D^{20} 1·545.

Trans:
Fischer, Speier, *Ber.*, 1895, **28**, 3254.
Marvel, King, *Organic Syntheses*, 1929, IX, 38.

Cis:
Auwers, Schmellenkamp, *Ber.*, 1921, **54**, 631.

α-Ethylcinnamic Acid (1-*Benzylidenebutyric acid*)

$C_6H_5{\cdot}CH{:}\overset{C_2H_5}{C}{\cdot}COOH$

$C_{11}H_{12}O_2$ MW, 176

Trans:
M.p. 104° (106°). Sol. EtOH, hot ligroin. Spar. sol. cold ligroin.
Me ester: $C_{12}H_{14}O_2$. MW, 190. B.p. 250–60°.
Et ester: $C_{13}H_{16}O_2$. MW, 204. B.p. 142–3°/12 mm.
Chloride: $C_{11}H_{11}OCl$. MW, 194·5. B.p. 142°/14 mm.
Amide: $C_{11}H_{13}ON$. MW, 175. Prisms from EtOH. M.p. 128°.

Cis: (1-Ethylallocinnamic acid).
Liq.
Aniline salt: m.p. 81°.

Trans:
Perkin, *J. Chem. Soc.*, 1877, **31**, 393.
Fittig, Slocum, *Ann.*, 1885, **227**, 53.
Michael, *Ber.*, 1901, **34**, 928.

Cis:
Stoermer, Voht, *Ann.*, 1915, **409**, 57.

β-Ethylcinnamic Acid

$C_6H_5{\cdot}\overset{C_2H_5}{C}{:}CH{\cdot}COOH$

$C_{11}H_{12}O_2$ MW, 176

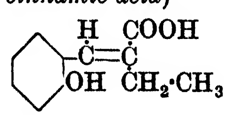
Trans:
M.p. 95·5°.
Me ester: b.p. 130°/8 mm.
Amide: m.p. 104°.
Anilide: m.p. 84°.

Cis: (2-Ethylallocinnamic acid).
M.p. 93–95·5°.
Me ester: b.p. 122–3°/8 mm.
Amide: m.p. 101°.
Anilide: m.p. 122°.

Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 959.

Ethylcitraconic Acid.
See Propylmaleic Acid.

α-Ethyl-o-coumaric Acid (α-*Ethyl*-o-*hydroxy*-trans-*cinnamic acid*)



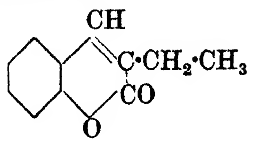
$C_{11}H_{12}O_3$ MW, 192

Prisms from EtOH.Aq. Needles from H_2O or C_6H_6. M.p. 181° decomp. (174°). Sol. EtOH, Et_2O. Spar. sol. H_2O, $CHCl_3$. Gives no col. with $FeCl_3$.
Me ether: $C_{12}H_{14}O_3$. MW, 206. Needles

from EtOH. M.p. 105°. *Me ester*: $C_{13}H_{16}O_3$. MW, 220. B.p. 292°. D_{15}^{15} 1·1100.

Perkin, *J. Chem. Soc.*, 1877, **31**, 416; 1881, **39**, 438.
Fries, Volk, *Ann.*, 1911, **379**, 99.

3-Ethylcoumarin



$C_{11}H_{10}O_2$ MW, 174

Prisms. M.p. 70–1°. B.p. 299° slight decomp. Sol. hot EtOH, Et_2O. Spar. sol. hot H_2O. KOH ⟶ salicylic acid. P_2S_5 ⟶ 3-ethyl-2-thiocoumarin.

Oxime: needles. M.p. 157°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. hot H_2O.

Phenylhydrazone: yellow needles. M.p. 115°. Sol. EtOH, Et_2O, C_6H_6.

Perkin, *J. Chem. Soc.*, 1868, **21**, 56.
Fittig, Brown, *Ann.*, 1889, **255**, 288.

1-Ethylcrotonic Acid (*2-Methyl-1-ethylacrylic acid, β-amylene-γ-carboxylic acid*)

$$CH_3{\cdot}CH{:}\overset{C_2H_5}{C}{\cdot}COOH$$

$C_6H_{10}O_2$ MW, 114

(I) Solid form.

M.p. 41–2° (45°). B.p. 209°, 109°/13 mm. $D_4^{56·1}$ 0·9484. Spar. sol. H_2O. Sol. EtOH, Et_2O, etc. $KMnO_4$ ⟶ 1 : 2-dihydroxy-1-ethylbutyric acid. Fusion with KOH ⟶ acetic and butyric acids. Br ⟶ 2 : 3-dibromopentane-3-carboxylic acid. HBr ⟶ 2-bromo-1-ethylbutyric acid.

Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 165° (167°).

Chloride: C_6H_9OCl. MW, 132·5. B.p. 54°/13 mm.

Amide: $C_6H_{11}ON$. MW, 113. M.p. 114–15°.

(II) Liquid form.

F.p. − 35°. B.p. 199·5°/750 mm., 107–8°/10 mm. Insol. H_2O. Sol. EtOH, Et_2O, etc. D_4^{15} 0·9805, D_4^{20} 0·976. PCl_3 ⟶ chloride of solid ethylcrotonic acid. $KMnO_4$ ⟶ 1 : 2-dihydroxy-1-ethylbutyric acid. Br ⟶ 2 : 3-dibromopentane-3-carboxylic acid.

Et ester: b.p. 158–9°, 52°/9 mm.

Fittig, *Ann.*, 1904, **334**, 102, 115.
Auwers, *Ann.*, 1933, **482**, 76.
Blaise, Bagard, *Ann. chim. phys.*, 1907, **11**, 127.

2-Ethylcrotonic Acid.

See 2-Methyl-2-ethylacrylic Acid.

Ethylcyanamide

$$CH_3{\cdot}CH_2{\cdot}NH{\cdot}CN$$

$C_3H_6N_2$ MW, 70

Neutral syrup. Polymerises. H_2S ⟶ ethylthiourea. H_2Se ⟶ ethylselenourea.

McKee, *Am. Chem. J.*, 1906, **36**, 212.
Cahours, Clöez, *Ann.*, 1854, **90**, 95.
Schmidt, *Ber.*, 1921, **54**, 2068.

Ethyl cyanide.

See under Propionic Acid.

Ethyl cyanoacetate (*Cyanoacetic ester*)

$$CN{\cdot}CH_2{\cdot}CO{\cdot}OC_2H_5$$

$C_5H_7O_2N$ MW, 113

B.p. 207°, 122°/42 mm., 107°/27 mm., 97°/16 mm. Insol. H_2O. Sol. NH_3.Aq. D_4^{20} 1·063, D_4^{25} 1·0560 (1·0562), D_4^{50} 1·0306, D_4^{75} 1·0052. $n_D^{20·5}$ 1·41793. Heat of comb. C_v 557·2 Cal., C_p 629·7 Cal. Br ⟶ bromocyanoacetic ester. NH_3 ⟶ cyanoacetamide. HNO_2 ⟶ oximinocyanoacetic ester. $NH_2{\cdot}NH_2$ in EtOH ⟶ cyanoacetylhydrazide. EtOH (+ conc. H_2SO_4) ⟶ ethyl malonate. Gives Na deriv. CH_3COCl and C_6H_5COCl ⟶ acetyl and benzoyl cyanoacetic esters.

Noyes, *J. Am. Chem. Soc.*, 1904, **26**, 1545.
Kohler, Allen, *Organic Syntheses*, 1923, III, 53.
Stephens, *J. Soc. Chem. Ind.*, 1924, **43**, 313T, 327T.
Inglis, *Organic Syntheses*, 1928, VIII, 74.

Ethyl 1-cyanoacetoacetate (*1-Cyanoacetoacetic ester*)

$$CH_3{\cdot}CO{\cdot}CH(CN){\cdot}CO{\cdot}OC_2H_5$$

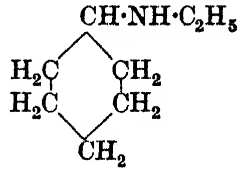
$C_7H_9O_3N$ MW, 155

Needles. M.p. 23° (26°). B.p. 195–7°, 130–2°/35 mm., 112–14°/18 mm., 104°/10 mm. Decomp. slowly on standing. Spar. sol. H_2O. Sol. EtOH, Et_2O, $CHCl_3$, CS_2, C_6H_6. D_4^{20} 1·1107. n_D^{20} 1·4710. Heat of comb. C_v 836·8 Cal., C_p 837·0 Cal. Aq. sol. reacts acid. Gives bright red. col. with $FeCl_3$. KOH in EtOH ⟶ ammonia, acetic acid, ethyl alcohol, and CO_2. NH_3 ⟶ ethyl 2-imino-1-cyanobutyrate. Forms Na, K, NH_4, Cu, Ca, Ba, Mg, Ag, and Pb derivs.

Semicarbazone: m.p. 190°.

Haller, Held, *Ann. chim. phys.*, 1889, **17**, 204.
Michael, Eckstein, *Ber.*, 1905, **38**, 51.

N-Ethylcyclohexylamine (*Hexahydroethylaniline*)

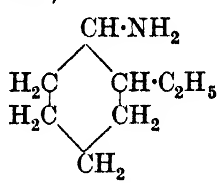


$C_8H_{17}N$ MW, 127

Liq. with fishy odour. B.p. 164°. D_0^0 0·868.
B,HCl: m.p. 184°.
N-*Acetyl*: b.p. 256°/740 mm.
N-*Benzoyl*: b.p. 201°.
N-*Nitroso*: b.p. 130°/12 mm.
Picrate: yellow cryst. from EtOH. M.p. 133°.

Skita, Rolfes, *Ber.*, 1920, **53**, 1251.
Sabatier, Mailhe, *Compt. rend.*, 1911, **153**, 1207.
I.G., E.P., 334,579, (*Chem. Abstracts*, 1931, **25**, 964).

2-Ethylcyclohexylamine (*Hexahydro-o-aminoethylbenzene*)



$C_8H_{17}N$ MW, 127

B.p. 170–1°, 53°/12 mm. D_4^{20} 0·8744. n_D^{20} 1·4682.
N-*Benzenesulphonyl*: m.p. 121–2°.
Chloroplatinate: m.p. 238–9°.
Picrate: m.p. 189–90°.

Willstätter, Seitz, v. Braun, *Ber.*, 1925, **58**, 385.

Ethylcyclohexyl Ketone.
See Hexahydropropiophenone.

Ethyl-n-decylcarbinol (*Tridecanol-3, 3-hydroxytridecane*)

$CH_3\cdot[CH_2]_9\cdot CH(OH)\cdot CH_2\cdot CH_3$

$C_{13}H_{28}O$ MW, 200

d-.
Needles from EtOH. M.p. 32°. B.p. 139°/12 mm. D_4^{46} 0·8139. $[\alpha]_D^{20}$ + 12·44°. Volatile in steam.
Acid phthalate: m.p. 35–35·5°. $[\alpha]_D^{20}$ + 17·58° in EtOH.

l-.
Needles from EtOH. M.p. 32°. B.p. 140°/15 mm. D_4^{48} 0·8180. $[\alpha]_D^{20}$ − 6·73° in EtOH.
Acid phthalate: m.p. 35–35·5°. $[\alpha]_D^{20}$ − 17·71° in EtOH.

dl-.
Plates. M.p. 14·5°. B.p. 148°/20 mm.
Acid phthalate: m.p. 46–7°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1948.

Ethyl n-decyl Ketone (*Tridecanone-3, 3-ketotridecane*)

$CH_3\cdot[CH_2]_9\cdot CO\cdot CH_2\cdot CH_3$

$C_{13}H_{26}O$ MW, 198

Plates. M.p. 25°. B.p. 140°/17 mm.
Semicarbazone: cryst. from EtOH.Aq. M.p. 90°.

See above reference.

α-Ethyldibenzyl.
See 1 : 2-Diphenyl-*n*-butane.

Ethyldibenzylamine

$C_2H_5\cdot N(CH_2\cdot C_6H_5)_2$

$C_{16}H_{19}N$ HW, 225

B.p. 306°. Sol. EtOH, Et_2O. Insol. H_2O.

Limpricht, *Ann.*, 1867, **144**, 315.
Kraft, *Ber.*, 1890, **23**, 2782.

Ethyldibromoarsine (*Dibromoethylarsine, ethylarsenic dibromide, ethylarsine-dibromide*)

$CH_3\cdot CH_2\cdot AsBr_2$

$C_2H_5Br_2As$ MW, 264

B.p. 192°.

Dehn, *Am. Chem. J.*, 1908, **40**, 108.

Ethyldichloroamine.
See N-Dichloroethylamine.

Ethyldichloroarsine (*Dichloro-ethylarsine, ethylarsine dichloride*)

$CH_3\cdot CH_2\cdot AsCl_2$

$C_2H_5Cl_2As$ MW, 175

B.p. 156° (155·3°), 131·2°/400 mm., 109·6°/200 mm., 90°/100 mm., 74°/50 mm. D_4^{20} 1·6595. Sol. H_2O. Misc. with EtOH, Et_2O, C_6H_6, etc. Dil. $HNO_3 \longrightarrow$ ethylarsinic acid.

La Coste, *Ann.*, 1881, **208**, 33.
Dehn, *Am. Chem. J.*, 1908, **40**, 110.
Gibson, Johnson, *J. Chem. Soc.*, 1931, 2518.

Ethyl 1 : 2-dichlorovinyl Ether (1 : 2-*Dichloro*-1-*ethoxyethylene*)

$C_2H_5\cdot O\cdot CCl{:}CHCl$

$C_4H_6OCl_2$ MW, 141

B.p. 128·2°. D^{10} 1·08. $H_2O \longrightarrow$ ethyl chloroacetate. H_2O at 180° ⟶ HCl + ethylchloride + glycollic acid.

Geuther, Brockhoff, *J. prakt. Chem.*, 1873, **7**, 112.
Imbert, D.R.P., 216,940, (*Chem. Zentr.*, 1910, I, 308).

Ethyl 2 : 2-dichlorovinyl Ether (2 : 2-*Dichloro*-1-*ethoxyethylene*)

$C_2H_5{\cdot}O{\cdot}CH{:}CCl_2$

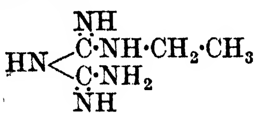
$C_4H_6OCl_2$ MW, 141

B.p. 144·2°/765·3 mm. D_4^{20} 1·2081. O ⟶ ethoxychloroacetyl chloride + phosgene + ethyl formate. H_2SO_4 at 130–40° ⟶ dichloroacetaldehyde + ethylene.

Godefroy, *Jahresber. Fortschr. Chem.*, 1886, 1174.
Neher, Foster, *J. Am. Chem. Soc.*, 1909, **31**, 415.

Ethyl diethoxypropionate.
See under Formylacetic Acid.

Ethyldiguanide



$C_4H_{11}N_5$ MW, 129

Deliquescent cryst. Sol. EtOH. Insol. Et_2O. Heat ⟶ NH_3 + ethylamine.

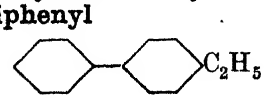
B,HCl: sol. H_2O, EtOH. Insol. Et_2O.

$B_2,H_2SO_4,1\frac{1}{2}H_2O$: m.p. 180° (anhyd.). Sol. H_2O. Insol. Et_2O, EtOH. Loses H_2O at 100°.

Smolka, Friedreich, *Monatsh.*, 1888, **9**, 229.
Emich, *Monatsh.*, 1883, **4**, 396.

Ethyl 2-dimethylaminoethyl Ether.
See 2-Dimethylaminodiethyl Ether.

4-Ethyldiphenyl



$C_{14}H_{14}$ MW, 182

Plates. M.p. 46–7°. B.p. 283–4°/763 mm., 140°/15 mm. D^0 1·043. CrO_3 ⟶ *p*-phenylbenzoic acid.

Adam, *Ann. chim. phys.*, 1888, **15**, 249.
Ferriss, Turner, *J. Chem. Soc.*, 1920, 1142.
Auwers, Jülicher, *Ber.*, 1922, **55**, 2182.

***N*-Ethyldiphenylamine**

$(C_6H_5)_2N{\cdot}C_2H_5$

$C_{14}H_{15}N$ MW, 197

B.p. 295–7° (285–7°).

Girard, *Bull. soc. chim.*, 1875, **23**, 3.
Tippmann, Fleissner, *Monatsh.*, 1883, **4**, 797.

Ethyldiphenylcarbinol.
See 1-Hydroxy-1 : 1-diphenylpropane.

α-Ethyldiphenylmethane.
See 1 : 1-Diphenylpropane.

Ethyldipicrylamine.
See under 2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitrodiphenylamine.

Ethyldipropylamine

$(CH_3{\cdot}CH_2{\cdot}CH_2)_2N{\cdot}CH_2{\cdot}CH_3$

$C_8H_{19}N$ MW, 129

B.p. 137·2°/749·9 mm. (132–4°). Sol. most org. solvents except EtOH. Spar. sol. H_2O. D^{24} 0·807.

B,HCl: needles. M.p. 113–15°.

B_2,H_2PtCl_6: orange-yellow cryst. M.p. 175°. Sol. H_2O. Insol. EtOH.

$B,HAuCl_4$: m.p. 96°. Sol. H_2O.

Comanducci, Arena, *Chem. Zentr.*, 1907, II, 1396.
Passon, *Ber.*, 1891, **24**, 1680.
v. Braun, *Ber.*, 1900, **33**, 1446.

Ethyldipropylcarbinol (4-*Ethylheptanol*-4, 3-*propylhexanol*-3)

$(CH_3{\cdot}CH_2{\cdot}CH_2)_2C(OH){\cdot}CH_2{\cdot}CH_3$

$C_9H_{20}O$ MW, 144

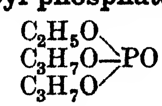
B.p. 179·5°. D^{20} 0·83492, D^{30} 0·82827. Heat of comb. C_p 1401·8 Cal. CrO_3 ⟶ CO_2, acetic, propionic and butyric acids, and butyrone.

Tschebotarew, Saizew, *J. prakt. Chem.*, 1886, **33**, 198.
Halse, *J. prakt. Chem.*, 1914, **89**, 456.

Ethyldipropylmethane.
See 4-Ethylheptane.

Ethyldipropylphenylmethane.
See 4-Ethyl-4-phenylheptane.

Ethyl dipropyl phosphate



$C_8H_{19}O_4P$ MW, 210

B.p. 145°/20 mm. D^0 1·046, D^{22} 1·025. Sol. 45 parts H_2O at 25°. H_2O ⟶ dipropyl phosphate + ethyl propyl phosphate.

Drushel, *Chem. Zentr.*, 1916, I, 1224.

ω-Ethyldipropyltoluene.
See 4-Ethyl-4-phenylheptane.

Ethyldodecylcarbinol (*Pentadecanol-3, 3-hydroxypentadecane*)

$CH_3 \cdot [CH_2]_{11} \cdot CH(OH) \cdot CH_2 \cdot CH_3$

$C_{15}H_{32}O$ MW, 228

l-.

Needles from EtOH. M.p. 45°. B.p. 168°/14 mm. D_4^{55} 0·8115. $[\alpha]_D^{20}$ − 5·46° in EtOH. Non-volatile in steam.

Acid phthalate: cryst. from pet. ether. M.p. 46–7°. $[\alpha]_D^{20}$ − 16·98° in EtOH.

dl-.

M.p. 32°. B.p. 163°/12 mm.

Acid phthalate: cryst. from pet. ether. M.p. 54–5°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1951.

Ethyl dodecyl Ketone (*Pentadecanone-3, 3-ketopentadecane*)

$CH_3 \cdot [CH_2]_{11} \cdot CO \cdot CH_2 \cdot CH_3$

$C_{15}H_{30}O$ MW, 226

Plates. M.p. 38°. B.p. 174°/20 mm. Spar. volatile in steam.

Semicarbazone: cryst. from EtOH.Aq. M.p. 90·5°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1936, 1952.

Ethylene

$CH_2{:}CH_2$

C_2H_4 MW, 28

F.p. −169°. B.p. −105° (−102·3°, −103·9°). Coefficient of absorption in H_2O: 0·226 at 0°, 0·162 at 10°, 0·122 at 20°, 0·098 at 30°. Heat of comb. C_p 333·35 (341·1, 345·8) Cal. Crit. temp. 9·5°. Crit. press. 50·65 atm. Burns with luminous flame. H ⟶ ethane. H_2SO_4 ⟶ ethyl hydrogen sulphate. Cl ⟶ ethylene dichloride, Br ⟶ ethylene dibromide. I ⟶ ethylene di-iodide. HBr ⟶ ethyl bromide. HI ⟶ ethyl iodide. O_3 ⟶ ethylene ozonide. N_2O_4 ⟶ ethylene nitrosate. HOCl ⟶ ethylene chlorohydrin. HOBr ⟶ ethylene bromohydrin.

Erlenmeyer, Bunte, *Ann.*, 1878, **192**, 244.
Newth, *J. Chem. Soc.*, 1901, **79**, 915.
Senderens, *Bull. soc. chim.*, 1911, **9**, 371.
Kesting, *Z. angew. Chem.*, 1925, **38**, 362.
Ssakmin, *Ber.*, 1934, **67**, 392.

Ethyleneacetic Acid.

See Cyclopropane-carboxylic Acid.

Ethylene bromohydrin (*2-Bromoethyl alcohol, 2-bromo-1-hydroxyethane*)

$BrCH_2 \cdot CH_2OH$

C_2H_5OBr MW, 125

B.p. 149–50°/750 mm., 63–4°/18 mm. D_4^0 1·7902. D^{17} 1·685. Misc. with most org. solvents. Forms azeotropic mixture with H_2O, b.p. 99·1°/762·4 mm. Hot H_2O ⟶ ethylene glycol.

Et ether: *see* 2-Bromodiethyl Ether.

Mokijewski, *Chem. Zentr.*, 1899, I, 591.
McDowall, *J. Chem. Soc.*, 1926, 499.
Thayer, Marvel, Hiers, *Organic Syntheses*, 1926, VI, 12.

Ethylene bromoiodide.

See 2-Bromo-1-iodoethane.

Ethylene chlorobromide.

See sym.-Chlorobromoethane.

Ethylene chlorohydrin (*2-Chloroethyl alcohol, 2-chloro-1-hydroxyethane*)

$ClCH_2 \cdot CH_2OH$

C_2H_5OCl MW, 80·5

F.p. − 67·5°. B.p. 128·6° (129·5°), 51–2°/22 mm., 44°/20 mm. D_4^0 1·2195, D_4^{20} 1·1988, D^{15} 1·2072, D^{30} 1·2019. n_D^{15} 1·44380, n_D^{20} 1·44189. Misc. with H_2O and most org. solvents. Forms azeotropic mixture with H_2O, b.p. 95–8°/735 mm. KOH ⟶ ethylene oxide. NaHg + H_2O ⟶ ethyl alcohol. CrO_3 ⟶ chloroacetic acid. Na_2S ⟶ thiodiglycol.

Me ether: *see* Methyl 2-chloroethyl Ether.

Et ether: *see* 2-Chlorodiethyl Ether.

Gomberg, *J. Am. Chem. Soc.*, 1919, **41**, 1414.
Shilov, *Journal of Chemical Industry (Moscow)*, 1928, **5**, 1273.
Zapadinskii, *ibid.*, 1426.
Long, Willson, Wheeler, E.P., 265,259, (*Chem. Abstracts*, 1928, **22**, 244).
Frahm, *Rec. trav. chim.*, 1931, **50**, 261.
Naamlooze Vennootschap de Bataafsche Petroleum Maatschappi, E.P. Application, 19215/1932.

Ethylene chloroiodide.

See 1-Chloro-2-iodoethane.

Ethylene cyanhydrin.

See under Hydracrylic Acid.

Ethylenediamine (*1 : 2-Diaminoethane*)

$H_2N \cdot CH_2 \cdot CH_2 \cdot NH_2$

$C_2H_8N_2$ MW, 60

M.p. 8·5°. B.p. 116·5°. Ammoniacal odour. Sol. H_2O with hydration. Insol. C_6H_6, Et_2O. D^{15} 0·902, D_4^{25} 0·898, $D_4^{26·1}$ 0·8919. $n_D^{26·1}$ 1·45400.

$k = 8.5 \times 10^{-5}$ at 25°. Volatile in steam. Forms compounds with metallic salts.

B,H$_2$O: m.p. 10°. B.p. 118°. $D_4^{20.5}$ 0·9634. $n_D^{20.5}$ 1·44997.

B,2HCl: monoclinic prisms. Insol. EtOH. Sublimes without melting.

NN-*Diacetyl*: needles. M.p. 172°. Very sol. H_2O, EtOH. Spar. sol. Et_2O.

Isovaleryl: hypotonin. M.p. 129–30°.

NN-*Dibenzoyl*: m.p. 244°.

NN-*Di-benzenesulphonyl*: m.p. 168°.

Di-picrate: m.p. 233–5° decomp.

Bailar, *J. Am. Chem. Soc.*, 1934, **56**, 955.
Kraut, *Ann.*, 1882, **212**, 251.
Ing, Manske, *J. Chem. Soc.*, 1926, 2348.
Putokhin, *Transactions of the Institute of Pure Chemical Reagents*, U.S.S.R., 1929, No. 300, 119.

Ethylene dibromide (sym.-*Dibromoethane*)

$BrCH_2{\cdot}CH_2Br$

$C_2H_4Br_2$ MW, 188

M.p. 10°. B.p. 131·7°, 52·1°/50·8 mm., 34°/14 mm. D_4^0 2·21324, D_4^{20} 2·1785, D_4^{25} 2·1620. n_D^{15} 1·54160, n_D^{20} 1·53789. Hot $H_2O \longrightarrow$ ethylene glycol. KOH $\longrightarrow$ vinyl bromide. KOH in EtOH $\longrightarrow$ vinyl bromide + acetylene. $NH_3 \longrightarrow$ ethylenediamine and diethylenediamine. K_2S in EtOH $\longrightarrow$ diethylene disulphide.

Erlenmeyer, Bunte, *Ann.*, 1873, **168**, 64.
Bauer, U.S.P., 1,414,852, (*Chem. Abstracts*, 1922, **16**, 2150).
Kesting, *Z. angew. Chem.*, 1925, **38**, 362.

Ethylene-dicarboxylic Acid.

See Fumaric Acid, Maleic Acid, *and* Methylenemalonic Acid.

Ethylene dichloride (sym.-*Dichloroethane*)

$ClCH_2{\cdot}CH_2Cl$

$C_2H_4Cl_2$ MW, 99

F.p. − 42·0° (− 36°). B.p. 83·7° (83·5°). 100 gm. H_2O dissolve 0·922 gm. at 0°, 0·885 gm. at 10°, 0·869 gm. at 20°, 0·865 gm. at 25°, 0·894 gm. at 30°. D_4^0 1·28034 (1·28238, 1·28082), D_4^{20} 1·2521 (1·2501, 1·2569), $D_4^{83.5}$ 1·1576. n_D^{15} 1·44759, n_D^{20} 1·44432 (1·44439). Heat of comb. C_p 296·36 Cal. KOH in EtOH $\longrightarrow$ vinyl chloride. $NH_3 \longrightarrow$ ethylenediamine and diethylenediamine. $AlCl_3 \longrightarrow$ acetylene. Aniline $\longrightarrow$ diphenylpiperazine.

Limpricht, *Ann.*, 1855, **94**, 245.
Bahr, Zieler, *Z. angew. Chem.*, 1930, **43**, 233.
Gersdorff, *U.S. Dept. Agriculture, Miscellaneous Publications*, 1932, **117**, 3 (*Bibl.*).

Ethylene dicyanide.

See under Succinic Acid.

Ethylenediethyldiamine.

See sym.-Diethylethylenediamine.

Ethylene di-iodide (sym.-*Di-iodoethane*)

$ICH_2{\cdot}CH_2I$

$C_2H_4I_2$ MW, 282

Prisms or plates. M.p. 81–2°. Decomp. in the light. D^{10} 2·132. Heat of comb. C_v 324·3 Cal., C_p 324·9 Cal. Br $\longrightarrow$ ethylene dibromide. EtOH at 70° $\longrightarrow$ 2-iododiethyl ether. $HgCl_2 \longrightarrow$ 2-chloro-1-iodoethane and ethylene dichloride. $AgNO_2 \longrightarrow$ 1 : 2-dinitroethane and 2-nitroethyl nitrite.

Semenoff, *Jahresber. Fortschr. Chem.*, 1864, 483.

Ethylenedimethyldiamine.

See sym.-Dimethylethylenediamine.

Ethylenedi-β-naphthyldiamine.

See sym.-Di-2-naphthylethylenediamine.

Ethylenediphenyldiamine.

See sym.-Diphenylethylenediamine.

Ethylene Dithioglycol (*Dimercaptoethane, dithioethylene glycol*)

$HS{\cdot}CH_2{\cdot}CH_2{\cdot}SH$

$C_2H_6S_2$ MW, 94

B.p. 146°. D^{24} 1·123. Sol. EtOH, alkalis. $HNO_3 \longrightarrow$ ethane-disulphonic acid. Br in $CHCl_3$ or $H_2SO_4 \longrightarrow$ diethylene tetrasulphide.

Di-Me ether: $C_4H_{10}S_2$. MW, 122. B.p. 183°.

Mono-Et ether: $C_4H_{10}S_2$. MW, 122. B.p. 188°.

Di-Et ether: $C_6H_{14}S_2$. MW, 150. B.p. 210–13°.

Meyer, *Ber.*, 1886, **19**, 3263.
Fasbender, *Ber.*, 1887, **20**, 461.

Ethyleneditolyldiamine.

See sym.-Ditolylethylenediamine.

Ethylene fluorobromide.

See sym.-Fluorobromoethane.

Ethylene fluorochloride.

See sym.-Fluorochloroethane.

Ethylene fluorohydrin (2-*Fluoroethyl alcohol*, 2-*fluoro*-1-*hydroxyethane*)

$FCH_2{\cdot}CH_2OH$

C_2H_5OF MW, 64

F.p. − 26·45°. B.p. 103·35°/757 mm. $D^{18.3}$ 1·11124, D^0 1·1297. $n_D^{18.4}$ 1·36470. Sol. H_2O. Dissolves $CaCl_2$ and $Ca(NO_3)_2$.

Acetyl: fluoroethyl acetate. $C_4H_7O_2F$. MW, 106. B.p. 119·3°/753 mm., 45·5°/27 mm. D^{20} 1·0982. n_D^{10} 1·37792.

Swarts, *Rec. trav. chim.*, 1914, **33**, 258, (*Chem. Abstracts*, 1915, **9**, 3227).

Ethylene Glycol (sym.-*Dihydroxyethane, glycol*)

HO·CH_2·CH_2·OH

$C_2H_6O_2$ MW, 62

Odourless, viscous liq. with sweet taste. M.p. − 11·5° (− 15·6°). B.p. 197°, 140·8°/101 mm., 136·7°/83 mm., 122·5°/44 mm., 109°/25 mm., 93°/13 mm. D_4^{20} 1·1088. n_D^{20} 1·43178 Misc. in all proportions with H_2O, EtOH, MeOH, amyl alcohol, Me_2CO, glycerol, AcOH, Py. Not misc. with $CHCl_3$, CCl_4, Et_2O, C_6H_6, CS_2. Heat of comb. C_p 282·2 Cal. Heat of form. C_p − 111·1 Cal.

Mono-acetyl: b.p. 187–9°.

Diacetyl: b.p. 186–7°. D^0 1·128.

*Mono-*p*-nitrobenzoyl*: m.p. 77–8°.

Mono-Me ether: *see* Methyl 2-hydroxyethyl Ether.

Di-Me ether: 1 : 2-dimethoxyethane. $C_4H_{10}O_2$. MW, 90. M.p. − 58°. B.p. 82–3°, 78°/750 mm. D_4^{15} 0·86877, D_4^{20} 0·86285. n_α^{20} 1·37216.

Mono-Et ether: *see* 2-Hydroxydiethyl Ether.

Di-Et ether: 1 : 2-diethoxyethane. $C_6H_{14}O_2$. MW, 118. B.p. 123·5°/758·5 mm. D^0 0·8628 (0·7993), D^{20} 0·8484.

Propyl ether: *see* 2-Hydroxyethyl propyl Ether.

Isopropyl ether: *see* 2-Hydroxyethyl isopropyl Ether.

Butyl ether: *see* 2-Hydroxyethyl butyl Ether.

Isobutyl ether: *see* 2-Hydroxyethyl isobutyl Ether.

Amyl ether: *see* 2-Hydroxyethyl amyl Ether.

Mono-allyl ether: 2-hydroxyethyl allyl ether. $C_5H_{10}O_2$. MW, 102. B.p. 158·8–159°/755·4 mm. D_{15}^{15} 0·96095.

Ethylene ether: *see* 1 : 4-Dioxan.

Phenyl ether: *see* 2-Hydroxyethyl phenyl Ether.

Chlorophenyl ether: *see* 2-Hydroxyethyl chlorophenyl Ether.

Diphenyl ether: *sym.*-diphenoxyethane. $C_{14}H_{14}O_2$. MW, 214. Leaflets from EtOH. M.p. 98°. Sol. Et_2O, $CHCl_3$, hot EtOH. Insol. H_2O.

*Di-*p*-aminophenyl ether*: *pp'*-diaminodiphenoxyethane. $C_{14}H_{16}O_2N_2$. MW, 244. Needles from EtOH. M.p. 176°. $FeCl_3$ ⟶ cherry-red col. Sol. H_2SO_4 ⟶ blue col.

Tolyl ether: *see* 2-Hydroxyethyl tolyl Ether.

Naphthyl ether: *see* 2-Hydroxyethyl naphthyl Ether.

Brooks, Humphrey, *Ind. Eng. Chem.*, 1917, **9**, 750.

Haworth, Perkin, *J. Chem. Soc.*, 1896, **69**, 176.

Niederist, *Ann.*, 1879, **196**, 354.

Ullrich, *Metallbörse*, 1929, **19**, 901, 957, 1013. (*Review of patent literature.*)

Skarblöm, E.P., 369,141, (*Chem. Zentr.*, 1932, II, 121).

Soc. Française de Catalyse Généralisée, F.P., 729,952, (*Chem. Zentr.*, 1932, II, 2107).

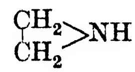
Dreyfus, F.P., 737,612, (*Chem. Zentr.*, 1933, I, 2313).

Schrader, *Z. angew. Chem.*, 1929, **42**, 541.

Clarke, *J. Chem. Soc.*, 1912, **101**, 1802.

Wurtz, *Ann. chim. phys.*, 1859, **55**, 431.

Ethyleneimine (*Aminoethylene, dimethyleneimine, azirane*)



C_2H_5N MW, 43

Liq. with strong ammoniacal odour. B.p. 55–6°/756 mm. Misc. with H_2O. D^{24} 0·8321. H_2S ⟶ thioethylamine. SO_2 ⟶ taurine. Shows strong alkaline reaction. This compound was formerly supposed to be vinylamine, CH_2:CH·NH_2, the methods of preparation of which were later shown to give the cyclic imine.

Oxalate: needles. M.p. 115° decomp.

N-*Toluenesulphonyl*: cryst. from ligroin. M.p. 52°.

Picrate: m.p. 142°.

Howard, Marckwald, *Ber.*, 1899, **32**, 2036.

Marckwald, *Ber.*, 1900, **33**, 764.

Gabriel, Stelzner, *Ber.*, 1895, **28**, 2929.

Ethylene iodohydrin (2-*Iodoethyl alcohol*, 2-*iodo*-1-*hydroxyethane*)

ICH_2·CH_2OH

C_2H_5OI MW, 172

B.p. 176–7° part. decomp., 85°/25 mm. Sol. H_2O. D^{20} 2·905. $AgNO_2$ ⟶ 2-nitroethyl alcohol. $Pb(OH)_2$ ⟶ acetaldehyde.

Me ether: methyl 2-iodoethyl ether. C_3H_7OI. MW, 186. B.p. 137·8°/750 mm.

Et ether: *see* 2-Iododiethyl Ether.

Butlerow, Ossokin, *Ann.*, 1867, **144**, 42.

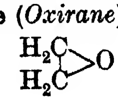
Ethylenelactic Acid.

See Hydracrylic Acid.

Ethylenemalonic Acid.

See Cyclopropane-1 : 1-dicarboxylic Acid.

Ethylene oxide (*Oxirane*)



C_2H_4O MW, 44

B.p. 13·5°/746·5 mm. (12·5°). D_4^4 0·8909, D_{10}^{10} 0·8824. n_D^7 1·35965. Sol. H_2O. Heat of comb. C_p 312·55 (308·4) Cal., C_v 307·5 Cal. Reduces $AgNO_3$. NaHg $\longrightarrow$ C_2H_5OH. HCl $\longrightarrow$ ethylene chlorohydrin. $N(CH_3)_3 \longrightarrow$ choline. Condenses with hydroxy and amino compounds to give hydroxyethyl derivatives and polymers containing the group $[-O\cdot CH_2\cdot CH_2-]_n$.

Demole, *Ann.*, 1874, **173**, 125.
Roithner, *Monatsh.*, 1894, **15**, 666.
Badische, D.R.P., 299,682, (*Chem. Zentr.*, 1920, IV, 16).
Kahlbaum, F.P., 728,849, (*Chem. Zentr.*, 1932, II, 2532).
Anglo-Persian Oil Co., E.P., 374,864, (*Chem. Zentr.*, 1932, II, 2723).
Soc. Française de Catalyse Généralisée, F.P., 739,562, (*Chem. Zentr.*, 1933, I, 2607).
Schrader, *Z. angew. Chem.*, 1929, **42**, 541.

Ethylene oxide carboxylic Acid.
See Glycidic Acid.

Ethylenesuccinic Acid.
See Cyclobutane-1 : 2-dicarboxylic Acid.

Ethylene sulphide (*Dimethylene sulphide*)

$$\begin{matrix} CH_2 \\ | \\ CH_2 \end{matrix} \!\!> S$$

C_2H_4S MW, 60

Colourless liq. B.p. 55–6°. D_4^0 1·0368 (1·0342). n_D^{18} 1·4914 (1·49001). Rapidly polymerises. $CH_3I \longrightarrow$ cryst. sulphonium iodide.

Delépine, *Compt. rend.*, 1920, **171**, 36.

Ethyleneurea (*2-Ketotetrahydroglyoxaline, tetrahydroiminazolone-2*)

$$\begin{matrix} CH_2\cdot NH \\ | \\ CH_2\cdot NH \end{matrix} \!\!> CO$$

$C_3H_6ON_2$ MW, 86

Needles. M.p. 131°. Sol. H_2O, hot EtOH. Spar. sol. Et_2O.

Fischer, Koch, *Ann.*, 1886, **232**, 227.

***N*-Ethylethanolamine.**
See 2-Hydroxydiethylamine.

Ethyl Ether.
See Diethyl Ether.

Ethyl ethylaminoformate.
See Ethylurethane.

Ethylethylene.
See 1-Butylene.

Ethylethylideneacetone.
See 2-Heptenone-4.

Ethyl fluoride (*Fluoroethane*)

$$CH_3\cdot CH_2F$$

C_2H_5F MW, 48

Gas. Liquifies at − 32° under atmospheric press., at 19° under 8 atm. Sol. EtOH, Et_2O. 100 c.c. H_2O dissolve 198 c.c. at 14°. 100 c.c. EtI dissolve 1480 c.c.

Moissan, *Ann. chim. phys.*, 1890, **19**, 272.
Meslans, *Ann. chim. phys.*, 1896, **7**, 94.

Ethyl formate

$$H\cdot CO\cdot OC_2H_5$$

$C_3H_6O_2$ MW, 74

B.p. 54·3°. $D_4^{10·3}$ 0·92286, D_4^{20} 0·91678. n_D^{20} 1·35975. Heat of comb. (vapour) C_p 400·06 (388·0) Cal., (liq.) C_p 391·7 Cal., C_v 391·4 Cal. $R\cdot C⋮CNa \longrightarrow R\cdot C⋮C\cdot CHO$.

Bishop, *J. Soc. Chem. Ind.*, 1923, **42**, 401T.
Young, Thomas, *J. Chem. Soc.*, 1893, **63**, 1202.
M.L.B., D.R.P., 315,021, (*Chem. Zentr.*, 1919, IV, 1104).

Ethylfumaric Acid (*1-Butylene-1 : 2-dicarboxylic acid, methylmesaconic acid*)

$$\begin{matrix} CH_3\cdot CH_2\cdot \overset{2}{C}\cdot COOH \\ \| \\ HOOC\cdot \underset{1}{C}H \end{matrix}$$

$C_6H_8O_4$ MW, 144

Prisms from H_2O. M.p. 194–5°. Sol. Et_2O. Spar. sol. $CHCl_3$, ligroin. $k = 9·4 \times 10^{-4}$ at 25°. Dist. with $P_2O_5 \longrightarrow$ ethylmaleic acid.

1-Et ester: $C_8H_{12}O_4$. MW, 172. Needles from Et_2O. M.p. 88°.

2-Et ester: m.p. 53°.

Di-Et ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 122–3°/12 mm.

Diamide: $C_6H_{10}O_2N_2$. MW, 142. Leaflets. M.p. 203–4°.

Anschütz, *Ann.*, 1928, **461**, 169.
Fichter, Goldhaber, *Ber.*, 1904, **37**, 2384.
Bischoff, *Ber.*, 1891, **24**, 2013.

Ethylgalactoside.
See Galactite.

Ethylglucoside.
See under Glucose.

1-Ethylglutaconic Acid (*1-Amylene-1 : 3-dicarboxylic acid, 1-pentene-1 : 3-dicarboxylic acid*)

$$\begin{matrix} C_2H_5\cdot CH\cdot COOH \\ | \\ CH \\ \| \\ CH\cdot COOH \end{matrix}$$

$C_7H_{10}O_4$ MW, 158

Exists in two forms. (i) Prisms from $CHCl_3$. M.p. 108°. Hot HCl $\longrightarrow$ (ii). (ii) Cryst. from H_2O. M.p. 133–4°.

Di-Et ester: $C_{11}H_{18}O_4$. MW, 214. B.p. 171°/62 mm.

Thole, Thorpe, *J. Chem. Soc.*, 1911, **99**, 2199, 2225.
Bland, Thorpe, *J. Chem. Soc.*, 1912, **101**, 1557.

Ethylglycine (*Ethylaminoacetic acid, ethylglycocoll*)

$CH_3·CH_2·NH·CH_2·COOH$

$C_4H_9O_2N$ MW, 103

Plates from EtOH. M.p. above 160° decomp.
B,HCl: plates. M.p. about 180°.
Et-amide: m.p. 179–179·5°.
Nitrile: ethylaminoacetonitrile. $C_4H_8N_2$. MW, 84. B.p. 166–7°, 81–3°/29 mm.

Heintz, *Ann.*, 1864, **129**, 35; 1864, **132**, 1.

Ethylglycylhydroxylamine.
See N′-Hydroxy-N-ethylurea.

Ethylguanidine (*Guanidinoethane*)

$H_2N·C(:NH)·NH·CH_2·CH_3$

$C_3H_9N_3$ MW, 87

Free base not described.
B_2,H_2PtCl_6: decomp. at 188–90°.
$B,HAuCl_4$: m.p. 100–103°. Sinters at 78–80°.
Picrate: m.p. 178–80°.
Picrolonate: decomp. at 285°.

Schenck, Kirchhof, *Z. physiol. Chem.*, 1926, **154**, 293.

Ethyl heptadecyl Ketone (*Eicosanone-3, 3-ketoeicosane*)

$CH_3·[CH_2]_{15}·CH_2·CO·CH_2·CH_3$

$C_{20}H_{40}O$ MW, 296

Leaflets from EtOH. M.p. 60–1° (57°). Sol. Et_2O, Me_2CO, AcOH, C_6H_6. Spar. sol. cold EtOH.
Oxime: needles from EtOH. M.p. 55·5–56·5°. Sol. Et_2O, Me_2CO. Spar. sol. EtOH, pet. ether.
Isonitroso deriv.: needles from pet. ether. M.p. 80–1°.

Ponzio, de Gaspari, *Gazz. chim. ital.*, 1899, **29**, I, 474.
Ryan, Nolan, *Chem. Zentr.*, 1913, II, 2050.

1-Ethylheptane.
See Nonane.

4-Ethylheptane (*Ethyldipropylmethane*)

$CH_3·CH_2·CH_2·CH(C_2H_5)·CH_2·CH_2·CH_3$

C_9H_{20} MW, 128

B.p. 138–9°. D^{20} 0·7407. n_D^{20} 1·41564.

Oberreit, *Ber.*, 1896, **29**, 2003.

4-Ethylheptanol-4.
See Ethyldipropylcarbinol.

Ethyl-n-heptylcarbinol (*Decanol-3, 3-hydroxydecane*)

$CH_3·[CH_2]_6·CH(OH)·CH_2·CH_3$

$C_{10}H_{22}O$ MW, 158

dl-.
B.p. 213°.

l-.
B.p. 108°/15 mm. D_4^{20} 0·8272. n_D^{20} 1·4336. $[\alpha]_D^{20}$ − 7·67° in C_6H_6, − 6·21° in EtOH.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1945.

Ethyl n-heptyl Ether

$CH_3·[CH_2]_6·O·CH_2·CH_3$

$C_9H_{20}O$ MW, 144

B.p. 166·6°, 165°/748·3 mm. D_0^0 0·7949, D^{16} 0·790.

Cross, *Ann.*, 1877, **189**, 5.
Welt, *Ber.*, 1897, **30**, 1494.

Ethyl n-heptyl Ketone (*Decanone-3, 3-ketodecane*)

$CH_3·[CH_2]_6·CO·CH_2·CH_3$

$C_{10}H_{20}O$ MW, 156

B.p. 211°. H ⟶ ethyl-n-heptylcarbinol.
Semicarbazone: m.p. 100–1°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1945.

1-Ethylhexane.
See Octane.

2-Ethylhexane.
See 3-Methylheptane.

3-Ethylhexane (*Diethylpropylmethane*)

$CH_3·CH_2·CH_2·CH(C_2H_5)·CH_2·CH_3$

C_8H_{18} MW, 114

B.p. 116–19°, 118·8–119°/766 mm. D_{15}^{15} 0·7175. n_D^{25} 1·3993. Heat of comb. C_v 1301 Cal.

Clarke, Riegel, *J. Am. Chem. Soc.*, 1912, **34**, 678.
Pope, Dykstra, Edgar, *J. Am. Chem. Soc.*, 1929, **51**, 2204.

2-Ethylhexanol-1.
See 2-Ethyl-n-hexyl Alcohol.

3-Ethylhexanol-3.
See Diethylpropylcarbinol.

2-Ethyl-*n*-hexyl Alcohol (*2-Ethylhexanol-1*)

$$CH_3\cdot[CH_2]_3\cdot\overset{C_2H_5}{CH}\cdot CH_2OH$$

$C_8H_{18}O$ MW, 130

B.p. 181–3°/743 mm. D_4^{20} 0·8328. n_D^{20} 1·4328. Al_2O_3 at 400° ⟶ octene.

Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 351.
Weizmann, Garrard, *J. Chem. Soc.*, 1920, **117**, 329.

Ethyl-*n*-hexylcarbinol (*Nonanol-3, 3-hydroxynonane*)

$$CH_3\cdot[CH_2]_5\cdot CH(OH)\cdot CH_2\cdot CH_3$$

$C_9H_{20}O$ MW, 144

dl-.

F.p. − 23° to − 22°. B.p. 194·5–195°/750 mm., 99·5–101·5°/24 mm. D^0 0·839, D_4^{20} 0·825. n_D 1·42791. Insol. H_2O. Sol. Et_2O, EtOH.

d-.

B.p. 97°/17 mm. $D_4^{16·8}$ 0·8281. n_D^{20} 1·4308. $[\alpha]_D^{20·6}$ + 8·05°.

l-.

B.p. 94°/13 mm. D_4^{17} 0·8277. $[\alpha]_D^{17}$ − 7·96°.

Bagard, *Bull. soc. chim.*, 1907, **1**, 359.
Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 70; 1913, **103**, 1945.

Ethyl *n*-hexyl Ether

$$CH_3\cdot[CH_2]_5\cdot O\cdot CH_2\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 134–7°, 42°/14 mm.

Lieben, Janecek, *Ann.*, 1877, **187**, 139.

Ethyl *n*-hexyl Ketone (*Nonanone-3, 3-ketononane*)

$$CH_3\cdot[CH_2]_5\cdot CO\cdot CH_2\cdot CH_3$$

$C_9H_{18}O$ MW, 142

F.p. − 8°. B.p. 190° (185–6°), 86°/20 mm. D_0^{20} 0·825. CrO_3 ⟶ acetic, propionic, caproic and heptylic acids.
Semicarbazone: m.p. 111–12°.

Wagner, *J. prakt. Chem.*, 1891, **44**, 267.
Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1936.

Ethylhydrazine

$$CH_3\cdot CH_2\cdot NH\cdot NH_2$$

$C_2H_8N_2$ MW, 60

Ethereal, hygroscopic liq. with ammoniacal odour. B.p. 99·5°/709 mm. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6. Fumes in moist air. Corrosive. Attacks cork and rubber. Reduces Fehling's solution. Gives carbylamine reaction with chloroform and potash. EtI ⟶ *sym.*-diethylhydrazine. KCNO ⟶ ethylsemicarbazide.
B,H₂SO₄: plates from hot EtOH. M.p. 110–20°.

Fischer, *Ann.*, 1879, **199**, 287.

Ethyl hydrogen carbonate

$$CH_3\cdot CH_2\cdot O\cdot CO\cdot OH$$

$C_3H_6O_3$ MW, 90

F.p. − 61° to − 57°. Unstable at ordinary temps.
K salt: sol. H_2O, EtOH. Insol. Et_2O.
Na salt: sol. H_2O. Spar. sol. EtOH.
Chloride: *see* Ethyl chloroformate.
Amide: *see* Urethane.

Hempel, Seidel, *Ber.*, 1898, **31**, 3001.
Faurholt, *Z. physik. Chem.*, 1927, **126**, 227.

Ethyl hydrogen sulphate (*Sulphovinic acid, ethyl sulphuric acid*)

$$CH_3\cdot CH_2\cdot O\cdot SO_3H$$

$C_2H_6O_4S$ MW, 126

Oily liq. Slowly hyd. by H_2O. D^{17} 1·316. Heat ⟶ ethylene. EtOH ⟶ diethyl ether (at 140° ⟶ diethyl sulphate). Most of the salts are easily sol. H_2O, and are decomp. on boiling in conc. solution.
NH₄ salt: prisms from EtOH. M.p. 99°.
Na salt, 1H₂O: sol. H_2O.
K salt: sol. in 0·8 part H_2O at 17°.
Mg salt, 4H₂O: sol. H_2O.
Ca salt, 2H₂O: sol. in 0·8 part H_2O at 17°.
Ba salt, 2H₂O: sol. in 0·92 part H_2O at 17°.

Berthelot, *Bull. soc. chim.*, 1873, **19**, 295.
Claesson, *J. prakt. Chem.*, 1879, **19**, 246.
Evans, Albertson, *J. Am. Chem. Soc.*, 1917, **39**, 456.
Compagnie de Béthune, E.P., 221,512, (*Chem. Abstracts*, 1925, **19**, 832).
Popelier, *Bull. soc. chim. Belg.*, 1926, **35**, 264.
Hamid, Singh, Dunnicliff, *J. Chem. Soc.*, 1926, 1098.

Ethyl hydrogen sulphite

$$CH_3\cdot CH_2\cdot O\cdot SO_2H$$

$C_2H_6O_3S$ MW, 110

Unstable in free state. Salts unstable in solid state. Aq. sols. decomp. slowly in cold, rapidly on heating. Dil. acids ⟶ SO_2. Decolourises $KMnO_4$.

Rosenheim, Liebknecht, *Ber.*, 1898, **31**, 408.
Divers, Ogawa, *J. Chem. Soc.*, 1899, **75**, 534.
Goldberg, Zimmermann, *Z. angew. Chem.*, 1902, **15**, 899.

Ethyl 1-hydroxybutyl Ketone.
See 4-Heptanolone-3.

Ethyl 3-hydroxybutyl Ketone.
See 2-Heptanolone-5.

Ethyl 2-hydroxyethyl Ether.
See 2-Hydroxydiethyl Ether.

***O*-Ethylhydroxylamine** (*α-Ethylhydroxylamine*)

$NH_2{\cdot}O{\cdot}CH_2{\cdot}CH_3$

C_2H_7ON MW, 61

Inflammable liq. with strong odour. B.p. 68°. Misc. with H_2O, EtOH, Et_2O. $D^{7\cdot5}$ 0·8827. Alkaline to litmus.
B,HCl : m.p. 128°.
B_2,H_2PtCl_6 : m.p. 174–6° decomp.

Lossen, Zanni, *Ann.*, 1876, **182**, 222.
Gürke, *Ann.*, 1880, **205**, 274.
Jones, Oesper, *J. Am. Chem. Soc.*, 1914, **36**, 730.

***N*-Ethylhydroxylamine** (*β-Ethylhydroxylamine*)

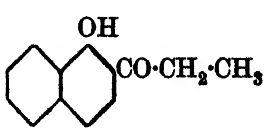
$CH_3{\cdot}CH_2{\cdot}NH{\cdot}OH$

C_2H_7ON MW, 61

Needles from ligroin. M.p. 59–60°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6, cold ligroin. D_4^{20} 0·9079. n_D^{20} 1·41519. Reduces Fehling's. HI ⟶ ethylamine. PhNCO ⟶ *N*-hydroxy-*N*-ethyl-*N'*-phenylurea. Na_3AsO_3 ⟶ ethylamine.
B,HI : m.p. 75°.
Oxalate : m.p. 95–7°.

Hantzsch, Hilland, *Ber.*, 1898, **31**, 2065.
Pierron, *Bull. soc. chim.*, 1899, **21**, 784.
Jones, Oesper, *J. Am. Chem. Soc.*, 1914, **36**, 729.

Ethyl 1-hydroxy-2-naphthyl Ketone (*1-Hydroxy-2-propionaphthone*, *2-propionyl-1-naphthol*)



$C_{13}H_{12}O_2$ MW, 200

Greenish-yellow plates from EtOH. M.p. 81°. Alc. $FeCl_3$ ⟶ reddish-brown col. Conc. H_2SO_4 ⟶ orange-yellow col.

Me ether : $C_{14}H_{14}O_2$. MW, 214. Needles from ligroin. M.p. 42–3°. *Semicarbazone* : needles from EtOH. M.p. 192°. *Oxime* : needles from EtOH. M.p. 112–13°.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, **43**, 95.
Hantzsch, *Ber.*, 1906, **39**, 3096.
Heilbron, Hey, Lowe, *J. Chem. Soc.*, 1934, 1314.

Ethyl *p*-hydroxyphenyl sulphide.
See under Thiohydroquinone.

Ethyl 1-hydroxypropyl Ketone.
See Diethylketol.

Ethyl 3-hydroxypropyl Ketone.
See 1-Hexanolone-4.

Ethyl hydroxytolyl Ketone.
See Hydroxymethylpropiophenone.

Ethyl hypochlorite

$CH_3{\cdot}CH_2{\cdot}OCl$

C_2H_5OCl MW, 80·5

Yellow liq. B.p. 36°/752 mm. Misc. with Et_2O, $CHCl_3$, C_6H_6. Explodes on heating, or in cold with Cu powder. Decomp. spontaneously, rapidly in sunlight. HCl ⟶ $C_2H_5OH + Cl_2$.

Sandmeyer, *Ber.*, 1886, **19**, 858.

Ethylideneacetone (*Methyl propenyl ketone*, *2-pentenone-4*)

$CH_3{\cdot}CH{:}CH{\cdot}CO{\cdot}CH_3$

C_5H_8O MW, 84

Colourless liq. with fruity odour, but becomes pungent on keeping. B.p. 122°. D^{15} 0·861, D_4^{20} 0·8624. n_D^{20} 1·4350.
Semicarbazone : m.p. 142°. 2 Mols. semicarbazide hydrochloride ⟶ semicarbazone of methyl β-semicarbazidopropyl ketone, m.p. 126°.

Claisen, *Ann.*, 1899, **306**, 326.
Wohl, Maag, *Ber.*, 1910, **43**, 3284.
Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 534.

Ethylideneaniline (*Acetaldehyde anil*)

$C_6H_5{\cdot}N{:}CH{\cdot}CH_3$

C_8H_9N MW, 119

Oil. Polymerises rapidly to 1 : 3-dianilino-1-butylene. Alkalis ⟶ aniline. Dil. acids ⟶ acetaldehyde. HCN ⟶ 1-anilinopropionitrile. H_2SO_3 ⟶ 1-anilinoethane-1-sulphonic acid.

Miller, Plöchl, Eckstein, *Ber.*, 1892, **25**, 2030.

Ethylidene bromide (*unsym.-Dibromoethane*, *1 : 1-dibromoethane*)

$CH_3{\cdot}CHBr_2$

$C_2H_4Br_2$ MW, 188

B.p. 112·5°/755 mm., 109–10°/751 mm. D_{15}^{15} 2·10294, D_{25}^{25} 2·08540, $D_4^{17·5}$ 2·10006, D_4^{30} 2·05545. n_D^{20} 1·512767. Br (+ Fe) ⟶ 1 : 1 : 2-tribromoethane. PbO + H_2O at 130° ⟶ acetaldehyde. NH_3 at 140° ⟶ 2-methyl-5-ethylpyridine.

Reboul, *Ann.*, 1870, **155**, 30.
Games Paternó, Pisati, *Ber.*, 1872, **5**, 289.

Ethylidene bromoiodide.
See 1-Bromo-1-iodoethane.

2-Ethylidenebutane.
See 3-Methyl-2-pentene.

3-Ethylidenebutyric acid (*γ-Amylene-α-carboxylic acid, 2-pentene-5-carboxylic acid, 3-hexenic acid*)

CH₃·CH:CH·CH₂·CH₂·COOH

$C_6H_{10}O_2$ MW, 114

Exists in two modifications.

(I) M.p. 1°. B.p. 206·5°, 106–8°/8 mm., 73°/0·5 mm. $D_4^{17·2}$ 0·9715. $n_D^{17·2}$ 1·4413. $k = 1·91$ (1·74) $\times 10^{-5}$ at 25°.

(II) B.p. 111–12°/20 mm. $D_4^{18·7}$ 0·9584. $n_D^{18·7}$ 1·4367.

$KMnO_4$ ⟶ succinic and acetic acids.

Chloride: C_6H_9OCl. MW, 132·5. B.p. 48–50°/7 mm.

Anilide: m.p. 87°.

p-*Toluidide*: m.p. 103°.

Fichter, *Ber.*, 1896, **29**, 2370.
Eccott, Linstead, *J. Chem. Soc.*, 1929, 2163.
Wallach, *Ann.*, 1905, **343**, 48.
v. Braun, Kirschbaum, *Ber.*, 1919, **52**, 1716.

Ethylidene chloride (unsym.-*Dichloroethane, 1 : 1-dichloroethane*)

$CH_3·CHCl_2$

$C_2H_4Cl_2$ MW, 99

F.p. − 96·6° (− 101·5°). B.p. 57·3° (59·2°). 100 gm. H_2O dissolve 0·656 gm. at 0°, 0·595 at 10°, 0·550 at 20°, 0·540 at 30°. D_4^0 1·2049, D_0^{15} 1·1835, D_4^{20} 1·1750 (1·1755), D_0^{30} 1·1601. n_D^{15} 1·41975, n_D^{20} 1·41655 (1·41678). Heat of comb. C_v 267·4 Cal., C_p 267·1 Cal. NH_3 in EtOH at 160° ⟶ 2-methyl-5-ethylpyridine.

Beilstein, *Ann.*, 1860, **113**, 110.
D'Ans, Kautzsch, *J. prakt. Chem.*, 1909, **80**, 310.
Coleman, Dow Chemical Co., U.S.P., 1,900,276, (*Chem. Abstracts*, 1933, **27**, 2965).

Ethylidene chlorobromide.
See unsym.-Chlorobromoethane.

4-Ethylidenecrotonyl Alcohol.
See 2 : 4-Hexadienol-1.

Ethylidenecyclobutylisobutyric Acid.
See γ-Fencholenic Acid.

Ethylidene diacetate (1 : 1-*Diacetoxyethane*)

$CH_3·CH(O·COCH_3)_2$

$C_6H_{10}O_4$ MW, 146

Liq. with sharp, fruity odour. B.p. 168°/740 mm., 113–15°/144 mm., 65–7°/10 mm. D^{12} 1·061. KOH ⟶ acetaldehyde.

Knoevenagel, *Ann.*, 1914, **402**, 127.
Chemische Fabrik Greisheim-Elektron, D.R.P., 271,381, (*Chem. Zentr.*, 1914, I, 1316).
Consortium für Elektro-chemische Industrie Gesellschaft, E.P., 288,549, (*Chem. Abstracts*, 1929, **23**, 608).
Morrison, Shaw, *Transactions of the Electrochemical Society*, 1933, **63**, 23.
Walter, Deutsche Gold und Silber-Scheideanstalt vormals Roessler, D.R.Ps., 556,775, 571,318, (*Chem. Abstracts*, 1933, **27**, 312, 2696).

Ethylidene-diacetic Acid.
See 2-Methylglutaric Acid.

Ethylidene-dianiline.
See Diphenylethylidenediamine.

α-Ethylidenediphenylmethane.
See 1 : 1-Diphenylpropylene.

Ethylidene-diurethane (*Dicarbethoxyethylidenediamine*)

$CH_3·CH<\begin{matrix}NH·COOC_2H_5\\NH·COOC_2H_5\end{matrix}$

$C_8H_{16}O_4N_2$ MW, 204

Needles. M.p. 125–6°. B.p. 170–8°/20 mm. Sol. MeOH, Me_2CO, $CHCl_3$. Spar. sol. Et_2O, ligroin, C_6H_6.

Curtius, *Ber.*, 1912, **45**, 1083.

1-Ethylideneglutaric Acid (*γ-Amylene-αγ-dicarboxylic acid, 2-pentene-3 : 5-dicarboxylic acid*)

$CH_3·CH:C·COOH$
  CH_2
  $CH_2·COOH$

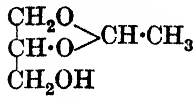
$C_7H_{10}O_4$ MW, 158

Needles from H_2O. M.p. 152°. Sol. hot H_2O, Et_2O. Spar. sol. $CHCl_3$, C_6H_6, CS_2, pet. ether. $k = 3·2 \times 10^{-5}$ at 25°.

Anhydride: $C_7H_8O_3$. MW, 140. Needles from Et_2O–pet. ether. M.p. 87°.

Fichter, *Ber.*, 1896, **29**, 2369.
Fichter, Eggert, *Ber.*, 1898, **31**, 1998.

1 : 2-Ethylideneglycerol



$C_5H_{10}O_3$ MW, 118

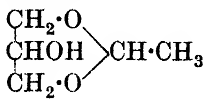
B.p. 68–70°/1 mm. D_4^{17} 1·1243. n_D^{17} 1·4413.

Me ether: $C_6H_{12}O_3$. MW, 132. B.p. 56–8°/23 mm. D_4^{17} 1·0224. n_D^{17} 1·4177.

Benzoyl: b.p. 144–5°/2 mm. D_4^{17} 1·1618. n_D^{17} 1·5145.

Hill, Hill, Hibbert, *J. Am. Chem. Soc.*, 1928, **50**, 2248.

1 : 3-Ethylideneglycerol



$C_5H_{10}O_3$ MW, 118

B.p. 52°/1 mm. D_4^{17} 1·1477. n_D^{17} 1·4532.

Me ether: b.p. 80°/23 mm. D_4^{17} 1·0705. n_D^{17} 1·4375.

Benzoyl: m.p. 86°.

See above reference.

Ethylidene iodide (unsym.-*Di-iodoethane*)

$CH_3 \cdot CHI_2$

$C_2H_4I_2$ MW, 282

B.p. 177–9°. D^0 2·84.

Gustavson, *Ber.*, 1874, **7**, 731.
Spindler, *Ann.*, 1885, **231**, 266.

3-Ethylidenepentane.
See 3-Ethylpentene-2.

2-Ethylidenepropane.
See 2-Methylbutylene-2.

1-Ethylidenepropionic Acid.
See Angelic Acid *and* Tiglic Acid.

2-Ethylidenepropionic Acid (2-*Pentenic acid*, 2-*butylene*-1-*carboxylic acid*, 3-*methylvinylacetic acid*, *propenylacetic acid*)

$CH_3 \cdot CH{:}CH \cdot CH_2 \cdot COOH$

$C_5H_8O_2$ MW, 100

B.p. 191–2°, 93·5–95°/16 mm. $D_4^{18 \cdot 8}$ 0·9885. $n_{He}^{18 \cdot 8}$ 1·43569. $k = 3{\cdot}35 \times 10^{-5}$ at 25°.

Me ester: $C_6H_{10}O_2$. MW, 114. B.p. 72–5°/87 mm., 42–3°/18 mm.

Et ester: $C_7H_{12}O_2$. MW, 128. B.p. 51–2°/15·5 mm.

Chloride: C_5H_7OCl. MW, 118·5. B.p. 53–4°/55 mm. $D_4^{16 \cdot 9}$ 1·0666. $n_{He}^{16 \cdot 9}$ 1·44990.

Amide: C_5H_9ON. MW, 99. Leaflets from C_6H_6. M.p. 69–70°.

Nitrile: C_5H_7N. MW, 81. B.p. 75°/74 mm. $D_4^{18 \cdot 8}$ 0·8423. $n_{He}^{18 \cdot 8}$ 1·42358.

p-*Bromophenacyl ester*: leaflets from C_6H_6–pet. ether. M.p. 87–8°.

Auwers, Meissner, Seydel, Wissebach, *Ann.*, 1923, **432**, 67.

Ethylidene-succinic Acid (1-*Methylitaconic acid*, 2-*butylene*-1 : 2-*dicarboxylic acid*)

$CH_3 \cdot CH{:}C \cdot COOH$
$CH_2 \cdot COOH$

$C_6H_8O_4$ MW, 144

Prisms. M.p. 166–7°. Spar. sol. Et_2O, cold H_2O. Insol. $CHCl_3$. $k = 9{\cdot}5 \times 10^{-5}$ at 25°. Non-volatile in steam. Na.Hg ⟶ ethylsuccinic acid.

Fittig, Fränkel, *Ann.*, 1889, **255**, 36, 40.
Fichter, Pfister, *Ber.*, 1904, **37**, 1998.

Ethylidene-urea (*Methylmethyleneurea*, *carbonylethylidenediamine*)

$CH_3 \cdot CH \langle {NH \atop NH} \rangle CO$

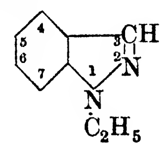
$C_3H_6ON_2$ MW, 86

Needles. M.p. 154°. Spar. sol. H_2O, EtOH, Et_2O.

Schiff, *Ann.*, 1869, **151**, 204.

4-Ethylidene-*n*-valeric Acid.
See 4-Heptenic Acid.

1-Ethylindazole



$C_9H_{10}N_2$ MW, 146

Oil. B.p. 233–4°/727 mm., 126–7°/21 mm.

Picrate: yellow needles. M.p. 148–50°.

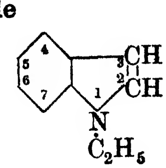
Auwers, Düesberg, *Ber.*, 1920, **53**, 1200.

2-Ethylindazole.

Leaflets from pet. ether. M.p. 37–9°. B.p. 268°, 140°/14 mm. Sol. H_2O, EtOH. Spar. sol. pet. ether. Volatile in steam.

Auwers, Pfuhl, *Ber.*, 1925, **58**, 1365.
Fischer, Tafel, *Ann.*, 1885, **227**, 314.
See also previous reference.

1-Ethylindole



$C_{10}H_{11}N$ MW, 145

Oil. B.p. 252–3°. D^{15} 1·2563.
Picrate: red needles from ligroin. M.p. 105°.

Michaelis, Robisch, *Ber.*, 1897, **30**, 2811.

2-Ethylindole.
Plates from ligroin. M.p. 43° (35°). B.p. 160–70°/25 mm., 142–3°/5 mm.

Verley, Beduwé, *Bull. soc. chim.*, 1925, **37**, 190.
I.C.I., E.P., 330,332, (*Chem. Zentr.*, 1930, II, 2055).

3-Ethylindole.
B.p. 282–4°/730 mm. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, ligroin. Spar. sol. H_2O. Insol. dil. acids. Volatile in steam.
Picrate: m.p. 143°.

Pictet, Duparc, *Ber.*, 1887, **20**, 3417.
Korczynski, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, **56**, 905.

Ethyl iodide (*Iodoethane*)

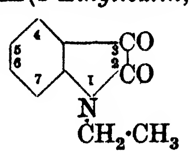
$CH_3{\cdot}CH_2I$

C_2H_5I MW, 156

B.p. 72·3°. D^{15} 1·94707, D^{30} 1·91326. n_D^{1} 1·51682. Heat of comb. C_p 356·0 Cal., C_v 355·4 Cal. Mg in $Et_2O \longrightarrow C_2H_5MgI$. Dry $AgNO_2$ $\longrightarrow$ nitroethane + ethyl nitrite.

Adams, Voorhees, *J. Am. Chem. Soc.*, 1919, **41**, 797.
Hunt, *J. Chem. Soc.*, 1920, **117**, 1592.

***N*-Ethylisatin** (1-*Ethylisatin*, 1-*ethyl-ψ-isatin*)



$C_{10}H_9O_2N$ MW, 175

Red cryst. from Et_2O. M.p. 95°. Sol. EtOH, hot H_2O. Mod. sol. Et_2O. Sol. alkalis with yellow col. of Na salt of *N*-ethylisatic acid. Blue col. with H_2SO_4 and crude C_6H_6.
3-*Oxime*: m.p. 160–2° with previous softening.

Stollé, Bergdoll, Luther, Auerhahn, Wacker, *J. prakt. Chem.*, 1930, **128**, 21.
Geigy, D.R.P., 320,647, (*Chem. Zentr.*, 1920, IV, 223).
Martinet, *Ann. chim.*, 1919, **11**, 101.
Michaelis, Robisch, *Ber.*, 1897, **30**, 2813.

5-Ethylisatin.
Red needles. M.p. 137°.

Paucksch, *Ber.*, 1884, **17**, 2806.

Ethylisoamylamine

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH_3$

$C_7H_{17}N$ MW, 115

B.p. 127°. Spar. sol. H_2O.
B_2,H_2PtCl_6: yellow needles.
Nitrosamine: b.p. 144°/85 mm.

Mailhe, *Bull. soc. chim.*, 1919, **25**, 324.
Sabatier, Mailhe, *Compt. rend.*, 1909, **148**, 900.
Durand, *Bull. soc. chim.*, 1897, **17**, 405.

Ethyl isoamylaminoformate.
See Isoamylurethane.

Ethylisoamylaniline

$C_6H_5{\cdot}N(C_2H_5){\cdot}CH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{13}H_{21}N$ MW, 191

Oil. B.p. 262°.
Picrate: yellow prisms. M.p. 103–4°.

Hofmann, *Ann.*, 1850, **74**, 156.

Ethylisoamylcarbinol (2-*Methylheptanol*-5)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_3$

$C_8H_{18}O$ MW, 130

Oil. B.p. 165–6°. n_D 1·42011.
Acetyl: b.p. 184–5°. D^{20} 0·8554. n_D 1·41602.

Buelens, *Rec. trav. chim.*, 1909, **28**, 114.

Ethyl isoamyl Ether

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_3$

$C_7H_{16}O$ MW, 116

B.p. 112°. D^{18} 0·764. $D^{21\cdot3}_{15}$ 0·7695. P_2O_5 $\longrightarrow$ 90% trimethylethylene + 10% isopropylethylene.

Peter, *Ber.*, 1899, **32**, 1419.

Ethyl isoamyl Ketone (3-*Keto*-6-*methylheptane*, 2-*methylheptanone*-5)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_8H_{16}O$ MW, 128

Liq. with pleasant odour resembling camphor. B.p. 163–163·5°/734·2 mm. D^{20} 0·8304. n_D 1·42087.
Semicarbazone: cryst. from hot ligroin. M.p. 132–3°.

Ponzio, de Gaspari, *Gazz. chim. ital.*, 1898, **28**, 275.
Bouveault, Locquin, *Bull. soc. chim.*, 1904, **31**, 1158.

2-Ethylisobutane.
See 2 : 2-Dimethylbutane.

Ethylisobutylamine

$(CH_3)_2CH·CH_2·NH·CH_2·CH_3$

$C_6H_{15}N$ MW, 101

B.p. 98°.

B,HCl : m.p. 209° decomp. Sol. H_2O, EtOH, $CHCl_3$. Insol. Et_2O.

B_2,H_2PtCl_6 : reddish-yellow cryst. M.p. 201° decomp. Sol. H_2O. Insol. Et_2O. D^{15} 1·804.

Nitrosamine : b.p. 193°.

Marckwald, v. Droste-Huelshoff, *Ber.*, 1899, **32**, 562.
Le Bel, *Compt. rend.*, 1897, **125**, 351.

Ethyl isobutylaminoformate.
See Isobutylurethane.

Ethylisobutylaniline

$C_6H_5·N(C_2H_5)·CH_2·CH(CH_3)_2$

$C_{12}H_{19}N$ MW, 177

Oil. B.p. 228–31°/770 mm.

Picrate : m.p. 91–2°.

Fröhlich, *Ber.*, 1909, **42**, 1562.

Ethylisobutylcarbinol (2-*Methylhexanol*-4)

$(CH_3)_2CH·CH_2·CH(OH)·CH_2·CH_3$

$C_7H_{16}O$ MW, 116

B.p. 147–8°/756·5 mm.

Wagner, *Bull. soc. chim.*, 1884, **42**, 330.

Ethyl isobutyl Ether

$(CH_3)_2CH·CH_2·O·CH_2·CH_3$

$C_6H_{14}O$ MW, 102

B.p. 81·1°. D_4^{25} 0·7323. n_D^{25} 1·3739.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.
Lippert, *Ann.*, 1893, **276**, 160.

Ethyl isobutyl Ketone (2-*Methylhexanone*-4)

$(CH_3)_2CH·CH_2·CO·CH_2·CH_3$

$C_7H_{14}O$ MW, 114

Liq. with peppermint-like odour. B.p. 134·5–135°/735 mm. D_0^0 0·829, D_0^{17} 0·815.

Oxime : m.p. 129°.

Semicarbazone : m.p. 152° (150°).

2 : 4-*Dinitrophenylhydrazone* : m.p. 75°.

Mailhe, *Compt. rend.*, 1913, **157**, 221.
Fournier, *Bull. soc. chim.*, 1910, **7**, 839.
Wagner, *J. prakt. Chem.*, 1891, **44**, 274.
Douris, *Compt. rend.*, 1913, **157**, 55.

Ethyl isobutyrate

$(CH_3)_2CH·CO·OC_2H_5$

$C_6H_{12}O_2$ MW, 116

B.p. 110°. D_4^0 0·89060, D_4^{20} 0·86930, D_4^{40} 0·84760.

Pribram, Handl, *Monatsh.*, 1881, **2**, 684.
Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 1046.

Ethyl isocyanate

$CH_3·CH_2·NCO$

C_3H_5ON MW, 71

Pungent smelling liq. B.p. 60°. Heat of comb. C_p 424·4 Cal., C_v 424·2 Cal. At 100° polymerises ⟶ cryst., m.p. 95°, probably triethylisocyanuric acid. H + Ni at 180–90° ⟶ mainly methylethylamine.

Wurtz, *Ann. chim. phys.*, 1854, **42**, 43.
Gattermann, *Ann.*, 1888, **244**, 36.

Ethyl isocyanide (*Ethylcarbylamine*)

$CH_3·CH_2·NC$

C_3H_5N MW, 55

B.p. 79° (75–8°). D^4 0·7591, D^{25} 0·74421. Heat of comb. C_p 480 Cal. Spar. sol. H_2O. Polymerises on heating to 100–60°. H + Ni at 160–70° ⟶ mainly methylethylamine.

Hofmann, *Ann.*, 1868, **146**, 109.
Gautier, *Ann. chim. phys.*, 1869, **17**, 203, 233.
Guillemard, *Ann. chim. phys.*, 1908, **14**, 363.

Ethyl isonitrosoacetoacetate.
See under Diketobutyric Acid.

Ethylisopropylamine

$(CH_3)_2CH·NH·CH_2·CH_3$

$C_5H_{13}N$ MW, 87

B.p. 76°. Misc. with H_2O, EtOH.

B_2,H_2PtCl_6 : reddish-yellow cryst. from H_2O. M.p. 180°. D^{15} 1·885.

Nitrosamine : b.p. 70°/11 mm.

Brill, *J. Am. Chem. Soc.*, 1932, **54**, 2486.
Schuftan, *Ber.*, 1894, **27**, 1010.
Mulder, *Rec. trav. chim.*, 1906, **25**, 105.

Ethyl isopropylaminoformate.
See Isopropylurethane.

Ethylisopropylaniline

$C_6H_5·N(C_2H_5)·CH(CH_3)_2$

$C_{11}H_{17}N$ MW, 163

Oil. B.p. 214–15° (220° approx.).

B_2,H_2PtCl_6 : m.p. 199°.

v. Braun, *Ber.*, 1900, **33**, 2732.

Ethylisopropylcarbinol (2-*Methylpentanol*-3, 3-*hydroxyisohexane*)

$(CH_3)_2CH·CH(OH)·CH_2·CH_3$

$C_6H_{14}O$ MW, 120

B.p. 129–30°. D^{20} 0·8243.
Phenylurethane: b.p. 175°/12 mm.

Hopff, *Ber.*, 1931, **64**, 2745.
Sabatier, Senderens, *Compt. rend.*, 1903, **137**, 302.

Ethyl isopropyl Ether

$(CH_3)_2CH{\cdot}O{\cdot}CH_2{\cdot}CH_3$

$C_5H_{12}O$ MW, 88

B.p. 53–4°. D_4^{25} 0·720.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.
Lippert, *Ann.*, 1893, **276**, 158.

Ethyl isopropyl Ketone (*2-Methylpentanone-3*)

$(CH_3)_2CH{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

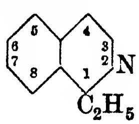
$C_6H_{12}O$ MW, 100

B.p. 115–16° (114·5–115°). D_0^0 0·830, D_0^{18} 0·814. Does not form bisulphite comp.
Oxime: b.p. 73–5°/11 mm.
Semicarbazone: m.p. 95° (80°).

Hopff, *Ber.*, 1931, **64**, 2744.
Fournier, *Bull. soc. chim.*, 1910, **7**, 840.
Wagner, *J. prakt. Chem.*, 1891, **44**, 257.

Ethylisopropylphenanthrene.
See Homoretene.

1-Ethylisoquinoline



$C_{11}H_{11}N$ MW, 157

Light yellow oil. B.p. 250°. Sol. EtOH, Et_2O. Insol. H_2O.
Picrate: m.p. 207–10°.
$B,HAuCl_4$: m.p. 168–72°.
Chloroplatinate: m.p. 199–200°.

Bergstrom, McAllister, *J. Am. Chem. Soc.*, 1930, **52**, 2848.
Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 137.

3-Ethylisoquinoline.
B.p. 255–6°/752 mm.
Picrate: yellow plates from EtOH. M.p. 171–2°.
$B,HAuCl_4$: yellow needles. M.p. 115–17°.
B_2,H_2PtCl_6: needles. M.p. 180° decomp.

Damerow, *Ber.*, 1894, **27**, 2237.

4-Ethylisoquinoline.
M.p. 63·5–65°. B.p. 274–5°.

Gabriel, *Ber.*, 1887, **20**, 1207.

Ethyl isothiocyanate

$CH_3{\cdot}CH_2{\cdot}NCS$

C_3H_5NS MW, 87

Pungent smelling liq. M.p. − 5·9°. B.p. 131–2°. D^0 1·0192, D^{18} 1·0030. n_D^{18} 1·5142. Insol. H_2O. Heat of comb. C_p 604·1 Cal., C_v 602·8 Cal.

Berthelot, *Compt. rend.*, 1900, **130**, 445.
Kaluza, *Monatsh.*, 1912, **33**, 366.
Anschütz, *Ann.*, 1909, **371**, 217.
Hofmann, *Ber.*, 1869, **2**, 452.

Ethylitaconic Acid.
See Propylidenesuccinic Acid.

Ethylmaleic Acid (*1-Butylene-1:2-dicarboxylic acid, methylcitraconic acid*)

$CH_3{\cdot}CH_2{\cdot}C{\cdot}COOH$
$\quad\quad\quad\quad\quad HC{\cdot}COOH$

$C_6H_8O_4$ MW, 144

Prisms from H_2O or $CHCl_3$. M.p. 100–1°. Sol. H_2O, Et_2O, warm $CHCl_3$. Spar. sol. C_6H_6. Insol. ligroin. Volatile in steam. $k = 2{\cdot}38 \times 10^{-3}$ at 25°.
Anhydride: $C_6H_6O_3$. MW, 126. B.p. 142°/66 mm.

Fittig, Fränkel, *Ann.*, 1889, **255**, 33.
Bischoff, *Ber.*, 1890, **23**, 1936.

1-Ethylmalic Acid (*2-Hydroxybutane-1:2-dicarboxylic acid, 1-hydroxy-1-ethylsuccinic acid*)

$CH_3{\cdot}CH_2{\cdot}C(OH){\cdot}COOH$
$\quad\quad\quad\quad\quad CH_2{\cdot}COOH$

$C_6H_{10}O_5$ MW, 162

Prisms from Et_2O. M.p. 131–3°.

Ssemenow, *Chem. Zentr.*, 1899, I, 1205.

2-Ethylmalic Acid (*1-Hydroxybutane-1:2-dicarboxylic acid, 2-hydroxy-1-ethylsuccinic acid*)

$\quad\quad\quad\quad\quad CH(OH){\cdot}COOH$
$CH_3{\cdot}CH_2{\cdot}CH{\cdot}COOH$

$C_6H_{10}O_5$ MW, 162

Exists in three forms.

(I) Cryst. from Et_2O–C_6H_6. M.p. 108°. Sol. H_2O, EtOH, Et_2O, Me_2CO, AcOEt.
Monoamide: $C_6H_{11}O_4N$. MW, 161. M.p. 158–9°.

(II) Prisms from Et_2O–pet. ether. M.p. 133–4°. Dist. ⟶ ethylmaleic, ethylfumaric, and ethylidenesuccinic acids.
Et ester: $C_8H_{14}O_5$. MW, 190. B.p. 133–5°.

(III) M.p. 86–7°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6, pet. ether. Dist. ⟶ ethylmaleic acid.

Lutz, *Ber.*, 1902, **35**, 4372.
Fichter, Goldhaber, *Ber.*, 1904, **37**, 2382.
Doebner, Segelitz, *Ber.*, 1905, **38**, 2735.

Ethylmalonic Acid (*Propane*-1 : 1-*dicarboxylic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH{<}{COOH \atop COOH}$$

$C_5H_8O_4$ MW, 132

Prisms + $1H_2O$ from H_2O. M.p. anhyd. 111·5°. Sol. EtOH, Et_2O. k (first) = $1{\cdot}27 \times 10^{-3}$ at 25°; (second) = $0{\cdot}54 \times 10^{-6}$. At 160° ⟶ butyric acid.

Di-Me ester: $C_7H_{12}O_4$. MW, 160. B.p. 178–9°. D_4^4 1·104.

Di-Et ester: $C_9H_{16}O_4$. MW, 188. B.p. 207–9°/755 mm., 92°/10 mm., 77°/5 mm. D_{15}^{18} 1·008.

Dichloride: $C_5H_6O_2Cl_2$. MW, 169. B.p. 76–82°/35 mm.

Mononitrile: *see* 1-Cyanobutyric Acid.

Dinitrile: 1 : 1-dicyanopropane. $C_5H_6N_2$. MW, 94. B.p. 206°/756 mm., 90–1°/20 mm. D^{11} 0·9515. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O.

Diamide: $C_5H_{10}O_2N_2$. MW, 130. Cryst. from H_2O or EtOH. M.p. 216° (212°). Spar. sol. H_2O, MeOH, EtOH. Insol. Et_2O, $CHCl_3$.

Dihydrazide: needles from EtOH. M.p. 168°.

Michael, *J. prakt. Chem.*, 1905, **72**, 539, 550.
Markownikoff, *Ann.*, 1876, **182**, 329.
Wislicenus, Urech, *Ann.*, 1873, **165**, 93.
Conrad, *Ann.*, 1880, **204**, 134.

Ethyl Mercaptan (*Mercaptoethane, thioethyl alcohol*)

$$CH_3{\cdot}CH_2SH$$

C_2H_6S MW, 62

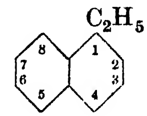
Liq. with leek-like odour. M.p. − 144·4°. B.p. 37°. D_4^0 0·86174, D_4^{25} 0·83147. n_D^{25} 1·4351. Very spar. sol. H_2O. Sol. alkalis. Dil. HNO_3 ⟶ diethyl disulphoxide. Conc. HNO_3 ⟶ ethane-sulphonic acid.

Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1219.
Klason, *Ber.*, 1887, **20**, 3411.

Ethylmesaconic Acid.
See Propylfumaric Acid.

Ethyl methylaminoformate.
See Methylurethane.

1-Ethylnaphthalene (α-*Ethylnaphthalene*, 1-*naphthylethane*)



$C_{12}H_{12}$ MW, 156

M.p. 15°. B.p. 251–2° (256·5°/756 mm.), 112–16°/8 mm., 100°/2–3 mm. D_0^0 1·0221, $D_4^{14\cdot2}$ 1·0111. $n_D^{14\cdot2}$ 1·6089.

Picrate: m.p. 98·5°.

Fröschl, Harlass, *Monatsh.*, 1932, **59**, 280.
Lévy, *Compt. rend.*, 1931, **193**, 174.
Clemmensen, *Ber.*, 1913, **46**, 1840.
Darzens, Rost, *Compt. rend.*, 1908, **146**, 933.

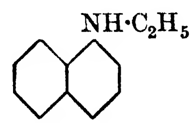
2-Ethylnaphthalene (β-*Ethylnaphthalene*, 2-*naphthylethane*).

M.p. − 7·5°. B.p. 252°, 117–18°/10 mm. D_0^0 1·0069, D_4^{15} 0·9958. n_D^{15} 1·6028.

Picrate: m.p. 76–7° (72–3°).

Lévy, *Compt. rend.*, 1931, **192**, 1397.
Barbot, *Bull. soc. chim.*, 1930, **47**, 1314.
Marchetti, *Gazz. chim. ital.*, 1881, **11**, 439.
Darzens, Rost, *Compt. rend.*, 1908, **146**, 934.

N-Ethyl-1-naphthylamine (*Ethyl*-α-*naphthylamine*)



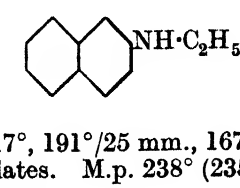
$C_{12}H_{13}N$ MW, 171

B.p. 303°/722·5 mm., 191°/16 mm.

B,HCl: m.p. 193°.

Knoevenagel, Dieterich, *J. prakt. Chem.*, 1914, **89**, 34.
Morgan, Micklethwait, *J. Chem. Soc.*, 1907, **91**, 1516.

N-Ethyl-2-naphthylamine (*Ethyl*-β-*naphthylamine*)



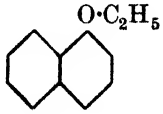
$C_{12}H_{13}N$ MW, 171

B.p. 316–17°, 191°/25 mm., 167°/10–12 mm.

B,HCl: plates. M.p. 238° (235°).

Meisenheimer, *Ann.*, 1911, **385**, 128.
Reychler, *Bull. soc. chim.*, 1902, **27**, 882.
Bischoff, Hausdörfer, *Ber.*, 1892, **25**, 2312.
Fischer, *Ber.*, 1893, **26**, 193.

Ethyl 1-naphthyl Ether (*α-Naphthol ethyl ether*)



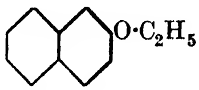
$C_{12}H_{12}O$ MW, 172

M.p. 5·5°. B.p. 276·4° (280°), 186–7°/66 mm. 152–4°/18 mm., 106–106·5°/2 mm. D^4 1·0711. $n_D^{22\cdot8}$ 1·59509.

$C_{12}H_{12}O,C_6H_3(NO_2)_3$-1 : 3 : 5 : yellow needles. M.p. 125·5°.

Kamm, McClugage, Landstrom, *J. Am. Chem. Soc.*, 1917, **39**, 1245.
Witt, Schneider, *Ber.*, 1901, **34**, 3172.
Schaeffer, *Ann.*, 1869, **152**, 286.

Ethyl 2-naphthyl Ether (*Nerolin II, Bromelia*)



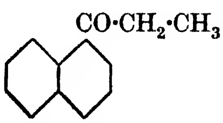
$C_{12}H_{12}O$ MW, 172

Plates. M.p. 37·5°. B.p. 282° (274–5°). D_{20}^{20} 1·0640. Sol. EtOH, Et_2O, pet. ether, CS_2, toluene. Insol. H_2O. Used in perfumery.

$C_{12}H_{12}O,C_6H_3(NO_2)_3$-1 : 3 : 5 : yellow needles. M.p. 95°.

Davis, *J. Chem. Soc.*, 1900, **77**, 35.
Schaeffer, *Ann.*, 1869, **152**, 287.

Ethyl 1-naphthyl Ketone (*α-Propionaphthone, 1-propionylnaphthalene, ethyl α-naphthyl ketone*)



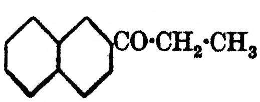
$C_{13}H_{12}O$ MW, 184

B.p. 305–7°, 166–8°/8 mm. D^0 1·1082. n_D^{27} 1·606. Sol. EtOH, Et_2O, CS_2. Spar. sol. pet. ether. $HNO_3 \longrightarrow$ 1-naphthoic acid.

Oxime : cryst. from ligroin. M.p. 57–8°.
Picrate : needles from EtOH. M.p. 77–8°.

Caille, *Compt. rend.*, 1911, **153**, 393.
Rousset, *Bull. soc. chim.*, 1896, **15**, 62.

Ethyl 2-naphthyl Ketone (*β-Propionaphthone, 2-propionylnaphthalene, ethyl β-naphthyl ketone*)



$C_{13}H_{12}O$ MW, 184

M.p. 60°. B.p. 312–14°, 181–3°/18 mm. Sol. EtOH, $CHCl_3$. Spar. sol. H_2O, pet. ether. $HNO_3 \longrightarrow$ 2-naphthoic acid.

Oxime : needles from EtOH.Aq. M.p. 133°.
Semicarbazone : m.p. 190–1°.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1319.
Rousset, *Bull. soc. chim.*, 1896, **15**, 62; 1897, **17**, 313.

Ethylnitramine (*N-Nitroethylamine*)

$CH_3{\cdot}CH_2{\cdot}NH{\cdot}NO_2$

$C_2H_6O_2N_2$ MW, 90

F.p. 6°. D^{15} 1·1675. Heat of comb. C_v 372·82 Cal. Acid reaction. Forms salts. 40% $H_2SO_4 \longrightarrow$ ethylene + N_2O.

Franchimont, Klobbie, *Rec. trav. chim.*, 1888, **7**, 356.
Umbgrove, Franchimont, *Rec. trav. chim.*, 1897, **16**, 388.

Ethyl nitrate

$CH_3{\cdot}CH_2{\cdot}O{\cdot}NO_2$

$C_2H_5O_3N$ MW, 91

M.p. −112°. B.p. 87·5–87·7°. D_4^4 1·1305, $D_4^{20\cdot7}$ 1·106, D_4^{25} 1·1004. Heat of comb. C_p 324·04 Cal. Sol. H_2O. Sn + HCl $\longrightarrow$ hydroxylamine + a base $C_4H_{11}ON$. $H_2S + NH_3 \longrightarrow C_2H_5{\cdot}SH$.

Millon, *Ann.*, 1843, **47**, 373.
Biron, *Chem. Zentr.*, 1901, I, 366.

Ethyl nitrite

$CH_3{\cdot}CH_2{\cdot}O{\cdot}NO$

$C_2H_5O_2N$ MW, 75

B.p. 17°. $D^{15\cdot5}$ 0·900. Heat of comb. C_p 334·21 Cal.

Thiele, Eichwede, *Ann.*, 1900, **311**, 366.
Wallach, Otto, *Ann.*, 1889, **253**, 251.
Feldhaus, *Ann.*, 1863, **126**, 73.

Ethylnitrolic Acid (*Acetonitrolic acid*)

$CH_3{\cdot}C(:N{\cdot}OH){\cdot}NO_2$

$C_2H_4O_3N_2$ MW, 104

Cryst. from H_2O or Et_2O. M.p. 87–8°. Sol. most org. solvents. Reacts acid to litmus. Sn + HCl $\longrightarrow$ hydroxylamine + $CH_3{\cdot}COOH$. Forms three series of salts : red, yellow and colourless.

Steinkopf, Jürgens, *J. prakt. Chem.*, 1911, **84**, 711.
Behrend, Tryller, *Ann.*, 1894, **283**, 239.
Meyer, Constam, *Ann.*, 1882, **214**, 329.
Wieland, *Ann.*, 1907, **353**, 82.

Ethylnonylcarbinol (*Dodecanol*-3, 3-*hydroxydodecane*)

$CH_3{\cdot}[CH_2]_8{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_3$

$C_{12}H_{26}O$ MW, 186

l-.

M.p. 25°. B.p. 130°/15 mm. D_4^{22} 0·8223. $[\alpha]_D^{20}$ −6·10° in EtOH. Volatile in steam.

Acid phthalate: needles. M.p. 25°. $[\alpha]_D^{20}$ −15·60° in EtOH.

dl-.

M.p. 12°. B.p. 133°/14 mm.

Acid phthalate: m.p. 31–2°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1947.

Ethyl nonyl Ketone (*Dodecanone*-3, 3-*ketododecane*)

$CH_3{\cdot}[CH_2]_8{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_{12}H_{24}O$ MW, 184

M.p. 19°. B.p. 134°/18 mm.

Semicarbazone: cryst. from EtOH.Aq. M.p. 89°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1936.

Ethyloctylcarbinol (*Undecanol*-3, 3-*hydroxyundecane*)

$CH_3{\cdot}[CH_2]_7{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_3$

$C_{11}H_{24}O$ MW, 172

l-.

Needles. M.p. 17°. B.p. 117°. D_4^{20} 0·8295. n_D^{20} 1·4367. $[\alpha]_D^{20}$ −6·22° in EtOH. Volatile in steam.

dl-.

B.p. 229°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1946.

Ethyl octyl Ketone (*Undecanone*-3, 3-*ketoundecane*)

$CH_3{\cdot}[CH_2]_7{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_{11}H_{22}O$ MW, 170

B.p. 227°, 104–6°/11 mm.

Semicarbazone: cryst. from EtOH.Aq. M.p. 90°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1936, 1946.

Ethyloxamic Acid

$CH_3{\cdot}CH_2{\cdot}NH{\cdot}CO{\cdot}COOH$

$C_4H_7O_3N$ MW, 117

M.p. 120°. Sol. H_2O, EtOH, Et_2O. Sublimes.

Et ester: $C_6H_{11}O_3N$. MW, 145. B.p. 244–6°. Misc. with H_2O, EtOH, Et_2O, $CHCl_3$.

Amide: $C_4H_8O_2N_2$. MW, 116. Needles from H_2O. M.p. about 202–3°. Sol. Et_2O, hot H_2O, hot EtOH.

Baum, D.R.P., 77,597.
Heintz, *Ann.*, 1863, **127**, 48.
Wurtz, *Ann. chim.*, 1850, **30**, 490.

Ethylpentadecylcarbinol (*Octadecanol*-3, 3-*hydroxyoctadecane*)

$CH_3{\cdot}[CH_2]_{14}{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_3$

$C_{18}H_{38}O$ MW, 270

l-.

Prisms from EtOH. M.p. 56°. B.p. 172°/2 mm. D_4^{73} 0·8011. $[\alpha]_D^{20}$ −4·78° in EtOH.

Acid phthalate: m.p. 32–3°. $[\alpha]_D^{20}$ −15·62° in EtOH.

dl-.

M.p. 43°. B.p. 202°/13 mm.

Acid phthalate: m.p. 39–41°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1953.

Ethyl pentadecyl Ketone (*Octadecanone*-3, 3-*keto-octadecane*)

$CH_3{\cdot}[CH_2]_{14}{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_{18}H_{36}O$ MW, 268

Prisms from EtOH–Et_2O. M.p. 53° (50°). B.p. 198°/14 mm. (197·5°/11 mm.).

Oxime: m.p. 44°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 76°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1936, 1953.
Bertrand, *Bull. soc. chim.*, 1896, **15**, 765.

1 - Ethyl - 4 - pentadecyltetramethylene Glycol.

See Heneicosandiol-3 : 6.

1-Ethylpentamethylene Glycol.

See Heptandiol-1 : 5.

3-Ethylpentane (*Triethylmethane*)

$$CH_3{\cdot}CH_2{\cdot}\overset{C_2H_5}{\overset{|}{C}H}{\cdot}CH_2{\cdot}CH_3$$

C_7H_{16} MW, 100

B.p. 93·3°. D_4^{20} 0·6984. n_D^{20} 1·39366.

Böeseken, Wildschut, *Rec. trav. chim.*, 1932, **51**, 168.
Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, **51**, 1483.

3-Ethylpentanol-3.

See Triethylcarbinol.

3-Ethylpentanol-4.
See Methyl-*sec.-n*-amylcarbinol.

3-Ethylpentanone-2 (*Diethylacetone*, 3-*acetopentane*, *methyl* sec.-n-*amyl ketone*, 2-*keto*-3-*ethylpentane*)

$$CH_3 \cdot CH_2 \cdot \underset{}{\overset{C_2H_5}{CH}} \cdot CO \cdot CH_3$$

$C_7H_{14}O$ MW, 114

B.p. 138–40°, 38–42°/19 mm.
Oxime: b.p. 186–188·5°/712 mm.
Semicarbazone: m.p. 99°.

Bardan, *Bull. soc. chim.*, 1931, **49**, 1876.
Frankland, Duppa, *Ann.*, 1866, **138**, 212.

3-Ethylpentene-2 (1-*Methyl*-2 : 2-*diethylethylene*, 3-*ethylidenepentane*)

$$CH_3 \cdot CH_2 \cdot \overset{C_2H_5}{C} \colon CH \cdot CH_3$$

C_7H_{14} MW, 98

B.p. 96°/764 mm. $D_4^{24·45}$ 0·7191. n_D^{20} 1·4139.

Böeseken, Wildschut, *Rec. trav. chim.*, 1932, **51**, 169.
Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, **51**, 1486.
Saizew, *J. prakt. Chem.*, 1898, **57**, 38.

Ethyl perchlorate

$$CH_3 \cdot CH_2 \cdot O \cdot ClO_3$$

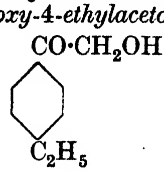
$C_2H_5O_4Cl$ MW, 128·5

Oil. Decomp. readily with explosion in dry state. Distilled under layer of H_2O, b.p. 74°.

Roscoe, *Ann.*, 1862, **124**, 124.

Ethyl peroxide.
See Diethyl peroxide.

4-Ethylphenacyl Alcohol (4-*Ethylbenzoylcarbinol*, ω-*hydroxy*-4-*ethylacetophenone*)

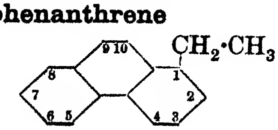


$C_{10}H_{12}O_2$ MW, 164

Yellow plates from pet. ether. M.p. 67–8°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. pet. ether.
Acetyl: prisms from ligroin or MeOH. M.p. 61–2°.
Semicarbazone: plates from MeOH. M.p. 161°.

Auwers, *Ber.*, 1906, **39**, 3759.

1-Ethylphenanthrene



$C_{16}H_{14}$ MW, 206

Prisms from EtOH. M.p. 62·5°.
Picrate: orange prisms from EtOH. M.p. 108–9°.
Styphnate: yellow needles from EtOH. M.p. 144°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

2-Ethylphenanthrene.
Leaflets from MeOH. M.p. 67–8° (64–5°).
Picrate: yellow needles from EtOH. M.p. 95·5–96° (92–3°).

Mosettig, van de Kamp, *J. Am. Chem. Soc.*, 1933, **55**, 3447.
Haworth, Mavin, *J. Chem. Soc.*, 1933, 1015.

3-Ethylphenanthrene.
Liq.
Picrate: orange-red needles from EtOH. M.p. 121·5–122°.
Styphnate: orange prisms from MeOH. M.p. 114–16°.

See above references.

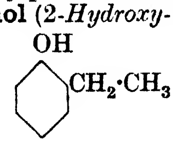
9-Ethylphenanthrene.
Needles from C_6H_6–pet. ether. M.p. 62·5–63°. B.p. 198–200°/11 mm.
Picrate: orange-red prisms from EtOH. M.p. 123–4°.

Mosettig, van de Kamp, *J. Am. Chem. Soc.*, 1933, **55**, 3447.

***N*-Ethylphenetidine.**
See under Ethylaminophenol.

Ethylphenetole.
See under Ethylphenol.

***o*-Ethylphenol** (2-*Hydroxy*-1-*ethylbenzene*)



$C_8H_{10}O$ MW, 122

B.p. 206·5–207·5°. Sol. EtOH, AcOH, C_6H_6. Very spar. sol. H_2O. $FeCl_3 \longrightarrow$ blue col.
Me ether: *o*-ethylanisole, 2-methoxy-1-ethylbenzene. $C_9H_{12}O$. MW, 136. B.p. 186–8°/755 mm. 70–71°/11 mm. D_4^{19} 0·9636. n_D 1·512.
Et ether: *o*-ethylphenetole, 2-ethoxy-1-ethylbenzene. $C_{10}H_{14}O$. MW, 150. B.p. 189–92°.

Beilstein, Kuhlberg, *Ann.*, 1870, **156**, 211.
Sempotowski, *Ber.*, 1889, **22**, 2672.
Marschalk, *Ber.*, 1910, **43**, 1699.
Klages, Eppelsheim, *Ber.*, 1903, **36**, 3591.

***m*-Ethylphenol** (3-*Hydroxy*-1-*ethylbenzene*).
M.p. −4°. B.p. 214°/752 mm. D^0 1·0250. $FeCl_3 \longrightarrow$ violet col.

Me ether: *m*-ethylanisole, 3-methoxy-1-ethylbenzene. B.p. 196–7°/758 mm., 77–8°/12 mm. D_4^{18} 0·95746. n_D 1·5102.
Acetyl: b.p. 222–3°. D^0 1·0403.

Sempotowski, *Ber.*, 1889, **22**, 2674.
Béhal, Choay, *Bull. soc. chim.*, 1894, **11**, 211.
Klages, Eppelsheim, *Ber.*, 1903, **36**, 3592.

p-Ethylphenol (4-*Hydroxy*-1-*ethylbenzene*).
Needles. M.p. 47–8° (45–6°). B.p. 218·5–219·5°. Sol. EtOH, Et_2O, C_6H_6, CS_2. $FeCl_3$ ⟶ deep blue col. Acetyl deriv. by Fries rearrangement ⟶ 2-hydroxy-5-ethylacetophenone.
Me ether: *p*-ethylanisole, 4-methoxy-1-ethylbenzene. B.p. 195–6°, 83–4°/16 mm., 75°/10 mm. D_4^{15} 0·9624. n_D 1·5094.
Et ether: *p*-ethylphenetole, 4-ethoxy-1-ethylbenzene. B.p. 211°, 92–3°/12 mm. D_4^{17} 0·9385.
Acetyl: b.p. 226–7°/750 mm.

Zincke, *Ann.*, 1902, **322**, 187 (*Footnote*).
Clemmensen, *Ber.*, 1914, **47**, 53.
Johnson, Hodge, *J. Am. Chem. Soc.*, 1913, **35**, 1018.
Baranger, *Bull. soc. chim.*, 1931, **49**, 1216.
Klages, Eppelsheim, *Ber.*, 1903, **36**, 3593.
Schering, E.P., 274,439, (*Chem. Zentr.*, 1929, II, 96).

1-Ethyl-2-phenylacetylene.
See 1-Phenylbutine-1.

Ethylphenylbarbituric Acid.
See Luminal.

Ethylphenylcarbinol (α-*Hydroxypropylbenzene*, ω-*ethylbenzyl alcohol*)

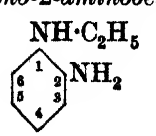
$$C_6H_5\cdot CH(OH)\cdot CH_2\cdot CH_3$$

$C_9H_{12}O$ MW, 136

B.p. 217–21°, 106–8°/18 mm., 105–8°/10 mm. D_0^0 1·016, D_0^{23} 0·994. *p*-Nitrobenzoyl chloride ⟶ mainly 1-chloro-1-phenylpropane.
Acetyl: b.p. 227–8°.
p-*Nitrobenzoyl*: m.p. 59–60°.

Davies, Kipping, *J. Chem. Soc.*, 1911, **99**, 298.
Tschelinzeff, *Ber.*, 1904, **37**, 4539.
Klages, *Ber.*, 1902, **35**, 2251.

Ethyl-o-phenylenediamine (o-*Amino-ethyl aniline*, 1-*ethylamino-2-aminobenzene*)



$C_8H_{12}N_2$ MW, 136

Oil. B.p. 248–9°.

Hempel, *J. prakt. Chem.*, 1890, **41**, 164; 1889, **39**, 199.

Ethyl-m-phenylenediamine (m-*Amino-ethylaniline*, 1-*ethylamino*-3-*aminobenzene*).
B.p. 276°.

Nölting, Stricker, *Ber.*, 1886, **19**, 547.
Badische, D.R.P., 76,419.

Ethyl-p-phenylenediamine (p-*Amino-ethylaniline*, 1-*ethylamino*-4-*aminobenzene*).
B.p. 270°, 261–2°/746 mm. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O.

Fischer, Hepp, *Ber.*, 1886, **19**, 2994.
Schweitzer, *Ber.*, 1886, **19**, 149.
Oehler, D.R.P., 12,932.

Ethyl phenyl Ether.
See Phenetole.

4-Ethyl-4-phenylheptane (3-*Propyl*-3-*phenylhexane*, ω-*ethyldipropyltoluene*, *ethyldipropylphenylmethane*)

$$CH_3\cdot CH_2\cdot CH_2\cdot \underset{C_6H_5}{\overset{C_2H_5}{C}}\cdot CH_2\cdot CH_2\cdot CH_3$$

$C_{15}H_{24}$ MW, 204

B.p. 127–8°/15 mm. D_4^{20} 0·8698. n_D^{15} 1·49211.

Halse, *J. prakt. Chem.*, 1914, **89**, 457.

***sym*.-Ethylphenylhydrazine**

$$C_6H_5\cdot NH\cdot NH\cdot CH_2\cdot CH_3$$

$C_8H_{12}N_2$ MW, 136

B.p. 235–6°/741 mm., 110°/14 mm., 100–104°/10 mm. D_{15}^{15} 1·004. n_D^{15} 1·55. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. Reduces Fehling's.
B,HCl: leaflets from EtOH–Et_2O. M.p. 164°.
B,(COOH)₂: needles from EtOH. M.p. 167–8° decomp.
N-*Benzoyl*: prisms from EtOH.Aq. M.p. 100°.

Fischer, Ehrhard, *Ann.*, 1879, **199**, 330.
Knorr, Weidel, *Ber.*, 1909, **42**, 3528.

***unsym*.-Ethylphenylhydrazine**

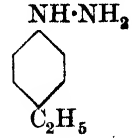
$$C_6H_5\cdot N(C_2H_5)\cdot NH_2$$

$C_8H_{12}N_2$ MW, 136

Oil. B.p. 237°. D^{15} 1·018. Reduces warm Fehling's.
B,HCl: leaflets from $CHCl_3$. M.p. 137°.

Fischer, *Ber.*, 1875, **8**, 1642.
Michaelis, Philips, *Ann.*, 1889, **252**, 270.
Michaelis, Robisch, *Ber.*, 1897, **30**, 2810.

p-Ethylphenylhydrazine (4-*Hydrazino*-1-*ethylbenzene*)



$C_8H_{12}N_2$ MW, 136

Leaflets. Unstable even in form of salts. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, Me_2CO, C_6H_6.

B,HCl: leaflets. M.p. 200°.

B,H_2SO_4: reddish leaflets from H_2O. M.p. 180°.

Picrate: yellow needles. M.p. 122°.

Willgerodt, Harter, *J. prakt. Chem.*, 1905, **71**, 410.

Ethyl phenyl Ketone.
See Propiophenone.

Ethyl phenyl sulphide.
See Thiophenetole.

Ethyl phenyl sulphone

$C_6H_5 \cdot SO_2 \cdot C_2H_5$

$C_8H_{10}O_2S$ MW, 170

Leaflets from EtOH.Aq. M.p. 42°. B.p. 160°/12 mm. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. cold H_2O.

Otto, *Ber.*, 1880, **13**, 1274; 1885, **18**, 161.
Ferns, Lapworth, *J. Chem. Soc.*, 1912, **101**, 284.

***sym*.-Ethylphenylurea**

$C_6H_5 \cdot NH \cdot CO \cdot NH \cdot CH_2 \cdot CH_3$

$C_9H_{12}ON_2$ MW, 164

Needles from EtOH.Aq. M.p. 104° (99°).

Sonn, *Ber.*, 1914, **47**, 2442.
Mauguin, *Ann. chim.*, 1911, **22**, 318.
Oliveri-Mandalà, Noto, *Gazz. chim. ital.*, 1913, **43**, I, 311.

***unsym*.-Ethylphenylurea**

$H_2N \cdot CO \cdot N<\begin{matrix} C_6H_5 \\ CH_2 \cdot CH_3 \end{matrix}$

$C_9H_{12}ON_2$ MW, 164

Plates from pet. ether. M.p. 62·3–62·5°. Very sol. H_2O and org. solvents except ligroin.

Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, **51**, 1800.
Gebhardt, *Ber.*, 1884, **17**, 2095.

Ethyl phosphate.
See Triethyl phosphate.

Ethylphosphine

$CH_3 \cdot CH_2 \cdot PH_2$

C_2H_7P MW, 62

Liq. with unpleasant odour. B.p. 25°. Decomp. by H_2O.

Hofmann, Mahla, *Ber.*, 1892, **25**, 2437.
Berthaud, *Compt. rend.*, 1906, **143**, 1166.

Ethylphosphinic Acid

$CH_3 \cdot CH_2 \cdot PO(OH)_2$

$C_2H_7O_3P$ MW, 110

Hygroscopic cryst. M.p. 44°.

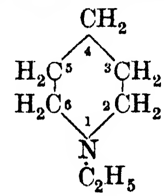
Di-Et ester: $C_6H_{15}O_3P$. MW, 166. B.p. 198° (203°/750 mm.), 90–95°/20 mm. D_4^{20} 1·0259. n_D^{20} 1·4163.

Dichloride: $C_2H_5OCl_2P$. MW, 147. B.p. 175°, 75–8°/50 mm. D^{20} 1·1883.

Hofmann, *Ber.*, 1872, **5**, 110.
Michaelis, *Ber.*, 1880, **13**, 2175.
Guichard, *Ber.*, 1899, **32**, 1578.
Michaelis, Becker, *Ber.*, 1897, **30**, 1006.

1-Ethylpimelic Acid.
See Heptane-1 : 5-dicarboxylic Acid.

N-Ethylpiperidine (*Ethylpiperidylamine*)



$C_7H_{15}N$ MW, 113

B.p. 128°. D_4^{20} 0·82373. n_a^{20} 1·44158.

B_2,H_2PtCl_6: orange prisms. M.p. 202°.

B,$HAuCl_4$: yellow cryst. M.p. 106–7°.

Picrate: yellow needles from EtOH. M.p. 167·5°.

Winans, Adkins, *J. Am. Chem. Soc.*, 1932, **54**, 310.
Evans, *J. Chem. Soc.*, 1897, **71**, 523.
Dennstedt, *Ber.*, 1890, **23**, 2571.
Clarke, *J. Chem. Soc.*, 1912, **101**, 1807.

2-Ethylpiperidine (α-*Ethylpiperidine*).

B.p. 142–3°/719 mm. D_0^0 0·8651. Spar. sol. H_2O.

B,HCl: m.p. 181–2°.

B_2,H_2PtCl_6: prisms. M.p. 208–10° decomp.

B,$HAuCl_4$: m.p. 129–30°.

Picrate: prisms. M.p. 133°.

N-*Benzenesulphonyl*: leaflets or plates from EtOH.Aq. M.p. 64–5°.

Lipp, *Ber.*, 1900, **33**, 3513.
Ladenburg, *Ber.*, 1898, **31**, 290.

3-Ethylpiperidine (β-*Ethylpiperidine*).

Oil. B.p. 152·6°. D_4^{16} 0·871. Spar. sol. H_2O. Fumes in air.

B,HCl : needles from C_6H_6. M.p. 141–2°.
B,HI : m.p. 123°.
B_2,H_2PtCl_6 : m.p. 183–4°.
$B,HAuCl_4$: m.p. 112°.
Picrate : m.p. 63°.

Stoehr, *J. prakt. Chem.*, 1892, **45**, 44.
Ladenburg, *Ann.*, 1898, **301**, 149.
Günther, *Ber.*, 1898, **31**, 2140.

4-Ethylpiperidine (*γ-Ethylpiperidine*).
B.p. 156–8°. D^0 0·8759. Spar. sol. H_2O.
B_2,H_2PtCl_6 : orange leaflets. M.p. 173–4°.
$B,HAuCl_4$: m.p. 105°.

Ladenburg, *Ann.*, 1888, **247**, 72.

Ethylpiperidylamine.
See *N*-Ethylpiperidine.

Ethyl propargyl Ether (*Ethoxyallylene*)

$HC⋮C·CH_2·O·CH_2·CH_3$

C_5H_8O MW, 84

Liq. with penetrating odour. B.p. 80°. D_4^{20} 0·8326. n_D^{20} 1·40390. Completely miscible with EtOH.

Baeyer, *Ann.*, 1866, **138**, 196.
Liebermann, Kretschmer, *Ann.*, 1871, **158**, 230.

Ethylpropenylcarbinol.
See 2-Hexenol-4.

Ethyl propenyl Ketone.
See 2-Hexenone-4.

Ethylpropiolic Acid (1-*Butine*-1-*carboxylic acid*, 3-*methyltetrolic acid*)

$CH_3·CH_2·C⋮C·COOH$

$C_5H_6O_2$ MW, 98

Cryst. M.p. 50°. Sol. H_2O.
Et ester : $C_7H_{10}O_2$. MW, 126. B.p. 67–8°/18 mm. D^0 0·962.

Dupont, *Compt. rend.*, 1909, **148**, 1523.

Ethylpropylacetic Acid.
See 1-Ethyl-*n*-valeric Acid.

Ethylpropylacetylene (3-*Heptine*)

$CH_3·CH_2·CH_2·C⋮C·CH_2·CH_3$

C_7H_{12} MW, 96

B.p. 105–6° (106–7°). D_4^{25} 0·7337. n_D 1·415. H_2SO_4 or HCl ⟶ butyrone. $HgCl_2$ ⟶ white ppt.

Lespieau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 635.
Béhal, *Ann. chim.*, 1888, **15**, 415.
Faworski, *J. prakt. Chem.*, 1895, **51**, 558.
Bourguel, *Ann. chim.*, 1925, **3**, 191, 325.

Ethylpropylamine

$CH_3·CH_2·CH_2·NH·CH_2·CH_3$

$C_5H_{13}N$ MW, 87

B.p. 79·8°/747 mm. Sol. EtOH. Spar. sol. H_2O. D^{24} 0·773.
B,HCl : m.p. 225–6° (217–18°).
N-*Nitroso* : b.p. 195°.
B_2,H_2PtCl_6 : orange yellow cryst. M.p. 198–9° (184–5°). D^{15} 1·89.
$B,HAuCl_4$: m.p. 86–7°.

Comanducci, Arena, *Chem. Zentr.*, 1907, II, 1396.
Bewad, *J. prakt. Chem.*, 1901, **63**, 211.

Ethyl propylaminoformate.
See Propylurethane.

Ethylpropylaniline

$C_6H_5·N{<}^{CH_2·CH_3}_{CH_2·CH_2·CH_3}$

$C_{11}H_{17}N$ MW, 163

Yellowish oil. B.p. 216°.
B,HCl : m.p. 131°.

Claus, Hirzel, *Ber.*, 1886, **19**, 2787.

Ethylpropylcarbinol (*Hexanol*-3, 3-*hydroxyhexane*)

$CH_3·CH_2·CH_2·CH(OH)·CH_2·CH_3$

$C_6H_{14}O$ MW, 102

B.p. 134·5–135·5°. D_4^{20} 0·81825.
Allophanate : m.p. 185·5°.
Acid phthalate : m.p. 76–7°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1942.
Lieben, Völker, *Ber.*, 1875, **8**, 1019.

Ethyl propyl Diketone.
See Heptandione-3 : 4.

Ethyl propyl Ether

$CH_3·CH_2·CH_2·O·CH_2·CH_3$

$C_5H_{12}O$ MW, 88

B.p. 63·6°. D_4^{20} 0·7386. n_D^{20} 1·36948.

Cerchez, *Bull. soc. chim.*, 1928, **43**, 767.
Michael, Wilson, *Ber.*, 1906, **39**, 2574.
Brühl, *Ann.*, 1880, **200**, 177.

***sym.*-Ethylpropylethylene.**
See 3-Heptene.

Ethylpropylethylene Glycol.
See Heptandiol-3 : 4.

Ethyl propyl Ketone (*Hexanone*-3, 3-*ketohexane*)

$CH_3·CH_2·CH_2·CO·CH_2·CH_3$

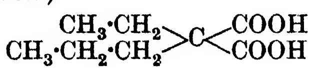
$C_6H_{12}O$ MW, 100

B.p. 123–123·5°. D_4^{22} 0·81491. n_D^{22} 1·39899.

Oxime: b.p. 86°/17 mm.
Semicarbazone: m.p. 112°.
2 : 4-*Dinitrophenylhydrazone*: m.p. 130°.

Sabatier, Mailhe, *Compt. rend.*, 1913, **156**, 1733.
Lieben, Völker, *Ber.*, 1875, **8**, 1019.
Michael, *Ber.*, 1906, **39**, 2144.

Ethylpropylmalonic Acid (*Hexane*-3 : 3-*dicarboxylic acid*)



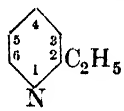
$C_8H_{14}O_4$ MW, 174

Needles. M.p. 117–18°. Sol. H_2O, EtOH, Et_2O. Insol. ligroin. $k = 1{\cdot}16 \times 10^{-2}$ at 25°.
Di-Me ester: $C_{10}H_{18}O_4$. MW, 202. B.p. 215–17°.
Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 234–6°.

Rasetti, *Bull. soc. chim.*, 1905, **33**, 684.

1-Ethyl-2-propylsuccinic Acid.
See Heptane-3 : 4-dicarboxylic Acid.

2-Ethylpyridine (α-*Ethylpyridine*)



C_7H_9N MW, 107

B.p. 148·6° (148–50°). D^0 0·9502. D^{17} 0·9371.
B,HCl,2HgCl₂: needles from H_2O. M.p. 103–6°.
B_2,H_2PtCl_6: orange plates. M.p. 165–7° decomp.
$B,HAuCl_4$: yellow plates from H_2O. M.p. 121°.
Picrate: m.p. 187–9°.

Bergstrom, McAllister, *J. Am. Chem. Soc.*, 1930, **52**, 2848.
Löffler, Grosse, *Ber.*, 1907, **40**, 1327.
Königs, Happe, *Ber.*, 1902, **35**, 1345.
Ladenburg, *Ber.*, 1899, **32**, 44.

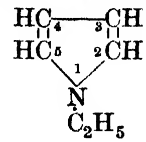
3-Ethylpyridine (β-*Ethylpyridine*).
B.p. 162–5°/762 mm. D^0 0·9539.
$B,HCl,2HgCl_2$: m.p. 132·5°.
B_2,H_2PtCl_6: m.p. 208–9° (196°).
Picrate: m.p. 128–30°.

Ladenburg, *Ann.*, 1898, **301**, 151.
Königs, *Ann.*, 1906, **347**, 216.

4-Ethylpyridine (γ-*Ethylpyridine*).
B.p. 164–5°. D^0 0·9557. D^{20} 0·9417.
$B,HCl,2HgCl_2$: plates. M.p. 150–2°.
B_2,H_2PtCl_6: plates. M.p. 213°.
$B,HAuCl_4$: prisms from HCl. M.p. 147–8° (145°).
Picrate: m.p. 168°.

Ladenburg, *Ber.*, 1899, **32**, 45.
Gabriel, Colman, *Ber.*, 1902, **35**, 1365.

N-Ethylpyrrole (*Ethylpyrrolylamine*)



C_6H_9N MW, 95

B.p. 131°. D^{10} 0·9042, D^{16} 0·8881. Sol. EtOH, Et_2O. Insol. H_2O.

Ciamician, Zanetti, *Ber.*, 1889, **22**, 660.
Bell, Lapper, *Ber.*, 1877, **10**, 1962.
Lubavin, *Ber.*, 1869, **2**, 100.

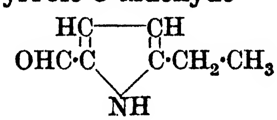
2-Ethylpyrrole (α-*Ethylpyrrole*).
B.p. 163–5°, 59–60°/15 mm.

de Jong, *Rec. trav. chim.*, 1929, **48**, 1029.
Hess, Wissing, *Ber.*, 1914, **47**, 1424.
Dennstedt, *Ber.*, 1890, **23**, 2563.

3-Ethylpyrrole (*Note.*—According to de Jong (*Rec. trav. chim.*, 1929, **48**, 1029) the 3-ethylpyrrole described in the literature (*refs. below*), is actually 2-ethylpyrrole).
B.p. 163–5°.

Oddo, Mameli, *Gazz. chim. ital.*, 1914, **44**, II, 169.
Dennstedt, Zimmermann, *Ber.*, 1886, **19**, 2190.

2-Ethylpyrrole-5-aldehyde

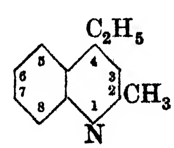


C_7H_9ON MW, 123

Needles from ligroin. M.p. 52°.

Fischer, Beyer, Zaucker, *Ann.*, 1931, **486**, 68.

4-Ethylquinaldine (2-*Methyl*-4-*ethylquinoline*)



$C_{12}H_{13}N$ MW, 171

B.p. 150–3°/14 mm. $K_2Cr_2O_7 + H_2SO_4 \longrightarrow$ quinaldine-4-carboxylic acid.
Methiodide: m.p. 246°.

Tartrate: needles from EtOH. M.p. 149°.

Knoll, D.R.Ps., 363,582–3, (*Chem. Abstracts*, 1924, **18**, 991).
Knövenagel, Bähr, *Ber.*, 1922, **55**, 1926.

6-Ethylquinaldine (2-*Methyl*-6-*ethylquinoline*).

B.p. 276–9°.

Methiodide: yellow needles from EtOH. M.p. 214°.

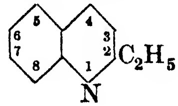
Dichromate: m.p. 134°.

$HgCl_2$ double salt: m.p. 155°.

$ZnCl_2$ double salt: m.p. 167°.

Mills, Harris, Lambourne, *J. Chem. Soc.*, 1921, **119**, 1300.

2-Ethylquinoline (α-*Ethylquinoline*)



$C_{11}H_{11}N$ MW, 157

B.p. 245–6°, 128–31°/13 mm. D^{17} 1·050. n_D^{23} 1·5979. Sol. EtOH, Et_2O, $CHCl_3$, CS . Spar. sol. H_2O.

Methiodide: greenish-yellow needles from EtOH. M.p. 180°.

B_2,H_2PtCl_6: m.p. 188°.

$B,HCl,HgCl_2$: needles. M.p. 118°.

$B,HCl,2AuCl_3$: yellow needles. M.p. 142°.

Picrate: m.p. 148°.

Delaby, Hiron, *Bull. soc. chim.*, 1930, **47**, 1395.
Döbner, *Ann.*, 1887, **242**, 272.
Reher, *Ber.*, 1887, **20**, 2734; 1886, **19**, 2996.

3-Ethylquinoline (β-*Ethylquinoline*).

B.p. 135–8°/12 mm. D_4^{20} 1·0508. n_D^{18} 1·603.

B,HCl: m.p. 173°.

Methiodide: m.p. 191°.

Picrate: m.p. 197°.

v. Braun, Petzold, Seeman, *Ber.*, 1922, **55**, 3785.

4-Ethylquinoline (γ-*Ethylquinoline*).

B.p. 271–4°, 143–5°/8–9 mm. $CrO_3 + H_2SO_4$ ⟶ cinchoninic acid.

B,HNO_3: m.p. 120° (115·5°).

$B,HCl,HgCl_2$: needles. M.p. 154°.

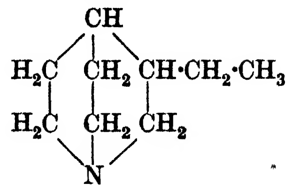
B_2,H_2PtCl_6: m.p. 204°.

Methiodide: yellow cryst. M.p. 149°.

Picrate: yellow needles from H_2O. M.p. 178–80° decomp.

Reher, *Ber.*, 1886, **19**, 2999; 1887, **20**, 2734.
Rabe, Pasternack, *Ber.*, 1913, **46**, 1032.

3-Ethylquinuclidine



$C_9H_{17}N$ MW, 139

Oil with odour resembling collidine. B.p. 190–92°/720 mm.

B,HCl: m.p. 208–11°.

B,HBr: m.p. 230–1°.

B,HI: m.p. 233°.

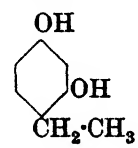
$B,HAuCl_4$: golden leaflets from EtOH.Aq. M.p. 176–8°.

B_2,H_2PtCl_6: m.p. 221° decomp.

Picrate: yellow needles from H_2O. M.p. 153–154·5°.

Koenigs, Bernhart, *Ber.*, 1905, **38**, 3054.
Koenigs, *Ber.*, 1904, **37**, 3244.

4-Ethylresorcinol (2 : 4-*Dihydroxyethylbenzene*)

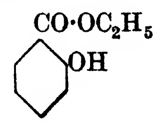


$C_8H_{10}O_2$ MW, 138

Cryst. from H_2O. M.p. 97–8°.

Johnson, Lane, *J. Am. Chem. Soc.*, 1921, **43**, 356.

Ethyl salicylate



$C_9H_{10}O_3$ MW, 166

M.p. 1·3°. B.p. 231·5°, 132·8°/37 mm., 107·5–108·5°/12 mm., 101·8°/8·8 mm. D_4^0 1·147, D_4^{20} 1·131. n_D^{20} 1·5226. Heat of comb. C_p 1051·748 Cal.

Me ether: *see under* o-Methoxybenzoic Acid.

Et ether: *see under* o-Ethoxybenzoic Acid.

Acetyl: *see under* Acetylsalicylic Acid.

Benzoyl: leaflets from EtOH. M.p. 79–80°.

p-*Nitrobenzoyl*: yellowish leaflets from C_6H_6. M.p. 107–8°.

Phenylcarbamate: m.p. 98–100°.

Göttig, *Ber.*, 1876, **9**, 1473.
Baly, *Ann.*, 1849, **70**, 270.
Auwers, *Ann.*, 1915, **408**, 253.

α-Ethylstilbene.
See 1 : 2-Diphenylbutylene-1.

Ethyl styryl Ether (β-*Ethoxystyrene*)

$C_6H_5{\cdot}CH{:}CH{\cdot}O{\cdot}CH_2{\cdot}CH_3$

$C_{10}H_{12}O$ MW, 148

B.p. 223–6°, 106°/14 mm., 98–9°/10 mm. D_4^{20} 0·979. n_D^{20} 1·5496.

Wislicenus, Bilhuber, *Ber.*, 1918, **51**, 1370.
Duffraisse, Chaux, *Bull. soc. chim.*, 1926, **39**, 905.

Ethyl styryl Ketone (*Benzylidenemethyl ethyl ketone*, β-*propionylstyrene*)

$C_6H_5{\cdot}CH{:}CH{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_{11}H_{12}O$ MW, 160

Leaflets from ligroin. M.p. 38–9°. B.p. 142°/12 mm. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. n_D^{40} 1·5726.
Oxime : m.p. 85–6°.
Semicarbazone : m.p. 173°.
Phenylhydrazone : m.p. 104–5° (101°).
Dibromide : m.p. 109–10°.

Harries, Müller, *Ber.*, 1902, **35**, 968.

Ethylsuccinic Acid (*Butane*-1 : 2-*dicarboxylic acid*)

$CH_3{\cdot}CH_2{\cdot}CH(COOH){\cdot}CH_2{\cdot}COOH$

$C_6H_{10}O_4$ MW, 146

Needles. M.p. 100°. Sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$. Insol. pet. ether. Heat of comb. C_v 671·9 Cal. k (first) $= 8{\cdot}5 \times 10^{-5}$ at 25° : (second) $= 1{\cdot}3 \times 10^{-6}$ at 100°. Dist. ⟶ anhydride.
Di-Me ester : $C_8H_{14}O_4$. MW, 174. B.p. 202–5°. D_{34}^{34} 1·051.
Di-Et ester : $C_{10}H_{18}O_4$. MW, 202. B.p. 223–6° (230–1°). D_{21}^{21} 1·030.
Anhydride : $C_6H_8O_3$. MW, 128. Liq. D^{34} 1·165.
Diamide : $C_6H_{12}O_2N_2$. MW, 144. M.p. 214°.

Fittig, Fränkel, *Ann.*, 1889, **255**, 41.
Polko, *Ann.*, 1887, **242**, 121.
Huggenberg, *Ann.*, 1878, **192**, 149.

Ethyl sulphate.
See Diethyl sulphate *and* Ethyl hydrogen sulphate

Ethyl sulphide.
See Diethyl sulphide.

Ethyl sulphite.
See Diethyl sulphite *and* Ethyl hydrogen sulphite.

Ethylsulphonal (*Tetronal*)

$(CH_3{\cdot}CH_2{\cdot}SO_2)_2C(CH_2{\cdot}CH_3)_2$

$C_9H_{20}O_4S_2$ MW, 256

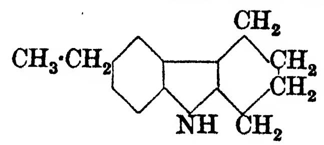
M.p. 85°. Sol. 450 parts cold H_2O. More sol. EtOH, Et_2O. Hypnotic.

Baumann, Kast, *Z. physiol. Chem.*, 1890, **14**, 64.

Ethylsulphonic Acid.
See Ethanesulphonic Acid.

Ethylsulphuric Acid.
See Ethyl hydrogen sulphate.

6-Ethyl-1 : 2 : 3 : 4-tetrahydrocarbazole



$C_{14}H_{17}N$ MW, 199

Plates from ligroin. M.p. 78°. S ⟶ 3-ethylcarbazole.

Plant, Williams, *J. Chem. Soc.*, 1934, 1143.

***N*-Ethyl-1 : 2 : 3 : 4-tetrahydroquinoline.**
See Kairoline A.

Ethyltetramethylene Glycol.
See Hexandiol-1 : 4.

Ethyl thiocyanate

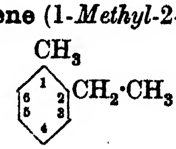
$CH_3{\cdot}CH_2{\cdot}SCN$

C_3H_5NS MW, 87

B.p. 146°. D^{16} 1·020, $D_4^{22\cdot9}$ 1·00715. n_D^{15} 1·4684. Misc. with EtOH, Et_2O. Insol. H_2O. Heat of comb. C_v 612·5 Cal., C_p 613·8 Cal. Polymerises on heating to 190° with trace of acid. Zn + HCl ⟶ $C_2H_5{\cdot}SH$ + HCN.

Biilmann, Bjerrum, *Ber.*, 1917, **50**, 509.
Walden, *Ber.*, 1907, **40**, 3215.
Palazzo, Scelsi, *Gazz. chim. ital.*, 1908, **38**, I, 669.

o-Ethyltoluene (1-*Methyl*-2-*ethylbenzene*)



C_9H_{12} MW, 120

B.p. 164·8–165°, 62–3°/20–1 mm. $D_4^{15\cdot7}$ 0·8841, D_4^{20} 0·881. n_D^{20} 1·5042. Dil. HNO_3 ⟶ *o*-toluic acid.

Auwers, *Ann.*, 1919, **419**, 109.
Blaise, Montagne, *Compt. rend.*, 1925, **181**, 122.

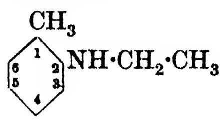
***m*-Ethyltoluene** (1-*Methyl*-3-*ethylbenzene*).
B.p. 161·5–162·5°. D_4^{20} 0·867. n_D^{20} 1·4975. CrO_3 ⟶ isophthalic acid.

Auwers, *Ann.*, 1919, **419**, 110.
Bartow, Sellards, *J. Am. Chem. Soc.*, 1905, **27**, 370.

***p*-Ethyltoluene** (1-*Methyl*-4-*ethylbenzene*).
B.p. 161–2°. D_4^{20} 0·862. n_D^{20} 1·4943. Dil. HNO_3 ⟶ *p*-toluic acid. CrO_3 ⟶ terephthalic acid.

Wallach, *Ann.*, 1917, **414**, 210.
Defren, *Ber.*, 1895, **28**, 2649.
See also first reference above.

***N*-Ethyl-*o*-toluidine**



$C_9H_{13}N$ MW, 135

B.p. 214–214·5°. D_4^{25} 0·948.
N-*Acetyl*: *N*-ethylacet-*o*-toluidide. B.p. 254–6°.

Finzi, *Chem. Abstracts*, 1925, **19**, 2648.
Thomas, *J. Chem. Soc.*, 1917, **111**, 563.
Reinhardt, Staedel, *Ber.*, 1883, **16**, 29.

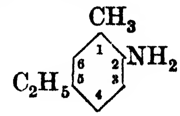
***N*-Ethyl-*m*-toluidine.**
B.p. 221–2° (215°).
B,HCl: m.p. 159°.
B,HBr: m.p. 161°.
B,HI: m.p. 138°.
Chloroplatinate: m.p. 182° decomp.
B,HgCl$_2$: m.p. 88°.
B,ZnCl$_2$: m.p. 128°.
N-*Acetyl*: *N*-ethylacet-*m*-toluidide. B.p. 254°.
N-*Benzoyl*: m.p. 72°.
N-*Oxalyl*: m.p. 111°.

Yamaguchi, Matsumoto, *Chem. Abstracts*, 1924, **18**, 3192.
See also first reference above.

***N*-Ethyl-*p*-toluidine.**
B.p. 217°. $D^{15·5}$ 0·9391, D_4^{25} 0·942.

Guyot, Fournier, *Bull. soc. chim.*, 1930, **47**, 209.
Finzi, *Chem. Abstracts*, 1925, **19**, 2648.
Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, **46**, 741.
Thomas, *J. Chem. Soc.*, 1917, **111**, 570.
Morley, Abel, *Ann.*, 1855, **93**, 313.

5-Ethyl-*o*-toluidine (2-*Methyl*-4-*ethylaniline*, 6-*amino*-1-*methyl*-3-*ethylbenzene*)



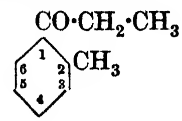
$C_9H_{13}N$ MW, 135

Colourless liq., darkening on exposure to air or light. B.p. 228–9°.
B,HCl: m.p. 152°.
N-*Formyl*: m.p. 151°.
N-*Acetyl*: m.p. 105°.
N-*Benzoyl*: m.p. 152°.

Mailhe, *Bull. soc. chim.*, 1921, **29**, 715.

Ethyl tolyl Ether.
See under Cresol.

Ethyl *o*-tolyl Ketone (2-*Methylpropiophenone*, 2-*propionyltoluene*)



$C_{10}H_{12}O$ MW, 148

B.p. 219–20°. D_4^0 1·0119.
Semicarbazone: m.p. 173° (169°).

Mauthner, *J. prakt. Chem.*, 1922, **103**, 393.
Senderens, *Ann. chim.*, 1913, **28**, 332.
Blaise, *Compt. rend.*, 1901, **133**, 1218.

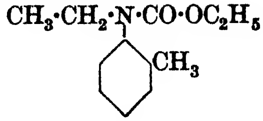
Ethyl *m*-tolyl Ketone (3-*Methylpropiophenone*, 3-*propionyltoluene*).
B.p. 234°/745 mm. D_4^0 1·0059.
Oxime: m.p. 68–9°.
Semicarbazone: m.p. 175–6° (166°).

Wallach, Rentschler, *Ann.*, 1908, **360**, 61.
See also second reference above.

Ethyl *p*-tolyl Ketone (4-*Methylpropiophenone*, 4-*propionyltoluene*).
B.p. 238–9°, 119–20°/18 mm., 106°/8 mm. D_4^0 1·0053, D_4^{20} 0·990. n_D^{20} 1·5278.
Oxime: m.p. 89–90°.
Semicarbazone: m.p. 186·5–187° (180°).

Mauthner, *J. prakt. Chem.*, 1922, **103**, 394.
Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1893.
Senderens, *Ann. chim.*, 1913, **28**, 332.
Auwers, *Ber.*, 1916, **49**, 2400.
Klages, *Ber.*, 1902, **35**, 2252.

Ethyl-o-tolylurethane



$C_{12}H_{17}O_2N$ MW, 207

B.p. 257°/755 mm. D^{25} 1·0225.

Baker, *J. Chem. Soc.*, 1913, **103**, 1657.

Ethyltridecylcarbinol (*Hexadecanol*-3, 3-*hydroxyhexadecane*)

$CH_3·[CH_2]_{12}·CH(OH)·CH_2·CH_3$

$C_{16}H_{34}O$ MW, 242

l-.

Needles from EtOH. M.p. 50°. B.p. 152°/4 mm. D_4^{67} 0·8000. $[\alpha]_D^{20}$ − 5·27° in EtOH. Spar. volatile in steam.

Acid phthalate: needles from pet. ether. M.p. 51°. $[\alpha]_D^{20}$ − 16·47° in EtOH.

dl-.

M.p. 37–8°. B.p. 176°/16 mm.

Acid phthalate: needles from pet. ether. M.p. 51–2°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1952.

Ethyl tridecyl Ketone (*Hexadecanone*-3)

$CH_3·[CH_2]_{12}·CO·CH_2·CH_3$

$C_{16}H_{32}O$ MW, 240

Leaflets from pet. ether. M.p. 42°. B.p. 184°/17 mm.

Semicarbazone: cryst. from EtOH.Aq. M.p. 86°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1952.

Ethylundecylcarbinol (*Tetradecanol*-3)

$CH_3·[CH_2]_{10}·CH(OH)·CH_2·CH_3$

$C_{14}H_{30}O$ MW, 214

l-.

Prisms from EtOH. M.p. 38°. B.p. 160°/15 mm., 146°/10 mm. D_4^{53} 0·8098. $[\alpha]_D^{20}$ − 6·25° in EtOH. Slowly volatilises in steam.

Acid phthalate: needles from pet. ether. M.p. 33°. $[\alpha]_D^{20}$ − 17·43° in EtOH.

dl-.

Needles. M.p. 25°. B.p. 173°/25 mm.

Acid phthalate: cryst. from pet. ether. M.p. 58–60°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1950.

Ethyl undecyl Ketone (*Tetradecanone*-3)

$CH_3·[CH_2]_{10}·CO·CH_2·CH_3$

$C_{14}H_{28}O$ MW, 212

Cryst. from MeOH. M.p. 34°. B.p. 152°/16 mm., 148°/10 mm.

Oxime: cryst. from MeOH. M.p. 40°.

Semicarbazone: cryst. from EtOH. M.p. 89°.

Blaise, Guérin, *Bull. soc. chim.*, 1903, **29**, 1208.

See also above reference.

Ethylurea

$CH_3·CH_2·NH·CO·NH_2$

$C_3H_8ON_2$ MW, 88

Needles from EtOH–Et_2O. M.p. 92°. Very sol. H_2O, EtOH, $CHCl_3$, C_6H_6. Insol. Et_2O, CS_2. Hot alc. KOH ⟶ K cyanate + ethylamine.

Nitrate: prisms. M.p. 55–60°.

Oxalate: plates. M.p. 55–60°.

Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, **51**, 1797.

Kjellin, Kuylenstjerna, *Ann.*, 1897, **298**, 119.

Ethylurethane (*Ethyl* N-*ethyl carbamate*, *ethyl ethylaminoformate*)

$CH_3·CH_2·NH·CO·OC_2H_5$

$C_5H_{11}O_2N$ MW, 117

B.p. 170° (174–6°), 74–5°/14 mm. D_4^{20} 0·9813. n_D^{20} 1·42192. Hot alkali ⟶ C_2H_5OH, CO_2, and $C_2H_5NH_2$.

Mauguin, *Ann. chim. phys.*, 1911, **22**, 323.

Curtius, Hille, *J. prakt. Chem.*, 1901, **64**, 409.

Schreiner, *J. prakt. Chem.*, 1880, **21**, 125.

1-Ethyl-n-valeric Acid (*Ethylpropylacetic acid, hexane-3-carboxylic acid*)

$$CH_3·CH_2·CH_2·\overset{C_2H_5}{CH}·COOH$$

$C_7H_{14}O_2$ MW, 130

B.p. 209·2°. Sol. EtOH, Et_2O. Prac. insol. H_2O. Heat of comb. C_v 994·7 Cal.

Me ester: $C_8H_{16}O_2$. MW, 144. B.p. 155–156·5°.

Et ester: $C_9H_{18}O_2$. MW, 158. B.p. 169–71°.

Chloride: $C_7H_{13}OCl$. MW, 148·5. B.p. 158–60°.

Amide: $C_7H_{15}ON$. MW, 129. Cryst. from CS_2. M.p. 102·5–103·5°.

Rasetti, *Bull. soc. chim.*, 1905, **33**, 685.

Kiliani, *Ber.*, 1886, **19**, 227.

Ethylvinylacetone.

See 1-Heptenone-4.

Ethylvinylcarbinol (1-*Pentenol*-3)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH{:}CH_2$

$C_5H_{10}O$ MW, 86

B.p. 114–16°, 37°/20 mm. D_4^0 0·856, D_4^{22} 0·839. $n_D^{27\cdot5}$ 1·4182.

p-*Nitrobenzoyl*: m.p. 53°.

Allophanate: m.p. 155°.

Delaby, *Compt. rend.*, 1922, **175**, 967.
Kohler, *Am. Chem. J.*, 1907, **38**, 525.

Ethyl vinyl Ether (*Ethoxyethylene*)

$CH_3{\cdot}CH_2{\cdot}O{\cdot}CH{:}CH_2$

C_4H_8O MW, 72

B.p. 35·5°. D_4^{20} 0·7589. $n_D^{9\cdot2}$ 1·3856. Spar. sol. H_2O. Polymerises violently on addn. of iodine.

I.G., D.R.Ps., 550,403, 550,495, (*Chem. Abstracts*, 1932, **26**, 4825).
Leuchs, Lemcke, *Ber.*, 1914, **47**, 2577.

Ethyl vinyl Ketone (1-*Pentenone*-3, 3-*keto-pentene*-1, *propionylethylene*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH{:}CH_2$

C_5H_8O MW, 84

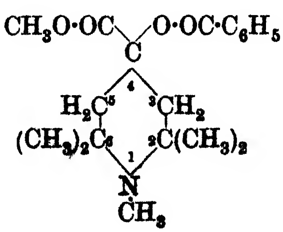
Liq. with penetrating odour. B.p. 68–70°/200 mm., 38°/60 mm. D_4^{15} 0·8524. n_D^{14} 1·4275. Sol. most org. solvents. Insol. H_2O. Polymerises easily, especially by heat or alkali. Forms add. comps. with aliphatic and aromatic amines.

Diethylacetal: $C_9H_{18}O_2$. MW, 158. B.p. 76–8°/15 mm.

Blaise, Maire, *Bull. soc. chim.*, 1908, **3**, 270.
Courtot, Pierron, *Compt. rend.*, 1929, **188**, 1501.

Ethylxanthogenic Acid.
See Xanthogenic Acid.

α-Eucaine (1 : 2 : 2 : 6 : 6-*Pentamethyl*-4-*benzoylhydroxypiperidine*-4-*carboxylic acid methyl ester*)



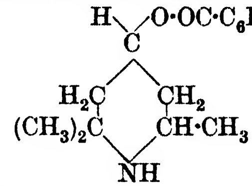
$C_{19}H_{27}O_4N$ MW, 333

M.p. 104–5° (103°). Sol. H_2O, Et_2O, $CHCl_3$, C_6H_6, pet. ether. Local anaesthetic.

Hydrochloride: m.p. about 200° decomp.

Parsons, *J. Am. Chem. Soc.*, 1901, **23**, 885.
Schering, D.R.P., 90,245.

β-Eucaine (o-*Benzoylvinyldiacetonealkamine* 2 : 6 : 6-*trimethyl*-4-*benzoylhydroxypiperidine*)



$C_{15}H_{21}O_2N$ MW, 247

l-.

Prisms from pet. ether. M.p. 57–8°.

B,HCl: plates. M.p. 244–5°. $[\alpha]_D$ − 11·3° in H_2O.

Picrate: prisms from EtOH. M.p. 198–9°.

d-.

Columns from pet. ether. M.p. 57–8°. Equally anæsthetic to the *l*-form but only half as toxic.

B,HCl: plates. M.p. 244–5°. $[\alpha]_D$ + 11·5° in H_2O.

r-.

Plates from pet. ether. M.p. 70–1° (91°, about 78°). Sol. Et_2O, $CHCl_3$, C_6H_6, pet. ether. Substitute for cocaine as local anæsthetic.

B,HCl: m.p. 277–9° (268° decomp.).

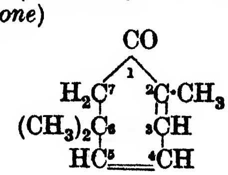
Picrate: plates from EtOH. M.p. 230·5–231·5°.

King, *J. Chem. Soc.*, 1924, **125**, 41.
Parsons, *J. Am. Chem. Soc.*, 1901, **23**, 885.
Schering, D.R.P., 97,672.

Eucalyptol.
See Cineole.

Eucarvol.
See Eucarvone.

Eucarvone (*Eucarvol*, 2 : 6 : 6-*trimethyl*-$\Delta^{2:4}$-*cycloheptadienone*)



$C_{10}H_{14}O$ MW, 150

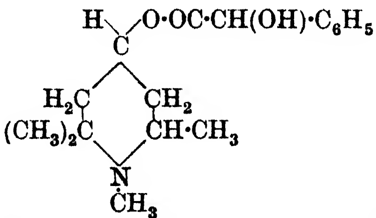
Oil with odour resembling menthone. B.p. 99–100°/22 mm., 88°/10 mm. D_4^{20} 0·9490. n_D^{20} 1·50872. Does not form bisulphite comp. Isomerises to carvacrol on boiling.

Oxime: cryst. from MeOH. M.p. 106°.

Semicarbazone : m.p. 186–8° (183–4°).

Wallach, Köhler, *Ann.*, 1905, **339**, 94.
Clarke, Lapworth, *J. Chem. Soc.*, 1910, **97**, 15.
Baeyer, Villiger, *Ber.*, 1898, **31**, 2068.

Eucatropine (*Euphthalmine, betacaine mandelate*)



$C_{17}H_{25}O_3N$ MW, 291

Prisms from pet. ether. M.p. 113° (sinters at 108°). Sol. H_2O, EtOH, $CHCl_3$. Insol. Et_2O. Mydriatic.

B,HCl : m.p. 183–4°.
B,HAuCl₄ : m.p. 158–9°.
Salicylate : m.p. 115–16°.

Kipping, *J. Chem. Soc.*, 1923, **123**, 3115.
Harries, *Ber.*, 1898, **31**, 665 ; *Ann.*, 1897, **296**, 341.
Schering, D.R.P., 95,620, (*Chem. Zentr.*, 1898, I, 968).

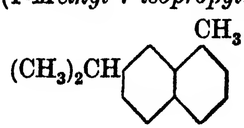
Eucazulene

$C_{15}H_{18}$ MW, 198

B.p. 135°/0·5 mm.
Picrate : m.p. 118–20°.
Styphnate : m.p. 122–3°.

Ruzicka, Rudolph, *Helv. Chim. Acta*, 1926, **9**, 133.

Eudalene (1-*Methyl*-7-*isopropylnaphthalene*)



$C_{14}H_{16}$ MW, 184

B.p. 140°/11 mm.
Picrate : needles from EtOH. M.p. 92°.
Styphnate : needles from EtOH. M.p. 119–20°.

Ruzicka, Meyer, Mingazzini, *Helv. Chim. Acta*, 1922, **5**, 361.
Ruzicka, Stoll, *ibid.*, 923.
Barnett, Sanders, *J. Chem. Soc.*, 1933, 435.

Eudesmene

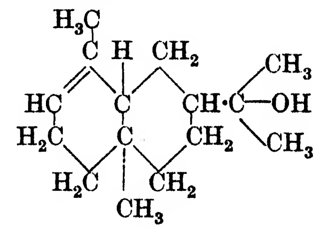
$C_{15}H_{24}$ MW, 204

B.p. 135–6°/14 mm. D_4^{20} 0·9232. n_D^{20} 1·5099. $[\alpha]_D$ + 51°.

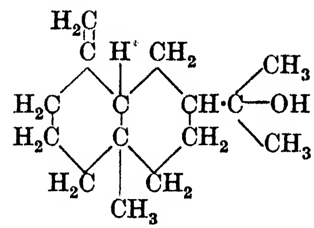
Dihydrochloride : m.p. 74–5° (79–80°). $[\alpha]_D$ + 20° ± 3°.

Ruzicka, Wind, Koolhaas, *Helv. Chim. Acta*, 1931, **14**, 1140.

Eudesmol (*Selinelol*)



α.



β.

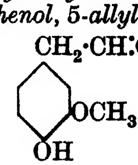
$C_{15}H_{26}O$ MW, 222

Constituent of various eucalyptus oils. Mixture of α- and β-forms. M.p. 82–3°. B.p. 156°/10 mm. D^{20} 0·9884. n_D^{20} 1·516°. $[\alpha]_D$ + 31·3° in $CHCl_3$. AcOH–HCl ⟶ eudesmene dihydrochloride.

Acetyl : b.p. 165–70°/11 mm. D^{20} 0·9933. n_D^{20} 1·49204. $[\alpha]_D^{20}$ + 31°.
Dibromide : m.p. 55–6°.
Allophanate : m.p. 174°.

Ruzicka, Wind, Koolhaas, *Helv. Chim. Acta*, 1931, **14**, 1132.
Ruzicka, Capato, *Ann.*, 1927, **453**, 62.
Semmler, Tobias, *Ber.*, 1913, **46**, 2026.

Eugenol (4-*Hydroxy*-3-*methoxyallylbenzene*, 2-*methoxy*-4-*allylphenol*, 5-*allylguaiacol*)



$C_{10}H_{12}O_2$ MW, 164

Chief constituent of clove oil and present in many other essential oils. B.p. 254° (248°), 127°/15 mm., 123°/12 mm. D_4^{25} 1·0620. n_D^{19} 1·5439. Sol. EtOH, Et_2O, AcOH, caustic alkalis. Spar. sol. H_2O. Alkaline $KMnO_4$ ⟶ vanillin. Boiling alc. KOH ⟶ isoeugenol.

Me ether : 3 : 4-dimethoxy-1-allylbenzene, methyleugenol, 4-allylveratrole. $C_{11}H_{14}O_2$.

MW, 178. Present in many essential oils. B.p. 248–9° (244°), 128–9°/11 mm. D^{15} 1·055. n_D^{20} 1·532.

Et ether: 3-methoxy-4-ethoxy-1-allylbenzene. $C_{12}H_{16}O_2$. MW, 192. B.p. 254°. $D^{18·5}$ 1·0117. Polymerises on heating or dist. ⟶ product, leaflets from EtOH, m.p. 140° (125°).

Acetyl: *see* Aceteugenol.
Benzoyl: m.p. 70·5° (69–70°).
p-*Nitrobenzoyl*: m.p. 81°.
3 : 5-*Dinitrobenzoyl*: m.p. 130·8°.
Phenylcarbamate: m.p. 95·5°.

Claisen, Kremers, *Ann.*, 1919, **418**, 113.
Wassermann, *Ann.*, 1875, **179**, 366.
Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, **97**, 1138.
Moureu, *Bull. soc. chim.*, 1896, **15**, 651.

Euonymol

$C_{21}H_{30}O_4$ MW, 346

Isolated from root bark of *Euonymus atropurpureus*, Jacquin. Prisms. M.p. 248–50°.
Acetyl deriv.: prisms. M.p. 215°.

Rogerson, *J. Chem. Soc.*, 1912, **101**, 1046.

Euonysterol

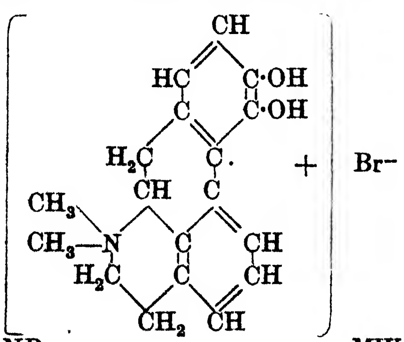
$C_{31}H_{52}O_2$ MW, 456

Isolated from root bark of *Euonymus atropurpureus*, Jacquin. M.p. 137–8°. $[\alpha]_D$ −28·2°.
Acetyl deriv.: laminæ. M.p. 116–18°.

Rogerson, *J. Chem. Soc.*, 1912, **101**, 1047.

Euphthalmine.
See Eucatropine.

Eupophine (*Apomorphine methobromide*)



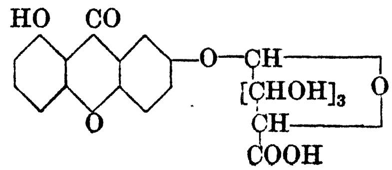
$C_{18}H_{20}O_2NBr$ MW, 362

Needles from MeOH. M.p. 180°. Sol. H_2O, EtOH. Insol. Et_2O.

Pschorr, D.R.P., 158,620, (*Chem. Zentr.*, 1905, I, 703).
Riedel, D.R.P., 167,879, (*Chem. Zentr.*, 1906, I, 1067).

Euresol.
See under Resorcinol.

Euxanthic Acid

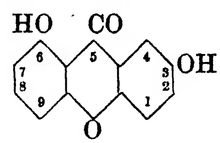


$C_{19}H_{16}O_{10}$ MW, 404

Exists as stable hydrate with $1H_2O$. M.p. 156–8° part. decomp.
Me ester: $C_{20}H_{18}O_{10}$. MW, 418. M.p. 212°.
Et ester: $C_{21}H_{20}O_{10}$. MW, 432. M.p. 198°.

Robertson, Waters, *J. Chem. Soc.*, 1931, 1709.
Neuberg, Neimann, *Z. physiol. Chem.*, 1905, **44**, 114.
Graebe, *Ber.*, 1900, **33**, 3360.

Euxanthone (3 : 6-*Dihydroxyxanthone*)



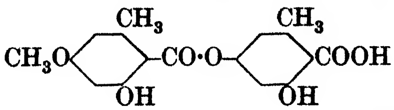
$C_{13}H_8O_4$ MW, 228

Occurs in *Platonia insignis*, Mart., *Mangnifera indica*, Linn., etc. Yellowish needles from toluene. M.p. 240°. Sol. hot EtOH, conc. alkalis. Spar. sol. Et_2O. Insol. H_2O. Sublimes with part. decomp. $FeCl_3$ ⟶ green col. KOH fusion ⟶ hydroquinone + resorcinol. Forms stable Na, Ca, Ba, Mg, etc. salts.

6-*Me ether*: $C_{14}H_{10}O_4$. MW, 242. Pale yellow plates from C_6H_6. M.p. 235° (240°).
3-*Me ether*: yellow plates from EtOH. M.p. 130·5°.
Di-Me ether: $C_{15}H_{12}O_4$. MW, 256. Needles from ligroin. M.p. 149·5°.
Di-Et ether: $C_{17}H_{16}O_4$. MW, 284. M.p. 126°.
3-*Acetyl*: yellowish prisms from EtOH. M.p. 160°.
Diacetyl: yellowish prisms from C_6H_6. M.p. 185°.
Dibenzoyl: yellow cryst. M.p. 221–2° (214°).

Robertson, Waters, *J. Chem. Soc.*, 1929, 2239.
Ullmann, Panchaud, *Ann.*, 1906, **350**, 108.
Graebe, Aders, *Ann.*, 1902, **318**, 365.

Evernic Acid (*Lecanoric acid methyl ether*)



$C_{17}H_{16}O_7$ MW, 332

Constituent of various lichens. Prisms from EtOH. M.p. 170°. Sol. hot EtOH. Spar. sol. cold EtOH, Et_2O. Insol. cold H_2O.

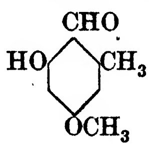
Diacetyl: prisms from AcOEt–ligroin. M.p. 159° (144°).

Me ester: $C_{18}H_{18}O_7$. MW, 346. Prisms from Me_2CO. M.p. 148°.

Et ester: $C_{19}H_{20}O_7$. MW, 360. Prisms from EtOH. M.p. 152°.

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1388.
Hesse, *J. prakt. Chem.*, 1898, **57**, 246.

Everninaldehyde (*3-Hydroxy-5-methoxy-o-toluic aldehyde, 6-hydroxy-2-methylanisaldehyde*)



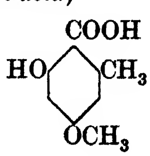
$C_9H_{10}O_3$ MW, 166

Prisms from 70% MeOH. M.p. 65°.

Acetyl: prisms from ligroin. M.p. 84°.

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1390.
Hoesch, *Ber.*, 1913, **46**, 889.

Everninic Acid (*6-Hydroxy-2-methylanisic acid, orsellinic acid 5-methyl ether, 3-hydroxy-5-methoxy-o-toluic acid*)



$C_9H_{10}O_4$ MW, 182

Needles from H_2O. M.p. 170° (157°). Sol. EtOH, Me_2CO, AcOEt. Spar. sol. Et_2O, C_6H_6, ligroin.

Et ester: $C_{11}H_{14}O_4$. MW, 210. Prisms from EtOH. M.p. 72°.

Me ether: 3 : 5-dimethoxy-*o*-toluic acid. $C_{10}H_{12}O_4$. MW, 196. Prisms from EtOH.Aq. M.p. 140° decomp.

Et ether: $C_{11}H_{14}O_4$. MW, 210. Prisms from AcOEt–ligroin. M.p. 87°.

Acetyl: prisms from AcOEt–ligroin. M.p. 117° (111°).

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1392.
Hesse, *J. prakt. Chem.*, 1915, **92**, 425.
Hoesch, *Ber.*, 1913, **46**, 892.
Fischer, Hoesch, *Ann.*, 1912, **391**, 367.

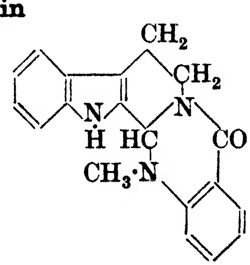
Evipan (*N-Methylcyclohexenylmethylbarbituric acid, N-methylcyclohexenylmethylmalonyl ureide*).

Tasteless cryst. powder. M.p. 143–5°. Sol. AcOEt, hot EtOH. Spar. sol. H_2O, Et_2O. Hypnotic.

Na salt: intravenous anæsthetic of short duration (15–20 mins.).

Weese, Scharpff, *Chem. Zentr.*, 1932, II, 2330.
Mayer, *ibid.*, 2078.

Evodiamin



$C_{19}H_{17}ON_3$ MW, 303

Occurs in fruit of *Evodia rutaecarpa*, Benth. and Hook. Leaflets from EtOH. M.p. 278°. $[\alpha]_D^{15}$ + 352° in Me_2CO. Sol. Me_2CO. Spar. sol. EtOH, Et_2O, AcOH, $CHCl_3$. Insol. H_2O, C_6H_6, pet. ether. Weak base, insol. dil. acids. Alc. HCl ⟶ inactive isoevodiamin, $C_{19}H_{19}O_2N_3$, m.p. 146–7°.

Asahina, Ohta, *Ber.*, 1928, **61**, 319.
Asahina, Ishio, Kashiwagi, Mayeda, Fujita, *Chem. Zentr.*, 1923, III, 249.
Asahina, Fujita, *Chem. Zentr.*, 1922, I, 357.

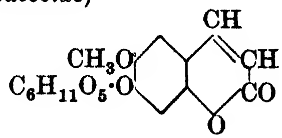
Exalgin.
See N-Methylacetanilide.

Exaltolide.
See under 15-Hydroxypentadecylic Acid.

Exaltone.
See Cyclopentadecanone.

F

Fabiatrin (*7-Glucosido-6-methoxycoumarin, scopoletin glucoside*)



$C_{16}H_{18}O_9$ MW, 354

Present in leaves of *Fabiana imbricata*, Ruiz. et Pav. Needles + $2H_2O$ from H_2O. M.p. 226–8°. Sol. hot H_2O. Spar. sol. cold org. solvents. Hyd. ⟶ glucose + scopoletin.

Edwards, Rogerson, *Biochem. J.*, 1927, **21**, 1010.

F-Acid.

See 2-Naphthol-7-sulphonic Acid.

Fæcosterol

$C_{27}H_{46}O$ MW, 386

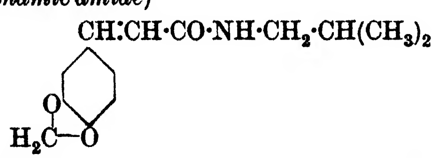
Needles from Me_2CO. M.p. 161–3°. $[\alpha]_D^{25}$ + 42·1° in $CHCl_3$. Sol. Et_2O, $CHCl_3$, AcOEt, C_6H_6, pet. ether. Spar. sol. EtOH, Me_2CO.

Acetyl deriv.: leaflets from EtOH. M.p. 159–61°.

Benzoyl deriv.: m.p. 144–6°. $[\alpha]_D^{20}$ + 35·4° in $CHCl_3$.

Wieland, Asano, *Ann.*, 1929, **473**, 307.

Fagaramide (*N-Isobutyl-3 : 4-methylenedioxycinnamic amide*)



$C_{14}H_{17}O_3N$ MW, 247

Occurs in bark of *Zanthoxylum macrophyllum*, Oliver. Plates from AcOEt. M.p. 119·5° (softens at 105°). $KMnO_4$ ⟶ piperonal ⟶ piperonylic acid. Alc. KOH ⟶ methylenedioxycinnamic acid + isobutylamine.

B_2,HCl: m.p. 137°.

Dibromide: m.p. 134–5°.

Goodson, *Biochem. J.*, 1921, **15**, 123.
Thoms, Thumen, *Ber.*, 1911, **44**, 3717.

Fagarol

$C_{20}H_{18}O_6$ MW, 354

Sterol occurring in root of *Zanthoxylum senegalense*, D.C. Needles from C_6H_6-pet. ether. M.p. 127–8°. Sol. C_6H_6, $CHCl_3$, Me_2CO, CS_2. Spar. sol. EtOH, pet. ether.

Preiss, *Chem. Zentr.*, 1911, II, 94.

Farnesal

$$(CH_3)_2C{:}CH \cdot [CH_2]_2 \cdot \overset{CH_3}{C}{:}CH \cdot [CH_2]_2 \cdot \overset{CH_3}{C}{:}CH \cdot CHO$$

$C_{15}H_{24}O$ MW, 220

B.p. 172–4°/14 mm. D^{18} 0·893. n_D 1·49951. Reduces $NH_3.AgNO_3$.

Semicarbazone: m.p. 133–5°.

Naef, D.R.P., 469,555, (*Chem. Abstracts*, 1929, **23**, 1724).
Kerschbaum, *Ber.*, 1913, **46**, 1734.
Ruzicka, *Helv. Chim. Acta*, 1923, **6**, 502.

Farnesane (2 : 6 : 10-*Trimethyldodecane*)

$$CH_3 \cdot CH_2 \cdot \overset{CH_3}{CH} \cdot [CH_2]_3 \cdot \overset{CH_3}{CH} \cdot [CH_2]_3 \cdot \overset{CH_3}{CH} \cdot CH_3$$

$C_{15}H_{32}$ MW, 212

B.p. 126·5°/15 mm., 119·5–120°/11 mm. Spar. sol. MeOH, AcOH. D_4^{25} 0·7682. n_D^{25} 1·4303.

Kuhn, Ehmann, *Helv. Chim. Acta*, 1929, **12**, 906.
Fischer, *Ann.*, 1928, **464**, 88.
Fischer, Löwenberg, *Ann.*, 1929, **475**, 193.

Farnesene

$$(CH_3)_2C{:}CH \cdot [CH_2]_2 \cdot \overset{CH_3}{C}{:}CH \cdot CH_2 \cdot CH{:}\overset{CH_3}{C} \cdot CH{:}CH_2$$

$C_{15}H_{24}$ MW, 204

Mobile oil. B.p. 129–32°/12 mm. D_4^{20} 0·8410. n_D^{20} 1·4836.

Ruzicka, *Helv. Chim. Acta*, 1923, **6**, 498.
Kerschbaum, *Ber.*, 1913, **46**, 1733.
Harries, Haarmann, *ibid.*, 1741.

Farnesenic Acid (2 : 6 : 10-*Trimethyl-undeca-1 : 5 : 9-triene carboxylic acid*, or 2 : 6 : 10-*trimethyl undeca-1 : 5 : 10-triene carboxylic acid*)

$$(CH_3)_2C{:}CH \cdot [CH_2]_2 \cdot \overset{CH_3}{C}{:}CH \cdot [CH_2]_2 \cdot \overset{CH_3}{C}{:}CH \cdot COOH$$

or

$$CH_2{:}\overset{CH_3}{C} \cdot [CH_2]_3 \cdot \overset{CH_3}{C}{:}CH \cdot CH_2 \cdot CH_2 \cdot \overset{CH_3}{C}{:}CH \cdot COOH$$

$C_{15}H_{24}O_2$ MW, 236

B.p. 202–6°/16 mm.

Me ester: $C_{16}H_{26}O_2$. MW, 250. B.p. 177–185°/10 mm.

Kerschbaum, *Ber.*, 1913, **46**, 1735.

Farnesol

$(CH_3)_2C{:}CH{\cdot}[CH_2]_2{\cdot}C(CH_3){:}CH{\cdot}[CH_2]_2{\cdot}C(CH_3){:}CH{\cdot}CH_2OH$

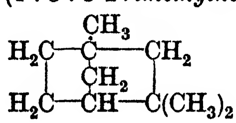
$C_{15}H_{26}O$ MW, 222

Occurs in many essential oils such as acacia, neroli, musk, and especially in oil from *Hibiscus abelmoschus*, Linn. B.p. 160°/10 mm., 149°/4 mm. (140–1°/3–4 mm.). D_4^{20} 0·8846. n_D^{20} 1·4877. $CrO_3 \longrightarrow$ farnesal.

Acetyl: farnesyl acetate. B.p. 169–70°/10 mm.

Ruzicka, *Helv. Chim. Acta*, 1926, **6**, 492.
Gresjean, Martinet, *Chem. Abstracts*, 1926, **20**, 93 (*Review*).
Fischer, *Ann.*, 1928, **464**, 74, 87 (*Bibl.*).
Naef, D.R.P., 469,555, (*Chem. Abstracts*, 1929, **23**, 1724).
Nivière, *Chem. Abstracts*, 1925, **19**, 2258 (*Review*).

Fenchane (1 : 3 : 3-*Trimethylnorcamphane*)

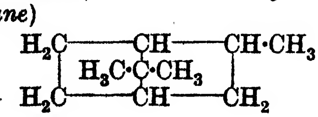


$C_{10}H_{18}$ MW, 138

Liq. at − 15°. B.p. 151–2°/765 mm. Sol. EtOH, Et_2O. Spar. sol. AcOH. D_4^{20} 0·8345. n_D^{20} 1·44714. $[\alpha]_D$ − 18°.

Wolff, *Ann.*, 1912, **394**, 86.
Komppa, Hasselström, *Ann.*, 1932, **496**, 164 (*Bibl.*).
Kondakov, *Chem. Abstracts*, 1930, **24**, 2453.

α-Fenchane (2 : 7 : 7-*Trimethylnorcamphane*, *isobornylane*)



$C_{10}H_{18}$ MW, 138

B.p. 163·5–164·5°/753 mm. D_4^{20} 0·8579. n_D^{20} 1·4590. $[\alpha]_D$ − 12·36°.

Komppa, Hasselström, *Ann.*, 1932, **496**, 164.
Nametkin, *Ann.*, 1924, **440**, 60.

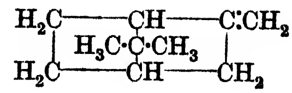
Fenchelene

$C_{10}H_{16}$ MW, 136

B.p. 175–8°, 66–70°/20 mm. D^{20} 0·842. n_D^{20} 1·47439.

Wallach, *Ann.*, 1898, **300**, 311.

α-Fenchene



$C_{10}H_{16}$ MW, 136

l-.

B.p. 157–9° (155–60°). D_4^{20} 0·8670 (0·8665). n_D^{20} 1·47133. $[\alpha]_D^{20}$ − 32·32°.

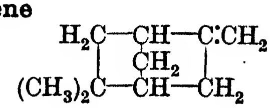
dl-. Isopinene.

B.p. 154–6°. D_{40}^{2} 0·8660, n_D^{20} 1·4705.

Hydrochloride: m.p. 35–7°.

Wallach, *Ann.*, 1891, **263**, 149.
Nametkin, Abahumowsky, Seliwanoff, *Ann.*, 1924, **440**, 66.
Komppa, Hasselström, *Ann.*, 1932, **496**, 165.
Komppa, Roschier, *Chem. Abstracts*, 1917, **11**, 3276.

β-Fenchene



$C_{10}H_{16}$ MW, 136

d-.

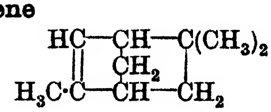
B.p. 150·5–153·5° (152–4°). D_4^{20} 0·8599 (0·8597). n_D^{20} 1·46511. $[\alpha]_D^{25}$ + 62·5°.

Dibromide: m.p. 81–2°.

Nitrosochloride: m.p. 120°.

Komppa, Hasselström, *Ann.*, 1932, **496**, 165; 1933, **502**, 272.
Komppa, Beckmann, *Ann.*, 1933, **503**, 130.
Quist, *Ann.*, 1918, **417**, 278.

γ-Fenchene



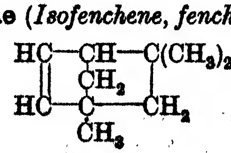
$C_{10}H_{16}$ MW, 136

B.p. 145–7°. D_4^{20} 0·8539. n_D^{20} 1·46063.

Nitrosochloride: m.p. 150° decomp.

Kondakov, *Chem. Abstracts*, 1929, **23**, 2707.
Komppa, Hasselström, *Ann.*, 1932, **496**, 156.

δ-Fenchene (*Isofenchene, fenchylene*)



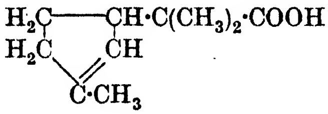
$C_{10}H_{16}$ MW, 136

B.p. 139–40°. D_4^{20} 0·8433 (0·8381). n_D^{20} 1·44862 (1·4494). $[\alpha]_D$ − 68·8° in EtOH.
Nitrosochloride: m.p. 131°.

See last reference above and also
Nametkin, *J. prakt. Chem.*, 1923, **106**, 25.

Fenchol.
See Fenchyl Alcohol.

α-Fencholenic Acid (*Methylcyclopentenyl-isobutyric acid*)



$C_{10}H_{16}O_2$ MW, 168

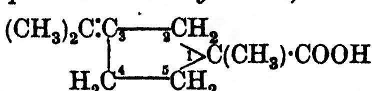
d-.
Viscous oil. B.p. 254–6° decomp., 136–8°/12 mm. D^{16} 1·0069. $[\alpha]_D$ + 32·35°.
Amide: $C_{10}H_{17}ON$. MW, 167. Leaflets from EtOH. M.p. 113–14°. $[\alpha]_D$ + 28·82° in EtOH.
Nitrile: $C_{10}H_{15}N$. MW, 149. B.p. 217–18° (211–12°). D^{20} 0·9005 (0·898). $[\alpha]_D$ + 43·3°.
Nitrosochloride: m.p. 123–4°.

l-.
Amide: m.p. 114–15°.

dl-.
Amide: m.p. 98–9°.

Wallach, *Ann.*, 1893, **272**, 105, 108; 1911, **381**, 75.
Blumann, Zeitschel, *Ber.*, 1909, **42**, 2702.
Cockburn, *J. Chem. Soc.*, 1899, **75**, 502.
Semmler, Bartelt, *Ber.*, 1907, **40**, 435.

β-Fencholenic Acid (1-*Methyl*-3-*isopropylidenecyclopentane*-1-*carboxylic acid*)

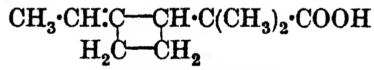


$C_{10}H_{16}O_2$ MW, 168

Cryst. from pet. ether. M.p. 72–3° (68°). B.p. 259–60°, 140·5–141·5°/12 mm. Sol. EtOH, Et_2O. Spar. sol. C_6H_6, AcOH. D_4^{76} 0·9638. $[\alpha]_D^{19}$ + 25·85° in Et_2O.
Me ester: $C_{11}H_{18}O_2$. MW, 182. B.p. 97–9°. D^{22} 0·9608. n_D^{20} 1·46459.
Amide: $C_{10}H_{17}ON$. MW, 167. M.p. 86·5–87·5°. Sol. EtOH, Et_2O.
Nitrile: $C_{10}H_{15}N$. MW, 149. B.p. 217–19°. $D^{15·6}$ 0·9203. $[\alpha]_D$ + 43·66° in EtOH.

Cockburn, *J. Chem. Soc.*, 1899, **75**, 501.
Wallach, *Ann.*, 1911, **379**, 205.
Semmler, *Ber.*, 1906, **39**, 2854.

γ-Fencholenic Acid (*Ethylidenecyclobutylisobutyric acid*)



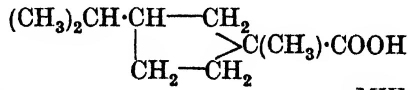
Probable structure

$C_{10}H_{16}O_2$ MW, 168

Oil. B.p. 151–3°/18 mm., 145–6°/10 mm. Sol. Et_2O. D^{20} 1·0087. n_D^{20} 1·47838. $[\alpha]_D$ + 52·3°. Readily changes to α-fencholenic acid.

Semmler, *Ber.*, 1907, **40**, 434, 440.

Fencholic Acid (1-*Methyl*-3-*isopropylcyclopentane*-1-*carboxylic acid*, *dihydro*-β-*fencholenic acid*)



$C_{10}H_{18}O_2$ MW, 170

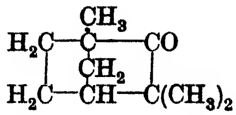
d-.
F.p. 18·8°. M.p. 18–19°. B.p. 255–9°, 162–5°/22 mm., 119–20°/1 mm. D_4^{19} 0·9698. n_D^{20} 1·4563. Spar. volatile in steam.
Me ester: $C_{11}H_{20}O_2$. MW, 184. B.p. 91°/12 mm. D^{22} 0·9295.
Et ester: $C_{12}H_{22}O_2$. MW, 198. B.p. 222–3°, 97°/10 mm. D^{20} 0·9129. n_D^{20} 1·43958.
Chloride: $C_{10}H_{17}OCl$. MW, 188·5. B.p. 218–19°/750 mm., 105°/20 mm., 100°/15 mm. D^{20} 1·0045. n_D^{20} 1·4606. $[\alpha]_D^{19}$ − 2·43°.
Anhydride: $C_{20}H_{34}O_3$. MW, 322. B.p. 205–10°/20 mm.
Amide: $C_{10}H_{19}ON$. MW, 169. F.p. 95·3°. M.p. 94°. B.p. 160°/11 mm.
Nitrile: $C_{10}H_{17}N$. MW, 151. B.p. 217–18°. D^{20} 0·8680. n_D^{20} 1·4426.

l-.
F.p. 16–18°. B.p. 144–5°/13 mm. $[\alpha]_D^{20}$ − 3·66°.
Et ester: b.p. 115–17°/25 mm. $[\alpha]_D^{20}$ − 3·753°.
Chloride: b.p. 118–19°/24 mm.
Amide: m.p. 94°.

dl-.
Amide: m.p. 116° (108°). Sol. EtOH, Et_2O, C_6H_6.

Maxwell, *Ann. chim.*, 1922, **17**, 341.
Wallach, *Ann.*, 1911, **379**, 198, 213.
Bouveault, Levallois, *Bull. soc. chim.*, 1910, **7**, 684, 966, 971.
Semmler, *Ber.*, 1906, **39**, 2579.
Barbier, Grignard, *Bull. soc. chim.*, 1909, **5**, 522.
Braun, Jakob, *Ber.*, 1933, **66**, 1463.

Fenchone



$C_{10}H_{16}O$ MW, 152

d-.

Occurs in essential oil of *Lavandula Stoechas*, Linn. F.p. 5–6°. M.p. 3–5°. B.p. 193·5°, 122°/100 mm., 82°/20 mm., 68·3°/10 mm. D_4^{20} 0·9465. n_D^{20} 1·4623. $[\alpha]_D^{20}$ + 63·03°.

Hydrazone: m.p. 56–7°. B.p. 230–1° decomp. $[\alpha]_D$ + 46·4° in EtOH.

d- (or *l*-) α-*Oxime*: m.p. 165°. *Benzoyl deriv.*: m.p. 79°. $[\alpha]_D$ ± 29°.

d- (or *l*-) β-*Oxime*: m.p. 123°. $[\alpha]_D$ ± 129·3° in EtOH. *Benzoyl deriv.*: m.p. 123°. $[\alpha]_D$ ± 120°.

d- (or *l*-) 2 : 4-*Dinitrophenylhydrazone*: m.p. 140°. Sinters at 125°.

Azine: m.p. 106–7°.

l-.

M.p. 5° (8·5°). B.p. 192–4°. D^2 0·948. $[\alpha]_D^{23}$ − 66·94° in EtOH.

Semicarbazone: m.p. 182–3°.

dl-.

M.p. − 18 to − 16°. B.p. 192–3° (193–4°), 72–3°/12 mm. D_{15}^{15} 0·9501. n_D^{20} 1·4702.

α-*Oxime*: m.p. 158–9°. *Benzoyl deriv.*: m.p. 77°.

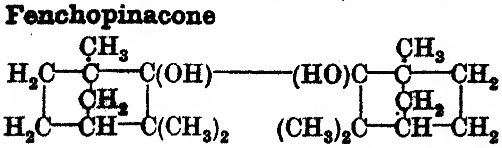
β-*Oxime*: m.p. 129°. *Benzoyl deriv.*: m.p. 111–15°.

Semicarbazone: m.p. 172–3°.

Phenylhydrazone: b.p. 202–3°/18 mm.

Braun, Jakob, *Ber.*, 1933, **66**, 1462.
Zeitschel, Todenhöfer, *J. prakt. Chem.*, 1932, **133**, 376.
Bouveault, Levallois, *Bull. soc. chim.*, 1916, **7**, 963, 968.
Roure-Bertrand Fils, *Chem. Abstracts*, 1922, **16**, 2577.
Ruzicka, *Ber.*, 1917, **50**, 1362 (*Bibl.*).
Maxwell, *Ann. chim.*, 1922, **17**, 332.
Delépine, *Bull. soc. chim.*, 1924, **35**, 1330.
Ruzicka, *Ann.*, 1924, **440**, 322.
Humphrey, U.S.P., 1,850,983, (*Chem. Abstracts*, 1932, **26**, 2752): U.S.P., 1,876,454, (*Chem. Zentr.*, 1933, I, 848).
du Pont, F.P., 736,087, (*ibid.*, 1352).

Fenchopinacone



$C_{20}H_{34}O_2$ MW, 306

d-.

Cryst. from EtOH or AcOH. M.p. 97°. B.p. 360–5° decomp., 219–20°/13 mm. $[\alpha]_D^{15}$ + 45° in AcOEt.

l-.

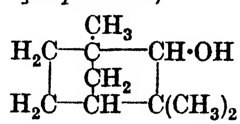
$[\alpha]_D^{20}$ − 44·78° in AcOEt.

dl-.

M.p. 104–5°.

Wallach, Wienhaus, *Ann.*, 1909, **369**, 68.

Fenchyl Alcohol (*Fenchol*, 1 : 3 : 3-*trimethylbicyclo*-[1 : 2 : 2]-*heptanol*-2)



$C_{10}H_{18}O$ MW, 154

d-α-.

M.p. 45°. B.p. 201–2°. $[\alpha]_D$ + 10·36° in EtOH.

Acetyl: *d*-fenchyl acetate. B.p. 125–7°/5 mm.

Phenylurethane: m.p. 82–82·5°.

Acid phthalate: m.p. 145–145·5°.

Oxalyl deriv.: cryst. from EtOH. M.p. 92–3°. $[\alpha]_D^{20}$ + 48·24° in C_6H_6.

l-α-.

Prisms. M.p. 47°. B.p. 94°/20 mm. D_4^{20} 0·9641. $[\alpha]_{5461}$ − 15·04°.

p-*Chlorobenzoyl deriv.*: m.p. 73–4°.

p-*Nitrobenzoyl deriv.*: m.p. 108–9°.

Acid phthalate: m.p. 146°.

Phenylurethane: m.p. 82°.

l-β-.

M.p. 3–4°. B.p. 91°/18 mm. $[\alpha]_{5461}$ − 27·97°.

p-*Nitrobenzoyl deriv.*: m.p. 82–3°.

Acid phthalate: m.p. 153°.

dl-.

M.p. 38–90° (37–8°). B.p. 201·4° (202–3°).

Phenylurethane: m.p. 104°.

Formyl deriv.: m.p. 21°. B.p. 207–8°. D^{15} 0·996. n_D^{20} 1·46092.

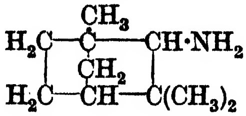
Acetyl: *dl*-fenchyl acetate. F.p. − 0·5°. B.p. 79°/15 mm.

Oxalyl deriv.: m.p. 100·5–101·5°.

Acid phthalate: m.p. 169–169·5°.

Kenyon, Priston, *J. Chem. Soc.*, 1925, **127**, 1472.
Zeitschel, Todenhöfer, *J. prakt. Chem.*, 1932, **133**, 374.
Smith, U.S.P., 1,887,171, (*Chem. Zentr.*, 1933, I, 1017).
Nametkin, Seliwanoff, *J. prakt. Chem.*, 1923, **106**, 28.

Fenchylamine (*2-Aminofenchane*)



$C_{10}H_{19}N$ MW, 153

d-.

N-*Benzylidene*: m.p. 42°. $[\alpha]_D^{19}$ − 62·1° in MeOH.

N-*Salicylidene*: m.p. 95°.

l-.

B.p. 195°. D^{22} 0·9095. $[\alpha]_D^{9.5}$ − 24·89°.

N-*Formyl*: m.p. 114°. $[\alpha]_D^{11}$ − 36·95° in $CHCl_3$.

N-*Acetyl*: m.p. 98°. $[\alpha]_D^{8}$ − 46·62° in $CHCl_3$.

N-*Oxalyl*: N : N′-difenchyloxamide. M.p. 188°.

N-*Benzoyl*: m.p. 133–5°.

N-*Benzylidene*: m.p. 42°. $[\alpha]_D^{8}$ + 73·23° in $CHCl_3$.

N-*Salicylidene*: m.p. 95°. $[\alpha]_D^{6}$ + 66·59° in $CHCl_3$. *Me ether*: m.p. 56°. $[\alpha]_D^{8}$ + 58·98° in $CHCl_3$.

N-4-*Hydroxybenzylidene*: m.p. 175°. $[\alpha]_D^{10}$ + 72·00° in $CHCl_3$. *Me ether*: m.p. 54–5°. $[\alpha]_D^{11}$ + 78·10° in $CHCl_3$.

dl-.

N-*Salicylidene*: m.p. 64–5°.

Wallach, Binz, *Ann.*, 1893, **276**, 318.
Wallach, *Ann.*, 1893, **272**, 105.

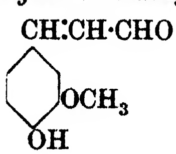
Fenchylene.

See δ-Fenchene.

Ferrobilin.

See under Glaucobilin.

Ferula-aldehyde (p-*Coniferyl aldehyde, 4-hydroxy-3-methoxycinnamaldehyde*)



$C_{10}H_{10}O_3$ MW, 178

Decomp. product of lignin.

Cis: (α-).

Unstable. Only obtained as polymer.

Trans: (β-).

Cryst. from C_6H_6. M.p. 82·5°. B.p. 157°/2·5 mm.

Semicarbazone: m.p. 218°.

Hillmer, Hellriegel, *Ber.*, 1929, **62**, 725.
Klason, *Ber.*, 1930, **63**, 912.

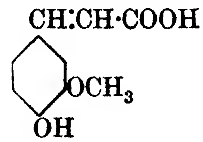
Ferulene

$C_{15}H_{26}$ MW, 206

Occurs in essential oil from *Dorema ammoniacum*, D. Don. and many *Ferula* species. B.p. 124–6°/0·7 mm. D^{20} 0·8698. n_D^{20} 1·48423. $[\alpha]_D^{20}$ + 6°. H ⟶ tetrahydroferulene, b.p. 118–22°/10 mm.

Semmler, Jonas, Roenisch, *Ber.*, 1917, **50**, 1826.
Roenisch, *Chem. Abstracts*, 1921, **15**, 2282.

Ferulic Acid (*4-Hydroxy-3-methoxycinnamic acid, caffeic acid 3-methyl ether*)



$C_{10}H_{10}O_4$ MW, 194

Occurs in *asafœtida* as free acid. Prisms or needles from H_2O. M.p. 168–9° (170°). Sol. EtOH, AcOEt, hot H_2O. Mod. sol. Et_2O. Spar. sol. C_6H_6, ligroin.

Me ester: $C_{11}H_{12}O_4$. MW, 208. M.p. 63–4°. B.p. 202°/11 mm. *Acetyl deriv.*: m.p. 124°.

Et ester: $C_{12}H_{14}O_4$. MW, 222. Cryst. + $1H_2O$. M.p. 75·5–76·5°.

Propyl ester: $C_{13}H_{16}O_4$. MW, 236. Cryst. + $1H_2O$. M.p. 78–9°.

Acetyl: m.p. 196–7°.

Carbomethoxyl: m.p. 186–7°. *Chloride*: m.p. 147°.

Posner, *J. prakt. Chem.*, 1910, **82**, 434.
Pacsu, Stieber, *Ber.*, 1929, **62**, 2977.
Tanaka, *Chem. Abstracts*, 1930, **24**, 2453.
Dutt, *J. Indian Chem. Soc.*, 1925, **1**, 297.
Fischer, Hoesch, *Ann.*, 1912, **391**, 357.

Ferulic Aldehyde.

See Ferula-aldehyde.

Fichtelite

$C_{18}H_{32}$ ($C_{19}H_{34}$) MW, 248 (262)

Constituent of *Pinus pumilio*, Haenke, and peat. M.p. 46·5°. B.p. 355°/719 mm., 235–6°/43 mm. Sol. $CHCl_3$, ligroin. Spar. sol. EtOH. D_4^{20} 0·9380. n_D^{20} 1·5052. $[\alpha]_D^{20}$ + 19·00° in $CHCl_3$. S ⟶ retene.

Ruzicka, Balas, Schinz, *Helv. Chim. Acta*, 1923, **6**, 692 (*Bibl.*).

Ficoceryl Alcohol

$C_{17}H_{28}O$ MW, 268

Occurs as ester of ficocerylic acid in wax of

Ficus ceriflua, Jungh. Cryst. from EtOH. M.p. 198°.

Greshoff, Sack, *Rec. trav. chim.*, 1901, **20**, 65.

Ficocerylic Acid

$C_{13}H_{26}O_2$ MW, 214

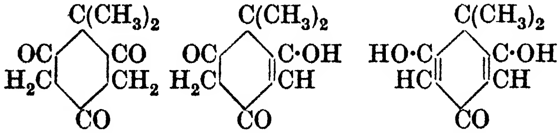
Occurs as ficoceryl ester in wax of *Ficus ceriflua*, Jungh. Cryst. from EtOH. M.p. 57°.

See previous reference.

Filicic Acid.

See Filicinic Acid.

Filicinic Acid (2 : 4 : 6-*Triketo*-1 : 1-*dimethylcyclohexane*, 1 : 1-*dimethylcyclohexane*-2 : 4 : 6-*trione*, gem-*dimethylphloroglucinol*)



I II III

$C_8H_{10}O_3$ MW, 154

Triketo form (I):

Occurs in male fern extract. Cryst. from EtOH. M.p. 213–15° decomp. Mod. sol. hot H_2O, hot EtOH. Spar. sol. Et_2O, AcOH. Reduces Tollen's reagent.

Monoenol form (II):

Me ether: $C_9H_{12}O_3$. MW, 168. Prisms from AcOEt. M.p. 205–7° (208°). B.p. 194–6°/18 mm. Mod. sol. EtOH. Spar. sol. Et_2O, C_6H_6, hot H_2O. Insol. pet. ether. $FeCl_3 \longrightarrow$ reddish-violet col.

Et ether: $C_{10}H_{14}O_3$. MW, 182. Prisms from hot EtOH. M.p. 215°. $FeCl_3 \longrightarrow$ reddish-purple col.

Dienol form (III):

Di-Et ether: $C_{12}H_{18}O_3$. MW, 210. Plates or prisms from hot pet. ether. M.p. 103–5°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. hot H_2O.

Diacetyl: m.p. 82–5°.

Dichloride: $C_8H_8OCl_2$. MW, 191. M.p. 79–80°.

Boehm, *Ann.*, 1899, **307**, 249.
Robertson, Sandrock, *J. Chem. Soc.*, 1933, 1617.

Filixic Acid

$C_{35}H_{40}O_{12}$ MW, 652

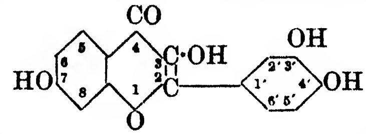
Occurs in male fern extract. Yellow plates from AcOEt. M.p. 184–5°. Sol. $CHCl_3$, CS_2. Mod. sol. C_6H_6, xylene. Spar. sol. Et_2O.

Boehm, *Ann.*, 1901, **318**, 253.

Firpene.

See Pinene.

Fisetin (3 : 7 : 3′ : 4′-*Tetrahydroxyflavone*)



$C_{15}H_{10}O_6$ MW, 286

Colouring matter obtained from *Rhus* species. M.p. 330°.

3 : 3′ : 4′-*Tri-Me ether*: $C_{18}H_{16}O_6$. MW, 328. Needles from AcOEt. M.p. 220°. *Acetyl deriv.*: m.p. 229°.

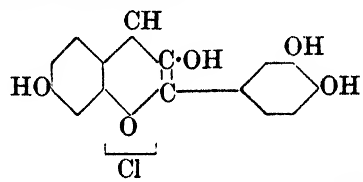
7 : 3′ : 4′-*Tri-Me ether*: yellow needles. M.p. 186–7°. *Acetyl deriv.*: m.p. 167°.

Tetra-Me ether: $C_{19}H_{18}O_6$. MW, 342. Needles from AcOEt. M.p. 180°.

Tetra-acetyl deriv.: m.p. 201·5° (196–8°).

Auwers, Pohl, *Ber.*, 1915, **48**, 85 (*Bibl.*).
Allan, Robinson, *J. Chem. Soc.*, 1926, 2334.
Gerngross, Hübner, *Ber.*, 1927, **60**, 2094.

Fisetinidin chloride

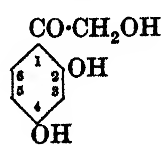


$C_{15}H_{11}O_5Cl$ MW, 306·5

Reddish-brown needles with violet sheen. M.p. above 220°. Alc. $FeCl_3 \longrightarrow$ blue col. Alkalis $\longrightarrow$ blue sols.

Pratt, Robinson, *J. Chem. Soc.*, 1925, **127**, 1136.

Fisetol (2 : 4-*Dihydroxyphenacyl alcohol*, ω : 2 : 4-*trihydroxyacetophenone*, ω-*hydroxyresacetophenone*)



$C_8H_8O_4$ MW, 168

Prisms from HCl.Aq. M.p. 189°.

ω-*Me ether*: $C_9H_{10}O_4$. MW, 182. M.p. 136°. p-*Nitrophenylhydrazone*: m.p. 205° decomp.

4-*Me ether*: m.p. 128°. *Diacetyl deriv.*: m.p. 86°.

ω : 4-*Di-Me ether*: $C_{10}H_{12}O_4$. MW, 196.

M.p. 66–8°. *Et ether*: $C_{12}H_{16}O_4$. MW, 224. M.p. 60–2° (67–8°).

2 : 4-*Di-Me ether*: m.p. 131°. *Phenylhydrazone*: m.p. 212°. *Et ether*: m.p. 56–7°. *Acetyl deriv.*: m.p. 75°.

Tri-Me ether: ω : 2 : 4-trimethoxyacetophenone. $C_{11}H_{14}O_4$. MW, 210. M.p. 61–2°.

ω-*Et ether*: $C_{10}H_{12}O_4$. MW, 196. M.p. 136–7°.

ω : 4-*Di-Et ether*: $C_{12}H_{16}O_4$. MW, 224. M.p. 42–4°. *Oxime*: m.p. 105–7°.

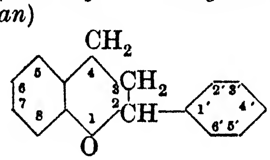
Tri-Et ether: ω : 2 : 4-triethoxyacetophenone. $C_{14}H_{20}O_4$. MW, 252. M.p. 66–8°.

ω-*Phenyl ether*: phenyl 2 : 4-dihydroxyphenacyl ether, ω-2 : 4-dihydroxybenzoylanisole. $C_{14}H_{12}O_4$. MW, 244. M.p. 204–5° (sinters at 200°). 2 : 4-*Di-Me ether*: $C_{16}H_{16}O_4$. MW, 272. M.p. 115° (118·5°). B.p. 260–4°/18 mm.

Triacetyl: m.p. 129°. *Phenylhydrazone*: m.p. 109° decomp.

Nierenstein, Wang, Warr, *J. Am. Chem. Soc.*, 1924, **46**, 2551 (*Bibl.*).

Flavan (2-*Phenyl*-2 : 3-*dihydrobenzpyran*, 2-*phenylchroman*)



$C_{15}H_{14}O$ MW, 210

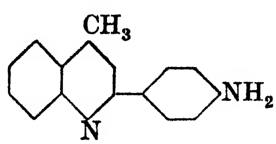
Cryst. from MeOH. M.p. 44–5°. Sol. ord. org. solvents.

Harries, Busse, *Ber.*, 1896, **29**, 380.

Flavandione-3 : 4.

See Flavonol.

Flavaniline (4-*Methyl*-2-[p-*aminophenyl*]-*quinoline*, p-*aminoflavoline*, 2-p-*aminophenyllepidine*)



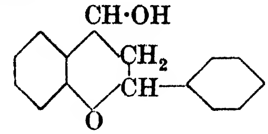
$C_{16}H_{14}N_2$ MW, 234

Prisms from C_6H_6. M.p. 97°. Spar. sol. H_2O. Sol. EtOH.

N-*Acetyl*: m.p. 162–3°.

Fischer, *Ber.*, 1886, **19**, 1038.
Goldschmidt, *Chem.-Ztg.*, 1903, **27**, 279.
M.L.B., D.R.P., 19,766.
Baum, D.R.P., 27,948.
Majert, D.R.P., 28,323.

Flavanol (4-*Hydroxyflavan*, 4-*hydroxy*-2-*phenylchroman*)



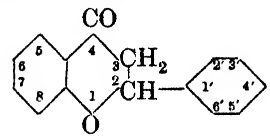
$C_{15}H_{14}O_2$ MW, 226

Cryst. from 30% EtOH. M.p. 119°. Sol. EtOH, $CHCl_3$, C_6H_6, Me_2CO. Mod. sol. Et_2O, ligroin.

Acetyl: m.p. 85–6°.

Freudenberg, Orthner, *Ber.*, 1922, **55**, 1748.

Flavanone (2-*Phenyl*-2 : 3-*dihydrobenz*-γ-*pyrone*, 2-*phenylchromanone*)



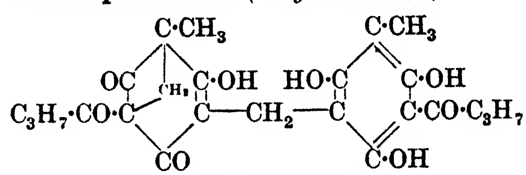
$C_{15}H_{12}O_2$ MW, 224

Needles from ligroin. M.p. 76°.

3-*Benzylidene deriv.*: m.p. 103–4°.
3-*Anisylidene deriv.*: m.p. 148–9°.
3-*Piperonylidene deriv.*: m.p. 155–6°.
3-*Vanillylidene deriv.*: m.p. 92–4°.

Ryan, Creuss-Callaghan, *Chem. Abstracts*, 1930, **24**, 4037.
Löwenbein, *Ber.*, 1924, **57**, 1515.
See also previous reference.

Flavaspidic Acid (*Polystichocitrin*)



Probable structure

$C_{24}H_{28}O_8$ MW, 444

Occurs in male fern extract.

α-*Form*:

Cryst. from MeOH. M.p. 92°. Solidifies on heating further and remelts at 150°.

β-*Form*:

Cryst. from C_6H_6 or AcOH. M.p. 156°. $FeCl_3$ in EtOH ⟶ deep red col. Reduces Tollen's reagent.

Diacetyl deriv.: m.p. 142–3°.

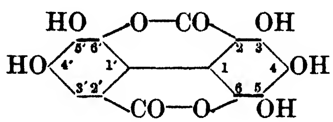
Boehm, *Ann.*, 1903, **320**, 310; 1901, **318**, 253.

Flavaspidin.

Constituent of *Filix mas* extract. Cryst. from AcOEt. M.p. 199°. Sol. C_6H_6, $CHCl_3$, AcOEt, Me_2CO, amyl alcohol. Spar. sol. EtOH, Et_2O, MeOH, pet. ether, CS_2. Possibly identical with phloraspin, *q.v.*

Kraft, *Chem. Zentr.*, 1902, II, 533.

Flavellagic Acid (3 : 4 : 5 : 6 : 4′ : 5′ : 6′-*Heptahydroxydiphenyl*-2 : 2′-*dicarboxylic acid*-2 : 6′ : 2′ : 6-*dilactone*)



$C_{14}H_6O_9$ MW, 318.

Pale yellow prisms. M.p. above 360°. Spar sol. ord. org. solvents. Alkalis ⟶ green sols.

4 : 5 : 4′ : 5′-*Tetra-Me ether*: $C_{18}H_{14}O_9$. MW, 374. Yellow needles from AcOH. M.p. 270–1°. 3-*Acetyl*: m.p. 237–8°.

3 : 4 : 5 : 4′ : 5′-*Penta-Me ether*: $C_{19}H_{16}O_9$. MW, 388. Yellow cryst. from AcOH. M.p. 242°.

Penta-acetyl: m.p. 317–19°. Zn dust dist. ⟶ fluorene.

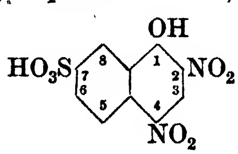
Penta-benzoyl: m.p. 287–9°.

Perkin, *J. Chem. Soc.*, 1906, **89**, 251.
Perkin, Perkin, *J. Chem. Soc.*, 1908, **93**, 1195.

Flaveanic Acid.

See Cyanothioformamide.

Flavianic Acid (2 : 4-*Dinitro*-1-*naphthol*-7-*sulphonic acid*, *Naphthol Yellow S*)



$C_{10}H_6O_8N_2S$ MW, 314

Yellow needles from HCl.Aq. M.p. 151°. Forms ppts. with many org. bases.

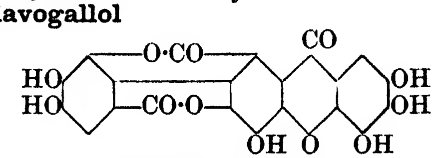
Methylamine salt: decomp. at 265–8°.
Dimethylamine salt: decomp. at 230–5°.
Trimethylamine salt: decomp. at 217–23°.
Ethylenediamine salt: decomp. at 265–7°.
Trimethylhydroxylamine salt: decomp. at 215–19°.
Tetramethylammonium hydroxide salt: decomp. at 259°.
Isoamylamine salt: m.p. 215–17°.
Cadaverine salt: decomp. at 268–73°.
Putrescine salt: decomp. at 260–4°.
Betaine salt: decomp. at 229°.
Galegine salt: m.p. 159°.
Arginine salt: blackens above 200°. Decomp. at 275°.

Sievers, Müller, *Chem. Abstracts*, 1929, **23**, 4702.
Kossel, Gross, *Z. physiol. Chem.*, 1924, **135**, 167.
Felix, Dirr, *Z. physiol. Chem.*, 1928, **176**, 38.
Müller, *Chem. Abstracts*, 1932, **26**, 4792.
Badische, D.R.P., 10,785.
Knecht, Hibbert, *Ber.*, 1904, **37**, 3475.

Flavindin.

See Quindoline-carboxylic Acid.

Flavogallol



Probable constitution

$C_{21}H_8O_{12}$ MW, 452

Yellow needles. Chars without melting. Spar. sol. ord. org. solvents. NaOH ⟶ orange sol. turning brown. $FeCl_3$ ⟶ green col.

Hexa-acetyl: m.p. 278–80°.
Hexa-benzoyl: m.p. 326–8°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 533.

Flavogallone

$C_{20}H_{10}O_{11}$ MW, 426

M.p. above 340°. Spar. sol. ord. org. solvents. Alc. $FeCl_3$ ⟶ blue col.

Hepta-acetyl deriv.: m.p. 257–9°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 537.

Flavogallonic Acid

$C_{21}H_{10}O_{13}$ MW, 470

Needles. M.p. above 300°. Ac_2O + Py ⟶ hexa-acetylflavogallol.

Me ester: $C_{22}H_{12}O_{13}$. MW, 484. *Hepta-acetyl deriv.*: m.p. 181–3°.

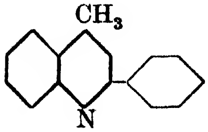
Et ester: $C_{23}H_{14}O_{13}$. MW, 498. M.p. above 300°. *Hepta-acetyl deriv.*: m.p. 215–17°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 535.

Flavol.

See 2 : 6-Dihydroxyanthracene.

Flavoline (*4-Methyl-2-phenylquinoline, 2-phenyl-lepidine*)

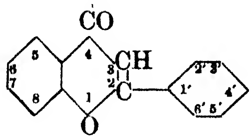


$C_{16}H_{13}N$ MW, 219

Plates from ligroin. M.p. 64–5°. B.p. 373–5°. *Methiodide* : m.p. 185°.

Fischer, *Ber.*, 1886, **19**, 1037.

Flavone (*2-Phenyl-γ-benzpyrone, 2-phenyl-chromone*)

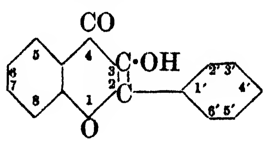


$C_{15}H_{10}O_2$ MW, 222

Needles from EtOH.Aq. M.p. 97°. Sol. ord. org. solvents. Insol. H_2O.

Simonis, *Z. angew. Chem.*, 1926, **39**, 1461 (*Review, Bibl.*).

Flavonol (*3-Hydroxyflavone, flavandione-3 : 4*)

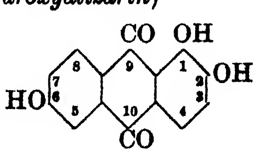


$C_{15}H_{10}O_3$ MW, 238

Yellow needles from EtOH. M.p. 169–70°. *Acetyl deriv.* : m.p. 110–11°.
3-*Oxime* : m.p. 158–9° decomp.

Kostanecki, Szabranski, *Ber.*, 1904, **37**, 2820.

Flavopurpurin (*1 : 2 : 6-Trihydroxyanthraquinone, 6-hydroxyalizarin*)



$C_{14}H_8O_5$ MW, 256

Yellow needles. M.p. above 330°. B.p. 459° decomp. Sublimes above 160°. Sol. EtOH, C_6H_6. Mod. sol. boiling H_2O. Spar. sol. Et_2O. Violet sol. in caustic alkalis, red to reddish-violet in conc. H_2SO_4.

2 : 6-*Di-Me ether* : $C_{16}H_{12}O_5$. MW, 284. Yellow needles. M.p. 239°. Sol. $CHCl_3$. Spar. sol. EtOH. *Acetyl* : m.p. 210°.

1 : 2 : 6-*Tri-Me ether* : $C_{17}H_{14}O_5$. MW, 298. Yellow needles. M.p. 225–6°. Sol. C_6H_6, AcOH. Spar. sol. EtOH.

2 : 6-*Di-Et ether* : $C_{18}H_{16}O_5$. MW, 312. Reddish-yellow needles from EtOH. M.p. 209°. Sol. hot AcOH.

Diacetyl deriv. : m.p. 238°.
Triacetyl : m.p. 202–3°.

Liebermann, Jellinek, *Ber.*, 1888, **21**, 1171.
Graebe, Thode, *Ann.*, 1906, **349**, 214.
Bistrzycki, Yssel, de Schipper, *Ber.*, 1898, **31**, 2799.
Frobenius, Hepp, *Ber.*, 1907, **40**, 1049.
Bayer, E.P., 26,601, (*Chem. Abstracts*, 1910, **4**, 118).
Bayer, D.R.P., 217,552, (*Chem. Zentr.*, 1910, I, 700).

Flavoxanthin

$C_{40}H_{56}O_3$ MW, 584

Red prisms from MeOH. M.p. 184°. $[\alpha]^{20}_{Cd}$ + 190° in C_6H_6. Absorption bands at 478 mμ, 447·5 mμ, 420 mμ in CS_2; 450 mμ, 422 mμ in pet. ether. 25% HCl in Et_2O ⟶ blue col.

Kuhn, Brockmann, *Z. physiol. Chem.*, 1932, **213**, 191.

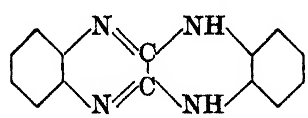
Flemingin

$C_{12}H_{12}O_3$ MW, 204

Dye from root of *Flemingia congesta*, Roxb., (Waras). Dark orange needles. M.p. 171–3°. Sol. EtOH. Spar. sol. hot AcOH, C_6H_6, $CHCl_3$. Insol. CS_2. Sol. alkalis. KOH fusion ⟶ salicylic and acetic acids.

Perkin, *J. Chem. Soc.*, 1898, **73**, 661.

Fluoflavine (*5 : 11-Dihydroquinoxaloquinoxaline*)

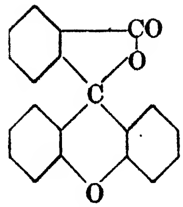


$C_{14}H_{10}N_4$ MW, 234

Yellow needles from AcOH. M.p. above 360°. Sol. hot AcOH with yellowish-green fluor. Spar. sol. ord. org. solvents.

Hinsberg, Pollak, *Ber.*, 1896, **29**, 784.
Hinsberg, *Ann.*, 1901, **319**, 267.

Fluoran

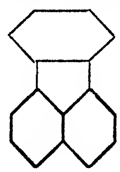


$C_{20}H_{12}O_3$ MW, 300

Needles from EtOH. M.p. 182–3°.

Meyer, Hoffmeyer, *Ber.*, 1892, **25**, 1385, 2118.

Fluoranthene (1:2-*Benzacenaphthene*, *idryl*)



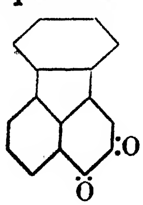
$C_{16}H_{10}$ MW, 202

Needles or plates from EtOH. M.p. 110°. B.p. 250–1°/60 mm., 217°/30 mm. Sol. EtOH, Et_2O, $CHCl_3$, CS_2, C_6H_6, AcOH. Warm conc. H_2SO_4 ⟶ blue col.

Picrate: m.p. 184–5°.

Meyer, Taeger, *Ber.*, 1920, **53**, 1264.
v. Braun, Anton, *Ber.*, 1929, **62**, 145.

Fluoranthenequinone

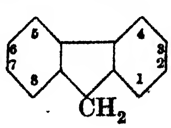


$C_{16}H_8O_2$ MW, 232

Red needles from EtOH. M.p. 188°. Sol. EtOH, AcOH.

v. Braun, Anton, *Ber.*, 1929, **62**, 151.

Fluorene (*Diphenylenemethane*, 2 : 3-*benzindene*)



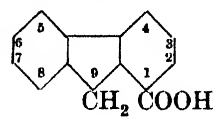
$C_{13}H_{10}$ MW, 166

Fluorescent cryst. from EtOH. M.p. 116°. B.p. 293–5°. Sol. Et_2O, C_6H_6, CS_2, hot EtOH. CrO_3 in AcOH ⟶ fluorenone. Forms mono-metallic derivs. with alkali metals. Forms many addn. comps.

Picrate: m.p. 77°.

Zelinsky, Titz, Gaverdowskaja, *Ber.*, 1926, **59**, 2591.
Jaeger. E.P., 364,629, (*Chem. Abstracts*, 1933, **27**, 1643).
Staudinger, Gaule, Siegwart, *Helv. Chim. Acta*, 1921, **4**, 214.

Fluorene-1-carboxylic Acid



$C_{14}H_{10}O_2$ MW, 210

Cryst. from EtOH.Aq. M.p. 245–6°. Sublimes. Sol. hot EtOH. Alk. $KMnO_4$ ⟶ fluorenone-1-carboxylic acid. Heat with lime ⟶ fluorene.

Et ester: $C_{16}H_{14}O_2$. MW, 238. M.p. 53–5°.

Fittig, Liepmann, *Ann.*, 1880, **200**, 13.

Fluorene-2-carboxylic Acid.

Yellow cryst. Sublimes at 340°. Sol. hot AcOH.

Me ester: $C_{15}H_{12}O_2$. MW, 224. M.p. 120°.

Nitrile: 2-cyanofluorene. $C_{14}H_9N$. MW, 191. M.p. 88°.

Fortner, *Monatsh.*, 1904, **25**, 448.

Fluorene-4-carboxylic Acid.

Cryst. from Et_2O. M.p. 175°.

Me ester: m.p. 64°.

Graebe, Aubin, *Ann.*, 1888, **247**, 283.

Fluorene-9-carboxylic Acid (*Diphenyleneacetic acid*).

Needles from AcOH. M.p. 230–2°.

Me ester: $C_{15}H_{12}O_2$. MW, 224. M.p. 63°.

Et ester: $C_{16}H_{14}O_2$. MW, 238. M.p. 44–5°. B.p. 207–9°/19 mm.

Chloride: $C_{14}H_9OCl$. MW, 228·5. M.p. 77°.

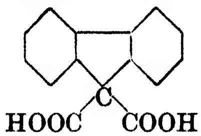
Amide: $C_{14}H_{11}ON$. MW, 209. M.p. 251°.

Anhydride: $C_{28}H_{18}O_3$. MW, 402. M.p. 164–5°.

Nitrile: 9-cyanofluorene. $C_{14}H_9N$. MW, 191. M.p. 151–2°.

Vorländer, Pritzsche, *Ber.*, 1913, **46**, 1794.
Schlenk, Hillemann, Rodloff, *Ann.*, 1931, **487**, 152.
Kliegl, *Ber.*, 1931, **64**, 2420.
Wislicenus, Ruthing, *Ber.*, 1913, **46**, 2771.

Fluorene-9 : 9-dicarboxylic Acid (*Diphenylenemalonic acid*)



$C_{15}H_{10}O_4$ MW, 254

Di-Me ester: $C_{17}H_{14}O_4$. MW, 282. M.p. 167°.

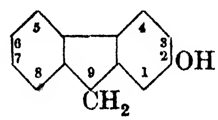
Di-Et ester: $C_{19}H_{18}O_4$. MW, 310. Cryst. from EtOH. M.p. 99·5°. B.p. 220–2°/13 mm.

Adickes, Brunnert, Lücker, Schäfer, *J. prakt. Chem.*, 1932, **133**, 320.

Fluorene Ketone.

See Fluorenone.

2-Fluorenol (*2-Hydroxyfluorene, 2-fluorenyl alcohol*)



$C_{13}H_{10}O$ MW, 182

Leaflets from H_2O. Needles from $CHCl_3$. M.p. 171°. Sol. EtOH, Et_2O, AcOH. Insol. cold H_2O. Sol. alkalis, hot NH_3.Aq.

Me ether: $C_{14}H_{12}O$. MW, 196. M.p. 106–8°.

Diels, *Ber.*, 1901, **34**, 1761.
Riuz, *Chem. Abstracts*, 1929, **23**, 4691.

9-Fluorenol (*9-Hydroxyfluorene, 9-fluorenyl alcohol, diphenylenecarbinol*).

Cryst. from pet. ether. M.p. 153° (156°). Sol. EtOH, Et_2O, C_6H_6. Spar. sol. EtOH.Aq.

Me ether: m.p. 43·5°.

Fluorenyl ether: difluorenyl ether. $C_{26}H_{18}O$. MW, 346. Cryst. from Ac_2O. M.p. 228° (270°).

Acetyl: (i) m.p. 75°. (ii) M.p. 208–9°.

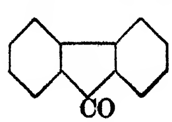
Benzoyl: (i) m.p. 100°. (ii) M.p. 161°.

Staudinger, Gaule, *Ber.*, 1916, **49**, 1956.
Kliegl, *Ber.*, 1929, **62**, 1327.
Bachmann, *J. Am. Chem. Soc.*, 1933, **55**, 773.

Fluorenol-carboxylic Acid.

See Hydroxyfluorene-carboxylic Acid.

Fluorenone (*Fluorene ketone, diphenylene ketone*)



$C_{13}H_8O$ MW, 180

M.p. 83·0–83·5° (84–6°). B.p. 341·5°. Insol. H_2O. Forms many add. comps.

Oxime: 9-isonitrosofluorene. M.p. 195°. *Me ether*: m.p. 145–6°. *Acetyl deriv.*: m.p. 79° (76°).

Hydrazone: m.p. 149–50°. N-*Benzylidene*: m.p. 91–4° (82–4°).

Phenylhydrazone: m.p. 151–2°.

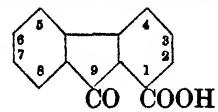
p-*Nitrophenylhydrazone*: m.p. 269°.

Phenylsemicarbazone: m.p. 222°.

Di-Me acetal: m.p. 87–8°.

Huntress, Hershberg, Cliff, *J. Am. Chem. Soc.*, 1931, **53**, 2720.
Jaeger, U.S.P., 1,868,531, (*Chem. Abstracts*, 1932, **26**, 5315).
Courtot, Pierron, *Bull. soc. chim.*, 1929, **65**, 290.
See also Kuhn, Wassermann, *Ber.*, 1925, **58**, 2230.

Fluorenone-1-carboxylic Acid



$C_{14}H_8O_3$ MW, 224

Orange-red needles from dil. EtOH. M.p. 191–2°. Sol. EtOH, Et_2O. Prac. insol. cold H_2O. Heat ⟶ fluorenone. NaHg ⟶ fluorene-1-carboxylic acid. Zn ⟶ fluorene. KOH fusion ⟶ diphenyl-2 : 3′-dicarboxylic acid.

Me ester: $C_{15}H_{10}O_3$. MW, 238. Yellow needles. M.p. 86–9°.

Et ester: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from dil. EtOH. M.p. 84–6°.

Chloride: $C_{14}H_7O_2Cl$. MW, 242·5. Yellow needles from C_6H_6. M.p. 140°.

Amide: $C_{14}H_9O_2N$. MW, 223. Yellow needles from EtOH. M.p. 229–30°.

Oxime: yellow prisms from EtOH. M.p. 230° decomp.

Fittig, Liepmann, *Ann.*, 1880, **200**, 6.

Fluorenone-2-carboxylic Acid.

Yellow needles from EtOH or AcOH. Sublimes at about 340°. Spar. sol. EtOH.

Me ester: yellow needles from MeOH. M.p. 181°.

Bamberger, Hooker, *Ann.*, 1885, **229**, 158.
Fortner, *Monatsh.*, 1904, **25**, 451.
Dziewoński, Schnayder, *Chem. Abstracts*, 1931, **25**, 5416.

Fluorenone-4-carboxylic Acid.

Yellow needles from EtOH. M.p. 227°. Insol. H_2O. HI + P at 180–200° ⟶ fluorene.

Zn + NH_3 ⟶ 9-hydroxyfluorene-4-carboxylic acid. KOH fusion ⟶ diphenic acid.

Me ester: yellow needles. M.p. 132°.

Et ester: yellow needles from EtOH. M.p. 103°.

Chloride: yellow needles from C_6H_6. M.p. 128°.

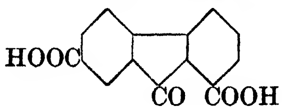
Amide: yellow needles + ½EtOH from EtOH. M.p. 230° (225°).

Nitrile: $C_{14}H_7ON$. MW, 205. Yellow needles. M.p. 240°.

Oxime: m.p. 263°.

Graebe, Aubin, *Ber.*, 1887, **20**, 845.
Stobbe, Seydel, *Ann.*, 1909, **370**, 134.

Fluorenone-1 : 7-dicarboxylic Acid



$C_{15}H_8O_5$ MW, 268

Yellow needles from AcOH. Sol. $PhNO_2$. Spar. sol. AcOH. Prac. insol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6. NaHg ⟶ fluorene-1 : 7-dicarboxylic acid. Ox. ⟶ hemimellitic and trimellitic acids. KOH fusion ⟶ diphenyl-2 : 4 : 3′-tricarboxylic acid.

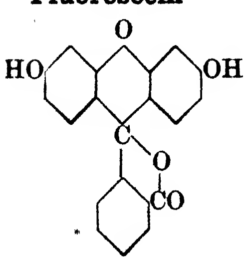
Di-Me ester: $C_{17}H_{12}O_5$. MW, 296. Cryst. from C_6H_6. M.p. 188–9° (184°).

Di-Et ester: $C_{19}H_{16}O_5$. MW, 324. Yellow needles. M.p. 114·5°.

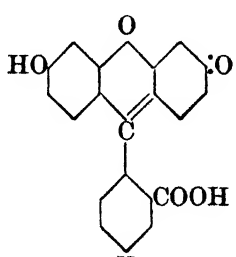
Bamberger, Hooker, *Ann.*, 1885, **229**, 151.

Fluorenyl Alcohol.
See Fluorenol.

Fluorescein



I



II

$C_{20}H_{12}O_5$ MW, 332

Compound showing intense fluor. in alk. sol. Antiseptic and mild purgative. Employed in cancer treatment.

I.

Yellow amorph. form. M.p. 314–16° (sealed tube). Becomes cryst. on heating. Sol. Me_2CO, MeOH, formic acid. Spar. sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6, AcOH, xylene, $PhNO_2$. Insol. pet. ether.

Me ether: $C_{21}H_{14}O_5$. MW, 346. M.p. 272°.

Et ether: $C_{22}H_{16}O_5$. MW, 360. M.p. 253–4°.

II.

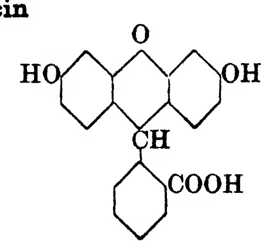
Red cryst. form with green iridescence. M.p. 314–16° decomp. (sealed tube). Sol. hot formic acid, hot aniline, hot Me_2CO. Spar sol. H_2O, EtOH, Et_2O, MeOH, AcOH. Insol. pet. ether.

Me ester: $C_{21}H_{14}O_5$. MW, 346. Red cryst. with green iridescence from MeOH. M.p. 282°. Spar. sol. ord. org. solvents. *Me ether*: $C_{22}H_{16}O_5$. MW, 360. Orange-yellow needles or deep red cryst. with metallic lustre from C_6H_6–MeOH. M.p. 208°.

Et ester: $C_{22}H_{16}O_5$. MW, 360. Green leaflets from EtOH. M.p. 247° (242°). Spar. sol. EtOH, Me_2CO, AcOH. Insol. H_2O. *Et ether*: $C_{24}H_{20}O_5$. MW, 388. Yellow needles from EtOH.Aq. M.p. 159°. *Acetyl deriv.*: m.p. 191°.

Liebig, *J. prakt. Chem.*, 1912, **86**, 472.
Fischer, Hepp, *Ber.*, 1913, **46**, 1952.
Kehrmann, *ibid.*, 3028.
George, *Chem. Abstracts*, 1927, **21**, 239.
Orndorff, Hemmer, *J. Am. Chem. Soc.*, 1927, **49**, 1272 (*Review, Bibl.*).
See also Dominikiewicz, *Chem. Abstracts*, 1931, **25**, 941.

Fluorescin



$C_{20}H_{14}O_5$ MW, 334

Needles from AcOH. M.p. 125–7°. Sol. Et_2O. Turns yellow in air. Sol. alkalis ⟶ colourless sols. Ox. ⟶ fluorescein.

Derivs. of this comp. are often wrongly described as derivs. of fluorescein. The literature of fluorescin and fluorescein is somewhat confused.

Di-Me ether: $C_{22}H_{18}O_5$. MW, 362. Needles from EtOH. M.p. 204–5°. *Me ester*: $C_{23}H_{20}O_5$. MW, 376. Cryst. from EtOH. M.p. 136°.

Di-Et ether: $C_{24}H_{22}O_5$. MW, 390. M.p. 187°. CrO_3 in AcOH ⟶ fluorescein di-Et ether. *Et ester*: $C_{26}H_{26}O_5$. MW, 418. Needles from EtOH. M.p. 111°.

Et ester: $C_{22}H_{18}O_5$. MW, 362. Needles from AcOH. M.p. 195–6°. Turns yellow in air.

Diacetyl : m.p. 200–2°.

Liebig, *J. prakt. Chem.*, 1913, **88**, 42.

Fluoroacetic Acid

$CH_2F{\cdot}COOH$

$C_2H_3O_2F$ MW, 78

M.p. 33°. B.p. 165°. Heat of comb. C_v 171·08 Cal. Burns with green flame.

Me ester : $C_3H_5O_2F$. MW, 92. B.p. 104·5°. D^{15} 1·16128. Sol. H_2O.

Et ester : $C_4H_7O_2F$. MW, 106. B.p. about 120°. Heat of comb. C_v 502·55 Cal.

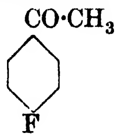
Amide : fluoroacetamide. C_2H_4ONF. MW, 77. Cryst. from $CHCl_3$. M.p. 108°.

Swarts, *Bull. soc. chim.*, 1896, **15**, 1134.

Fluoroacetanilide.

See under Fluoroaniline.

***p*-Fluoroacetophenone**

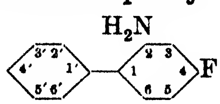


C_8H_7OF MW, 138

M.p. — 4·5°. B.p. 77–8°/10 mm.

Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1345.

4-Fluoro-2-aminodiphenyl



$C_{12}H_{10}NF$ MW, 187

N-*Acetyl* : m.p. 98°.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

2′-Fluoro-2-aminodiphenyl.

M.p. 91°.

N-*Acetyl* : m.p. 102°.

See previous reference.

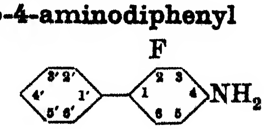
4′-Fluoro-2-aminodiphenyl.

M.p. 42–42·5°. B.p. 186–7°/40 mm. Ox. ⟶ *p*-fluorobenzoic acid.

N-*Acetyl* : m.p. 120°.

See previous reference.

2-Fluoro-4-aminodiphenyl



$C_{12}H_{10}NF$ MW, 187

Ox. ⟶ benzoic acid.

N-*Acetyl* : prisms. M.p. 155°.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

2′-Fluoro-4-aminodiphenyl.

M.p. 36°. B.p. 199–201°/25 mm.

N-*Acetyl* : m.p. 147–8°.

See previous reference.

4′-Fluoro-4-aminodiphenyl.

Leaflets from EtOH. M.p. 120° (121°).

N-*Acetyl* : m.p. 205–205·5°.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.
See also previous reference.

3-Fluoro-β-aminoethyl-benzene.

See 2-*m*-Fluorophenylethylamine.

o-Fluoroaniline

C_6H_6NF MW, 111

M.p. — 34·6° (— 28·95°). B.p. 174·5–176°/757 mm., 94·6°/55 mm., 68·5°/14 mm., 58°/11 mm.

N-*Acetyl* : *o*-fluoroacetanilide. C_8H_8ONF. MW, 153. M.p. 80°. B.p. 140–2°/14 mm.

N-*Dimethyl* : *o*-fluorodimethylaniline. $C_8H_{10}NF$. MW, 139. B.p. 64–5°/13 mm. *Picrate* : m.p. 131°.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3041.
Braun, Rudolf, *Ber.*, 1931, **64**, 2469.

***m*-Fluoroaniline.**

Yellow liq. B.p. 186·1°/754 mm. (187–9°). 82·3°/18 mm. $D^{15.8}$ 1·16004.

N-*Acetyl* : *m*-fluoroacetanilide. M.p. 88° (84·6°, 83°).

Ingold, Vass, *J. Chem. Soc.*, 1928, 421.
Braun, Rudolf, *Ber.*, 1931, **64**, 2470.
Schiemann, *Z. physik. Chem.*, 1931, **156A**, 418.

***p*-Fluoroaniline.**

M.p. — 0·82° (— 1·9°). B.p. 184–6°, 85°/19 mm. D_4^{20} 1·1725. n_D^{20} 1·51954.

B,HCl : b.p. 167°/27 mm.

N-*Acetyl* : *p*-fluoroacetanilide. M.p. 152°.

N-*Benzoyl* : *p*-fluorobenzanilide. M.p. 185°.

N-p-*Nitrobenzoyl* : m.p. 180·5°.

N-*Dimethyl* : *p*-fluorodimethylaniline. M.p. 25°. B.p. 78–79·5°/16 mm. *B,HCl* : m.p. 118°. *Picrate* : m.p. 151·5°.
N-*Diethyl* : *p*-fluorodiethylaniline. $C_{10}H_{14}NF$. MW, 167. B.p. 92·5°/12 mm.

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1933, **135**, 258.
Schiemann, Winkelmüller, *Ber.*, 1933, **66**, 731.
Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3041.

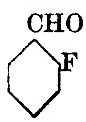
2-Fluoro-*p*-anisidine (2-*Fluoro-4-amino-anisole*)

C_7H_8ONF MW, 141

M.p. 82·6°.
B,HCl : m.p. 180–200° decomp.

Schiemann, Miau, *Ber.*, 1933, **66**, 1186.

Fluoroanisole.
See under Fluorophenol.
o-Fluorobenzaldehyde



C_7H_5OF MW, 124

M.p. — 44·5°. B.p. 175°, 80·5°/36 mm.
Oxime : m.p. 63°.
Phenylhydrazone : m.p. 89·5°.
p-*Nitrophenylhydrazone* : m.p. 205°.

Schiemann, *Z. physik. Chem.*, 1931, **156A**, 417.
Shoesmith, Sosson, Slater, *J. Chem. Soc.*, 1926, 2761.

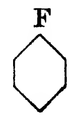
***m*-Fluorobenzaldehyde.**
Oil. B.p. 173°, 76°/26 mm.
Oxime : m.p. 63°.
Phenylhydrazone : m.p. 114°.
p-*Nitrophenylhydrazone* : m.p. 202°.

See previous references.

***p*-Fluorobenzaldehyde.**
M.p. — 10°. B.p. 174·5°/752 mm. (181·5°), 104·5°/74 mm.
Oxime : (a) *syn*-, m.p. 116–17°. (b) *Anti*-, m.p. 86·5°.
Phenylhydrazone : m.p. 147°.
p-*Nitrophenylhydrazone* : m.p. 212°.

See previous references.

Fluorobenzanilide.
See under Fluoroaniline.
Fluorobenzene

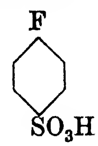


C_6H_5F MW, 96

F.p. — 39·2° (— 40·5°). M.p. — 41·2°. B.p. 85·2°. D_4^{20} 1·0236. n_D^{20} 1·46773. Heat of comb. C_v 746·26, C_p 746·84 Cal.
$C_6H_5F,SbCl_3$: m.p. 10° decomp.

Balz, Schiemann, *Ber.*, 1927, **60**, 1188.
Tronov, Krüger, *Chem. Abstracts*, 1927, **21**, 3887.
Flood, *Organic Syntheses*, 1933, XIII, 46 (*Bibl.*).
Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

***p*-Fluorobenzenesulphonic Acid**

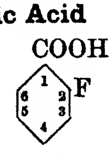


$C_6H_5O_3FS$ MW, 176

Salts sol. H_2O, EtOH. *K* salt heated with HCl ⟶ fluorobenzene.
Chloride : $C_6H_4O_2FClS$. MW, 194·5. M.p. 30°. Sol. Et_2O, C_6H_6, $CHCl_3$.
Amide : $C_6H_6O_2NFS$. MW, 175. Plates or needles from H_2O. M.p. 123°. Sol. EtOH, Et_2O, Me_2CO. Spar. sol. H_2O, C_6H_6.

Holleman, *Rec. trav. chim.*, 1905, **24**, 30.
Lenz, *Ber.*, 1879, **12**, 580.

***o*-Fluorobenzoic Acid**



$C_7H_5O_2F$ MW, 140

Cryst. from H_2O. M.p. 126·5°. Sol. EtOH, Et_2O. $k = 3 \times 10^{-4}$ at 25°. Heat of comb. C_v 739·92 Cal.
Me ester : $C_8H_7O_2F$. MW, 154. M.p. — 20°. B.p. 209°, 89–90°/14 mm.
Et ester : $C_9H_9O_2F$. MW, 168. B.p. 221°.
Chloride : C_7H_4OClF. MW, 158·5. M.p. 4°. B.p. 206°, 85°/14 mm.

Amide: C_7H_6ONF. MW, 139. M.p. 116° (114°).

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.
Holleman, Slothouwer, *Chem. Abstracts*, 1911, **5**, 1905.
Meyer, Hub, *Monatsh.*, 1910, **31**, 933.
Bergmann, Bondi, *Ber.*, 1931, **64**, 1474.
Rinkes, *Chem. Zentr.*, 1919, I, 821.
Slothouwer, *Rec. trav. chim.*, 1914, **33**, 324.

_m_-Fluorobenzoic Acid.

Leaflets from hot H_2O. M.p. 123·6° (124°). $k = 1{\cdot}4 \times 10^{-4}$ at 25°. Heat of comb. C_v 737·36 Cal.

Me ester: m.p. − 10°. B.p. 197°.
Et ester: b.p. 209°.
Chloride: m.p. − 30°. B.p. 189° (204°), 91°/18 mm.
Amide: m.p. 130°.

See first three references above.

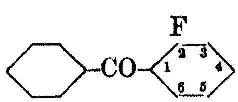
_p_-Fluorobenzoic Acid.

Prisms from H_2O. M.p. 182·6°. Sol. EtOH, Et_2O, hot H_2O. $k = 1{\cdot}4 \times 10^{-4}$ at 25°. Heat of comb. C_v 739·43 Cal.

Me ester: m.p. 4·5°. B.p. 198°.
Et ester: m.p. 26°. B.p. 210°.
Chloride: m.p. 9°. B.p. 193°.
Amide: m.p. 154·5°. B.p. 104°/38 mm.
Nitrile: *p*-fluorobenzonitrile. C_7H_4NF. MW, 121. M.p. 34·8°. B.p. 188·2°/750 mm.

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.
Schiemann, Winkelmüller, *Organic Syntheses*, 1933, XIII, 52 (*Bibl.*).

2-Fluorobenzophenone (*Phenyl 2-fluorophenyl ketone*)



$C_{13}H_9OF$ MW, 200

Oil. B.p. 150°/16 mm.
Oxime: m.p. 126°.

Bergmann, Bondi, *Ber.*, 1931, **64**, 1474.

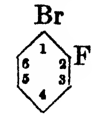
4-Fluorobenzophenone (*Phenyl 4-fluorophenyl ketone*).

Cryst. from pet. ether. M.p. 48·2–48·7°. B.p. 159–61°/13 mm.
Oxime: m.p. 135°.

Phenylhydrazone: m.p. 105°.

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1933, **135**, 257.
Koopal, *Rec. trav. chim.*, 1915, **34**, 157.
Dunlop, Gardner, *J. Am. Chem. Soc.*, 1933, **55**, 1665.

_o_-Fluorobromobenzene



C_6H_4FBr MW, 175

B.p. 57°/22 mm.

Bergmann, Engel, St. Sándor, *Z. physik. Chem.*, 1930, **10B**, 120.

_m_-Fluorobromobenzene.

B.p. 149–51°/764 mm.

Schiemann, Pillarsky, *Z. physik. Chem.*, 1931, **156A**, 413.

_p_-Fluorobromobenzene.

F.p. − 17·4°. M.p. − 8 to − 7·5°. B.p. 151·6–151·9°/755 mm. (153·5°/756 mm). D_4^{20} 1·597. n_D^{21} 1·52855.

Allen, Sugden, *J. Chem. Soc.*, 1932, 762.
Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1343.

4′-Fluoro-4-bromobiphenyl

$C_{12}H_8FBr$ MW, 251

Needles from EtOH. M.p. 97–9°. Ox. ⟶ *p*-bromobenzoic acid.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.
Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1344.

sym.-Fluorobromoethane (*Ethylene fluorobromide*)

$CH_2Br{\cdot}CH_2F$

C_2H_4FBr MW, 127

B.p. 71–72·5°.

Swarts, *Rec. trav. chim.*, 1914, **33**, 262.

sym.-Fluorobromoethylene (*1-Fluoro-2-bromoethylene, acetylene fluorobromide*)

CHBr:CHF

C_2H_2FBr MW, 125

B.p. 36°. $D^{16 \cdot 5}$ 1·6939.

Swarts, *Chem. Zentr.*, 1909, II, 1414; *Bull. soc. chim.*, 1919, **25**, 153.

***unsym.*-Fluorobromoethylene** (*1-Fluoro-1-bromoethylene*)

$CH_2{:}CBrF$

C_2H_2FBr MW, 125

B.p. 12·5° (30–35°, 6·8°).

Swarts, *Chem. Zentr.*, 1909, II, 1414; 1911, II, 848.

Fluorobromomethane (*Methylene fluorobromide*)

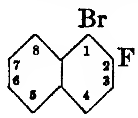
CH_2BrF

CH_2FBr MW, 113

B.p. 18–20°.

Swarts, *Chem. Zentr.*, 1910, I, 1868.

2-Fluoro-1-bromonaphthalene



$C_{10}H_6FBr$ MW, 225

Cryst. from MeOH. M.p. 49°.

Nataka, *Ber.*, 1931, **64**, 2067.

4-Fluoro-1-bromonaphthalene. Needles from MeOH. M.p. 37°. Sol. ord. org. solvents.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 285.

1-Fluorobutane (n-*Butyl fluoride*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2F$

C_4H_9F MW, 76

B.p. 31·95–31·98°/745·8 mm. D_4^{20} 0·7761. n_D^{15} 1·3419.

Desreux, *Chem. Zentr.*, 1934, II, 2516.

2-Fluorobutane (sec.-n-*Butyl fluoride*)

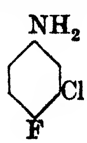
$CH_3{\cdot}CH_2{\cdot}CHF{\cdot}CH_3$

C_4H_9F MW, 76

B.p. 25·25–25·27°/765 mm. D_4^{15} 0·700. n_D^{12} 1·3366.

See previous reference.

4-Fluoro-3-chloroaniline

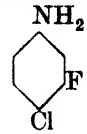


C_6H_5NFCl MW, 145·5

Plates. M.p. 43·9° (44°).

Rinkes, *Chem. Abstracts*, 1916, **10**, 194.
Ingold, Vass, *J. Chem. Soc.*, 1928, 423.

3-Fluoro-4-chloroaniline

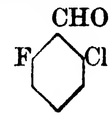


C_6H_5NFCl MW, 145·5

M.p. 61–2°. B.p. about 220°.
N-*Acetyl*: 3-fluoro-4-chloroacetanilide. C_8H_7ONFCl. MW, 187·5. M.p. 115°.

Ingold, Vass, *J. Chem. Soc.*, 1928, 422.

6-Fluoro-2-chlorobenzaldehyde

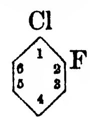


C_7H_4OFCl MW, 158·5

B.p. 104–5°/20 mm.
Semicarbazone: m.p. 213°.

Willstaedt, *Ber.*, 1931, **64**, 2691.

***o*-Fluorochlorobenzene**



C_6H_4FCl MW, 130·5

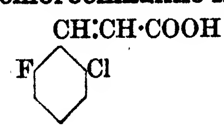
M.p. − 42·5°. B.p. 138–40°/758 mm.

Ingold, Vass, *J. Chem. Soc.*, 1928, 423.
Rinkes, *Chem. Abstracts*, 1916, **10**, 194.

***p*-Fluorochlorobenzene.** F.p. − 27·7°. M.p. − 26·85°. B.p. 130°/756 mm. (130·15°/757 mm.). $D_4^{20·5}$ 1·226. $n_D^{11·2}$ 1·4989.

Ingold, Vass, *J. Chem. Soc.*, 1928, 2265.
Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

6-Fluoro-2-chlorocinnamic Acid



$C_9H_6O_2FCl$ MW, 200·5

M.p. 212°.

Willstaedt, *Ber.*, 1931, **64**, 2692.

4′-Fluoro-4-chlorodiphenyl

$C_{12}H_8FCl$ MW, 206·5

Needles from EtOH. M.p. 87–8°.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.

sym.-Fluorochloroethane (*Ethylene fluorochloride*)

$CH_2Cl{\cdot}CH_2F$

C_2H_4FCl MW, 82·5

B.p. 10–11°. Sol. EtOH. Insol. H_2O.

Swarts, *Chem. Zentr.*, 1903, I, 13.

sym.-Fluorochloroethylene (*1-Fluoro-2-chloroethylene, acetylene fluorochloride*)

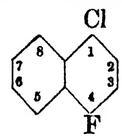
CHCl:CHF

C_2H_2FCl MW, 80·5

B.p. 10–11°. Sol. EtOH. Insol. H_2O.

Swarts, *Chem. Zentr.*, 1903, I, 13.

4-Fluoro-1-chloronaphthalene



$C_{10}H_6FCl$ MW, 180·5

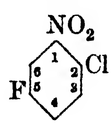
Cryst. from EtOH. M.p. 85°.

Mauzelius, *Öfversigt Kongeliga Svenska Vetenskaps Akademiens, Förhandlingar*, 1890, 445.

5-Fluoro-1-chloronaphthalene.
Prisms. M.p. 32°. Sol. EtOH.

Mauzelius, *Öfversigt Kongeliga Svenska Vetenskaps Akademiens, Förhandlingar*, 1889, 581.

5-Fluoro-2-chloronitrobenzene

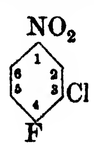


$C_6H_3O_2NFCl$ MW, 175·5

Prisms. M.p. 37·25°. B.p. 238·5°.

Swarts, *Rec. trav. chim.*, 1915, **35**, 144.

4-Fluoro-3-chloronitrobenzene



$C_6H_3O_2NFCl$ MW, 175·5

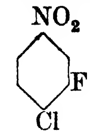
M.p. 41·5°. B.p. 227–32°. Volatile in steam.

Rinkes, *Chem. Weekblad*, 1914, **11**, 952.
Ingold, Vass, *J. Chem. Soc.*, 1928, 422.

6-Fluoro-3-chloronitrobenzene.
Prisms from ligroin. M.p. 10·2°. B.p. 138·5°/29 mm. KOH ⟶ 4-chloro-2-nitrophenol.

Swarts, *Rec. trav. chim.*, 1915, **35**, 135.

3-Fluoro-4-chloronitrobenzene

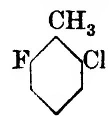


$C_6H_3O_2NFCl$ MW, 175·5

Pale yellow leaflets from ligroin. M.p. 63–4°. B.p. 114–16°/24 mm.

Ingold, Vass, *J. Chem. Soc.*, 1928, 422.

6-Fluoro-*o*-chlorotoluene



C_7H_6FCl MW, 144·5

B.p. 153–4°.

Willstaedt, *Ber.*, 1931, **64**, 2691.

α-Fluorocinnamic Acid

CH:CF·COOH

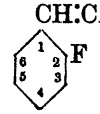
$C_9H_7O_2F$ MW, 166

Prisms. M.p. 157·6°. B.p. 290°. Sol. EtOH, Et_2O. Heat of comb. C_v 1011·3 Cal. $k = 2{\cdot}0 \times 10^{-3}$ at 25°. Br in $CHCl_3$ ⟶ α-fluoro-αβ-dibromohydrocinnamic acid.

Swarts, *Bull. soc. chim.*, 1919, **25**, 326, 329.

2-Fluorocinnamic Acid (*o-Fluorocinnamic acid*)

CH:CH·COOH



$C_9H_7O_2F$ MW, 166

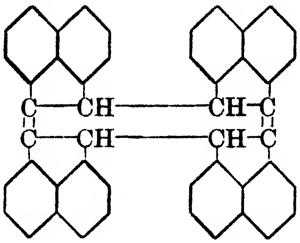
Needles from H_2O. M.p. 175°. Br ⟶ *o*-fluoro-αβ-dibromohydrocinnamic acid, m.p. 183°.
Et ester: $C_{11}H_{11}O_2F$. MW, 194. B.p. 140–1°/11 mm.

Willstaedt, *Ber.*, 1931, **64**, 2689.

3-Fluorocinnamic Acid (*m-Fluorocinnamic acid*).
M.p. 166·5°.

Schiemann, *Ber.*, 1932, **65**, 1438.

Fluorocyclene (*Tetraperinaphthylenecyclo-octadiene*)

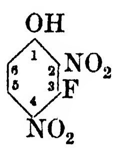


$C_{48}H_{28}$ MW, 604

Yellow needles from C_6H_6. M.p. 396–7°. Sol. hot $PhNO_2$, hot cymene. Spar. sol. hot $CHCl_3$, hot C_6H_6, hot CS_2. Insol. EtOH, Et_2O. Sols. show violet fluor. $Na_2Cr_2O_7$ in AcOH ⟶ naphthalic anhydride.

Suknarowski, *Ber.*, 1918, **51**, 463.
Dziewoński, Suszko, *Ber.*, 1925, **58**, 723.

Fluorodiethylaniline.
See under Fluoroaniline.
Fluorodimethylaniline.
See under Fluoroaniline.
Fluorodinitroanisole.
See under Fluorodinitrophenol.
Fluorodinitrophenetole.
See under Fluorodinitrophenol.
3-Fluoro-2 : 4-dinitrophenol



$C_6H_3O_5N_2F$ MW, 202

Pale yellow cryst. from ligroin. M.p. 138–9°. Volatile in steam.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1881.

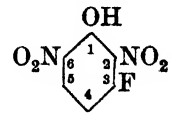
5-Fluoro-2 : 4-dinitrophenol.
Needles from H_2O or ligroin. M.p. 80°. Volatile in steam.

See previous reference.

6-Fluoro-2 : 4-dinitrophenol.
M.p. 102°.
Me ether: 6-fluoro-2 : 4-dinitroanisole. $C_7H_5O_5N_2F$. MW, 216. B.p. 164–5°/10 mm.
Et ether: 6-fluoro-2 : 4-dinitrophenetole. $C_8H_7O_5N_2F$. MW, 230. B.p. 168°/13 mm.

Schiemann, Miau, *Ber.*, 1933, **66**, 1185.

3-Fluoro-2 : 6-dinitrophenol



$C_6H_3O_5N_2F$ MW, 202

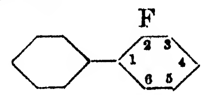
Needles from ligroin. M.p. 68·5°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1881.

4-Fluoro-2 : 6-dinitrophenol.
M.p. 50–50·2°.
Me ether: 4-fluoro-2 : 6-dinitroanisole. $C_7H_5O_5N_2F$. MW, 216. M.p. 81·7–82·7°.

Schiemann, Miau, *Ber.*, 1933, **66**, 1186.

2-Fluorodiphenyl



$C_{12}H_9F$ MW, 172

Prisms. M.p. 73·5°. B.p. 248°. Volatile in steam. D_4^{25} 1·2452.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.
Schiemann, Roselius, *Ber.*, 1929, **62**, 1809.
Mascarelli, Gatti, Pirona, *Atti accad. Lincei*, 1931, **14**, 510.

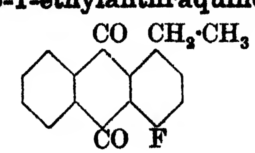
3-Fluorodiphenyl.
M.p. 26–7°. D_4^{19} 1·2874.

Schiemann, Roselius, *Ber.*, 1929, **62**, 1810.

4-Fluorodiphenyl.
Plates. M.p. 74·2°. B.p. 253°. Volatile in steam. D_4^{25} 1·247.

See previous reference and also
van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

Fluoroethane.
See Ethyl fluoride.
Fluoroethyl Alcohol.
See Ethylene fluorohydrin.
4-Fluoro-1-ethylanthraquinone

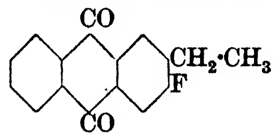


$C_{16}H_{11}O_2F$ MW, 254

Cryst. from C_6H_6. M.p. 80–2°.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

3-Fluoro-2-ethylanthraquinone

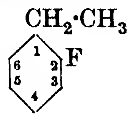


$C_{16}H_{11}O_2F$ MW, 254

Cryst. from C_6H_6. M.p. 110°.

See previous referenee.

***o*-Fluoro-ethylbenzene**



C_8H_9F MW, 124

B.p. 136–7°. D_0^0 1·002, D_0^{20} 0·983.

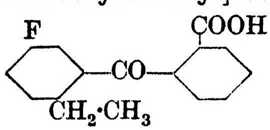
Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

***p*-Fluoro-ethylbenzene.**

B.p. 142–3°/755 mm. (141°). D_0^0 0·994, D_0^{20} 0·967.

Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1344.
See also previous reference.

***o*-[5-Fluoro-2-ethylbenzoyl]-benzoic Acid**

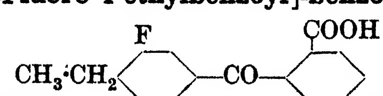


$C_{16}H_{13}O_3F$ MW, 272

Cryst. from C_6H_6 or AcOH. M.p. 210–20°. $H_2SO_4 \longrightarrow$ 4-fluoro-1-ethylanthraquinone.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

***o*-[3-Fluoro-4-ethylbenzoyl]-benzoic Acid**



$C_{16}H_{13}O_3F$ MW, 272

Cryst. from C_6H_6 or AcOH. M.p. 120°. $H_2SO_4 \longrightarrow$ 3-fluoro-2-ethylanthraquinone.

See previous reference.

Fluoroethylene.
See Vinyl fluoride.
Fluoroform (*Trifluoromethane*)

CHF_3

CHF_3 MW, 70

B.p. 20° at 40 atm. press. Sol. H_2O. Alc. KOH $\longrightarrow$ KF + H·COOK.

Valentiner, Schwarz, D.R.P., 105,916, (*Chem. Zentr.*, 1900, I, 525).
Booth, Bixby, *Ind. Eng. Chem.*, 1932, **24**, 640 (*Bibl.*).

1-Fluoroheptane (n-*Heptyl fluoride*)

$CH_3{\cdot}[CH_2]_5{\cdot}CH_2F$

$C_7H_{15}F$ MW, 118

B.p. 120·55°/765 mm.

Desreux, *Chem. Zentr.*, 1934, II, 2516.

1-Fluorohexane (n-*Hexyl fluoride*)

$CH_3{\cdot}[CH_2]_4{\cdot}CH_2F$

$C_6H_{13}F$ MW, 104

B.p. 93·15°/753 mm. D_4^0 0·8200. n_D^{20} 1·3748.

See previous reference.

2-Fluorohexane (sec.-n-*Hexyl fluoride*)

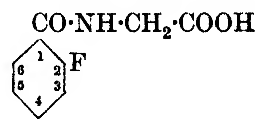
$CH_3{\cdot}[CH_2]_3{\cdot}CHF{\cdot}CH_3$

$C_6H_{13}F$ MW, 104

B.p. 86·1–86·2°/758 mm. D_4^{20} 0·7916. n_D^{20} 1·3693.

See previous reference.

2-Fluorohippuric Acid (o-*Fluorobenzoylglycine*)



$C_9H_8O_3NF$ MW, 197

M.p. 121–121·5°. Sol. EtOH, Et_2O, AcOEt. Mod. sol. $CHCl_3$. Insol. C_6H_6, CS_2.

Coppola, *Gazz. chim. ital.*, 1883, **13**, 522.

3-Fluorohippuric Acid (m-*Fluorobenzoylglycine*).

Needles from Et_2O. M.p. 152–3°. Sol. hot H_2O. Spar. sol. $CHCl_3$. Insol. C_6H_6, CS_2.

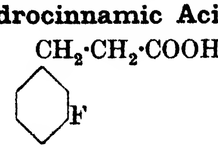
See previous reference.

4-Fluorohippuric Acid (p-*Fluorobenzoylglycine*).

Needles from Et_2O. M.p. 161–161·5°. Insol. C_6H_6, $CHCl_3$, CS_2.

See previous reference.

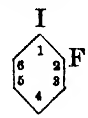
3-Fluorohydrocinnamic Acid



$C_9H_9O_2F$ MW, 168

M.p. 46°.
Amide: $C_9H_{10}ONF$. MW, 167. M.p. 95·5°.
Schiemann, *Ber.*, 1932, **65**, 1438.

o-Fluoroiodobenzene

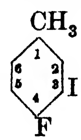


C_6H_4FI MW, 222

M.p. — 41·5°. B.p. 188·6°. Volatile in steam.
Rinkes, *Chem. Zentr.*, 1919, I, 820.

***p*-Fluoroiodobenzene.**
Exists in two forms. (i) M.p. — 27·2°. (ii) M.p. — 18°. B.p. 183·2° (182–4°).
See previous reference and also
Wallach, Hensler, *Ann.*, 1888, **243**, 227.

4-Fluoro-3-iodotoluene

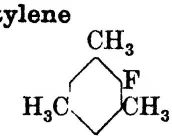


C_7H_6FI MW, 236

B.p. 122–5°/30 mm. D_{20}^{20} 1·8337. n_D^{18} 1·5757.
Stoughton, Adams, *J. Am. Chem. Soc.*, 1932, **54**, 4429.

Fluoroisopentane.
See Isoamyl fluoride.

Fluoromesitylene

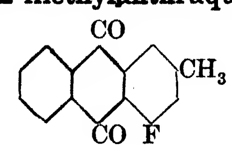


$C_9H_{11}F$ MW, 138

B.p. 171–2°.
Töhl, *Ber.*, 1892, **25**, 1525.

Fluoromethane.
See Methyl fluoride.

4-Fluoro-2-methylanthraquinone

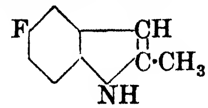


$C_{15}H_9O_2F$ MW, 240

Cryst. from C_6H_6. M.p. 135·5–137°.
Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

2′-Fluoro-4′-methylbenzophenone-2-carboxylic Acid.
See 2′-Fluoro-*o*-toluylbenzoic Acid.

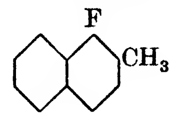
5-Fluoro-2-methylindole



C_9H_8NF MW, 149

Yellow needles. M.p. 102°.
Schiemann, Winkelmüller, *Ber.*, 1933, **66**, 730.

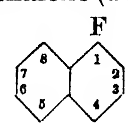
1-Fluoro-2-methylnaphthalene



$C_{11}H_9F$ MW, 160

B.p. 260–2°.
Willstaedt, Scheiber, *Ber.*, 1934, **67**, 473.

1-Fluoronaphthalene (α-*Fluoronaphthalene*)

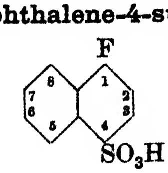


$C_{10}H_7F$ MW, 146

M.p. — 9 to — 8°. B.p. 212° (215°/756 mm.), 89°/17 mm., 80°/11 mm. Sol. EtOH, AcOH, C_6H_6, $CHCl_3$. $D_4^{19.5}$ 1·1332, D_4^{16} 1·141. $n_D^{19.5}$ 1·59389.
Picrate: m.p. 113°.
Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 275 (*Bibl.*).
Allen, Sugden, *J. Chem. Soc.*, 1932, 762.
Nakata, *Ber.*, 1931, **64**, 2066.

2-Fluoronaphthalene (β-*Fluoronaphthalene*).
Cryst. from EtOH. M.p. 61°. B.p. 211·5°/737 mm., 90°/16 mm. Sol. EtOH, AcOH, C_6H_6, $CHCl_3$. Sublimes.
Picrate: m.p. 101°.
See last reference above and also
Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 276 (*Bibl.*).

1-Fluoronaphthalene-4-sulphonic Acid



$C_{10}H_7O_3FS$ MW, 226

Cryst. + $\frac{1}{2}H_2O$. M.p. 100°.
Et ester: $C_{12}H_{11}O_3FS$. MW, 254. M.p. 93°.
Chloride: $C_{10}H_6O_2FClS$. MW, 244·5. Cryst.

from $CHCl_3$. M.p. 86°. B.p. 145–8°/4 mm., 131·5–132°/0·05 mm. Sol. EtOH, C_6H_6, $CHCl_3$. Insol. H_2O, pet. ether.

Amide : $C_{10}H_8O_2NFS$. MW, 225. M.p. 206°.

Anilide : m.p. 144°.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 277.

1-Fluoronaphthalene-5-sulphonic Acid.

Leaflets + 3(?)H_2O from H_2O. M.p. 105–6°.

Me ester : $C_{11}H_9O_3FS$. MW, 240. Cryst. from Et_2O. M.p. 118°.

Et ester : prisms from Et_2O. M.p. 79° (74°).

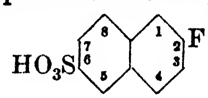
Chloride : prisms. M.p. 122–3°.

Bromide : $C_{10}H_6O_2FBrS$. MW, 289. M.p. 145°.

Amide : m.p. 196–7°.

Mauzelius, *Ber.*, 1889, **22**, 1844.

2-Fluoronaphthalene-6-sulphonic Acid



$C_{10}H_7O_3FS$ MW, 226

Cryst. + $1H_2O$. M.p. 105°. Hygroscopic.

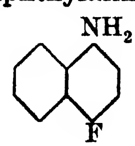
Chloride : $C_{10}H_6O_2FClS$. MW, 244·5. Cryst. from $CHCl_3$. M.p. 97°. B.p. 144°/0·05 mm.

Amide : $C_{10}H_8O_2NFS$. MW, 225. M.p. 133°.

Anilide : m.p. 129°.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 279.

4-Fluoro-1-naphthylamine



$C_{10}H_8NF$ MW, 161

M.p. 48°. B.p. 162°/16 mm. Volatile in steam. Rapidly turns dark violet.

B,HCl : m.p. 280° decomp. (sealed tube).

B_2,H_2SO_4 : m.p. 230°.

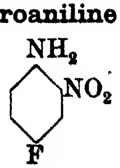
N-*Benzoyl* : m.p. 197°.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 283.

Fluoronitroacetanilide.

See under Fluoronitroaniline.

4-Fluoro-2-nitroaniline



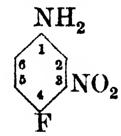
$C_6H_5O_2N_2F$ MW, 156

Orange prisms. M.p. 92·45°.

N-*Acetyl* : 4-fluoro-2-nitroacetanilide. $C_8H_7O_2N_2F$. MW, 182. Pale yellow prisms. M.p. 71·5°.

Swarts, *Rec. trav. chim.*, 1915, **35**, 142.

4-Fluoro-3-nitroaniline



$C_6H_5O_2N_2F$ MW, 156

Orange needles from H_2O. M.p. 98°.

N-*Acetyl* : 4-fluoro-3-nitroacetanilide. M.p. 138·5°.

Holleman, Beekman, *Rec. trav. chim.*, 1904, **23**, 237.

Swarts, *Rec. trav. chim.*, 1915, **35**, 141.

6-Fluoro-3-nitroaniline.

Yellow needles. M.p. 101·5°.

N-*Acetyl* : 6-fluoro-3-nitroacetanilide. Cryst. from C_6H_6. M.p. 178·4°.

Swarts, *Rec. trav. chim.*, 1915, **35**, 142.

Fluoronitroanisole.

See under Fluoronitrophenol.

***o*-Fluoronitrobenzene**

$C_6H_4O_2NF$ MW, 141

M.p. − 5·9°. B.p. 214·6°, 110–12°/22 mm., 86–7°/11 mm. $D^{17.2}$ 1·3375. $n_D^{17.2}$ 1·5331.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3040.

***m*-Fluoronitrobenzene.**

Exists in three forms. (i) Stable. M.p. 41°. (ii) Labile. M.p. 3·1°. (iii) Labile. M.p. 3·6°. B.p. 200·2°/756 mm. (199–200°), 86°/19 mm. D_4^{19} 1·3254. n_D^{19} 1·52622.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3041.

Ingold, Vass, *J. Chem. Soc.*, 1928, 421.

Hasselblatt, *Z. physik. Chem.*, 1913, **63**, 23.

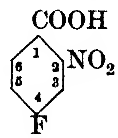
***p*-Fluoronitrobenzene.**

Exists in two forms. (i) Stable. M.p. 27° (26·5°). (ii) Labile. F.p. 21·5°. B.p. 205·3°/735 mm., 95–97·5°/22 mm., 86·6°/14 mm. D_4^{20}

1·3300. n_D^{20} 1·53156. Heat of comb. C_p 701·7 Cal., C_v 702·1 Cal.

Schiemann, Pillarsky, *Ber.*, 1929, **62**, 3040.
Holleman, *Rec. trav. chim.*, 1905, **24**, 25.

4-Fluoro-2-nitrobenzoic Acid (p-*Fluoro*-o-*nitrobenzoic acid*)



$C_7H_4O_4NF$ MW, 185

M.p. 130°.

Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

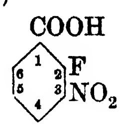
5-Fluoro-2-nitrobenzoic Acid.
M.p. 134·5°.

Slothouwer, *Rec. trav. chim.*, 1914, **33**, 336.

6-Fluoro-2-nitrobenzoic Acid.
M.p. 127°. Sol. H_2O.

van Loon, Meyer, *Ber.*, 1896, **29**, 841.

2-Fluoro-3-nitrobenzoic Acid (o-*Fluoro*-m-*nitrobenzoic acid*)



$C_7H_4O_4NF$ MW, 185

Needles. M.p. 160° decomp.

Slothouwer, *Rec. trav. chim.*, 1914, **33**, 335.

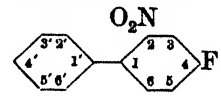
4-Fluoro-3-nitrobenzoic Acid.
Needles from H_2O. M.p. 121–2°. $k = 4{\cdot}33 \times 10^{-4}$ at 25°. The salts have yellow to red col.
Et ester: $C_9H_8O_4NF$. MW, 213. Yellow cryst. M.p. 45°.
Chloride: $C_7H_3O_3NFCl$. MW, 203·5. B.p. 210°/130 mm.
Amide: $C_7H_5O_3N_2F$. MW, 184. M.p. 153°.

Govaert, *Chem. Abstracts*, 1930, **24**, 2448.
Rouche, *Chem. Abstracts*, 1923, **17**, 2876.
See also previous reference.

6-Fluoro-3-nitrobenzoic Acid.
Cryst. from H_2O. M.p. 138–9°. $k = 1{\cdot}88 \times 10^{-3}$ at 25°.
Et ester: m.p. 49·5°.

See first reference above and also Slothouwer, *Rec. trav. chim.*, 1914, **33**, 334.

4-Fluoro-2-nitrodiphenyl



$C_{12}H_8O_2NF$ MW, 217

Prisms. M.p. 53–4°. Ox. ⟶ 4-fluoro-2-nitrobenzoic acid.

van Hove, *Bull. soc. chim. Belg.*, 1923, **32**, 52.

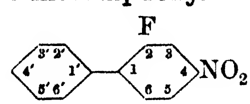
2′-Fluoro-2-nitrodiphenyl.
M.p. 71·5°. CrO_3 ⟶ *o*-nitrobenzoic acid.

See previous reference.

4′-Fluoro-2-nitrodiphenyl.
Needles. M.p. 59–60°. Ox. ⟶ *p*-fluorobenzoic acid.

See previous reference.

2-Fluoro-4-nitrodiphenyl



$C_{12}H_8O_2NF$ MW, 217

Needles. M.p. 81°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

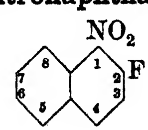
2′-Fluoro-4-nitrodiphenyl.
Yellow needles. M.p. 74·5°. Ox. ⟶ *p*-nitrobenzoic acid.

See previous reference.

4′-Fluoro-4-nitrodiphenyl.
Yellow needles from EtOH. M.p. 123° (120–1°). Ox. ⟶ *p*-nitrobenzoic acid.

Marler, Turner, *J. Chem. Soc.*, 1931, 1361.
See also previous reference.

2-Fluoro-1-nitronaphthalene



$C_{10}H_6O_2NF$ MW, 191

Cryst. from pet. ether. M.p. 49–50°. B.p. 120–4°/12–15 mm.

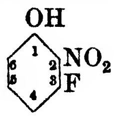
Willstaedt, Scheiber, *Ber.*, 1934, **67**, 471.

4-Fluoro-1-nitronaphthalene.
Yellow needles from EtOH. M.p. 80°. Sol. most org. solvents.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, **487**, 281.

Fluoronitrophenetole.
See under Fluoronitrophenol.

3-Fluoro-2-nitrophenol



$C_6H_4O_3NF$ MW, 157

Red needles from ligroin. M.p. 39°. Volatile in steam.

Me ether : 3-fluoro-2-nitroanisole. $C_7H_6O_3NF$. MW, 171. Needles from ligroin. M.p. 43·5°.

Benzoyl : needles. M.p. 114°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.

4-Fluoro-2-nitrophenol.

Yellow cryst. from EtOH. M.p. 73·7°.

Me ether : 4-fluoro-2-nitroanisole. Prisms from EtOH. M.p. 61·6°.

Et ether : 4-fluoro-2-nitrophenetole. $C_8H_8O_3NF$. MW, 185. Needles from EtOH. M.p. 33·7°. B.p. 225–7°.

Swarts, *Bulletin de L'Académie Royale de Belgique, Classe des Sciences*, 1913, 278 (*Chem. Abstracts*, 1914, **8**, 681).

5-Fluoro-2-nitrophenol.

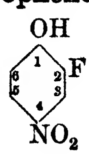
Yellow needles from ligroin. M.p. 32°. Volatile in steam.

Me ether : 5-fluoro-2-nitroanisole. Cryst. from ligroin. M.p. 52°.

Benzoyl : m.p. 110–11°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.

2-Fluoro-4-nitrophenol



$C_6H_4O_3NF$ MW, 157

Me ether : 2-fluoro-4-nitroanisole. $C_7H_6O_3NF$. MW, 171. M.p. 104·6°.

Et ether : 2-fluoro-4-nitrophenetole. $C_8H_8O_3NF$. MW, 185. M.p. 77°.

Schiemann, Miau, *Ber.*, 1933, **66**, 1183.

3-Fluoro-4-nitrophenol.

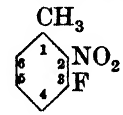
Needles from H_2O or ligroin. M.p. 42°. Non-volatile in steam.

Me ether : 3-fluoro-4-nitroanisole. Needles from ligroin. M.p. 56·5°.

Benzoyl : plates. M.p. 118°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.

3-Fluoro-o-nitrotoluene



$C_7H_6O_2NF$ MW, 155

M.p. 17·5–18°. B.p. 92·4–92·8°/12 mm.

Schiemann, *Ber.*, 1929, **62**, 1802.

4-Fluoro-o-nitrotoluene.

M.p. − 8·85°. B.p. 213°/768 mm. (218°), 102·4°/20 mm. D^{20} 1·2686. n_D^{20} 1·52358.

Desirant, *Chem. Abstracts*, 1933, **27**, 4781.
van Loon, Meyer, *Ber.*, 1896, **29**, 841.

5-Fluoro-o-nitrotoluene.

M.p. 27–8°. B.p. 97–8°/10 mm.

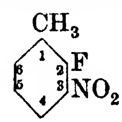
Schiemann, *Ber.*, 1929, **62**, 1802.

6-Fluoro-o-nitrotoluene.

M.p. − 2°. B.p. 97–97·2°/11 mm.

Schiemann, *Ber.*, 1929, **62**, 1805.

2-Fluoro-m-nitrotoluene



$C_7H_6O_2NF$ MW, 155

B.p. 110–11°/12 mm.

Braun, Rudolf, *Ber.*, 1931, **64**, 2471.

4-Fluoro-m-nitrotoluene.

M.p. 26·48° (1–2°). B.p. 241°, 134–5°/83 mm., 124·5°/21 mm., 104·2°/9 mm. D^{28} 1·2619. n_D^{28} 1·52371.

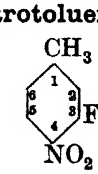
Slothouwer, *Chem. Zentr.*, 1914, II, 1431.
Schiemann, *Ber.*, 1929, **62**, 1799.
Desirant, *Chem. Abstracts*, 1933, **27**, 4781.

6-Fluoro-m-nitrotoluene.

M.p. 41·5°. B.p. 99·4–99·6°/13 mm.

Schiemann, *Ber.*, 1929, **62**, 1804.

3-Fluoro-p-nitrotoluene



$C_7H_6O_2NF$ MW, 155

Needles from EtOH. M.p. 53·2°.

Schiemann, *Ber.*, 1929, **62**, 1801.

Fluorophenetole.
See under Fluorophenol.

o-Fluorophenol

C_6H_5OF MW, 112

M.p. 16·1°. B.p. 151–2°, 52·9°/14 mm.

Me ether: o-fluoroanisole. C_7H_7OF. MW, 126. M.p. – 39°. B.p. 64°/17 mm., 59·2°/12 mm.

Et ether: o-fluorophenetole. C_8H_9OF. MW, 140. M.p. – 16·7°. B.p. 171·4°, 63·9–64·3°/11 mm.

Schiemann, Miau, *Ber.*, 1933, **66**, 1183.
Schiemann, *Z. physik. Chem.*, 1931, **156A**, 417 (*Bibl.*).
Rinkes, *Chem. Abstracts*, 1916, **10**, 194.
Swarts, *Chem. Abstracts*, 1914, **8**, 680.

m-Fluorophenol.

M.p. 13·8°. B.p. 177·8°, 108°/70 mm., 76·8°/14 mm.

Me ether: m-fluoroanisole. M.p. – 35°. B.p. 51°/14 mm., 47°/12 mm.

Et ether: m-fluorophenetole. M.p. – 27·5°. B.p. 171·4°, 65–65·5°/15 mm. $D^{16·4}$ 1·0716. $n_D^{16·4}$ 1·4847.

Schiemann, *Z. physik. Chem.*, 1931, **156A**, 414.
See also last reference above.

p-Fluorophenol.

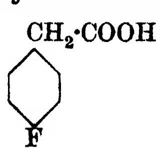
Exists in two forms. (i) F.p. 46·5°. M.p. 48°. (ii) M.p. 26·5–27°. B.p. 185·5°, 102–5°/30 mm., 81·5°/13 mm.

Me ether: p-fluoroanisole. M.p. – 45°. B.p. 157°, 57·2°/19 mm., 50·7°/13 mm.

Et ether: p-fluorophenetole. M.p. – 8·5°. B.p. 172·8°, 71°/18 mm. $D^{18·2}$ 1·07148. $n_D^{18·2}$ 1·48257.

Rinkes, *Chem. Abstracts*, 1916, **10**, 194.
Swarts, *Chem. Abstracts*, 1914, **8**, 688.

p-Fluorophenylacetic Acid

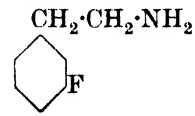


$C_8H_7O_2F$ MW, 154

Leaflets from H_2O. M.p. 86°.

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.

2-m-Fluorophenylethylamine (*3-Fluoro-β-amino-ethylbenzene*)



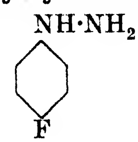
$C_8H_{10}NF$ MW, 139

B.p. 87°/15 mm.

Picrate: m.p. 157° decomp.

Schiemann, *Ber.*, 1932, **65**, 1438.

p-Fluorophenylhydrazine



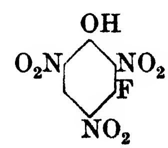
$C_6H_7N_2F$ MW, 126

M.p. 39°. B.p. 129·2°/21 mm.

Schiemann, Winkelmüller, *Ber.*, 1933, **66**, 729.

1-p-Fluorophenylpropane.
See p-Fluoropropylbenzene.

Fluoropicric Acid (*3-Fluoro-2:4:6-trinitrophenol*)



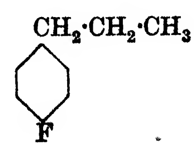
$C_6H_2O_7N_3F$ MW, 247

Plates from H_2O. M.p. 173°. Non-volatile in steam.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1882.

Fluoropropane.
See Propyl fluoride.

p-Fluoropropylbenzene (*1-p-Fluorophenylpropane*)

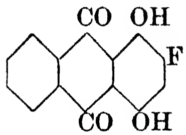


$C_9H_{11}F$ MW, 138

B.p. 164–5°.

Schiemann, Pillarsky, *Ber.*, 1931, **64**, 1344.

2-Fluoroquinizarin (*2-Fluoro-1 : 4-dihydroxyanthraquinone*)

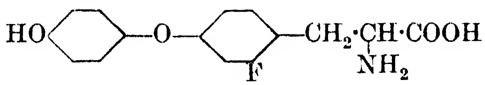


$C_{14}H_7O_4F$ MW, 258

Red prisms. Bluish-red sol. in KOH.Aq.
Diacetyl: yellow needles from AcOH. M.p. 189°.

Dimroth, Hilcken, *Ber.*, 1921, **54**, 3056.

2-Fluorothyronine (*α-Amino-β-p-hydroxyphenoxyphenylpropionic acid*)

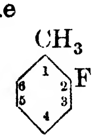


$C_{15}H_{14}O_4NF$ MW, 291

Decomp. at 264·5°.

Schiemann, *Ber.*, 1932, **65**, 1437.

***o*-Fluorotoluene**



C_7H_7F MW, 110

B.p. 114°, 30°/26 mm., 19°/17 mm. $D^{13\cdot2}$ 1·0041. Heat of comb. C_v 901·61 Cal.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, **6**, 1905.
Slothouwer, *Rec. trav. chim.*, 1914, **33**, 325.
Schiemann, *Ber.*, 1929, **62**, 1798.

***m*-Fluorotoluene.**
B.p. 116°. $D^{13\cdot4}$ 0·9972.

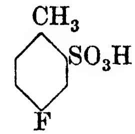
See previous references.

***p*-Fluorotoluene.**
B.p. 115·5°/756 mm. D_4^{16} 1·0007. Heat of comb. C_v 901·86 Cal.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, **6**, 1905.
Allen, Sugden, *J. Chem. Soc.*, 1932, 762.
Schiemann, *Ber.*, 1927, **60**, 1188.

ω-Fluorotoluene.
See Benzyl fluoride. Addendum Vol. I, p. 693.

***p*-Fluorotoluene-*o*-sulphonic Acid**

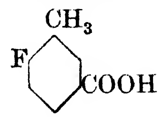


$C_7H_7O_3FS$ MW, 190

Chloride: $C_7H_6O_2FClS$. MW, 208·5. B.p. 145–50°/20 mm.
Amide: $C_7H_8O_2NFS$. MW, 189. Prisms from EtOH. M.p. 155° (140°). Sol. EtOH.

de Roode, *Am. Chem. J.*, 1891, **13**, 219.
Holleman, *Rec. trav. chim.*, 1906, **25**, 332.

6-Fluoro-*m*-toluic Acid

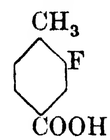


$C_8H_7O_2F$ MW, 154

M.p. 165°.

Schiemann, Roselius, *Ber.*, 1932, **65**, 745.

2-Fluoro-*p*-toluic Acid

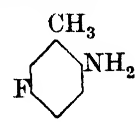


$C_8H_7O_2F$ MW, 154

Cryst. from EtOH.Aq. M.p. 160 1°.

Paternó, Oliveri, *Gazz. chim. ital.*, 1882, **12**, 93.

5-Fluoro-*o*-toluidine

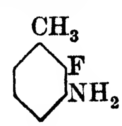


C_7H_8NF MW, 125

B.p. 94°/17 mm.
N-*Benzoyl*: m.p. 166°.
N-p-*Nitrobenzoyl*: m.p. 168°.
Picrate: m.p. 199°.

Schiemann, *Ber.*, 1929, **62**, 1803.

2-Fluoro-*m*-toluidine



C_7H_8NF MW, 125

B.p. 85–7°/12 mm.

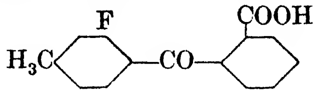
B,HCl: m.p. 197°.

N-*Acetyl*: 2-fluoro-*m*-acet-toluidide. B.p. 167–70°/14 mm.

Picrate: m.p. 205°.

Braun, Rudolph, *Ber.*, 1931, **64**, 2471.

2′-Fluoro-o-toluylbenzoic Acid (*2′-Fluoro-4′-methylbenzophenone-2-carboxylic acid*, o-[*2-fluoro-4-methyl-benzoyl*]-*benzoic acid*)

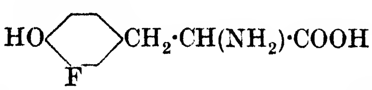


$C_{15}H_{11}O_3F$ MW, 258

Cryst. from C_6H_6 or AcOH. M.p. 129°. H_2SO_4 ⟶ 4-fluoro-2-methylanthraquinone.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2359.

3-Fluorotyrosine



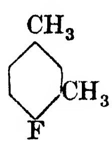
$C_9H_{10}O_3NF$ MW, 199

Decomp. at 277°.

Schiemann, *Ber.*, 1932, **65**, 1435.

Fluorotrinitrophenol.
See Fluoropicric Acid.

4-Fluoro-m-xylene



C_8H_9F MW, 124

B.p. 143–4°/749 mm.

Klages, Liecke, *J. prakt. Chem.*, 1900, **61**, 328.
Balz, Schiemann, *Ber.*, 1927, **60**, 1188.

Formaldehyde (*Methanal*)

H·CHO

CH_2O MW, 30

M.p. − 92°. B.p. − 21°. D^{-20} 0·815. Stable at temps. below − 30°. Misc. with non-hydroxylic solvents except pet. ether. Heat of polymerisation 15 Cal. The 40% aq. sol. is the "formalin" of commerce. NaOBr ⟶ H·COONa. NH_3 ⟶ hexamethylenetetramine. H_2SO_4 ⟶ polyoxymethylenes. HCN ⟶ glycollic nitrile. Phenols ⟶ "phenol-formaldehyde" resins. Reduces $AgNO_3$ and H_2O_2. **Ox.** ⟶ formic acid. Red. ⟶ methyl alcohol. $R·NH_2$ ⟶ $R·N:CH_2$ or $R·NH·CH_2OH$. Caustic alkalis ⟶ CH_3OH + H·COONa. excess alkali or CaO, etc. ⟶ α-acrose. C_2H_5OH (+ HCl) ⟶ $C_2H_5·O·CH_2Cl$. $R·CO·NH_2$ ⟶ $R·CO·NH·CH_2OH$ or $CH_2(NH·CO·R)_2$.

Anhydrous polymer: m.p. 170–2°. Sol. 0·017 gm./100 c.c. H_2O at 20°.

Paraformaldehyde: m.p. 121–3°. Sol. 0·24 gm./100 c.c. H_2O at 20°.

Oxime: formaldoxime. CH_3ON. MW, 45. B.p. 84°. Sol. H_2O. Gradually turns to amorph. trimeride insol. H_2O. *Hydrochloride*: $(CH_3ON)_3,HCl$. Prisms. M.p. 136°.

Semicarbazone: m.p. 169° decomp. (255–6° decomp.).

Phenylhydrazone: m.p. 145°.

p-*Nitrophenylhydrazone*: yellow needles from C_6H_6. M.p. 181–2°.

2 : 4-*Dinitrophenylhydrazone*: prisms from ligroin. M.p. 167° (155°).

Ammonia comp.: *see* Hexamethylenetetramine.

Cyanhydrin: *see under* Glycollic Acid.

Dimethyl acetal: dimethylformal. *See* Methylal.

Diethyl acetal: diethylformal, diethoxymethane, ethylal, methylene diethyl ether. $C_5H_{12}O_2$. MW, 104. B.p. 89°. D^0 0·851. Sol. 11 vols. H_2O at 18°.

Trimeride: metaformaldehyde. *See* Trioxymethylene.

Walker, *J. Am. Chem. Soc.*, 1933, **55**, 2821; *Ind. Eng. Chem.*, 1931, **23**, 1220 (*Bibl., Review*).
Schwyzer, *Chem. Abstracts*, 1930, **24**, 1181.
Coulouma, *Chem. Abstracts*, 1928, **22**, 4105 (*Bibl., Review*).
Trotman, *Chem. Trade J.*, 1928, **82**, 242 (*Review*).
Raschig, Prahl, *Ber.*, 1928, **61**, 179.

Bisulphite comp.: $OH·CH_2·O·SO_2Na$. Cryst. + $1H_2O$ from H_2O. Sol. MeOH. Spar. sol. EtOH. Red. of 2 mols. with 1Zn + AcOH ⟶ sodium formaldehyde-hydrosulphite, "Hyraldite," $(CH_2O)_2Na_2S_2O_4$. Needles from H_2O. Red. of 1 mol. with 1Zn + AcOH ⟶ sodium formaldehyde-sulphoxylate, "Rongalite," "Formosul," $HO·CH_2·SO_2Na$. Needles from H_2O. The hydrosulphites and sulphoxylates are used in calico-printing for printing vat dyes and for discharging. Zinc formaldehyde-sulphoxylate

(Decroline, zinc Formosul) is also employed in the textile industry as a reducing agent.

Schwartz, Baumann, Sünder, Thesmar, *Bulletin de la société industrielle de Mulhouse*, 1903, **73**, 183.
Bach-Nikolajowa, *Chem. Zentr.*, 1927, II, 1014.
Badische, D.R.Ps., 180,529, 168,729.
Schneider, D.R.P., 403,193.
Binz, Räth, Walter, *Ber.*, 1924, **57**, 1398.
Baumann, Thesmar, Frossard, *Bulletin de la société industrielle de Mulhouse*, 1904, **74**, 348.
Dubosc, *Rev. prod. chim.*, 1921, **24**, 11.

Formaldehyde-sulphoxylate.
See under Formaldehyde.

Formaldoxime.
See under Formaldehyde.

Formamide

H·CO·NH_2

CH_3ON MW, 45

M.p. 2·5°. B.p. 111°/20 mm., 103°/9 mm. D_4^{20} 1·1334. n_D^{20} 1·4472. Heat of comb. C_p 134·9 Cal. Hygroscopic. Misc. with EtOH. Sol. 1·4 gm./100 c.c. abs. Et_2O at ord. temps. Insol. C_6H_6, $CHCl_3$, hexane.

N-*Allyl*: formylallylamine. C_4H_7ON. MW, 85. B.p. 109°/15 mm. D^0 1·0078.

I.G. (Wietzel), D.R.P., 550,749, (*Chem. Abstracts*, 1932, **26**, 4829).
Smith, *J. Chem. Soc.*, 1931, 3257.
Deschamps, *Chimie et Industrie*, Special No., 1931, 589 (*Review*); *Chem. Abstracts*, 1931, **25**, 3620.

Formanilide (*Formylaniline*)

H·CO·NH·C_6H_5

C_7H_7ON MW, 121

Cryst. from ligroin–xylene. M.p. 50°. B.p. 216°/120 mm., 166°/14 mm. D_{50}^{50} 1·1322. Mod. sol. H_2O. Sol. EtOH, C_6H_6. Heat of comb. C_p 861·4 Cal.

Fröschl, Bomberg, *Monatsh.*, 1927, **48**, 573.
Schmidt, E.P., 252,460, (*Chem. Abstracts*, 1927, **21**, 2273).

Formhydroxamic Acid (*Formhydroximic acid*)

H·CO·NH·OH
or
HC(=N·OH)OH

CH_3O_2N MW, 61

Glistening waxy leaflets. M.p. 82°. Sol. EtOH, H_2O. Spar. sol. Et_2O. Insol. $CHCl_3$, ligroin, C_6H_6. $k = 1 \times 10^{-7}$ at 25°. Decomp. above m.p. to CO + NH_2OH. Forms metallic salts.

Me ester: $C_2H_5O_2N$. MW, 75. Prisms. M.p. 38–9° (99–100°). B.p. 117°/33 mm.

Et ester: $C_3H_7O_2N$. MW, 89. Needles from CCl_4. M.p. 80°. B.p. 76–7°/15 mm.

Rimini, *Chem. Zentr.*, 1901, II, 100.
Jones, Oesper, *Am. Chem. J.*, 1909, **42**, 518.
Houben, *J. prakt. Chem.*, 1922, **105**, 7.
Baudisch, *Chem. Abstracts*, 1925, **19**, 3221.

Formic Acid

H·COOH

CH_2O_2 MW, 46

M.p. 8·4°. B.p. 100·5°, 50°/120 mm. D_4^{20} 1·220. n_D^{20} 1·3714. $k = 2{\cdot}4 \times 10^{-4}$ at 25°. Heat of comb. (vapour) C_p 69·4 Cal.; (liq.) C_p 61·7 Cal. Vapour burns with blue flame. Liq. is misc. in all proportions with H_2O, EtOH, Et_2O. Mod. sol. C_6H_6. Good solvent for many inorg. and org. comps. Reducing agent.

Me ester: *see* Methyl formate.

Et ester: *see* Ethyl formate.

Propyl ester: $C_4H_8O_2$. MW, 88. B.p. 81°. D_4^{20} 0·9058.

Allyl ester: $C_4H_6O_2$. MW, 86. B.p. 83°. D^{17} 0·932.

n-*Amyl ester*: $C_6H_{12}O_2$. MW, 116. B.p. 130°. D^0 0·9018.

Isoamyl ester: *see* Isoamyl formate.

Glycerol esters: *see* Monoformin, Diformin, *and* Triformin.

Benzyl ester: $C_8H_8O_2$. MW, 136. B.p. 202–3°/747 mm., 84–5°/10 mm. D^{23} 1·081.

Amide: *see* Formamide.

Nitrile: *see* Hydrocyanic acid.

Anilide: *see* Formanilide.

Toluidide: *see* Formo-toluidide.

Pryanishnikov, Shakhova, *Chem. Abstracts*, 1933, **27**, 2672.
Sucharda, Mazonski, *ibid.*, 5954.
I.G., F.P. 718,672, (*Chem. Abstracts*, 1932, **26**, 3261).
Cie de Bethune, F.P. 673,337, (*Chem. Abstracts*, 1930, **24**, 2474).

Formin.
See Hexamethylenetetramine.

Formocholine (*Hydroxytrimethylaminomethanol, trimethylhydroxymethylammonium hydroxide, hydroxytetramethylammonium hydroxide*)

$(CH_3)_3N(OH)·CH_2OH$

$C_4H_{13}O_2N$ MW, 107

Hygroscopic cryst. mass. Absorbs CO_2 from the air.

Iodide: *acetyl deriv.*, acetoxytetramethylammonium iodide, $(CH_3)_3NI{\cdot}CH_2O{\cdot}CO{\cdot}CH_3$. Needles from EtOH. M.p. 152°.

Platinichloride: $[(CH_3)_3N{\cdot}CH_2OH]_2,PtCl_6$. M.p. 230° decomp.

Me ether: *platinichloride*: $[(CH_3)_3N{\cdot}CH_2OCH_3]_2,PtCl_6$. Prisms. M.p. 234° decomp. *Aurichloride*: $[(CH_3)_3N{\cdot}CH_2OCH_3],AuCl_4$. M.p. 235–6° (135–6°). *Iodide*: $C_5H_{14}ONI$. MW, 231. M.p. 84°. *Picrate*: m.p. 198°.

Et ether: *platinichloride*: m.p. 241–2°. *Aurichloride*: m.p. 138–9°. *Iodide*: $C_6H_{16}ONI$. MW, 245. M.p. 94°.

Propyl ether: *platinichloride*: m.p. 236–7°. *Aurichloride*: m.p. 114°. *Iodide*: $C_7H_{18}ONI$. MW, 259. M.p. 108°.

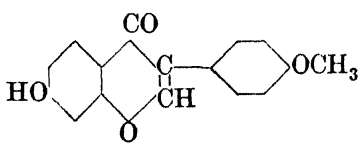
Butyl ether: *platinichloride*: m.p. 243–4°. *Aurichloride*: m.p. 81°. *Iodide*: $C_8H_{20}ONI$. MW, 273. M.p. 98°.

Schmidt, Litterscheid, *Ann.*, 1904, **337**, 74.
Ewins, *Biochem. J.*, 1914, **8**, 371.
Renshaw, Ware, *J. Am. Chem. Soc.*, 1925, **47**, 2990.

Formodiphenylamide.
See Formyldiphenylamine.

Formonitrile.
See Hydrocyanic Acid.

Formo-ononetin (*7-Hydroxy-4'-methoxyisoflavone*)



$C_{16}H_{12}O_4$ MW, 268

The aglucone from ononin. Cryst. M.p. 257°.

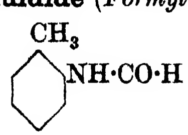
Me ether: dimethyldaidzein. *See under* Daidzein. A more recent m.p. gives 162–4°.

Wessely, Kornfeld, Lechner, *Ber.*, 1933, **66**, 685.

Formophenetidide.
See under Phenetidine.

Formosul.
See under Formaldehyde.

Formo-o-toluidide (*Formyl-*o*-toluidine*)



C_8H_9ON MW, 135

Leaflets from EtOH. M.p. 62° (57°). B.p. 288°. Very sol. EtOH.

Hirst, Cohen, *J. Chem. Soc.*, 1895, **67**, 830.

Formo-m-toluidide (*Formyl-*m*-toluidine*). B.p. 278°/724 mm. (part. decomp.).

Niementowski, *Ber.*, 1887, **20**, 1892.

Formo-p-toluidide (*Formyl-*p*-toluidine*). Needles. M.p. 53° (45°). Very sol. EtOH. Sol. H_2O.

Hirst, Cohen, *J. Chem. Soc.*, 1895, **67**, 830.
Hübner, Rudolph, *Ann.*, 1881, **209**, 372.

Formylacetic Acid (*Malonaldehydic acid, aldehydoacetic acid, 2-hydroxyacrylic acid, malonic semi-aldehyde*)

$$OHC{\cdot}CH_2{\cdot}COOH$$
or
$$HO{\cdot}CH{:}CH{\cdot}COOH$$

$C_3H_4O_3$ MW, 88

Neither the free acid nor its methyl or ethyl esters have been isolated.

Nitrile: *see* Cyanoacetaldehyde.

Oxime: *see* Isonitrosopropionic Acid.

Semicarbazone: m.p. 116° decomp.

Me ester diethyl acetal: methyl 2 : 2-diethoxypropionate. $C_8H_{16}O_4$. MW, 176. B.p. 193°.

Et ester: *oxime*, m.p. 57–9°. *Semicarbazone*: m.p. 147–8°.

Et ester diethyl acetal: ethyl 2 : 2-diethoxypropionate. $C_9H_{18}O_4$. MW, 190. B.p. 93°/22 mm.

Rinkes, *Rec. trav. chim.*, 1927, **46**, 273.
Straus, Voss, *Ber.*, 1926, **59**, 1681.
Claisen, *Ber.*, 1903, **36**, 3666.
Wohl, Emmerich, *Ber.*, 1900, **33**, 2763.

Formylacetone.
See Acetoacetaldehyde.

Formylacetonitrile.
See Cyanoacetaldehyde.

ω-Formylacetophenone (*ω-Aldehydoacetophenone, benzoylacetaldehyde, benzoylvinyl alcohol, hydroxymethyleneacetophenone, hydroxyvinyl phenyl ketone, phenacyl aldehyde, phenacyl formaldehyde*

$$C_6H_5{\cdot}CO{\cdot}CH_2{\cdot}CHO$$
or
$$C_6H_5{\cdot}CO{\cdot}CH{:}CH{\cdot}OH$$

$C_9H_8O_2$ MW, 148

Yellow unstable oil. Resinifies readily. $FeCl_3$ on EtOH sol. ⟶ intense red col. Forms stable Na and Cu derivs. Heat in AcOH ⟶ 1 : 3 : 5-tribenzoylbenzene.

Oxime: benzoylacetaldoxime. Prisms from C_6H_6. M.p. 86–7°.

Stähler, *Ber.*, 1914, **47**, 590.
Mumm, Münchmeyer, *Ber.*, 1910, **43**, 3338.
Bülow, Sicherer, *Ber.*, 1901, **34**, 3891.

Formylacrylic Acid (*Maleic semi-aldehyde*)

HC·COOH
‖
HC·CHO

$C_4H_4O_3$ MW, 100

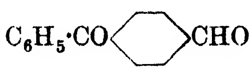
Needles from Et_2O–C_6H_6. M.p. 55°. B.p. 145°/10 mm. slight decomp. Very sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$, C_6H_6. Insol. ligroin.
Et ester: 2 : 4-*dinitrophenylhydrazone*, m.p. 290–2°.
Oxime: cryst. from Et_2O. M.p. 130–40° decomp.
Phenylhydrazone: citron yellow needles. M.p. 158–9°.

Fecht, *Ber.*, 1905, **38**, 1272.

Formylallylamine.
See under Formamide.

Formylaniline.
See Formanilide.

p-Formylbenzophenone (4-*Aldehydobenzophenone*, *benzophenone-4-aldehyde*, 4-*benzoylbenzaldehyde*)



$C_{14}H_{10}O_2$ MW, 210

Pearly plates from H_2O. M.p. 64°. Very sol. H_2O, EtOH, Et_2O, $CHCl_3$. Insol. C_6H_6, pet. ether. Forms bisulphite comp.

Bourcet, *Bull. soc. chim.*, 1896, **15**, 950.

Formylbenzyl cyanide.
See under Phenylformylacetic Acid.

β-Formylbutyrophenone (β-*Aldehydobutyrophenone*, α-*benzoylbutyraldehyde*, β-*hydroxymethylenebutyrophenone*)

$C_6H_5·CO·CH(CHO)·C_2H_5$
or
$C_6H_5·CO·C·C_2H_5$
‖
CH·OH

$C_{11}H_{12}O_2$ MW, 176

Leaflets from dil. EtOH. M.p. 87–9°. B.p. 260–2° decomp.

Bishop, Claisen, Sinclair, *Ann.*, 1894, **281**, 397.

7-Formylcaprylic Acid (7-*Aldehydo-octoic acid*, *azelaic semi-aldehyde*)

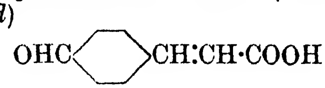
$OHC·[CH_2]_7·COOH$

$C_9H_{16}O_3$ MW, 172

M.p. 57–63° (70°). B.p. 181–2°/15 mm. Sol. ord. org. solvents. Insol. H_2O.
Trimeride: cryst. from Me_2CO. M.p. 112–13°.
Me ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 111–12°/3 mm. (140–5°/15 mm.). D_4^{20} 0·9704. n_D^{20} 1·4384. *Semicarbazone*: m.p. 104–5° (162–3°). *Trimeride*: cryst. from pet. ether. M.p. 34–6°.
Di-Me acetal: $C_{12}H_{24}O_4$. MW, 232. B.p. 148–50°/14 mm. D_4^{19} 0·9379. n_D^{19} 1·4312.
Et ester di-Et acetal: $C_{15}H_{30}O_4$. MW, 274. B.p. 158–60°/14 mm.
Semicarbazone: m.p. 163°.

Fischer, Düll, Ertal, *Ber.*, 1932, **65**, 1471.
Noller, Adams, *J. Am. Chem. Soc.*, 1926, **48**, 1074.
Helferich, Schäfer, *Ber.*, 1924, **57**, 1911.
Haller, Brochet, *Compt. rend.*, 1910, **150**, 496.

p-Formylcinnamic Acid (4-*Aldehydocinnamic acid*)



$C_{10}H_8O_3$ MW, 176.

Prisms or needles. M.p. 247°. Sublimes Sol. hot AcOH. Spar. sol. Et_2O, $CHCl_3$, hot H_2O.
Me ester: $C_{11}H_{10}O_3$. MW, 190. Cryst. from Et_2O. M.p. 82–3°.

Löw, *Ann.*, 1885, **231**, 375.
Ephraim, *Ber.*, 1901, **34**, 2784.

Formyldiethylamine.
See N-Diethylformamide.

Formyldimethylamine.
See Dimethylformamide.

Formyldiphenylamine (*Formodiphenylamide*, N-*diphenylformamide*)

$H·CO·N(C_6H_5)_2$

$C_{13}H_{11}ON$ MW, 197

Cryst. from EtOH.Aq. M.p. 73–4°. B.p. 190°/13 mm. Sol. EtOH, C_6H_6. Insol. H_2O.

Tobias, *Ber.*, 1882, **15**, 2866.

3-Formylglutaconic Acid (3-*Hydroxymethyleneglutaconic acid*)

HOOC·CH(CHO)·CH:CH·COOH
or
HOOC·C(:CHOH)·CH:CH·COOH

$C_6H_6O_5$ MW, 158

The free acid has not been characterized.
Di-Me ester: $C_8H_{10}O_5$. MW, 186. Needles. M.p. 88–9°. Sol. Et_2O. Spar. sol. $CHCl_3$, C_6H_6. Insol. ligroin.

Di-Et ester: $C_{10}H_{14}O_5$. MW, 214. Leaflets from Et_2O or C_6H_6. M.p. 66–7°. Sol. ord. org. solvents. $FeCl_3$ ⟶ bluish-violet col. On standing in moist air or heating above m.p. changes to oily dimeride which with $FeCl_3$ ⟶ red col. Heat at 120° ⟶ trimesic ester + ethyl acetate + formic acid.

Wislicenus, Wrangell, *Ann.*, 1911, **381**, 367, 376.

Formylglycine (*Formylaminoacetic acid*)

OHC·NH·CH_2·COOH

$C_3H_5O_3N$ MW, 103

Leaflets from H_2O or EtOH. M.p. 153–4° decomp. Very sol. hot H_2O, EtOH. Spar. sol. Me_2CO, AcOEt. Very spar. sol. Et_2O, C_6H_6.

Chloride: $C_3H_4O_2NCl$. MW, 121·5. Cryst. from acetyl chloride. Decomp. at 100°. Sol. hot $CHCl_3$, C_6H_6. Spar. sol. Et_2O.

Fischer, Warburg, *Ber.*, 1905, **38**, 3999.
Max, *Ann.*, 1909, **369**, 285.

Formylglycollic Acid.

See Hydroxypyruvic Acid.

Formyl-isoleucine (*Note.* The *d*- and *l*- refer to configuration, not to sign of rotation)

H_3C NH·CHO
CH_3·CH_2·CH·CH·COOH

$C_7H_{13}O_3N$ MW, 159

d-.

Cryst. from EtOH. M.p. 156–7° (sinters at 154°). $[\alpha]^{20}_D$ − 26·8° in EtOH.

l-.

Cryst. from EtOH. M.p. 156–7° (sinters at 154°). $[\alpha]^{20}_D$ + 26·6° in EtOH.

dl-.

Cryst. from H_2O. M.p. 121–2°.

Et ester: $C_9H_{17}O_3N$. MW, 187. B.p. 163°/17 mm. D^0_4 1·056.

Abderhalden, Zeisset, *Z. physiol. Chem.*, 1931, **195**, 121.
Locquin, *Bull. soc. chim.*, 1907, **4**, 598.

Formyl-leucine

NH·CHO
$(CH_3)_2$CH·CH_2·CH·COOH

$C_7H_{13}O_3N$ MW, 159

dl-.

Prisms from H_2O. M.p. 115–16°. Very sol. EtOH, hot H_2O. Spar. sol. Et_2O, $CHCl_3$, C_6H_6. Insol. pet. ether.

Fischer, Warburg, *Ber.*, 1905, **38**, 3998.
Fischer, *Ber.*, 1906, **39**, 2928.

Formylmalonic Acid (*Hydroxymethylenemalonic acid*)

OHC·CH<(COOH)(COOH)

or

HO·CH:C<(COOH)(COOH)

$C_4H_4O_5$ MW, 132

The free acid has not been isolated.

Di-Et ester: $C_8H_{12}O_5$. MW, 188. B.p. 217–19°, 107–9°/12 mm. D^{14}_4 1·127. n^{14}_D 1·456. $FeCl_3$ on EtOH sol. ⟶ orange-red col. Hyd. by alkalis ⟶ formic + malonic acids. *Ba deriv.*: $(C_8H_{11}O_5)_2Ba$. M.p. 119° (138° anhyd.).

Auwers, *Ann.*, 1918, **415**, 222.

Formylnaphthoic Acid.

See Naphthaldehydic Acid.

Formylphenylglycine (*Phenylformylaminoacetic acid*)

CHO
C_6H_5·N·CH_2·COOH

$C_9H_9O_3N$ MW, 179

Needles from H_2O. M.p. 125°. Sol. EtOH, Et_2O. Mod. sol. cold H_2O.

Et ester: $C_{11}H_{13}O_3N$. MW, 207. B.p. 290–5°.

Vorländer, Mumme, *Ber.*, 1901, **34**, 1648.

β-Formylphenylhydrazine

C_6H_5·NH·NH·CHO

$C_7H_8ON_2$ MW, 136

Leaflets from EtOH. M.p. 146°. Very sol. dil. aq. alkalis. Sol. EtOH, hot H_2O. Spar. sol. C_6H_6, $CHCl_3$, cold H_2O.

Claisen, *Ann.*, 1895, **287**, 369.
Willstätter, Stoll, *Ber.*, 1909, **42**, 4874.

β-Formylpropiophenone (1-*Benzoylpropionaldehyde*, 1-*formylethyl phenyl ketone*, β-*hydroxymethylenepropiophenone*)

CHO
C_6H_5·CO·CH·CH_3

or

CH·OH
C_6H_5·CO·C·CH_3

$C_{10}H_{10}O_2$ MW, 162

Needles from dil. EtOH. M.p. 118–19°. B.p. 155°/25 mm. Sol. MeOH, EtOH, C_6H_6, hot H_2O. Spar. sol. Et_2O, CS_2. Very spar. sol. ligroin. $FeCl_3$ on EtOH sol. ⟶ deep violet col.

Reynolds, *Am. Chem. J.*, 1910, **44**, 313.

Formylprotocatechuic Acid.

See Isonoropianic Acid.

Formylsuccinic Acid (*Hydroxymethylene-succinic acid*)

OHC·CH·COOH
CH$_2$·COOH
or
HO·CH:C·COOH
CH$_2$·COOH

$C_5H_6O_5$ MW, 146

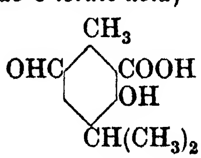
The free acid has not been isolated.

Di-Me ester: $C_7H_{10}O_5$. MW, 174. B.p. 112–15°. *Cu salt*: $(C_7H_9O_5)_2Cu,1H_2O$. Needles from MeOH. M.p. 133–5°.

Di-Et ester: $C_9H_{14}O_5$. MW, 202. *Aldo-form*: b.p. 134–40°/19 mm. *Enol-form*: b.p. 145–51°/19 mm. *Equilibrium-mixture*: b.p. 128–48°/15 mm. $FeCl_3$ on EtOH sol. ⟶ cherry-red col. Hyd. by acids or alkalis ⟶ C_2H_5OH + formic + succinic acids. *Semicarbazone*: m.p. 126°. p-*Nitrophenylhydrazone*: m.p. 100°. *Cu salt*: $(C_9H_{13}O_5)_2Cu$. Needles from EtOH. M.p. 132–3° (EtOH-free). *Ni salt*: $(C_9H_{13}O_5)_2Ni$. Needles from EtOH. M.p. 219–20°.

Carrière, *Ann. chim.*, 1922, **17**, 41.
Johnson, Peck, Ambler, *J. Am. Chem. Soc.*, 1911, **33**, 761.

Formylthymotinic Acid (3-*Hydroxy*-4-*iso-propyl*-6-*aldehydo*-o-*toluic acid*)



$C_{12}H_{14}O_4$ MW, 222

Cryst. from dil. EtOH. M.p. 180–5°.

Heyl, Meyer, *Ber.*, 1895, **28**, 2796.

Formylveratric Acid.
See Opianic Acid *and* Iso-opianic Acid.

Fortoin (*Methylene-dicotoin.* See Cotoin)

$CH_2(C_{14}H_{11}O_4)_2$

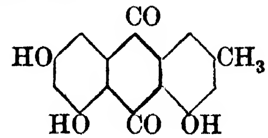
$C_{29}H_{24}O_8$ MW, 500

Yellow cryst. with cinnamon-like odour. M.p. 211–13° decomp. (128°). Sol. alkalis, AcOH, Me_2CO, $CHCl_3$. Spar. sol. EtOH, Et_2O, C_6H_6. Insol. H_2O.

Jodlbauer, Kurz, *Biochem. Z.*, 1916, **74**, 351.
Boehm, *Ann.*, 1904, **329**, 276.
Overlach, *Chem. Zentr.*, 1900, I, 872.
Zimmer, D.R.P., 104,362, (*Chem. Zentr.*, 1899, II, 951).

Fragarol.
See under 2-Naphthol.

Frangula-emodin (4 : 5 : 7-*Trihydroxy*-2-*methylanthraquinone*)



$C_{15}H_{10}O_5$ MW, 270

Aglucone obtained by hydrolysis of frangulin. Orange needles from Py.Aq. M.p. 256–7°.

Triacetyl: m.p. 193–4°.

Jacobson, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1312.

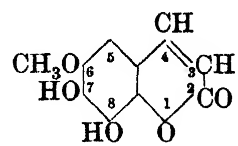
Frangulin (*Franguloside*)

$C_{21}H_{20}O_9$ MW, 416

Glucoside of alder buckthorn bark. Orange needles + $1H_2O$ from Py.Aq. M.p. 246–9° (turns red at 197°). $[\alpha]_D$ − 134° in 80% AcOH. Acid hyd. ⟶ rhamnose + frangula-emodin.

Bridel, Charaux, *Bull. soc. chim. biol.*, 1933, **15**, 642.

Fraxetin (7 : 8-*Dihydroxy*-6-*methoxy-coumarin*)



$C_{10}H_8O_5$ MW, 208

Aglucone obtained by hydrolysis of fraxin. Plates from EtOH.Aq. M.p. 227–8° (turns yellow at 150°). Sol. EtOH, HCl.Aq. Spar. sol. Et_2O, boiling H_2O. $FeCl_3$ ⟶ greenish-blue col.

Me ether: 8-hydroxy-6 : 7-dimethoxy-coumarin. $C_{11}H_{10}O_5$. MW, 222. M.p. 195°.

Et ether: 8-hydroxy-6-methoxy-7-ethoxy-coumarin. $C_{12}H_{12}O_5$. MW, 236. M.p. 153–4°.

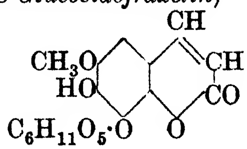
Di-Me ether: 6 : 7 : 8-trimethoxycoumarin. $C_{12}H_{12}O_5$. MW, 236. M.p. 103–4°. B.p. 90–100°/0·2 mm.

Me-Et ether: 6 : 7-dimethoxy-8-ethoxycoumarin. $C_{13}H_{14}O_5$. MW, 250. M.p. 108·5°.

Di-Et ether: 6-methoxy-7 : 8-diethoxycoumarin. $C_{14}H_{16}O_5$. MW, 264. M.p. 81–2°.

Wessely, Lechner, *Monatsh.*, 1932, **60**, 159.
Wessely, Demmer, *Ber.*, 1929, **62**, 120; 1928, **61**, 1279.

Fraxin (8-*Glucosidofraxetin*)



$C_{16}H_{18}O_{10}$ MW, 370

Glucoside of ash, *Fraxinus Excelsior*, Linn., and other plants. Yellowish needles from EtOH. M.p. 205°. Dil. alk. sols. fluor. bluish-green.

See previous references.

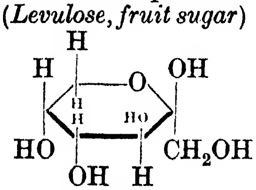
Freund's Acid.

See 1-Naphthylamine-3 : 6-disulphonic Acid.

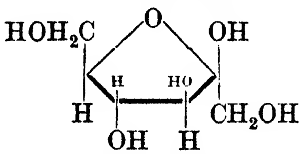
Fritzsche's Reagent.

See 2 : 7-Dinitroanthraquinone.

Fructose (*Levulose, fruit sugar*)



Fructopyranose



$C_6H_{12}O_6$ Fructofuranose MW, 180

The furanose modification is known only in the form of its derivatives.

Pyranose form :

d-.

Occurs in a large variety of fruits, etc. Prisms from EtOH. M.p. 102–4° decomp. Very sol. H_2O. Sol. 12 parts EtOH at 18°. Sol. Me_2CO. Mod. sol. Py. $[\alpha]_D^{20}$ − 133° initial, − 92° final, in 10% aq. sol. Heat of comb. C_p 671·6 Cal. NaHg ⟶ *d*-mannitol + *d*-sorbitol. Oxidises rapidly in alk. sol. Reduces alk. Cu salts more rapidly than any other naturally occurring sugar.

α-*Methylglucoside* : $C_7H_{14}O_6$. MW, 194. M.p. 102°. $[\alpha]_D^{20}$ + 92·76° in EtOH. *Tetra-acetyl* : m.p. 112°. $[\alpha]_D^{20}$ + 45·0° in $CHCl_3$.

β-*Methylglucoside*: m.p. 119–20°. $[\alpha]_D^{20}$ −172·1° in H_2O. *Tetra-acetyl* : m.p. 75–6°. $[\alpha]_D$ − 124·4° in $CHCl_3$. *Tetrabenzoyl* : m.p. 113°. $[\alpha]_D^{20}$ − 171·8° in $CHCl_3$. *Tetra-Me ether* : $C_{11}H_{22}O_6$. MW, 250. M.p. 33–4°. B.p. 105–6°/0·06 mm. $[\alpha]_D^{17}$ − 149·1° in H_2O.

1 : 3 : 4 : 5-*Tetra-Me ether* : $C_{10}H_{20}O_6$. MW, 236. M.p. 98–9°. B.p. 139–41°/12 mm. $[\alpha]_D^{20}$ − 121·3° in H_2O.

1 : 3 : 4 : 5-*Tetra-acetyl* : m.p. 127–9°. $[\alpha]_D$ − 109° in $CHCl_3$.

Penta-acetyl: α-*form*, m.p. 70°. $[\alpha]_D^{20}$ +34·75° in $CHCl_3$. β-*Form* : m.p. 108–9°. $[\alpha]_D^{20}$ −120·5° in $CHCl_3$.

1 : 2–4 : 5-α-*Di-acetone deriv.* : m.p. 119–20°. $[\alpha]_D^{20}$ − 162·8° in H_2O.

2 : 3–4 : 5-β-*Di-acetone deriv.*: m.p. 97°. B.p. 110–15°/0·17–0·5 mm. $[\alpha]_D^{22}$ − 32·9° in H_2O.

p-*Nitrophenylhydrazone* : m.p. 176°. $[\alpha]_D$ + 16° in Py–EtOH.

Phenylosazone : *d*-glucosazone, *d*-mannosazone. M.p. 210°.

2 : 4-*Dichlorophenylosazone* : m.p. 120°.

Haworth, Hirst, Learner, *J. Chem. Soc.*, 1927, 1040.

Hudson, Brauns, *J. Am. Chem. Soc.*, 1916, **38**, 1216; 1915, **37**, 2736.

Schlubach, Schroter, *Ber.*, 1930, **63**, 367.

Brigl, Schinle, *Ber.*, 1933, **66**, 327.

Butler, Cretcher, *J. Am. Chem. Soc.*, 1929, **51**, 3161.

Fischer, Taube, *Ber.*, 1927, **60**, 485.

I.G., D.R.P., 574,803, (*Chem. Abstracts*, 1933, **27**, 4714).

Furanose form :

Methylglucoside : syrup. $[\alpha]_D$ + 26·6° in H_2O. *Tetra-Me ether* : $C_{11}H_{22}O_6$. MW, 250. B.p. 93–4°/0·03 mm. $[\alpha]_D$ + 48·8° in H_2O. *Tetra-carbomethoxyl* : b.p. 226–7°/0·1 mm. $[\alpha]_D$ + 19·8° in Me_2CO.

Ethylglucoside : $C_8H_{16}O_6$. MW, 208. Syrup. $[\alpha]_D$ + 28° in EtOH.

1 : 3 : 4 : 6-*Tetra-acetyl* : syrup. $[\alpha]_D$ + 38·7° in C_6H_6.

3 : 4 : 6-*Tri-Me ether* : $C_9H_{18}O_6$. MW, 222. B.p. 115°/0·02 mm. (146°/0·37 mm.). $[\alpha]_D^{15}$ + 30·51° in H_2O.

1 : 3 : 4 : 6-*Tetra-Me ether* : b.p. 95–7°/0·01 mm. $[\alpha]_D^{16}$ + 31·3° in H_2O.

Avery, Haworth, Hirst, *J. Chem. Soc.*, 1927, 2308.

Allpress, Haworth, Inkster, *ibid.*, 1233.

l-.

Dextrorotatory syrup. Does not ferment.

Phenylosazone : *l*-glucosazone, *l*-mannosazone. M.p. 208°.

Fischer, *Ber.*, 1890, **23**, 389.

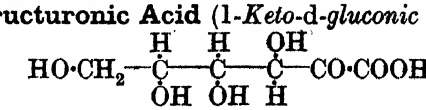
dl-.

See α-Acrose.

Fructosone.

See Glucosone.

Fructuronic Acid (1-*Keto*-d-*gluconic acid*)



$C_6H_{10}O_7$ MW, 194

Formed by many bacteria, *e.g. B. gluconium*, from glucose. Neither the acid nor lactone exists in free state. Acid ox. ⟶ *d*-arabonic acid. Alk. ox. ⟶ oxalic acid. $[\alpha]_D - 99{\cdot}62°$.

Me ester: $C_7H_{12}O_7$. MW, 208. Cryst. from MeOH. M.p. 173° decomp. $[\alpha]_D^{20} - 82{\cdot}08°$. Exhibits mutarotation. Sol. AcOH, Py. Spar. sol. most solvents. *Phenylhydrazone*: cryst. from EtOH. M.p. 163°. $[\alpha]_D^{20} - 124{\cdot}1°$. *Tetra-acetyl*: b.p. 199–203°/0·5 mm. $[\alpha]_D^{18} - 38{\cdot}8°$ in $CHCl_3$. *Di-acetone deriv.*: needles from EtOH.Aq. M.p. 52°. $[\alpha]_D^{20} - 44{\cdot}7°$ in $CHCl_3$.

Et ester: $C_8H_{14}O_7$. MW, 222. Prisms from EtOH. M.p. 123–4°. $[\alpha]_D^{17} - 66{\cdot}64°$ in H_2O.

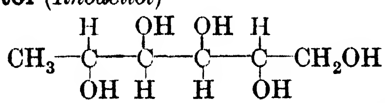
Di-acetone deriv.: $C_{12}H_{18}O_7$. MW, 274. Prisms from C_6H_6–pet. ether. M.p. 99–100°. $[\alpha]_D^{18} - 49{\cdot}35°$ in $CHCl_3$. Sol. most solvents. Insol. pet. ether. *Amide*: $C_{12}H_{19}O_6N$. MW, 273. Needles from C_6H_6–pet. ether. M.p. 98–9°. $[\alpha]_D^{17} - 50{\cdot}58°$ in $CHCl_3$. *Anilide*: cryst. from pet. ether. M.p. 107°. $[\alpha]_D^{20} - 16{\cdot}15°$. Insol. H_2O. *Brucine salt*: m.p. 175°.

Brucine salt: cryst. from Me_2CO.Aq. M.p. 166° decomp.

Phenylhydrazine salt of phenylhydrazone: cryst. from H_2O. M.p. 102–3°.

Ohle, Walter, *Ber.*, 1930, **63**, 843.

Fucitol (*Rhodeitol*)



$C_6H_{14}O_5$ MW, 166

Methylpentitol obtained from fucose by red. in dil. H_2SO_4 with NaHg.

d-.

Silvery leaflets from EtOH. M.p. 153–4°. $[\alpha]_D^{20} - 4{\cdot}7°$ in 10% aq. borax sol.

l-.

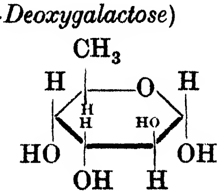
Leaflets from EtOH. M.p. 153–4°. $[\alpha]_D^{20} + 4{\cdot}7°$ in 10% aq. borax.

dl-.

M.p. 168–70°.

Votoček, Potměšil, *Ber.*, 1913, **46**, 3653.
Votoček, Bulir, *Chem. Zentr.*, 1906, I, 1818.

Fucose (6-*Deoxygalactose*)



$C_6H_{12}O_5$ MW, 164

d- (Rhodeose).

Occurs in various glucosides, *e.g.* Jalapin. Needles from EtOH. M.p. 140–5°. Very sol. H_2O. $[\alpha]_D^{22} + 89{\cdot}3°$ initial, $+ 75{\cdot}7°$ final, in H_2O.

Phenylosazone: m.p. 177°.

Methylphenylosazone: m.p. 181°.

p-*Toluenesulphonylhydrazone*: m.p. 175°. $[\alpha]_D^{17} + 17{\cdot}1°$ in Py.

α-*Methylglucoside*: syrup. $[\alpha]_D + 189{\cdot}9°$ in H_2O.

β-*Methylglucoside*: m.p. 120°. $[\alpha]_D^{19} - 14{\cdot}0°$ in H_2O. *Triacetyl deriv.*: m.p. 98·5°. $[\alpha]_D^{20} - 5{\cdot}9°$.

Di-acetone deriv.: m.p. 37°. B.p. 120°/13 mm. $[\alpha]_D^{19} - 52{\cdot}4°$.

Oxime: m.p. 188–9°. $[\alpha]_D + 13{\cdot}2°$ in H_2O.

Penta-acetyl: m.p. 115–16°.

l-.

Occurs as polymerised anhydride (Fucosan) in seatang, gum tragacanth, etc. Microscopic needles from EtOH. M.p. 145°. $[\alpha]_D^{22} - 93{\cdot}6°$ initial, $- 75{\cdot}3°$ final, in H_2O. Very sol. H_2O. Heat of comb. C_p 712·2 Cal., C_v 711·9 Cal. Dist. with conc. HCl ⟶ methylfurfural.

Phenylosazone: m.p. 178°.

Methylphenylhydrazone: m.p. 174°. $[\alpha]_D^{19} - 17{\cdot}0°$ in Py.

α-*Methylglucoside*: m.p. 157·5–158·5°. $[\alpha]_D^{20} - 197{\cdot}45°$ in H_2O.

β-*Methylglucoside*: m.p. 117–19°. $[\alpha]_D^{20} + 16{\cdot}04°$ in H_2O.

Tetra-acetyl deriv.: m.p. 40°. $[\alpha]_D - 46{\cdot}5°$.

Oxime: m.p. 188–9°. $[\alpha]_D - 12{\cdot}7°$ in H_2O.

Mono-acetone deriv.: m.p. 57°. $[\alpha]_D - 62{\cdot}28°$.

Di-acetone deriv.: m.p. 37°. $[\alpha]_D^{18} + 52{\cdot}2°$.

dl-.

Cryst. from EtOH. M.p. 161°. Optically inactive.

Osazone: m.p. 187°.

Di-acetone deriv.: m.p. 41°.

Minsaas, *Rec. trav. chim.*, 1932, **51**, 475.
Manske, *J. Biol. Chem.*, 1930, **86**, 571.
Freudenberg, Raschig, *Ber.*, 1929, **62**, 373; 1927, **60**, 1633.
Tadokoro, Nakamura, *Chem. Zentr.*, 1924, I, 1507.
Votoček, *Ber.*, 1910, **43**, 469; *Chem. Zentr.*, 1919, III, 812.
Votoček, Valentin, *Chem. Zentr.*, 1930, I, 1507.
Schlubach, Wagenitz, *Ber.*, 1932, **65**, 307.

Fucosterol

$C_{29}H_{48}O$ MW, 412

Characteristic sterol of seaweeds. Needles from MeOH. M.p. 124°. Sol. most org. solvents. $[\alpha]_D^{20}$ − 38·4° in $CHCl_3$. H ⟶ stigmastanol. Adds 2 mols. Br. $SbCl_3$ in $CHCl_3$ ⟶ red col. on standing.

Acetyl deriv.: m.p. 119°. *Tetrabromo deriv.*, m.p. 133°.

Propionyl deriv.: m.p. 105–6°.

Benzoyl deriv.: m.p. 119–20°.

Heilbron, Phipers, Wright, *J. Chem. Soc.*, 1934, 1572.

Fucoxanthin

$C_{40}H_{56}O_6$ ($C_{40}H_{60}O_6$) MW, 632 (636)

Carotenoid colouring matter from brown algæ. Brownish-red prisms from Et_2O–pet. ether. M.p. 168° (160°). Sol. Et_2O, MeOH. Gives deep blue col. with conc. H_2SO_4. Adds $10H_2$ per mol. on treatment with H(+ Pt black).

Hydrochloride: $C_{40}H_{56}O_6,4HCl$. M.p. 215° (not sharp).

Iodide: violet-black prisms. M.p. 134–5°.

Karrer *et al.*, *Helv. Chim. Acta*, 1931, **14**, 622.
Heilbron, Phipers, *Biochem. J.*, 1935, **29**, 1369.

Fukugenetin

$C_{19}H_{14}O_7$ MW, 354

One of the products of action of 50% KOH.Aq. on fukugetin in atmosphere of H. M.p. 205°.

Acetyl deriv.: m.p. 265°.

Tetra-Me ether: $C_{23}H_{22}O_7$. MW, 410. M.p. 204°.

Tetra-Et ether: $C_{27}H_{30}O_7$. MW, 466. M.p. 171–2°.

Shinoda, *Chem. Zentr.*, 1933, I, 1453.

Fukugetin

$C_{22}H_{16}O_8$(+ $2H_2O$) MW, 408 (444)

Occurs in bark of *Garcinia spicata*. KOH fusion ⟶ phloroglucinol. Isomeric with garcinin.

Penta-Me ether: $C_{27}H_{26}O_8 + 1\frac{1}{2}H_2O$. MW, 505. Decomp. at 141–2°.

Murakami, *Chem. Zentr.*, 1934, II, 2394.
Murakami, Irie, *British Chemical Abstracts*, 1935, 220A.

Fulminic Acid (*Carbyloxime*)

C⁚N·OH

CHON MW, 43

The free acid is stable for a time only in Et_2O sol. at low temps. It tends to polymerise very rapidly. Monomolecular esters cannot be prepared. The salts are explosive and some are powerful detonators.

Trimolecular Me ester: $[C⁚NO·CH_3]_3$. MW, 171. Needles from boiling H_2O. M.p. 149°.

Mercury fulminate: $Hg(O·N⁚C)_2$. Needles from H_2O or EtOH. Heat of decomp. 408 cal./gm.

Silver fulminate: AgO·N⁚C. Needles from hot H_2O. Is extraordinarily explosive.

Copper fulminate: CuO·N⁚C. Greenish-grey powder. Heat of decomp. 508 cal./gm.

Cadmium fulminate: CdO·N⁚C. Cryst. Sol. MeOH. Mod. sol. EtOH. Very sol. H_2O with rapid decomp. Heat of decomp. 470 cal./gm.

Thallium fulminate: TlO·N⁚C. Needles. Sol. H_2O with decomp. Heat of decomp. 223 cal./gm.

Sodium fulminate: NaO·N⁚C. Prisms from H_2O. Explodes on rubbing or heating.

Potassium fulminate: KO·N⁚C. Prisms from MeOH. More hygroscopic than Na salt.

Wieland, Hess, *Ber.*, 1909, **42**, 1346.
Wieland, *Ber.*, 1910, **43**, 3362.
Palazzo, *Gazz. chim. ital.*, 1913, **43**, I, 563.
Pauling, Hendricks, *J. Am. Chem. Soc.*, 1926, **48**, 645.
Wöhler, Weber, *Ber.*, 1929, **62**, 2742.
Wöhler, Berthmann, *ibid.*, 2748.

Fumaric Acid (trans-*Ethylene*-1 : 2-*dicarboxylic acid*)

HOOC·CH
‖
HC·COOH

$C_4H_4O_4$ MW, 116

Prisms or needles. M.p. 300–2° (286–7°, 282–4°) in sealed tube. Sublimes above 200° in open vessels: at 230° ⟶ maleic anhydride. Sol. 150 parts H_2O at 16°. Sol. EtOH. Spar. sol. Et_2O, Me_2CO. Insol. C_6H_6. k (first) = $9·3 \times 10^{-4}$ at 25°; (second) = $2·9 \times 10^{-5}$ at 25°. Heat of comb. C_p 320 Cal. Heat with H_2O at 150–70° in sealed tube ⟶ *dl*-maleic acid. Ox. ⟶ racemic acid.

Mono-Me ester: $C_5H_6O_4$. MW, 130. Prisms from EtOH. M.p. 144·5°.

Di-Me ester: $C_6H_8O_4$. MW, 144. M.p. 102°. B.p. 192°. Sublimes at ord. temp.

Mono-Et ester: $C_6H_8O_4$. MW, 144. Plates. M.p. 70°. B.p. 147°/16 mm.

Di-Et ester: $C_8H_{12}O_4$. MW, 172. B.p. 213–15°, 99°/12 mm. D_4^{25} 1·0472.

Mono-benzyl ester: $C_{11}H_{10}O_4$. MW, 206. M.p. 98°.

Di-benzyl ester: $C_{18}H_{16}O_4$. MW, 296. M.p. 60–1°.

p-*Nitrobenzyl ester* : m.p. 151°.

Mono-phenyl ester : $C_{10}H_8O_4$. MW, 192. Needles. M.p. 130°. Sol. hot H_2O, EtOH, Et_2O. At 200° ⟶ maleic anhydride + phenol.

Di-phenyl ester : $C_{16}H_{12}O_4$. MW, 268. Needles. M.p. 161–2°. B.p. 219°/14 mm. Spar. sol. EtOH.

Dibromide : $C_4H_2O_2Br_2$. MW, 242. B.p. 113–15°/32 mm.

Dichloride : $C_4H_2O_2Cl_2$. MW, 153. B.p. 158–60°. D_4^{17} 1·4117.

Diamide : $C_4H_6O_2N_2$. MW, 114. M.p. 267° decomp.

Di-nitrile : $C_4H_2N_2$. MW, 78. Needles. M.p. 96°. B.p. 186°.

Mono-Me ester monochloride : $C_5H_5O_3Cl$. MW, 148·5. M.p. 16°. B.p. 69·5°/14 mm.

Mono-Et ester monochloride : $C_6H_7O_3Cl$. MW, 162·5. B.p. 84°/17 mm.

Milas, *Organic Syntheses*, 1931, XI, 46.
Challenger, *Industrial Chemist*, 1930, **6**, 390 (*Bibl.*, *Review*).
Corson, Adams, Scott, *Organic Syntheses*, 1930, X, 48.
Anschütz, *Ann.*, 1928, **461**, 155.
Wehmer, E.P., 146,411, (*Chem. Abstracts*, 1920, **14**, 3749).

Fumarine.
See Protopine.

Fungisterol

$C_{25}H_{39}OH$

$C_{25}H_{40}O$ MW, 356

Occurs, together with ergosterol, in ergot and other higher fungi. Leaflets from EtOH. M.p. 144–6° (152°). Sol. Et_2O. More easily sol. than ergosterol in usual solvents. $[\alpha]_D$ − 20° in EtOH–$CHCl_3$. 90% H_2SO_4 ⟶ ruby-red col.

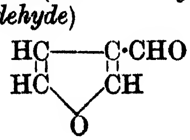
Acetate : $C_{25}H_{39}O·CO·CH_3$. M.p. 158·5° (156–7°). $[\alpha]_D$ − 16° in $CHCl_3$.

Hart, Heyl, *J. Am. Chem. Soc.*, 1930, **52**, 2014.
Zellner, Zikmunda, *Monatsh.*, 1930, **56**, 200.

Furalacetone.
See Furfurylideneacetone.

α-Furaldehyde.
See Furfural.

β-Furaldehyde (*3-Furaldehyde*, *3-furyl aldehyde*, *3-furoic aldehyde*)



$C_5H_4O_2$ MW, 96

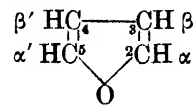
B.p. 144°/732 mm., 70–2°/43 mm. D_{20}^{20} 1·111. n_D^{20} 1·4945. Stable in the cold and in absence of light. Polymerises in direct sunlight. Gives no col. with aniline acetate test.

Diacetate : $C_4H_3O·CH(O·CO·CH_3)_2$. M.p. 50°. B.p. 130°/15 mm.

Phenylhydrazone : m.p. 149·5°.

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, **55**, 2908.

Furan (*Furfuran*)



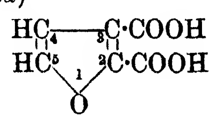
C_4H_4O MW, 68

B.p. 32°. D^0 0·9644. Easily sol. EtOH, Et_2O. Insol. H_2O. Heat of comb. C_p 500·1 Cal. Resinifies with min. acids. Unattacked by alkalis or Na. With pine-chip moistened with HCl ⟶ emerald-green col.

Gilman, Louisinian, *Rec. trav. chim.*, 1933, **52**, 156.
Hurd, Goldsby, Osborne, *J. Am. Chem. Soc.*, 1932, **54**, 2532.
Wilson, U.S.P., 1,636,030, (*Chem. Abstracts*, 1927, **21**, 2907).

Furan-carboxylic Acid.
See β-Furoic Acid *and* Pyromucic Acid.

Furan-2 : 3-dicarboxylic Acid (*Furan-αβ-dicarboxylic acid*)



$C_6H_4O_5$ MW, 156

M.p. 221°. Does not form anhydride. Sublimes unchanged in vacuo.

Di-Me ester : $C_8H_8O_5$. MW, 184. M.p. 37° (39°).

Mono-anilide : m.p. 170°.

Asahina *et al.*, *Chem. Abstracts*, 1927, **21**, 2896.
Cf. Wesselý, Dinjaski, *Monatsh.*, 1934, **64**, 131.

Furan-2 : 4-dicarboxylic Acid (*Furan-αβ′-dicarboxylic acid*).

Leaflets + $1H_2O$ from H_2O. M.p. 266°. Sublimes. Sol. hot H_2O, EtOH, Me_2CO. Spar. sol. cold H_2O, $CHCl_3$, CS_2, AcOH. Pract. insol. Et_2O, ligroin.

4-Me ester : $C_7H_6O_5$. MW, 170. Plates from H_2O. M.p. 132·5°. *Chloride* : $C_7H_5O_4Cl$. MW, 188·5. M.p. 83–4°.

Di-Me ester: $C_8H_8O_5$. MW, 184. Prisms from MeOH. M.p. 109–10°.

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, **55**, 403, 2903.

Furan-2 : 5-dicarboxylic Acid (*Dehydromucic acid, furan-αα'-dicarboxylic acid*).

Needles from H_2O. M.p. above 320°. Sublimes. Isatin + conc. H_2SO_4 at 145–55° ⟶ violet-blue sol.

Mono-Me ester: $C_7H_6O_5$. MW, 170. Leaflets from H_2O. M.p. 201–2°.

Di-Me ester: $C_8H_8O_5$. MW, 184. Needles from H_2O. M.p. 112°. B.p. 154–6°/15 mm.

Mono-Et ester: $C_8H_8O_5$. MW, 184. Needles from H_2O. M.p. 148–9°.

Di-Et ester: $C_{10}H_{12}O_5$. MW, 212. M.p. 47°. B.p. 167–8°/15 mm.

Dipropyl ester: $C_{12}H_{16}O_5$. MW, 240. M.p. 22°. B.p. 177°/15 mm.

Dichloride: $C_6H_2O_3Cl_2$. MW, 193. M.p. 80°. B.p. 245°.

Mono-amide: $C_6H_5O_4N$. MW, 155. M.p. 280–1°.

Diamide: $C_6H_6O_3N_2$. MW, 154. Needles from hot H_2O. M.p. above 240°.

Dianilide: long needles from 50% EtOH. M.p. 227–8°.

Phelps, Hale, *Am. Chem. J.*, 1901, **25**, 445.
Yoder, Tollens, *Ber.*, 1901, **34**, 3447.
Hill, *Ber.*, 1899, **32**, 1221.

Furan-3 : 4-dicarboxylic Acid (*Furan-ββ'-dicarboxylic acid*).

M.p. 217–18°. Heat with quinoline ⟶ β-furoic acid.

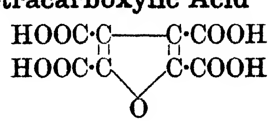
Di-Me ester: $C_8H_8O_5$. MW, 184. M.p. 46°.

Reichstein *et al.*, *Helv. Chim. Acta*, 1933, **16**, 280.

Furanethene.
See α-Furylethylene.

Furanethine.
See α-Furylacetylene.

Furan-tetracarboxylic Acid



$C_8H_4O_9$ MW, 244

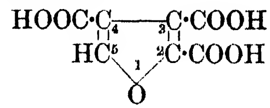
Cryst. from Me_2CO–C_6H_6. M.p. 247° decomp. Very sol. H_2O, Me_2CO, EtOH. Mod. sol. AcOH. Spar. sol. Et_2O, C_6H_6. Insol. ligroin.

Tetra-Me ester: $C_{12}H_{12}O_9$. MW, 300. Needles from MeOH. M.p. 107–8°.

Tetra-Et ester: $C_{16}H_{20}O_9$. MW, 356. Cryst. from EtOH. M.p. 34·5°. B.p. 175°/0·2 mm.

Reichstein *et al.*, *Helv. Chim. Acta*, 1933, **16**, 280.

Furan-2 : 3 : 4-tricarboxylic Acid (*Furan-αββ'-tricarboxylic acid*)



$C_7H_4O_7$ MW, 200

Cryst. from AcOH. M.p. 273° decomp. Very sol. H_2O, EtOH. Spar. sol. Et_2O.

Tri-Me ester: $C_{10}H_{10}O_7$. MW, 242. M.p. 108°.

Tri-Et ester: $C_{13}H_{16}O_7$. MW, 284. M.p. 37°. B.p. 140°/0·3 mm.

See previous reference.

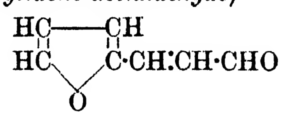
Furan-2 : 3 : 5-tricarboxylic Acid.

Cryst. from AcOH.

Tri-Me ester: $C_{10}H_{10}O_7$. MW, 242. B.p. 130–1°/0·3 mm.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, **16**, 555.

Furfuracrolein (*Furanacrolein, 2-furylacrolein, furfurylidene-acetaldehyde*)



$C_7H_6O_2$ MW, 122

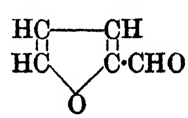
Needles with cinnamon-like odour. M.p. 54°. B.p. over 200° part. decomp. Sol. EtOH, Et_2O, hot H_2O. Spar. sol. cold H_2O. Volatile in steam.

Semicarbazone: m.p. 215–19°.

Phenylhydrazone: cryst. from pet. ether. M.p. 132°.

Bray, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2104.
König, *J. prakt. Chem.*, 1913, **88**, 193.

Furfural (*2-Formylfuran, α-furaldehyde furfuraldehyde, furfurol, 2-furylaldehyde, 2-furoic aldehyde*)



$C_5H_4O_2$ MW, 96

B.p. 162°, 90°/65 mm. D_4^{20} 1·1594. n_D^{20} 1·52608. Heat of comb. C_p 560 Cal. Sol. 11 parts H_2O

at 13°. Very sol. EtOH, Et_2O. Darkens and resinifies on keeping. Volatile in steam. HNO_3 ⟶ oxalic acid. $KMnO_4$ or AgOH ⟶ pyromucic acid.

Diacetate: $C_4H_3O{\cdot}CH(O{\cdot}CO{\cdot}CH_3)_2$. B.p. 143–4°/20 mm.

Oxime: *anti*-(α-): m.p. 75–6°. *Syn*-(β-): m.p. 91–2°.

Phenylhydrazone: leaflets. M.p. 97–8°.

p-*Nitrophenylhydrazone*: reddish-brown needles. M.p. 127°.

2 : 4-*Dinitrophenylhydrazone*: scarlet leaflets. M.p. 202°.

2 : 5-*Dibromophenylhydrazone*: m.p. 104°.

3 : 5-*Dibromophenylhydrazone*: m.p. 116°.

p-*Tolylhydrazone*: m.p. 105–6°.

2-*Naphthylhydrazone*: m.p. 134–5°.

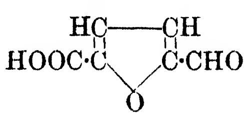
Phenylsemicarbazone: m.p. 180–1°.

p-*Tolylsemicarbazone*: m.p. 156–7°.

Anil: *see* Furfurylideneaniline.

Hammer, *Chemistry and Industry*, 1933, 608.
Adams, Voorhees, *Organic Syntheses*, 1932, Collective Vol. I, 274.
Gilman, Wright, *Rec. trav. chim.*, 1931, **50**, 833.
Brady, Goldstein, *J. Chem. Soc.*, 1927, 1959.

Furfural-5-carboxylic Acid (*Aldehydopyromucic acid*)



$C_6H_4O_4$ MW, 140

Needles + $1H_2O$ from H_2O. M.p. anhyd. 202°. Sol. EtOH, hot H_2O. Spar. sol. Et_2O, $CHCl_3$, cold H_2O. Insol. C_6H_6, ligroin, CS_2. Alk. sol. + Ag_2O ⟶ furan-2 : 5-decarboxylic acid.

Oxime: m.p. 224–6° decomp.

Phenylhydrazone: m.p. 176° decomp.

Hill, Sawyer, *Am. Chem. J.*, 1898, **20**, 174.

Furfuraldehyde.

See Furfural.

Furfuramide (*Hydrofuramide*)

$$C_4H_3O{\cdot}CH(N{:}CH{\cdot}C_4H_3O)_2$$

$C_{15}H_{12}O_3N_2$ MW, 268

Needles from EtOH. M.p. 117°. Sol. EtOH, Et_2O. Insol. cold H_2O. Heat of comb. C_p 1828 Cal. Decomp. by long boiling with H_2O, quickly by acids ⟶ NH_3 + furfural. Hot dil. KOH ⟶ the isomeric base "furfurine," m.p. 116°.

Hartley, Dobbie, *J. Chem. Soc.*, 1898, **73**, 599.

Furfuran.

See Furan.

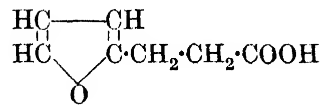
Furfurine.

See under Furfuramide.

Furfurol.

See Furfural.

Furfurylacetic Acid (2-[α-*Furyl*]-*propionic acid*)

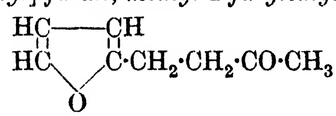


$C_7H_8O_3$ MW, 140

Cryst. from $CHCl_3$-ligroin. M.p. 58°.

Kirner, Richter, *J. Am. Chem. Soc.*, 1929, **51**, 3133.

Furfurylacetone (1-[α-*Furyl*]-*butanone*-3, 2-[3-*ketobutyl*]-*furan*, *methyl* 2-*furylethyl ketone*)



$C_8H_{10}O_2$ MW, 138

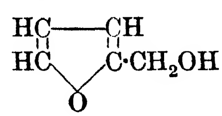
Oil with fruity odour. B.p. 203°, 101–2°/21–2 mm. D_4^{19} 1·0361. Forms cryst. comp. with $NaHSO_3$.

p-*Bromophenylhydrazone*: golden-yellow prisms from EtOH. M.p. 103–4°.

Semicarbazone: yellow leaflets. M.p. 143°.

See previous reference.

Furfuryl Alcohol (2-*Furylcarbinol*, 2-*hydroxymethylfuran*)



$C_5H_6O_2$ MW, 98

B.p. 170–1°, 75–7°/15 mm., 68–9°/10 mm. D_4^{23} 1·1282. n_D^{23} 1·48515. Heat of comb. C_p 612·8 Cal. (609). Misc. with H_2O in all proportions. Aq. sols. decompose on standing. Very sol. EtOH, Et_2O. Resinified by acids. Reduces cold $KMnO_4$, warm $NH_3.AgNO_3$. Poisonous.

Acetate: $C_7H_8O_3$. MW, 140. B.p. 175–7°. D_{20} 1·1175.

Propionate: $C_8H_{10}O_3$. MW, 154. B.p. 195–6°. D_{20} 1·1085.

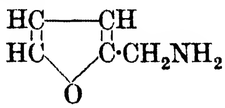
Carbamate: $C_4H_3O{\cdot}CH_2O{\cdot}CO{\cdot}NH_2$. Needles from ligroin. M.p. 50°.

Acid phthalate : m.p. 85°.

Wilson, *Organic Syntheses*, 1932, Collective Vol. I, 270.
Zanetti, *J. Am. Chem. Soc.*, 1925, **47**, 535.

Furfurylaldehyde.
See α-Furylacetaldehyde.

Furfurylamine (*α-Furylmethylamine, 2-aminomethylfuran*)

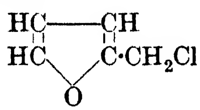


C_5H_7ON MW, 97

Colourless oil. B.p. 145–6°, 80°/84 mm. Misc. with H_2O. Absorbs CO_2 from the air ⟶ cryst. comp., m.p. 75°.
Oxalate : $C_5H_7ON,C_2H_2O_4,\frac{1}{2}H_2O$. Leaflets from EtOH. Decomp. at 145°. Sol. H_2O.
Picrate : decomp. at 150°.

Zanetti, Beckmann, *J. Am. Chem. Soc.*, 1928, **50**, 2032.

α-Furfuryl chloride (*Furylmethyl chloride, 2-chloromethylfuran*)



C_5H_5OCl MW, 116·5

B.p. 49°/26 mm., 37°/15 mm. D_4^{20} 1·1783. n_D^{20} 1·4941. Sol. ord. org. solvents. Insol. H_2O. Highly reactive. Readily resinifies in presence of moisture.

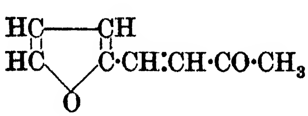
Reichstein, *Ber.*, 1930, **63**, 751.

Furfurylformic Acid.
See Furylacetic Acid.

Furfurylidene-acetaldehyde.
See Furfuracrolein.

Furfurylideneacetic Acid.
See 2-α-Furylacrylic Acid.

Furfurylideneacetone (*Furfuralacetone, 2-furalacetone*, 2-[3-*ketobutenyl*]-*furan*, 1-*furylbutenone*-3)



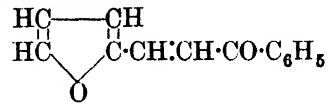
$C_8H_8O_2$ MW, 136

Needles. M.p. 39–40°. B.p. 135–7°/33–4 mm., 112–15°/10 mm. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. pet. ether. Sol. conc. H_2SO_4 ⟶ yellow col. turning to dark wine-red on warming.

Phenylhydrazone : needles from EtOH. M.p. 131–2°.

Leuck, Cejka, *Organic Syntheses*, 1927, VII, 42.
Auwers, Voss, *Ber.*, 1909, **42**, 4426.

Furfurylideneacetophenone (*Phenyl furylvinyl ketone, 1-benzoyl-2-furyl-ethylene, 2-phenacylidenemethylfuran*)

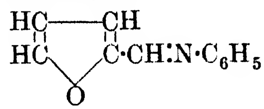


$C_{13}H_{10}O_2$ MW, 198

Oil. B.p. 317°, 181–2°/9 mm. D_4^{17} 1·150.

Semmler, Ascher, *Ber.*, 1909, **42**, 2356.

Furfurylideneaniline (*α-Furfuralanil*)

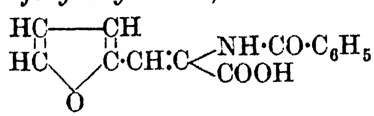


$C_{11}H_9ON$ MW, 171

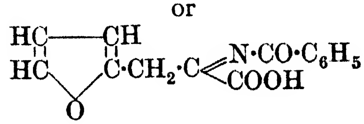
Cryst. M.p. 58°. B.p. 163–4°/19 mm.

de Chalmot, *Ann.*, 1892, **271**, 12.

Furfurylidenehippuric Acid (1-*Benzoylamino-2-α-furylacrylic acid*)



or

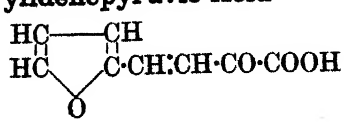


$C_{14}H_{11}O_4N$ MW, 257

Leaflets from EtOH.Aq. M.p. 210°.
Me ester : $C_{15}H_{13}O_4N$. MW, 271. Leaflets. M.p. 141°.
Et ester : $C_{16}H_{15}O_4N$. MW, 285. Needles from dil. EtOH. M.p. 132–3°.
Amide : $C_{14}H_{12}O_3N_2$. MW, 256. Yellow needles from EtOH. M.p. 184°.

Posner, Sichert-Modrow, *Ber.*, 1930, **63**, 3082.

Furfurylidenepyruvic Acid



$C_8H_6O_4$ MW, 166

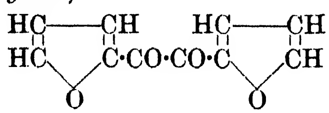
Yellow needles $+ 1H_2O$ from H_2O. M.p. anhyd. 112°. Sol. EtOH, Et_2O, Me_2CO, C_6H_6. Ox. ⟶ furylacrylic acid.

Et ester: $C_{10}H_{10}O_4$. MW, 194. Yellow needles from H_2O. M.p. 44–5°.

Phenylhydrazone: m.p. 164–5°.

Friedmann, *Helv. Chim. Acta*, 1931, **14**, 786.

αα-Furil (*Di-α-furoyl, di-α-furyl diketone, di-[α-furyl]-glyoxal*)

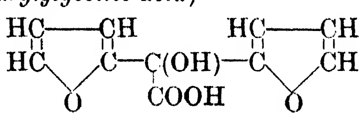


$C_{10}H_6O_4$ MW, 190

Yellow needles from C_6H_6. M.p. 165–6°. Sol. EtOH. Heat of comb. C_p 1064 Cal.

Hartman, Dickey, *J. Am. Chem. Soc.*, 1933, **55**, 1228.
Corson, McAllister, *J. Am. Chem. Soc.*, 1929, **51**, 2822.

Furilic Acid (*α-Hydroxydi-[2-furyl]-acetic acid, difurylglycollic acid*)



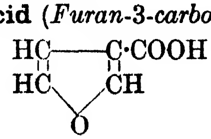
$C_{10}H_8O_5$ MW, 208

Fine needles. Decomp. at 100°. Very unstable in presence of H_2O. Sol. EtOH, Et_2O. Spar. sol. cold H_2O. Sol. conc. H_2SO_4 ⟶ dark brown col.

Fischer, *Ann.*, 1882, **211**, 222.
Evans, Dehn, *J. Am. Chem. Soc.*, 1930, **52**, 254.

α-Furoic Acid.
See Pyromucic Acid.

β-Furoic Acid (*Furan-3-carboxylic acid*)



$C_5H_4O_3$ MW, 112

Needles from H_2O. M.p. 122–3°. Spar. sol. H_2O. Aq. sol. gives no ppt. with $FeCl_3$.

Et ester: $C_7H_8O_3$. MW, 140. B.p. 65–7°/14 mm. D_{20}^{20} 1·038. n_D^{20} 1·4592.

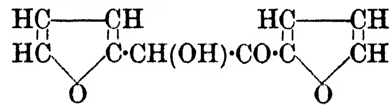
Chloride: $C_5H_3O_2Cl$. MW, 130·5. M.p. 29°. B.p. 65°/47 mm.

Amide: $C_5H_5O_2N$. MW, 111. M.p. 169°.

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, **55**, 2903.

Furoic Aldehyde.
See β-Furaldehyde *and* Furfural.

αα-Furoin (*Furylfuroylcarbinol, 1-hydroxy-2-keto-1 : 2-difurylethane*)



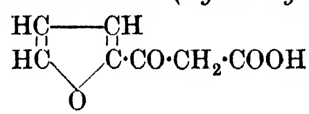
$C_{10}H_8O_4$ MW, 192

Needles from hot EtOH. M.p. 138–9° (135°). Sol. MeOH. Heat of comb. C_p 1114 Cal.

Benzoate: m.p. 92–3°.

Hartman, Dickey, *J. Am. Chem. Soc.*, 1933, **55**, 1228.
Buck, Jenkins, *J. Am. Chem. Soc.*, 1929, **51**, 2163.

α-Furoylacetic Acid (*Pyromucylacetic acid*)



$C_7H_6O_4$ MW, 154

The free acid has not been isolated. The esters form cryst. Na, K and Cu salts and with $FeCl_3$ ⟶ wine-red col.

Me ester: $C_8H_8O_4$. MW, 168. B.p. 144–5°/20 mm., 96–8°/1 mm. *Oxime*: m.p. 124–5° decomp. *Semicarbazone*: m.p. 141–2° decomp.

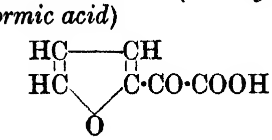
Et ester: $C_9H_{10}O_4$. MW, 182. B.p. 143–5°/10 mm. *Oxime*: m.p. 131–2°. *Isonitroso-deriv.*: needles. M.p. 128–9°.

Propyl ester: $C_{10}H_{12}O_4$. MW, 196. B.p. 110–12°/1 mm. *Oxime*: m.p. 120–1°. *Semicarbazone*: m.p. 137–8°.

Butyl ester: $C_{11}H_{14}O_4$. MW, 210. Needles. M.p. 25°. B.p. 136–8°/3 mm. *Oxime*: m.p. 101–2°. *Semicarbazone*: m.p. 127–8°.

Zanetti, Beckmann, *J. Am. Chem. Soc.*, 1928, **50**, 1438.

α-Furoylformic Acid (*α-Furylglyoxylic acid, pyromucylformic acid*)



$C_6H_4O_4$ MW, 140

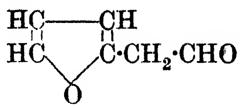
Colourless cryst. from ligroin. M.p. 98°. B.p. 105°/1 mm.

Chloride: $C_6H_3O_3Cl$. MW, 158·5. B.p. 65°/1 mm.

Anilide: leaflets from ligroin. M.p. 84–5°.

Reichstein, *Ber.*, 1930, **63**, 752.

α-Furylacetaldehyde (2-*Furanacetaldehyde, furfurylaldehyde*)



$C_6H_6O_2$ MW, 110

Colourless oil with strong hyacinth odour. B.p. 58°/10 mm. (140–6°/15 mm.). Polymerises. Sensitive to atmospheric O, alkalis, acids, and heat.

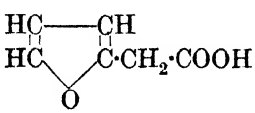
Oxime: m.p. 63°. Gradually resinifies.

Semicarbazone: m.p. 131–2°.

Reichstein, *Ber.*, 1930, **63**, 753.

Scheibler, Tutundzitsch, *Ber.*, 1931, **64**, 2919.

α-Furylacetic Acid (2-*Furanacetic acid, α-furfurylformic acid*)



$C_6H_6O_3$ MW, 126

Leaflets from pet. ether. M.p. 68–9°. Sol. H_2O.

Chloride: $C_6H_5O_2Cl$. MW, 144·5. B.p. 65°/1 mm.

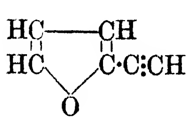
Nitrile: C_6H_5ON. MW, 107. B.p. 78–80°/20 mm., 69–73°/10 mm. D_4^{25} 1·0854. n_D^{25} 1·4715.

Anilide: leaflets from ligroin. M.p. 84–5° (79–80°).

Runde, Scott, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 1287.

See also first reference above.

α-Furylacetylene (2-*Furanethine, 2-acetylenylfuran*)



C_6H_4O MW, 92

B.p. 105–6°, 54–5°/120 mm. D_4^{20} 0·9919. n_D^{20} 1·5055. Forms Ag and Cu derivs.

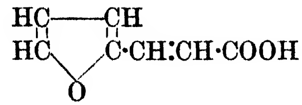
Hg deriv.: m.p. 118–19°.

Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, **7**, 28.

Furylacrolein.

See Furfuracrolein.

2-α-Furylacrylic Acid (*Furfurylideneacetic acid*)



$C_7H_6O_3$ MW, 138

(i) *Stable form.*

Needles from H_2O. M.p. 141°. Sublimes in high vacuum at 112°. Sol. EtOH, Et_2O, AcOH, C_6H_6. Mod. sol. hot H_2O. Spar. sol. cold H_2O. Insol. CS_2, ligroin. Heat of comb. C_v 757·3 Cal. $k = 3{\cdot}25 \times 10^{-5}$ at 25°. Volatile in steam. Slow dist. ⟶ α-furylethylene.

Me ester: $C_8H_8O_3$. MW, 152. M.p. 27·5°. B.p. 112°/15 mm.

Et ester: $C_9H_{10}O_3$. MW, 166. M.p. 24·5°. B.p. 230–3°, 120–1°/17 mm.

Amide: $C_7H_7O_2N$. MW, 137. M.p. 168–9°.

(ii) *Labile form.*

Prisms or plates. M.p. 103–4°. Sublimes in high vacuum at 95°. Sol. hot H_2O. Spar. sol. cold H_2O, C_6H_6. Changes slowly, on boiling, into the stable form with part. decomp. ⟶ α-furylethylene. In C_6H_6 sol. with I in sunlight ⟶ stable form.

Gilman, Hewlett, *Chem. Abstracts*, 1930, **24**, 1640.

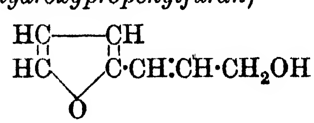
Posner, Sichert-Modrow, *Ber.*, 1930, **63**, 3084.

Liebermann, *Ber.*, 1894, **27**, 284.

Furyl Aldehyde.

See β-Furaldehyde *and* Furfural.

3-α-Furylallyl Alcohol (*Furfurylidene-ethyl-alcohol, ω-hydroxypropenylfuran*)



$C_7H_8O_2$ MW, 124

B.p. 108–10°/4 mm. (slight decomp.). D_{20}^{2} 1·1439. n_D^{27} 1·5520. Unstable.

1-*Naphthylurethane*: rosettes from ligroin. M.p. 93·5°.

Bray, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2101.

Furylbutanone.

See Furfurylacetone.

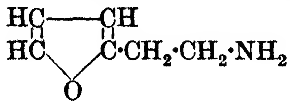
Furylbutenone.

See Furfurylideneacetone.

2-Furylcarbinol.

See Furfuryl Alcohol.

2-α-Furylethylamine (*2-β-Aminoethylfuran*)

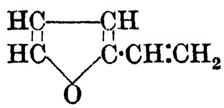


C_6H_9ON MW, 111

Pale yellow liq. B.p. 159°. Rapidly absorbs CO_2.
N-*Benzoyl*: needles from EtOH.Aq. M.p. 81°.
Carbamate: m.p. 84°.
Picrolonate: m.p. 204° decomp.

Windaus, Dalmer, *Ber.*, 1920, **53**, 2306.

α-Furylethylene (*α-Furanethene, 2-vinylfuran*)



C_6H_6O MW, 94

B.p. 99–100°, 49–50°/130 mm., 19°/17 mm. D_4^{19} 0·9445. n_D^{19} 1·4992. Polymerises rapidly in presence of O and sunlight.

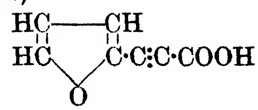
Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, **7**, 17.

Furylfuroylcarbinol.
See αα-Furoin.

Furylglyoxylic Acid.
See Furoylformic Acid.

Furylmethylamine.
See Furfurylamine.

α-Furylpropiolic Acid (*2-Furanacetylenecarboxylic acid*)



$C_7H_4O_3$ MW, 136

Cryst. from pet. ether. M.p. 113–14° decomp.

Gilman, Hewlett, Wright, *J. Am. Chem. Soc.*, 1931, **53**, 4195.
Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, **7**, 40.

Furylpropionic Acid.
See Furfurylacetic Acid.

G

G-Acid.
See 2-Naphthol-6 : 8-disulphonic Acid.

Gadelaidic Acid.
See under Gadoleic Acid.

Gadoleic Acid

$C_{19}H_{37}·COOH$

$C_{20}H_{38}O_2$ MW, 310

Occurs in cod-liver and other oils.

Cis:
M.p. about 20°.
Amide: $C_{20}H_{39}ON$. MW, 309. M.p. 78–9°.

Trans: Gadelaidic Acid.
M.p. 53–4°.
Amide: m.p. 90–1°.

Bull, *Ber.*, 1906, **39**, 3574.
Veselý, Chudožilov, *Chem. Abstracts*, 1930, **24**, 2428.

Gaidic Acid (*1-Pentadecylene-1-carboxylic acid, 1-hexadecenoic acid, $\Delta^{1,2}$-hexadecylenic acid, 2-tridecylacrylic acid*)

$CH_3·[CH_2]_{12}·CH{:}CH·COOH$

$C_{16}H_{30}O_2$ MW, 254

Cryst. M.p. 39°. Sol. EtOH.
Et ester: $C_{18}H_{34}O_2$. MW, 282. F.p. 9–10°.

Schröder, *Ann.*, 1867, **143**, 38.

Galactite.
See under Galactose.

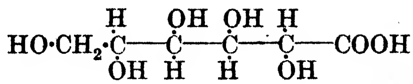
Galactobiose (*Galactosidogalactose*)

$C_{12}H_{22}O_{11}$ MW, 342

(1) Cryst. from MeOH. $[\alpha]_D^{16}$ +53·05° in H_2O. *Osazone*: m.p. 126–7°.
(2) Stereoisomer of (1). Cryst. from MeOH. Sinters at 78°, softens at 147·5°, m.p. 180°. $[\alpha]_D$ +35·01°. *Osazone*: m.p. 194°.

Bourquelot, *Ann. chim.*, 1920, **13**, 22.
Bourquelot, Aubry, *Compt. rend.*, 1917, **164**, 521; 1917, **165**, 60.
See also Fischer, Armstrong, *Ber.*, 1902, **35**, 3149.

Galactonic Acid



$C_6H_{12}O_7$ MW, 196

d-.

Needles from EtOH. M.p. 145–6° ⟶ lactone. $[\alpha]_D^{20}$ −12·23°.

Et ester: *penta-acetyl*, cryst. from EtOH. M.p. 101–2°.

Amide: $C_6H_{13}O_6N$. MW, 195. M.p. 172–172·5°. $[\alpha]_D^{20}$ +30·2°.

p-*Bromophenylhydrazide*: m.p. 125° decomp.

o-*Tolylhydrazide*: m.p. 191° decomp.

m-*Tolylhydrazide*: m.p. 174°.

p-*Tolylhydrazide*: m.p. 212°.

o-*Toluidide*: m.p. 204°.

m-*Toluidide*: m.p. 212°.

p-*Toluidide*: m.p. 224° decomp.

6-*Acetyl deriv.*: m.p. 160°.

6-*Me ether*: $C_7H_{14}O_7$. MW, 210. M.p. 156°.

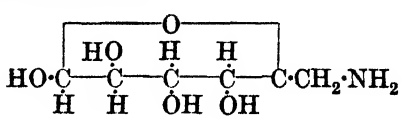
γ-Lactone: $C_6H_{10}O_6$. MW, 178. Needles + $1H_2O$. M.p. 66° (90–2°, 108–11° anhyd.). $[\alpha]_D$ −65·5° in H_2O. *Semicarbazone*: m.p. 189°.

dl-.

γ-Lactone: m.p. 122–5°.

Hudson, Komatsu, *J. Am. Chem. Soc.*, 1919, **41**, 1146.
Black, U.S.P., 1,864,229, (*Chem. Abstracts*, 1932, **26**, 4346).
Levene, Meyer, *J. Biol. Chem.*, 1921, **46**, 307.
Hönig, Ruzicka, *Ber.*, 1929, **62**, 1434.
Brackenburg, Upson, *J. Am. Chem. Soc.*, 1933, **55**, 2512.
Killiani, *Ber.*, 1933, **66**, 119.

Galactosamine



$C_6H_{13}O_5N$ MW, 179

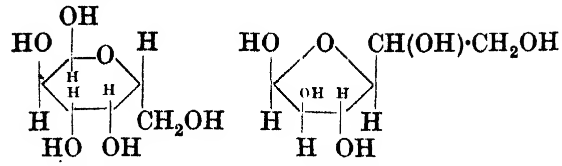
N-*Benzoyl*: m.p. 132·5°. *Phenylhydrazone*: m.p. 201°.

Perchlorate: m.p. 223° decomp.

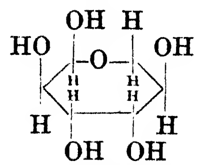
Di-acetone deriv.: b.p. 122–6°/0·5–1·0 mm. *Hydrochloride*: decomp. at 229°.

Freudenberg, Doser, *Ber.*, 1925, **58**, 298.

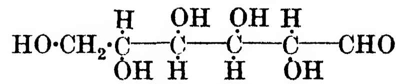
Galactose



(I) Pyranose (II) Furanose



(III) Septanose



(IV) Aldehydo

$C_6H_{12}O_6$ MW, 180

d-. *Pyranose form*, (I).

Hydrolysis product of lactose, raffinose, stachyose, and galactan. Occurs as a component of pectins, gums and mucilages and of some flavone and anthocyanin glycosides, etc. Prisms or needles + $1H_2O$ from H_2O, m.p. 118–20°; plates from EtOH, m.p. 170°. $[\alpha]_D^{20}$ + 83·3° in H_2O. *α-Form*: m.p. 168°. $[\alpha]_D^{20}$ + 144° (initial) in H_2O. *β-Form*: $[\alpha]_D^{20}$ + 52° (initial) in H_2O.

Osazone: yellow needles. M.p. 186°. $[\alpha]_D$ + 0·46° in Py–EtOH.

Phenylhydrazone: needles from EtOH. M.p. 160–2°. $[\alpha]_D$ + 20·54° in Py.

Methylgalactoside: $C_7H_{14}O_6$. MW, 194.

α-. Cryst. from AcOEt. M.p. 111–12°. $[\alpha]_D^{20}$ + 178·8° in H_2O. Heat of comb. C_v 839·4 Cal.

β-. Cryst. from hot EtOH. M.p. 178–80°. $[\alpha]_D^{20}$ + 2·6° in saturated borax sol. *Tetra-acetyl deriv.*: cryst. from EtOH. M.p. 93–4°. $[\alpha]_D$ − 25·5° in C_6H_6. *Tetra-Me ether*: m.p. 44–5°. B.p. 135–40°/11 mm. $[\alpha]_D^{20}$ + 30·7° in H_2O.

Ethylgalactoside:

α-. Galactite. $C_8H_{16}O_6$. MW, 208. Occurs in lupins. Cryst. Sinters at 138°, m.p. 142° (140°). $[\alpha]_D$ + 185·52° in H_2O.

β-. M.p. 153–5°. $[\alpha]_D^{20}$ − 4·0° in H_2O. *Tetra-acetyl deriv.*: cryst. from EtOH. M.p. 88°. $[\alpha]_D^{20}$ − 29·8° in C_6H_6.

2 : 3 : 4 : 6-*Tetra-Me ether*: $C_{10}H_{20}O_6$. MW, 236. Cryst. from Et_2O. M.p. 71–2°. B.p. 172°/13 mm. $[\alpha]_D^{15}$ + 118° in H_2O.

1 : 2 : 3 : 4 : 6-*Penta-acetyl deriv.* :

α-. Cryst. from EtOH. M.p. 96°. $[\alpha]_D^{20}$ + 107° in $CHCl_3$.

β-. Cryst. from EtOH. M.p. 142°. $[\alpha]_D^{20}$ + 23° in $CHCl_3$.

Oxime : m.p. 162–3°. *Hexa-acetyl deriv.* : (i) m.p. 146°. (ii) M.p. 106°.

Haworth, Hirst, Jones, *J. Chem. Soc.*, 1927, 2428 (*Bibl.*).
Deulofeu, Wolfrom, Cattaneo, Christman, Georges, *J. Am. Chem. Soc.*, 1933, **55**, 3488.
Verschuur, *Rec. trav. chim.*, 1928, **47**, 442 (*Bibl.*).
Herissey, Aubry, *Chem. Zentr.*, 1914, I, 1661.
Fischer, *Ber.*, 1914, **47**, 456.

d-. *Furanose form*, (II).

Methylgalactoside : *tetra-Me ether*, b.p. 112°/0·015 mm. n_D 1·4405. $[\alpha]_D$ − 45·2° in H_2O.

2 : 3 : 5 : 6-*Tetra-Me ether* : b.p. 136°/0·05 mm. n_D 1·4540. $[\alpha]_D$ − 21·2° in H_2O.

Ethylgalactoside :

β-. M.p. 86°. $[\alpha]_D$ − 97·2° in H_2O. *Tetra-acetyl deriv.* : m.p. 59°. $[\alpha]_D^{20}$ − 50·5° in $CHCl_3$.

1 : 2 : 3 : 5 : 6-*Penta-acetyl deriv.* : (α-). Cryst. from EtOH. M.p. 87°. $[\alpha]_D^{20}$ + 61° in $CHCl_3$. (β-). Cryst. from EtOH. M.p. 98°. $[\alpha]_D^{20}$ − 42° in $CHCl_3$.

Schlubach, Meisenheimer, *Ber.*, 1934, **67**, 430.

d-. *Septanose form*, (III).

Methylgalactoside : α-. Syrup. $[\alpha]_D^{20}$ + 26° in H_2O. *Tetra-Me ether* : b.p. 86°/0·005 mm.

1 : 2 : 3 : 4 : 5-*Penta-acetyl deriv.* : (α-). Cryst. from Et_2O. M.p. 128°. $[\alpha]_D^{20}$ − 11·0° in $CHCl_3$. (β-). Cryst. from Et_2O. M.p. 101°. $[\alpha]_D^{18}$ −78·3° in $CHCl_3$.

Micheel, Suckfüll, *Ann.*, 1933, **507**, 138.

d-. *Aldehydo form*, (IV).

Ethyl mercaptan : cryst. from hot H_2O. M.p. 140–2°. *Penta-acetyl deriv.* : needles from MeOH.Aq. M.p. 77·5–78·5°. $[\alpha]_D^{25}$ + 9·7° in $CHCl_3$.

Penta-acetyl deriv. : m.p. 121°. $[\alpha]_D^{25}$ −25° in $CHCl_3$.

Wolfrom, *J. Am. Chem. Soc.*, 1930, **52**, 2464.

l-.

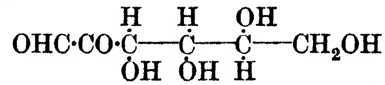
M.p. 162–3°. $[\alpha]_D$ − 74° in H_2O.

dl-.

M.p. 143–4°.

Fischer, Hertz, *Ber.*, 1892, **25**, 1247.
Anderson, *J. Biol. Chem.*, 1933, **100**, 249.

Galactosone

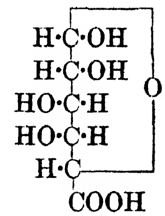


$C_6H_{10}O_6$ MW, 178

Tetra-acetyl deriv. of hydrate : m.p. 96°.

Maurer, Müller, *Ber.*, 1930, **63**, 2070.

Galacturonic Acid



$C_6H_{10}O_7$ MW, 194

d-.

Decomposition product of pectin. Ox. ⟶ mucic acid.

Brucine salt : m.p. 180° decomp.
Cinchonine salt : m.p. 178° decomp.
Morphine salt : m.p. 162–3° decomp.
Phenylhydrazone : m.p. 140–1°.
p-*Bromophenylhydrazone* : m.p. 150–1°.

(α-). Needles $+1H_2O$. Sinters at 110°. M.p. 156–9° decomp. $[\alpha]_D$ +97·29° (98·0°) in H_2O (initial).

Methylgalactoside : $C_7H_{12}O_7$. MW, 208. Cryst. + $2H_2O$ from H_2O. Sinters at 109°. M.p. 112–14° decomp. $[\alpha]_D^{20}$ +129·9° in H_2O. *Me ester* : $C_8H_{14}O_7$. MW, 222. Cryst. + $1H_2O$ from MeOH.Aq. M.p. 140–1°. $[\alpha]_D^{20}$ +125·0° in H_2O.

(β-). M.p. 160° decomp. $[\alpha]_D^{20}$ +27·0° (initial).

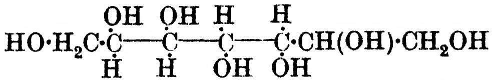
Methylgalactoside : sinters at 126°. M.p. 134° decomp. $[\alpha]_D^{20}$ +39·2° in H_2O. *Me ester* : m.p. 193–4°. $[\alpha]_D^{20}$ −45·6° in H_2O.

dl-.

Needles from H_2O. M.p. 156° decomp.

Ehrlich, *Cellulose-Chemie*, 1930, **11**, 149 (*Review*).
Niemann, Link, *J. Biol. Chem.*, 1932, **95**, 203; 1934, **104**, 743.
Morell, Link, *J. Biol. Chem.*, 1933, **100**, 385.
Smolenski, Cichocki, *Chem. Abstracts*, 1933, **27**, 1618.
Ehrlich, Guttmann, *Biochem. Z.*, 1933, **259**, 100; *Ber.*, 1933, **66**, 220 (*Bibl.*).

d-Galaheptitol

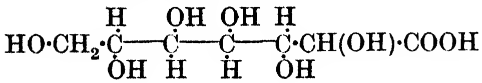


$C_7H_{16}O_7$ MW, 212

(α). *l*-α-Mannoheptitol. M.p. 187–8°. Sol. H_2O. Spar. sol. EtOH.
(β). Needles. Softens at 138°. M.p. 141–4°.

Peirce, *J. Biol. Chem.*, 1915, **23**, 327.

d-Galaheptonic Acid



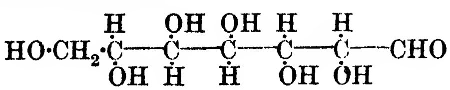
$C_7H_{14}O_8$* MW, 226

α-.
M.p. 206°. Sol. H_2O. Insol. EtOH.
Amide: m.p. 206°. $[\alpha]_D^{20}$ + 14·5°. *Hepta-acetyl deriv.*: m.p. 125·5–126°.
Phenylhydrazide: m.p. 220°.
γ-Lactone: $C_7H_{12}O_7$. MW, 208. M.p. 145–7° (151°). $[\alpha]_D$ −51°.

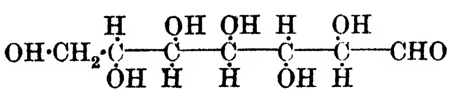
β-.
M.p. 145°.
Phenylhydrazide: m.p. 185°.

Miksic, *Chem. Abstracts*, 1929, **23**, 2942.
Killiani, *Ber.*, 1922, **55**, 96.
Hudson, Komatsu, *J. Am. Chem. Soc.*, 1919, **41**, 1141.

d-Galaheptose



α-.



β-.

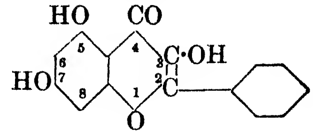
$C_7H_{14}O_7$ MW, 210

α-.
Syrup. Sol. H_2O. Spar. sol. EtOH.
Osazone: m.p. 222°.

β-.
Cryst. from EtOH.Aq. Sublimes at 195–9° (rapid heat.) decomp.

Fischer, *Ann.*, 1895, **288**, 144.
Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1514.
Peirce, *J. Biol. Chem.*, 1915, **23**, 328.

Galangin (5 : 7-*Dihydroxyflavonol*)

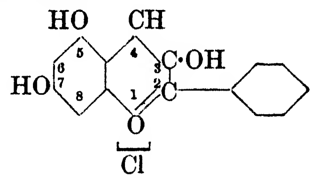


$C_{15}H_{10}O_5$ MW, 270

Constituent of galanga root (*Alpinia officinarum*, Hance). Yellowish needles from EtOH. M.p. 214–15° (219–21°). Mod. sol. EtOH, Et_2O. Yellow sols. in aq. alkalis. Sublimes.
Triacetyl deriv.: m.p. 142·5–143·5°.
Tribenzoyl deriv.: m.p. 177°.
3-*Me ether*: $C_{16}H_{12}O_5$. MW, 284. Occurs with galangin. M.p. 299°. *Diacetyl deriv.*: m.p. 175–6°.
5 : 7-*Di-Me ether*: $C_{17}H_{14}O_5$. MW, 298. M.p. 177–8°. *Acetyl deriv.*: m.p. 192–3°.

Chavan, Robinson, *J. Chem. Soc.*, 1933, 368.

Galanginidin chloride (3 : 5 : 7-*Trihydroxy-2-phenylbenzpyrilium chloride*)

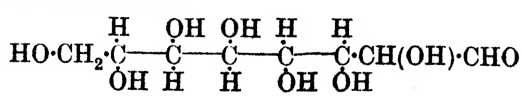


$C_{15}H_{11}O_4Cl$ MW, 290·5

Red prisms from EtOH. Darkens at 160°. M.p. above 300°. Sol. EtOH, $CHCl_3$. Sols. are red.
3-*Me ether*: $C_{16}H_{13}O_4Cl$. MW, 304·5. Brownish-red cryst. + $1H_2O$. Red sol. in amyl alcohol, col. discharged by Na_2CO_3. *Perchlorate*: chars at 255–60°. M.p. above 300°.
Tri-Me ether: $C_{18}H_{17}O_4Cl$. MW, 332·5. Orange-red needles. *Ferrichloride*: yellowish-brown prisms. M.p. 174°. Sol. $CHCl_3$ to red sol.

Kondo, *Chem. Abstracts*, 1932, **26**, 4333.
Malkin, Robinson, *J. Chem. Soc.*, 1925, 1190.

d-Gala-octose



$C_8H_{16}O_8$ MW, 240

Leaflets $+1H_2O$ from hot EtOH.Aq. M.p. 109–11°. $[\alpha]_D$ −40°.

Phenylhydrazone: plates from H_2O. M.p. 200–205°.
Osazone: m.p. 220–25° decomp.

Fischer, *Ann.*, 1895, **288**, 150.
Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1514.

Galegine (2-[2-*Methyl*-β-*butenyl*]-*guanidine*, 2-[*isopropylidene-ethyl*]-*guanidine*)

$(NH_2)_2C{:}N{\cdot}CH_2{\cdot}CH{:}C(CH_3)_2$

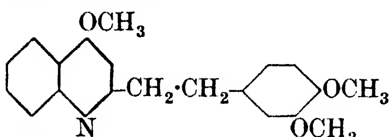
$C_6H_{13}N_2$ MW, 113

Alkaloid obtained from *Galega officinalis*, Linn. M.p. 60–5°. Hygroscopic. Insol. Et_2O, $CHCl_3$, pet. ether.
Nitrate: m.p. 108°.
Sulphate: m.p. 227°.
Bicarbonate: m.p. 138°.
$B_2,(COOH)_2$: m.p. 192–5°.
N-*Benzoyl*: m.p. 95–6°.
N : N'-*Di*-m-*nitrobenzoyl*: m.p. 163–4°.
B_2,H_2PtCl_6: m.p. 123°.
Picrate: m.p. 180–1°.

Späth, Spitzy, *Ber.*, 1925, **58**, 2273.
Braun, *Chem. Abstracts*, 1932, **26**, 1391.

Galipidine.
See Galipine.

Galipine (*Galipoline methyl ether*, *galipidine*, 1-[4-*methoxy*-2-*quinolyl*]-2-[3 : 4-*dimethoxyphenyl*]-*ethane*, 4-*methoxy*-2-[3 : 4-*dimethoxyphenylethyl*]-*quinoline*)



$C_{20}H_{21}O_3N$ MW, 323

Occurs in bark of *Cusparia febrifuga*, Humb. (angostura bark). Cryst. from Et_2O. M.p. 113·5°.
B,HCl: m.p. 165°.
B,HI: m.p. 178°.
Picrate: m.p. 194°.

Späth, Papaioanou, *Monatsh.*, 1929, **52**, 134.

Galipoidine

$C_{19}H_{15}O_4N$ MW, 321

Occurs in bark of *Cusparia trifoliata*, Engler (angostura bark). M.p. 231°.

Tröger, Runne, *Chem. Abstracts*, 1911, **5**, 3044.
Späth, Pikl, *Monatsh.*, 1930, **55**, 352.

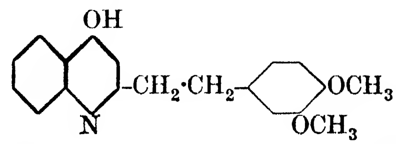
Galipol

$C_{15}H_{26}O$ MW, 222

Constituent of angostura oil. Yellow oil. B.p. 264–5°. D^{20} 0·9270.

Beckurts, Tröger, *Chem. Zentr.*, 1898, II, 786.

Galipoline (4-*Hydroxy*-2-[3 : 4-*dimethoxyphenylethyl*]-*quinoline*, 1-[4-*hydroxy*-2-*quinolyl*]-2-[3 : 4-*dimethoxyphenyl*]-*ethane*)

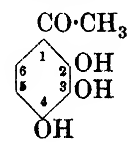


$C_{19}H_{19}O_3N$ MW, 309

Occurs in bark of angostura (*Cusparia febrifuga*, Humb.). Cryst. from Et_2O. M.p. 193°.

Späth, Papaioanou, *Monatsh.*, 1929, **52**, 129.

Gallacetophenone (2 : 3 : 4-*Trihydroxyacetophenone*, 4-*acetopyrogallol*, *Alizarin Yellow C*)



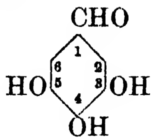
$C_8H_8O_4$ MW, 168

Needles or leaflets from H_2O. M.p. 173°. Sol. EtOH, hot H_2O. Spar. sol. C_6H_6. $FeCl_3$ ⟶ brown col.
2-(or 4-)*Me ether*: $C_9H_{10}O_4$. MW, 182. M.p. 175°.
3-*Me ether*: m.p. 134–5°. 2 : 4-*Diacetyl*: m.p. 150–1°.
4-*Me ether*: 2 : 3-*diacetyl*, m.p. 146–8°.
2 : 3-*Di-Me ether*: *oxime*, m.p. 112°.
2 : 4-*Di-Me ether*: $C_{10}H_{12}O_4$. MW, 196. M.p. 79–80°. *Phenylhydrazone*: m.p. 108–10°. 3-*Acetyl*: m.p. 110–11°.
3 : 4-*Di-Me ether*: m.p. 83°.
Tri-Me ether: 2 : 3 : 4-trimethoxyacetophenone. $C_{11}H_{14}O_4$. MW, 210. M.p. 15–17°. B.p. 295–7°, 165°/12 mm.
3-(or 4-)*Et ether*: $C_{10}H_{12}O_4$. MW, 196. M.p. 102°.
2 : 4-*Diacetyl*: m.p. 107–8°.
Triacetyl: m.p. 85°.
Oxime: m.p. 162–3°.
Semicarbazone: m.p. 225° (rapid heat.).

Picrate: m.p. 133°.

Perkin, Storey, *J. Chem. Soc.*, 1928, 232.
Perkin, *J. Chem. Soc.*, 1895, **67**, 997.
Brand, Collischonn, *J. prakt. Chem.*, 1922, **103**, 338.
Einhorn, Hollandt, *Ann.*, 1898, **301**, 107.

Gallaldehyde (3 : 4 : 5-*Trihydroxybenzaldehyde, gallic aldehyde*)



$C_7H_6O_4$ MW, 154

Cryst. $+1H_2O$ from H_2O. M.p. 212° (rapid heat.) decomp. Sol. EtOH, C_6H_6, $CHCl_3$, Me_2CO, hot H_2O. Spar. sol. Et_2O.

3-*Me ether*: $C_8H_8O_4$. MW, 168. Needles from C_6H_6. M.p. 130–1°. Sol. EtOH, Et_2O. $FeCl_3 \longrightarrow$ green col.

4-*Me ether*: m.p. 139–40°. p-*Nitrophenylhydrazone*: m.p. 222–3°.

3 : 5-*Di-Me ether*: *see* Syringa-aldehyde.

Tri-Me ether: 3 : 4 : 5-trimethoxybenzaldehyde. $C_{10}H_{12}O_4$. MW, 196. M.p. 78° (74–5°). B.p. 163–5°/10 mm. p-*Nitrophenylhydrazone*: m.p. 201–2°. *Oxime*: m.p. 83–4°. B.p. 198–200°/10 mm. *Semicarbazone*: m.p. 219–20°.

Triacetyl: m.p. 107–8°. p-*Nitrophenylhydrazone*: m.p. 207–8°.

Tricarbomethoxyl: m.p. 81–2°. p-*Nitrophenylhydrazone*: m.p. 206–7°.

Tribenzoyl: p-*nitrophenylhydrazone*, decomp. at 232–3°.

Oxime: decomp. at 195–200°. *Acetyl deriv.*: m.p. 126–7°.

p-*Nitrophenylhydrazone*: m.p. 226° (slow heat.), 234–6° decomp. (rapid heat.).

Cyanhydrin: decomp. at 150–60° (rapid heat.). *Tetra-acetyl deriv.*: m.p. 135°.

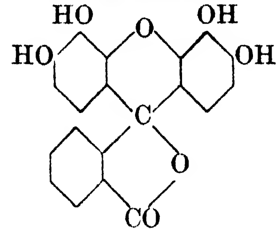
Rosenmund, Pfannkuch, *Ber.*, 1922, **55**, 2357.
Rosenmund, Zetzsche, *Ber.*, 1918, **51**, 594.
Nierenstein, *J. prakt. Chem.*, 1932, **132**, 200, (*Bibl.*).

Gallamide.
See under Gallic Acid.

Gallanilide.
See under Gallic Acid.

Gallanol.
See under Gallic Acid.

Gallein (4 : 5-*Dihydroxyfluorescein*)



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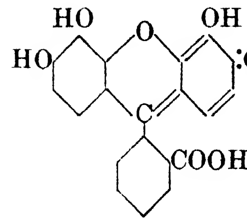


II

$C_{20}H_{12}O_7$ MW, 364

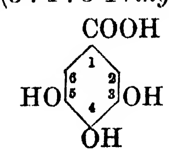
Brownish-red powder or fine cryst. with green, metallic lustre. Blackens above 180°. Sol. EtOH. Spar. sol. Et_2O, AcOH, Me_2CO. Insol. C_6H_6, $CHCl_3$.

Me ester: (structure II). $C_{21}H_{14}O_7$. MW, 378. Amorphous. M.p. above 280°. *Tri-Me ether*: $C_{24}H_{20}O_7$. MW, 420. M.p. 199°.

Et ester tri-Et ether: (structure II). $C_{28}H_{28}O_7$. MW, 476. M.p. 155°.

Orndorff, Delbridge, *Am. Chem. J.*, 1909, **42**, 185, (*Bibl*).

Gallic Acid (3 : 4 : 5-*Trihydroxybenzoic acid*)



$C_7H_6O_5$ MW, 170

Occurs in many tannins. Cryst. $+1H_2O$ from H_2O. M.p. 253° decomp. (225° decomp., 235–40°). Sol. Me_2CO. Mod. sol. EtOH. Spar. sol. H_2O, Et_2O. Insol. C_6H_6, $CHCl_3$. Heat of comb. C_p 634·1 Cal., C_v 634·7 Cal.

Me ester: gallicin. $C_8H_8O_5$. MW, 184. M.p. 157°. *Triacetyl*: m.p. 120–2° *Tribenzoyl*: m.p. 139°. 3 : 4-*Diacetyl-5-benzoyl*: m.p. 110–11°. 3 : 5-*Diacetyl-4-benzoyl*: m.p. 138–9°.

Et ester: $C_9H_{10}O_5$. MW, 198. M.p. 158°, anhyd. 160°. $k = 9 \times 10^{-8}$ at 25°. *Triacetyl*: m.p. 138°. *Tribenzoyl*: m.p. 126–8°.

Propyl ester: $C_{10}H_{12}O_5$. MW, 212. M.p. 150°.

Isopropyl ester: m.p. 123–124·5°.

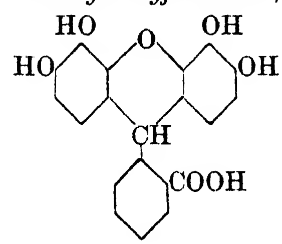
Butyl ester: $C_{11}H_4O_5$. MW, 226. M.p. 143–4° (133–4°).
Isobutyl ester: m.p. 130–1°.
Amide: gallamide. $C_7H_7O_4N$. MW, 169. Leaflets $+1\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 244–5°. N-*Acetyl*: m.p. 210°. 3 : 4 : 5-*Triacetyl*: m.p. 163°.
Nitrile: gallonitrile, gallanol. $C_7H_5O_3N$. MW, 151. M.p. 223°. *Triacetyl*: m.p. 129–30°.
Anilide: gallanilide. $C_{13}H_{11}O_4N$. MW, 245. Leaflets $+2H_2O$ from EtOH.Aq. M.p. 207° (205°). *Triacetyl*: m.p. 161–2°. *Tribenzoyl*: m.p. 181°.
3-*Acetyl*: m.p. 225° decomp.
3 : 5-*Diacetyl*: m.p. 174–5°.
Triacetyl: m.p. 171–2°.
3-*Benzoyl*: m.p. 224–7° (240–2°).
3 : 5-*Dibenzoyl*: m.p. 218–21°.
Tribenzoyl: m.p. 191–2°.
3 : 4-*Diacetyl-5-benzoyl*: m.p. 178–9°.
3 : 5-*Diacetyl-4-benzoyl*: m.p. 183–4°.
3-*Me ether*: 4 : 5-dihydroxy-3-methoxybenzoic acid. $C_8H_8O_5$. MW, 184. M.p. 220° (131–2°). *Me ester*: $C_9H_{10}O_5$. MW, 198. M.p. 112–13°. *Chloride*: $C_8H_7O_4Cl$. MW, 202·5. M.p. 101–2°. *Diacetyl*: m.p. 170–1° (102–3°).
4-*Me ether*: 3 : 5-dihydroxy-4-methoxybenzoic acid. M.p. 246°. *Diacetyl*: m.p. 120–1°. *Me ester*: m.p. 147°, *diacetyl*, m.p. 68–9°.
3 : 4-*Di-Me ether*: 3-hydroxy-4 : 5-dimethoxybenzoic acid. $C_9H_{10}O_5$. MW, 198. M.p. 197–8°. *Me ester*: $C_{10}H_{12}O_5$. MW, 212. M.p. 84°, 5-*benzoyl*, m.p. 91–2°.
3 : 5-*Di-Me ether*: *see* Syringic Acid.
Tri-Me ether: 3 : 4 : 5-trimethoxybenzoic acid. $C_{10}H_{12}O_5$. MW, 212. M.p. 166°. *Me ester*: $C_{11}H_{14}O_5$. MW, 226. M.p. 82·5°, b.p. 274–5°, 166–7°/10 mm. *Et ester*: $C_{12}H_{16}O_5$. MW, 240. M.p. 53–5°. *Phenyl ester*: $C_{16}H_{16}O_5$. MW, 288. M.p. 103°. *Chloride*: $C_{10}H_{11}O_4Cl$. MW, 230·5. M.p. 77–8°, b.p. 185°/18 mm. *Amide*: $C_{10}H_{13}O_4N$. MW, 211. M.p. 176–7°. *Nitrile*: $C_{10}H_{11}O_3N$. MW, 193. M.p. 95°, b.p. 180–5°/10 mm.
Tri-Et ether: 3 : 4 : 5-triethoxybenzoic acid. $C_{13}H_{18}O_5$. MW, 254. M.p. 112°. *Et ester*: $C_{15}H_{22}O_5$. MW, 282. M.p. 51°.
Glucoside: *see* Glucogallic Acid.

Schiff, *Ann.*, 1893, **272**, 234.
Grehm, Gansser, *J. prakt. Chem.*, 1901, **63**, 82.
Fischer, Nouri, *Ber.*, 1917, **50**, 621.
Heffter, Capellmann, *Ber.*, 1905, **38**, 3636.
Manning, Nierenstein, *Ber.*, 1912, **45**, 1550.
Zimmermann, U.S.P., 1,222,345, (*Chem. Abstracts*, 1917, **11**, 1886).
Christiansen, *J. Am. Chem. Soc.*, 1926, **48**, 1360.
Mauthner, *Organic Syntheses*, 1926, VI, 96.
Yakimov, Tatarskaya, Russian Ps., 24,075, 28,280, (*Chem. Abstracts*, 1933, **27**, 3851).
Hepner, Zyto, *Chem. Abstracts*, 1933, **27**, 280.
Takino, *Chem. Abstracts*, 1929, **23**, 2707.
Shriner, McCutchan, *J. Am. Chem. Soc.*, 1929, **51**, 2193.

Gallic Aldehyde.
See Gallaldehyde.

Gallicin.
See under Gallic Acid.

Gallin (4 : 5-*Dihydroxyfluorescin*)

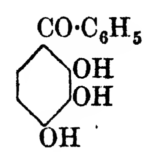


$C_{20}H_{14}O_7$ MW, 366

Needles from Et_2O. Sol. EtOH, AcOH, Me_2CO.
Tetra-Me ether Me ester: $C_{25}H_{24}O_7$. MW, 436. M.p. 127°.
Tetra-acetyl: m.p. 220°.

Orndorff, Delbridge, *Am. Chem. J.*, 1909, **42**, 186.

Gallobenzophenone (4-*Benzoylpyrogallol*, 2 : 3 : 4-*trihydroxybenzophenone*, *Alizarin Yellow A*)



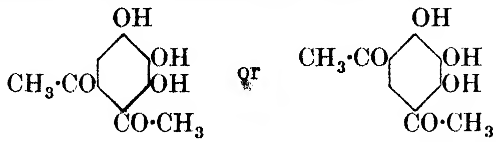
$C_{13}H_{10}O_4$ MW, 230

Yellow needles from EtOH.Aq. M.p. 140–1° (138–9°). Sol. EtOH, Et_2O, AcOH, Me_2CO, hot H_2O. Spar. sol. C_6H_6.
3-(or 4)-*Me ether*: $C_{14}H_{12}O_4$. MW, 244. M.p. 165°.
3 : 4-*Di-Me ether*: $C_{15}H_{14}O_4$. MW, 258. M.p. 131° (120–1°). *Acetyl deriv.*: m.p. 98°.

Triacetyl: m.p. 117–18°. *Oxime*: m.p. 135°. *Phenylhydrazone*: m.p. 130°.

Fischer, Rapaport, *Ber.*, 1913, **46**, 2393.
Motylewski, *Ber.*, 1909, **42**, 3151.

Gallodiacetophenone (4 : 5-(or 4 : 6-)*Diacetylpyrogallol, trihydroxydiacetylbenzene*)

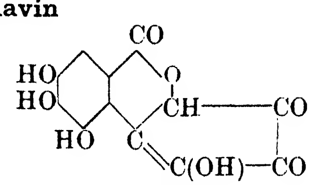


$C_{10}H_{10}O_5$ MW, 210

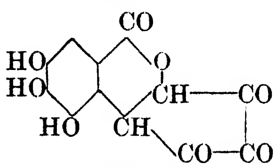
Yellow needles from H_2O. M.p. 190–1°.
Mono-acetyl deriv.: m.p. 207–9°.
Tribenzoyl: m.p. 189°.

Heller, *Ber.*, 1912, **45**, 2391.

Galloflavin



Enol form



Keto form

$C_{12}H_6O_8$ MW, 278

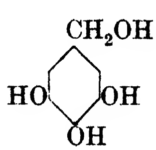
Greenish-yellow leaflets. Blackens without melting. Sol. aniline. Spar. sol. H_2O, EtOH, Et_2O.
Tetra-Me ether: $C_{16}H_{14}O_8$. MW, 334. M.p. 236–9°.
Tetra-acetyl: m.p. 230–3°.

Herzig, *Ann.*, 1920, **421**, 247.

Gallonitrile.
See under Gallic Acid.

4-Galloylpyrogallol.
See 2 : 3 : 4 : 3′ : 4′ : 5′-Hexahydroxybenzophenone.

Gallyl Alcohol (3 : 4 : 5-*Trihydroxybenzyl alcohol*)

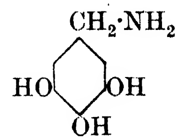


$C_7H_8O_4$ MW, 156

3 : 4 : 5-*Tri-Me ether*: 3 : 4 : 5-trimethoxybenzyl alcohol. $C_{10}H_{14}O_4$. MW, 198. B.p. 228°/25 mm.
3 : 4 : 5-*Tricarbomethoxyl*: m.p. 67–8°. *Naphthylurethane*: m.p. 131–2°. *Ethyl*-p-*nitrobenzoate*: m.p. 147–8°.
3 : 4 : 5-*Tricarbethoxyl*: m.p. 58–9°. *Naphthylurethane*: m.p. 87–8°.

Rosenmund, Pfannkuch, *Ber.*, 1922, **55**, 2369.
Rosenmund, Boehm, *Chem. Abstracts*, 1927, **21**, 2886.

Gallylamine (3 : 4 : 5 - *Trihydroxybenzyl - amine*)



$C_7H_9O_3N$ MW, 155

B,HCl: m.p. 225–6° decomp. (rapid heat.).
Triacetyl deriv.: m.p. 196–7°.
Tri-Me ether: 3 : 4 : 5-trimethoxybenzylamine. $C_{10}H_{15}O_3N$. MW, 197. Oil. Sol. H_2O, EtOH, Et_2O. B_2,H_2PtCl_6: m.p. 197°.

Heffter, Capellmann, *Ber.*, 1905, **38**, 3639.
Rosenmund, Pfannkuch, *Ber.*, 1922, **55**, 2367.

***d*-Galtose**

HO·CH$_2$·CH(OH)·CH(OH)·CO·CH(OH)·CH$_2$OH

$C_6H_{12}O_6$ MW, 180

Syrup. Mixture of α- and β-forms.
Osazone: m.p. 175–82°.

Nef, *Ann.*, 1914, **403**, 239, 347.

Gamma Acid.
See 2-Amino-8-naphthol-6-sulphonic Acid.

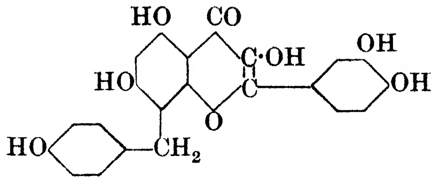
Gangaleoidin

$C_{18}H_{14}O_7Cl_2$ MW, 413

Depside present in *Lecanora gangaleoides*. Needles from EtOH–Me_2CO. M.p. 214–15°. Sol. Me_2CO, warm C_6H_6. Spar. sol. MeOH, EtOH, $CHCl_3$, Et_2O. No. col. with $FeCl_3$.
Acetyl deriv.: prisms from $CHCl_3$–EtOH. M.p. 244–5°.

Hardiman, Keane, Nolan, *Scientific Proceedings, Royal Dublin Society*, 1935, **21**, 141.

Garcinin



Suggested structure

$C_{22}H_{16}O_8(+2H_2O)$ MW, 408 (444)

Occurs in bark of *Garcinia spicata*.

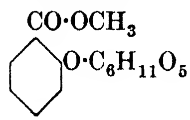
Penta-Me ether: $C_{27}H_{26}O_8$, $1H_2O$. MW, 496. Decomp. at 141–2°.

Murakami, *Chem. Zentr.*, 1934, II, 2394.

Gardenin.

See Crocetin.

Gaultherin (*Glucosido-β-methyl salicylate*)



$C_{14}H_{18}O_8$ MW, 314

Occurs in *Betula lenta*, Linn. Prisms from EtOH. M.p. 90–2° (105° solvent-free). Sol. H_2O, EtOH, AcOH. Insol. Et_2O, $CHCl_3$, Me_2CO, C_6H_6.

Tetra-acetyl deriv.: m.p. 154°.

Schneegens, Gerock, *Ber.*, 1894, **27**R, 883.
Karrer, Weidmann, *Helv. Chim. Acta*, 1920, **3**, 252.

Geijerene

$C_{12}H_{18}$ MW, 162

Oil present in *Geijera parviflora*. B.p. 85°/17 mm. D_{20}^{20} 0·8720. n_D^{20} 1·4888.

Hexahydro deriv.: b.p. 96°/20 mm. D_{25}^{25} 0·8373. n_D^{25} 1·4577.

Penfold, Simonsen, *Chem. Abstracts*, 1933, **27**, 2684.

Geissospermine

$C_{40}H_{50}O_3N_4$ MW, 634

Alkaloid from bark of *Geissospermum velosii*, Allem. (Peruvian bark). (1) Cryst. $+2H_2O$. Sinters at 160°. M.p. 210–12° decomp. Sol. MeOH, EtOH, C_6H_6, AcOEt, Py. Spar. sol. H_2O, Et_2O, CCl_4. $[\alpha]_D$ −108·2° in EtOH. Zn dust dist. ⟶ 2-methyl-4-ethylpyridine. (2) Cryst. $+1\frac{1}{2}H_2O$. Decomp. at 145–7°. $[\alpha]_D$ −101·9° in EtOH.

Di-methiodide: $B_2,2CH_3I,4H_2O$. Decomp. at 261–2°.

B,(COOH)₂: decomp. at 193°.

Bertho, Moog, *Ann.*, 1934, **509**, 241, (*Bibl.*).

Gelsemicine.

Occurs in rhizome of *Gelsemium sempervirens*, Ait. Prisms from Me_2CO. M.p. 171°.

Chou, *Chem. Abstracts*, 1931, **25**, 4085.

Gelsemine

$C_{20}H_{22}O_2N_2$ MW, 322

Occurs in rhizome of *Gelsemium sempervirens*, Ait. Cryst. from Me_2CO. M.p. 178°. $[\alpha]_D$ +15·9° in $CHCl_3$.

B,HCl: m.p. about 300°. $[\alpha]_D$ +2·6° in H_2O.

Acetyl deriv.: m.p. 106–8°. *Hydrochloride*: m.p. 290°.

Benzoyl deriv.: *hydrochloride*, m.p. 303°.

See above reference and also
Sayre, *Chem. Abstracts*, 1919, **13**, 2972.
Moore, *J. Chem. Soc.*, 1911, **99**, 1231.

Gelseminic Acid.

See Scopoletin.

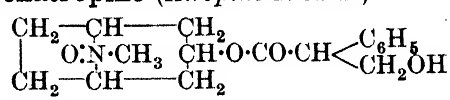
Gemmatein

$C_{17}H_{12}O_7$ MW, 328

Pigment from *Lycoperdon gemmatum*, Batsch. Brown needles. Sol. EtOH. Spar. sol. H_2O. Insol. Et_2O. H_2O_2 + HCl ⟶ homogentisic anhydride. KOH fusion ⟶ *p*-hydroxyphenylacetic acid.

Kotake, Naito, *Z. physiol. Chem.*, 1914, **90**, 254.

Genatropine (*Atropine* N-*oxide*)



$C_{17}H_{23}O_4N$ MW, 305

M.p. 127–8°, decomp. at 135°.

Hydrochloride: m.p. 192–3°.

$(B_4,SiO_2,12WO_3,2H_2O)nH_2O$: m.p. 187°.

Glucoside: $C_{23}H_{33}O_9N$. MW, 467. d-*Tartrate*: m.p. 111°. *Picrate*: m.p. 117–18°.

Polonowski, *Chem. Abstracts*, 1931, **25**, 1289 (*Review*).
Polonowski, Polonowski, *Bull. soc. chim.*, 1926, **39**, 1147.

Geneserethol (*Geneseroline ethyl ether*)

$C_{15}H_{22}O_2N_2$ MW, 262

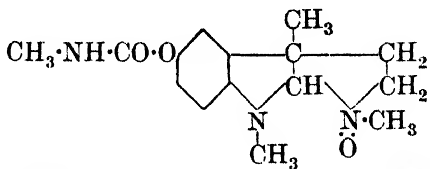
Leaflets. M.p. 83°. $[\alpha]_D$ −182° in EtOH.

Hydrochloride: m.p. 120–4°.

Hydriodide: m.p. 108°.
Picrate: m.p. 156–7°.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, **17**, 249.

Geneserine (*Physostigmine oxide, eserine oxide*)



$C_{15}H_{21}O_3N_3$ MW, 291

Alkaloid of calabar bean. M.p. 128–9°. $[\alpha]_D$ −175° in EtOH.
Salicylate: m.p. 89–90°.
Picrate: m.p. 175°.
Methiodide: m.p. 215°.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, **17**, 244; 1916, **19**, 27.

Geneseroline

$C_{13}H_{18}O_2N_2$ MW, 234

Cryst. M.p. 150°. Sol. EtOH. Spar. sol. Et_2O, pet. ether. Oxidises rapidly in air. $[\alpha]_D$ −176° in EtOH.
Hydrochloride: m.p. 154°.
Hydrobromide: m.p. 208°.
Picrate: m.p. 175°.
Et ether: *see* Geneserethol.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, **17**, 248.

ψ-Geneserolene.
See Hydroxyeserolene.

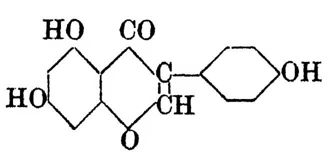
Genin

$C_{22}H_{32}O_6$ MW, 392

Occurs in digitalis species. M.p. 205–6°.
Dibenzoyl deriv.: sinters about 190°.

Killiani, *Ber.*, 1915, **48**, 334.

Genistein (*Prunetol, 5 : 7 : 4′-trihydroxyisoflavone*)



$C_{15}H_{10}O_5$ MW, 270

Occurs as the glucoside genistin in *Genista tinctoria*, Linn. (dyer's broom). Prisms from EtOH,Aq. M.p. 296–8° decomp.
(?)4′-*Me ether*: $C_{16}H_{12}O_5$. MW, 284. M.p. 189–91°.
(?)7-*Me ether*: prunetin. M.p. 242°.
5 : 4′-*Di-Me ether*: $C_{17}H_{14}O_5$. MW, 298. M.p. 290–3°.
7 : 4′-*Di-Me ether*: m.p. 140–2°. *Acetyl deriv.*: m.p. 202–4°.
Tri-Me ether: $C_{18}H_{16}O_5$. MW, 312. M.p. 162–3°.
7 : 4′-*Di-Et ether*: $C_{19}H_{18}O_5$. MW, 326. M.p. 132–4°. *Acetyl deriv.*: m.p. 168–70°.
Triacetyl deriv.: m.p. 200–2°.
Tribenzoyl deriv.: m.p. 239°.

Walz, *Ann.*, 1931, **489**, 124.
Baker, Robinson, *J. Chem. Soc.*, 1928, 3115.

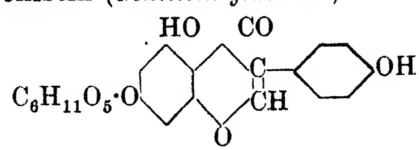
Genisteine

$C_{16}H_{28}N_2$ MW, 248

Alkaloid from broom. M.p. 60·5°. B.p. 177–8°/22 mm., 139·5–140·5°/5 mm.
$B_2,2HCl,3AuCl_3$: m.p. 188°.
$B,H_2PtCl_6,\frac{1}{2}H_2O$: decomp. at 235°.
Dipicrate: m.p. 215° decomp.

Valeur, *Compt. rend.*, 1918, **167**, 163.

Genistin (*Genistein glucoside*)



$C_{21}H_{20}O_{10}$ MW, 432

Glucoside of Soya bean and *Genista tinctoria*, Linn. Leaflets from EtOH. M.p. 254–6° decomp. $[\alpha]_D^{21}$ −27·7° in MeOH.Aq.
Tri-Me ether: $C_{24}H_{26}O_{10}$. MW, 474. M.p. 200–5° decomp.
Hexa-acetyl deriv.: m.p. 198°.
Hexa-benzoyl deriv.: m.p. 132°.

Walz, *Ann.*, 1931, **489**, 121.

Gentiamarin

$C_{16}H_{22}O_{10}$ ($C_{16}H_{20}O_{10}$) MW, 374 (372)

Glucoside occurring in root of "enzian." Amorphous. Sol. H_2O, EtOH. $[\alpha]_D$ −80° to −90°. $FeCl_3 \longrightarrow$ black col. Reduces Fehling's. Hyd. $\longrightarrow$ glucose.

Tanret, *Bull. soc. chim.*, 1905, **33**, 1071.

Gentianin.
See Gentisin.

Gentianose

$C_{18}H_{32}O_6$ MW, 344

Trisaccharide occurring in roots of various species of gentian. Cryst. from 95% EtOH.

M.p. 209°. Hyd. by gentianase ⟶ sucrose + glucose; by invertase ⟶ gentiobiose + fructose; by emulsin ⟶ sucrose + glucose. $[\alpha]_D$ +31·25°. Does not reduce Fehling's.

Sivadjian, *J. pharm. chim.*, 1929, **9**, 434.
Bridel, *J. pharm. chim.*, 1930, **10**, 62.

Gentienin

$C_{14}H_{10}O_5$ MW, 258

Occurs as glucoside gentiin in gentian. Yellow needles from EtOH. M.p. 225°.

Tanret, *Compt. rend.*, 1905, **141**, 263.

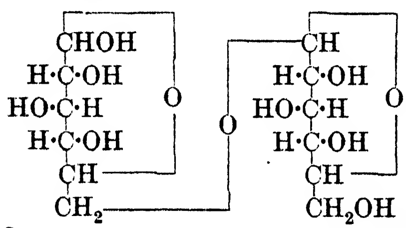
Gentiin

$C_{25}H_{28}O_{14}$ MW, 552

Glucoside from gentian root. Yellow needles from EtOH.Aq. M.p. 274°. Hyd. ⟶ gentienin + glucose + xylose.

Tanret, *Compt. rend.*, 1905, **141**, 263; *Bull. soc. chim.*, 1905, **33**, 1073.

Gentiobiose (*Isomaltose*, 6-β-*glucosidoglucose*)



$C_{12}H_{22}O_{11}$ MW, 342

Disaccharide formed by hyd. of gentianose, α-crocin, and amygdalin.

α-Form:

Cryst. + $2CH_3OH$ from MeOH. M.p. 85·5–86°, anhyd. 189–195°. $[\alpha]_D$ + 31° ⟶ + 9·6° in H_2O.

β-Form:

Cryst. from EtOH. M.p. 190–5°. $[\alpha]_D$ − 11° ⟶ + 9·6° in H_2O.

Osazone: m.p. 162–7° decomp. $[\alpha]_D^{20}$ − 14·8° in Py.

Methyl-glucoside: $C_{13}H_{24}O_{11}$. MW, 356. (α). Cryst. + 1EtOH. M.p. 102°. $[\alpha]_D^{23}$ (anhyd.) + 61·8° in H_2O. (β). M.p. 98°. $[\alpha]_D^{20}$ − 36·0° in $CHCl_3$. *Hepta-acetyl*: m.p. 82°. $[\alpha]_D^{20}$ −18·8° in $CHCl_3$. *Hepta-Me ether*: m.p. 109° (106°). $[\alpha]_D^{16\cdot5}$ − 20·89° in EtOH.

Hepta-acetyl: m.p. 178°. $[\alpha]_D^{20}$ +35·1° ⟶ + 31·6° in Py. *Chloro*: (α). M.p. 136·5–137° (148°). $[\alpha]_D^{20}$ + 82·8° (+ 80·57°) in $CHCl_3$. *Bromo*: (α). M.p. 144°. $[\alpha]_D^{20}$ + 101·08° in $CHCl_3$.

Octa-acetyl: (α). M.p. 188–9°. $[\alpha]_D^{20}$ + 52·3° in CHCl. (β). M.p. 192–3°. $[\alpha]_D^{20}$ − 5·3° in $CHCl_3$.

Zemplén, Gerecs, *Ber.*, 1931, **64**, 1545.
Hudson, Johnson, *J. Am. Chem. Soc.*, 1917, **39**, 1272.
Brauns, *J. Am. Chem. Soc.*, 1927, **49**, 3170.
Haworth, Wylam, *J. Chem. Soc.*, 1923, **123**, 3120.
Taylor, Lipschitz, *J. Am. Chem. Soc.*, 1932, **54**, 1054.

Gentiogenin

$C_{10}H_{10}O_4$ MW, 194

Occurs in gentian root as glucoside gentiopicrin. Needles. M.p. 185°. Sol. MeOH, hot EtOH.

Tetra-acetyl deriv.: m.p. 207–10°.

Tanret, *Bull. soc. chim.*, 1905, **33**, 1059.

Gentiopicrin

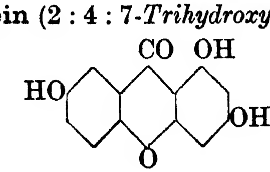
$C_{16}H_{20}O_9$ ($C_{20}H_{30}O_{12}$) MW, 356 (462)

Glucoside from root of *Gentiana lutea*, Linn., and other species, and *Chlora perfoliata*, Linn. Cryst. from H_2O. M.p. 122°, anhyd. 191°. Spar. sol. EtOH. Insol. Et_2O. Reduces Tollen's reagent. $[\alpha]_D$ −196·3° in H_2O. Hyd. by emulsin ⟶ gentiogenin + glucose.

Penta-acetyl deriv.: m.p. 139°. [α] − 164°.

Kromayer, *Jahresbericht über die Fortschritte der Chemie*, 1862, 483.
Tanret, *Compt. rend.*, 1905, **141**, 207; *Bull. soc. chim.*, 1905, **33**, 1059.
Bridel, *J. pharm. chim.*, 1913, **6**, 481; 1913, **7**, 486; 1914, **10**, 62.

Gentisein (2 : 4 : 7-*Trihydroxyxanthone*



$C_{13}H_8O_5$ MW, 244

Orange-yellow needles from MeOH. M.p. 318°. Sol. EtOH.

2-*Me ether*: *see* Gentisin.

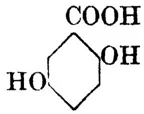
7-*Me ether*: isogentisin. $C_{14}H_{10}O_5$. MW, 258. M.p. 241°. *Acetyl deriv.*: m.p. 211–12°.

2 : 7-*Di-Me ether*: $C_{15}H_{12}O_5$. MW, 272. M.p. 167°. *Acetyl deriv.*: m.p. 189°.

2 : 4 : 7-*Triacetyl*: m.p. 226°.

Shinoda, *J. Chem. Soc.*, 1927, 1985.

Gentisic Acid (2 : 5-*Dihydroxybenzoic acid, hydroquinonecarboxylic acid, 5-hydroxysalicylic acid*)



$C_7H_6O_4$ MW, 154

Cryst. from H_2O. M.p. 200°. Sol. H_2O, EtOH, Et_2O. Insol. $CHCl_3$, C_6H_6, CS_2. $k = 1{\cdot}3\ (1{\cdot}1) \times 10^{-3}$ at 25°. $FeCl_3 \longrightarrow$ blue col. Reduces Fehling's and Tollen's reagent. Heat $\longrightarrow$ hydroquinone.

Me ester: $C_8H_8O_4$. MW, 168. M.p. 88°. *Diacetyl*: m.p. 62–63·5° in sealed tube.

Et ester: $C_9H_{10}O_4$. MW, 182. M.p. 77°.

Nitrile: $C_7H_5O_2N$. MW, 135. M.p. 151°.

2-*Acetyl*: m.p. 171–2°.

5-*Acetyl*: m.p. 131–2°.

Diacetyl: m.p. 118–19°.

2-*Benzoyl*: m.p. 211–12°.

5-*Benzoyl*: m.p. 178–9°.

2-*Acetyl-5-benzoyl*: m.p. 166–7°.

2-*Me ether*: 5-hydroxy-2-methoxybenzoic acid. $C_8H_8O_4$. MW, 168. M.p. 155–6°. *Me ester, 5-benzoyl deriv.*, m.p. 83–4°.

5-*Me ether*: 5-methoxysalicylic acid. M.p. 145–6°. *Me ester*: $C_9H_{10}O_4$. MW, 182. B.p. 255°, 146–7°/17 mm.; 2-*acetyl deriv.*, m.p. 45–6°, b.p. 183–4°/16 mm.; 2-*benzoyl deriv.*, m.p. 106–7°.

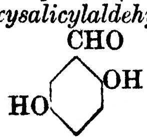
Di-Me ether: *see* 2 : 5-Dimethoxybenzoic Acid.

5-*Et ether*: 2-hydroxy-5-ethoxybenzoic acid, 5-ethoxysalicylic acid. $C_9H_{10}O_4$. MW, 182. M.p. 164°.

5-*Me-2-phenyl ether*: 5-methoxy-2-phenoxybenzoic acid, 4-methoxydiphenyl ether 2-carboxylic acid. $C_{14}H_{12}O_4$. MW, 244. M.p. 156°.

Fichter, Grisard, *Helv. Chim. Acta*, 1921, **4**, 930.
Pukkedu, *Gazz. chim. ital.*, 1929, **59**, 13.
Raistrick, Simonart, *Biochem. J.*, 1933, **27**, 628.
Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).
Mauthner, *J. prakt. Chem.*, 1915, **91**, 180.

Gentisic Aldehyde (2 : 5-*Dihydroxybenzaldehyde, 5-hydroxysalicylaldehyde*)



$C_7H_6O_3$ MW, 138

Yellow needles from hot C_6H_6. M.p. 99°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. ligroin.

5-*Me ether*: 2-hydroxy-5-methoxybenzaldehyde, 5-methoxysalicylaldehyde. $C_8H_8O_3$. MW, 152. M.p. 4°. B.p. 247–8° (in CO_2). Sol. EtOH, Et_2O. 2-*Acetyl*: m.p. 63°.

Di-Me ether: 2 : 5-dimethoxybenzaldehyde. $C_9H_{10}O_3$. MW, 166. Needles. M.p. 53°. Turns green on standing or on melting. B.p. 270° (in CO_2), 146°/10 mm. Sol. EtOH, Et_2O. *Semicarbazone*: m.p. 208°.

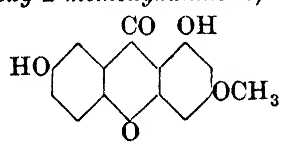
5-*Et ether*: 2-hydroxy-5-ethoxybenzaldehyde, 5-ethoxysalicylaldehyde. $C_9H_{10}O_3$. MW, 166. Yellow prisms. M.p. 51–2°. B.p. 230°. Sol. EtOH, Et_2O, $CHCl_3$. Volatile in steam. 2-*Acetyl*: m.p. 69°.

Di-Et ether: 2 : 5-diethoxybenzaldehyde. $C_{11}H_{14}O_3$. MW, 194. Colourless needles. M.p. 62·5°. B.p. 280–5°.

Semicarbazone: m.p. 249°.

Neubauer, Flatow, *Z. physiol. Chem.*, 1907, **52**, 380.
Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Gentisin (*Gentianin, gentisein 2-methyl ether, 4 : 7-dihydroxy-2-methoxyxanthone*)



$C_{14}H_{10}O_5$ MW, 258

Yellow pigment from root of *Gentiana lutea*, Linn. Yellow needles. M.p. 266–7°.

Diacetyl: m.p. 196–196·5°.

Dibenzoyl: m.p. 192°.

Tunmann, *Chem. Zentr.*, 1916, II, 65.
Shinoda, *J. Chem. Soc.*, 1927, 1983 (*Bibl.*).
Binaghi, Falqui, *Chem. Abstracts*, 1926, **20**, 645 (*Bibl.*).

Geoffroyin.

See Surinamine.

Geranial.

See Citral.

Geranic Acid (2 : 6-*Dimethyl*-1 : 5-*heptadiene-1-carboxylic acid* and 2 : 6-*dimethyl*-1 : 6-*heptadiene*-1-*carboxylic acid*)

$$CH_3{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}COOH$$

and

$$CH_2{:}\overset{CH_3}{C}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}COOH$$

$C_{10}H_{16}O_2$ **MW, 168**

A mixture of the above isomers. B.p. 158°/14 mm., 153°/11 mm. $D_4^{19\cdot4}$ 0·9518. $n_D^{20\cdot2}$ 1·48695.

Me ester: $C_{11}H_{18}O_2$. MW, 182. B.p. 117°/14 mm. D_4^{20} 0·9220. $n_D^{19\cdot1}$ 1·47143.

Et ester: $C_{12}H_{20}O_2$. MW, 196. B.p. 110–20°.

Nitrile: $C_{10}H_{15}N$. MW, 149. B.p. 138–40°/15 mm., 110°/10 mm. D^{20} 0·8709. n_D^{20} 1·4759.

Tiemann, *Ber.*, 1898, **31**, 827.
Verley, *Bull. soc. chim.*, 1919, **25**, 70.

Geraniene

$C_{10}H_{16}$ MW, 136

B.p. 162–4°. D^{20} 0·8425.

Jacobsen, *Ann.*, 1871, **157**, 239.

Geraniol (2 : 6-*Dimethyl*-2 : 6(or 2 : 7)-*octadienol*-8)

$$CH_3{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2OH$$

or

$$CH_2{:}\overset{CH_3}{C}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2OH$$

$C_{10}H_{18}O$ MW, 154

Occurs in oils of *Andropogon schoenanthus*, Linn., *Pelargonium odoratissimum*, Ait., rose, palmarosa, etc. Liq. at −15°. B.p. 230°, 129°/25 mm., 122°/29 mm., 121°/18 mm., 120·5–122·5°/17 mm., 110·5–111°/10 mm., 107–107·6°/8 mm., 94°/3 mm. D^{20} 0·8894. n_D^{20} 1·4766. Sol. EtOH, Et_2O. Insol. H_2O.

Et ether: $C_{12}H_{22}O$. MW, 182. B.p. 218°, 115°/19 mm. D^{25} 0·864.

Formyl: geranyl formate. B.p. 113–14°/15 mm., 104–5°/10–11 mm.

Acetyl: geranyl acetate. Occurs in citronella, orange flower and other volatile oils. B.p. 242–5°/764 mm. decomp., 130–2°/22 mm., 127·8–129·2°/16 mm., 129–130·5°/14·5 mm., 110–15°/10–11 mm. D^{15} 0·9174. n_D^{15} 1·4628.

Butyryl: geranyl butyrate. B.p. 151–3°/18 mm., 142–3°/13 mm. D_4^{17} 0·9008.

Isobutyryl: geranyl isobutyrate. B.p. 135–7°/13 mm.

Benzoyl deriv.: geranyl benzoate. B.p. 198–200°/15 mm., 194–5°/12 mm.

Diphenylurethane: m.p. 82°.

Valli-Douau, *Revue de Parfumerie*, 1925, **5**, 10 (*Review*).
Kötz, Steche, *J. prakt. Chem.*, 1924, **107**, 193.
Labo, *Chimie et Industrie*, 1923, **10**, 931.
Forster, Cardwell, *J. Chem. Soc.*, 1913, **103**, 1342.
Sachs, *Perfumer's Journal*, 1926, **7**, iii, 11, 32; iv, 11.
Dubosc, *Parfumerie moderne*, 1925, **18**, 98, 196.
Verley, *Bull. soc. chim.*, 1919, **25**, 73.

Geraniolene.

See 2 : 6-Dimethylheptadiene-1 : 5.

Geranyl acetate.

See under Geraniol.

Geranylamine (3 : 7-*Dimethyl*-2 : 6(or 2 : 7)-*octadienylamine*, 1-*amino*-3 : 7-*dimethyloctadiene*-2 : 6(or 2 : 7))

$$CH_3{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}NH_2$$

or

$$CH_2{:}\overset{CH_3}{C}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}NH_2$$

$C_{10}H_{19}N$ MW, 153

Probably a mixture of above isomers. B.p. 105°/19 mm. D^{25} 0·829.

B,HCl: m.p. about 120°.

N-*Acetyl*: b.p. 191°/18 mm.

N-*Benzylidene*: b.p. 220°/20 mm.

Picrate: m.p. 117–19°.

Forster, Cardwell, *J. Chem. Soc.*, 1913, **103**, 1343.

Geranyl benzoate.

See under Geraniol.

Geranyl butyrate.

See under Geraniol.

Geranyl formate.

See under Geraniol.

Geranyl isobutyrate.

See under Geraniol.

Germanin.

See Bayer 205. Addendum, Vol. I., p. 693.

Geronaldehyde (1 : 1-*Dimethyl*-4-*aceto*-n *valeraldehyde, geronic aldehyde*)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\underset{CH_3}{CH_3}}{\cdot}CHO$$

$C_9H_{16}O_2$ MW, 156

B.p. 48–50°/3 mm.

Pummerer, Rebmann, Reindel, *Ber.*, 1931, **64**, 497.

Geronic Acid (1 : 1-*Dimethyl*-4-*aceto*-n-*valeric acid*)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\underset{CH_3}{C}}{\cdot}COOH$$

$C_9H_{16}O_3$ **MW, 172**

B.p. 275–80°/740 mm., 190–1°/31 mm., 169°/12 mm., 132°/2 mm. Sol. EtOH, Et_2O. D_4^{20} 1·0211. n_D^{20} 1·44883. HNO_3 $\longrightarrow$ 1 : 1-dimethylglutaric acid.

Et ester: $C_{11}H_{20}O_3$. MW, 200. B.p. 121–2°/12 mm.

Oxime: m.p. 93–4°.

Semicarbazone: m.p. 164°.

2 : 4-*Dinitrophenylhydrazone*: m.p. 135·5–137°.

Masson, *Compt. rend.*, 1912, **154**, 518.
Pummerer, Rebmann, Reindel, *Ber.*, 1931, **64**, 494.
Strain, *J. Biol. Chem.*, 1933, **102**, 137.

Geronic Aldehyde.
See Geronaldehyde.

Gheddic Acid

$C_{34}H_{68}O_2$ MW, 508

Constituent of Ghedda or East Indian Wax from *Apis dorsata*, *A. florea* and *A. indica*. Needles from AcOEt. M.p. 94·5–95°. Spar. sol. Et_2O.

Lipp, Casimir, *J. prakt. Chem.*, 1919, **99**, 263.

Gingerol

$C_6H_3(OH)(OCH_3)\cdot CH_2\cdot CH_2\cdot CO\cdot CH_2\cdot CH(OH)$
$CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH_2$

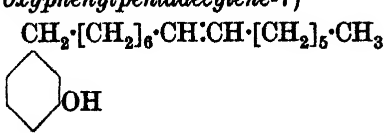
$C_{17}H_{26}O_4$ MW, 294

Occurs in rhizome of *Zingiber officinale*, Rosc. Not obtained pure. B.p. 235–40°/18 mm., 227–9°/6 mm. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Mod. sol. hot pet. ether. D_{20}^{20} 1·0713. n_D^{20} 1·5212. $[\alpha]_D$ +12·9°.

Me ether: $C_{18}H_{28}O_4$. MW, 308. M.p. 63·5–64°. $[\alpha]_D^{20}$ +9·04° in EtOH. *Oxime*: m.p. 85·5–86·5°.

Nomura, Iwamoto, *Science Reports Tokyo Imperial University*, 1928, **17**, 973; 1929, **18**, 661.
Redgrove, *Pharm. J.*, 1930, **125**, 54 (*Bibl.*, *Review*).
Lapworth, Pearson, Royle, *J. Chem. Soc.*, 1917, **111**, 777.

Ginkgol (m-*Hydroxypentadecenylbenzene*, 15-m-*hydroxyphenylpentadecylene*-7)



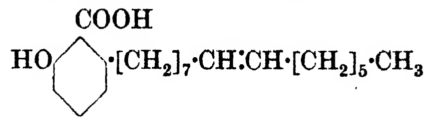
$C_{21}H_{34}O$ MW, 302

B.p. 221–3°/4 mm. Conc. H_2SO_4 $\longrightarrow$ orange-red sol.

Me ether: $C_{22}H_{36}O$. MW, 316. B.p. 224–8°/7 mm.

Kawamura, *Japan J. Chem.*, 1928, **3**, 89.
Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, **24**, 304.

Ginkgolic Acid (6-*Hydroxy-2-pentadecenylbenzoic acid*, 6-*pentadecenylsalicylic acid*)



$C_{22}H_{34}O_3$ MW, 346

Constituent of *Ginkgo biloba*, Linn. Needles from pet. ether. M.p. 42–3°. Alc. $FeCl_3$ $\longrightarrow$ violet col. Conc. H_2SO_4 $\longrightarrow$ yellow sol. with green fluor. Heat $\longrightarrow$ ginkgol + CO_2.

Me ether: $C_{23}H_{36}O_3$. MW. 360. *Me ester*: $C_{24}H_{38}O_3$. MW, 374. B.p. 230–3°/2 mm. No col. with alc. $FeCl_3$.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, **26**, 178.
See also first reference above.

Ginnol

$C_{27}H_{56}O$ MW, 396

Constituent of *Ginkgo biloba*, Linn. Cryst. from EtOH or Me_2CO. M.p. 82·5°. Sol. Et_2O, C_6H_6, $CHCl_3$, pet. ether. Spar. sol. EtOH, MeOH.

Acetyl deriv.: plates from Me_2CO. M.p. 43–43·5°.

Kawamura, *Japan J. Chem.*, 1928, **3**, 100.

Ginnone

$C_{27}H_{54}O$ MW, 394

Cryst. from EtOH.Aq. M.p. 74–5°.

Oxime: needles from EtOH. M.p. 49–50°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 45–6°.

Kawamura, *Japan J. Chem.*, 1928, **3**, 101.

Gitaligenin

$C_{11}H_{18}O_3$ MW, 198

Hydrolysis product of gitalin. Needles. M.p. 222°.

Cloetta, *Chem. Abstracts*, 1926, **20**, 2724.

Gitalin (ψ-*Digitonin*)

$C_{17}H_{28}O_6$ MW, 328

Glucoside obtained from *Digitalis purpurea*, Linn. (foxglove). M.p. 245°. Sol. EtOH, $CHCl_3$, Me_2CO. $[\alpha]_D^{18}$ −25·2° in $CHCl_3$.

Steppun, *Chem. Abstracts*, 1929, **23**, 1213.
Windaus, *Chem. Abstracts*, 1930, **24**, 4789.
Maneli, *Gior. chim. ind. applicata*, 1922, **4**, 355.
See also above reference.

Githagenin

$C_{29}H_{44}O_4$ MW, 456

Occurs in *Lychnis Githago*, Scop., (corn cockle seed). M.p. 286–7° decomp. $[\alpha]_D$ +77·3°.
Diacetyl deriv.: m.p. 187–8°.
Oxime: m.p. 155–7° decomp.
Semicarbazone: m.p. 292° decomp.

Wedekind, Schicke, *Z. physiol. Chem.*, 1929, **182**, 72; 1930, **190**, 1.

Githagic Acid

$C_{29}H_{42}O_6$ MW, 486

M.p. 223–4°.
Dioxime: m.p. 225° decomp.

See previous reference.

Githagoic Acid

$C_{28}H_{44}O_5$ MW, 460

M.p. 359°. $[\alpha]_D$ +91·6°.
Di-Me ester: $C_{30}H_{48}O_5$. MW, 488. M.p. 247°. $[\alpha]_D$ +77°.

Wedekind, Schicke, *Z. physiol. Chem.*, 1930, **190**, 1.

Githagonolic Acid

$C_{25}H_{38}O_4$ MW, 402

Cryst. +1H_2O. M.p. 364°.
Me ester: $C_{26}H_{40}O_4$. MW, 416. M.p. 234–5°. *Mono-acetyl deriv.*: m.p. 171°.
Mono-acetyl deriv.: m.p. 321°.

See previous reference.

Gitin

$C_{55}H_{94}O_{28}$ MW, 1202

Glucoside from digitalis leaves. M.p. 265°. Hyd. ⟶ galactose + digitogenin.

Kraft, *Chem. Zentr.*, 1912, I, 1576.
Kobert, *ibid.*, II, 947.

Gitogenic Acid

$C_{26}H_{40}O_6$ MW, 448

Leaflets. M.p. 242–3°.

Windaus, Linsert, *Z. physiol. Chem.*, 1925, **147**, 275.

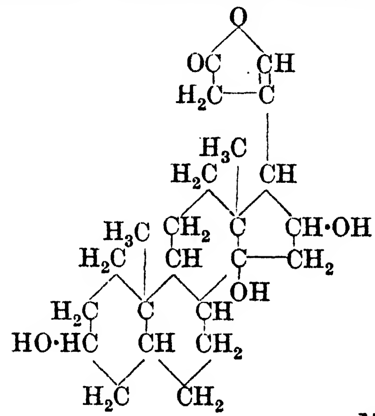
Gitogenin (*Digine*)

$C_{26}H_{42}O_4$ MW, 418

Leaflets. M.p. 271–2°. Se ⟶ γ-methylcyclopentenylphenanthrene.
Diacetyl deriv.: m.p. 243–4°.
Dipropionyl deriv.: m.p. 195–6°.

Jacobs, Simpson, *J. Am. Chem. Soc.*, 1934, **56**, 1424; *J. Biol. Chem.*, 1935, **110**, 429.
See also previous reference.

Gitoxigenin (*Bigitaligenin, hydroxydigitoxin*)



$C_{23}H_{34}O_5$ MW, 390

Leaflets from MeOH. M.p. 231–2° (224–5° decomp.).
Diacetyl deriv.: m.p. 249–50°.
Dibenzoyl deriv.: m.p. 262°.

Jacobs, Elderfield, *J. Biol. Chem.*, 1935, **108**, 497.

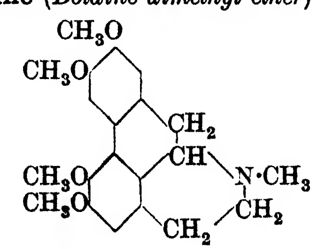
Gitoxin (*Anhydrogitalin, bigitalin*)

$C_{41}H_{64}O_{14}$ MW, 780

Glucoside from digitalis leaves. M.p. 266–9° (varies with rate of heating). Spar. sol. H_2O, EtOH, $CHCl_3$. Hyd. ⟶ gitoxigenin + 3 mols. digitoxose.

Windaus, Westphal, Stein, *Ber.*, 1928, **61**, 1847.

Glaucine (*Boldine dimethyl ether*)



$C_{21}H_{25}O_4N$ MW, 355

Alkaloid from *Glaucium flavum*, Crants, and *Corydalis tuberosa*, D.C. Yellow prisms.

d-.

M.p. 119–20°. $[\alpha]_D$ +115·4° in EtOH.Aq.

l-.

M.p. 124–5° (119–20°). $[\alpha]_D$ − 115·4° in EtOH.Aq. Sol. ord. org. solvents. Insol. H_2O, pet. ether.

B,HCl,3H₂O: decomp. at 243–6°. $[\alpha]^{22}_D$ −57·10°.

B,HBr: decomp. at 241°. $[\alpha]^{17}_D$ − 98·04°.

d-*Hydrogen tartrate*: m.p. 216–17°. $[\alpha]^{18}_D$ −44·12°.

l-*Hydrogen tartrate*: m.p. 165°.

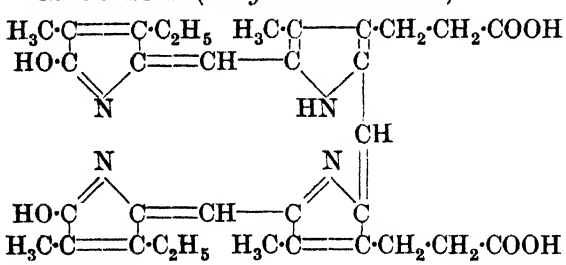
Methiodide: m.p. 224–5°. $[\alpha]^{17}_D$ −72·46°.

dl-.

M.p. 137–9°.

Gorter, *Chem. Zentr.*, 1921, III, 345.
Girardet, *J. Chem. Soc.*, 1931, 2630.
Go, *Chem. Abstracts*, 1931, **25**, 518.
Warmut, *Ber.*, 1926, **59**, 85.
Gadamer, *Chem. Zentr.*, 1912, I, 151.

Glaucobilin (*Dehydromesobilirubin*)



$C_{33}H_{38}O_6N_4$ MW, 586

Greenish-blue prisms from MeOH. Sinters at 205–20°. M.p. 304° decomp.

Di-Me ester: $C_{35}H_{42}O_6N_4$. MW, 614. Violet iridescent needles. M.p. 216°.

Ferrichloride: ferrobilin. $C_{33}H_{38}O_6N_4$, $FeCl_3$, HCl. MW, 785. Blue needles. M.p. 260° decomp. Sol. EtOH, MeOH. Spar. sol. AcOH, $CHCl_3$. Sols. green. *Di-Me ester*: $C_{35}H_{42}O_6N_4$, $FeCl_3$, HCl. MW, 813. (a) M.p. 255°: (b) m.p. 244°.

Fischer, Baumgartner, Hess, *Z. physiol. Chem.*, 1932, **206**, 201.

Glauconic Acid.

There are two acids of this name.

(i) $C_{18}H_{20}O_7$. MW, 348. Prisms from AcOH. M.p. 202°. Sol. AcOH, AcOEt, Py. Spar. sol. EtOH, Et_2O, C_6H_6, pet. ether.

(ii) $C_{18}H_{20}O_6$. MW, 332. Cryst. from EtOH. M.p. 186°.

Mono-acetyl deriv.: m.p. 175°.

Mono-benzoyl deriv.: m.p. 170°.

Wijkman, *Ann.*, 1931, **485**, 61.

Glaucophyllin

$C_{31}H_{32}N_4Mg(COOH)_2$

$C_{33}H_{34}O_4N_4Mg$ MW, 574

Prisms with blue sheen from Et_2O. Sol. Me_2CO, Py. Mod. sol. EtOH. Insol. H_2O, $CHCl_3$, C_6H_6, CS_2, pet. ether. Sols. have intense red col.

Willstätter, *Ber.*, 1914, **47**, 2854; *Ann.*, 1909, **371**, 61.

Glaucoporphyrin

$C_{31}H_{34}N_4(COOH)_2$

$C_{33}H_{36}O_4N_4$ MW, 552

Reddish-violet needles from Py–AcOEt. Begins to melt at 270°, m.p. 290–5° decomp. Sol. Py, formic acid, Spar. sol. EtOH, Et_2O. Insol. $CHCl_3$.

Willstätter, *Ber.*, 1914, **47**, 2843, 2854; *Ann.*, 1909, **371**, 87.

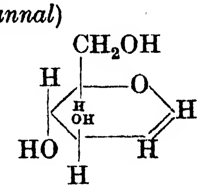
Globulol

$C_{15}H_{26}O$ MW, 222

Occurs in oil of *Eucalyptus globulus*. B.p. 283°/755 mm. $[\alpha]^{20}_D$ −35·29° in $CHCl_3$.

Burke, Scalione, *Ind. Eng. Chem.*, 1915, **7**, 206.
Semmler, Tobias, *Ber.*, 1913, **46**, 2026.

Glucal (*Mannal*)



$C_6H_{10}O_4$ MW, 146

Hygroscopic needles. M.p. 60°. $[\alpha]^{19}_D$ − 7·2° in H_2O. Very sol. H_2O.

3 : 4 : 6-*Tri-Me ether*: $C_9H_{16}O_4$. MW, 188. B.p. 45°/0·03 mm. n^{20}_D 1·4558. $[\alpha]^{18}_D$ + 19·6° in H_2O.

3 : 4 : 6-*Triacetyl*: m.p. 54·5°. $[\alpha]_D$ − 15·5° in EtOH.

3 : 4-*Diacetyl-6-benzoyl*: m.p. 92–3°. $[\alpha]^{23}_D$ + 37·7° in $CHCl_3$.

Hirst, Woolven, *J. Chem. Soc.*, 1931, 1131.
Brigl, Grüner, *Ann.*, 1932, **495**, 75.
Gehre, Obst, *Ber.*, 1931, **64**, 1728.

Glucoacetovanillone.
See Androsin.

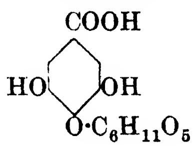
Glucofrangulin (*Frangulin glucoside*)

$C_{27}H_{30}O_{14}$ MW, 578

Occurs in frangula bark. Amorphous yellow solid + $1H_2O$. M.p. 215°. Sol. H_2O, MeOH, EtOH, AcOH, Py. Insol. C_6H_6, $CHCl_3$, CS_2, Et_2O. H_2SO_4.Aq. ⟶ frangula-emodin + glucose + rhamnose.

Casparis, Maeder, *Bull. soc. chim. biol.*, 1927, **9**, 324; *Chem. Abstracts*, 1927, **21**, 2169.

Glucogallic Acid (β-4-*Glucosido*-3 : 4 : 5-*trihydroxybenzoic acid, gallic acid glucoside*)



$C_{13}H_{16}O_{10}$ MW, 332

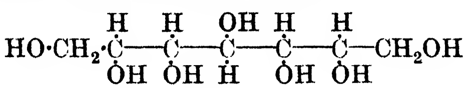
Occurs in galls. Grey prisms from Me_2CO. M.p. 233°. Sol. H_2O, EtOH. Reduces Fehling's.

Et ester: *tetra-acetyl deriv.*, m.p. 180–1°. $[\alpha]_D^{20}$ − 10·66° in $C_2H_2Cl_4$. *Hexa-acetyl deriv.*, m.p. 176–7°. $[\alpha]_D^{18}$ − 19° in $C_2H_2Cl_4$.

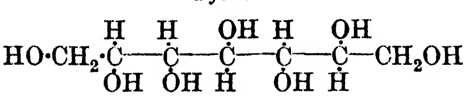
Me ether: $C_{14}H_{18}O_{10}$. MW, 346. M.p. 79°.

Fischer, *Ber.*, 1919, **52**, 820 (*Bibl.*).

Glucoheptitol (*Glucoheptite*)



α-form



β-form

$C_7H_{16}O_7$ MW, 212

α-Form:

Prisms from MeOH. M.p. 134–5°. Sol. H_2O. Spar. sol. EtOH. Heat of comb. 841·2 Cal. Optically inactive.

Hepta-acetyl: plates from H_2O. M.p. 113°.

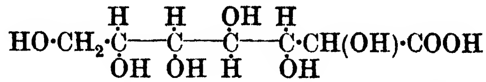
β-Form:

Plates from EtOH. M.p. 130–1°. Sol. H_2O. Spar. sol. EtOH. $[\alpha]_D^{10}$ + 0·48° in H_2O.

Hepta-benzoyl: m.p. 182°.

Phillippe, *Compt. rend.*, 1909, **147**, 1481.
Pictet, Barbier, *Helv. Chim. Acta*, 1921, **4**, 924.

d-Glucoheptonic Acid (1 : 2 : 3 : 4 : 5 : 6-*Hexahydroxy*-n-*heptylic acid*)



$C_7H_{14}O_8$ MW, 226

α-Form:

γ-Lactone: $C_7H_{12}O_7$. MW, 208. Prisms from H_2O. M.p. 156–7°. $[\alpha]_D^{20}$ + 41° in H_2O. *Tetra-acetyl*: m.p. 128°. $[\alpha]_D^{20}$ − 23·83°. 1 : 2 : 4 : 5 : 6-*Penta-Me ether*: $C_{12}H_{22}O_7$. MW, 278. M.p. 104°. $[\alpha]_D^{20}$ − 13·2° initial, in H_2O.

Amide: $C_7H_{15}O_7N$. MW, 225. M.p. 134–5° (129°). $[\alpha]_D^{20}$ + 10·6° in H_2O. *Hexa-acetyl*: m.p. 163°. $[\alpha]_D^{20}$ + 17·4° in $CHCl_3$.

Nitrile: *hexa-acetyl*, m.p. 112·5–113·5°. $[\alpha]_D^{21}$ + 24·6° in $CHCl_3$.

δ-Lactone: 1 : 2 : 3 : 5 : 6-*Penta-Me ether*: m.p. 83°. $[\alpha]_D^{17}$ + 40° initial, + 9° final, in H_2O.

β-Form:

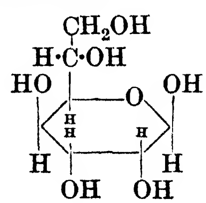
M.p. 134–5°.

γ-Lactone: $[\alpha]_D^{20}$ + 1·4°.

Amide: m.p. 158°.

Zemplén, Kiss, *Ber.*, 1927, **60**, 169.
Rehorst, *Ann.*, 1933, **503**, 163.
Philippe, *Ann. chim. phys.*, 1912, **26**, 328.
Haworth, Hirst, Stacey, *J. Chem. Soc.*, 1932, 2483.
Levene, Meyer, *J. Biol. Chem.*, 1925, **66**, 173.
Liebrecht, E.P., 8,503, (*Chem. Abstracts*, 1913, **7**, 3196).

d-α-Glucoheptose



$C_7H_{14}O_7$ MW, 210

Cryst. from H_2O. M.p. 193°. $[\alpha]_D^{20}$ − 20° in H_2O.

Methylglucoside: β-methyl-α-glucoheptoside. $C_8H_{16}O_7$. MW, 224. M.p. 169°. $[\alpha]_D$ − 75° in H_2O. *Penta-acetyl*: (α). M.p. 169°. $[\alpha]_D^{19}$ + 91° in $CHCl_3$. (β). M.p. 150°. $[\alpha]_D^{21}$ − 16° in $CHCl_3$.

2 : 3 : 4 : 6 : 7-*Penta-Me ether*: $C_{12}H_{24}O_7$. MW, 280. (β). M.p. 84°. $[\alpha]_D^{18}$ − 62·5°. *Methylglucoside*: methylglucoheptoside. $C_{13}H_{26}O_7$.

MW, 294. B.p. 140°/0·08 mm. n_D^{17} 1·4487. $[\alpha]_D^{21}$ − 97° in H_2O.

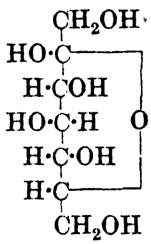
1 : 2 : 3 : 4 : 6 : 7-*Hexa-acetyl*: (α). M.p. 164°. $[\alpha]_D^{20}$ + 87° in $CHCl_3$. (β). M.p. 135°. $[\alpha]_D^{20}$ + 4·8° in $CHCl_3$.

Osazone : m.p. 194–5° decomp.

Hudson, Yanovsky, *J. Am. Chem. Soc.*, 1916, **38**, 1575.

Haworth, Hirst, Stacey, *J. Chem. Soc.*, 1931, 2864 (*Bibl.*).

Glucoheptulose



$C_7H_{14}O_7$ MW, 210

d-.

M.p. 171·4°. $[\alpha]_D^{20}$ + 67·4° in H_2O. Reduces Fehling's.

α-*Methylglucoside* : $C_8H_{16}O_7$. MW, 224. M.p. 138–40°. $[\alpha]_D^{22}$ + 108·5° in H_2O. *Penta-acetyl* : m.p. 110°. $[\alpha]_D^{22}$ + 78·5° in $CHCl_3$.

1 : 2 : 3 : 4 : 5 : 7-*Hexa-acetyl* : m.p. 112°. $[\alpha]_D^{22}$ + 87·0°.

Osazone : m.p. 209–10°.

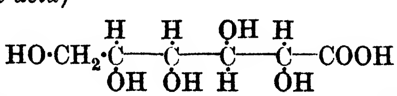
l-.

M.p. 173°. $[\alpha]_D$ − 67·8° in H_2O.

Austin, *J. Am. Chem. Soc.*, 1932, **54**, 1925, 1933.

Bertrand, Nitzberg, *Bull. soc. chim.*, 1928, **43**, 1019.

Gluconic Acid (1 : 2 : 3 : 4 : 5-*Pentahydroxy-caproic acid*)



$C_6H_{12}O_7$ MW, 196

d-.

Syrup, readily converted to the lactone.

Et ester : $C_8H_{16}O_7$. MW, 224. M.p. 62–3°. *Penta-acetyl deriv.* : m.p. 103·5°.

γ-*Lactone* : $C_6H_{10}O_6$. MW, 178. M.p. 134–6°. $[\alpha]_D$ + 67·5° initial, + 6·2° final, in H_2O. *Tetra-acetyl*: m.p. 103°. $[\alpha]_D^{20}$ + 13·5°. 2 : 3 : 6-*Tri-Me ether* : $C_9H_{16}O_6$. MW, 220. M.p. 29–30°. B.p. 130°/0·05 mm. $[\alpha]_D^{18}$ + 55° initial, + 37·5° final. *Tetra-Me ether* : $C_{10}H_{18}O_6$. MW, 234. M.p. 26–27·5°. n_D^{20} 1·4770. $[\alpha]_D^{20}$ + 72° initial, + 38·8° final, in H_2O.

δ-*Lactone* : m.p. 153°. $[\alpha]_D$ + 63·5° initial, + 6·2° final. *Tetra-Me ether* : b.p. 101°/0·06 mm. n_D^{14} 1·4565. $[\alpha]_D^{22}$ + 101° initial, + 29·6° final, in H_2O.

Amide : $C_6H_{13}O_6N$. MW, 195. M.p. 143–4°. $[\alpha]_D^{20}$ + 31·2° in H_2O.

Methylamide : $C_7H_{15}O_6N$. MW, 209. M.p. 127°.

Nitrile : $C_6H_{11}O_5N$. MW, 177. M.p. 146°. *Penta-acetyl deriv.* : m.p. 83–4°. $[\alpha]_D^{22}$ + 46·2° in $CHCl_3$.

Penta-Me ether : $C_{11}H_{22}O_7$. MW, 266. B.p. 155°/1 mm. $[\alpha]_D^{20}$ + 22·5° in H_2O. *Me ester* : $C_{12}H_{24}O_7$. MW, 280. B.p. 100°/1 mm. n_D^{15} 1·4412.

l-.

γ-*Lactone* : m.p. 134–5°. $[\alpha]_D$ − 68·7° initial, − 13·7° final in H_2O.

Carrington, Haworth, Hirst, *J. Am. Chem. Soc.*, 1933, **55**, 1084.

Aurisicchio, *Industria chimica*, 1933, **8**, 836.

Wohl, Wollenberg, *Ann.*, 1933, **500**, 281.

Brackenbury, Upson, *J. Am. Chem. Soc.*, 1933, **55**, 2512 (*Bibl.*).

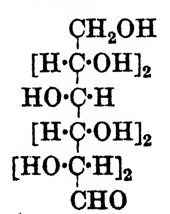
Haworth, Hirst, Miller, *J. Chem. Soc.*, 1927, 2439.

Upson, Sands, Whitnah, *J. Am. Chem. Soc.*, 1928, **56**, 519.

Gluconolactone.

See Lactones *under* Gluconic Acid.

ααα-*d*-Gluco-nonose



$C_9H_{18}O_9$ MW, 270

$[\alpha]_D^{15}$ + 13·5° in H_2O.

Phenylhydrazone : m.p. 224–5°.

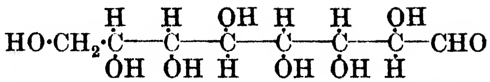
Osazone : m.p. 244°.

Philippe, *Ann. chim.*, 1912, **26**, 362.

Fischer, *Ann.*, 1892, **270**, 104.

Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1513.

αα-*d*-Gluco-octose



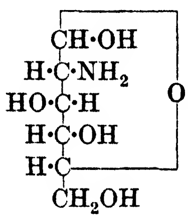
$C_8H_{16}O_8$ MW, 240

α-*Form*:
Cryst. + $2H_2O$. M.p. 93° (110–15°). $[\alpha]_D^{18}$ − 86·3° initial, − 49·6° final, in H_2O.

β-*Form*:
Non-cryst. $[\alpha]_D$ − 28·1°.
Phenylhydrazone: m.p. 203–4°.
Osazone: m.p. 229–30°.

Philippe, *Ann. chim.*, 1912, **26**, 345.
Fischer, *Ann.*, 1892, **270**, 95.
See also last reference above.

Glucosamine (*Chitosamine*)

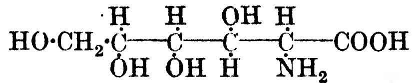


$C_6H_{13}O_5N$ MW, 179

d-.
Occurs in the skeletal polysaccharide chitin of insects, crustacea and fungi. Needles from EtOH. M.p. 110° decomp. Sol. H_2O, hot MeOH. Spar. sol. EtOH. Insol. Et_2O, $CHCl_3$. $[\alpha]_D$ + 44° in H_2O. HNO_2 —— chitose.
B,HCl: (α). $[\alpha]_D$ + 100° initial, + 72·5° final, in H_2O. (β). $[\alpha]_D$ + 25° initial, + 72·6° final, in H_2O.
Methylglucoside: *hydrochloride*, m.p. 185–7° decomp. $[\alpha]_D^{20}$ − 24·2° in H_2O. 3 : 4 : 6-*Tri-acetyl*: *hydrobromide*, m.p. 230–3°. $[\alpha]_D$ + 20·6° in $CHCl_3$.
N-*Acetyl*: darkens at 150°, decomp. at 190°. $[\alpha]_D$ + 41·8° in H_2O.
Tetra-acetyl deriv.: m.p. 143°. N-*acetyl*: (α). M.p. 187° (188–9°). (β). M.p. 139–40°.
Oxime: m.p. about 127°. *Hydrochloride*: m.p. 166°.
Semicarbazone: m.p. 165° decomp.
Osazone: m.p. 210°.

Levene, *Chemical Reviews*, 1925, **2**, 179 (*Bibl.*).
Hynd, Macfarlane, *Biochem. J.*, 1926, **20**, 1264.
Komori, *Chem. Abstracts*, 1927, **21**, 372.
van Alphen, *Chem. Abstracts*, 1930, **24**, 2113.
Micheel, Micheel, *Ber.*, 1932, **65**, 253.

Glucosaminic Acid (*Chitosaminic acid*, 2 : 3 : 4 : 5-*tetrahydroxy*-1-*aminocaproic acid*)



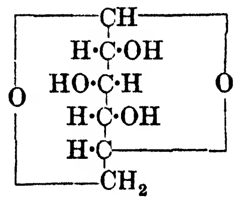
$C_6H_{13}O_6N$ MW, 195

d-.
Plates or needles from H_2O. Decomp. above 250°. $[\alpha]_D^{18}$ + 14·31° in 2·5% HCl.Aq.

l-.
Leaflets or needles from H_2O. Chars at 250°. Sol. hot EtOH. Insol. Et_2O. $[\alpha]_D^{18}$ − 14·49° in 2·5% HCl.Aq.
Nitrile: *penta-acetyl*, m.p. 118–19°.

Levene, *J. Biol. Chem.*, 1918, **36**, 77.
Pringsheim, Ruschmann, *Ber.*, 1915, **48**, 680.
Bergmann, Zervas, Silberkweit, *Ber.*, 1931, **64**, 2428.

β-Glucosan (1 : 6-*Anhydroglucose*, *lævo-glucosan*)

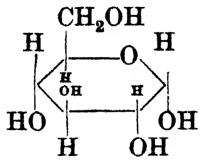


$C_6H_{10}O_5$ MW, 162

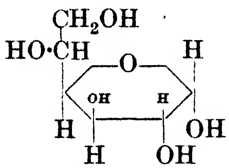
Plates or prisms. M.p. 179–80°. Very sol. H_2O. Sol. MeOH, EtOH. Insol. Et_2O. Does not reduce Fehling's. $[\alpha]_D$ − 66·2° in H_2O. Dil. acids ⟶ glucose.
2 : 3 : 4-*Tri-Me ether*: $C_9H_{16}O_5$. MW, 204. M.p. 63–4°. B.p. 135·5°/12 mm. $[\alpha]_D^{20}$ − 63·5° in H_2O.
2 : 3 : 4-*Tri-acetyl*: needles from AcOEt. M.p. 110°. $[\alpha]_D$ − 45·5° in EtOH.
Tribenzoyl: cryst. from AcOH. M.p. 199·5–200°.

Venn, *Chem. Abstracts*, 1925, **19**, 41.
Irvine, Oldham, *J. Chem. Soc.*, 1921, **119**, 1744.
Karrer, Smirnoff, *Helv. Chim. Acta*, 1921, **4**, 817.
Pictet, Sarasin, *Helv. Chim. Acta*, 1918, **1**, 87.
Josephson, *Ber.*, 1929, **62**, 313.

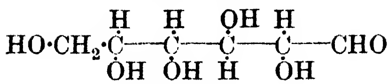
Glucose (*Dextrose, grape-sugar*)



Pyranose (I)



Furanose (II)



Aldehydo (III)

$C_6H_{12}O_6$ MW, 180

d-. *Pyranose form*, (I).

Occurs free in many fruits and in plant products as glucosides. α-*Form*: cryst. from 70% EtOH at ord. temps. M.p. 146°. $[\alpha]_D^{20}$ + 111·2° initial, + 52·5° final, in H_2O. β-*Form*: cryst. from H_2O above 98°. M.p. 148–50°. $[\alpha]_D^{20}$ + 17·5° initial, + 52·5° final, in H_2O.

Sol. H_2O, hot EtOH, hot Py. Heat of comb. 677·2 (673·7) Cal. Reduces Tollen's, Fehling's, and Barfoed's reagents. Ox. ⟶ gluconic acid ⟶ saccharic acid. Red. ⟶ sorbitol. Forms bisulphite comp. Restores colour slowly to Schiff's reagent. Forms add. comps. (glucosates) with metallic oxides.

Methylglucoside: $C_7H_{14}O_6$. MW, 194.

α-*Form*: needles from abs. EtOH. M.p. 166°. $[\alpha]_D^{20}$ + 158·9° in H_2O. 2 : 3 : 4 : 6-*Tetra-Me ether*: syrup. B.p. 89–92°/0·4 mm. $[\alpha]_D^{25}$ + 151° in H_2O. D_4^{20} 1·0944. n_D^{20} 1·4460. 2 : 3 : 4 : 6-*Tetra-acetyl*: m.p. 100°. $[\alpha]_D^{20}$ + 130·5° in $CHCl_3$.

β-*Form*: prisms from EtOH. M.p. 105°. $[\alpha]_D^{20}$ − 34·2° in H_2O. 2 : 3 : 4-*Tri-Me ether*: needles from pet. ether. M.p. 93–4°. $[\alpha]_D$ − 22·9° in MeOH. 2 : 3 : 6-*Tri-Me ether*: cryst. from pet. ether. M.p. 57·5°. $[\alpha]_D^{20}$ − 29·3° in MeOH. 2 : 3 : 4 : 6-*Tetra-Me ether*: needles from pet. ether. M.p. 40–1°. $[\alpha]_D$ − 17·43° in EtOH. 2 : 3 : 4 : 6-*Tetra-acetyl*: cryst. from MeOH. M.p. 104–5°. $[\alpha]_D^{20}$ − 18·2° in $CHCl_3$.

2-*Me ether*: prisms from EtOH. M.p. 158°. $[\alpha]_D^{20}$ + 34·6° initial, + 66° final, in H_2O. *Phenylhydrazone*: m.p. 177°. $[\alpha]_D^{19}$ − 13·3° in Py.

3-*Me ether*: α-*form*. Plates from MeOH. M.p. 160–1°. $[\alpha]_D^{17}$ + 104·3° initial, + 55·3° final, in H_2O. β-*Form*: prismatic needles from Me_2CO–MeOH. M.p. 133·5–135°. $[\alpha]_D^{20}$ + 31·9° initial, + 55·1° final, in H_2O. *Osazone*: m.p. 178–9°. $[\alpha]_D$ − 109° initial, − 9° final, in EtOH. *Tetra-acetyl*: cryst. from EtOH. M.p. 95–6°.

6-*Me ether*: needles from EtOH. M.p. 153–4°. $[\alpha]_D^{20}$ + 104·5° initial, + 58·5° final, in H_2O. *Osazone*: cryst. from EtOH. M.p. 183°. *Tetra-acetyl*: cryst. from EtOH. M.p. 95–6°. $[\alpha]_D^{20}$ + 21·5°.

2 : 3 : 4-*Tri-Me ether*: $C_9H_{18}O_6$. MW, 222. Syrup. B.p. 162–6°/0·3 mm. $[\alpha]_D^{20}$ + 42·7° (+ 66·8°) in H_2O.

2 : 3 : 6-*Tri-Me ether*: needles from Et_2O. M.p. 124°. B.p. 165–70°/0·4 mm. $[\alpha]_D^{18}$ + 118°.

2 : 3 : 4 : 6-*Tetra-Me ether*: $C_{10}H_{20}O_6$. MW, 236. α-*Form*: needles from pet. ether. M.p. 96°. n_D 1·4588. $[\alpha]_D^{20}$ + 100·8° initial, + 83·3° final, in H_2O. β-*Form*: m.p. 50°. B.p. 125°/0·5 mm. $[\alpha]_D^{20}$ + 73·1° initial, + 83·1° final, in H_2O.

Ethylglucoside: $C_8H_{16}O_6$. MW, 208. α-*Form*: m.p. 113–14°. $[\alpha]_D^{20}$ + 150·3°. β-*Form*: m.p. 73°. $[\alpha]_D^{20}$ − 33·4°.

2 : 3 : 4 : 6-*Tetra-acetyl*: (β). Cryst. from EtOH. M.p. 117°. $[\alpha]_D^{20}$ + 2·2° in EtOH.

2 : 3 : 4 : 6-*Tetra-acetyl bromo*: *see* Acetobromoglucose.

Penta-acetyl: α-*form*, needles from EtOH. M.p. 112–13°. $[\alpha]_D^{20}$ + 101·6° in $CHCl_3$. β-*Form*: cryst. from EtOH. M.p. 134°. $[\alpha]_D^{20}$ + 3·8°.

2 : 3 : 4 : 6-*Tetrabenzoyl*: needles from ligroin. M.p. 119–20°. $[\alpha]_D^{21}$ + 70·6° in EtOH.

Pentabenzoyl: (α). Needles from AcOEt. M.p. 157°. $[\alpha]_D^{25}$ + 107·6° in $CHCl_3$. (β). Needles from AcOEt. M.p. 187°. $[\alpha]_D^{24}$ + 23·7° in $CHCl_3$.

6-*Triphenylmethyl*: needles + $2C_2H_5OH$ from EtOH. M.p. 57–8°. $[\alpha]_D^{22}$ + 59·6° in Py. *Tetra-acetyl*: needles from EtOH. M.p. 129–31°. $[\alpha]_D^{27}$ + 97·8° in Py.

Oxime: m.p. 136·7°. $[\alpha]_D$ − 2·2° in H_2O.

Osazone: m.p. 210°.

3 : 4-*Dibromophenylhydrazone*: m.p. 165–7°.

3 : 4-*Dibromophenylosazone*: m.p. 225–6° decomp.

2 : 5-*Dibromophenylosazone*: m.p. 228–9°.

3 : 5-*Dibromophenylosazone*: m.p. 172°.

West, Holden, *J. Am. Chem. Soc.*, 1934, **56**, 930.

Hagen, U.S.P., **1,928,891**, (*Chem. Abstracts*, **1933**, **27**, **6006**).

Coles, *Iowa State College Journal of Science*, **1932**, **6**, **33**, **43** (*Bibl.*).

Oldham, Rutherford, *J. Am. Chem. Soc.*, 1932, **54**, 1086.
Levene, Raymond, *J. Biol. Chem.*, 1932, **97**, 751.
Hirst, *J. Chem. Soc.*, 1926, 350.
Fischer, *Ber.*, 1890, **23**, 2618.
Charlton, Haworth, Herbert, *J. Chem. Soc.*, 1931, 2855.

d-. *Furanose form*, (II).

Methylglucoside: α-*Form*. Needles from AcOEt. M.p. 62–3°. $[\alpha]_D^{23}$ + 136° in MeOH. 5 : 6-*Monocarbonate*: m.p. 130°. $[\alpha]_D^{23}$ + 130° in MeOH. *Tetra-Me ether*: m.p. 11°. B.p. 94°/0·04 mm. n_D^{13} 1·4457. $[\alpha]_D^{18}$ + 106·5° in MeOH. β-*Form*: syrup. $[\alpha]_D^{20}$ − 77° in H_2O.

2 : 3 : 5 : 6-*Tetra-Me ether*: syrup. B.p. 117°/0·2 mm. $[\alpha]_D^{20}$ − 28·8° in $CHCl_3$.

Ethylglucoside: α-*Form*. Needles from AcOEt. M.p. 82–3°. $[\alpha]_D^{23}$ + 98° in H_2O. 5 : 6-*Monocarbonate*: m.p. 138–40°. $[\alpha]_D^{17}$ + 117° in EtOH. β-*Form*: cryst. from AcOEt–Et_2O. M.p. 59–60°. $[\alpha]_D^{26.5}$ − 86° in H_2O. 5 : 6-*Monocarbonate*: m.p. 164–5°. $[\alpha]_{5461}^{19}$ − 55·0° in H_2O.

1 : 2-*Monoacetone deriv.*: cryst. from AcOEt. M.p. 156–7°. $[\alpha]_D^{20}$ − 11·0° in H_2O. *Tri-Me ether*: syrup. B.p. 138–9°/12 mm. $[\alpha]_D$ −29·5° in MeOH.

1 : 2–5 : 6-*Di-acetone deriv.*: needles from pet. ether. M.p. 109–10°. $[\alpha]_D^{17}$ − 18·6° in H_2O. 3-*Me ether*: b.p. 105–6°/0·3 mm. $[\alpha]_D^{27}$ − 31·4°. n_D^{17} 1·4518.

Pentabenzoyl: (α). Cryst. from EtOH. M.p. 118–20°. $[\alpha]_D^{20}$ + 79° in $CHCl_3$. (β). Cryst. from EtOH. M.p. 146–7°. $[\alpha]_D^{20}$ − 82·0° in $CHCl_3$.

Josephson, *Ber.*, 1929, **62**, 1913.
Micheel, Hess, *Ann.*, 1926, **450**, 21.
Pringsheim, Koloduy, *Ber.*, 1926, **59**, 1135.
Haworth, Porter, Waine, *J. Chem. Soc.*, 1932, 2254.

d-. *Aldehydo form*, (III).

Penta-Me ether: b.p. 108–10°/0·4 mm. $[\alpha]_D^{20}$ − 35·1° in $C_2H_2Cl_4$. *Di-Me acetal*: b.p. 95°/0·8 mm. $[\alpha]_D^{20}$ + 15·09° in MeOH. *Di-Et mercaptal*: b.p. 152°/0·6 mm. $[\alpha]_D^{20}$ + 19·2° in MeOH.

Penta-acetyl: plates from Me_2CO–Et_2O. M.p. 116–18°. $[\alpha]_D^{25}$ + 2·7° in $C_2H_2Cl_4$. *Di-Et mercaptal*: cryst. from MeOH.Aq. M.p. 45–7°. $[\alpha]_D^{30}$ + 11·4° in $CHCl_3$.

Pentabenzoyl: *semi-acetal*, plates from EtOH. M.p. 76–82°. $[\alpha]_D^{17}$ + 37·1° in EtOH. *Di-Et mercaptal*: plates from EtOH. M.p. 97–8°. $[\alpha]_D^{19}$ + 49·6° in $CHCl_3$.

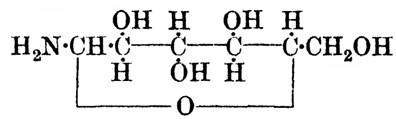
Levene, Meyer, *J. Biol. Chem.*, 1926, **69**, 175.
Brigl, Mühlschlegel, *Ber.*, 1930, **63**, 1551.
Wolfrom, *J. Am. Chem. Soc.*, 1929, **51**, 2190.

l-.

Prism from MeOH–EtOH. M.p. 141–3°. Sol. H_2O. Spar. sol. EtOH. $[\alpha]_D^{20}$ − 51·4° final.

Fischer, *Ber.*, 1890, **23**, 2618.

Glucosimine



or

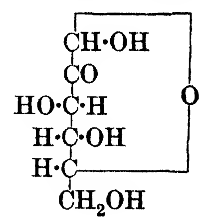
HN:CH·$[CHOH]_4$·CH_2OH

$C_6H_{13}O_3N$ MW, 147

Needles from 95% MeOH. M.p. 127–8° decomp. (122–3°). Sol. H_2O. Insol. EtOH, Et_2O. Dil. acids ⟶ glucose.

Levene, *J. Biol. Chem.*, 1915, **24**, 60.
Irvine, Thomson, Garnett, *J. Chem. Soc.*, 1913, **103**, 239.
Hynd, Macfarlane, *Biochem. J.*, 1926, **20**, 1264.

Glucosone (*Fructosone, mannosone*)



$C_6H_{10}O_6$ MW, 178

d-.

Syrup. Sol. EtOH. Insol. Et_2O. Lævorotatory in H_2O. Reduces cold Fehling's. Baryta water ⟶ gluconic acid. Zn + AcOH ⟶ *d*-fructose. Phenylhydrazine ⟶ glucosazone.

Triacetyl deriv.: cryst. from $CHCl_3$–pet. ether. M.p. 76°. $[\alpha]_D^{19}$ + 84·2° in 40% EtOH.

3 : 4 : 6-*Triacetyl-1-benzoyl*: cryst. from EtOH. M.p. 116°. $[\alpha]_D^{19}$ + 144·3° in $CHCl_3$.

dl-. *See* α-Acrosone.

Dixon, Harrison, *Biochem. J.*, 1932, **26**, 1954.
Maurer, Petsch, *Ber.*, 1933, **66**, 995.
Fischer, Tafel, *Ber.*, 1889, **22**, 88, 98.

Glucothiose (*Thioglucose*)

$HO{\cdot}CH_2{\cdot}[CH(OH)]_4{\cdot}CHS$

$C_6H_{12}O_5S$ MW, 196

Amorphous solid + $1H_2O$.

α-.

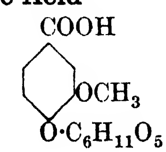
Penta-acetyl deriv.: m.p. 128–9° (121°).

β-.

Tetra-acetyl deriv.: cryst. from MeOH. M.p. 113–14°. $[\alpha]_D^{20}$ – 2·13° in $C_2H_2Cl_4$. *Methyl-glucoside*: m.p. 94–5°. $[\alpha]_D^{20}$ – 18·6° in $C_2H_2Cl_4$. *Benzoyl deriv.*: cryst. from EtOH. M.p. 126°. $[\alpha]_D^{20}$ – 12·4° in $C_2H_2Cl_4$.

Kahlbaum, D.R.P., 557,247, (*Chem. Abstracts*, 1933, **27**, 374).
Schneider, Bansa, *Ber.*, 1931, **64**, 1322.

Glucovanillic Acid



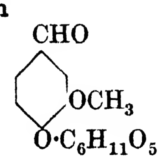
$C_{14}H_{18}O_9$ MW, 330

Prisms + H_2O from H_2O. M.p. 211–12°. Sol. EtOH, hot H_2O. Insol. Et_2O. Emulsin ⟶ glucose + vanillic acid.

Tetra-acetyl deriv.: needles from dil. EtOH. M.p. 181–2°. *Me ester*: needles from MeOH. M.p. 144–5°.

Mauthner, *J. prakt. Chem.*, 1911, **83**, 556.

Glucovanillin



$C_{14}H_{18}O_8$ MW, 314

Needles + $2H_2O$ from EtOH.Aq. M.p. 192°. Mod. sol. H_2O. Spar. sol. EtOH. Insol. Et_2O. $[\alpha]_D^{20}$ – 88·03° in H_2O.

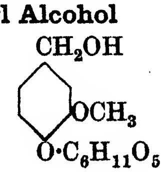
Tetra-acetyl deriv.: m.p. 143–4°. $[\alpha]_D^{20}$ – 50·68° in Me_2CO.

Oxime: m.p. 152°.

Phenylhydrazone: m.p. 195°.

Goris, *Compt. rend.*, 1924, **179**, 70.
Robertson, Waters, *J. Chem. Soc.*, 1930, 2733.

Glucovanillyl Alcohol



$C_{14}H_{20}O_8$ MW, 316

Needles + H_2O. M.p. 120°. Sol. H_2O, EtOH. Insol. Et_2O. Emulsin ⟶ glucose + vanillyl alcohol.

See first reference above and also
Tiemann, *Ber.*, 1885, **18**, 1597.

Glucoxylose

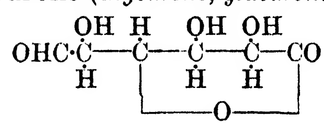
$C_{11}H_{20}O_{10}$ MW, 312

Occurs as mixture of dibenzoyl derivs. in leaves and stem of *Daviesia Latifolia*, R.Br. Amorph., hygroscopic solid. Sol. H_2O, MeOH. Mod. sol. EtOH. Does not reduce Fehling's or form an osazone.

Di-benzoyl deriv.: (1) m.p. 152–3°. $[\alpha]_D$ – 105·9° in MeOH. *Penta-acetyl deriv.*, m.p. 203°. (2) Isodibenzoylglucoxylose. Needles from H_2O. M.p. 173–4°. *Penta-acetyl deriv.*, m.p. 173–4°.

Tutin, *J. Chem. Soc.*, 1915, **107**, 7.

d-Glucurone (*Glycurone, glucuronolactone*)



$C_6H_8O_6$ MW, 176

Cryst. from H_2O. M.p. 177°. Sol. H_2O. Insol. EtOH. $[\alpha]_D^{22}$ + 19·4° in H_2O.

Diacetyl deriv.: m.p. 130–1°.

Diacetyl-chloro deriv.: $C_{10}H_{11}O_7Cl$. MW, 278·5. M.p. 107·5–108·5°. $[\alpha]_D^{22}$ + 95·5° in $CHCl_3$.

Triacetyl deriv.: (α). Plates from Et_2O. M.p. 110–12°. $[\alpha]_D^{24}$ + 203·6° in $CHCl_3$. (β). Prisms from EtOH. M.p. 194–5°. $[\alpha]_D^{23}$ + 84·1° in $CHCl_3$.

α-*Benzoyl deriv.*: m.p. 98–102° decomp.

Oxime: m.p. 151°. $[\alpha]_D$ + 14·4° in H_2O.

Semicarbazone: m.p. 188–9° decomp. (slow heat.).

Thiosemicarbazone: m.p. 223°.

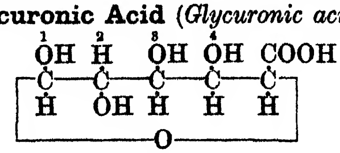
Phenylhydrazone: m.p. 160°.

p-*Bromophenylhydrazone*: m.p. 144° decomp.

unsym.-*Diphenylhydrazone*: m.p. 150°.

Vedder, *Chem. Abstracts*, 1933, **27**, 2183.
Goebel, Babers, *J. Biol. Chem.*, 1933, **100**, 573, 743; **101**, 173.
Killiani, *Ber.*, 1926, **59**, 1469.
Zervas, Sessler, *Ber.*, 1933, **66**, 1327.

d-Glucuronic Acid (*Glycuronic acid*)



$C_6H_{10}O_7$ MW, 194

M.p. 156°. Sol. EtOH. Reduces Fehling's and Tollen's reagents. $[\alpha]_D^{20}$ + 36·00° in H_2O. NaOI ⟶ saccharic acid.

2 : 3 : 4-*Tri-Me ether* : $C_9H_{16}O_7$. MW, 236. Yellow syrup. n_D^{16} 1·4709. $[\alpha]_D^{18}$ + 58°. *Methylglucoside* : needles. M.p. 133°. $[\alpha]_D^{23}$ − 38° in H_2O.

Lactone : *see* Glucurone.

p-*Bromophenylosazone* : m.p. 199°.

Bergmann, Wolff, *Ber.*, 1923, **56**, 1060.
Weinmann, *Ber.*, 1929, **62**, 1637.
Ehrlich, Rehorst, *Ber.*, 1929, **62**, 628.
Zervas, Sessler, *Ber.*, 1933, **66**, 1326.
Challinor, Haworth, Hirst, *J. Chem. Soc.*, 1931, 258.

Glutacondialdehyde (4-*Hydroxy*-1-*aldehydobutadiene*, 1 : 3-*dialdehydopropylene*, *propylene* 1 : 3-*dialdehyde pentenedial*, *glutaconic aldehyde*)

OHC·CH₂·CH:CH·CHO
I

or

HO·CH:CH·CH:CH·CHO
II

$C_5H_6O_2$ MW, 98

Neither the dialdehyde (I) nor its enol form (II) has been isolated in the free state. $NaHSO_3$ forms a *bis*-bisulphite comp.

Enol form (II) :

Acetate : $C_7H_8O_3$. MW, 140. Brownish needles from pet. ether. M.p. 75°.

Benzoate : $C_{12}H_{10}O_3$. MW, 202. Yellow needles from hot EtOH. M.p. 116–18°.

Di-anil monohydrochloride : crimson needles from MeOH. M.p. 139–40°.

Na salt : $C_5H_5O_2Na,2H_2O$. Dark red leaflets from H_2O. Gives coloured ppts. with aq. sols. of metallic salts.

Ba salt : $(C_5H_5O_2)_2Ba,5H_2O$. Yellowish-red cryst. powder.

Baumgarten, Glatzel, *Ber.*, 1926, **59**, 2658.

Glutaconic Acid (*Propylene*-1 : 3-*dicarboxylic acid*)

HOOC·CH:CH·CH₂·COOH

$C_5H_6O_4$ MW, 130

Labile (cis-) *form* :

Short prisms from Et_2O. M.p. 136°. Sol. H_2O, EtOH, Me_2CO. Spar. sol. Et_2O. Insol. $CHCl_3$, C_6H_6. $k = 1·43 \times 10^{-4}$ at 0° Stable in solid state and in Et_2O sol. Changes on melting and in H_2O sol. to *trans*-form. Ac_2O at 40° ⟶ hydroxy-anhydride.

Monoanilide : m.p. 135°.

Stable (trans-) *form* :

Flat needles from Et_2O–C_6H_6. M.p. 138°. Sol. H_2O, EtOH, Et_2O. $k = 1·74 \times 10^{-4}$ at 0°. Does not give anhydride with Ac_2O at 40°.

Chloro-anhydride : 6-chloro-α-pyrone. $C_5H_3O_2Cl$. MW, 130·5. M.p. 27°.

Hydroxy-anhydride : 6-hydroxy-α-pyrone. $C_5H_4O_3$. MW, 112. Needles from C_6H_6. M.p. 87–8°. $FeCl_3$ ⟶ intense green col. changing rapidly to pale brown.

Di-Et ester : $C_9H_{14}O_4$. MW, 186. B.p. 236–8°, 132–4°/18 mm., 124–5°/12 mm. D_4^{20} 1·0496. n_D^{20} 1·4470.

Monoanilide : m.p. 167°.

Dianilide : m.p. 228°.

Gidvani, *J. Chem. Soc.*, 1932, 2666.
McCombs, Packer, Thorpe, *J. Chem. Soc.*, 1931, 547, 559.
Malachowski, *Ber.*, 1929, **62**, 1323.
Ingold, Thorpe, *J. Chem. Soc.*, 1921, **119**, 499.

Glutaconic Aldehyde.

See Glutacondialdehyde.

Glutamic Acid (1-*Aminoglutaric acid*, 1-*aminopropane*-1 : 3-*dicarboxylic acid*)

HOOC·CH₂·CH₂·CH(NH₂)·COOH
3 2 1

$C_5H_9O_4N$ MW, 147

d-.

Product of acid hydrolysis of many plant and animal proteins. The Na salt has a meaty flavour and is used in meat extracts and as a condiment particularly in the Far East.

Rhombic cryst. from EtOH.Aq. M.p. 224–5° (247–9°) decomp. Spar. sol. H_2O. Very spar. sol. EtOH. Heat of comb. C_p 366 Cal. $[\alpha]_D^{25}$ + 11·0° in H_2O, $[\alpha]_D^{20}$ + 34·9° in 10% HCl.Aq.

B,HCl : m.p. 202° decomp., 213° (rapid heat.).

Mono-Et ester : $C_7H_{13}O_4N$. MW, 175. Prisms from 50% EtOH. M.p. 194° (164°). *Hydrochloride* : m.p. 134°.

Di-Et ester : $C_9H_{17}O_4N$. MW, 203. Oil. B.p. 139–40°/10 mm. Very sol. H_2O.

N-*Acetyl* : $C_7H_{11}O_5N$. MW, 189. M.p. 199°.

3-*Monoamide* : glutamine. $C_5H_{10}O_3N_2$. MW, 146. Occurs widespread in plants. Needles from EtOH.Aq. M.p. 184–5°. Sol. H_2O. Very spar. sol. EtOH. $[\alpha]_D^{19}$ + 8° in H_2O, $[\alpha]_D^{20}$ + 32° in 5% HCl.Aq. N-*Chloroacetyl* : $C_7H_{11}O_4N_2Cl$. MW, 222·5. Needles from AcOEt. M.p. 130–2°. $[\alpha]_D^{16}$ − 104° in H_2O.

1-*Monoamide* : isoglutamine. Cryst. Sol. H_2O. Very spar. sol. org. solvents. $[\alpha]_D^{22}$ + 21·1° in H_2O.

l-.

Leaflets from H_2O. M.p. 213° decomp. (rapid heat.). Tasteless. $[\alpha]_D^{26}$ − 12·9° in H_2O, $[\alpha]_D^{19}$ 31·1° in HCl.Aq.

dl-.

Rhombic cryst. from H_2O. M.p. 199° (225–7°) decomp. Sol. hot H_2O. Spar. sol. cold H_2O, EtOH, Et_2O, CS_2, ligroin.

B,HCl: m.p. 193° decomp.

Mono-Et ester: m.p. 185°.

N-*Chloroacetyl*: cryst. M.p. 123°.

Picrolonate: decomp. at 184°.

Abderhalden, Nienburg, *Z. physiol. Chem.*, 1933, **219**, 155.
Bergmann, Zervas, Salzmann, *Ber.*, 1933, **66**, 1290.
Tseng, Chu, *Chem. Abstracts*, 1933, **27**, 708, 1867; 1932, **26**, 5548.
King, *Organic Syntheses*, 1932, Collective Vol. I. 281.
Dunn, Smart, Redemann, Brown, *J. Biol. Chem.*, 1931, **94**, 599.
Fischer, Kropp, Stahlschmidt, *Ann.*, 1909, **365**, 183.
Bergmann, Zervas, *Ber.*, 1932, **65**, 1197; *Z. physiol. Chem.*, 1933, **221**, 51.
Han, *Ind. Eng. Chem.*, 1929, **21**, 984.
Dyson, *Chemical Age* (*London*), 1931, **24**, 328.

Glutamine.

See under Glutamic Acid.

Glutaraldehyde (*Glutaric dialdehyde, propane*-1 : 3-*dial*, 1 : 3-*dialdehydopropane*)

OHC·CH_2·CH_2·CH_2·CHO

$C_5H_8O_2$ MW, 100

Oil. B.p. 187–9° decomp., 71–2°/10 mm. Sol. H_2O. Volatile in steam. Polymerises in presence of H_2O ⟶ " glassy " form which on dist. in vacuo regenerates the dialdehyde.

Dioxime: needles from H_2O. M.p. 175° (178°, 171°). Sublimes without decomp. Hot min. acids ⟶ pyridine.

Fischer, Düll, Ertel, *Ber.*, 1932, **65**, 1471.
Shaw, *J. Chem. Soc.*, 1925, **127**, 215.
v. Braun, Sobecki, *Ber.*, 1911, **44**, 2533.

Glutaric Acid (*Propane*-1 : 3-*dicarboxylic acid*)

HOOC·CH_2·CH_2·CH_2·COOH

$C_5H_8O_4$ MW, 132

Needles from C_6H_6. M.p. 97–8°. B.p. 302–4°, 200°/20 mm. Very sol. H_2O, EtOH, Et_2O. k (first) = 4·73 × 10^{-5} at 25°, (second) = 2·9 × 10^{-6} at 25°.

Anhydride: $C_5H_6O_3$. MW, 114. Cryst. from Et_2O. M.p. 56°. B.p. 150°/10 mm.

Mono-Me ester: $C_6H_{10}O_4$. MW, 146. B.p. 150–1°/10 mm. D^{18} 1·164. n_D^{18} 1·4392.

Di-Me ester: $C_7H_{12}O_4$. MW, 160. B.p. 84–5°/6 mm. D_4^{20} 1·0876. n_D^{20} 1·4246.

Mono-Et ester: $C_7H_{12}O_4$. MW, 160. B.p. 143–5°/7 mm.

Di-Et ester: $C_9H_{16}O_4$. MW, 188. B.p. 103–4°/7 mm. D_4^{20} 1·022. n_D^{20} 1·4241.

p-*Bromophenacyl ester*: m.p. 137°.

Dichloride: $C_5H_6O_2Cl_2$. MW, 169. B.p. 107–8°/16 mm. D_4^{22} 1·3221.

Diamide: $C_5H_{10}O_2N_2$. MW, 130. Leaflets. M.p. 175–6°.

Mono-nitrile: *see* 3-Cyanobutyric Acid.

Di-nitrile: trimethylene cyanide, 1 : 3-dicyanopropane. $C_5H_6N_2$. MW, 94. B.p. 144–7°/13 mm., 131–4°/10 mm.

Imide: $C_5H_7O_2N$. MW, 113. Glistening scales from H_2O. M.p. 152°.

Marvel, Tuley, *Organic Syntheses*, 1932, Collective Vol. I, 283.
Boedtker, *J. pharm. chim.*, 1932, **15**, 225.
Berner, *Z. physik. Chem.*, 1929, **141**A, 116.
Fourneau, Sabetay, *Bull. soc. chim.*, 1929, **45**, 838.

Glutathione (*Glutamylcysteinylglycine*)

```
          CH2·CH2·CH(NH2)·COOH
          |
          CO
          |
          NH
          |
HS·CH2·CH·CO·NH·CH2·COOH
```

$C_{10}H_{17}O_6N_3S$ MW, 307

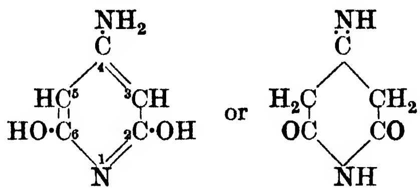
Basic respiratory peptide occurring in plant and animal tissues. Cryst. M.p. 190–2° decomp. Unstable. $[\alpha]_{Hg}^{28.5}$ − 9·4° in H_2O, − 85° in 10% HCl.Aq. Incubated + H_2O at 62° ⟶ pyrrolidone-carboxylic acid + cysteinylglycine. Acid hyd. ⟶ glycine + glutamic acid + cysteine. Addition of Cu_2O to the sol. in 0·5N/H_2SO_4 ⟶ insol. cryst. Cu˙ deriv.

Cu˙ deriv.: $[\alpha]_{5461}^{16.5}$ + 45·6° in HCl.Aq.

Phenylcarbamyl deriv.: m.p. 210° (foaming).

Hopkins, *J. Biol. Chem.*, 1929, **84**, 269.
Eggleton, *Science Progress*, 1932, **27**, 32 (*Review*).
Pirie, Bernal, *Biochem. J.*, 1932, **26**, 75.
Mason, *J. Biol. Chem.*, 1931, **90**, 409.
Nicolet, *J. Biol. Chem.*, 1930, **88**, 389.
Kendall, Mason, McKenzie, *ibid.*, 409.
Pirie, *Biochem. J.*, 1930, **24**, 51.
Meldrum, Dixon, *ibid.*, 472.

Glutazine (2 : 6-*Dihydroxy-4-amino-pyridine, 2-iminoglutarimide*)



$C_5H_6O_2N_2$ MW, 126

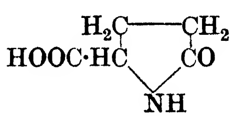
Rectangular plates from H_2O. M.p. 300° decomp. Spar. sol. cold H_2O : sol. reacts acid. Insol. EtOH, AcOH. Sol. alkalis, cold dil. min. acids. $FeCl_3$ on H_2O sol. ⟶ deep red col. which on warming ⟶ dark green. Heat + HCl.Aq. ⟶ NH_4Cl + 2 : 4 : 6-trihydroxypyridine.

N-*Acetyl* : glistening plates from H_2O. M.p. 285–90°.

Niementowski, Sucharda, *J. prakt. Chem.*, 1916, **94**, 203.

Glutimic Acid.
See Glutiminic Acid.

Glutiminic Acid (*Pyroglutamic acid, 2-pyrrolidone-5-carboxylic acid*)



$C_5H_7O_3N$ MW, 129

d-.
Cryst. from H_2O. M.p. 182–3°. $[\alpha]_D$ + 10·7° in H_2O.
Amide : $C_5H_8O_2N_2,1H_2O$. MW, 146. M.p. 165°.

l-.
Cryst. from H_2O. M.p. 162–3° (148°). $[\alpha]_D$ − 11·5° in H_2O.
Et ester : $C_7H_{11}O_3N$. MW, 157. B.p. 161°/3 mm. D_{17}^{17} 1·0075. $[\alpha]_D$ − 8·6° in H_2O.
Amide : m.p. 165°.
Anilide : plates from EtOH. M.p. 191°. Spar. sol. cold H_2O. $[\alpha]_D^{15}$ + 17·9° in 80% EtOH.

dl-.
M.p. 178–9°.
Me ester : $C_6H_9O_3N$. MW, 143. B.p. 180°/25 mm.
Et ester : needles from Et_2O. M.p. 61° (52–3°).
Amide : m.p. 220–1° (217–8°).

Hg salt : decomp. at 207–8°.

Bergmann, Zervas, *Z. physiol. Chem.*, 1933, **221**, 51.
Gray, *J. Chem. Soc.*, 1928, 1264.
Abderhalden, Schwab, *Z. physiol. Chem.*, 1926, **153**, 88.

Glutinic Acid (*Allylene-1 : 3-dicarboxylic acid, propine-1 : 3-dicarboxylic acid*)

$$HOOC\cdot CH_2\cdot C{:}C\cdot COOH$$

$C_5H_4O_4$ MW, 128

Fine needles from H_2O. M.p. 145–6° decomp. Sol. H_2O, EtOH, Et_2O. Insol. $CHCl_3$, C_6H_6.
Di-Me ester : $C_7H_8O_4$. MW, 156. B.p. 101°/6 mm. D_4^{20} 1·1657. n_D^{20} 1·4878. Pungent odour. Alkalis ⟶ red col.

Burton, Pechmann, *Ber.*, 1887, **20**, 148.
Makulec, Malachowski, Mansitius, *Chem. Abstracts*, 1929, **23**, 2153.

Glyceraldehyde (1 : 2-*Dihydroxypropionaldehyde*)

$$\underset{2}{CH_2OH}\cdot\underset{1}{CH}(OH)\cdot CHO$$

$C_3H_6O_3$ MW, 90

The optically active forms of the free aldehyde polymerise much more readily than the inactive form.

d-.
Syrup. $[\alpha]_D$ + 13·5°.
Di-Me acetal : $C_5H_{12}O_4$. MW, 136. B.p. 124–7°/14 mm. $[\alpha]_D^{22}$ + 22° in H_2O.
Dibenzoyl : $C_{17}H_{14}O_5$. MW, 298. M.p. 80°.
Bisulphite comp. : m.p. 130–1° decomp.
Semicarbazone : m.p. 133°.

Brigl, Grüner, *Ber.*, 1933, **66**, 931.

l-.
Di-Me acetal : b.p. 126–9°/18 mm. $[\alpha]_D^{26}$ − 21° in H_2O.

dl-.
Cryst. from EtOH–Et_2O. M.p. 142° (138·5°). Dimolecular. Sol. 3 parts in 100 parts H_2O at 18°. Insol. pentane, C_6H_6. Hot dil. H_2SO_4 ⟶ methylglyoxal. Dil. $Ba(OH)_2$ ⟶ *dl*-fructose + *dl*-sorbose.
2-*Me ether* : dimeride. $(C_4H_8O_3)_2$. MW, 208. Prisms. M.p. 120–1°.
Di-Et acetal : $C_7H_{16}O_4$. MW, 164. B.p. 120–1°/8 mm.
Mono-acetone deriv. : $C_6H_{10}O_3$. MW, 130. B.p. 30–5°/1 mm.
1 : 2-*Diacetyl* : $C_7H_{10}O_5$. MW, 174. B.p. 100–8°/0·8 mm. *Dimeride* : cryst. from EtOH. M.p. 154°.

2-*Benzoyl*: $C_{10}H_{10}O_4$. MW, 194. M.p. 106–10°. *Semicarbazone*: decomp. at 160°. *Oxime*: m.p. 117–18°.

Dibenzoyl: dimeride. $(C_{17}H_{14}O_5)_2$. MW, 596. Cryst. from toluene. M.p. 231°.

Di-p-*nitrobenzoyl*: dimeride. Cryst. from toluene. M.p. 247°.

Osazone: m.p. 132°.

p-*Bromophenylosazone*: m.p. 168°.

Neuberg, *Biochem. Z.*, 1932, **255**, 1.
Fischer, Baer, *Ber.*, 1930, **63**, 1750.
Fischer, Tauber, Baer, *Ber.*, 1927, **60**, 479.
Reeves, *J. Chem. Soc.*, 1927, 2477.
Witzemann, *Organic Syntheses*, 1931, XI, 50.

Glyceric Acid (1 : 2-*Dihydroxypropionic acid*)

$CH_2OH{\cdot}CH(OH){\cdot}COOH$

$C_3H_6O_4$ MW, 106

The free acid is a thick gum. Decomp. on dist. Misc. with H_2O, EtOH. Insol. Et_2O. The *d*- and *l*-forms in aq. sol. have dextro and lævo rotations, respectively, but their metallic salts in aq. sol. show reversed sign of rotation. Aq. sol. + $FeCl_3$ ⟶ intense yellow col. Esters and ether-esters of the *d*-acid are lævorotatory. Esters of the *l*-acid have not been recorded.

d-.

Me ester: $C_4H_8O_4$. MW, 120. B.p. 119–20°/14 mm. D_{15}^{15} 1·2798. $[\alpha]_D^{15}$ − 6·44° (− 4·8°).

Di-Me ether Me ester: $C_6H_{12}O_4$. MW, 148. B.p. 77–8°/15 mm. D_4^{20} 1·0634. $[\alpha]_D^{20}$ − 69·7°.

Di-Me ether Et ester: $C_7H_{14}O_4$. MW, 162. B.p. 92°/17 mm. D_4^{20} 1·0309. $[\alpha]_D^{20}$ − 69·9°.

Et ester: *diacetyl*. $C_9H_{14}O_6$. MW, 218. B.p. 247–9°. D_{15}^{15} 1·1570. $[\alpha]_D^{15}$ − 16·31°.

Ba salt: $C_6H_{10}O_8Ba,2H_2O$. MW, 347. $[\alpha]_D^{20}$ − 9·8° in H_2O.

Ca salt: $C_6H_{10}O_8Ca,2H_2O$. MW, 250. $[\alpha]_D^{20}$ − 14·6° in H_2O.

Quinine salt: m.p. 187–8° (182°). $[\alpha]_D^{20}$ − 127° in H_2O.

Brucine salt: m.p. 222°. $[\alpha]_D^{20}$ − 33° in H_2O.

l-.

Ba salt: $[\alpha]_D^{20}$ + 9·9° in H_2O.

Ca salt: $[\alpha]_D^{20}$ + 12·9° in H_2O.

Quinine salt: m.p. 178–80° (165–7°). $[\alpha]_D^{20}$ − 116·2° in H_2O.

Brucine salt: m.p. 222°. $[\alpha]_D^{20}$ − 22° in H_2O.

dl-.

$k = 2{\cdot}8 \times 10^{-4}$ at 25°. Ox. with MnO_2 or by electrolysis of Cu salt ⟶ glycollic aldehyde. On long standing ⟶ polymeric anhydride, needles from H_2O, decomp. at 250°.

Me ester: b.p. 119–20°/14 mm. D_{15}^{15} 1·2814. *Mono-acetone* (*isopropylidene*) *deriv.*: $C_7H_{12}O_4$. MW, 160. B.p. 84°/14 mm. D_4^{19} 1·1055. n_D^{26} 1·4230.

Et ester: $C_5H_{10}O_4$. MW, 134. B.p. 120–1°/14 mm. D_{15}^{15} 1·1909. *Mono-acetone* (*isopropylidene*) *deriv.*: $C_8H_{14}O_4$. MW, 174. B.p. 89°/11 mm. D_4^{20} 1·0754. n_D^{17} 1·4263.

Propyl ester: $C_6H_{12}O_4$. MW, 148. B.p. 126–7°/14 mm. D_{15}^{15} 1·1453.

Amide: $C_3H_7O_3N$. MW, 105. Prisms from MeOH. M.p. 92°. *Acetone* (*isopropylidene*) *deriv.*: $C_6H_{11}O_3N$. MW, 145. Cryst. from C_6H_6. M.p. 111–12°.

2-*Benzoyl*: $C_{10}H_{10}O_5$. MW, 210. M.p. 141–2°.

Glattfeld, *Am. Chem. J.*, 1913, **50**, 151.
Nef, *Ann.*, 1914, **403**, 295.
Nef, Hedenburg, Glattfeld, *J. Am. Chem. Soc.*, 1917, **39**, 1643.
Frankland, Gebhard, *J. Chem. Soc.*, 1905, **87**, 864.
Glattfeld, Hanke, *J. Am. Chem. Soc.*, 1918, **40**, 987–9.
Ott, Krämer, *J. prakt. Chem.*, 1933, **137**, 255.

Glycerin.

See Glycerol.

Glycerol (*Glycerin*, 1 : 2 : 3-*trihydroxypropane*)

$CH_2OH{\cdot}CH(OH){\cdot}CH_2OH$

$C_3H_8O_3$ MW, 92

Colourless syrup. Solidifies at about 0° to rhombic cryst. M.p. 20°. B.p. 290° part. decomp., 210°/50 mm., 182°/20 mm., 179–80°/12 mm., 166°/9 mm. D_4^{15} 1·26414, $D_{17\cdot5}^{17\cdot5}$ 1·2620, D_{15}^{15} 1·26468. Heat of comb. C_p. 4323 cal./gm. Very hygroscopic. Misc. in all proportions with H_2O and EtOH. Sol. 11 parts AcOEt, 500 parts Et_2O. Insol. $CHCl_3$, CS_2, pet. ether, C_6H_6. Volatile in steam. Mild ox. ⟶ "glycerose" (glyceraldehyde + dihydroxyacetone). Forms metallic derivs. Its sulphuric esters are very hygroscopic and unstable.

1-*Mononitrate*: $C_3H_7O_5N$. MW, 137. Prisms from H_2O, EtOH, or Et_2O. M.p. 58–9°. B.p. 155–60°. Non-explosive.

2-*Mononitrate*: leaflets from H_2O. M.p. 54°. B.p. 155–60°. More sol. than the 1-deriv.

1 : 2-*Dinitrate*: $C_3H_6O_7N_2$. MW, 182. Oil. B.p. 146–8°/15 mm. slight decomp.

1 : 3-*Dinitrate*: $C_3H_6O_7N_2,\frac{1}{2}H_2O$. Prisms from H_2O. M.p. 26°.

Hepworth, *J. Chem. Soc.*, 1919, **115**, 842.

Trinitrate: *see* Nitroglycerin.

Monophosphate: *see* Glycerophosphoric Acid.

Formates: *see* Monoformin, Diformin, *and* Triformin.

Acetates: *see* Monoacetin, Diacetin, *and* Triacetin.

Butyrates: *see* Tributyrin, *and under* Butyric Acid.

Isobutyrates: *see* Mono-isobutyrin, Di-isobutyrin *and* Tri-isobutyrin.

1-*Caproate*: α-monocaproin. $C_9H_{18}O_4$. MW, 190. B.p. 132–4°/2 mm.

Tricaproate: *see under* Caproic Acid.

1-*Caprylate*: α-monocaprylin. $C_{11}H_{22}O_4$. MW, 218. M.p. 40°.

Tricaprylate: *see under* Caprylic Acid.

1-*Caprate*: α-monocaprin. $C_{13}H_{26}O_4$. MW, 246. M.p. 54°.

Tricaprate: *see under n*-Capric Acid.

Monolaurate: *see* Monolaurin.

1 : 3-*Dilaurate*: αα'-dilaurin. $C_{27}H_{52}O_5$. MW, 456. M.p. 57°.

Trilaurate: *see* Trilaurin.

Monomyristate: *see* Monomyristin.

1 : 3-*Dimyristate*: αα'-dimyristin. $C_{31}H_{60}O_5$. MW, 512. M.p. 64°.

Trimyristate: *see* Trimyristin.

Palmitates: *see* Monopalmitin, Dipalmitin, *and* Tripalmitin.

Stearates: *see* Monostearin, Distearin, *and* Tristearin.

Oleates: *see* Mono-olein *and* Triolein.

1-*Benzoate*: $C_{10}H_{12}O_4$. MW, 196. M.p. 36°. B.p. 124° in high vacuum.

2-*Benzoate*: m.p. 72·5°.

1 : 2-*Dibenzoate*: $C_{17}H_{16}O_5$. MW, 300. M.p. 60°.

Tribenzoate: $C_{24}H_{20}O_6$. MW, 404. M.p. 76° (71°).

1-p-*Bromobenzoate*: m.p. 70°.

1-p-*Nitrobenzoate*: m.p. 107°.

2-p-*Nitrobenzoate*: m.p. 120–1°.

Other esters: *see under* the Acids.

Rewadikar, Watson, *J. Indian Inst. Sci.*, 1930, **13a**, 128.

1-*Me ether*: 1 : 2-dihydroxy-3-methoxypropane. $C_4H_{10}O_3$. MW, 106. B.p. 220°, 136°/40 mm. D_4^{25} 1·111. n_D^{25} 1·442. *Di*-p-*nitrobenzoate*: m.p. 108°. *Diphenylcarbamate*: m.p. 118–19°.

2-*Me ether*: 1 : 3-dihydroxy-2-methoxypropane. B.p. 232°, 148°/40 mm. D_4^{25} 1·124. n_D^{25} 1·446. *Di*-p-*nitrobenzoate*: m.p. 155°. *Diphenylcarbamate*: m.p. 102°.

1 : 2-*Di-Me ether*: 1-hydroxy-2 : 3-dimethoxypropane. $C_5H_{12}O_3$. MW, 120. B.p. 180°, 100°/40 mm. D_4^{25} 1·016. n_D^{25} 1·421.

1 : 3-*Di-Me ether*: 2-hydroxy-1 : 3-dimethoxypropane. B.p. 169°, 88°/40 mm. D_4^{25} 1·004. n_D^{25} 1·417.

Tri-Me ether: 1 : 2 : 3-trimethoxypropane. $C_6H_{14}O_3$. MW, 134. B.p. 148°. D_4^{25} 0·937. n_D^{25} 1·401.

1-*Et ether*: 1 : 2-dihydroxy-3-ethoxypropane. $C_5H_{12}O_3$. MW, 120. B.p. 222°, 118°/21 mm. D_4^{25} 1·063. n_D^{20} 1·441.

1 : 3-*Di-Et ether*: 2-hydroxy-1 : 3-diethoxypropane. $C_7H_{16}O_3$. MW, 148. B.p. 191°, 108–10°/60 mm. D_4^{25} 0·953. n_D^{25} 1·420.

Tri-Et ether: 1 : 2 : 3-triethoxypropane. $C_9H_{20}O_3$. MW, 176. B.p. 181°, 103–5°/60 mm. D_4^{25} 0·937. n_D^{25} 1·401.

1-*Propyl ether*: $C_6H_{14}O_3$. MW, 134. B.p. 118–22°/15 mm. D_4^{18} 1·074. n_D^{18} 1·440.

1 : 3-*Dipropyl ether*: $C_9H_{20}O_3$. MW, 176. B.p. 216–18°, 135–7°/60 mm. D_4^{25} 0·927. n_D^{2} 1·424.

1 : 3-*Di-isopropyl ether*: b.p. 198–9°, 123–4°/60 mm. D_4^{25} 0·914. n_D^{25} 1·418.

1-n-*Butyl ether*: $C_7H_{16}O_3$. MW, 148. B.p. 138–40°/22 mm. D_4^{18} 1·002. n_D^{18} 1·4463.

1-*Isoamyl ether*: $C_8H_{18}O_3$. MW, 162. B.p. 254°, 136–8°/10 mm. D_4^{25} 0·976. n_D^{25} 1·440.

1-*Cetyl ether*: *see* Chimyl Alcohol.

1-*Octadecyl ether*: *see* Batyl Alcohol.

1-*Octadecenyl ether*: *see* Selachyl Alcohol.

1-*Phenyl ether*: 1 : 2-dihydroxy-3-phenoxypropane. $C_9H_{12}O_3$. MW, 168. M.p. 67–8° (53–4°). B.p. 145–8°/0·6 mm.

1 : 3-*Diphenyl ether*: 2-hydroxy-1 : 3-diphenoxypropane. $C_{15}H_{16}O_3$. MW, 244. M.p. 80–1°.

1-o-*Tolyl ether*: $C_{10}H_{14}O_3$. MW, 182. M.p. 67°. B.p. 195–6°/16 mm.

1-m-*Tolyl ether*: m.p. 60° (65–70°). B.p. 199°/16 mm.

1-p-*Tolyl ether*: m.p. 73°.

1 : 3-*Di*-o-*tolyl ether*: $C_{17}H_{20}O_3$. MW, 272. B.p. 196°/2 mm.

1 : 3-*Di*-m-*tolyl ether*: b.p. 205°/2 mm.

1 : 3-*Di*-p-*tolyl ether*: m.p. 88°.

1-*Benzyl ether*: $C_{10}H_{14}O_3$. MW, 182. B.p. 164–6°/2 mm. D_4^{25} 1·130. n_D^{25} 1·530.

1 : 3-*Dibenzyl ether*: $C_{17}H_{20}O_3$. MW, 272. B.p. 198–204°/2 mm. D_4^{15} 1·100. n_D^{25} 1·547.

Methylene ether: *see* Methyleneglycerol.

Ethylidene ether: *see* Ethylideneglycerol.

Isopropylidene ether, acetone deriv., acetoneglycerol: *see* Isopropylideneglycerol.

Benzylidene ether: *see* Benzylideneglycerol, Addendum, Vol. I.

Fairbourne, *J. Chem. Soc.*, 1932, 1965, 1972; 1931, 445; 1930, 369; *Chemistry and Industry*, 1930, **49**, 1021.

α-Monobromohydrin: 3-bromopropylene glycol. $C_3H_7O_2Br$. MW, 155. B.p. 134°/16 mm.

β-Monobromohydrin: 2-bromotrimethylene glycol. B.p. 106°/6 mm. D_4^{18} 1·7709. n_D^{18} 1·5228.

Dibromohydrin: *see* 2: 3-Dibromopropyl Alcohol *and sym.*-Dibromoisopropyl Alcohol.

Monochlorohydrin: *see* 3-Chloropropylene Glycol *and* 2-Chlorotrimethylene Glycol.

Dichlorohydrin: *see* 2: 3-Dichloropropyl Alcohol *and sym.*-Dichloroisopropyl Alcohol.

α-Monoiodohydrin: 3-iodopropylene glycol. $C_3H_7O_2I$. MW, 202. M.p. 49°. *Di*-p-*nitrobenzoyl*: m.p. 102°.

β-Monoiodohydrin: 2-iodotrimethylene glycol. M.p. 52–3°.

Di-iodohydrin: *see* 2: 3-Di-iodopropyl Alcohol *and sym.*-Di-iodoisopropyl Alcohol.

Glattfeld, Klaas, *J. Am. Chem. Soc.*, 1933, **55**, 1115.
Smith, Laudon, *Ber.*, 1933, **66**, 899.
Fairbourne, Stephens, *J. Chem. Soc.*, 1932, 1975.
Carré, *Bull. soc. chim.*, 1910, **7**, 835.

Glycerophosphoric Acid (*Glycerol monophosphate*)

$C_3H_9O_6P$ MW, 172

Exists in several isomeric forms. The free acid in every case is a syrup. Decomp. on dist. Slowly hyd. by H_2O.

α-Glycerophosphoric acid (*glycerol-1-monophosphate*)

$HO·CH_2·CH(OH)·CH_2O·PO(OH)_2$

d-.

Di-Me ether di-Me ester: $C_7H_{17}O_6P$. MW, 228. $[\alpha]_D + 5·1°$.

Li salt: $Li_2C_3H_7O_6P$. MW, 184. $[\alpha]_D^{18} + 3·51°$ in H_2O.

l-.

Di-Me ether Na salt: $Na_2C_5H_{11}O_6P$. MW, 244. $[\alpha]_D - 7·2°$.

Li salt: $[\alpha]_D^{18} - 3·02°$ in H_2O.

dl-.

Ca salt: $CaC_3H_7O_6P$. MW, 210. Sol. 2·6 parts in 100 parts H_2O at 18°. A second modification is sol. 1·8 in 100 parts H_2O at 18°.

Ba salt: $BaC_3H_7O_6P$, $0·25H_2O$. MW, 307 (anhyd.). Sol. 1·87 in 100 parts H_2O at 16°.

Quinine salt: m.p. 155°.

β-Glycerophosphoric acid (*glycerol-2-monophosphate*)

$[CH_2(OH)]_2CH·O·PO(OH)_2$

Ba salt: $BaC_3H_7O_6P,1H_2O$. MW, 325. Sol. 5·25 parts in 100 parts H_2O at 21°. Other (unstable) forms of this salt exist.

"Natural glycerophosphoric acid" obtained from animal and vegetable phosphatides is a mixture of about 3 parts β- and 1 part of the optically active α-comp. and has $[\alpha]_D$ about $-0·5°$.

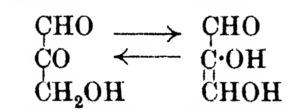
"Synthetic glycerophosphoric acid" made by interaction of glycerol and phosphoric acid, anhydride, or salts, is also a mixture of the α- and β-comps. but not identical with fully racemized "natural glycerophosphoric acid." D^{14} 1·59. Becomes glassy and pulverisable at − 20°. *Ba salt*: $BaC_3H_7O_6P,\frac{1}{2}H_2O$. Sol. 1 in 53·7 H_2O at 17°. *Ca salt*: $CaC_3H_7O_6P$. Sol. 1 in 22·4 H_2O at 16°.

Fleury, Paris, *Compt. rend.*, 1933, **196**, 1416.
Charpentier, Bocquet, *Compt. rend.*, 1932, **194**, 104.
Frisch, Waldmann, Austrian P., 12,8071, (*Chem. Abstracts*, 1932, **26**, 4422).
Karrer, Saloman, *J. Biol. Chem.*, 1931, **93**, 407, 409.
Hill, Pyman, *J. Chem. Soc.*, 1929, 2236.
Abderhalden, Eichwald, *Ber.*, 1918, **51**, 1308.

Glycerose.

See under Glycerol.

Glycerosone (*Glycollylformaldehyde*, 2-*hydroxy-1-ketopropionaldehyde*, *glyoxylylcarbinol*, *hydroxymethylglyoxal*, *hydroxypyruvic aldehyde*)



Neutral form ψ-Acid form

$C_3H_4O_3$ MW, 88

Produced as polymer during photochemical decomposition of glyoxal vapour under mercury-vapour lamp illumination. Sol. $H_2O \longrightarrow$ acid sol. which reduces Fehling's in the cold. H_2O sol. adds Br_2 instantly. Forms yellow Na salt.

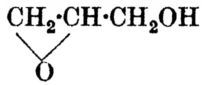
Dioxime: m.p. 168° decomp.

Tri-phenylhydrazone: two modifications. (*a*) Formed in the cold. Yellow cryst. from EtOH.Aq. M.p. 161°. (*b*) Formed hot. Reddish cryst. from EtOH.Aq. M.p. 132°.

Quinoxaline deriv.: yellow cryst. from EtOH.Aq. M.p. 165°.

Norrish, Griffiths, *J. Chem. Soc.*, 1928, 2829.

Glycide (*Glycidol, epihydrin-alcohol, 3-hydroxypropylene oxide, hydroxymethyl-ethylene oxide*)



$C_3H_6O_2$ MW, 74

B.p. 166–7° decomp., 65–6°/2·5 mm., 41°/1 mm. D^{25} 1·1143. n_D^{25} 1·4302. Sol. H_2O, EtOH, Et_2O, Me_2CO, $CHCl_3$, C_6H_6. Spar. sol. pet. ether, xylene. $H_2O \longrightarrow$ glycerol. Polymerises on boiling Py sol. Does not reduce Fehling's or $NH_3{\cdot}AgNO_3$.

Acetyl: b.p. 168–9°. D_4^{20} 1·124.

Me ether: methoxypropylene oxide. $C_4H_8O_2$. MW, 88. B.p. 115–18°. Sol. H_2O.

Et ether: ethoxypropylene oxide. $C_5H_{10}O_2$. MW, 102. B.p. 124–6° (128°). D_4^{25} 0·94. n_D^{25} 1·406. Sol. cold H_2O.

Phenyl ether: phenoxypropylene oxide. $C_9H_{10}O_2$. MW, 150. B.p. 243–4°, 133°/23 mm., 115–16°/3–4 mm. D_4^{25} 1·10. n_D^{25} 1·53.

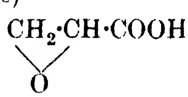
Phenylurethane: m.p. 60°.

1-*Naphthylurethane*: m.p. 102°.

Mono-nitrate: "nitroglycide." B.p. 174° part decomp., 62–4°/15 mm. D^{20} 1·332. Insol. H_2O.

Rider, Hill, *J. Am. Chem. Soc.*, 1930, **52**, 1521.
Bigot, *Ann. chim. phys.*, 1891, **22**, 482.

Glycidic Acid (*Ethylene oxide carboxylic acid, acrylic acid oxide*)



$C_3H_4O_3$ MW, 88

Liq. misc. in all proportions with H_2O, EtOH, Et_2O. Vapour is lachrymatory. The free acid and its salts on warming with $H_2O \longrightarrow$ glyceric acid or its salts.

d-.

K salt: $[\alpha]_D^{18}$ +30·16° in H_2O.

l-.

K salt: $[\alpha]_D^{18}$ −11·7° in H_2O.

dl-.

Et ester: $C_5H_8O_3$. MW, 116. B.p. 161–3°. Immiscible with H_2O. D_4^{22} 1·0933.

Abderhalden, Eichwald, *Ber.*, 1915, **48**, 116.
Freudenberg, *Ber.*, 1914, **47**, 2034.

Glycidol.
See Glycide.

Glycine (*Aminoacetic acid, glycocoll*)

$H_2N{\cdot}CH_2{\cdot}COOH$

$C_2H_5O_2N$ MW, 75

Prisms. M.p. 262° decomp. (turns brown at 228°). Sol. 2 parts H_2O at 20–25°, 930 parts EtOH, 164 parts Py. Insol. Et_2O. Triboluminescent. Heat of comb. C_p 3110 cal./gm. k (acid) $= 1{\cdot}15 \times 10^{-10}$ at 25°: k (base) $= 1{\cdot}7 \times 10^{-12}$ at 25°. Isoelectric point, $[H^{\cdot}]$ about 10^{-6}. Sweet taste.

The acid and its salts combine with many metallic salts to give double salts.

B,HCl: m.p. 185°.

N-*Acetyl*: *see* Acetylglycine.

N-*Benzoyl*: *see* Hippuric Acid.

Me ester: $C_3H_7O_2N$. MW, 89. B.p. about 130° decomp., 54°/50 mm. Absorbs CO_2. *B,HCl*: m.p. 175°. Sol. EtOH.

Et ester: $C_4H_9O_2N$. MW, 103. B.p. 148–9°/750 mm. slight decomp., 65°/40 mm., 51–2°/10 mm. D_4^{20} 1·0275. n_D^{20} 1·42417. Misc. with H_2O, EtOH, Et_2O, C_6H_6, ligroin. *B,HCl*: needles. M.p. 144°. Sublimes. Very sol. H_2O, EtOH. *Picrate*: m.p. 157°.

Allyl ester: $C_5H_9O_2N$. MW, 115. *B,HCl*: m.p. 170–80°.

Amide: *see* Aminoacetamide.

Nitrile: *see* Aminoacetonitrile.

Anhydride: *see* 2 : 5-Diketopiperazine.

Hydrazide: aminoacethydrazide. $NH_2{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}NH_2$. $C_2H_7ON_3$. MW, 89. Hygroscopic cryst. M.p. 80–5°. Decomp. at 150°. Sol. $CHCl_3$. Spar. sol. EtOH. Insol. Et_2O. Absorbs CO_2. Reduces Fehling's. *Hydrochloride*: needles. M.p. 200–1°.

Anilide: needles + $2H_2O$ from H_2O. M.p. 62°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6.

o-*Toluidide*: needles from H_2O. M.p. 66°.

m-*Toluidide*: cryst. from H_2O. M.p. 74°.

p-*Toluidide*: m.p. anhyd. 107°.

Picrate: m.p. 190°.

N-*Me*: *see* Sarcosine.

N-*Di-Me*: *see* Dimethylglycine.

N-*Et*: *see* Ethylglycine.

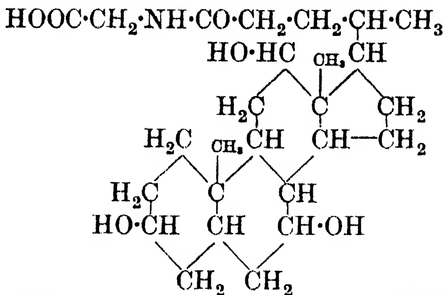
N-*Di-Et*: *see* Diethylglycine.

N-*Phenyl*: *see* Phenylglycine.

Contardi, Ravazzoni, *Chem. Zentr.*, 1934, I, 1186.
Kulikov, Slastenina, *Chem. Abstracts*, 1933, **27**, 2675.
Anslow, King, *Organic Syntheses*, 1932, Collective Vol. I, 292; *J. Chem. Soc.*, 1929, 2463.
Fischer, *Ber.*, 1906, **39**, 548.

Glycine Aldehyde.
Aminoacetaldehyde, *q.v.*

Glycocholic Acid (*Cholylglycine*)



$C_{26}H_{43}O_6N$ MW, 465

Constituent of bile. M.p. 154–5° (144°) decomp. $[\alpha]_D^{13}$ +24·3° in H_2O, +27·8° in 90% EtOH. Forms add. comps. with nitrobenzene, aniline, benzaldehyde, etc. Hyd. ⟶ glycine + cholic acid.

Tetra-acetyl: m.p. 145°. *Chloride*: m.p. 164°.

Tres-Chemisch-Pharmazeutische Industrie, D.R.P., 574,654, (*Chem. Zentr.*, 1933, I, 1550).
Minovici, Vanghelovici, *Chem. Zentr.*, 1932, I, 397.
Letsche, *Z. physiol. Chem.*, 1909, **60**, 462.

Glycocoll.
See Glycine.

Glycocyamidine (*Glycollylguanidine*, 4-*keto*-2-*iminotetrahydroglyoxaline*)

$$HN{:}C\genfrac{}{}{0pt}{}{\diagup NH-CO}{\diagdown NH-CH_2}$$

$C_3H_5ON_3$ MW, 99

Free base very sol. cold H_2O. Turns brown at about 240° and chars gradually up to 300°.

B,HCl: m.p. 213°.

Picrate: needles or plates from H_2O. M.p. 214–15° decomp.

Me deriv.: Creatinine, *q.v.*

King, *J. Chem. Soc.*, 1930, 2374.

Glycocyamine (*Guanidinoacetic acid*, N-*guanylglycine*)

$$HN{:}C\genfrac{}{}{0pt}{}{\diagup NH_2}{\diagdown NH{\cdot}CH_2{\cdot}COOH}$$

$C_3H_7O_2N_3$ MW, 117

Plates from boiling H_2O. M.p. above 300° (250–60°).

B,HCl: plates from conc. HCl. M.p. 200° decomp.

Picrate: needles from boiling H_2O. M.p. 210° decomp.

"*Half-picrate*": plates from boiling H_2O. M.p. 242° decomp.

Me deriv.: *see* Creatine.

See previous reference.

Glycogen ("*Animal starch*")

$(C_6H_{10}O_5)_n$

Polysaccharide occurring in livers of animals. White powder. Sol. cold H_2O to slightly opalescent sol. $[\alpha]_D^{25}$ +191·4° in H_2O. I ⟶ red col. Does not reduce Fehling's. Hyd. by dil. acids ⟶ glucose only.

"*Triacetate*": decomp. at 177°. Sol. $CHCl_3$, Me_2CO. Insol. H_2O, MeOH, EtOH. $[\alpha]_D^{20}$ + 170° in $CHCl_3$.

"*Tri-Me deriv.*": m.p. 147° (softens at 135°). $[\alpha]_D^{20}$ + 209° in $CHCl_3$.

Haworth, Percival, *J. Chem. Soc.*, 1932, 2277.
Mizutani, F.P., 720,268, (*Chem. Abstracts*, 1932, **26**, 3870).

Glycol.
See Ethylene Glycol.

Glycoline.
See 2 : 5-Dimethylpyrazine.

Glycollic Acid (*Hydroxyacetic acid*)

$$HO{\cdot}CH_2{\cdot}COOH$$

$C_2H_4O_3$ MW, 76

Constituent of cane-sugar juice. Needles from H_2O, leaflets from Et_2O. M.p. 80°. Sol. H_2O, EtOH, Et_2O. Heat of comb. C_p 167 Cal. k = $1{\cdot}5 \times 10^{-4}$ at 25°. Prolonged heat. at 100° ⟶ glycollic anhydride. Dist. in vacuum ⟶ glycollide + polyglycollide. $H_2O_2(+ Fe^{\cdot\cdot})$ ⟶ glyoxylic acid.

Ammonium salt: m.p. 102°. B.p. 160°/10 mm. Distils undecomp. in vacuo. Hygroscopic.

Acetyl: *see* Acetoxyacetic Acid.

Benzoyl: m.p. 112°. *Anhydride*: m.p. 126°.

Carbomethoxyl: $CH_3O{\cdot}CO{\cdot}OCH_2{\cdot}COOH$. Micro-plates from Et_2O or C_6H_6. M.p. 33–4°. B.p. 112°/0·6 mm.

Me ester: $C_3H_6O_3$. MW, 90. B.p. 151°. D^{18} 1·1677. *Phenylurethane*: m.p. 74°.

Et ester: $C_4H_8O_3$. MW, 104. B.p. 160°. D_4^{15} 1·0869.

Anhydride: m.p. 128–30°. Insol. EtOH, Et_2O. *Diacetate*: b.p. 178–80°/20 mm.

Amide: hydroxyacetamide. $C_2H_5O_2N$. MW, 75. Leaflets from EtOH. M.p. 116–17°.

Nitrile: hydroxyacetonitrile, formaldehyde cyanhydrin. C_2H_3ON. MW, 57. B.p. 183°

slight decomp., 98°/10 mm. *Benzoyl*: m.p. 195–6°.

Phenylurethane: m.p. 141° decomp.

Hydrazide: hydroxyacethydrazide. $HO{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}NH_2$. M.p. 93°. *B,HCl*: m.p. 155°.

Me ether: *see* Methoxyacetic Acid.

Et ether: *see* Ethoxyacetic Acid.

Butyl ether: $C_6H_{12}O_3$. MW, 132. B.p. 113–16°/10 mm.

Isobutyl ether: b.p. 114°/9 mm.

Phenyl ether: *see* Phenoxyacetic Acid.

Société Franco-Belge d'Ougré, F.P., 735,050, (*Chem. Abstracts*, 1933, **27**, 914).
Brigl, Grüner, *Ber.*, 1932, **65**, 642.
Palomaa, *Chem. Zentr.*, 1913, II, 1959.
Kopetschni, Karczag, D.R.P., 262,883, (*Chem. Zentr.*, 1913, II, 728).
Polstorff, Meyer, *Ber.*, 1912, **45**, 1910.

Glycollic Aldehyde (*Hydroxyacetaldehyde*)

$HO{\cdot}CH_2{\cdot}CHO$

$C_2H_4O_2$ MW, 60

Plates. M.p. 96–7°. Sol. H_2O, hot EtOH. Spar. sol. Et_2O. Fresh H_2O sols. contain bimolecular form of the aldehyde which becomes monomolecular after 24 hours. Reduces Fehling's in the cold. 1% NaOH.Aq. at 0° (on standing) ⟶ hexose mixture. Conc. alkalis ⟶ yellow col.

Mono-acetyl: bimolecular form. M.p. 157–8°.

Triacetyl: cryst. from Et_2O–pet. ether. M.p. 52°.

Benzoyl: m.p. 32–4°. B.p. 124–6°/9 mm. *Oxime*: m.p. 78–81°. *Semicarbazone*: m.p. 194–5°.

Carbomethoxyl: $CH_3O{\cdot}CO{\cdot}OCH_2{\cdot}CHO$. B.p. 78–9°/17 mm.

Di-Me acetal: $C_4H_{10}O_3$. MW, 106. B.p. 158–9°/749 mm.

Di-Et acetal: $C_6H_{14}O_3$. MW, 134. B.p. 167°, 57–8°/8 mm. D^{24} 0·888.

Et ether: $C_4H_8O_2$. MW, 88. (*a*) Aldehydic form. B.p. 71–3°. Reduces $NH_3.AgNO_3$ in cold. (*b*) Deriv. of cyclic form of glycollic aldehyde ("glycolose"). Bimolecular. M.p. 59–60°. B.p. 84–5°/9 mm. Sol. ord. org. solvents. Spar. sol. cold H_2O, pet. ether. Reduces hot $NH_3.AgNO_3$. Does not reduce Fehling's.

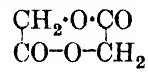
Phenylhydrazone: cryst. M.p. about 162°. Sol. H_2O, EtOH, Et_2O.

Phenylosazone: glyoxal phenylosazone. Yellow plates from Et_2O. M.p. 179–80°. Sol. $CHCl_3$, C_6H_6, hot EtOH. Insol. H_2O, ligroin.

p-*Nitrophenylosazone*: glyoxal-*p*-nitrophenylosazone. M.p. 311°.

Hartung, *J. Am. Chem. Soc.*, 1927, **49**, 2520.
Fischer, Taube, *Ber.*, 1927, **60**, 1707.
Aoyama, *Journal of the Pharmaceutical Society of Japan*, 1927, **539**, 27.
Bergmann, Miekeley, *Ber.*, 1921, **54**, 2150.
v. Pechmann, *Ber.*, 1897, **30**, 2460.

Glycollide (*Glycollodilactone*)



$C_4H_4O_4$ MW, 116

Cryst. from EtOH. M.p. 84°.

Johansson, Sebelius, *Ber.*, 1919, **52**, 745.

Glycollylformaldehyde.
See Glycerosone.

Glycollylguanidine.
See Glycocyamidine.

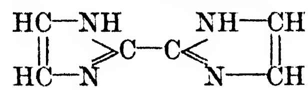
***p*-Glycollylphenol.**
See *p*-Hydroxyphenacyl Alcohol.

Glycollylurea.
See Hydantoin.

Glycolose.
See under Glycollic Aldehyde.

Glycoluric Acid.
See Hydantoic Acid.

Glycosine (2 : 2′-*Di-iminazole*)



$C_6H_6N_4$ MW, 134

Prisms from AcOH or boiling H_2O. Very spar. sol. ord. org. solvents. Insol. cold H_2O. Di-acidic base or weak acid according to conditions. Br.Aq. on aq. sols. ⟶ green ppt. Na alcoholates ⟶ violet-red col. Nitration ⟶ mixture of mono-, di-, tri-, and tetra-nitro derivs. Alkali salts mod. sol. H_2O and cryst. in reddish-brown needles which explode on heating. Alkaline sol. couples with diazonium salts.

Dinitro deriv.: yellow hexagonal leaflets. M.p. 283° decomp.

Trinitro deriv.: light brown leaflets. Decomp. above 300°.

Tetranitro deriv.: yellow prisms. M.p. 276° decomp. Explosive.

Tetra-azobenzene deriv.: dark red needles + $8H_2O$. M.p. 230–2°.

Picrate: needles from H_2O. M.p. above 270°.

Polyiodides: $C_6H_6N_4,HI,I_2$. M.p. 194–5°.

$C_6H_6N_4,2HI_3$. M.p. 204–6°. $C_6H_8N_4I_8$. M.p. 185–6°.

Lehmstedt, *Ann.*, 1927, **456**, 253.

Glycurone.
See Glucurone.

Glycuronic Acid.
See Glucuronic Acid.

Glycyl-alanine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_5H_{10}O_3N_2$ MW, 146

d-.

Needles or plates from EtOH.Aq. M.p. 235–6° decomp. (brown at 218°). Very sol. H_2O. Insol. ord. org. solvents. $[\alpha]_D^{20}$ − 50° (42°) in H_2O.

Me ester hydrochloride: $C_6H_{13}O_3N_2Cl$. MW, 196·5. M.p. 160–2°.

Anhydride: *see* 3-Methyl-2 : 5-diketopiperazine.

NH_4Cl double salt: $[\alpha]_D^{20}$ − 9·4°.

dl-.

M.p. 227° decomp. Very sol. H_2O. Very spar. sol. EtOH. *k* (acid) = 4·4 × 10^{-9} at 20°; *k* (base) = 7·6 × 10^{-12} at 20°.

Et ester: *picrate*, m.p. 97–8°. p-*Toluenesulphonyl*, m.p. 68°.

Anhydride: *see* 3-Methyl-2 : 5-diketopiperazine.

Carbethoxyl: needles from H_2O. M.p. 188°. *Et ester*, needles from Et_2O. M.p. 66° (sinters at 62°).

p-*Toluenesulphonyl*: m.p. 167°.

Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, **97**, 717.
Abderhalden, *Fermentforschung*, 1931, **12**, 376; 1928, **9**, 446, (*Chem. Abstracts*, 1931, **25**, 2741; 1928, **22**, 2550).
Bergmann, Grafe, *Z. physiol. Chem.*, 1930, **187**, 195.
Schönheimer, *Z. physiol. Chem.*, 1926, **154**, 211.
Fischer, *Ber.*, 1908, **41**, 2867.
Fischer, Schulze, *Ber.*, 1907, **40**, 943.

Glycyl-*dl*-alanyl-*dl*-alanine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\overset{CH_3}{CH}{\cdot}CO{\cdot}NH{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_8H_{15}O_4N_3$ MW, 217

Pearly leaflets from EtOH.Aq. M.p. 204–5° decomp. Hygroscopic.

Schlack, Kumpf, *Z. physiol. Chem.*, 1926, **154**, 140, 162.

Glycyl-alanyl-glycine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\overset{CH_3}{CH}{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}COOH$$

$C_7H_{13}O_4N_3$ MW, 203

d-.

Needles from H_2O or EtOH.Aq. M.p. 245° (darkens at 220°) (rapid heat.). Very easily sol. dil. acids or alkalis. Insol. ord. org. solvents. $[\alpha]_D^{20}$ − 64·3° in H_2O. Alkalis + $CuSO_4$ ⟶ bluish-violet col.

l-.

Chloroacetyl deriv.: m.p. 130° decomp. $[\alpha]_D^{20}$ + 48·3°.

dl-.

M.p. 243°.

Levene, Pfaltz, *J. Biol. Chem.*, 1926, **68**, 277.
Fischer, *Ber.*, 1908, **41**, 853.

Glycyl-*d*-alanyl-*l*-leucine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\overset{CH_3}{CH}{\cdot}CO{\cdot}NH{\cdot}\underset{CH_2{\cdot}CH(CH_3)_2}{CH}{\cdot}COOH$$

$C_{11}H_{21}O_4N_3$ MW, 259

Needles from H_2O. M.p. 239–40° decomp. $[\alpha]_D^{20}$ − 90° in H_2O. Sol. hot H_2O. Mod. sol. cold H_2O. Insol. EtOH. Reacts weakly acidic.

Abderhalden, Fodor, *Z. physiol. Chem.*, 1912, **81**, 15.
Fischer, Brunner, *Ann.*, 1905, **340**, 150.

Glycyl-*l*-asparagine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\underset{CH_2{\cdot}CO{\cdot}NH_2}{CH}{\cdot}COOH$$

$C_6H_{11}O_4N_3$ MW, 189

Needles from EtOH.Aq. M.p. 216° decomp. Very sol. H_2O. Very spar. sol. EtOH. $[\alpha]_D^{20}$ − 6·4° in H_2O. Reacts weakly acidic. Alkalis + $CuSO_4$ ⟶ reddish-violet col.

Anhydride: m.p. 274° decomp. (brown at 245°).

Miyanoki, *J. Biochem. Japan*, 1931, **13**, 389.
Fischer, Koenigs, *Ber.*, 1904, **37**, 4587.

Glycylcysteine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\underset{CH_2SH}{CH}{\cdot}COOH$$

$C_5H_{10}O_3N_2S$ MW, 178

Cryst. from H_2O. M.p. 177° decomp. (sinters at 130°).

Pirie, *Biochem. J.*, 1931, **25**, 616.

Glycyl-diglycyl-glycine.
See Triglycylglycine.

Glycyl-*d*-glutamine

$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH{\cdot}COOH$
$\quad CH_2$
$\quad CH_2{\cdot}CO{\cdot}NH_2$

$C_7H_{13}O_4N_3$ MW, 203

Cryst. + $1H_2O$ from MeOH.Aq. Decomp. at 199–200° (anhyd.). $[\alpha]_D^{15}$ − 2·47° in H_2O. Reacts acid to litmus.

Thierfelder, Cramm, *Z. physiol. Chem.*, 1919, **105**, 64.

Glycylglycine

$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}COOH$

$C_4H_8O_3N_2$ MW, 132

Leaflets from EtOH.Aq. Decomp. at 260–2° (215–20°, 235–6°). Sol. hot H_2O. Very spar. sol. EtOH. Insol. Et_2O. Heat of comb. C_v 472·4 Cal. k (acid) = 5·6 × 10^{-9} at 20°; k (base) = 7·6 × 10^{-12} at 20°.

Acetyl deriv.: plates from EtOH. M.p. 187–9°.

Bromoacetyl deriv.: m.p. 174–5°.

Chloroacetyl deriv.: prisms from H_2O. M.p. 178–80°. *Et ester*: m.p. 153–4°.

Benzoyl deriv.: m.p. 208°.

Et ester: $C_6H_{12}O_3N_2$. MW, 160. Needles from $CHCl_3$–pet. ether. M.p. 88–9°. *Hydrochloride*: m.p. 182° decomp. *Carbethoxyl*: m.p. 87°. *Acetyl*: m.p. 152°.

2-*Naphthalenesulphonate*: $B,C_{10}H_7SO_3H$. M.p. 193°.

p-*Toluenesulphonyl*: $C_{11}H_{14}O_5N_2S$. MW, 286. Needles from H_2O. M.p. 178°.

B_2,H_2PtCl_6: orange-red cryst. + $2H_2O$. Decomp. at 120° (anhyd.).

Fischer, Fourneau, *Ber.*, 1901, **34**, 2868.
Dunn, Butler, Deakers, *J. Biol. Chem.*, 1932, **99**, 217 (*Bibl.*).
Dernby, *Biochem. Z.*, 1917, **81**, 166.

Glycyl-glycyl-*dl*-alanine (*Diglycylalanine*)

$\qquad\qquad CH_3$
$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH{\cdot}COOH$

$C_7H_{13}O_4N_3$ MW, 203

Turns brown at 215°.

Fischer, *Ber.*, 1903, **36**, 2987.
Abderhalden, Ehrenwall, *Fermentforschung*, 1931, **12**, 376, (*Chem. Abstracts*, 1931, **25**, 2741).

Glycyl-glycyl-glycine.
See Diglycylglycine.

Glycyl-glycyl-*dl*-leucine

$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH{\cdot}COOH$
$\qquad CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{19}O_4N_3$ MW, 245

Hard cryst. M.p. 240° decomp. Gives soluble Cu salt.

Chloroacetyl deriv.: m.p. 176–7° decomp.

Fischer, *Ber.*, 1903, **36**, 2990.
Abderhalden, Zeisset, *Fermentforschung*, 1929, **10**, 554, (*Chem. Abstracts*, 1929, **23**, 4232).

Glycyl-glycyl-*dl*-valine

$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH{\cdot}COOH$
$\qquad CH(CH_3)_2$

$C_9H_{17}O_4N_3$ MW, 231

M.p. 219–21° decomp.

Chloroacetyl deriv.: m.p. 169–71° decomp.

See last reference above.

Glycyl-leucine

$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH{\cdot}COOH$
$\qquad CH_2{\cdot}CH(CH_3)_2$

$C_8H_{16}O_3N_2$ MW, 188

d-.

Cryst. from H_2O. $[\alpha]_D^{20}$ + 37·6° in H_2O.

l-.

Plates from EtOH.Aq. M.p. 256° decomp. (245°) (yellow at 246°). $[\alpha]_D^{20}$ − 35·2° in H_2O; − 35° in 10% HCl.

Et ester: *hydrochloride*, m.p. 161–2°.

Anhydride: m.p. 254–5°. $[\alpha]_D^{20}$ + 31° in H_2O.

Carbonyl deriv.: $CO(C_8H_{15}O_3N_2)_2$. M.p. 135°.

dl-.

Tetragonal cryst. from EtOH.Aq. M.p. 242° decomp. Sol. H_2O. Insol. EtOH.

Carbethoxyl: plates from Me_2CO, needles from EtOH.Aq. M.p. 136°.

Amide: $C_8H_{17}O_2N_3$. MW, 187. *Hydrochloride*, m.p. 211–12°.

Anhydride: m.p. 245°.

p-*Toluenesulphonyl*: m.p. 81–2°. *Et ester*, m.p. 83·5°.

2-*Naphthalenesulphonyl*: m.p. 123°.

$C_6H_5{\cdot}NCO$ *deriv.*: m.p. 177°.

Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, **97**, 717.
Abderhalden, *Z. physiol. Chem.*, 1927, **168**, 201; 1926, **160**, 256.
Fischer, Warburg, *Ann.*, 1905, **340**, 157.

Glycyl-leucyl-alanine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\underset{CH_2\cdot CH(CH_3)_2}{CH}{\cdot}CO{\cdot}NH{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_{11}H_{21}O_4N_3$ MW, 259

Glycyl-l-*leucyl*-d-*alanine*.

Needles from H_2O. M.p. 235–6° decomp. $[\alpha]_D^{20}$ − 59° in H_2O. Very vol. H_2O. Insol. EtOH.

Inactive.

Tetragonal plates from H_2O. M.p. 250° decomp. Sol. H_2O. Alkali + $CuSO_4$ ⟶ reddish-violet col.

Abderhalden, Fodor, *Z. physiol. Chem.*, 1912, **81**, 20.
Fischer, Warburg, *Ann.*, 1905, **340**, 164.

Glycyl-leucyl-glycine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\underset{CH_2\cdot CH(CH_3)_2}{CH}{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}COOH$$

$C_{10}H_{19}O_4N_3$ MW, 245

d-.

M.p. 215°. $[\alpha]_D^{20}$ + 25°.

dl-.

Fine needles from EtOH.Aq. M.p. 232° (206°) decomp. Insol. MeOH, Et_2O, AcOEt.

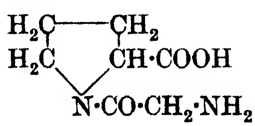
Et ester: $C_{12}H_{23}O_4N_3$. MW, 273. M.p. 51°.

Fischer, Brunner, *Ann.*, 1905, **340**, 150.
Abderhalden, *Fermentforschung*, 1930, **11**, 143; 1928, **10**, 179, (*Chem. Abstracts*, 1930, **24**, 1623; 1929, **23**, 1113).
Abderhalden, Möller, *Z. physiol. Chem.*, 1928, **174**, 206.

Glycyl-*p*-phenetidine.

See under *p*-Phenetidine.

Glycyl-*l*-proline (N-*Aminoacetylpyrrollidine-2-carboxylic acid*)



$C_7H_{12}O_3N_2$ MW, 172

Prisms from MeOH.Aq. M.p. 185°. $[\alpha]_D^{20}$ − 113·8° in H_2O ($[\alpha]_D^{18}$ − 86·2°). Hygroscopic.

Anhydride: m.p. 180–3°. $[\alpha]_D^{20}$ − 202°.

Bergmann, Zervas, *Ber.*, 1932, **65**, 1192.
Abderhalden, Zumstein, *Fermentforschung*, 1930, **12**, 1, (*Chem. Abstracts*, 1931, **25**, 77).
Abderhalden, Komm, *Z. physiol. Chem.*, 1925, **145**, 308.

Glycylsarcosine (*Glycylmethylglycine*)

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}N(CH_3){\cdot}CH_2{\cdot}COOH$$

$C_5H_{10}O_3N_2$ MW, 146

Cryst. from EtOH.Aq. M.p. 220° (200–1°).

Levene, Simms, Pfaltz, *J. Biol. Chem.*, 1924, **61**, 450.

Glycyl-*dl*-serine

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\underset{CH_2OH}{CH}{\cdot}COOH$$

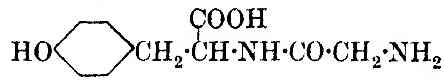
$C_5H_{10}O_4N_2$ MW, 162

Plates from MeOH.Aq. M.p. 207° decomp. (yellow at 195°). Very sol. H_2O. Spar. sol. MeOH. Insol. Et_2O.

Anhydride: thick rods from H_2O. M.p. 227° (sinters at 220°). Spar. sol. EtOH.

Fischer, Roesner, *Ann.*, 1910, **375**, 201.
Cf. Bergmann, Miekeley, *Z. physiol. Chem.*, 1924, **140**, 128.

Glycyltyrosine



$C_{11}H_{14}O_4N_2$ MW, 238

d-.

Amorphous. M.p. 160° decomp. (sinters at 120°).

l-.

M.p. 165° decomp. (sinters at 125°). Sol. H_2O, MeOH. Spar. sol. EtOH. Insol. Et_2O.

Et ester hydrochloride: $C_{13}H_{19}O_4N_2Cl$. MW, 302·5. M.p. 245° decomp.

Anhydride: needles. M.p. 295° decomp. $[\alpha]_D^{20}$ + 125·4°.

dl-.

Anhydride: cryst. from hot H_2O. M.p. 255–7°. Sol. alkalis. Very spar. sol. cold H_2O and dil. acids. Insol. EtOH, Et_2O.

Fischer, Schrauth, *Ann.*, 1907, **354**, 21.
Fischer, *Ber.*, 1904, **37**, 2496.
Greenstein, *J. Biol. Chem.*, 1932, **95**, 465.
Abderhalden, *Fermentforschung*, 1931, **12**, 295; 1930, **11**, 399, (*Chem. Abstracts*, 1931, **25**, 2694; 1930, **24**, 3218).

Glycylvaline

$$H_2N{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\underset{CH(CH_3)_2}{CH}{\cdot}COOH$$

$C_7H_{14}O_3N_2$ MW, 174

d-.

Needles from EtOH.Aq. M.p. 254° (sinters at

239°). Sol. 2 parts cold H_2O. $[\alpha]_D^{20}$ − 19·6° in H_2O; − 10·5° in normal HCl; − 6·9° in normal NaOH.

Anhydride: needles. M.p. 266° (sinters at 260°). $[\alpha]_D^{20}$ + 20·5° in AcOH; + 33° in H_2O.

l-.

$[\alpha]_D^{25}$ + 20·3° in H_2O.

dl-.

M.p. 240°.

Dichloroacetyl deriv.: m.p. 152°.

Benzoyl deriv.: m.p. 135–6°.

C_6H_5·NCO deriv.: m.p. 155°.

Fischer, Scheibler, *Ann.*, 1908, **363**, 140.
Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, **97**, 717.
Abderhalden, *Fermentforschung*, 1928, **10**, 213, (*Chem. Abstracts*, 1929, **23**, 1389).

Glycyrrhetic Acid

$C_{45}H_{72}O_6$ MW, 708

The aglucone from glycyrrhizin, the sweet principle of liquorice, *Glycyrrhiza glabra*, Linn. Needles from AcOH–Et_2O–ligroin. M.p. 297–8°. K salt of glycyrrhetic acid heated with HI and PH_4I ⟶ deoxyglycyrrhetin, m.p. 298–300°. Se at 340° ⟶ sapotalin (1:2:7-trimethylnaphthalene).

Me ester: $C_{46}H_{74}O_6$. MW, 722. Needles from EtOH. M.p. 241°.

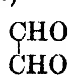
Et ester: $C_{47}H_{76}O_6$. MW, 736. Needles from EtOH. M.p. 246–8°.

Karrer, Karrer, Chao, *Helv. Chim. Acta*, 1921, **4**, 100, (cf. Galassi, *Chem. Abstracts*, 1928, **22**, 385; Ruzicka, van Veen, *Z. physiol. Chem.*, 1929, **184**, 69).

Glycyrrhizin.

See under Glycyrrhetic Acid.

Glyoxal (*Diformyl*)



$C_2H_2O_2$ MW, 58

Yellow prisms. M.p. 15°. B.p. 51°. The vapour has green col. and burns with violet flame. D^{20} 1·14. n_D^{20} 1·3826. Very sol. ord. org. solvents. Polymerises on standing or in presence of trace of H_2O. Aq. sol. contains monomolecular glyoxal, reacts weakly acid, reduces $NH_3.AgNO_3$, does not reduce Fehling's.

Tetra-acetate: tetragonal cryst. from H_2O or AcOH. M.p. 106–7°.

Tetra-Et acetal: $C_{10}H_{22}O_4$. MW, 206. B.p. 180°, 88–9°/14 mm.

Phenylosazone: m.p. 169–70° part. decomp.

p-*Bromophenylosazone*: m.p. 215° decomp.

p-*Chlorophenylosazone*: m.p. 227° decomp.

p-*Nitrophenylosazone*: m.p. 310° decomp.

Dioxime: *see* Glyoxime.

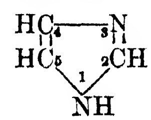
"*Sulphate*": $[-CHO_2SO_2]_2$. Colourless needles. M.p. 176–7°. Sol. H_2O.

Consortium für elektrochemische Industrie, D.R.P., 573,721, (*Chem. Abstracts*, 1933, **27**, 4253).
I.C.I., F.P., 734,537; D.R.P., 574,162, (*Chem. Abstracts*, 1933, **27**, 999, 3486).
I.G., D.R.P., 521,722, (*Chem. Abstracts*, 1931, **25**, 3363).
Ruggli, Henzi, *Helv. Chim. Acta*, 1929, **12**, 362.
Kindler, *Ber.*, 1921, **54**, 647.
Hess, Uibrig, *Ber.*, 1917, **50**, 365.

Glyoxalic Acid.

See Glyoxylic Acid.

Glyoxaline (*Iminazole, 1:3-diazole*)



$C_3H_4N_2$ MW, 68

Thick prisms. M.p. 88–9°. B.p. 255°. Easily sol. H_2O, EtOH, Et_2O. Strongly basic. Unattacked by H_2CrO_4. $KMnO_4$.Aq. ⟶ formic acid. H_2O_2 ⟶ oxamide.

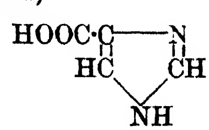
Benzoyl: leaflets. M.p. 202–3°. *Dibromide*: m.p. 255°.

B,AuCl$_3$: decomp. at 190°.

B,HAuCl$_4$: yellow needles. Decomp. at 230°.

Oddo, *Gazz. chim. ital.*, 1932, **62**, 1092; 1928, **58**, 573; 1926, **56**, 958.
Ruggli, Henzi, *Helv. Chim. Acta*, 1929, **12**, 362 (*Bibl.*).
Pyman, *J. Soc. Dyers Colourists*, 1920, **36**, 107 (*Review*).

Glyoxaline-4-carboxylic Acid (*Iminazole-4-carboxylic acid*)



$C_4H_4O_2N_2$ MW, 112

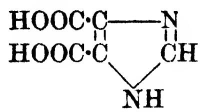
Amide: $C_4H_5ON_3$. MW, 111. Cryst. + $1H_2O$. M.p. 214.° *Hydrochloride*: m.p. 220°. *Picrate*: m.p. 208°.

Picrate: m.p. 195°.

Hydrazide: cryst. + $1H_2O$. M.p. 213°. *Picrate*: m.p. 223°.

Gerard, Parrod, *Compt. rend.*, 1930, **190**, 328.
Yabuta, Kambe, *Chem. Abstracts*, 1933, **27**, 1882.
Balaban, *J. Chem. Soc.*, 1930, 270.
Parrod, *Bull. soc. chim.*, 1933, **53**, 196.

Glyoxaline-4 : 5-dicarboxylic Acid (*Iminazole-4 : 5-dicarboxylic acid*)

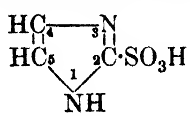


$C_5H_4O_4N_2$ MW, 156

Prisms. M.p. 288° decomp. k (first) = $2{\cdot}85 \times 10^{-4}$; (second) = $6{\cdot}44 \times 10^{-10}$.
Mono-K salt: cryst. + $1H_2O$. M.p. 281°.

Yllner, *Chem. Abstracts*, 1928, **22**, 589.
Tamamushi, *Chem. Abstracts*, 1929, **23**, 1639.

Glyoxaline-2-sulphonic Acid



$C_3H_4O_3N_2S$ MW, 148

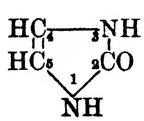
Colourless prisms + $1H_2O$ from H_2O. M.p. 303° (softens and darkens at 285°). Readily sol. hot H_2O. Sol. 8 parts cold H_2O. Insol. EtOH.

Barnes, Pyman, *J. Chem. Soc.*, 1927, 2711.

Glyoxaline-4(5)-sulphonic Acid.
Anhydrous cubes from H_2O. M.p. 307°.

See previous reference.

Glyoxalone (*2-Iminazolone*)

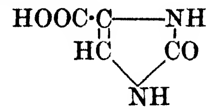


$C_3H_4ON_2$ MW, 84

Pyramidal cryst. Decomp. at 250–1° (darkens at 225°). Sol. hot H_2O, acids, alkalis.
1 : 3-*Diacetyl*: silky needles. M.p. 105–6°.

Hilbert, *J. Am. Chem. Soc.*, 1932, **54**, 3413.

Glyoxalone-4-carboxylic Acid (*2-Iminazolone-4-carboxylic Acid*)



$C_4H_4O_3N_2$ MW, 128

Colourless nodules from hot H_2O. M.p. 261° decomp. Insol. ord. org. solvents. Reduces Tollen's reagent and $NH_3.AgNO_3$. Aq. sol. + $FeCl_3$ ⟶ dark brown col. CrO_3 ⟶ parabanic acid.
Et ester: $C_6H_8O_3N_2$. MW, 156. Glistening plates from EtOH.Aq. M.p. 255°.

See previous reference.

Glyoxalylurea.
See Allanturic Acid.
Glyoxylylcarbinol.
See Glycerosone.
Glyoxime (*Glyoxal-dioxime, di-isonitroso-ethane*)

CH:N·OH
CH:N·OH

$C_2H_4O_2N_2$ MW, 88

Plates from H_2O. M.p. 178°. Sublimes. Sol. hot H_2O, EtOH, Et_2O. Aq. sol. reacts weakly acidic.
Dibenzoyl: m.p. 139°.

Milone, *Chem. Abstracts*, 1933, **27**, 706.
Bamberger, Seligman, *Ber.*, 1903, **36**, 3831.
Hantzsch, Wild, *Ann.*, 1896, **289**, 293.

Glyoximic Acid.
See Isonitrosoacetic Acid.
Glyoxylic Acid (*Glyoxalic acid, aldehydoformic acid*)

OHC·COOH

$C_2H_2O_3$ MW, 74

Occurs in plant and animal tissues and fluids. Colourless prisms. M.p. 98°. Very sol. cold H_2O ⟶ yellow sol. Spar. sol. EtOH, Et_2O, C_6H_6. Slowly reduces $NH_3.AgNO_3$. $k = 0{\cdot}474 \times 10^{-3}$ at 25°. Heat above m.p. ⟶ glycollic + oxalic acids + H_2O.
Me ester: $C_3H_4O_3$. MW, 88. Leaflets. M.p. 53°. *Semicarbazone*: m.p. 206° decomp.
Et ester: $C_4H_6O_3$. MW, 102. B.p. 130°. *Phenylhydrazone*: m.p. 129–30°. *Semicarbazone*: m.p. 218° (228°). 2 : 4-*Dichlorophenylhydrazone*: m.p. 122°. 2 : 4 : 6-*Tribromophenylhydrazone*: m.p. 126°.
Di-Et acetal: diethoxyacetic acid. $C_6H_{12}O_4$. MW, 148. B.p. 108–10°/11 mm. *Et ester*:

$C_8H_{16}O_4$. MW, 176. B.p. 199°, 83–5°/13 mm. D^{18} 0·994.

Phenylhydrazone: (α) Decomp. on heating. (β) M.p. 144° (137°) decomp.

p-*Nitrophenylhydrazone*: m.p. 200° decomp.

2 : 4-*Dichlorophenylhydrazone*: decomp. at 150°.

2 : 4-*Dinitrophenylhydrazone*: m.p. 190° decomp.

2 : 4 : 6-*Tribromophenylhydrazone*: m.p. 170° decomp.

Benzylphenylhydrazone: m.p. 172°.

Oxime: *see* Isonitrosoacetic Acid.

Semicarbazone: m.p. 240° (202–3°) decomp.

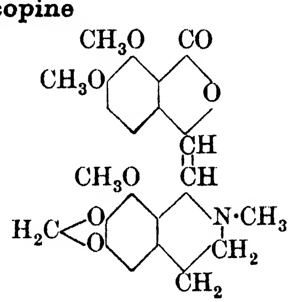
Diureide: *see* Allantoin.

Mohrschulz, *Z. Elektrochem.*, 1926, **32**, 434.
Hatcher, Holden, *Chem. Abstracts*, 1926, **20**, 323.
Avy, *Bull. soc. chim.*, 1931, **49**, 14.

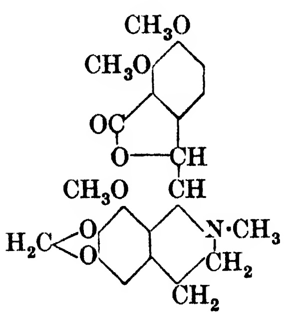
α-Gnoscopine.

See Narcotine.

β-Gnoscopine



or



$C_{22}H_{23}O_7N$ MW, 413

Prisms from MeOH. M.p. 180°. HNO_3.Aq· ⟶ cotarnine + opianic acid.

B,HCl: m.p. 86–8° (224–6° on standing).

Picrate: m.p. 199–201°.

Hope, Robinson, *J. Chem. Soc.*, 1914, **105**, 2085.
Marshall, Pyman, Robinson, *J. Chem. Soc.*, 1934, 1318.

Gorlic Acid

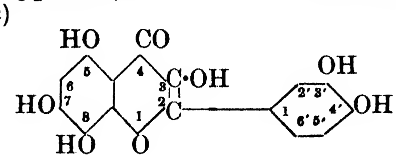
$C_{18}H_{30}O_2$ MW, 278

Occurs as glyceride in *Oncoba echinata*, Oliver (Gorli). Oil. D^{18} 0·9364. Turns yellow in air.

Amide: $C_{18}H_{31}ON$. MW, 277. Cryst. from Me_2CO. M.p. 95°.

André, Jouatte, *Bull. soc. chim.*, 1928, **43**, 352.

Gossypetin (3 : 5 : 7 : 8 : 3′ : 4′-*Hexahydroxyflavone*)



$C_{15}H_{10}O_8$ MW, 318

Colouring matter of Indian cotton flowers, *Gossypium herbaceum*, Linn. and other *G.* species and of *Hibiscus sabdariffa*, Linn. Yellow needles. M.p. 311–13° (310–14°).

3 : 5 : 8 : 3′ : 4′-*Penta-Me ether*: $C_{20}H_{20}O_8$. MW, 388. M.p. 253–4°.

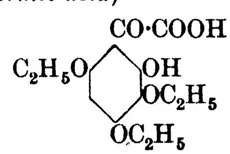
Hexa-Me ether: $C_{21}H_{22}O_8$. MW, 402. M.p. 170–2°.

Hexa-Et ether: $C_{27}H_{34}O_8$. MW, 486. M.p. 144–6°.

Hexa-acetyl: m.p. 229–30°.

Baker, Nodzu, Robinson, *J. Chem. Soc.*, 1929, 74 (*Bibl.*).

Gossypetonic Acid (2-*Hydroxy*-3 : 4 : 6-*triethoxybenzoylformic acid*)



$C_{14}H_{18}O_7$ MW, 298

Yellow needles from C_6H_6. M.p. 154–5° decomp.

Perkin, *J. Chem. Soc.*, 1913, **103**, 655.

Gossypic Acid

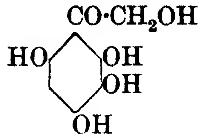
$(C_{12}H_{14}O_4)_n$ MW, $(222)_n$

Cryst. from EtOH. M.p. 241°. $FeCl_3$ on EtOH sol. ⟶ violet col.

Me ether: $(C_{13}H_{16}O_4)_n$. MW, $(236)_n$. M.p. 225°. *Me ester*: $(C_{14}H_{18}O_4)_n$. MW, $(250)_n$. M.p. 142°.

Karrer, Tobler, *Helv. Chim. Acta*, 1932, **15**, 1209.

Gossypitol (ω-2 : 3 : 4 : 6-*Pentahydroxyacetophenone*, 2 : 3 : 4 : 6-*tetrahydroxyphenacyl alcohol*)



$C_8H_8O_6$ MW, 200

ω-3 : 4 : 6-*Tetra-Me ether*: $C_{12}H_{16}O_6$. MW, 256. Needles from EtOH. M.p. 115–16°.

ω-2 : 3 : 4-*Tetra-Et ether*: $C_{16}H_{24}O_6$. MW, 312. M.p. 46–8°. *Oxime*: m.p. 93–5°.

ω-3 : 4 : 6-*Tetra-Et ether*: m.p. 110–11°. *Oxime*: m.p. 127–9°.

Perkin, *J. Chem. Soc.*, 1913, **103**, 653.

Gossypitone

$C_{15}H_8O_8$ MW, 316

Red needles. Sol. Py, quinoline. Spar. sol. hot H_2O. Insol. EtOH, $PhNO_2$. Alkalis ⟶ blue col.

Hexa-acetyl deriv.: m.p. 228–30°.

Perkin, *J. Chem. Soc.*, 1913, **103**, 657.

Gossypol

$C_{30}H_{30}O_8$ MW, 518

Toxic principle of cottonseed. Yellow cryst. from Et_2O–pet. ether. M.p. 199°.

Dihydrazone: m.p. about 285°.

Clark, *J. Am. Chem. Soc.*, 1929, **51**, 1475.
Karrer, Tobler, *Helv. Chim. Acta*, 1932, **15**, 1204.

Gossypose.
See Raffinose.

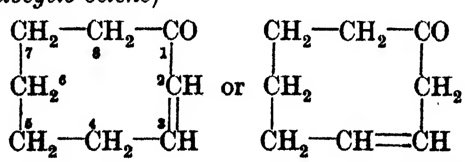
Gossypyl Alcohol

$C_{30}H_{62}O$ MW, 438

Occurs in wax of American cotton. (α) M.p. 87–8°. Spar. sol. $CHCl_3$, Et_2O. (β) M.p. 86°. Mod. sol. $CHCl_3$, Et_2O. (γ) M.p. 82–3°. Sol. $CHCl_3$, Et_2O.

Fargher, Probert, *Chem. Abstracts*, 1923, **17**, 1890; 1924, **18**, 2813.

Granatal (Δ^2 (or Δ^3)-*Cyclo-octenone*, 3 (or 4)-*ketocyclo-octene*)

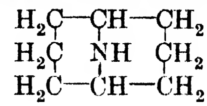


$C_8H_{12}O$ MW, 124

B.p. 200–1°, 73·3–74°/8 mm. D_4^{20} 0·990. Sol. ord. org. solvents. Reduces Tollen's reagent. Ox. ⟶ adipic acid.

Willstätter, Waser, *Ber.*, 1911, **44**, 3424.

Granatanine (*Dihydrogranatenine*, 2 : 6-*trimethylenepiperidine*, "*norgranatanine*")



$C_8H_{15}N$ MW, 125

Needles. M.p. 50–60°. Zn dust dist. ⟶ 2-propylpyridine.

B,HAuCl$_4$: yellow plates from H_2O. M.p. 225°. Sol. hot H_2O.

B$_2$,H$_2$PtCl$_6$: yellow plates from dil. HCl. M.p. above 255°.

N-*Benzoyl*: needles from pet. ether. M.p. 111°.

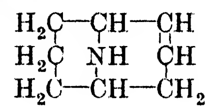
N-*Nitroso*: cryst. from pet. ether. M.p. 148°. Sol. hot H_2O, Et_2O, C_6H_6.

N-*Me*: *see* *N*-Methylgranatanine.

Ciamician, Silber, *Ber.*, 1893, **26**, 2750; 1894, **27**, 2851.

Granataninol.
See Granatoline.

Granatenine



$C_8H_{13}N$ MW, 123

Free base not isolated.

B,HAuCl$_4$: yellow plates from dil. HCl. M.p. 186°.

B$_2$,H$_2$PtCl$_6$: yellowish-red cryst. M.p. above 260°.

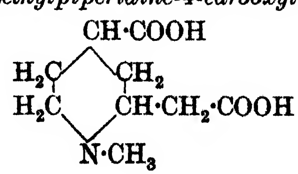
N-*Me*: *see* *N*-Methylgranatenine.

Ciamician, Silber, *Ber.*, 1894, **27**, 2857.

Granatic Acid.

There are two Granatic Acids described in the literature.

(1) Granatic Acid (N-*Methylpiperidine*-4-*carboxylic acid*-2-*acetic acid*, *homotropinic acid*, 2-[N-*methyl*-4-*carboxypiperidyl*]-*acetic acid*, N-*methyl*-2-*carboxymethylpiperidine*-4-*carboxylic acid*)

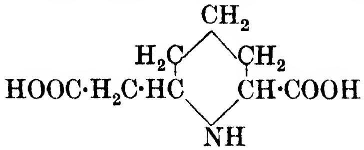


$C_9H_{15}O_4N$ MW, 201

M.p. 240–5° decomp.
B,HAuCl$_4$: m.p. 190° decomp.

Ciamician, Silber, *Ber.*, 1896, **29**, 487.

(2) Granatic Acid (*Piperidine-2-carboxylic acid-6-acetic acid*, 2-[6-*carboxypiperidyl*]-*acetic acid*, 6-*carboxymethylpiperidine-2-carboxylic acid*)

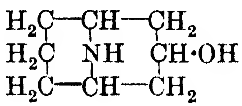


$C_8H_{13}O_4N$ MW, 187

Yellow prisms. M.p. 270°.
N-*Me di-Me ester* : $C_{11}H_{19}O_4N$. MW, 229. Oil. *Methiodide* : m.p. 167°.

Piccinini, *Gazz. chim. ital.*, 1899, **29**, i, 415; ii, 104.

Granatoline (*Granataninol*, 3-*hydroxygranatanine*)



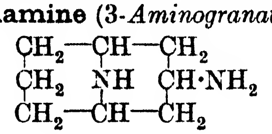
$C_8H_{15}ON$ MW, 141

Needles and prisms from Et_2O. M.p. 134°. Sol. H_2O, EtOH. Spar. sol. Et_2O.
B,HAuCl$_4$: yellow needles and prisms from dil. HCl. M.p. 215°.
N-*Nitroso* : plates + H_2O. M.p. 72–3°, anhyd. 125°.
N-*Acetyl* : m.p. 120°. O-*Acetyl* : m.p. 80°.
N-*Me* : *see N*-Methylgranatoline.

Ciamician, Silber, *Ber.*, 1894, **27**, 2855.

Note. These authors refer to the above compound as "Norgranatoline" and the *N*-Me deriv. as "Granatoline."

Granatylamine (3-*Aminogranatanine*)



$C_8H_{15}N_2$ MW, 139

Imino-N-*Me* : $C_9H_{17}N_2$. MW, 153. Oil. B.p. 235–40° decomp., 160–70°/60 mm. Sol. H_2O. *Platinichloride* : m.p. 260–1° decomp.
B,(HAuCl$_4$)$_2$: yellow cryst. M.p. 238–9°.

Piccinini, Cortese, *Gazz. chim. ital.*, 1901, **31**, i, 566.
Piccinini, Quartaroli, *Gazz. chim. ital.*, 1899, **29**, ii, 119.

ψ-Granatylamine.
Stereoisomer of granatylamine. Prisms from pet. ether. M.p. 125°. Hygroscopic.
Picrate : decomp. at 230–47°.
Imino-N-*Me* : oil. B.p. 232–6°. Sol. H_2O. *Platinichloride*: m.p. 265° decomp. *B,(HAuCl$_4$)$_2$*: m.p. 231–2° decomp. *Picrate* : m.p. 239–40° decomp.
Platinichloride : m.p. 256°.
Aurichloride : m.p. 208° decomp.

See first reference above.

Gratiogenin

$C_{31}H_{50}O_5$ MW, 502

Plates from EtOH. M.p. 198°. Sol. EtOH. Spar. sol. H_2O, Et_2O.

Retzlaff, *Chem. Zentr.*, 1903, I, 42.

Gratioligenin

$C_{37}H_{60}O_{10}$ MW, 664

Needles from EtOH. M.p. 285°. Spar. sol. EtOH. Insol. H_2O, Et_2O. Hyd. ⟶ glucose + gratiogenin.

See previous reference.

Gratiolin

$C_{43}H_{70}O_{15}$ MW, 826

Diglucoside from tubers of *Gratiola officinalis*. Needles. M.p. 235–7° decomp. Sol. EtOH. Spar. sol. H_2O. Insol. Et_2O. Hyd. ⟶ glucose + gratiogenin.

See previous reference.

Grayanotoxin

$$C_{20}H_{30}(O{\cdot}CO{\cdot}CH_3)(OH)_3$$
or
$$C_{21}H_{34}(O{\cdot}CO{\cdot}CH_3)(OH)_3$$

$C_{22}H_{36}O_5$ ($C_{23}H_{40}O_5$) MW, 380 (396)

Occurs in leaves of *Leucophoe grayana*, Max. M.p. 238–238·5°. Sol. AcOH. Mod. sol. $CHCl_3$. Spar. sol. H_2O. $[\alpha]_D$ — 3·15° in AcOH.
Triacetyl deriv. : m.p. 211·5–212·5°.
Tribenzoyl deriv. : m.p. 201–201·5°.

Yamashita, *Chem. Abstracts*, 1933, **27**, 303.

Grindelol

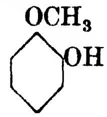
$C_{23}H_{38}O_4$ MW, 378

Phytosterol glucoside from *Grindelia camporium*. M.p. 257°.
Acetyl deriv. : m.p. 161°.

Power, Salway, *J. Chem. Soc.*, 1913, **103**, 402.

Guacamphol.
See under d-Camphoric Acid.

Guaiacol (*Catechol methyl ether, o-hydroxy-anisole, o-methoxyphenol*)



$C_7H_8O_2$ MW, 124

(a) Prisms. F.p. 28·20°. M.p. 32° (28·4°). B.p. 205° (204·65°/746 mm.), 106·5°/24 mm. $D_4^{21 \cdot 4}$ 1·1287. (b) Needles. F.p. − 3·2°. Sol. ord. org. solvents. Spar. sol. H_2O. $FeCl_3 \longrightarrow$ green col.

Formyl: guaiacol formate. B.p. 80°/1 mm. D^{24} 1·1251. n_D^{24} 1·51364.

Acetyl: guaiacol acetate. B.p. 107°/22 mm. (123–4°/13 mm.). D_4^{25} 1·1285. n_D^{25} 1·5101.

Mono-guaiacol carbonate: *Me ester*: $C_9H_{10}O_4$. MW, 182. B.p. 132–4°/16 mm. *Et ester*: $C_{10}H_{12}O_4$. MW, 196. B.p. 265°. *Propyl ester*: $C_{11}H_{14}O_4$. MW, 210. B.p. 201–2°/90 mm. D^0 1·116. $n_D^{15 \cdot 7}$ 1·49872. *Phenyl ester*: $C_{14}H_{12}O_4$. MW, 244. M.p. 82°.

Di-guaiacol carbonate: duotal. $C_{15}H_{14}O_5$. MW, 274. M.p. 86°.

Di-guaiacol oxalate: $C_{16}H_{14}O_6$. MW, 302. M.p. 127°.

Mono-guaiacol succinate: $C_{11}H_{12}O_5$. MW, 224. M.p. 75°.

Di-guaiacol succinate: $C_{18}H_{18}O_6$. MW, 330. M.p. 135°.

Benzoyl: guaiacol benzoate. M.p. 57–8°.

3 : 5-*Dinitrobenzoyl*: m.p. 141–2°.

Cinnamoyl: *see* Styracol.

p-*Bromobenzenesulphonyl*: m.p. 103–4°.

Picrate: m.p. 90°.

Me ether: *see* Veratrol.

Et ether: 1-methoxy-2-ethoxybenzene, *o*-methoxyphenetole. $C_9H_{12}O_2$. MW, 152. B.p. 207–9°, 104°/18 mm. D_4^{25} 1·0433. n_D^{25} 1·5210.

Propyl ether: 1-methoxy-2-propoxybenzene, propyl *o*-methoxyphenyl ether. $C_{10}H_{14}O_2$. MW, 166. B.p. 142–3°/68 mm. D_4^{25} 1·0174. n_D^{25} 1·5119.

n-*Butyl ether*: 1-methoxy-2-butoxybenzene, butyl *o*-methoxyphenyl ether. $C_{11}H_{16}O_2$. MW, 180. B.p. 178°/132 mm. D_4^{25} 0·9990. n_D^{25} 1·5067.

Vinyl ether: $C_9H_{10}O_2$. MW, 150. B.p. 202–3°.

Allyl ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 116°/14 mm. D^{15} 1·058.

β-*Bromoethyl ether*: $C_9H_{11}O_2Br$. MW, 231. M.p. 43–5°. B.p. 135–40°/7 mm.

β-*Hydroxyethyl ether*: $C_9H_{12}O_3$. MW, 168. B.p. 166–7°/22 mm.

1-*Monoglyceryl ether*: guaiamar. $C_{10}H_{14}O_4$. MW, 198. M.p. 78·5–9°.

1 : 3-*Diglyceryl ether*: $C_{17}H_{20}O_5$. MW, 304. M.p. 72·5°.

d-*Glucoside*: $C_{13}H_{18}O_7$. MW, 286. M.p. 156·5–7°.

Cetyl ether: $C_{23}H_{40}O_2$. MW, 348. M.p. 54°. $D_4^{19 \cdot 4}$ 0·8740.

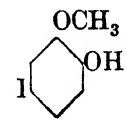
Phenyl ether: *see under* 2-Hydroxydiphenyl Ether.

Benzyl ether: $C_{14}H_{14}O_2$. MW, 214. M.p. 57·5–58·5°. B.p. 168–70°/13 mm. n_D^{25} 1·5780.

Phenacyl ether: *see under* *o*-Hydroxyphenyl phenacyl Ether.

Tanaka, Ishimasa, Koyama, *Chem. Abstracts*, 1926, **20**, 2670.
Gallotti, *Chem. Abstracts*, 1933, **27**, 4530 (*Bibl.*).
Titherley, Hudson, U.S.P., 1,878,061, (*ibid.*, 312).
Hirao, *J. Chem. Soc. Japan*, 1932, **53**, 488.

Guaiadol (5-*Iodoguaiacol, 4-iodocatechol 2-methyl ether*)



$C_7H_7O_2I$ MW, 250

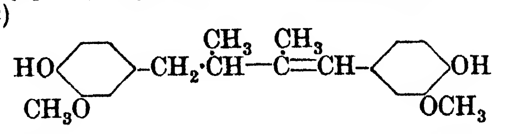
Prisms. M.p. 43°. Sol. ord. org. solvents. Spar. sol. H_2O.

Mameli, Pinna, *Chem. Zentr.*, 1907, II, 2045.

Guaiamar.

See under Guaiacol.

Guaiaretic Acid (2-[4-*Hydroxy-3-methoxybenzyl*]-3-[4-*hydroxy-3-methoxybenzylidene*]-*butane*)



$C_{20}H_{24}O_4$ MW, 328

Leaflets from EtOH. M.p. 99–100·5°. $[\alpha]_D$ − 94° in EtOH.

dl-*Di-Me ether*: $C_{22}H_{28}O_4$. MW, 356. Plates from MeOH. M.p. 112–13°.

Di-Et ether: $C_{24}H_{32}O_4$. MW, 384. *l*-: prisms from MeOH. M.p. 95–6°. $[\alpha]_D^{19}$ − 48·0° in EtOH. *dl*-: prisms. M.p. 103–4°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 1423 (*Bibl.*).
Haworth, Richardson, *J. Chem. Soc.*, 1935, 120.

Guaiene.
See 2 : 3-Dimethylnaphthalene.

Guaiene-quinone.
See under 2 : 3-Dimethylnaphthalene.

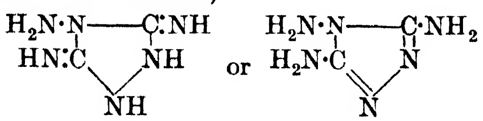
Guaiol (*Champacol*)

$C_{15}H_{26}O$ MW, 222

Sesquiterpene alcohol occurring in guaiacum resin. Prisms from EtOH. M.p. 91°. B.p. 288°.

Ruzicka, Haagen-Smit, *Helv. Chim. Acta*, 1931, **14**, 1122.

Guanazine (4-(N-)*Aminoguanazole*, 4-*amino*-3 : 5-*di-imino*-1 : 2 : 4-*triazole*, or 3 : 4 : 5-*tri-amino*-1 : 2 : 4-*triazole*)



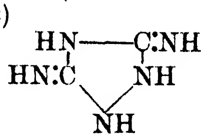
$C_2H_6N_6$ MW, 114

Yellowish-white cryst. from H_2O or EtOH. M.p. 257° decomp. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O. Reacts alkaline. Reduces warm $NH_3.AgNO_3$ and Fehling's.

B,HNO₃ → *B,HNO_3* : m.p. 210°.
B_2,H_2SO_4,H_2O : m.p. 275°.
$B,CH_3{\cdot}COOH,1\frac{1}{2}H_2O$: m.p. 175°.
Triacetyl deriv. : needles from EtOH. M.p. 240°.

Pellizzari, Repetto, *Gazz. chim. ital.*, 1907, **37**, ii, 317.

Guanazole (3 : 5 - *Di - imino - tetrahydro* - 1 : 2 : 4-*triazole*)



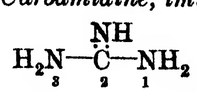
$C_2H_5N_5$ MW, 99

Prisms from H_2O. M.p. 206°. Sol. H_2O, EtOH. Insol. Et_2O, $CHCl_3$, C_6H_6. $FeCl_3 \longrightarrow$ red col.

B,HCl : m.p. 100°.
B,2HCl : m.p. 145°.
B,HNO_3 : m.p. 165°.
Picrate : m.p. 245°.

Pellizzari, *Gazz. chim. ital.*, 1894, **24**, i, 491; 1901, **31**, i, 500.

Guanidine (*Carbamidine, iminourea*)



CH_5N_3 MW, 59

Cryst. caustic solid.
B,HNO_2 : m.p. 76–78·5°.
B,HNO_3 : m.p. 214°.
$B,HClO_3$: m.p. 100–1°.
$B,HClO_4$: m.p. 245–6°.
B_2,H_2CO_3 : m.p. 197°.
B_2,H_2CS_3 : m.p. 133–5°.
$B,CH_3{\cdot}COOH$: m.p. 229–30°.
$B,CH_2Br{\cdot}CHBr{\cdot}COOH$: m.p. 107–8°.
$CH_5N_3O{\cdot}OC{\cdot}COO{\cdot}C_2H_5$: m.p. 134–6°.
$CH_5N_3O{\cdot}OC{\cdot}CH_2{\cdot}CH_2{\cdot}COO{\cdot}C_2H_5$: m.p. 136–8°.
$B,C_6H_5SO_3H$: m.p. 209–10°.
Alizarin-disulphonate : m.p. 259°.
Picrate : m.p. 333°.
m-*Br-picrolonate* : decomp. at 275°.
1-N-*Formyl* : m.p. 178° decomp.
1-N-*Acetyl* : m.p. 145°.
1-N-*Chloroacetyl* : m.p. 125°.
1-N-*Trichloroacetyl* : m.p. 183°.
1 : 2-N-*Diacetyl* : m.p. 271°.
1 : 3-N-*Diacetyl* : m.p. 152°.
1-N-*Propionyl* : *B,HCl*, m.p. 170–1°. *$B,HAuCl_4$*, m.p. 187°. *B_2,H_2PtCl_6*, m.p. 207–8°.
1 : 3-N-*Dipropionyl* : m.p. 85–6°.
1-N-*Hippuryl* : m.p. 183°. *Picrate*, decomp. above 300°.
N-*Benzenesulphonyl* : m.p. 212°. *Picrate*, m.p. 190–1°.

Manvelli, *Ann. chim. applicata*, 1933, **23**, 235 (*Review*).
Müller, *Z. physiol. Chem.*, 1932, **209**, 207.
Gluud, Keller, Schultze, *Chem. Abstracts*, 1932, **26**, 2017; D.R.P., 545,713, (*ibid.*, 3517).
Sander, D.R.P., 527,237, (*Chem. Abstracts*, 1931, **25**, 4559).
Smith, Sabetta, Steinbach, *Ind. Eng. Chem.*, 1931, **23**, 124.
Lecher, *Z. physiol. Chem.*, 1928, **176**, 43.
Schotte, Priewe, Roescheisen, *Z. physiol. Chem.*, 1928, **174**, 119.
Pellizzari, *Memorie della reale accademia nazionale dei Lincei*, 1924, **14**, 707 (*Review*).

Guanidinoacetic Acid.
See Glycocyamine.

4-Guanidinobutylamine.
See Agmatine, Addendum Vol. I, p. 689.

3-[1-Guanidino]-butyric Acid

$H_2N{\cdot}C({:}NH){\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_5H_{11}O_2N_3$ MW, 145

Cryst. + $2H_2O$ from H_2O.
B,HCl : m.p. 184°.
$B,HAuCl_4$: m.p. 198–200°.

Engeland, Kutscher, *Ber.*, 1910, **43**, 2882.

2-[1-Guanidino]-ethyl Alcohol (1-β-*Hydroxyethylguanidine*)

$H_2N{\cdot}C(\colon NH){\cdot}NH{\cdot}CH_2{\cdot}CH_2OH$

$C_3H_9ON_3$ MW, 103

Benzoyl deriv.: *picrate*, m.p. 186°.
Tribenzoyl deriv.: m.p. 156°.
Picrate: m.p. 147°.

Fromm, Fantl, Fisch, *J. prakt. Chem.*, 1930, **124**, 163.

2-[2-Guanidino]-ethyl Alcohol (2-β-*Hydroxyethylguanidine*)

$(H_2N)_2C\colon N{\cdot}CH_2{\cdot}CH_2OH$

$C_3H_9ON_3$ MW, 103

M.p. 100–1°.
Picrate: m.p. 148–148·5°.

Kawai, *Chem. Abstracts*, 1931, **25**, 5665.

***dl*-1-Guanidinopalmitic Acid**

$CH_3{\cdot}[CH_2]_{13}{\cdot}CH{\cdot}COOH$
$NH{\cdot}C(\colon NH){\cdot}NH_2$

$C_{17}H_{35}O_2N_3$ MW, 313

Cryst. from hot MeOH. M.p. 173° decomp. Spar. sol. EtOH. Insol. H_2O, Et_2O, Me_2CO.
B,HCl: decomp. at 132–4°.
B,HNO₃: m.p. 155–6° decomp.

Ramsay, *Ber.*, 1908, **41**, 4391.

***dl*-1-Guanidinopropionic Acid** (*Alanocyamine, alacreatine, isocreatine*)

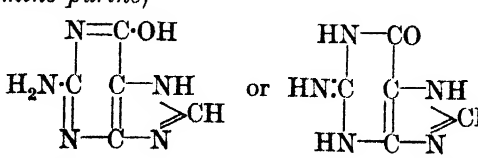
$CH_3{\cdot}CH{\cdot}COOH$
$NH{\cdot}C(\colon NH){\cdot}NH_2$

$C_4H_9O_2N_3$ MW, 131

Prisms from H_2O. M.p. 226° decomp. (rapid heat.). Sol. H_2O. Insol. Et_2O, Me_2CO.

Ramsay, *Ber.*, 1908, **41**, 4388.

Guanine (2-*Aminohypoxanthine*, 6-*hydroxy*-2-*amino-purine*)

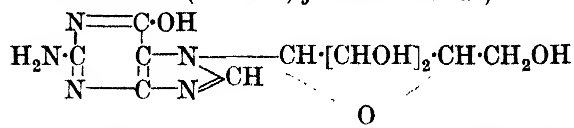


$C_5H_5ON_5$ MW, 151

Occurs in guano, human fæces, etc. Cryst. Insol. H_2O. Heat of comb. 586·6 Cal. HCl + $KClO_3$ ⟶ guanidine + parabanic acid.
B,HBr,2½H₂O: m.p. 180°.
Acetyl deriv.: m.p. above 260°.
Propionyl deriv.: m.p. above 260°.
Picrate: decomp. at 190°.

Hoppe-Seyler, Schmidt, *Z. physiol. Chem.*, 1928, **175**, 304.
Fischer, *Ber.*, 1897, **30**, 2251.
Levene, *Biochem. Z.*, 1907, **4**, 320.

Guanosine (*Vernine, guanine riboside*)



$C_{10}H_{13}O_5N_5$ MW, 273

Occurs in leaves and unripe berries of coffee plant. Needles from hot H_2O. M.p. 230–5° decomp. Spar. sol. H_2O. Hyd. ⟶ guanine + ribofuranose.
Tetra-Me deriv.: *hydrochloride*, decomp. at 98°.
Triacetyl deriv.: m.p. 226°.

Levene, Tipson, *J. Biol. Chem.*, 1932, **97**, 491.
Thannhauser, Topfmüller, *Z. physiol. Chem.*, 1917, **100**, 121.
Levene, Clark, *J. Biol. Chem.*, 1921, **46**, 19.

Guanylglycine.
See Glycocyamine.

Guanylguanidine.
See Diguanide.

Guanylhydrazine.
See Aminoguanidine.

Guanylic Acid (*Guanosine phosphoric acid*)

$C_{10}H_{14}O_8N_5P$ MW, 363

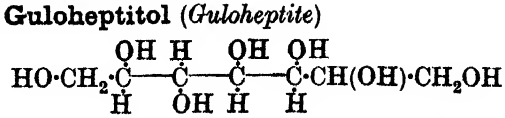
A nucleic acid occurring in yeast. Needles + $2H_2O$. M.p. 208° decomp. $[\alpha]_D^{20}$ − 7·5° in H_2O. $k_1 = 4{\cdot}45 \times 10^{-3}$, $k_2 = 8{\cdot}2 \times 10^{-7}$, $k_3 = 2{\cdot}0 \times 10^{-10}$.
Brucine salt: m.p. 233° decomp. $[\alpha]_D^{20}$ −26·0° in EtOH.Aq.
Di-brucine salt: m.p. 203°.

Peiser, *Ber.*, 1925, **58**, 2051.
Levene, *J. Biol. Chem.*, 1919, **40**, 171; 1920, **41**, 483.
Read, *J. Biol. Chem.*, 1917, **31**, 47.

Guanylurea.
See Carbamylguanidine.

Guăthol.
See under Catechol.

Guloheptitol (*Guloheptite*)



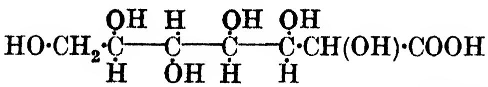
$C_7H_{16}O_7$ MW, 212

α-.
Identical with β-galaheptitol, *q.v.*

β-.
Cryst. from EtOH.Aq. M.p. 128–9°.
Benzylidene: m.p. 260° decomp.

La Forge, *J. Biol. Chem.*, 1920, **41**, 251.

d-Guloheptonic Acid



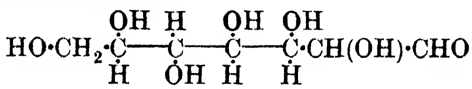
$C_7H_{14}O_8$ MW, 226

α-.
Non-cryst. syrup. Heat ⟶ lactone.
Phenylhydrazide: needles. M.p. 191–2°. $[\alpha]_D^{20}$ − 15·4°.

β-.
Non-cryst. syrup. Heat ⟶ lactone.

See previous reference.

d-Guloheptose



$C_7H_{14}O_7$ MW, 210

α-.
Cryst. from EtOH.Aq. M.p. 185–7°. Sol. 2 parts hot H_2O or 10 parts 60% EtOH. $[\alpha]_D^{20}$ − 65·6° (final) in H_2O.

β-.
Syrup.

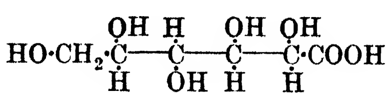
See previous reference.

Gulonic Acid

$C_6H_{12}O_7$ MW, 196

The free acid by evaporation of the aq. sol. ⟶ the lactone. HNO_3 ⟶ saccharic acid.

d-.



$[\alpha]_D^0$ − 1·6° (− 5·6°) in H_2O.
Amide: $C_6H_{13}O_6N$. MW, 195. M.p. 122–3°. $[\alpha]_D^{20}$ + 15·2°.
Phenylhydrazide: m.p. 147–9° (142–4° decomp.). $[\alpha]_D^{20}$ + 13·45° ($[\alpha]_D^{16}$ + 30·6°).
Ca salt: $(C_6H_{11}O_7)_2Ca$. $[\alpha]_D^{21}$ − 14·5° in H_2O.
γ-Lactone: $C_6H_{10}O_6$. MW, 178. Plates or prisms from H_2O. M.p. 180–1°. $[\alpha]_D^{20}$ + 55° in H_2O.

l-.
Phenylhydrazide: m.p. 147–8°, decomp. at 195°.
Benzylidene-hydrazide: spangles. M.p. 173°, decomp. at 183°. $[\alpha]_D^{17}$ − 11·2° in Py.
p-*Bromophenylhydrazide*: m.p. 153°.
Ca salt, $3\frac{1}{2}H_2O$: needles. Sol. 5·8 parts (anhyd. salt) in 100 parts H_2O at 15°.
γ-Lactone: prisms from hot H_2O or 60% EtOH. M.p. 185° (sinters at 179°). $[\alpha]_D^{20}$ − 55° in H_2O.

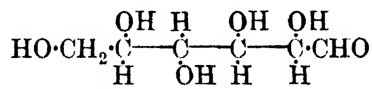
dl-.
$k = 2{\cdot}1 \times 10^{-4}$ at 25° (corr. for activity).
Phenylhydrazide: m.p. 153–5°.
Ca salt: cryst. + xH_2O. Fine needles. Sol. 1·6 parts (anhyd. salt.) in 100 parts H_2O at 15°.

Fischer, Curtiss, *Ber.*, 1892, **25**, 1025.
Weerman, *Rec. trav. chim.*, 1917, **37**, 34.
La Forge, *J. Biol. Chem.*, 1918, **36**, 347; U.S.P., 1,285,248, (*Chem. Abstracts*, 1919, **13**, 230).
van Marle, *Rec. trav. chim.*, 1920, **39**, 549.
Levene, *J. Biol. Chem.*, 1924, **59**, 123; 1925, **65**, 31.

Gulose

$C_6H_{12}O_6$ MW, 180

d-.



Syrup. Non-fermentable. (α). $[\alpha]_D^{20}$ + 61·6°. Forms cryst. add. comp. with $CaCl_2$, $C_6H_{12}O_6,CaCl_2,H_2O$, which has $[\alpha]_D^{20}$ + 37·7° (initial) and shows mutarotation.
Methylguloside: (α). + $1H_2O$. M.p. 77° decomp. $[\alpha]_D^{20}$ + 109°. (β). M.p. 176°. $[\alpha]_D^{20}$ − 83°.
Osazone: m.p. 168°, decomp. at 180°. $[\alpha]_D^{20}$ + 0·5° (final) in EtOH–Py.

l-.
Syrup. $[\alpha]_D$ − 20·4°. Red. ⟶ *l*-sorbitol. $Ba(OH)_2$ ⟶ *l*-sorbose (in part). Does not ferment with yeast.
Phenylhydrazone: m.p. 143°.
Osazone: m.p. 156°.

dl-.
Syrup.
Phenylhydrazone: m.p. 143°.
Osazone: m.p. 157–9°.

Blanksma, Ekenstein, *Chem. Zentr.*, 1908, II, 1583.
Levene, La Forge, *J. Biol. Chem.*, 1915, **20**, 430.
Talen, *Rec. trav. chim.*, 1925, **44**, 891.
Isbell, *J. Am. Chem. Soc.*, 1933, **55**, 2167; *Chem. Abstracts*, 1931, **25**, 1223; 1930, **24**, 2726.
See also first reference above.

Gurjunene

$C_{15}H_{24}$ MW, 204

Tricyclic terpene from gurjun balsam.

(α). B.p. 114–16°/10 mm. D^{20} 0·918. n_D^{20} 1·501. $[\alpha]_D^{20}$ − 110°.

(β). B.p. 120–3°/13 mm. D^{20} 0·9348. n_D^{20} 1·50275. $[\alpha]_D^{20}$ + 74·5°.

An isomeric hydrocarbon regenerated from the hydrochloride of gurjunene has b.p. 123–9°, D_4^{15} 0·9233, n_D^{15} 1·5105, $[\alpha]_D^{15}$ − 39·0°, and is probably a hydronaphthalene deriv.

Ruzicka, Pontalti, Balas, *Helv. Chim. Acta*, 1923, **6**, 855.

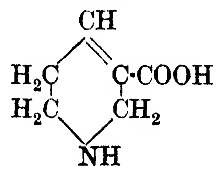
Gurjuresene

$C_{17}H_{28}O_2$ MW, 264

Resin-acid from gurjun balsam. M.p. 40–3°.

Tschirch, Weil, *Arch. Pharm.*, 1903, **241**, 372.

Guvacine (Δ^3-*Tetrahydropyridine-3-carboxylic acid*, Δ^3-*tetrahydronicotinic acid*)



$C_6H_9O_2N$ MW, 127

Short rods + $1H_2O$ from EtOH.Aq. Decomp. at 285°.

Me ester: guvacoline. $C_7H_{11}O_2N$. MW, 141. M.p. 27°. B.p. 114°/14 mm. *Hydrochloride*: m.p. 121–2°. B_2,H_2PtCl_6: m.p. 211° decomp.

B,HCl: decomp. at 316°.

B,HAuCl$_4$: m.p. 197–9° decomp.

B_2,H_2PtCl_6: m.p. 220–1° decomp.

p-*Toluenesulphonyl*: m.p. 167–8°.

N-Me: *see* Arecaidine.

Freudenberg, *Ber.*, 1918, **51**, 818.
Hess, Leibbrandt, *Ber.*, 1919, **52**, 206.

Guvacoline.

See under Guvacine.

Gynocardic Acid

$C_{17}H_{33}$·COOH

$C_{18}H_{34}O_2$ MW, 282

Constituent of chaulmoogra oil. Leaflets from EtOH. M.p. 67·5°. Readily sol. most org. solvents. Has therapeutic value in treatment of tuberculosis and leprosy.

Cu salt: two forms. (α) M.p. 70°. Partially converted to β-form on heating in solution. (β) High m.p. Probably polymer of the α-form.

Me ester: $C_{19}H_{36}O_2$. MW, 296. Fluorescent oil. B.p. 320–30°.

Cholesteryl ester: m.p. 110–12°. *Tetrabromide*: m.p. 77–8°.

Ostromuislenskii, Bergman, *J. Russ. Phys. Chem. Soc.*, 1915, **47**, 318, (*Chem. Abstracts*, 1916, **10**, 44).
Cf. Schöbl, Perkins, Cruz, *Chem. Abstracts*, 1924, **18**, 1155. Rock, Fairchild, Power, *Chem. Abstracts*, 1922, **16**, 2197. Gardner, *Pharm. J.*, 1922, **109**, 154. Rakuzin, Flier, *Chem. Abstracts*, 1916, **10**, 1521.

Gynocardin

$C_{13}H_{19}O_9N$ MW, 333

Cyanogenetic β-glucoside from *Gynocardia odorata*, R.Br., and *Pangium edule*, Reinw. Glistening prismatic needles + $1\frac{1}{2}H_2O$ from H_2O. M.p. 162–3° (anhyd.) slight decomp. Sol. hot EtOH. Very spar sol. other org. solvents. Feebly acidic. $[\alpha]_D^{21}$ + 72·5° in H_2O. NaOEt or NaOH in EtOH ⟶ white solid, $C_{13}H_{18}O_9NNa$. Hot $Ba(OH)_2$.Aq. ⟶ gynocardinic acid + NH_3.

Hepta-acetyl deriv.: needles. M.p. 118–19°. $[\alpha]_D^{21}$ + 40·4° in $CHCl_3$.

Moore, Tutin, *J. Chem. Soc.*, 1910, **97**, 1285.
Cf. Brill, *Chem. Abstracts*, 1917, **11**, 3381.

Gynocardinic Acid

$C_{12}H_{19}O_9$·COOH

$C_{13}H_{20}O_{11}$ MW, 352

Hydrolysis product of gynocardin. Syrup. Dextrorotatory. Does not reduce Fehling's. Forms cryst. Ba salt. Hot dil. H_2SO_4 ⟶ glucose + a carboxylic acid (*quinine salt*: m.p. 224° decomp.).

Power, Lees, *J. Chem. Soc.*, 1905, **87**, 349.

Gypsogenin

$$C_{25}H_{41}\begin{cases}>CHOH\\>CO\\-COOH\end{cases}$$

$C_{28}H_{44}O_4$ MW, 444

Polyterpenoid sapogenin from *Gypsophila* and other species of *Saponaria*. Needles from EtOH. M.p. 275° (sinters at 250°). Spar. sol. hot EtOH. H (+ Pt) in EtOH ⟶ dihydro-comp., m.p. 321–2°. Se ⟶ 2 : 7-dimethylnaphthalene + 1 : 2 : 7-trimethylnaphthalene (sapotalin).

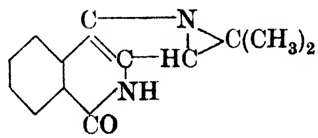
Acetyl deriv.: m.p. 192–4° (sinters at 178°).

Me ester: $C_{29}H_{46}O_4$. MW, 458. Needles from EtOH. M.p. 192° (foams at 140°).

Oxime: decomp. at 264–5° (turns brown at 250°).
Semicarbazone: m.p. 272°.

Ruzicka *et al.*, *Helv. Chim. Acta*, 1932, **15**, 1496.
Karrer *et al.*, *Helv. Chim. Acta*, 1924, **7**, 784.
van der Haar, *Rec. trav. chim.*, 1927, **46**, 85.

Gyrilone

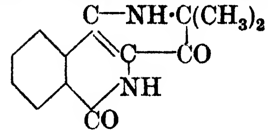


$C_{13}H_{12}ON_2$ MW, 212

Silky needles from H_2O. M.p. 212° (reddens). Mod. sol. hot EtOH. Spar. sol. boiling H_2O. Sol. alkalis. Forms cryst. salts with hydrochloric, chloroauric, chloroplatinic, and chromic acids. Fuming HCl in sealed tube at 135° ⟶ compound, yellow leaflets from EtOH, m.p. above 300° decomp.; sublimes; isomeric with gyrolone.

Gabriel, *Ber.*, 1911, **44**, 90.

Gyrolone (1 : 3-*Dihydro*-3-*ketogyrilone*)

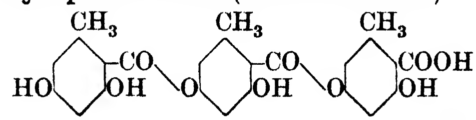


$C_{13}H_{12}O_2N_2$ MW, 228

Yellow rhombic and quadratic cryst. from hot H_2O. M.p. 303° (blackens). Sol. alkalis. Insol. NH_3.Aq. H_2O sols fluor. bluish-green. Conc. H_2SO_4 ⟶ malachite-green col., H_2O ⟶ blue ppt.

Gabriel, *Ber.*, 1911, **44**, 84.

Gyrophoric Acid (*Triorsellinic acid*)



$C_{24}H_{20}O_{10}$ MW, 468

Occurs in lichens. Cryst. from Me_2CO. M.p. 220°. Sol. EtOH, Me_2CO. Spar. sol. Et_2O. C_6H_6, $CHCl_3$, AcOH.
Tetra-Me ether Me ester: $C_{29}H_{30}O_{10}$. MW, 538. M.p. 196–7°.
Tetra-acetyl: m.p. 228°.
Tetra-chloroacetyl: m.p. 163–4°.
Quinine salt: m.p. 162°.

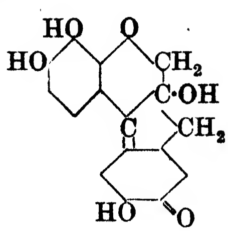
Asahina, Watanabe, *Ber.*, 1930, **63**, 3044.

H

H Acid.

See 1-Amino-8-naphthol-3 : 6-disulphonic Acid.

Hæmatein



$C_{16}H_{12}O_6$ MW, 300

Brownish-red needles from EtOH.Aq. M.p. above 200°. Spar. sol. H_2O, AcOEt. Insol. $CHCl_3$, C_6H_6. Sol. conc. H_2SO_4 ⟶ brownish-violet sol. Gives salts with heavy metals.

Tetra-Me ether: $C_{20}H_{20}O_6$. MW, 356. M.p. 210°.

Perkin, Robinson, *J. Chem. Soc.*, 1908, **93**, 1121.
Bollina, Kostanecki, Tambor, *Ber.*, 1902, **35**, 1678.
Hummel, Perkin, *Ber.*, 1882, **15**, 2337.

Hæmatin.

See under Hæmin.

***dibasic*-Hæmatinic Acid** (β-*Amylene*-β : γ-*dicarboxylic acid*, 1-*methyl*-2-*ethylmaleic acid*, 2-*pentene*-2 : 3-*dicarboxylic acid*, 1-*methyl*-2-*butylene*-2 : 3-*dicarboxylic acid*)

$$\begin{array}{c} CH_3\cdot C\cdot COOH \\ \| \\ CH_3\cdot CH_2\cdot C\cdot COOH \end{array}$$

$C_7H_{10}O_4$ MW, 158

Exists only in form of salts. Anhydride and imide produced by oxidation of hæmin, etc.

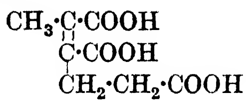
Di-Me ester: $C_9H_{14}O_4$. MW, 186. B.p. 235°.

Anhydride: $C_7H_8O_3$. MW, 140. B.p. 230°.

Imide: C_7H_9ON. MW, 123. M.p. 67° (72°).

Kuster, *Ann.*, 1901, **315**, 207.
Kuster, Galler, *Ann.*, 1906, **345**, 16.

***tribasic*-Hæmatinic Acid** (*β-Amylene-β : γ : ε-tricarboxylic acid, 2-pentene-2 : 3 : 5-tricarboxylic acid, 1-methyl-1-butylene-1 : 2 : 4-tricarboxylic acid*)



$C_8H_{10}O_6$ MW, 202

Exists only in form of salts. Anhydride and imide produced by oxidation of hæmin, bilirubin, etc.

Mono-Me ester: $C_9H_{12}O_6$. MW, 216. B.p. 173–6°/11 mm.

Tri-Me ester: $C_{11}H_{16}O_6$. MW, 244. B.p. 300–1°, 165–7°/10 mm.

Mono-Et ester: $C_{10}H_{14}O_6$. MW, 230. B.p. 165°/10 mm. *Amide*: m.p. 105–10°.

Di-Et ester: $C_{12}H_{18}O_6$. MW, 258. B.p. 179–80°/15 mm.

Tri-Et ester: $C_{14}H_{22}O_6$. MW, 286. B.p. 191°/17 mm.

Anhydride: $C_8H_8O_5$. MW, 184. M.p. 97°.

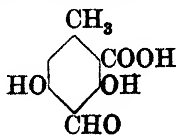
Imide: $C_8H_9O_4N$. MW, 183. M.p. 114–15°.

Fischer, Nenitszescu, *Z. physiol. Chem.*, 1925, **145**, 295.
Kuster, Weller, *Ber.*, 1914, **47**, 532.
See also above references.

Hæmatoidine.

See Bilirubin.

Hæmatommic Acid (3 : 5-*Dihydroxy-4-aldehydo-o-toluic acid, 4-aldehydo-orsellinic acid*)



$C_9H_8O_5$ MW, 196

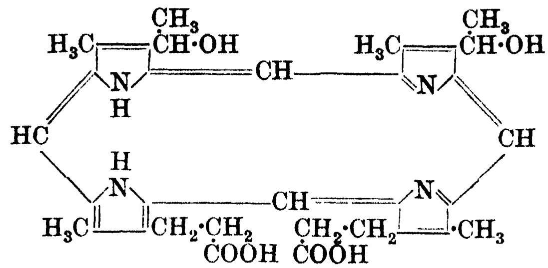
Constituent of *Hæmotomma coccineum*. Needles from AcOH. M.p. 172–3°. Depside with β-orcinol-carboxylic acid methyl ester is atranorin, *q.v.*

Me ester: $C_{10}H_{10}O_5$. MW, 210. M.p. 147°.

Et ester: $C_{11}H_{12}O_5$. MW, 224. M.p. 113°.

St. Pfau, *Helv. Chim. Acta*, 1933, **16**, 282.

Hæmatoporphyrin



$C_{34}H_{38}O_6N_4$ MW, 598

Deep red cryst. Sol. EtOH. Spar. sol. Et_2O, $CHCl_3$. Insol. H_2O, AcOH.Aq. Obtained from hæmin and hæmatin by removal of Fe by conc. acids. $HI + PH_4I \longrightarrow$ hæmopyrrole.

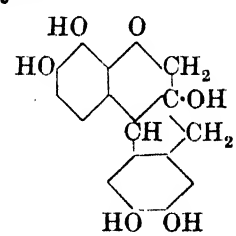
Di-Me ester: $C_{36}H_{42}O_6N_4$. MW, 626. M.p. 212°.

Tetra-Me deriv.: m.p. 120°.

Tetra-Et deriv.: m.p. 149°.

Fischer *et al.*, *Z. physiol. Chem.*, 1929, **185**, 33.
Fischer, Zeile, *Ann.*, 1929, **468**, 112.
Treibs, *Angew. Chem.*, 1934, **47**, 294 (*Bibl.*).

Hæmatoxylin



$C_{16}H_{14}O_6$ MW, 302

Constituent of *Hæmotoxylon campechianum*. Prisms $+ 3H_2O$ from EtOH. M.p. 100–120°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Sol. NH_3 $\longrightarrow$ purple sol. Ox. $\longrightarrow$ hæmatein. KOH fusion $\longrightarrow$ pyrogallol. Forms salts with heavy metals.

Penta-acetyl: m.p. 165–6°.

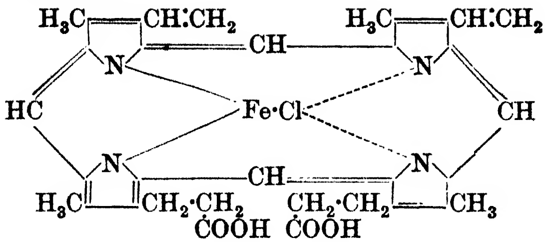
Tetra-Me ether: $C_{20}H_{22}O_6$. MW, 358. M.p. 139–40°. *Acetyl*: m.p. 178–80°.

Penta-Me ether: $C_{21}H_{24}O_6$. MW, 372. M.p. 144–7°.

Dibromide: m.p. 120° decomp.

Perkin, Robinson, *J. Chem. Soc.*, 1908, **93**, 496, 1121.
Herzig, *Monatsh.*, 1898, **16**, 906.
Bolling, Kostanecki, Tambor, *Ber.*, 1902, **35**, 1678.

Hæmin

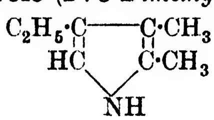


$C_{34}H_{32}O_4N_4ClFe$ MW, 651·5

Bluish-black microscopic rhombohedra. Sol. AcOH, Insol. H_2O, EtOH, Et_2O, $CHCl_3$. Obtained by ox. of blood in presence of NaCl (Teichmann's reaction). Conc. acids ⟶ hæmatoporphyrin. Ox. in absence of NaCl ⟶ *hæmatin*, the Cl-free compound: $C_{34}H_{33}O_5N_4Fe$, blue-black cryst., decomp. at 200° without melting. Insol. H_2O, EtOH, Et_2O.

Fischer, Zeile, *Ann.*, 1929, **468**, 112.
Fischer, Stangler, *Ann.*, 1927, **459**, 53.
Treibs, *Angew. Chem.*, 1934, **47**, 294 (*Bibl.*).
Cambi, Szegli, *Chem. Zentr.*, 1934, II, 2681.

Hæmopyrrole (2 : 3-*Dimethyl*-4-*ethylpyrrole*)



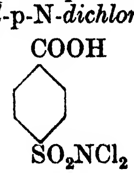
$C_8H_{13}N$ MW, 123

Obtained from hæmatoporphyrin by treatment with HI + PH_4I. B.p. 113°/16 mm.
Picrate: m.p. 123° (108°).

Fischer, Klarer, *Ann.*, 1926, **450**, 187, 198.
Knorr, Hess, *Ber.*, 1912, **45**, 2626 (*Bibl.*).
Fischer, Bartolomäus, *Ber.*, 1912, **45**, 1979.

Hæmopyrrole-C.
See Cryptopyrrole.

Halazone (p - *Sulphondichloroaminobenzoic acid, benzoic acid*-p-N-*dichlorosulphonamide*)



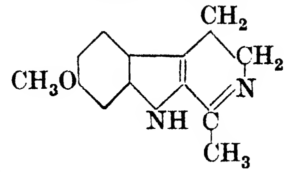
$C_7H_5O_4NCl_2S$ MW, 270

Prisms from AcOH. M.p. 213°. Spar. sol. H_2O, $CHCl_3$. Insol. pet. ether. Sol. alkalis, re-pptd. by acids. Explodes on rapid heating on Pt foil. Hyd. by phosphates, and borates. Powerful germicide. Used for sterilisation of drinking water.

Et ester: $C_9H_9O_4NCl_2S$. MW, 298. Prisms from CCl_4. M.p. 80°.

Dakin, Dunham, *British Medical Journal*, 1917, I, 683.

Harmaline (*Dihydroharmine*)

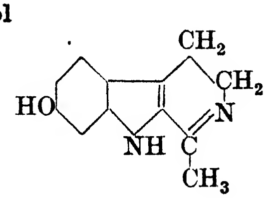


$C_{13}H_{14}ON_2$ MW, 214

Constituent of *Peganium harmala*. Prisms from EtOH. M.p. 250° decomp. Sol. EtOH. Spar. sol. H_2O, Et_2O. Optically inactive. Boiling HCl ⟶ harmalol.
B,HCl: m.p. 212°.
N-*Acetyl*: m.p. 204–5°.
Methiodide: m.p. 260°.
Methosulphate: m.p. 170–2°.
Benzylidine deriv.: m.p. 245°.

Späth, Lederer, *Ber.*, 1930, **63**, 120.
Manske, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1.
Perkin, Robinson, *J. Chem. Soc.*, 1919, **115**, 933.
Fischer, *Ber.*, 1897, **30**, 2483.

Harmalol



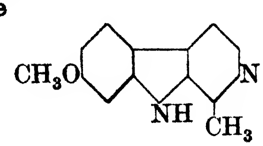
$C_{12}H_{12}ON_2$ MW, 200

Constituent of *Peganium harmala*. Needles + $3H_2O$ from H_2O. M.p. 212° decomp. Sol. Me_2CO, $CHCl_3$, hot H_2O. Spar. sol. C_6H_6. Unstable in air.
Me ether: *see* Harmaline.

See previous references.

Harman.
See Aribine.

Harmine



$C_{13}H_{12}ON_2$ MW, 212

Constituents of *Peganium harmala*. Prisms

from MeOH. M.p. 257–9° (264–5°). Spar. sol. H_2O, EtOH, Et_2O. Optically inactive. Salts show deep blue fluor. in sol. Boiling HCl ⟶ harmol, $C_{12}H_{10}ON_2$, m.p. 321°.
B,HCl: m.p. 321°.
Methiodide: m.p. 305–7°.
Methosulphate: m.p. 220°.
Benzylidene deriv.: m.p. 191–2°.

Späth, Lederer, *Ber.*, 1930, **63**, 120.
Manske, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1.
Perkin, Robinson, *J. Chem. Soc.*, 1919, **115**, 933.
Fischer, *Ber.*, 1897, **30**, 2483.

Harmol.
See under Harmine.

Hederagenolic Acid.
See under Hederagenin.

Hederagenin

$C_{30}H_{48}O_4$ MW, 472

Cryst. from EtOH. M.p. 327–9°. Sol. EtOH, Py. Spar. sol. most org. solvents. Insol. H_2O. $[\alpha]_D^{21}$ + 70·1° in $CHCl_3$–MeOH. Ox. ⟶ hederagenolic acid, m.p. 230°.
Mono-acetyl: m.p. 156°.
Diacetyl: m.p. 160–80°.
Me ester: $C_{31}H_{50}O_4$. MW, 486. M.p. 240°. $[\alpha]_D^{18}$ + 70·9°. *Diacetyl*: cryst. + $1H_2O$. M.p. 193°. $[\alpha]_D^{13}$ + 61·8°.
Et ester: $C_{32}H_{52}O_4$. MW, 500. M.p. 218–19°. $[\alpha]_D^{18}$ + 72·5°. *Diacetyl*: m.p. 150°. $[\alpha]_D^{16}$ + 76·47°.
Amide: $C_{30}H_{49}O_3N$. MW, 471. M.p. 285°.
Lactone: m.p. 354°. $[\alpha]_D^{19}$ + 16·5° in $CHCl_3$. *Acetyl*: m.p. 244°.
Phenylurethane: m.p. 155·8°.

Winterstein, Stein, *Z. physiol. Chem.*, 1932, **211**, 5.
Jacobs, *J. Biol. Chem.*, 1925, **63**, 621.
van der Haar, Tamburello, *Ber.*, 1921, **54**, 3148.
Kitasato, *Chem. Abstracts*, 1935, **29**, 469.

Hederin

$C_{41}H_{64}O_{11}$ MW, 732

Widely distributed saponin. First isolated from *Hedera Helix*. Needles from EtOH–pet. ether. M.p. 256–7°. Sol. EtOH, Me_2CO, AcOEt. Insol. Et_2O, pet. ether. $[\alpha]_D^{10}$ − 9·68°. Sol. dil. alkalis, Not pptd. by cholesterol. Hyd. ⟶ hederagenin, arabinose, and rhamnose.
Me ester: $C_{42}H_{66}O_{11}$. MW, 746. M.p. 199–200°.

van der Haar, *Arch. Pharm.*, 1913, **251**, 632.
Ruzicka, Veen, *Z. physiol. Chem.*, 1929, **184**, 69.
See also previous references.

Hedonal.
See under Carbamic Acid.

Helenien

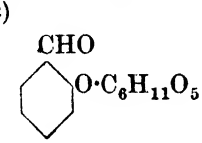
$C_{72}H_{116}O_4$ MW, 1044

Pigment of *Helenium autumnale*, Tagetes. Dipalmitate of lutein. Deep red needles from EtOH. M.p. 92°. Absorption bands in CS_2, 511, 478, 466 mμ. Hyd. ⟶ lutein + palmitic acid.

Kuhn, Winterstein, Lederer, *Z. physiol. Chem.*, 1931, **197**, 150.
Winterstein, *Angew. Chem.*, 1934, **47**, 315.

Helenine.
See Alantolactone.

Helicin (*Salicylaldehyde glucoside, glucosido-salicylaldehyde*)



$C_{13}H_{16}O_7$ MW, 284

Obtained from salicin by ox. with HNO_3. Needles from H_2O. M.p. 174–5°. Sol. H_2O, EtOH, hot Et_2O. Spar. sol. Et_2O. $[\alpha]_D^{20}$ −60·43°. Hyd. ⟶ salicylaldehyde + glucose. Red. ⟶ salicin. Sol. conc. H_2SO_4 ⟶ red sol. Hyd. by emulsin.

Michael, *Am. Chem. J.*, 1879, **1**, 309.
Schiff, *Ann.*, 1870, **154**, 19.

Heliotridine.
See under Heliotrine.

Heliotrine

$C_{16}H_{27}O_5N$ MW, 313

Alkaloid from *Heliotropium lasiocarpum*. Prisms from Me_2CO. M.p. 125–6°. Sol. H_2O, EtOH, $CHCl_3$. Spar. sol. Et_2O, pet. ether. $[\alpha]_D^{20}$ − 3·75°. Hyd. ⟶ heliotrinic acid, m.p. 92–4°, and heliotridine, m.p. 116–18°, $[\alpha]_D^{20}$ + 31°.
Methiodide: m.p. 108–11°.

Menschikoff, *Ber.*, 1932, **65**, 974.

Heliotrinic Acid.
See under Heliotrine.

Heliotropin.
See Piperonal.

Helleborein

$C_{37}H_{56}O_{18}$ MW, 788

Glucoside from *Helleborus niger*. Needles from EtOH. M.p. 270°. $[\alpha]_D^{22}$ − 2·8°. Hyd. ⟶ helleboretin (m.p. above 200°), acetic acid, glucose, and arabinose. Toxic.

Acetyl: m.p. 129–30°.
Benzoyl: m.p. 142°.

Sieburg, *Arch. Pharm.*, 1913, **251**, 154.
Thaeter, *Arch. Pharm.*, 1897, **235**, 414.

Helleboresin.
See under Helleborin.

Helleboretin.
See under Helleborein.

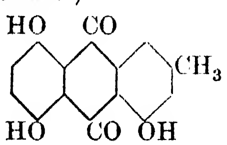
Helleborin

$C_{28}H_{36}O_6$ MW, 468

Constituent of *Helleborus viridus* and *H. niger*. M.p. above 250°. Sol. $CHCl_3$. Spar. sol. Et_2O. Insol. H_2O, EtOH. Hyd. ⟶ helleboresin (m.p. 140–50°) and glucose. Toxic.

Keller, Schöbel, *Arch. Pharm.*, 1928, **266**, 545.

Helminthosporin (4 : 5 : 8-*Trihydroxy*-2-*methylanthraquinone*)



$C_{15}H_{10}O_5$ MW, 270

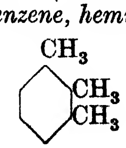
Pigment of *Helminthosporium gramineum*. Maroon needles from $CHCl_3$. M.p. 225–6°. Spar. sol. EtOH, Et_2O, Me_2CO, AcOH. Sols. are orange-red with green fluor. Zn dust dist. ⟶ 2-methylanthracene.

Triacetyl: $C_{21}H_{16}O_8$. MW, 396. M.p. 223–4°.

Charles, Raistrick, Robinson, Todd, *Biochem. J.*, 1933, **27**, 499.

Hemellitic Acid.
See 2 : 3-Dimethylbenzoic Acid.

Hemimellitene (1 : 2 : 3-*Trimethylbenzene*, vicinal-*trimethylbenzene*, *hemimellithene*)



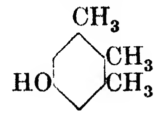
C_9H_{12} MW, 120

M.p. − 15°. B.p. 175–6°. D^{20} 0·895. $n_D^{19·5}$ 1·513.

Picrate: m.p. 89·5°.

Auwers, *Ann.*, 1919, **419**, 116.

***sym.*-Hemimellitenol** (3 : 4 : 5-*Trimethylphenol*, 5-*hydroxyhemimellitene*)



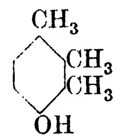
$C_9H_{12}O$ MW, 136

Needles from pet. ether with bluish fluor. M.p. 107°. B.p. 248–9°. Sol. most org. solvents.

Acetyl: m.p. 59–60°.
Phenylurethane: m.p. 148–9°.

Auwers, Wieners, *Ber.*, 1925, **58**, 2815.
Auwers, Sauerwein, *Ber.*, 1922, **55**, 2372.

***unsym.*-Hemimellitenol** (vicinal-*Hemimellitenol*, 2 : 3 : 4-*trimethylphenol*, 4-*hydroxyhemimellitene*)



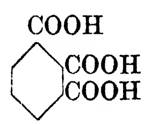
$C_9H_{12}O$ MW, 136

Needles from pet. ether. M.p. 81°. B.p. 235–7°. Sol. most org. solvents.

Acetyl: b.p. 239–41°.
Phenylurethane: m.p. 127°.

See above references.

Hemimellitic Acid (*Benzene*-1 : 2 : 3-*tricarboxylic acid*)



$C_9H_6O_6$ MW, 210

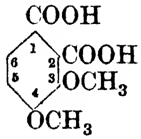
Needles from H_2O. M.p. 190°. Sol. H_2O. Spar. sol. Et_2O. Insol. conc. HCl. D^{20} 1·546.

2-*Me ester*: $C_{10}H_8O_6$. MW, 224. M.p. 203–5°.
1 : 3-*Di-Me ester*: $C_{11}H_{10}O_6$. MW, 238. M.p. 148–50°. *Chloride*: m.p. 84–7°.
Tri-Me ester: $C_{12}H_{12}O_6$. MW, 252. M.p. 102°.
Tri-Et ester: $C_{15}H_{18}O_6$. MW, 294. M.p. 39°.
Anhydride: $C_9H_4O_5$. MW, 192. M.p. 310° decomp. ⟶ phthalic anhydride.
Imide: $C_9H_5O_4N$. MW, 191. M.p. 247°.

Graebe, Leonhardt, *Ann.*, 1896, **290**, 226.

Hemipic Acid.
See Hemipinic Acid.

Hemipinic Acid (3 : 4-*Dimethoxyphthalic acid, hemipic acid*)



$C_{10}H_{10}O_6$ MW, 226

Needles + $2H_2O$. M.p. 177° (181°). Sol. EtOH, AcOH. Spar. sol. Et_2O, C_6H_6. Heat of comb. C_p 102·4 Cal. $k = 1{\cdot}1 \times 10^{-3}$ at 25°. $FeCl_3$.Aq. ⟶ yellow sol. HCl ⟶ isovanillic acid + protocatechuic acid. Hot conc. H_2SO_4 ⟶ 1 : 2 : 5 : 6-tetrahydroxyanthraquinone.

1-*Me ester*: $C_{11}H_{12}O_6$. MW, 240. M.p. 138°.

2-*Me ester*: exists in two forms. *Labile*: cryst. from H_2O. M.p. 96–8°. *Stable*: cryst. from Et_2O. M.p. 138°.

Di-Me ester: $C_{12}H_{14}O_6$. MW, 254. M.p. 61–2°. B.p. 207°/16·5 mm.

1-*Et ester*: $C_{12}H_{14}O_6$. MW, 254. M.p. 147–9°.

2-*Et ester*: m.p. 145°.

Di-Et ester: $C_{14}H_{18}O_6$. MW, 282. M.p. 72°.

1-*Amide*: $C_{10}H_{11}O_5N$. MW, 225. M.p. 142°. 2-*Me ester*: m.p. 173–4°. 2-*Et ester*: m.p. 180–1°.

2-*Amide*: m.p. 162°.

Anhydride: $C_{10}H_8O_5$. MW, 208. M.p. 166–7°.

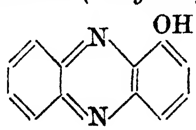
Imide: $C_{10}H_9O_4N$. MW, 207. M.p. 230°.

1-*Nitrile*: $C_{10}H_9O_4N$. MW, 207. M.p. 82°.

2-*Nitrile*: m.p. 207–8°.

Goldschmiedt, *Monatsh.*, 1888, **9**, 769.
Pschorr, Sumuleanu, *Ber.*, 1899, **32**, 3411.
Perkin, *J. Chem. Soc.*, 1916, **109**, 921.
Hoogewerff, van Dorp, *Rec. trav. chim.*, 1895, **14**, 273.

Hemipyocyanine (1-*Hydroxyphenazine*)



$C_{12}H_8ON_2$ MW, 196

M.p. 158°. Sol. Py, phenol. Spar. sol. H_2O, EtOH, $CHCl_3$.

Acetyl: m.p. 120°.

Benzoyl: m.p. 173°.

Wrede, Strack, *Z. physiol. Chem.*, 1928, **177**, 177.

Hemisine.
See Adrenaline.

Hendecane.
See Undecane.

Heneicosandiol-3 : 6 (3 : 6-*Dihydroxyheneicosane, 1-ethyl-4-pentadecyl-tetramethyleneglycol*)

$CH_3{\cdot}[CH_2]_{14}{\cdot}CH(OH){\cdot}[CH_2]_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_3$

$C_{21}H_{44}O_2$ MW, 328

Cryst. from EtOH. M.p. 95°.

Diacetyl: m.p. 48°.

Helferich, Köster, *Ber.*, 1923, **56**, 2094.

Heneicosane

$CH_3{\cdot}CH_2{\cdot}[CH_2]_{17}{\cdot}CH_2{\cdot}CH_3$

$C_{21}H_{44}$ MW, 296

White wax. M.p. 40·5°. B.p. 215°/15 mm. $D^{40\cdot5}$ 0·778.

Krafft, *Ber.*, 1882, **15**, 1718.

Heneicosane-1 : 1-dicarboxylic Acid (*Eicosylmalonic acid*)

$CH_3{\cdot}[CH_2]_{19}{\cdot}CH{<}^{COOH}_{COOH}$

$C_{23}H_{44}O_4$ MW, 384

M.p. 119°. Spar. sol. $CHCl_3$. Evolves CO_2 at 150°.

Mono-nitrile: $C_{23}H_{43}O_2N$. MW, 365. M.p. 87–9°.

Fileti, *Gazz. chim. ital.*, 1910, **27**, 302.

Heneicosane-1 : 21-dicarboxylic Acid

$HOOC{\cdot}CH_2{\cdot}[CH_2]_{19}{\cdot}CH_2{\cdot}COOH$

$C_{23}H_{44}O_4$ MW, 384

Occurs as esters in Japan wax. Needles from $CHCl_3$. M.p. 127·5°. Spar. sol. org. solvents.

Me ester: $C_{24}H_{46}O_4$. MW, 398. M.p. 87°.

Di-Me ester: $C_{25}H_{48}O_4$. MW, 412. M.p. 71°.

Et ester: $C_{25}H_{48}O_4$. MW, 412. M.p. 83·5°.

Di-Et ester: $C_{27}H_{52}O_4$. MW, 440. M.p. 61·5°.

Flaschenträger, Halle, *Z. physiol. Chem.*, 1930, **190**, 120.

Heneicosanone-11 (*Didecyl ketone*)

$CH_3{\cdot}[CH_2]_9{\cdot}CO{\cdot}[CH_2]_9{\cdot}CH_3$

$C_{21}H_{42}O$ MW, 310

Needles from EtOH.Aq. M.p. 64°.

Oxime: m.p. 27·5°.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 57.

9-Heneicosene (1-*Octyl-2-undecyl-ethylene*)

$CH_3{\cdot}[CH_2]_{10}{\cdot}CH{:}CH{\cdot}[CH_2]_7{\cdot}CH_3$

$C_{21}H_{42}$ MW, 294

M.p. + 3°. B.p. 201–2°/11 mm. D^{15} 0·8048. P + HI ⟶ heneicosane.

Schaal, *Ber.*, 1907, **40**, 4787.
Mai, *Ber.*, 1889, **22**, 2135.

Heneicosene-carboxylic Acid.
Erucic Acid *and* Brassidic Acid, *q.v.*

Heneicosine-carboxylic Acid.
Behenolic Acid, *q.v.*

Hentriacontane

$CH_3 \cdot CH_2 \cdot [CH_2]_{27} \cdot CH_2 \cdot CH_3$

$C_{31}H_{64}$ MW, 436

Constituent of many waxes. Leaflets from AcOEt. M.p. 68°. Sol. pet. ether. Spar. sol. EtOH, Et_2O, AcOEt. $D^{68 \cdot 1}$ 0·7808.

Krafft, Weilandt, *Ber.*, 1896, **29**, 1323.
Krafft, *Ber.*, 1907, **40**, 4783.
Heilbron, Phipers, Wright, *J. Chem. Soc.*, 1934, 1573.

Hentriacontane-1-carboxylic Acid.
See Lacceric Acid.

Hentriacontanol-1.
See Melissyl Alcohol.

Hentriacontanol-16 (*Dipentadecylcarbinol*)

$CH_3 \cdot [CH_2]_{14} \cdot CH(OH) \cdot [CH_2]_{14} \cdot CH_3$

$C_{31}H_{64}O$ MW, 452

Needles from EtOH. M.p. 84–5°. Sol. Et_2O, pet. ether, C_6H_6. Spar. sol. EtOH, MeOH.

Kipping, *J. Chem. Soc.*, 1890, **57**, 986.

Hentriacontanone.
See Palmitone.

Hentriacontene

$C_{31}H_{62}$ MW, 434

Felted mass from Me_2CO. M.p. 64°. B.p. 295°/15 mm.
Bromide: m.p. 62°. Unstable.

Pummerer, Kranz, *Ber.*, 1929, **62**, 2625.

Heptachloroanthracene

$C_{14}H_3Cl_7$ MW, 419·5

Yellow needles. M.p. above 350°. Sol. $PhNO_2$, ligroin. Spar. sol. $CHCl_3$, hot toluene. Insol. EtOH, Et_2O, AcOH, C_6H_6. Sublimes. Ox. ⟶ pentachloroanthraquinone.

Diehl, *Ber.*, 1878, **11**, 176.

1 : 1 : 1 : 2 : 2 : 3 : 3-Heptachloropropane

$CHCl_2 \cdot CCl_2 \cdot CCl_3$

C_3HCl_7 MW, 285·5

M.p. 29·4°. B.p. 247–8°, 164°/90 mm., 150–51°/50 mm., 132°/30 mm. D_4^{34} 1·8048. Heat at 250–420° ⟶ $CCl_3 \cdot CCl{:}CCl_2$ + HCl. Alc. KOH ⟶ hexachloropropylene.

Prins, *J. prakt. Chem.*, 1914, **89**, 415.
Fritsch, *Ann.*, 1897, **297**, 314.

1 : 1 : 1 : 2 : 3 : 3 : 3-Heptachloropropane

$CCl_3 \cdot CHCl \cdot CCl_3$

C_3HCl_7 MW, 285·5

M.p. 11–11·5°. B.p. 249°, 165°/90 mm. D_4^{3} 1·7921. n_D^{21} 1·5427. Alc. KOH ⟶ hexachloropropylene.

Prins, *J. prakt. Chem.*, 1914, **89**, 417; D.R.P., 261,689, (*Chem. Zentr.*, 1913, II, 394).

Heptacosane

$CH_3 \cdot CH_2 \cdot [CH_2]_{23} \cdot CH_2 \cdot CH_3$

$C_{27}H_{56}$ MW, 380

Constituent of Gedda wax and beeswax. Pearly leaflets from AcOEt. M.p. 59·5°. B.p. 270°/15 mm. Spar. sol. Et_2O. Insol. EtOH. D^{60} 0·780. n_D^{65} 1·4345.

Gluud, *Ber.*, 1919, **52**, 1051.
Lipp, Casimir, *J. prakt. Chem.*, 1919, **99**, 256.

Heptacosanic Acid (*Carboceric acid*)

$CH_3 \cdot [CH_2]_{24} \cdot CH_2 \cdot COOH$

$C_{27}H_{54}O_2$ MW, 410

Present as ester in Chinese and Montan waxes. Needles from AcOEt. M.p. 82°.
Me ester: $C_{28}H_{56}O_2$. MW, 424. Cryst. from MeOH. M.p. 64°. B.p. 265–8°.

Tropsch, Kreutzer, *Chem. Abstracts*, 1922, **16**, 2111.
Gascard, *Compt. rend.*, 1920, **170**, 1328.

Heptacosanol-14 (*14-Hydroxyheptacosane, di-n-tridecylcarbinol*)

$$\begin{matrix} CH_3 \cdot CH_2 \cdot [CH_2]_{10} \cdot CH_2 \\ CH_3 \cdot CH_2 \cdot [CH_2]_{10} \cdot CH_2 \end{matrix} > CH \cdot OH$$

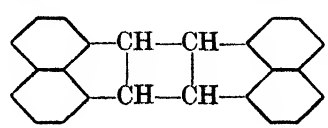
$C_{27}H_{56}O$ MW, 396

Found in traces in apple skin wax. M.p. 80–1°. Very sol. $CHCl_3$. Sol. Me_2CO, MeOH, pet. ether, hot EtOH. Insol. H_2O.

Jacobson, *J. Am. Chem. Soc.*, 1911, **33**, 2050.
Grün, Ulbrich, Krczil, *Z. angew. Chem.*, 1926, **39**, 421.

Heptacosanone-14.
See Myristone.

Heptacyclene (*Di-perinaphthylenecyclobutane*)



$C_{24}H_{16}$ MW, 304

α-Form :

Needles from C_6H_6. M.p. 306–7°. Sol. hot $PhNO_2$. Insol. cold conc. H_2SO_4. $K_2Cr_2O_7$ in AcOH ⟶ naphthalic anhydride.

Picrate : m.p. 225–7° decomp.

β-Form :

Prisms or plates from C_6H_6. M.p. 232–4°. Sol. $CHCl_3$, C_6H_6. Spar. sol. EtOH, Et_2O, AcOH. Sol. hot conc. H_2SO_4. $Na_2Cr_2O_7$ in AcOH ⟶ naphthalic anhydride.

Picrate : m.p. 215–16°.

Dziewoński, Paschalski, *Ber.*, 1914, **47**, 2680.

Heptadecanal.
See Heptadecyl Aldehyde.

Heptadecane

$CH_3{\cdot}[CH_2]_{15}{\cdot}CH_3$

$C_{17}H_{36}$ MW, 240

M.p. 22°. B.p. 303°, 223°/100 mm., 187·5°/30 mm., 159–63°/11 mm. $D_4^{22.5}$ 0·7777. n_D 1·44052.

Semmler, Feldstein, *Ber.*, 1914, **47**, 2691.
Krafft, *Ber.*, 1882, **15**, 1702.

Heptadecanoic Acid.
See Heptadecylic Acid.

Heptadecanol-1.
See Heptadecyl Alcohol.

Heptadecanol-2 (*Methylpentadecylcarbinol*)

$CH_3{\cdot}[CH_2]_{13}{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3$

$C_{17}H_{36}O$ MW, 272

Plates. M.p. 54°.

Gascard, *Ann. chim.*, 1921, **15**, 332.

Heptadecanol-9 (*Di*-n-*octylcarbinol*, *9-hydroxyheptadecane*)

$CH_3{\cdot}[CH_2]_7{\cdot}CH(OH){\cdot}[CH_2]_7{\cdot}CH_3$

$C_{17}H_{36}O$ MW, 256

Plates from EtOH.Aq. M.p. 61°. Sol. most org. solvents. Insol. H_2O.

Kipping, *J. Chem. Soc.*, 1893, **63**, 457.
Messer, *Chem. News*, 1929, **138**, 292.

Heptadecanone-2.
See Methyl pentadecyl Ketone.

Heptadecanone-9.
See Di-*n*-octyl Ketone.

Heptadecatetraene (*Aplotaxene*)

$C_{17}H_{28}$ MW, 232

Constituent of certain root oils. B.p. 153–5°/11 mm. D^{21} 0·8310. n_D^{21} 1·483. Red. ⟶ heptadecatriene (*dihydro-aplotaxene*), b.p. 154–7°/11 mm., D^{21} 0·8177, n_D^{21} 1·471.

Semmler, Feldstein, *Ber.*, 1914, **47**, 2690.

Heptadecatriene.
See under Heptadecatetraene.

Heptadecene.
See Heptadecylene.

Heptadecylacetanilide.
See under Heptadecylaniline.

Heptadecyl Alcohol (*Heptadecanol*-1, *1-hydroxyheptadecane*)

$CH_3{\cdot}[CH_2]_{15}{\cdot}CH_2OH$

$C_{17}H_{36}O$ MW, 256

Cryst. from Me_2O. M.p. 54°. Sol. EtOH, Et_2O.

Stearate : plates. M.p. 64·7°.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 531.
Gascard, *Ann. chim.*, 1921, **15**, 347.

Heptadecyl Aldehyde (*Margaric aldehyde, heptadecanal*)

$CH_3{\cdot}[CH_2]_{14}{\cdot}CH_2{\cdot}CHO$

$C_{17}H_{34}O$ MW, 254

Needles from pet. ether. M.p. 36°. Cryst. + $1C_2H_5OH$ from abs. EtOH. M.p. 52°. B.p. 204°/26 mm. Sol. Et_2O, $CHCl_3$, C_6H_6. Spar. sol. EtOH, Me_2CO, AcOEt. Decolourises $KMnO_4$. Long standing ⟶ trimeric form, m.p. 77–8°. Ox. ⟶ heptadecylic acid.

Semicarbazone : m.p. 108°. Sol. EtOH. Spar. sol. $CHCl_3$, C_6H_6. Insol. Et_2O, pet. ether.

Oxime : m.p. 89·5°.

Le Sueur, *J. Chem. Soc.*, 1904, **85**, 832.

Heptadecylamine (1-*Aminoheptadecane*)

$CH_3{\cdot}CH_2{\cdot}[CH_2]_{14}{\cdot}CH_2NH_2$

$C_{17}H_{37}N$ MW, 255

Cryst. M.p. 49°. B.p. 335–40°. Sol. EtOH, Et_2O. Insol. H_2O. Non-volatile in steam.

B,HCl : m.p. 158°.

N-*Acetyl* : m.p. 62°.

N-*Benzoyl* : leaflets from C_6H_6. M.p. 91°.

Nageli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, **12**, 236.
v. Braun, Sobecki, *Ber.*, 1911, **44**, 1473.

Heptadecylaniline (N-*Phenylheptadecylamine*)

$C_6H_5{\cdot}NH{\cdot}[CH_2]_{16}{\cdot}CH_3$

$C_{23}H_{41}N$ MW, 331

Plates from EtOH, rapidly changing to needles. M.p. 42–3°. B.p. 285–6°/35 mm. Sol. Et_2O, Me_2CO, $CHCl_3$, AcOEt, C_6H_6, pet. ether. Spar. sol. cold EtOH. Insol. HCl.

B,HCl : plates from pet. ether. M.p. 99–100°. Hyd. by hot H_2O.

N-Acetyl: *N*-heptadecylacetanilide. $C_{25}H_{43}ON$. MW, 373. Needles from MeOH.Aq. M.p. 42–3°.

Le Sueur, *J. Chem. Soc.*, 1910, **97**, 2435.

Heptadecyl bromide (1-*Bromoheptadecane*)

$CH_3 \cdot [CH_2]_{15} \cdot CH_2Br$

$C_{17}H_{35}Br$ MW, 319

M.p. 32°. B.p. 193–200°/10 mm.

v. Braun, Irmisch, *Ber.*, 1932, **65**, 881.

Heptadecylcatechol.

See Hydrolaccol *and* Hydrothitsiol.

Heptadecyl chloride (1-*Chloroheptadecane*)

$CH_3 \cdot [CH_2]_{15} \cdot CH_2Cl$

$C_{17}H_{35}Cl$ MW, 274·5

Cryst. M.p. 24°. B.p. 192–5°/10 mm.

v. Braun, Sobecki, *Ber.*, 1911, **44**, 1473.

Heptadecylene-8 (*Heptadecene*-8, sym.-n-*heptyl*-n-*octyl-ethylene*)

$CH_3 \cdot [CH_2]_7 \cdot CH{:}CH \cdot [CH_2]_6 \cdot CH_3$

$C_{17}H_{34}$ MW, 238

B.p. 160°/9·5 mm. D^{10} 0·7977.

Mai, *Ber.*, 1889, **22**, 2135.
Messer, *Chem. News*, 1929, **138**, 292.

Heptadecylic Acid (*Margaric acid, heptadecanoic acid, heptadecoic acid.* See also Margaric Acid)

$CH_3 \cdot [CH_2]_{14} \cdot CH_2 \cdot COOH$

$C_{17}H_{34}O_2$ MW, 270

Plates from pet. ether. M.p. 60–1°. B.p. 227°/100 mm. D^{60} 0·8532. n_D^{60} 1·4342. Sol. Et_2O. Spar. sol. EtOH. Dist. of Ba salt ⟶ methyl hexadecyl ketone.

Me ester: $C_{18}H_{36}O_2$. MW, 284. Plates from EtOH. M.p. 29°. Sol. Et_2O, C_6H_6.

Et ester: $C_{19}H_{38}O_2$. MW, 298. Plates from EtOH.Aq. M.p. 28° (24°). Sol. Et_2O. Insol. H_2O.

Phenyl ester: $C_{23}H_{38}O_2$. MW, 346. M.p. 37°.

Amide: $C_{17}H_{35}ON$. MW, 269. Plates from EtOH. M.p. 108°. Sol. EtOH. Spar. sol. cold Et_2O.

Nitrile: $C_{17}H_{33}N$. MW, 251. Cryst. from EtOH. B.p. 208°/10 mm. Sol. hot EtOH, Et_2O. Spar. sol. cold EtOH.

Le Sueur, *J. Chem. Soc.*, 1904, **85**, 836.
Krafft, *Ber.*, 1879, **12**, 1672.
Levene, West, *J. Biol. Chem.*, 1913, **16**, 477.
Bömer, Limprich, *Chem. Zentr.*, 1912, II, 703.

Heptadecyl iodide (1-*Iodoheptadecane*)

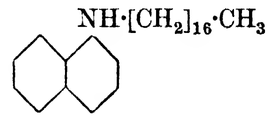
$CH_3 \cdot [CH_2]_{15} \cdot CH_2I$

$C_{17}H_{35}I$ MW, 366

Leaflets from Me_2CO. M.p. 33·6°. B.p. 158–9°/0·5 mm.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 531.

Heptadecyl-1-naphthylamine (1-N-*Naphthylheptadecylamine*)



$C_{27}H_{43}N$ MW, 381

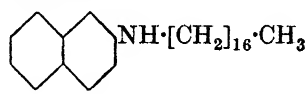
Cryst. from EtOH. M.p. 53–5°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, pet. ether. Insol. H_2O, dil. HCl.

B,HCl: plates from pet. ether. M.p. 96–7°.

N-*Benzenesulphonyl*: needles from EtOH. M.p. 66–8°.

Le Sueur, *J. Chem. Soc.*, 1911, **99**, 831.

Heptadecyl-2-naphthylamine (2-N-*Naphthylheptadecylamine*)



$C_{27}H_{43}N$ MW, 381

Plates from EtOH. M.p. 60–1°. Sol. Et_2O, $CHCl_3$, C_6H_6. Spar. sol. pet. ether. Insol. H_2O, HCl.

B,HCl: needles from $CHCl_3$–pet. ether. M.p. 170–1°.

N-*Benzenesulphonyl*: needles from EtOH. M.p. 51–2°.

Le Sueur, *J. Chem. Soc.*, 1911, **99**, 828.

1 : 2-Heptadiene (n-*Butylallene*)

$CH_3 \cdot [CH_2]_3 \cdot CH{:}C{:}CH_2$

C_7H_{12} MW, 96

B.p. 105–6°. D^{18} 0·7306. n_D^{18} 1·432.

Bouis, *Compt. rend.*, 1926, **183**, 133.

1 : 4-Heptadiene (1-*Methylene*-3-*propylidenepropane*, 4-*propylidene*-1-*butylene*, 1-*vinyl*-2-*pentene*)

$CH_3 \cdot CH_2 \cdot CH{:}CH \cdot CH_2 \cdot CH{:}CH_2$

C_7H_{12} MW, 96

B.p. 92°. D_4^{20} 0·7176. n_D^{20} 1·420.

Shoemaker, Boord, *J. Am. Chem. Soc.*, 1931, **53**, 1505.

2 : 4-Heptadiene (1-*Propylidene-2-butylene*, sym.-*methyl-α-butenyl-ethylene*, 1-*methyl*-1 : 3-*hexadiene*, 1-*propenyl*-1-*butylene*)

$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH{:}CH{\cdot}CH_3$

C_7H_{12} MW, 96

B.p. 107°. $D_4^{21.5}$ 0·7341. $n_D^{21.5}$ 1·4486.

Reif, *Ber.*, 1908, **41**, 2744.
Prévost, *Compt. rend.*, 1926, **182**, 853.

1 : 5-Heptadienol-4.
See Propenylallylcarbinol.

1 : 6-Heptadienol-4.
See Diallylcarbinol.

2 : 4-Heptadienone-6 (*Crotonylideneacetone*, β-*butenylideneacetone*, *methyl* 1 : 3-*pentadienyl ketone*, 1-*aceto*-1 : 3-*pentadiene*, 6-*ketoheptadiene*-2 : 4)

$CH_3{\cdot}CO{\cdot}CH{:}CH{\cdot}CH{:}CH{\cdot}CH_3$

$C_7H_{10}O$ MW, 110

B.p. 88°/28 mm., 78°/16 mm. D^{15} 0·8990. n_D^{15} 1·5195. Resinifies on standing in air.
Oxime : m.p. 90–2°.
Semicarbazone : m.p. 157–8°.
Phenylhydrazone : m.p. 70–1°.

Auwers, Eisenlohr, *J. prakt. Chem.*, 1911, **84**, 65.
Meerwein, *Ann.*, 1908, **358**, 87.

1 : 5-Heptadi-ine (1-*Methinyl*-3-*propinyl-propane*, 1-*acetylenyl*-3-*propinyl-ethane*)

$CH_3{\cdot}C{:}C{\cdot}CH_2{\cdot}CH_2{\cdot}C{:}CH$

C_7H_8 MW, 92

B.p. 26–7°/30 mm. D^{21} 0·8100. n_D^{21} 1·452. Alc. $AgNO_3 \longrightarrow$ white ppt. $Cu_2Cl_2 \longrightarrow$ yellow ppt.

Urion, *Compt. rend.*, 1927, **185**, 1286.

1 : 6-Heptadi-ine (1 : 5-*Dimethinylpentane*, 1 : 3-*diacetylenylpropane*)

$HC{:}C{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}C{:}CH$

C_7H_8 MW, 92

B.p. 112°. D^{17} 0·8164. n_D^{17} 1·451. Gives ppts. with Cu_2Cl_2, $HgCl_2$, $AgNO_3$.

Lespieau, Journaud, *Compt. rend.*, 1929, **188**, 1410.

2 : 5-Heptadi-inol-4 (*Dipropinylcarbinol*, *diacetylenylisopropyl alcohol*, 4-*hydroxyheptadi-ine*-2 : 5)

$CH_3{\cdot}C{:}C{\cdot}CH(OH){\cdot}C{:}C{\cdot}CH_3$

C_7H_8O MW, 108

Leaflets from CCl_4. M.p. 105–6°. Sublimes in vacuum.

Jozitsch, Lebedew, *J. Russ. Phys.-Chem. Soc.*, 1910, **42**, 1494.
Viguier, *Compt. rend.*, 1911, **153**, 957.

***n*-Heptaldehyde** (*Oenanthaldehyde*, *œnanthol*)

$CH_3{\cdot}[CH_2]_4{\cdot}CH_2{\cdot}CHO$

$C_7H_{14}O$ MW, 114

M.p. − 43·3°. B.p. 152·8°, 79·3°/86 mm., 66·9°/41 mm., 59·6°/30 mm., 44·4°/8·96 mm. D_4^{15} 0·82162, D_4^{20} 0·8495. n_D^{20} 1·42571. $CrO_3 \longrightarrow$ *n*-heptylic acid. H + Pt in AcOH $\longrightarrow$ *n*-heptyl alcohol.
Oxime : plates from EtOH. M.p. 57–8° (50°). B.p. 195°, 100·5°/14 mm. Al_2O_3 at 340–60° $\longrightarrow$ *n*-heptylic nitrile.
Cyanhydrin : *see under* 1-Hydroxycaprylic Acid.
Semicarbazone : m.p. 109°.
Phenylhydrazone : b.p. 202·5–203°.
p-*Nitrophenylhydrazone* : m.p. 73°.
Diethylacetal : b.p. 204–5°/774 mm. D^{17} 0·836.

Sherrill, *J. Am. Chem. Soc.*, 1930, **52**, 1991.
Sabatier, Mailhe, *Compt. rend.*, 1914, **158**, 986.
Krafft, *Ber.*, 1877, **10**, 2035.

Heptamethylene.
See Cycloheptane.

Heptamethylenediamine (1 : 7-*Diamino-heptane*)

$H_2N{\cdot}CH_2{\cdot}[CH_2]_5{\cdot}CH_2NH_2$

$C_7H_{18}N_2$ MW, 130

Needles from EtOH. M.p. 28–9°. B.p. 223–5°.
B,2HCl : needles from EtOH. Decomp. at about 250°.
NN-*Dibenzoyl* : cryst. from EtOH. M.p. 124°.
NN-*Di-benzenesulphonyl* : m.p. 104°.

v. Braun, Müller, *Ber.*, 1905, **38**, 2206.

Heptamethylene Glycol.
See Heptandiol-1 : 7.

Heptandiol-1 : 2 (1 : 2-*Dihydroxyheptane*, n-*amylethylene glycol*, 1-*heptene glycol*)

$CH_3{\cdot}[CH_2]_4{\cdot}CH(OH){\cdot}CH_2OH$

$C_7H_{16}O_2$ MW, 132

B.p. 127·5–128·5°/15 mm., 128–30°/11 mm. HCl $\longrightarrow$ 1-chloro-2-hydroxyheptane.

d-.
B.p. 90°/1 mm. (93–4°/1 mm.). $[\alpha]_D^{22}$ + 16·81° in EtOH.

Di-phenylurethane : m.p. 109° (111–12°). $[\alpha]_D^{25}$ + 12·14° in EtOH.

Hershberg, *Helv. Chim. Acta*, 1934, **17**, 357.
v. Braun, Schirmacher, *Ber.*, 1923, **56**, 1847.
Levene, Walti, *J. Biol. Chem.*, 1932, **98**, 737.

Heptandiol-1 : 4 (1 : 4-*Dihydroxyheptane*, 1-n-*propyltetramethylene glycol*)

$CH_3\cdot[CH_2]_2\cdot CH(OH)\cdot[CH_2]_2\cdot CH_2OH$

$C_7H_{16}O_2$ MW, 132

B.p. 240–5°/750 mm., 126·5–128·5°/4 mm. Misc. with H_2O. D_{20}^{20} 0·9559. n_D^{25} 1·4510.
Diacetyl : b.p. 249–52°/748 mm., 113–113·5°/1 mm. D_0^0 1·0135, D_{20}^{20} 0·9934. n_D^{25} 1·4268.
1-*Naphthylurethane* : cryst. from ligroin. M.p. 81–2°.

Bray, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2105.

Heptandiol-1 : 5 (1 : 5-*Dihydroxyheptane*, 1-*ethylpentamethylene glycol*)

$CH_3\cdot CH_2\cdot CH(OH)\cdot[CH_2]_3\cdot CH_2OH$

$C_7H_{16}O_2$ MW, 132

B.p. 126–8°/1·8 mm. Sol. most org. solvents. Insol. H_2O. D_4^{20} 0·9705. n_D^{22} 1·4571.
Di-p-*nitrobenzoyl* : m.p. 82–3°.

Pierce, Adams, *J. Am. Chem. Soc.*, 1925, **47**, 1102.

Heptandiol-1 : 7 (1 : 7-*Dihydroxyheptane*, *heptamethylene glycol*)

$HO\cdot CH_2\cdot[CH_2]_5\cdot CH_2OH$

$C_7H_{16}O_2$ MW, 132

M.p. 22·5° (19°). B.p. 262°, 172°/35 mm., 148–9°/10 mm. Sol. H_2O, EtOH. Spar. sol. Et_2O. Hygroscopic. HBr at 130–40° ⟶ 1 : 7-dibromoheptane.
Di-Me ether : $C_9H_{20}O_2$. MW, 160. B.p. 201° (189–90°), 108°/38 mm. D^0 0·8705, D^{15} 0·8606. n_D^{15} 1·4126.
Di-Et ether : $C_{11}H_{24}O_2$. MW, 188. B.p. 226°, 129°/35 mm. D^0 0·8786, D_4^{11} 0·853.
Diacetyl : b.p. 274°. D_0^0 1·0219.
Di-phenylurethane : m.p. 137° (134°).

Dionneau, *Ann. chim.*, 1915, **3**, 247.
Müller, Rölz, *Monatsh.*, 1927, **48**, 736.

Heptandiol-2 : 5 (2 : 5-*Dihydroxyheptane*, 1-*methyl-4-ethyltetramethylene glycol*)

$CH_3\cdot CH_2\cdot CH(OH)\cdot[CH_2]_2\cdot CH(OH)\cdot CH_3$

$C_7H_{16}O_2$ MW, 132

B.p. 132°/18·5 mm. Hot dil. H_2SO_4 ⟶ 2-methyl-5-ethyltetrahydrofuran.
Diacetyl : b.p. 121–4°/11 mm. Insol. H_2O.
Di-phenylurethane : m.p. 147°.

Wohlgemuth, *Ann. chim.*, 1914, **2**, 435.

Heptandiol-2 : 6 (2 : 6-*Dihydroxyheptane*, 1 : 5-*dimethylpentamethylene glycol*)

$CH_3\cdot CH(OH)\cdot[CH_2]_3\cdot CH(OH)\cdot CH_3$

$C_7H_{16}O_2$ MW, 132

B.p. 128°/30 mm. H_2SO_4 ⟶ 2 : 6-dimethyltetrahydropyran.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1360.

Heptandiol-3 : 4 (3 : 4-*Dihydroxyheptane*, 1-*ethyl*-2-n-*propylethylene glycol*, 3-*heptene glycol*)

$CH_3\cdot[CH_2]_2\cdot CH(OH)\cdot CH(OH)\cdot CH_2\cdot CH_3$

$C_7H_{16}O_2$ MW, 132

M.p. 98–9° (96–96·5°). B.p. 212°/761 mm. Sol. H_2O and most org. solvents. n_D^{25} 1·4420.
Di-p-*nitrobenzoyl* : m.p. 157·5–158·5°.

Pierce, Adams, *J. Am. Chem. Soc.*, 1925, **47**, 1101.
Mathus, Gibon, *Bull. soc. chim. Belg.*, 1925, **34**, 303.

Heptandione-2 : 4.
Butyrylacetone, *q.v.*

Heptandione-2 : 6 (2 : 6-*Diketoheptane*, sym.-*diacetopropane* 1 : 3-*diacetylpropane*)

$CH_3\cdot CO\cdot[CH_2]_3\cdot CO\cdot CH_3$

$C_7H_{12}O_2$ MW, 128

Cryst. from ligroin. M.p. 33–4°. B.p. 221–4°/764 mm. slight decomp., 96·5–97°/10–11 mm. Sol. H_2O, EtOH, Et_2O, C_6H_6. D_4^{37} 0·93986. n_D^{37} 1·42767. Reduces hot Fehling's and $NH_3.AgNO_3$. Hot. dil. H_2SO_4 ⟶ 1-methyl-1-cyclohexenone-3.
Dioxime : prisms from ligroin. M.p. 89°.
Disemicarbazone : m.p. 215°.
Di-p-*nitrophenylhydrazone* : m.p. 182–3°.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1361.
Harries, *Ber.*, 1914, **47**, 787.

Heptandione-3 : 4 (3 : 4-*Diketoheptane*, *ethyl propyl diketone propionylbutyryl*)

$CH_3\cdot[CH_2]_2\cdot CO\cdot CO\cdot CH_2\cdot CH_3$

$C_7H_{12}O_2$ MW, 128

B.p. 147°/732 mm. D_4^0 0·885.
3-*Oxime* : b.p. 145°/60 mm. Insol. H_2O.
Dioxime : cryst. from EtOH. M.p. 167–8°.

Sol. EtOH, Et_2O, Me_2CO. Spar. sol. H_2O, C_6H_6, ligroin.

Fileti, Ponzio, *J. prakt. Chem.*, 1897, **55**, 194.
Ponzio, Borelli, *Gazz. chim. ital.*, 1902, **32**, 421.

Heptandione-3 : 5 (3 : 5-*Diketoheptane, dipropionylmethane*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH_3$

$C_7H_{12}O_2$ MW, 128

B.p. 172–3°/711 mm. D^{20} 0·9445.

Fischer, Bartholomäus, *Ber.*, 1912, **45**, 1983.

***n*-Heptane**

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$

C_7H_{16} MW, 100

M.p. − 90·65°. B.p. 98·38°. D_4^{20} 0·68378, D_4^{25} 0·67963. n_D^{20} 1·38777, n_D^{25} 1·38553.

Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1931, **53**, 1948.
Karvonen, *Chem. Abstracts*, 1931, **25**, 2412.
Edgar, Calingaert, *J. Am. Chem. Soc.*, 1929, **51**, 1540.

Heptane-1-carboxylic Acid.
See n-Caprylic Acid.

Heptane-4-carboxylic Acid.
See Dipropylacetic Acid.

Heptane-1 : 7-dial.
See Pimelic Dialdehyde.

Heptane-1 : 1-dicarboxylic Acid (n-*Hexylmalonic acid*)

$CH_3{\cdot}[CH_2]_4{\cdot}CH_2{\cdot}CH{<}^{COOH}_{COOH}$

$C_9H_{16}O_4$ MW, 188

Cryst. from C_6H_6. M.p. 103–5°.
Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 150–5°/20 mm.

v. Braun, *Ber.*, 1934, **67**, 224.

Heptane-1 : 4-dicarboxylic Acid (1-*Propyladipic acid*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{\cdot}COOH$
CH_2
CH_2
$CH_2{\cdot}COOH$

$C_9H_{16}O_4$ MW, 188

M.p. 55–9°. $k = 4{\cdot}2 \times 10^{-5}$ at 24·4°.

Mellor, *J. Chem. Soc.*, 1901, **79**, 131.

Heptane-1 : 5-dicarboxylic Acid (1-*Ethylpimelic acid*)

$CH_3{\cdot}CH_2{\cdot}CH{\cdot}COOH$
$[CH_2]_3$
$CH_2{\cdot}COOH$

$C_9H_{16}O_4$ MW, 188

M.p. 41·5–43°. B.p. 260–5°/82 mm.
Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 198–200°/83 mm.
Dianilide: cryst. from C_6H_6. M.p. 145°.

Crossley, Perkin, *J. Chem. Soc.*, 1894, **65**, 990.
Carter, *J. Am. Chem. Soc.*, 1928, **50**, 1967.
See also previous reference.

Heptane-1 : 7-dicarboxylic Acid.
See Azelaic Acid.

Heptane-2 : 4-dicarboxylic Acid (1-*Methyl-3-propylglutaric acid*)

$CH_3{\cdot}CH{\cdot}COOH$
CH_2
$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{\cdot}COOH$

$C_9H_{16}O_4$ MW, 188

Exists in two modifications.
(i) M.p. 101–2°. $k = 5{\cdot}9 \times 10^{-5}$ at 25°.
(ii) Needles from ligroin. M.p. 51–3°. $k = 5{\cdot}4 \times 10^{-5}$ at 25°.

Bischoff, Tigerstedt, *Ber.*, 1890, **23**, 1940.

Heptane-2 : 5-dicarboxylic Acid.
See 1-Methyl-4-ethyladipic Acid.

Heptane-2 : 6-dicarboxylic Acid (1 : 5-*Dimethylpimelic acid*)

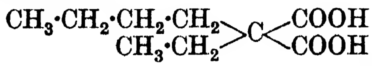
$CH_3{\cdot}CH{\cdot}COOH$
$[CH_2]_3$
$CH_3{\cdot}CH{\cdot}COOH$

$C_9H_{16}O_4$ MW, 188

Exists in two modifications.
(i) Prisms from H_2O. M.p. 81–81·5°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. ligroin. 100 parts H_2O dissolve 1·17 parts at 15°. $k = 3{\cdot}44 \times 10^{-5}$ at 25°.
Dianilide: m.p. 183–4°.
(ii) Cryst. from H_2O. M.p. 76–76·5°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. ligroin. 100 parts H_2O dissolve 2·206 parts at 15°. $k = 3{\cdot}43 \times 10^{-5}$ at 25°.
Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 195–6°/100 mm. D_4^t 0·9817.
Dianilide: m.p. 154–5°.

Kipping, *J. Chem. Soc.*, 1895, **67**, 143, 149.
Perkin, Prentice, *J. Chem. Soc.*, 1891, **59**, 831.

Heptane-3 : 3-dicarboxylic Acid (*Ethylbutylmalonic acid*)



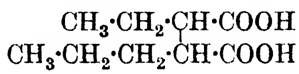
$C_9H_{16}O_4$ MW, 188

Needles from H_2O. M.p. 116°. $k = 1{\cdot}163 \times 10^{-2}$ at 25°. Heat ⟶ 1-ethylcaproic acid.

Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 235–45°.

Raper, *J. Chem. Soc.*, 1907, **91**, 1837.

Heptane-3 : 4-dicarboxylic Acid (1-*Ethyl-2-propylsuccinic acid*)



$C_9H_{16}O_4$ MW, 188

Exists in two modifications.

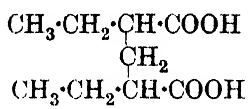
(i) M.p. 178–9°.

Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 134–5°/16 mm.

(ii) M.p. 97–8°.

Fichter, *Ann.*, 1908, **361**, 388.

Heptane-3 : 5-dicarboxylic Acid (1 : 3-*Diethylglutaric acid*)



$C_9H_{16}O_4$ MW, 188

Exists in two modifications.

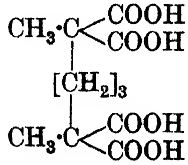
(i) M.p. 119·5–120°. Sol. EtOH, Et_2O, $CHCl_3$, Me_2CO, C_6H_6. Mod. sol. ligroin. 100 parts H_2O dissolve 0·8095 parts at 19°. $k = 5{\cdot}5 \times 10^{-5}$ at 25°.

(ii) M.p. 93·5–94·5°. 100 parts H_2O dissolve 1·5280 parts at 19°. $k = 5{\cdot}95 \times 10^{-5}$ at 25°.

Reformatski, *Chem. Zentr.*, 1902, II, 107.

Heptane-4 : 4-dicarboxylic Acid.
See Dipropylmalonic Acid.

Heptane-2 : 2 : 6 : 6-tetracarboxylic Acid



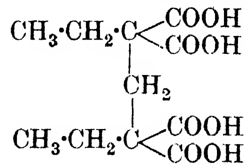
$C_{11}H_{16}O_8$ MW, 276

M.p. 210–11° decomp. Sol. EtOH. Spar. sol. H_2O, Et_2O, $CHCl_3$, C_6H_6. $k = 3{\cdot}7 \times 10^{-3}$ at 25°. Heat ⟶ heptane-2 : 6-dicarboxylic acid.

Tetra-Et ester: $C_{19}H_{32}O_8$. MW, 388. B.p. 238–40°/30 mm., 220–30°/20 mm.

Perkin, Prentice, *J. Chem. Soc.*, 1891, **59**, 829.
Bischoff, *Ber.*, 1895, **28**, 2828.
Noyes, *Am. Chem. J.*, 1898, **20**, 793.

Heptane-3 : 3 : 5 : 5-tetracarboxylic Acid



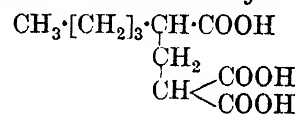
$C_{11}H_{16}O_8$ MW, 276

Cryst. from Et_2O. Heat at 163° ⟶ 1 : 3-diethylglutaric acid.

Tetra-Et ester: $C_{19}H_{32}O_8$. MW, 388. M.p. 61°. B.p. 195°/12 mm.

Dressel, *Ann.*, 1890, **256**, 186.

Heptane-1 : 1 : 3-tricarboxylic Acid

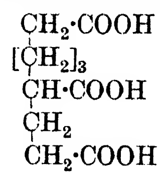


$C_{10}H_{16}O_6$ MW, 232

Cryst. from Et_2O. M.p. 144°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 782.

Heptane-1 : 3 : 7-tricarboxylic Acid



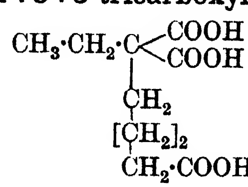
$C_{10}H_{16}O_6$ MW, 232

Free acid not isolated.

Anhydride: $C_{10}H_{14}O_5$. MW, 214. Nodules from C_6H_6. M.p. 72–3°. B.p. 250–60°/0·2 mm.

Haworth, Mavin, *J. Chem. Soc.*, 1933, 1015.

Heptane-1 : 5 : 5-tricarboxylic Acid



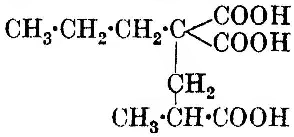
$C_{10}H_{16}O_6$ MW, 232

M.p. 86–8°. Heat ⟶ heptane-1 : 5-dicarboxylic acid.

Tri-Et ester: $C_{16}H_{28}O_6$. MW, 316. B.p. 189–91°/20 mm.

Mellor, *J. Chem. Soc.*, 1901, **79**, 132.
Carter, *J. Am. Chem. Soc.*, 1928, **50**, 1969.

Heptane-2 : 4 : 4-tricarboxylic Acid



$C_{10}H_{16}O_6$ MW, 232

M.p. 167–8° decomp. Sol. H_2O, Et_2O. $k = 1.02 \times 10^{-2}$ at 15°. Heat ⟶ 1-methyl-3-propylglutaric acid.

Tri-Et ester: $C_{16}H_{28}O_6$. MW, 316. B.p. 300–1°.

Bischoff, Tigerstedt, *Ber.*, 1890, **23**, 1937.

Heptanol-1.
See *n*-Heptyl Alcohol.

Heptanol-2.
See Methyl-*n*-amylcarbinol.

Heptanol-3.
See Ethyl-*n*-butylcarbinol.

Heptanol-4.
See Dipropylcarbinol.

1-Heptanolone-2 (*Hydroxymethyl* n-*amyl ketone, 1-hydroxy-2-ketoheptane, caproylcarbinol*)

$CH_3\cdot[CH_2]_4\cdot CO\cdot CH_2OH$

$C_7H_{14}O_2$ MW, 130

B.p. 95°/20 mm. Reduces cold Fehling's.

Levene, Walti, *J. Biol. Chem.*, 1932, **98**, 736.

2-Heptanolone-5 (*Ethyl 3-hydroxy*-n-*butyl ketone, 2-hydroxy-5-ketoheptane*)

$CH_3\cdot CH_2\cdot CO\cdot[CH_2]_2\cdot CH(OH)\cdot CH_3$

$C_7H_{14}O_2$ MW, 130

B.p. 86·5°/11 mm. Dist. ⟶ 2-methyl-5-ethyl-2 : 3-dihydrofuran. NaHg ⟶ heptandiol-2 : 5.

Oxime: b.p. 149–50°/13 mm.

Phenylurethane: m.p. 79°.

Wohlgemuth, *Ann. chim.*, 1914, **2**, 432.

2-Heptanolone-6 (*Methyl 4-hydroxy*-n-*amyl ketone, methyl-3-acetopropylcarbinol, 2-hydroxy-6-ketoheptane*)

$CH_3\cdot CO\cdot[CH_2]_3\cdot CH(OH)\cdot CH_3$

$C_7H_{14}O_2$ MW, 130

B.p. 117°/20 mm. CrO_3 ⟶ heptandione-2:6 NaHg ⟶ heptandiol-2 : 6.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1359.

3-Heptanolone-4 (*Ethylbutyrylcarbinol, propyl 1-hydroxypropyl ketone, 3-hydroxy-4-ketoheptane*)

$CH_3\cdot[CH_2]_2\cdot CO\cdot CH(OH)\cdot CH_2\cdot CH_3$

$C_7H_{14}O_2$ MW, 130

B.p. 181–2° 86–7°/26 mm., 75–6°/18 mm. D_4^{20} 0·9309.

Semicarbazone: m.p. 117–18°.

Vénus-Daniloff, *Bull. soc. chim.*, 1928, **43**, 576.

4-Heptanolone-2 (*Methyl 2-hydroxy*-n-*amyl ketone, 4-hydroxy-2-ketoheptane, propylacetonylcarbinol*)

$CH_3\cdot[CH_2]_2\cdot CH(OH)\cdot CH_2\cdot CO\cdot CH_3$

$C_7H_{14}O_2$ MW, 130

B.p. 95°/12 mm. $D_4^{19.5}$ 0·9296. $n_D^{19.5}$ 1·4357.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 911.
Grignard, Dubien, *Ann. chim.*, 1924, **2**, 288.

4-Heptanolone-3 (*Ethyl 1-hydroxybutyl ketone, propylpropionylcarbinol, 4-hydroxy-3-ketoheptane*)

$CH_3\cdot[CH_2]_2\cdot CH(OH)\cdot CO\cdot CH_2\cdot CH_3$

$C_7H_{14}O_2$ MW, 130

B.p. 176–7°, 83–5°/26 mm., 74–5°/18 mm. D_4^{20} 0·9235.

Semicarbazone: m.p. 121–2°.

Vénus-Daniloff, *Bull. soc. chim.*, 1928, **43**, 578.

Heptanone-2.
See Methyl *n*-amyl Ketone.

Heptanone-3.
See Ethyl *n*-butyl Ketone.

Heptanone-4.
Butyrone, *q.v.*

Heptantriol-1 : 2 : 3 (1-n-*Butylglycerol, 1 : 2 : 3-trihydroxyheptane*)

$CH_3\cdot[CH_2]_3\cdot CH(OH)\cdot CH(OH)\cdot CH_2OH$

$C_7H_{16}O_3$ MW, 148

M.p. 52–4°. B.p. 175–175·5°/17 mm. Hygroscopic. Bitter taste.

Triacetyl: b.p. 174°/21 mm.

Delaby, *Compt. rend.*, 1922, **175**, 1153.

Heptantriol-1 : 4 : 7 (*1 : 4 : 7-Trihydroxyheptane*)

$HO\cdot CH_2\cdot[CH_2]_2\cdot CH(OH)\cdot[CH_2]_2\cdot CH_2OH$

$C_7H_{16}O_3$ MW, 148

Viscous liq. with sweet taste. B.p. 230–2°/25 mm. D^{0} 1·084, D^{18} 1·075. n_D^{18} 1·4738. Hot dil. H_2SO_4 ⟶ 2-(3-hydroxypropyl)-tetrahydrofuran.

Hamonet, *Ann. chim.*, 1918, **10**, 26.

Heptantriol-2 : 3 : 4 (1-*Methyl*-3-n-*propylglycerol*, 2 : 3 : 4-*trihydroxyheptane*)

$CH_3·[CH_2]_2·CH(OH)·CH(OH)·CH(OH)·CH_3$

$C_7H_{16}O_3$ MW, 148

B.p. 162–4°/25 mm.

Delaby, Morel, *Compt. rend.*, 1925, **180**, 1409.

Heptantrione-2 : 4 : 6.
Diacetylacetone, *q.v.*

1 : 3 : 5-Heptatriene (1-*Vinyl*-3-*propylidenepropylene*, 1-*methylene*-4-*ethylidene*-2-*butylene*, sym.-*vinylpropenylethylene*)

$CH_3·CH:CH·CH:CH·CH:CH_2$

C_7H_{10} MW, 94

Colourless liq. B.p. 113–14°. D_4^{20} 0·764. n_a 1·50786.

Auwers, Westermann, *J. prakt. Chem.*, 1923, **105**, 373.

1 : 3 : 6-Heptatriene (sym.-*Vinylallylethylene*, 1-*allylbutadiene*-1 : 3, 1 : 3-*divinylpropylene*)

$CH_2:CH·CH_2·CH:CH·CH:CH_2$

C_7H_{10} MW, 94

B.p. 115°. Partially polymerises on boiling. Br ⟶ hexabromide.

Saytzeff, *Ann.*, 1877, **185**, 144.

1-Heptenal (2-*Butylacrolein*, 1-*heptenic aldehyde*, 3-*propylcrotonaldehyde*)

$CH_3·[CH_2]_3·CH:CH·CHO$

$C_7H_{12}O$ MW, 112

B.p. 165–7°. D_4^{17} 0·864. n_D^{17} 1·4468.
Semicarbazone : m.p. 169°.
p-*Nitrophenylhydrazone* : m.p. 154°.

Delaby, Guillot-Allegre, *Compt. rend.*, 1931, **192**, 1467.

1-Heptene (1-*Heptylene*, n-*amylethylene*)

$CH_3·CH_2·CH_2·CH_2·CH_2·CH:CH_2$

C_7H_{14} MW, 98

B.p. 93·7–93·8°/771 mm., 90·5–90·8°/720 mm. D_4^{20} 0·6973. n_D^{20} 1·3996.
Dibromide : 1 : 2-dibromoheptane. $C_7H_{14}Br_2$. MW, 258. Bp. 116°/25 mm. D_4^{20} 1·5180. n^{20} 1·5022.
Glycol : *see* Heptandiol-1 : 2.

Wilkinson, *J. Chem. Soc.*, 1931, **134**, 3057.
Waterman, De Kok, *Rec. trav. chim.*, 1933, **52**, 298.
Herschberg, *Helv. Chim. Acta*, 1934, **17**, 356.

2-Heptene (2-*Heptylene*, sym.-*methylbutylethylene*)

$CH_3·CH_2·CH_2·CH_2·CH:CH·CH_3$

C_7H_{14} MW, 98

B.p. 98·5°. Ox. ⟶ acetic and valeric acids.

Schorlemmer, Thorpe, *Ann.*, 1883, **217**, 150.

3-Heptene (3-*Heptylene*, sym.-*ethylpropylethylene*)

$CH_3·CH_2·CH_2·CH:CH·CH_2·CH_3$

C_7H_{14} MW, 98

B.p. 95·8°/768 mm (94°). D^{20} 0·7016. n_D^{20} 1·40419. Ox. ⟶ propionic and butyric acids.
Glycol : *see* Heptandiol-3 : 4.

Prévost, *Compt. rend.*, 1928, **187**, 946.
Mathus, Gibon, *Bull. soc. chim. Belg.*, 1925, **34**, 303.

1-Heptenic Acid (1-*Hexene*-1-*carboxylic acid*)

$CH_3·[CH_2]_3·CH:CH·COOH$

$C_7H_{12}O_2$ MW, 128

B.p. 225–8°, 120–2°/11 mm. D^{20} 0·9575. n_D^{20} 1·4488. $k = 1·5 \times 10^{-5}$ at 25°. Ox. ⟶ valeric acid.
Et ester : $C_9H_{16}O_2$. MW, 156. B.p. 81–6°/12 mm.

Rupe, Ronus, Lotz, *Ber.*, 1902, **35**, 4268.

2-Heptenic Acid (2-*Hexene*-1-*carboxylic acid*, 2-*butylidenepropionic acid*)

$CH_3·[CH_2]_2·CH:CH·CH_2·COOH$

$C_7H_{12}O_2$ MW, 128

B.p. 226–8°. Spar. sol. H_2O. Volatile in steam.

Fittig, Schmidt, *Ann.*, 1889, **255**, 77.

4-Heptenic Acid (3-*Propenylbutyric acid*, 4-*ethylidene*-n-*valeric acid*, 2-*hexene*-6-*carboxylic acid*)

$CH_3·CH:CH·[CH_2]_3·COOH$

$C_7H_{12}O_2$ MW, 128

B.p. 222–4°, 117°/11 mm. D_4^{20} 0·9496. n_D^{20} 1·4444. Volatile in steam. Ox. ⟶ acetic and glutaric acids.

Ciamician, Silber, *Ber.*, 1908, **41**, 1075.
v. Braun, Sobecki, *Ber.*, 1911, **44**, 1047.

5-Heptenic Acid (*1-Hexene-6-carboxylic acid, 4-vinylvaleric acid*)

$CH_2{:}CH{\cdot}[CH_2]_4{\cdot}COOH$

$C_7H_{12}O_2$ MW, 128

B.p. 225–7°. D^{17} 0·952. n_D^{17} 1·4425. Ox. ⟶ adipic acid.

Wallach, *Ann.*, 1900, **312**, 207.

Heptenic Aldehyde.
See Heptenal.

1-Heptenol-2 (*Enol form of methyl* n-*amyl ketone*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}C(OH){:}CH_2$

⇅

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_7H_{14}O$ MW, 114

Me ether: $C_8H_{16}O$. MW, 128. B.p. 144·5° D_0^0 0·8252. $n_D^{13 \cdot 5}$ 1·4284. Dil. H_2SO_4 ⟶ methyl *n*-amyl ketone.

Et ether: $C_9H_{18}O$. MW, 142. B.p. 161–161·5°. D_0^0 0·822, $D_0^{15 \cdot 5}$ 0·8125. $n_D^{15 \cdot 5}$ 1·4274.

Moureu, *Bull. soc. chim.*, 1904, **31**, 522.

1-Heptenol-3 (n-*Butylvinylcarbinol*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH{:}CH_2$

$C_7H_{14}O$ MW, 114

d-.

B.p. 153–5°.

Formyl: b.p. 155–7°. D_4^{20} 0·8754. n_{5896}^{20} 1·4225. $[\alpha]_{5893}^{20}$ − 17·83°.

Benzoyl: b.p. 152–3°/18 mm. D_4^{20} 1·0033. n_{5896}^{20} 1·5038. $[\alpha]_{5893}^{20}$ + 41·47°.

Acid phthalate: m.p. 50–2°. $[\alpha]_D^{20}$ + 12·6° in EtOH.

l-.

B.p. 153–5°, 83°/15 mm. D_4^{20} 0·8360. n_D^{20} 1·4337. $[\alpha]_{5893}^{20}$ − 26·20°. Catalytic red. ⟶ *d*-ethylbutylcarbinol.

Acetyl: b.p. 165–7°. D_4^{20} 0·8682. n_{5896}^{20} 1·4200. $[\alpha]_{5893}^{20}$ + 4·36°.

Acid phthalate: m.p. 50–2°. $[\alpha]_D^{20}$ − 12·6° in EtOH.

dl-.

B.p. 153–5°. Passed over Cu at 320° ⟶ ethyl butyl ketone.

Acid phthalate: m.p. 56–7°.

p-*Nitrobenzoyl*: m.p. 24–5°.

Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, 1169.
Delaby, Dumoulin, *Bull. soc. chim.*, 1926, **39**, 1578.
Johnson, Kenyon, *J. Chem. Soc.*, 1932, 722.

1-Heptenol-4 (*Propylallylcarbinol*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{14}O$ MW, 114

B.p. 145–6°.

I.G., D.R.P., 544,388, (*Chem. Abstracts*, 1932, **26**, 2466).

1-Heptenol-5 (*Ethyl-γ-butenylcarbinol*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{14}O$ MW, 114

B.p. 60–61·5°/11 mm. D_4^{18} 0·8447. n_D^{18} 1·4369. Spar. sol. H_2O. Misc. with most org. solvents.

Helferich, *Ber.*, 1919, **52**, 1810.

1-Heptenol-6 (*Methyl-4-pentenylcarbinol*)

$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{14}O$ MW, 114

Liq. with resinous odour. B.p. 64–5°/13 mm. D_4^{18} 0·8484. n_D^{18} 1·4387. Spar. sol. H_2O. Misc. with most org. solvents.

Helferich, Malkomes, *Ber.*, 1922, **55**, 706.

2-Heptenol-1 (*2-*n*-Butylallyl alcohol, 2-hexenylcarbinol, 2-heptenyl alcohol*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_2OH$

$C_7H_{14}O$ MW, 114

B.p. 177–9°. D_4^{20} 0·8421. n_D^{20} 1·4410.

Acetyl: b.p. 192–4°. D_4^{18} 0·8915. n_D^{18} 1·4314.

Bouis, *Ann. chim.*, 1928, **9**, 427.

2-Heptenol-4 (*Propylpropenylcarbinol*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH)CH{:}CH{\cdot}CH_3$

$C_7H_{14}O$ MW, 114

B.p. 152–4°, 104–5°/106 mm., 63°/11 mm. $D_4^{14 \cdot 4}$ 0·8422. $n_\alpha^{14 \cdot 4}$ 1·4369.

Acetyl: b.p. 168–70°.

Reif, *Ber.*, 1908, **41**, 2742.
Auwers, Westermann, *Ber.*, 1921, **54**, 2993.

1-Heptenone-4 (*Propyl allyl ketone, ethylvinylacetone*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{12}O$ MW, 112

B.p. 146–7°, 54–5°/20 mm. Isomerises readily to 2-heptenone-4. HBr ⟶ 2-bromoheptanone-4.

Oxime: b.p. 92–3°/13 mm. Spar. sol. H_2O.

Semicarbazone: plates from EtOH.Aq. M.p. 110°.

Blaise, *Bull. soc. chim.*, 1905, **33**, 42.

1-Heptenone-5 (*Ethyl γ-butenyl ketone, 4-propionyl-1-butylene, methylallylacetone*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{12}O$ MW, 112

Liq. with unpleasant odour. B.p. 46–7°/12 mm. $D_4^{18\cdot3}$ 0·8487. $n_D^{18\cdot3}$ 1·4254. Spar. sol. H_2O. Misc. with most org. solvents.

Semicarbazone: plates from EtOH.Aq. M.p. 82–3°.

Helferich, *Ber.*, 1919, **52**, 1809.

1-Heptenone-6 (*Methyl 4-pentenyl ketone, 5-aceto-1-pentene, γ-butenylacetone*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{12}O$ MW, 112

Liq. with unpleasant odour. B.p. 41–3°/10 mm. D_4^{18} 0·8673. n_D^{18} 1·4350. Spar. sol. H_2O. Misc. with most org. solvents.

Semicarbazone: needles from EtOH.Aq. M.p. 108°.

Helferich, Malkomes, *Ber.*, 1922, **55**, 705.

2-Heptenone-4 (*Propyl propenyl ketone, ethylethylideneacetone, 1-butyrylpropylene*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH{:}CH{\cdot}CH_3$

$C_7H_{12}O$ MW, 112

B.p. 156–7°, 74–5°/12 mm.

Semicarbazone: cryst. from MeOH.Aq. M.p. 147°.

Blaise, *Bull. soc. chim.*, 1905, **33**, 45.

2-Heptenone-6 (*Methyl 3-pentenyl ketone, β-butenylacetone, crotonylacetone, 5-aceto-2-pentene*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_3$

$C_7H_{12}O$ MW, 112

B.p. 152–5°, 42–3°/9 mm. D_4^{20} 0·8446. n_D^{20} 1·4292.

Semicarbazone: plates. M.p. 97°.

Braun, Gossel, *Ber.*, 1924, **57**, 377.

3-Heptenone-2 (*Methyl 1-pentenyl ketone, butylideneacetone, 1-aceto-1-pentene*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CO{\cdot}CH_3$

$C_7H_{12}O$ MW, 112

Exists in *cis* and *trans* forms which are not interconvertible.

Cis:
B.p. 70°/15 mm. D_4^{22} 0·8555. n_D^{22} 1·4505.
Semicarbazone: m.p. 152°.

Trans:
B.p. 62°/15 mm. D_4^{20} 0·8445. n_D^{20} 1·4430.
Semicarbazone: silvery plates. M.p. 128°.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 914.

3-Heptenone-6 (*Methyl 2-pentenyl ketone, 1-aceto-2-pentene, α-butenylacetone,* sym.*-ethylacetonylethylene*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_2{\cdot}CH_3$

$C_7H_{12}O$ MW, 112

Sweet-smelling liq. B.p. 61–2°/20 mm. D_4^{21} 0·8618. n_D^{21} 1·4290. Boiling 20% H_2SO_4 ⟶ *trans*-3-heptenone-2-.

Semicarbazone: white plates. M.p. 109–10°.

See previous reference.

2-Heptenyl Alcohol.
See 2-Heptenol-1.

1-Heptine.
See Oenanthylidene.

2-Heptine.
See Methylbutylacetylene.

3-Heptine.
See Ethylpropylacetylene.

Heptoic Acid.
See Heptylic Acid.

Heptoylacetic Acid.
See 2-Ketopelargonic Acid.

Heptoprene (*2-n-Heptyl-1 : 3-butadiene, 2-heptylerythrene, 3-methylene-1-decylene, butadienylhexane, 2-nonenylethylene*)

$$CH_3{\cdot}[CH_2]_5{\cdot}CH{\cdot}\overset{CH_2}{\overset{||}{C}}{\cdot}CH{:}CH_2$$

$C_{11}H_{20}$ MW, 152

B.p. 52–4°/5 mm. D_4^{20} 0·7796. n_D^{20} 1·4511.

Carothers, Berchet, *J. Am. Chem. Soc.*, 1933, **55**, 2815.

Heptoylresorcinol.
See Heptylylresorcinol.

***n*-Heptylacetylene** (*1-Nonine*)

$CH_3{\cdot}[CH_2]_6{\cdot}C{:}CH$

C_9H_{16} MW, 124

B.p. 149–51°, 51°/8 mm. D^{20} 0·765. n_D^{20} 1·426. Sol. most org. solvents. Insol. H_2O.

Truchet, *Ann. chim.*, 1931, **16**, 410.
Bourguel, *Ann. chim.*, 1925, **3**, 211, 383.

***n*-Heptyl Alcohol** (*Heptanol-1, 1-hydroxyheptane*)

$CH_3{\cdot}[CH_2]_5{\cdot}CH_2OH$

$C_7H_{16}O$ MW, 116

M.p. – 34·1°. B.p. 176·3°. D_4^0 0·83622, D_4^{15} 0·82601. n_{He}^{15} 1·42310. $KHSO_4$ at 145° ⟶ diheptyl ether: at 175° ⟶ heptylene.

Acetyl: *n*-heptyl acetate. B.p. 191·5°/758·5 mm. D_0^0 0·8891.

Phenylurethane: m.p. 60°.

p-*Nitrophenylurethane*: m.p. 102°.

Naphthylurethane : m.p. 62°.

Clarke, Dreger, *Organic Syntheses*, Collective Vol. I, 298.
Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Natta, *Giorn. chim. ind. applicata*, 1930, **12**, 13.

n-Heptylamine.
See 1-Amino-*n*-heptane.

Heptylaminoethyl Alcohol.
See *N*-2-Hydroxyethylheptylamine.

n-Heptylbenzene (1-*Phenylheptane*)

$C_6H_5{\cdot}CH_2{\cdot}[CH_2]_5{\cdot}CH_3$

$C_{13}H_{20}$ MW, 176

B.p. 240° (235°), 108–10°/10 mm. D_4^{20} 0·8570. n_D^{20} 1·4865.

Sabatier, Mailhe, *Compt. rend.*, 1918, **158**, 834.

Heptyl bromide.
See Bromoheptane.

2-n-Heptyl-1 : 3-butadiene.
See Heptoprene.

Heptyl chloride.
See Chloroheptane.

Heptylene.
See Heptene.

n-Heptyl fluoride.
See 1-Fluoroheptane.

1-n-Heptylhydracrylic Acid (*Nonanol*-2-*carboxylic acid*, 1-*hydroxymethyl-pelargonic acid*)

$CH_3{\cdot}[CH_2]_6{\cdot}CH{\cdot}COOH$
CH_2OH (on CH)

$C_{10}H_{20}O_3$ MW, 188

Cryst. from pet. ether. M.p. 47–8°. Sol. EtOH, Et_2O. Spar. sol. pet. ether. Insol. H_2O.

Et ester : $C_{12}H_{24}O_3$. MW, 216. B.p. 165–6°/22 mm.

Phenylurethane : m.p. 105°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 651.

n-Heptylic Acid (*Heptoic acid, œnanthylic acid, œnanthic acid*)

$CH_3{\cdot}[CH_2]_5{\cdot}COOH$

$C_7H_{14}O_2$ MW, 130

Oily liq. M.p. — 9°. B.p. 222–45°, 115–16°/11 mm. D_4^0 0·93338, D_4^{15} 0·92099. n_{He}^{15} 1·42219. $k = 1{\cdot}42 \times 10^{-5}$.

Me ester : $C_8H_{16}O_2$. MW, 144. B.p. 172·1°. D_4^{15} 0·8806. n_D^{15} 1·41366.

Et ester : $C_9H_{18}O_2$. MW, 158. M.p. — 66·1°. B.p. 188·6°. D_4^0 0·88619, D_4^{15} 0·87297. n_{He}^{15} 1·41286.

Chloride : $C_7H_{13}OCl$. MW, 148·5. M.p. — 83·8°. B.p. 125·2°. D_4^0 0·98079, D_4^{15} 0·96645. n_{He}^{15} 1·43037.

Anhydride : $C_{14}H_{26}O_3$. MW, 242. M.p. — 12·4°. B.p. 164°/12·5 mm. D_4^0 0·93356, D_4^{15} 0·92146. n_{He}^{15} 1·43283.

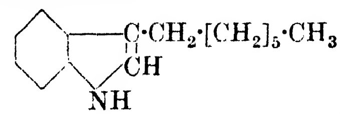
Amide : $C_7H_{13}ON$. MW, 127. Needles from EtOH. M.p. 96°.

Nitrile : $C_7H_{13}N$. MW, 111. B.p. 183–4°/765 mm. D_0^{20} 0·8107.

Anilide : m.p. 70–1°.

Deffet, *Bull. soc. chim. Belg.*, 1931, **40**, 385.
Rogers, *J. Am. Pharm. Assocn.*, 1923, **12**, 503.
Guerbet, *Bull. soc. chim.*, 1912, **11**, 168.

3-n-Heptylindole



$C_{15}H_{21}N$ MW, 215

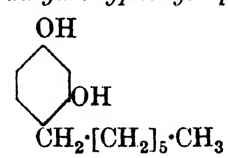
Red liq. B.p. 179–82°/3 mm.

Korczyński, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, **56**, 907.

Heptyl iodide.
See Iodoheptane.

***sym*.-n-Heptyl-n-octyl-ethylene.**
See Heptadecylene-8.

4-n-Heptylresorcinol (2 : 4-*Dihydroxyheptylbenzene*, 2 : 4-*dihydroxyphenylheptane*)



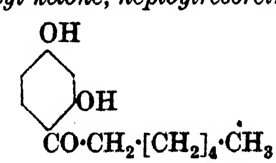
$C_{13}H_{20}O_2$ MW, 208

M.p. 73–74·5°. B.p. 186–8°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.
Dohme, U.S.P., 1,717,098, (*Chem. Abstracts*, 1929, **23**, 3717).

Heptylylpropionic Acid.
See 3-Ketocapric Acid.

4-n-Heptylylresorcinol (*Hexyl* 2 : 4-*dihydroxyphenyl ketone, heptoylresorcinol*)

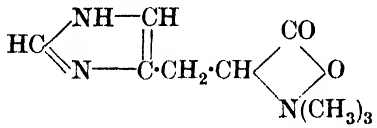


$C_{13}H_{18}O_3$ MW, 222

M.p. 48–50°. B.p. 204–6°/6–7 mm.

See first reference above.

Hercynin (*Histidine betaine*)



$C_9H_{15}O_2N_3$ MW, 197

Present in numerous fungi, e.g. *Boletus edulis*, Bull. Not known in free state.

B,2HAuCl$_4$: orange-yellow cryst. from dil. HCl. M.p. 184°.

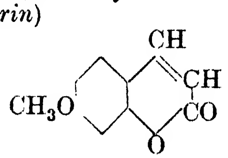
Mono-picrate: m.p. 201°.

Di-picrate: cryst. from EtOH. M.p. anhyd. 213–14°.

Picrolonate: orange-yellow needles. M.p. 229–30°.

Engeland, Kutscher, *Chem. Zentr.*, 1913, I, 28.
Winterstein, Reuter, *Z. physiol. Chem.*, 1913, **86**, 234.
Barger, Ewins, *J. Chem. Soc.*, 1911, **99**, 2340.
Küng, *Z. physiol. Chem.*, 1914, **91**, 249.

Herniarin (*Umbelliferone methyl ether, 7-methoxycoumarin*)



$C_{10}H_8O_2$ MW, 160

Present in leaves of *Herniaria hirsuta* Linn. Leaflets from H_2O or MeOH. M.p. 117–18°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Sol. conc. H_2SO_4 with blue fluor. Sol. alkalis.

Oxime: needles from H_2O. M.p. 138°.

Phenylhydrazone: yellow needles from EtOH. M.p. 115°.

Tiemann, Reimer, *Ber.*, 1879, **12**, 996.
v. Pechmann, Graeger, *Ber.*, 1901, **34**, 383.

Heroin (*Diacetylmorphine, diamorphine*)

$C_{21}H_{23}O_5N$ MW, 369

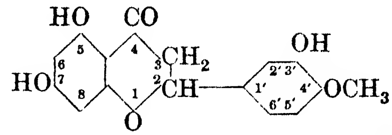
Cryst. from MeOH. M.p. 171° (173°). B.p. 272–4°/12 mm. Sol. $CHCl_3$, C_6H_6, hot EtOH. Prac. insol. H_2O. Sol. dil. acids and caustic alkalis. Used in medicine as the hydrochloride. Powerful narcotic causing less mental depression than morphine.

B,HCl: m.p. 231–2°. Sol. H_2O, EtOH. $[\alpha]_D^{20}$ − 153° in H_2O, (c = 1·1699.)

Methiodide: needles. M.p. 252° decomp. $[\alpha]_D^{15}$ − 107° in H_2O.

Knorr, Hörlein, Staubach, *Ber.*, 1909, **52**, 3514.
Tiffeneau, *Bull. soc. chim.*, 1915, **17**, 109.

Hesperetin (*5 : 7 : 3'-Trihydroxy-4'-methoxy-flavanone*)



$C_{16}H_{14}O_6$ MW, 302

Plates from EtOH.Aq. M.p. 227–8° (225–6°). Very sol. EtOH. Sol. Et_2O. Spar. sol. $CHCl_3$, C_6H_6. Insol. H_2O.

Triacetyl: m.p. 80–2°, after sintering at 75°.

Tetra-acetyl: yellow cryst. from EtOH–AcOEt. M.p. 127°.

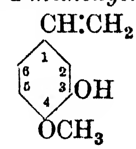
Oxime: needles or plates. M.p. 229–30° decomp.

Asahina, Shinoda, Inubuse, *Chem. Abstracts*, 1928, **22**, 2946.
Shinoda, Kawagoye, *Chem. Abstracts*, 1929, **23**, 2957.

Hesperetinic Acid.

See Isoferulic Acid.

Hesperetol (*3-Hydroxy-4-methoxy-1-vinylbenzene, 3-hydroxy-4-methoxystyrene*)



$C_9H_{10}O_2$ MW, 150

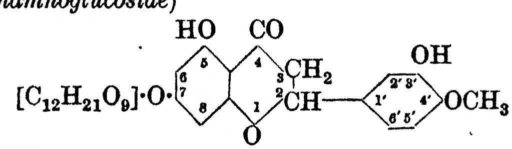
Cryst. M.p. 57°. Very sol. EtOH, Et_2O. Spar. sol. H_2O. Carmine-red col. with conc. H_2SO_4.

Tiemann, Will, *Ber.*, 1881, **14**, 967.

Hesperidene.

See Limonene.

Hesperidin (*Citrus-hesperidin, hesperetin rhamnoglucoside*)



$C_{28}H_{34}O_{15}$ MW, 610

Constituent of most citrus fruits. Needles from MeOH.Aq. or AcOH. M.p. 251–2° (decomp. at 254°). Very sol. Py. Sol. EtOH, AcOH. Insol. Et_2O, $CHCl_3$, C_6H_6, CS_2. Hyd.

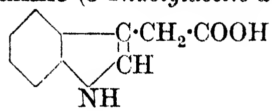
⟶ hesperetin, rhamnose and glucose. $Ba(OH)_2$ ⟶ isoferulic acid.

Diacetyl: needles from AcOH.Aq. M.p. 142–3°. $[\alpha]_D^{21}$ – 32·9°.

King, Robertson, *J. Chem. Soc.*, 1931, 1704.

Asahina, Inubuse, *Chem. Abstracts*, 1929, **23**, 3475.

Heteroauxine (*3-Indolylacetic acid*)



$C_{10}H_9O_2N$ MW, 175

Plant-growth hormone occurring in urine. Plates from $CHCl_3$. M.p. 164–5°. $[\alpha]_D^{20}$ – 3·8° in EtOH.

Nitrile: $C_{10}H_8N_2$. MW, 156. B.p. 185–90°/3·5 mm., 160°/0·2 mm. *Picrate*: m.p. 127°.

N-*Me*: m.p. 128°.

Picrate: m.p. 177° (178° decomp.).

Majima, Hoshino, *Ber.*, 1925, **58**, 2042.

Kögl, Haagen-Smit, Erxleben, *Z. physiol. Chem.*, 1934, **228**, 99.

King, l'Ecuyer. *J. Chem. Soc.*, 1934, 1903.

Heterobetulin

$C_{30}H_{50}O_2$ MW, 442

Plates from C_6H_6–EtOH. M.p. 267–8° (sinters at 260°). $[\alpha]_D^{20}$ + 11·59°. Sol. EtOH, AcOH, C_6H_6. Spar. sol. Me_2CO.

Diacetyl deriv.: leaflets from EtOH. M.p. 248–9°. $[\alpha]_D^{20}$ + 28·29°.

Dibenzoyl deriv.: needles from AcOH. M.p. 222–8°. $[\alpha]_D^{20}$ + 35·49°.

*Di-*p*-bromobenzoyl deriv.*: needles from AcOH. M.p. 253° (sinters at 200°). $[\alpha]_D^{23}$ + 40·16°.

Formate: leaflets from AcOH. M.p. 284–5°. $[\alpha]_D^{19}$ + 44·52°.

Dischendorfer, Grillmayer, *Monatsh.*, 1926, **47**, 423.

Heteroxanthine.

See 7-Methylxanthine.

Hexa.

See Hexamethylenetetramine.

Hexabenzobenzene.

See Coronene.

Hexabromoacetone (*Hexabromopropanone*)

$Br_3C·CO·CBr_3$

C_3OBr_6 MW, 532

Prisms from $CHCl_3$. M.p. 107–9°. Very sol. CS_2, $CHCl_3$, Et_2O, C_6H_6. Insol. H_2O. Decomp. by C_2H_5OH.

Weidel, Gruber, *Ber.*, 1877, **10**, 1145.

Levy, Jedlicka, *Ann.*, 1888, **249**, 80.

Hexabromoacetylacetone (*1 : 1 : 1 : 5 : 5 : 5-Hexabromopentandione-2 : 4, 1 : 1 : 1 : 5 : 5 : 5-hexabromo-2 : 4-diketopentane*)

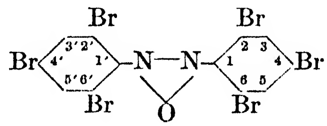
$CBr_3·CO·CH_2·CO·CBr_3$

$C_5H_2O_2Br_6$ MW, 574

Needles from abs. Et_2O. M.p. 107–8°. Decomp. by C_2H_5OH.

Combes, *Ann. chim. phys.*, 1887, **12**, 236.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexabromoazoxybenzene

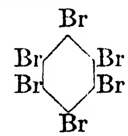


$C_{12}H_4ON_2Br_6$ MW, 672

Reddish-yellow leaflets from C_6H_6–EtOH. M.p. 215° decomp. Spar. sol. most org. solvents.

v. Pechmann, Nold, *Ber.*, 1898, **31**, 564.

Hexabromobenzene

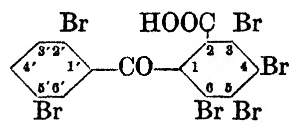


C_6Br_6 MW, 552

Needles from C_6H_6. M.p. 306° (316°). Spar. sol. Et_2O, EtOH. Sol. pet. ether, $CHCl_3$, C_6H_6, boiling AcOH.

Eckert, Steiner, *Monatsh.*, 1915, **36**, 279.

3 : 4 : 5 : 6 : 2′ : 5′-Hexabromobenzophenone-2-carboxylic Acid (*o-[2 : 5-Dibromobenzoyl]-2 : 3 : 4 : 5-tetrabromobenzoic acid*)

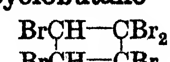


$C_{14}H_4O_3Br_6$ MW, 700

Cryst. from AcOH. M.p. 218–19°.

Hofmann, *Monatsh.*, 1915, **36**, 821.

Hexabromocyclobutane



$C_4H_2Br_6$ MW, 530

Plates from C_6H_6. M.p. 186·5°. Sol. Me_2CO, $CHCl_3$, C_6H_6. Spar. sol. EtOH, Et_2O, pet. ether.

Willstätter, Bruce, *Ber.*, 1907, **40**, 3999.

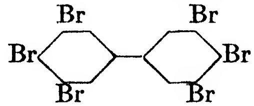
Hexabromocyclohexane.

See Benzene hexabromide.

Hexabromocyclohexantrione-1 : 3 : 5.
See Hexabromophloroglucinol.

Hexabromodiketopentane.
See Hexabromoacetylacetone.

3 : 4 : 5 : 3′ : 4′ : 5′-Hexabromodiphenyl



$C_{12}H_4Br_6$ MW, 628

M.p. 248°. Sol. AcOH, C_6H_6. Mod. sol. EtOH. HNO_3 ⟶ 2 : 2′-dinitro deriv.

van Roosmalen, *Rec. trav. chim.*, 1934, **53**, 373.

Hexabromoethane (*Perbromoethane*)

$Br_3C·CBr_3$

C_2Br_6 MW, 504

Prisms. Decomp. at 200–10° without melting. Spar. sol. Et_2O, EtOH. Sol. CS_2.

Biltz, *Ber.*, 1902, **35**, 1530.
Mouneyrat, *Bull. soc. chim.*, 1898, **19**, 177.
Dussol, *Bull. soc. chim.*, 1925, **37**, 161.

1 : 2 : 3 : 4 : 5 : 6-Hexabromo-*n*-hexane

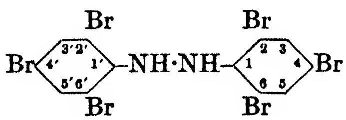
$CH_2Br·[CHBr]_4·CH_2Br$

$C_6H_8Br_6$ MW, 560

M.p. 78°. Alc. KOH ⟶ *dl*-mannitol.

Pace, *Chem. Abstracts*, 1927, **21**, 1964.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexabromohydrazobenzene

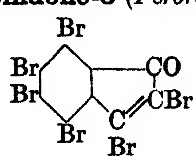


$C_{12}H_6N_2Br_6$ MW, 658

Needles from EtOH.Aq. M.p. 126–7°. Sol. conc. H_2SO_4 with red col.

v. Pechmann, Nold, *Ber.*, 1898, **31**, 564.
Hunter, Sly, *J. Am. Chem. Soc.*, 1932, **54**, 3350.

Hexabromoindone-3 (*Perbromoindone*)



C_9OBr_6 MW, 604

Yellow needles. M.p. 195–6°. Sol. AcOH, C_6H_6. Insol. Et_2O, pet. ether.

Anilide: red needles. M.p. 224° decomp.

Zincke, *Ann.*, 1924, **435**, 172.

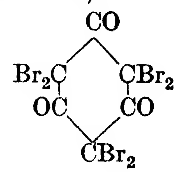
Hexabromonaphthalene

$C_{10}H_2Br_6$ MW, 602

(i) Cryst. from toluene. M.p. 269°.
(ii) Needles from toluene. M.p. 312°.

Zelinsky, Turowa-Pollak, *Ber.*, 1929, **62**, 1659.

Hexabromophloroglucinol (*Hexabromocyclohexantrione*-1 : 3 : 5)



$C_6O_3Br_6$ MW, 600

Plates from CS_2–pet. ether. M.p. 146–7°. Very sol. Et_2O, $CHCl_3$, hot AcOH, C_6H_6.

Zinke, Kegel, *Ber.*, 1890, **23**, 1729.

Hexabromostearic Acid (*Linolenic acid hexabromide*)

$CH_3·CH_2·CHBr·CHBr·CH_2·CHBr·CHBr$
$HOOC·[CH_2]_7·CHBr·CHBr·CH_2$

$C_{18}H_{30}O_2Br_6$ MW, 758

α-Form:

Micro-needles from C_6H_6. M.p. 180–1° (185°). Spar. sol. EtOH, AcOH, $CHCl_3$, C_6H_6. Zn ⟶ α- and β-linolenic acids. Forms alkaloid salts.

Me ester: $C_{19}H_{32}O_2Br_6$. MW, 772. M.p. 157–8°.
Et ester: $C_{20}H_{34}O_2Br_6$. MW, 786. M.p. 151·5–152·5°.
Propyl ester: $C_{21}H_{36}O_2Br_6$. MW, 800. M.p. 144–6°.
n-*Butyl ester*: $C_{22}H_{38}O_2Br_6$. MW, 814. M.p. 143°.
Quinine salt: m.p. 169°.
Strychnine salt: m.p. 224–6°.
Morphine salt: m.p. 185°.
Narcotine salt: m.p. 184°.

β-Form:

Liq. Zn ⟶ β-linolenic acid.

γ-Form:

Needles from C_6H_6. M.p. 195–6° decomp. Sol. hot EtOH, hot AcOH. Spar. sol. EtOH, Et_2O, AcOH, $CHCl_3$, pet. ether. Insol. H_2O.

Coffey, *J. Chem. Soc.*, 1921, **119**, 1308, 1410.
Erdmann, Bedford, *Ber.*, 1909, **42**, 1329.
Stanfield, Schierz, *J. Am. Chem. Soc.*, 1932, **54**, 4358.
Vincente, West, *Chem. Abstracts*, 1928, **22**, 4105.
Heiduschka, Lüft, *Arch. Pharm.*, 1919, **257**, 50.

Hexachloroacetone (*Hexachloropropanone*)

$Cl_3C{\cdot}CO{\cdot}CCl_3$

C_3OCl_6 MW, 265

M.p. − 2°. B.p. 202–4°. D_{12}^{12} 1·7444. Slightly sol. H_2O giving a monohydrate, m.p. 15°. H_2O at 120° ⟶ $CHCl_3$ + $CCl_3{\cdot}COOH$. NH_3 ⟶ $CHCl_3$ + $CCl_3{\cdot}CO{\cdot}NH_2$.

Cloëz, *Ann. chim. phys.*, 1886, **9**, 202.
Zaharia, *Chem. Zentr.*, 1896, I, 100.

Hexachloroacetylacetone (1 : 1 : 1 : 5 : 5 : 5-*Hexachloropentandione*-2 : 4, 1 : 1 : 1 : 5 : 5 : 5-*hexachloro*-2 : 4-*diketopentane*)

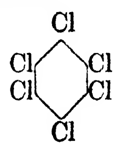
$CCl_3{\cdot}CO{\cdot}CH_2{\cdot}CO{\cdot}CCl_3$

$C_5H_2O_2Cl_6$ MW, 307

B.p. 190–5°/20 mm.

Combes, *Ann. chim. phys.*, 1887, **12**, 236.

Hexachlorobenzene

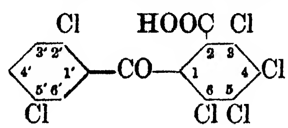


C_6Cl_6 MW, 285

Needles from C_6H_6–EtOH. M.p. 227°. B.p. 309–10°/725 mm. $D^{23\cdot5}$ 2·044, D^{236} 1·5691. Sublimes in long needles. Sol Et_2O, $CHCl_3$, C_6H_6. Spar. sol. EtOH.

Graebe, *Ann.*, 1891, **263**, 30.
Fichter, Glantzstein, *Ber.*, 1916, **49**, 2477.

3 : 4 : 5 : 6 : 2′ : 5′-Hexachlorobenzophenone-2-carboxylic Acid (o-[2 : 5-*Dichlorobenzoyl*]-2 : 3 : 4 : 5-*tetrachlorobenzoic acid*)



$C_{14}H_4O_3Cl_6$ MW, 433

Cryst. from MeOH. M.p. 238–9°. Sol. EtOH. Hot conc. H_2SO_4 ⟶ 1 : 2 : 3 : 4 : 5 : 8-hexachloroanthraquinone.

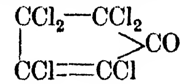
Chloride: $C_{14}H_3O_2Cl_7$. MW, 451·5. Cryst. from AcOH. M.p. 181–4°.

Hofmann, *Monatsh.*, 1915, **36**, 813.

Hexachlorocyclohexane.
See Benzene hexachloride.

Hexachlorocyclohexenedione-3 : 5.
See Hexachlororesorcinol.

Hexachlorocyclopentenone-3

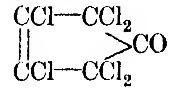


C_5OCl_6 MW, 289

Plates. M.p. 28°. B.p. 162–3°/75 mm., 250·5–251°/740·5 mm. D_4^{20} 1·7616. n_D^{20} 1·56626.

Zinke, Küster, *Ber.*, 1890, **23**, 2213.

Hexachlorocyclopentenone-4



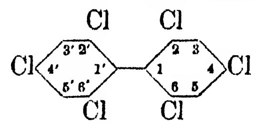
C_5OCl_6 MW, 289

Cryst. from EtOH or AcOH. M.p. 92°. B.p. 148°/75 mm. Very sol. Et_2O, $CHCl_3$, C_6H_6. Sol. EtOH, AcOH. Sublimes in plates.

See previous reference.

Hexachlorodiketopentane.
See Hexachloroacetylacetone.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexachlorodiphenyl



$C_{12}H_4Cl_6$ MW, 361

M.p. 112°. Sol. AcOH, C_6H_6. Mod. sol. EtOH. Insol. ligroin.

van Roosmalen, *Rec. trav. chim.*, 1934, **53**, 373.
Ullmann, *Ann.*, 1904, **332**, 56.

3 : 4 : 5 : 3′ : 4′ : 5′-Hexachlorodiphenyl.
M.p. 198°. Sol. AcOH, C_6H_6. Mod. sol. EtOH. Sublimes. HNO_3 ⟶ 2 : 2′-dinitro deriv.

van Roosmalen, *Rec. trav. chim.*, 1934, **53**, 372.

Hexachloroethane (*Perchloroethane*)

$Cl_3C{\cdot}CCl_3$

C_2Cl_6 MW, 237

Exists in three cryst. modifications. Rhombohedra from EtOH–Et_2O. M.p. 186·8–187·4° (sealed tube). B.p. 185·5°/776·7 mm. Heat of comb. C_p 110 Cal.

Hofmann, Seiler, *Ber.*, 1905, **38**, 3058.
Miller, *Ind. Eng. Chem.*, 1925, **17**, 1182.

1 : 2 : 3 : 4 : 5 : 6-Hexachloro-*n*-hexane

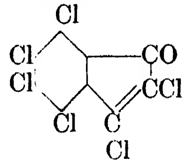
$CH_2Cl{\cdot}[CHCl]_4{\cdot}CH_2Cl$

$C_6H_8Cl_6$ MW, 293

Cryst. from pet. ether. M.p. 137·5°. B.p. 180–5°/30 mm. $[\alpha]_D$ + 18·5° in C_6H_6.

Mourques, *Compt. rend.*, 1890, **111**, 112.

Hexachloroindone-3 (*Perchloroindone*)



C_9OCl_6 MW, 337

Golden-yellow leaflets from EtOH or AcOH. M.p. 148–9°. Sol. CS_2, hot EtOH, hot AcOH. Spar. sol. Et_2O, $CHCl_3$, C_6H_6, pet. ether.
Oxime: m.p. 255° decomp.

Zincke, Pfaffendorf, *Ann.*, 1912, **394**, 22.
Zincke, Fuchs, *Ber.*, 1893, **26**, 521.

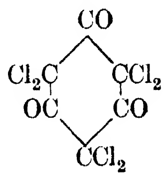
Hexachloroperylene

$C_{20}H_6Cl_6$ MW, 459

Yellow cryst. from $PhNO_2$. M.p. 356–7°. Very sol. aniline, Py, xylene, boiling $PhNO_2$. Spar. sol. EtOH, Et_2O, Me_2CO, AcOH. Sol. conc. H_2SO_4 with blue col.

Zinke, Pongratz, Funke, *Ber.*, 1925, **58**, 332.
Zinke, Funke, Lorber, *Ber.*, 1927, **60**, 580.

Hexachlorophloroglucinol (*Hexachlorocyclohexantrione*-1 : 3 : 5)



$C_6O_3Cl_6$ MW, 333

Plates. M.p. 48°. B.p. 268–9°, 150–1°/18–20 mm. Very sol. Et_2O, $CHCl_3$, CS_2, C_6H_6. $NH_3 \longrightarrow$ dichloroacetamide.

Zinke, Kegel, *Ber.*, 1889, **22**, 1473; 1890, **23**, 230.

1 : 1 : 1 : 2 : 3 : 3-Hexachloropropane

$CHCl_2{\cdot}CHCl{\cdot}CCl_3$

$C_3H_2Cl_6$ MW, 251

B.p. 216°, 145°/90 mm. D_4^{34} 1·6980. n_D^{17} 1·5250. Alc. KOH $\longrightarrow$ 1 : 1 : 2 : 3 : 3-pentachloropropylene.

Prins, *J. prakt. Chem.*, 1914, **89**, 417; D.R.P., 261,689, (*Chem. Zentr.*, 1913, II, 394).

1 : 1 : 2 : 2 : 3 : 3-Hexachloropropane

$CHCl_2{\cdot}CCl_2{\cdot}CHCl_2$

$C_3H_2Cl_6$ MW, 251

B.p. 218·5°. D_4^{34} 1·7137. n_D^{18} 1·5262. Alc. KOH $\longrightarrow$ 1 : 1 : 2 : 3 : 3-pentachloropropylene.

Prins, *J. prakt. Chem.*, 1914, **89**, 422.

Hexachloropropylene (*Hexachloropropene*)

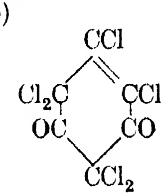
$CCl_3{\cdot}CCl{:}CCl_2$

C_3Cl_6 MW, 249

B.p. 209–10°, 122–3°/50 mm., 99°/15 mm. D_4^{20} 1·7652. n_D^{20} 1·5091. Hot conc. $H_2SO_4 \longrightarrow$ trichloroacrylic acid.

Böeseken, van der Scheer, de Voogt, *Rec. trav. chim.*, 1915, **34**, 78.
Fritsch, *Ann.*, 1897, **297**, 314.

Hexachlororesorcinol (*Hexachlorocyclohexenedione*-3 : 5)

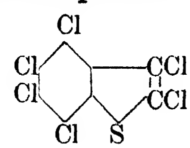


$C_6O_2Cl_6$ MW, 317

Plates or prisms from AcOH. M.p. 115°. B.p. 159–60°/13–15 mm. Sol. Et_2O, $CHCl_3$, C_6H_6. Spar. sol. pet. ether.

Zincke, Fuchs, *Ber.*, 1892, **25**, 2687.

Hexachlorothionaphthene

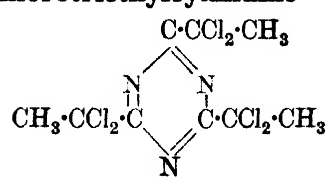


C_8Cl_6S MW, 341

Needles from ligroin. M.p. 158°.

Barger, Ewins, *J. Chem. Soc.*, 1908, **93**, 2088.

Hexachlorotriethylcyanidine



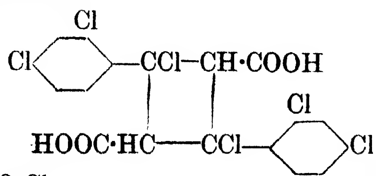
$C_9H_9N_3Cl_6$ MW, 372

Polymer of 1 : 1-dichloropropionitrile. Plates from EtOH. M.p. 73·5°. Insol. H_2O. Sol. 7·17 parts EtOH at 26°. Decomp. on heating.

$NH_3 \longrightarrow$ dichloropropionamide. $K_2S \longrightarrow$ trithioacetylcyanidine.

Otto, Voigt, *J. prakt. Chem.*, 1887, **36**, 79.
Troeger, Hornung, *J. prakt. Chem.*, 1898, **57**, 357.

Hexachlorotruxillic Acid (2 : 4-*Dichloro*-2 : 4-*di*[2 : 4-*dichlorophenyl*]-*cyclobutane*-1 : 3-*dicarboxylic acid*)



$C_{18}H_{10}O_4Cl_6$ MW, 503

α-Form :

Needles from EtOH. M.p. 316°. Dist. ⟶ 2 : 4 : β-trichlorocinnamic acid.

Di-Me ester : $C_{20}H_{14}O_4Cl_6$. MW, 531. Needles from AcOH. M.p. 215°. Spar. sol. hot EtOH.

Di-Et ester : $C_{22}H_{18}O_4Cl_6$. MW, 559. Cryst. from $CHCl_3$. M.p. 178°.

γ-Form :

Needles from EtOH. M.p. 285°. Sol. EtOH, AcOH, hot C_6H_6. Dist. ⟶ 2 : 4 : β-trichlorocinnamic acid.

Di-Me ester : needles from EtOH. M.p. 180–2°. Sol. hot. MeOH, EtOH.

Krauss, *Ber.*, 1904, **37**, 219.

Hexacontane

$CH_3{\cdot}[CH_2]_{58}{\cdot}CH_3$

$C_{60}H_{122}$ MW, 842

Cryst. from butyl acetate. M.p. 98·5–99·3°. B.p. 250°.

Carothers, Hill, Kirby, Jacobson, *J. Am. Chem. Soc.*, 1930, **52**, 5279.

Hexacosane

$CH_3{\cdot}[CH_2]_{24}{\cdot}CH_3$

$C_{26}H_{54}$ MW, 366

Cryst. from Et_2O. M.p. 56·1° (56·5°, 59–60°). B.p. 262°/15 mm., 199°/0·4 mm. n_D^{65} 1·43332. Sol. C_6H_6. Spar. sol. EtOH.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 528.
Garner, van Bibber, King, *J. Chem. Soc.*, 1931, 1537.

Hexacosanic Acid (*See* Cerotic Acid. This name is sometimes given to the pure hexacosanic acid)

$CH_3{\cdot}[CH_2]_{23}{\cdot}CH_2{\cdot}COOH$

$C_{26}H_{52}O_2$ MW, 396

Constituent of various oils and waxes, *e.g.*, beeswax, Chinese insect wax, montan wax. M.p. 87·7–87·9° (88–9°). D_4^{100} 0·8198. n_D^{100} 1·4301.

Et ester : $C_{28}H_{56}O_2$. MW, 424. M.p. 59·5–59·8°.

Anhydride : $C_{52}H_{102}O_3$. MW, 774. M.p. 89·3–89·5°. D_4^{100} 0·8188. n_D^{100} 1·4337.

Nitrile : pentacosyl cyanide. $C_{26}H_{51}N$. MW, 377. M.p. 61–2°.

Levene, Taylor, *J. Biol. Chem.*, 1924, **59**, 905.
Bleyberg, Ulrich, *Ber.*, 1931, **64**, 2512.

Hexacosanol.

Ceryl Alcohol, *q.v.*

Hexacosyl iodide (*Ceryl iodide, iodohexacosane*)

$CH_3{\cdot}[CH_2]_{24}CH_2I$

$C_{26}H_{53}I$ MW, 492

M.p. 58·2–58·5°.

Bleyberg, Ulrich, *Ber.*, 1931, **64**, 2512.

Hexacyanogen.

See Cyanuric cyanide.

Hexadecanal.

See Palmitic Aldehyde.

***n*-Hexadecane** (*Cetane*)

$CH_3{\cdot}[CH_2]_{14}{\cdot}CH_3$

$C_{16}H_{34}$ MW, 226

Cryst. from Me_2CO. M.p. 18·13°. B.p. 105–10°/0·1 mm.

Carey, Smith, *J. Chem. Soc.*, 1933, 346.

Hexadecanol-1.

See Cetyl Alcohol.

Hexadecanol-3.

See Ethyltridecylcarbinol.

Hexadecanone-2.

See Methyl tetradecyl Ketone.

Hexadecanone-3.

See Ethyl tridecyl Ketone.

1-Hexadecenoic Acid.

See Gaidic Acid

Hexadecylacetylene (*Cetylacetylene, octadecine*-1)

$CH_3{\cdot}[CH_2]_{15}{\cdot}C{\vdots}CH$

$C_{18}H_{34}$ MW, 250

Cryst. from EtOH. M.p. 22·5° (26°). B.p. 180°/15 mm. D_0^0 0·8696.

Picon, *Compt. rend.*, 1919, **169**, 32.
Krafft, Reuter, *Ber.*, 1892, **25**, 2248.

***n*-Hexadecyl Alcohol.**

See Cetyl Alcohol.

***n*-Hexadecylamine.**

See Cetylamine.

1-Hexadecylene (*Hexadecene, cetylene, cetene*)

$CH_3{\cdot}[CH_2]_{13}{\cdot}CH{:}CH_2$

$C_{16}H_{32}$ MW, 224

M.p. 2·2°. B.p. 157·5°/15 mm., 152–4°/13 mm. D_4^{20} 0·7825. n_D^{20} 1·4419.

Waterman, van't Spijker, van Westen, *Rec. trav. chim.*, 1929, **48**, 1103.
Landa, *Bull. soc. chim.*, 1928, **43**, 1087.

Hexadecylenic Acid.
See Gaidic Acid.

Hexadecylic Acid.
See Palmitic Acid.

Hexadecylic Aldehyde.
See Palmitic Aldehyde.

1 : 3-Hexadienal.
See Sorbic Aldehyde.

1 : 2-Hexadiene (*Propylallene, butylidene-ethylene*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}C{:}CH_2$

C_6H_{10} MW, 82

B.p. 78°. D^{17} 0·7198. n_D^{17} 1·4298. Does not form Cu deriv. $HgCl_2 \longrightarrow$ white ppt.

Bouis, *Ann. chim.*, 1928, **9**, 441.
Bourguel, Piaux, *Bull. soc. chim.*, 1932, **51**, 1047.

1 : 3-Hexadiene (*3-Propylidene-propylene, 1-vinylbutylene-1, 1-ethyl-1 : 3-butadiene*)

$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH{:}CH_2$

C_6H_{10} MW, 82

B.p. 72–5°. D_4^{13} 0·7152. n_D^{12} 1·4416.

Tetrabromide : 1 : 2 : 3 : 4-tetrabromohexane. M.p. 19°.

Prévost, *Ann. chim.*, 1928, **10**, 176.

1 : 5-Hexadiene.
See Diallyl.

2 : 4-Hexadiene.
See Dipropenyl.

2 : 4-Hexadiene-2-carboxylic Acid.
See 1-Methylsorbic Acid.

2 : 4-Hexadienol-1 (*3-Propenylallyl alcohol, 4-ethylidenecrotonyl alcohol, sorbyl alcohol*)

$CH_3{\cdot}CH{:}CH{\cdot}CH{:}CH{\cdot}CH_2OH$

$C_6H_{10}O$ MW, 98

Needles. M.p. 30·5–31·5°. B.p. 76–7°/12 mm. Volatile in steam.

Diphenylurethane : cryst. from pet. ether. M.p. 78–9°.

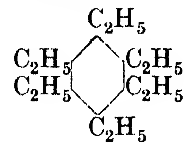
3 : 5-Dinitrobenzoyl : yellow needles from pet. ether. M.p. 85°.

Reichstein, Ammann, Trivelli, *Helv. Chim. Acta*, 1932, **15**, 264.

1 : 5-Hexadienol-3.
See Vinylallylcarbinol.

Hexadi-ine.
See Dipropargyl.

Hexa-ethylbenzene



$C_{18}H_{30}$ MW, 246

Cryst. from EtOH. M.p. 129°. B.p. 298°. D^{130} 0·830.

Wertyporoch, Firla, *Ann.*, 1933, **500**, 293.

Hexafluoroethane

$F_3C{\cdot}CF_3$

C_2F_6 MW, 138

M.p. − 106·3°. B.p. − 79 to − 78·6°. Crit. temp. 19·7°. 28·3 c.cs dissolve in 100 c.cs abs. EtOH. 66·2 c.cs dissolve in 100 c.cs CCl_4. Supports comb. of Na and Mg.

Swarts, *Bull. soc. chim. Belg.*, 1933, **42**, 114.
Ruff, Bretschneider, *Z. anorg. allgem. Chem.*, 1933, **210**, 173, (*Chem. Abstracts*, 1933, **27**, 2131).
Frigidaire Corporation, E.P., 389,619, (*Chem. Zentr.*, 1933, II, 131).

Hexahydroacetanilide.
See under Cyclohexylamine.

Hexahydroacetophenone.
See Acetocyclohexane.

Hexahydro-o-aminoethylbenzene.
See 2-Ethylcyclohexylamine.

Hexahydroaniline.
See Cyclohexylamine.

Hexahydroanisole.
See under Cyclohexanol.

Hexahydroanthracene

$C_{14}H_{16}$ MW, 184

Needles from 50% EtOH. M.p. 60–1°. Very sol. EtOH.

Clemmensen, *Ber.*, 1914, **47**, 685.

β-Hexahydroanthracene

$C_{14}H_{16}$ MW, 184

Plates. M.p. 66·5°. B.p. 303–6°. Very sol. hot Et_2O, AcOH, C_6H_6.

Godchot, *Ann. chim. phys.*, 1907, **12**, 504.

γ-Hexahydroanthracene

$C_{14}H_{16}$ MW, 184

Plates. M.p. 63°. B.p. 290°. Very sol. EtOH, Et_2O, C_6H_6. $HNO_3 \longrightarrow$ anthracene-9:10-dihydride.

See previous reference.

Hexahydroanthrahydroquinone

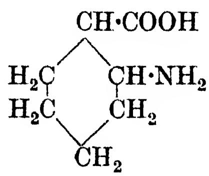
$C_{14}H_{16}O_2$ MW, 216

White needles from EtOH. M.p. 229–30°.

Diacetyl: white needles from EtOH. M.p. 212–14° (215–16°).

Skita, *Ber.*, 1925, **58**, 2695; *Ber.*, 1927, **60**, 2526.

Hexahydroanthranilic Acid (o-*Aminohexahydrobenzoic acid, aminocyclohexane*-o-*carboxylic acid*)



$C_7H_{13}O_2N$ MW, 143

Needles from dil. EtOH. M.p. 274° decomp. Prac. insol. EtOH, Et_2O. $HNO_2 \longrightarrow$ hexahydrosalicylic acid.

B,HCl: m.p. 203–4° (188–90°).

Et ester: $C_9H_{17}O_2N$. MW, 171. B.p. 148–51°/30 mm. Sol. H_2O, EtOH. Decomp. on standing in air. *Hydrochloride*: m.p. 156°. Sol. H_2O.

Amide: $C_7H_{14}ON_2$. MW, 142. Needles. M.p. 153–4°. Sol. H_2O. Insol. Et_2O, C_6H_6. *Hydrobromide*: m.p. 257–9°.

Einhorn, Meyenberg, *Ber.*, 1894, **27**, 2470.
Einhorn, Bull, *Ann.*, 1897, **295**, 207.
Houben, Pfau, *Ber.*, 1916, **49**, 2298.

Hexahydroanthraquinone

$C_{14}H_{14}O_2$ MW, 214

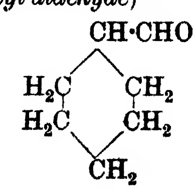
Yellow needles from MeOH. M.p. 170° (175°).

Dibromide: yellow prisms from MeOH. M.p. 118°.

Diacetyl: cryst. from AcOH or EtOH. M.p. 204–6°.

Skita, *Ber.*, 1925, **58**, 2694; 1927, **60**, 2526.

Hexahydrobenzaldehyde (*Aldehydocyclohexane, cyclohexyl aldehyde*)



$C_7H_{12}O$ MW, 112

B.p. 159·3°, 75–8°/20 mm. D_0^4 0·945. n_D^{19} 1·4495.

Diethylacetal: b.p. 109–10°/20 mm.

Oxime: needles from pet. ether. M.p. 90–1°. *Hydrochloride*: m.p. 107–8° decomp.

Semicarbazone: cryst. from H_2O. M.p. 176° (167–8°).

Wallach, Isaac, *Ann.*, 1906, **347**, 331.
Wood, Comley, *J. Soc. Chem. Ind.*, 1923, **42**, 249T.

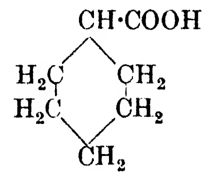
Hexahydrobenzanilide.

See under Cyclohexylamine.

Hexahydrobenzene.

See Cyclohexane.

Hexahydrobenzoic Acid (*Cyclohexane-carboxylic acid*)



$C_7H_{12}O_2$ MW, 128

Prisms. M.p. 29–30°. B.p. 232–3°, 105–6°/4 mm., 115–17°/13 mm. D_4^{38} 1·0251. n_D^{38} 1·4520. $k = 1{\cdot}32 \times 10^{-5}$ at 25°. Very sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O.

Me ester: $C_8H_{14}O_2$. MW, 142. B.p. 183°, 73°/15 mm. D_4^{15} 0·9954. n_D^{15} 1·45372.

Et ester: $C_9H_{16}O_2$. MW, 156. B.p. 196, 82–3°/12 mm. D_4^{15} 0·9672. n_D^{15} 1·45012.

Chloride: hexahydrobenzoyl chloride, $C_7H_{11}OCl$. MW, 146·5. B.p. 179–80° (184°), 76°/17 mm. D_4^{15} 1·0962. n_D^{15} 1·47662.

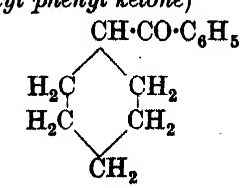
Amide: hexahydrobenzamide. $C_7H_{13}ON$. MW, 127. Prisms from H_2O. M.p. 185–6°. Very sol. EtOH, Et_2O.

Anhydride: $C_{14}H_{22}O_3$. MW, 238. Cryst. M.p. 25°. B.p. 280–3°. D_4^{15} 1·0585. n_D^{15} 1·48189.

Nitrile: hexahydrobenzonitrile. $C_7H_{11}N$. MW, 109. B.p. 184–5°, 75–7°/16 mm. D_4^{25} 0·913. n_D^{25} 1·453.

Lumsden, *J. Chem. Soc.*, 1905, **87**, 90.
Hiers, Adams, *J. Am. Chem. Soc.*, 1926, **48**, 2392.
Grignard, Bellet, Courtot, *Ann. chim.*, 1919, **12**, 368.

Hexahydrobenzophenone (*Benzoylcyclohexane, cyclohexyl phenyl ketone*)

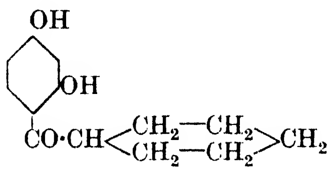


$C_{13}H_{16}O$ MW, 188

Needles from pet. ether. M.p. 59–60° (54°).
Semicarbazone : m.p. 175° (168–9°).
Oxime : *syn*- : needles from EtOH. M.p. 158. *Anti*- : prisms from EtOH. M.p. 111°.

Moureu, Mignonac, *Ann. chim.*, 1920, **14**, 335.
Meyer, Scharvin, *Ber.*, 1897, **30**, 1942.

Hexahydrobenzoylaminoacetic Acid.
See Hexahydrohippuric Acid.
Hexahydrobenzoylglycine.
See Hexahydrohippuric Acid.
4 - Hexahydrobenzoylresorcinol (*Cyclohexyl* 2:4-*dihydroxyphenyl ketone*, 2:4-*dihydroxybenzoylcyclohexane*, β-*resorcyl-cyclohexane*)

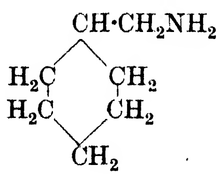


$C_{13}H_{16}O_3$ MW, 220

Cryst. from $CHCl_3$–ligroin. M.p. 115·5–116°. B.p. 200–2°/4 mm.

Talbot, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2040.

Hexahydrobenzyl Alcohol.
See Cyclohexylcarbinol.
Hexahydrobenzylamine (*Cyclohexylmethylamine*, ω-*aminohexahydrotoluene*)

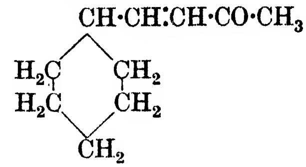


$C_7H_{15}N$ MW, 113

B.p. 163·5°. D_4^{14} 0·8747 (D_4^{20} 0·8702). n^{18} 1·4646.
N-*Benzoyl* : cryst. from EtOH.Aq. M.p. 98° (107–8°).
B,HCl : plates from H_2O. M.p. about 254°.
B,HAuCl₄ : yellow needles. M.p. 183°.
Picrate : yellow plates. M.p. about 184–6°.

Wallach, *Ann.*, 1907, **353**, 298.
Gutt, *Ber.*, 1907, **40**, 2068.
Skita, *Ber.*, 1924, **57**, 1977.

Hexahydrobenzylideneacetone (1-*Cyclohexyl*-2-*acetylethylene*, *methyl hexahydrostyryl ketone*, ω-*acetohexahydrostyrene*)

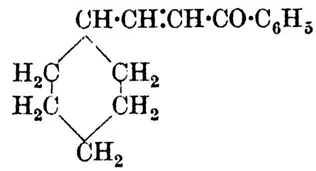


$C_{10}H_{16}O$ MW, 152

B.p. 230–2°, 112–16°/17 mm., 103°/9 mm.
Semicarbazone : m.p. 168°.

Kon, *J. Chem. Soc.*, 1926, 1798.

Hexahydrobenzylideneacetophenone (*Hexahydrobenzalacetophenone*, ω-*benzoylhexahydrostyrene*, *phenyl hexahydrostyryl ketone*)

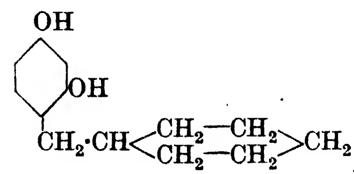


$C_{15}H_{18}O$ MW, 214

Needles from EtOH. M.p. 167–8°. Very sol. Et_2O, Me_2CO. Sol. EtOH.

Frézouls, *Compt. rend.*, 1912, **154**, 1707.

4-Hexahydrobenzylresorcinol (2 : 4-*Dihydroxy*-ω-*cyclohexyltoluene*, *cyclohexyl*-2 : 4-*dihydroxyphenyl-methane*, 2 : 4-*dihydroxybenzylcyclohexane*)

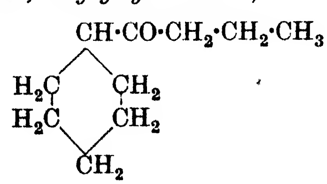


$C_{13}H_{18}O_2$ MW, 206

Cryst. from $CHCl_3$. M.p. 116·5–117·5°.

Talbot, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2040.

Hexahydrobutyrophenone (*Propyl cyclohexyl ketone*, *butyrylcyclohexane*)

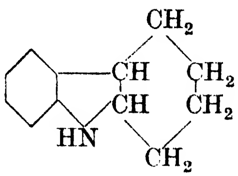


$C_{10}H_{18}O$ MW, 154

B.p. 94°/13 mm.
Semicarbazone : m.p. 155°.

Douris, *Compt. rend.*, 1913, **157**, 57.
Darzens, Rost, *Compt. rend.*, 1911, **153**, 774.

Hexahydrocarbazole (*Carbazoline*)



$C_{12}H_{15}N$ MW, 173

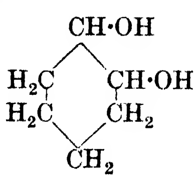
Cis :
Needles from EtOH. M.p. 99°. B.p. 280°/769 mm. Sol. EtOH, Et_2O, C_6H_6, dil. HCl.
Acetyl : m.p. 98°.
Benzoyl : colourless needles from EtOH. M.p. 106°. B.p. 270°/10 mm.
Picrate : yellow needles. M.p. 166°.

Trans :
Colourless needles from EtOH. M.p. 127°. B.p. 286°/769 mm. Readily sol. dil. HCl.
Acetyl : long needles from EtOH.Aq. M.p. 113°.
Benzoyl : colourless needles from EtOH. M.p. 133°.
Picrate : yellow needles from EtOH. M.p. 179°.

Gurney, Perkin, Plant, *J. Chem. Soc.*, 1927, **130**, 2676.

Hexahydrocarvacrol.
See Carvomenthol.

Hexahydrocatechol (*Cyclohexane*-1 : 2-*diol*, 1 : 2-*dihydroxycyclohexane*)



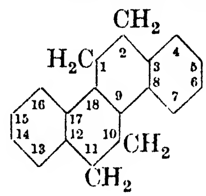
$C_6H_{12}O_2$ MW, 116

Cis :
Cryst. from Et_2O. M.p. 98°. B.p. 116°/13 mm.
Acetone comp. : b.p. 182°, 78°/24 mm. D_4^{20} 0·980. n_{He}^{20} 1·4479.
Diacetyl : b.p. 118°/13 mm. $D_4^{19.5}$ 1·0836. $n_D^{19.5}$ 1·4429.
Dibenzoyl : m.p. 63·5°.
Di-phenylurethane : m.p. 185°.

Trans :
Cryst. from Me_2CO. M.p. 104°. B.p. 117°/13 mm.
Diacetyl : b.p. 113°/11·5 mm. D_4^{20} 1·077. n_{He}^{20} 1·4464.
Dibenzoyl : m.p. 94·5° (92°).
Di-phenylurethane : m.p. 212°.

Rothstein, *Ann. chim.*, 1930, **14**, 461.
Auwers, Dersch, *J. prakt. Chem.*, 1930, **124**, 235.
Lindemann, Lange, *Ann.*, 1930, **483**, 31.
Schering-Kahlbaum, D.R.P., 574,838, (*Chem. Abstracts*, 1933, **27**, 4540).

1 : 2 : 9 : 10 : 11 : 18-Hexahydrochrysene



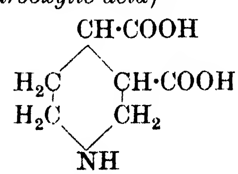
$C_{18}H_{18}$ MW, 234

Cis :
Prisms from EtOH. M.p. 75°. B.p. 208°/12 mm.

Trans :
Prisms from butanol–EtOH. M.p. 115°. B.p. 223°/12 mm.

Ramage, Robinson, *J. Chem. Soc.*, 1933, 609.

Hexahydrocinchomeronic Acid (*Piperidine*-3 : 4-*dicarboxylic acid*)



$C_7H_{11}O_4N$ MW, 173

Mixture of *cis* and *trans*. Cryst. from H_2O. M.p. 256° decomp. Spar. sol. H_2O.
B,HCl : m.p. 237° decomp. Very spar. sol. H_2O. Sol. EtOH.
B,HAuCl$_4$: m.p. 205° decomp.
Heat with KOH ⟶ stable form. Also obtained in a similar manner from leuponic acid (*q.v.*).
Stable form : Cryst. from H_2O. M.p. 268–70° decomp. 275° (rapid heat.).
B,HCl : m.p. 240–2° decomp. Very sol. H_2O.
B,HAuCl$_4$: m.p. 205° decomp.

Koenigs, Wolff, *Ber.*, 1896, **29**, 2187.
Koenigs, *Ber.*, 1897, **30**, 1326.

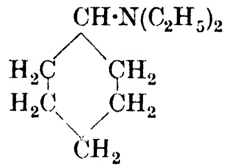
Hexahydrocresol.
See Methylcyclohexanol.

Hexahydrocumene.
See Isopropylcyclohexane.

Hexahydro-ψ-cumene.
See 1 : 2 : 4-Trimethylcyclohexane.

Hexahydrocymene.
See Menthane.

Hexahydrodiethylaniline (*Diethylcyclohexylamine*)



$C_{10}H_{21}N$ MW, 155

B.p. 191° (193°). D_0^0 0·872.
Picrate: cryst. M.p. 91–2°.

Darzens, *Compt. rend.*, 1909, **149**, 1003.
Skita, Berendt, *Ber.*, 1919, **52**, 1527.

Hexahydrodiphenyl.
See Phenylcyclohexane.

Hexahydrodurene.
See 1 : 2 : 4 : 5-Tetramethylcyclohexane.

Hexahydroethylaniline.
See *N*-Ethylcyclohexylamine.

Hexahydroethylcresol.
See Methylethylcyclohexanol.

Hexahydroethyltoluene.
See Methylethylcyclohexane.

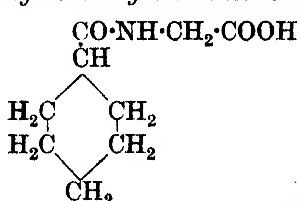
Hexahydrofluorene

$C_{13}H_{16}$ MW, 172

Constituent of certain coal oils. Oily liq. with violet fluor. B.p. 240–50°, 110–20°/10 mm. D^{20} 0·945. Sol. Et_2O, AcOH, C_6H_6, $CHCl_3$. Spar. sol. EtOH, pet. ether. Insol. H_2O. Spar. volatile in steam. Polymerises on long boiling. Ox. ⟶ acetic, propionic, adipic, and oxalic acids.

Pictet, Ramseyer, *Ber.*, 1911, **44**, 2491.
Pictet, *Ann. chim. phys.*, 1918, [9], **10**, 275, 303.

Hexahydrohippuric Acid (*Hexahydrobenzoylglycine, hexahydrobenzoylaminoacetic acid*)



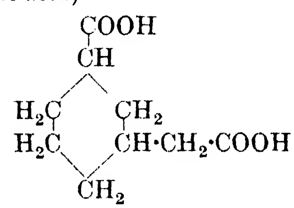
$C_9H_{15}O_3N$ MW, 185

Needles from H_2O. M.p. 152°. Sol. H_2O, EtOH, hot Et_2O.
Me ester: $C_{10}H_{17}O_3N$. MW, 199. Needles. M.p. 100–1°.
Et ester: $C_{11}H_{19}O_3N$. MW, 213. Needles. M.p. 75–6°.
Amide: $C_9H_{16}O_2N_2$. MW, 184. Cryst. from H_2O. M.p. 195–6°.

Godchot, *Bull. soc. chim.*, 1911, **9**, 262.

Hexahydrohomocatechol.
See 4-Methylcyclohexandiol-1 : 2.

Hexahydrohomoisophthalic Acid (*3-Carboxycyclohexylacetic acid, 3-carboxymethylhexahydrobenzoic acid*)

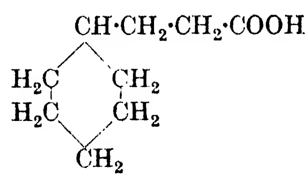


$C_9H_{14}O_4$ MW, 186

Needles from H_2O. M.p. 158°. Sol. Me_2CO. Spar. sol. C_6H_6, pet. ether. Stable to cold $KMnO_4$. Distilled over $Ca(OH)_2$ ⟶ bicyclo-1 : 2 : 3-octanone-6.

Komppa, Hirn, *Ber.*, 1903, **36**, 3611.

Hexahydro-hydrocinnamic Acid (*2-Hexahydrophenylpropionic acid, 2-cyclohexylpropionic acid*)

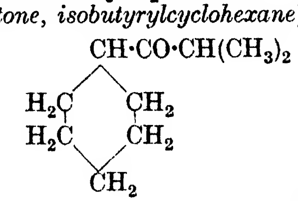


$C_9H_{16}O_2$ MW, 156

B.p. 275–8°, 143·5°/11 mm. D_4^{20} 0·9966. n_D^{20} 1·4634. $k = 1{\cdot}34 \times 10^{-5}$.
Amide: $C_9H_{17}ON$. MW, 155. Needles from MeOH. M.p. 120°.

Ipatiew, *Ber.*, 1909, **42**, 2097.
Zelinsky, *Ber.*, 1908, **41**, 2676.

Hexahydroisobutyrophenone (*Isopropyl cyclohexyl ketone, isobutyrylcyclohexane*)

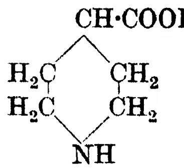


$C_{10}H_{18}O$ MW, 154

B.p. 83°/11 mm.

Faworski, Charitonowa, *J. prakt. Chem.*, 1913, **88**, 695.

Hexahydroisonicotinic Acid (*Piperidine-4-carboxylic acid, isonipecotic acid*)

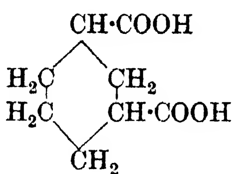


$C_6H_{11}O_2N$ MW, 129

Needles from H_2O. M.p. above 320°. Sol. H_2O. Insol. EtOH.
B,HCl: m.p. 293° decomp.
Me ester: $C_7H_{13}O_2N$. MW, 143. *Hydrochloride*: m.p. 169°.
B_2,H_2PtCl_6: m.p. 239–40° decomp.
Nitroso deriv.: needles. M.p. 101°.
p-*Toluenesulphonyl*: m.p. 170°.

Freudenberg, *Ber.*, 1918, **51**, 1673.
Hanousek, Prelog, *Chem. Abstracts*, 1932, **26**, 5302.

Hexahydroisophthalic Acid (*Cyclohexane-1 : 3-dicarboxylic acid*)



$C_8H_{12}O_4$ MW, 172

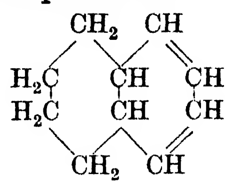
Cis:
Needles from conc. HCl. M.p. 187–9°. Very sol. H_2O, EtOH, C_6H_6. Sol. Et_2O. Spar. sol. pet. ether. $k = 5{\cdot}34 \times 10^{-5}$ at 25°. Conc. HCl at 180° ⟶ *trans*-form.
Di-Me ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 263°. D_4^{20} 1·048. n_D^{20} 1·452.
Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 288°, 142°/11 mm. D_4^{20} 1·045. n_D^{20} 1·452.
Anhydride: $C_8H_{10}O_3$. MW, 154. B.p. 304°.
Dianilide: m.p. 298–9°.

Trans:
dl-.
Needles from H_2O. M.p. 148°. Sol. hot H_2O. $k = 3{\cdot}45 \times 10^{-5}$ at 25°. Heat with CH_3COCl ⟶ anhydride of *cis*-form.
Di-Et ester: b.p. 142°/12 mm. D^{20} 1·047. n_{He}^{20} 1·453.
d-.
M.p. 134°. $[\alpha]_D^{22}$ + 23·46°.
l-.
M.p. 134°. $[\alpha]_D^{22}$ − 23·10°.

Böeseken, Peek, *Rec. trav. chim.*, 1925, **44**, 841.
Goodwin, Perkin, *J. Chem. Soc.*, 1905, **87**, 848.
Baeyer, Villiger, *Ann.*, 1893, **276**, 259.
Willstätter, Jaquet, *Ber.*, 1918, **51**, 777.

Hexahydromesitylene.
See 1 : 3 : 5-Trimethylcyclohexane.

Hexahydronaphthalene

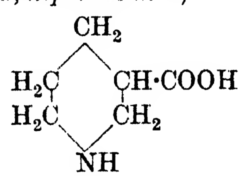


$C_{10}H_{14}$ MW, 134

B.p. 200°. D^{23} 0·934. $n_D^{16\cdot4}$ 1·526.

Agrestini, *Gazz. chim. ital.*, 1882, **12**, 495.
Lossen, Zander, *Ann.*, 1884, **225**, 112.

Hexahydronicotinic Acid (*Piperidene-3-carboxylic acid, nipecotic acid*)



$C_6H_{11}O_2N$ MW, 129

Cryst. M.p. 261° decomp. Sol. H_2O. Insol. EtOH, Et_2O.
B,HCl: cryst. M.p. 240–1° decomp.
B_2,H_2PtCl_6: m.p. 228–9° decomp.
N-*Acetyl*: m.p. 289–90° decomp. p-*Toluenesulphonyl*: m.p. 167°.
Me ester: $C_7H_{13}O_2N$. MW, 143. Needles. M.p. 215–17°. Sol. H_2O, EtOH. *B,HCl*: m.p. 131–2°. *B_2,H_2PtCl_6*: m.p. 207–8°.
Et ester: $C_8H_{15}O_2N$. MW, 157. B.p. 102–4°/7 mm. D_{20}^{20} 1·0121. n_D^{19} 1·4592. *B,HCl*: m.p. 110–11°.
Nitroso deriv.: prisms from H_2O. M.p. 111–12°.
N-*Me deriv.*: methylpiperidine-3-carboxylic acid. $C_7H_{13}O_2N$. MW, 143. Cryst. + $1H_2O$. M.p. anhyd. 162–3°. *B,H_2PtCl_6*: prisms, m.p. 215–16°. *$B,HAuCl_4$*: m.p. 158–9°. *Me ester*: $C_8H_{15}O_2N$. MW, 157. Liq. Misc. with H_2O, EtOH, Et_2O. *B_2,H_2PtCl_6*: m.p. 233–5°.

Freudenberg, *Ber.*, 1918, **51**, 1668.
McElvain, Adams, *J. Am. Chem. Soc.*, 1923, **45**, 2738.
Jahns, *Arch. Pharm.*, 1891, **229**, 686.

Hexahydroperylene

$C_{20}H_{18}$ MW, 258

Leaflets. M.p. 183–4° (189°). Sublimes on careful heating. Dist.⟶ perylene. Red sol. in conc. H_2SO_4.

Zinke, Unterkreuter, *Monatsh.*, 1920, **40**, 405.
Zinke, Schniderschitsch, *Monatsh.*, 1929, **51**, 282.

Hexahydrophenanthrene

$C_{14}H_{16}$ MW, 184

Exists in two forms according to method of preparation.

(i) By hydrogen reduction. Yellowish liq. M.p. − 3°. B.p. 307°, 167°/13 mm. D^{15} 1·043. n_D^{15} 1·580. Sol. Et_2O, AcOH, C_6H_6, $CHCl_3$. Spar. sol. EtOH.

Picrate: m.p. 106°.

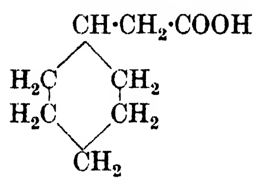
(ii) By hydriodic acid reduction. M.p. − 8°. B.p. 290°. D^{20} 1·045. n_D^{20} 1·57. Sol. Et_2O, AcOH, C_6H_6, CS_2, pet. ether. Spar. sol. EtOH. Does not form a picrate.

Schmidt, Mezger, *Ber.*, 1907, **40**, 4252.
Breteau, *Compt. rend.*, 1905, **140**, 942.

Hexahydrophenetole.
See under Cyclohexanol.

Hexahydrophenol.
See Cyclohexanol.

Hexahydrophenylacetic Acid (*Cyclohexylacetic acid*)



$C_8H_{14}O_2$ MW, 142

Needles from formic acid. M.p. 33° (27°). B.p. 244–6°, 156°/40 mm., 135°/13 mm., 117°/5 mm. D^{22} 0·9985, D^{78} 0·9671. $n_\alpha^{78\cdot 6}$ 1·438. $k = 2{\cdot}36 \times 10^{-5}$. Sol. most org. solvents. Spar. sol. H_2O.

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 200–2°. D^{14} 0·9896. n_D^{14} 1·459.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 211–12°, 100°/17 mm. D^{14} 0·9537. n_D^{14} 1·451.

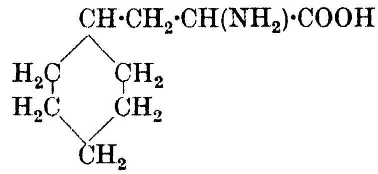
Amide: $C_8H_{15}ON$. MW, 141. Cryst. from MeOH.Aq. M.p. 171–2°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 215°. D^{18} 0·913. n_D^{18} 1·457.

Chloride: $C_8H_{13}OCl$. MW, 160·5. B.p. 98–100°/23 mm.

Sabatier, Murat, *Compt. rend.*, 1913, **156**, 425.
Darzens, Rost, *Compt. rend.*, 1911, **153**, 774.
Wallach, *Ann.*, 1908, **359**, 311.

Hexahydrophenyl-α-alanine (1-*Amino*-2-*cyclohexylpropionic acid*, 2-*cyclohexyl-α-alanine*)



$C_9H_{17}O_2N$ MW, 171

l-.

Needles from H_2O. M.p. 324°. $[\alpha]_D^{20}$ + 13·3°. Sol. H_2O, EtOH. Insol. Et_2O.

B,HCl: m.p. 246°. $[\alpha]_D^{20}$ + 13·4°.

Me ester: $C_{10}H_{19}O_2N$. MW, 185. N-*Benzoyl*: m.p. 104–5°.

Et ester: $C_{11}H_{21}O_2N$. MW, 199. B.p. 149–50°/11 mm. *Hydrochloride*: m.p. 196°.

N-*Benzoyl*: m.p. 124–5°. $[\alpha]_D^{20}$ − 12·68°.

N-p-*Nitrobenzoyl*: m.p. 158–9°.

d-.

B,HCl: m.p. 246°. $[\alpha]_{656\cdot 3}^{20}$ − 10·16°.

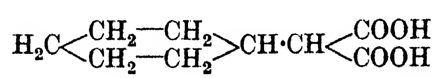
dl-.

B,HCl: m.p. 246°.

Karrer, Kehl, *Helv. Chim. Acta*, 1930, **13**, 58.
Waser, Brauchli, *Helv. Chim. Acta*, 1924, **7**, 751.

Hexahydrophenylenediamine.
See Diaminocyclohexane.

Hexahydrophenylmalonic Acid (*Cyclohexylmalonic acid*)



$C_9H_{14}O_4$ MW, 186

Prisms from formic acid. M.p. 176–8° decomp. Sol. Et_2O. Spar. sol. H_2O, $CHCl_3$. Insol. C_6H_6, pet. ether.

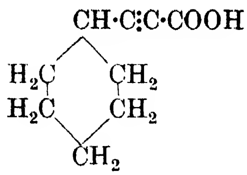
Di-Me ester: $C_{11}H_{18}O_4$. MW, 214. B.p. 121–2°/6 mm. D_{24}^{24} 1·074.

Di-Et ester: $C_{13}H_{22}O_4$. MW, 242. B.p. 151–3°/16 mm. D^{20} 1·028. n_α^{20} 1·449.

Et ester-nitrile: $C_{11}H_{17}O_2N$. MW, 195. B.p. 158–61°/24 mm.

Hope, Perkin, *J. Chem. Soc.*, 1909, **95**, 1363.
Freundler, Damond, *Compt. rend.*, 1905, **141**, 594.

Hexahydrophenylpropiolic Acid (*Cyclohexylpropiolic acid*)



$C_9H_{12}O_2$ MW, 152

B.p. 138–40°/6 mm.

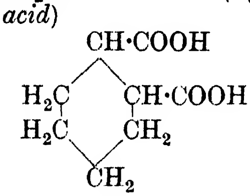
Me ester: $C_{10}H_{14}O_2$. MW, 166. B.p. 96°/5 mm.

Et ester: $C_{11}H_{16}O_2$. MW, 180. B.p. 105°/5 mm.

Darzens, Rost, *Compt. rend.*, 1909, **149**, 682.
Jegorowa, *J. Russ. Phys.-Chem. Soc.*, 1911, **43**, 1122.

2-Hexahydrophenylpropionic Acid.
See Hexahydro-hydrocinnamic Acid.

Hexahydrophthalic Acid (*Cyclohexane*-1:2-*dicarboxylic acid*)



$C_8H_{12}O_4$ MW, 172

Cis:

Needles from EtOH. M.p. 192°. Sol. H_2O, EtOH, Et_2O, C_6H_6. Conc. HCl at 180° ⟶ *trans*-form.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 133°/10 mm. D_4^{20} 1·054. n_{He}^{20} 1·453.

Anhydride: $C_8H_{10}O_3$. MW, 154. M.p. 32°. B.p. 145°/18 mm.

Trans:

dl-.

Leaflets from H_2O. M.p. 221°. Resolved by quinine into active components. Dist. ⟶ anhydride of *cis*-form.

Mono-Me ester: $C_9H_{14}O_4$. MW, 186. Cryst. from C_6H_6–pet. ether. M.p. 96°.

Di-Me ester: $C_{10}H_{16}O_4$. MW, 200. Cryst. from C_6H_6–pet. ether. M.p. 33°.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 135°/11 mm. D_4^{20} 1·040. n_{He}^{20} 1·450.

Anhydride: $C_8H_{10}O_3$. MW, 154. Needles from Et_2O. M.p. 140°.

Monoamide: $C_8H_{13}O_3N$. MW, 171. M.p. 196°.

d-.

Cryst. powder from H_2O. M.p. 179–83°. $[\alpha]_D$ + 18·2°. More sol. than the *dl*- acid.

Mono-Me ester: m.p. 39°. $[\alpha]_D$ + 26·5°.

Di-Me ester: oil. $[\alpha]_D$ + 28·7°.

l-.

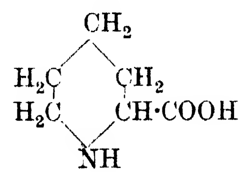
Cryst. powder from H_2O. M.p. 179–83°. $[\alpha]_D$ − 18·5°.

Mono-Me ester: m.p. 39°. $[\alpha]_D$ − 24·8°.

Di-Me ester: oil. $[\alpha]_D$ − 29·6°.

Baeyer, *Ann.*, 1890, **258**, 213.
Werner, Conrad, *Ber.*, 1899, **32**, 3053.
Auwers, Ottens, *Ber.*, 1924, **57**, 437.
Stoermer, Steinbeck, *Ber.*, 1932, **65**, 413.

Hexahydropicolinic Acid (*Piperidine*-2-*carboxylic acid, pipecolic acid*)



$C_6H_{11}O_2N$ MW, 129

d-.

Plates from EtOH. M.p. 270°. Sol. H_2O, EtOH.

Tartrate: cryst. M.p. 187°.

l-.

Plates. M.p. 270°. Sol. H_2O, EtOH.Aq. Spar. Sol. EtOH, Me_2CO, $CHCl_3$. Insol. Et_2O. Sublimes. Reacts neutral.

B,HCl: m.p. 256–8° decomp.

Tartrate: m.p. 187°.

dl-.

Plates from H_2O. M.p. 264°. Sol. H_2O, EtOH.

Me ester: $C_7H_{13}O_2N$. MW, 143. Needles. M.p. 191°. Sol. H_2O. Spar. sol. EtOH.

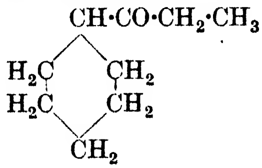
Et ester: $C_8H_{15}O_2N$. MW, 157. Oil. B.p. 216–17°, 107°/20 mm.

N-*Acetyl*: m.p. 219° decomp.

N-*Me deriv.*: methylpiperidine-2-carboxylic acid. $C_7H_{13}O_2N$. MW, 143. Oil. *B,HAuCl₄*: prisms from EtOH. M.p. 227–8° decomp.

Ladenburg, *Ber.*, 1891, **24**, 640.
Willstätter, *Ber.*, 1896, **29**, 390.
Hess, Leibrandt, *Ber.*, 1917, **50**, 385.

Hexahydropropiophenone (*Ethyl cyclohexyl ketone, propionylcyclohexane*)



$C_9H_{16}O$ MW, 140

Oil. B.p. 196°, 88–9°/19 mm. D_4^{20} 0·9105. n_D^{20} 1·4530.

Oxime: plates. M.p. 70–2° (72–3°).

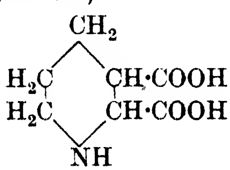
Semicarbazone: plates from EtOH. M.p. 150–2° (144–50°).

Meerwein, *Ann.*, 1919, **419**, 167.
Hell, Schaal, *Ber.*, 1909, **42**, 2232.

Hexahydropyrazine.
See Piperazine.

Hexahydropyridine.
See Piperidine.

Hexahydroquinolinic Acid (*Piperidine-2 : 3-dicarboxylic acid*)



$C_7H_{11}O_4N$ MW, 173

Cis:

M.p. 227°. Spar. sol. H_2O.

B,HCl: m.p. 239°. Very sol. H_2O.

Di-Et ester: $C_{11}H_{19}O_4N$. MW, 229. Oil. *B,HCl*: m.p. 204–5° decomp.

B,HAuCl₄: m.p. 195° decomp. Spar. sol. H_2O.

N-*Nitroso*: m.p. 138–9° decomp. Very sol. H_2O.

Trans:

M.p. 253° decomp. Spar. sol. H_2O.

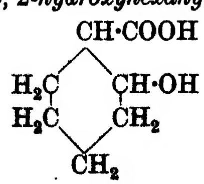
B,HCl: m.p. 221° decomp. Very sol. H_2O.

Di-Me ester: $C_9H_{15}O_4N$. MW, 201. *B,HCl*: m.p. 166–70° decomp.

N-*Nitroso*: m.p. 154° decomp.

Besthorn, *Ber.*, 1896, **29**, 2662.

Hexahydrosalicylic Acid (*Cyclohexanol-2-carboxylic acid, 2-hydroxyhexahydrobenzoic acid*)



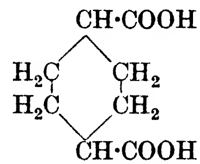
$C_7H_{12}O_3$ MW, 144

Needles from AcOEt. M.p. 111°. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6.

Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 120–1°/30 mm., 100–3°/10 mm.

Houben, Pfau, *Ber.*, 1916, **49**, 2295.
Einhorn, Meyenburg, *Ber.*, 1894, **27**, 2472.

Hexahydroterephthalic Acid (*Cyclohexane-1 : 4-dicarboxylic acid*)



$C_8H_{12}O_4$ MW, 172

Cis:

Leaflets from H_2O. M.p. 168–9°. Sol. EtOH, Et_2O, $CHCl_3$, hot H_2O. Heat of comb. C_p 928·6 Cal., C_v, 928·0 Cal. $k = 3 \times 10^{-6}$ at 100°. Conc. HCl at 180° ⟶ *trans*-form.

Di-Me ester: $C_{10}H_{16}O_4$. MW, 200. M.p. 3–5°. B.p. 132·5°/10 mm. D_4^{20} 1·1112.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 151°/13 mm. D_4^{20} 1·015. n_{He}^{20} 1·436.

Trans:

Prisms from H_2O. M.p. 300°. Sol. EtOH, Me_2CO. Spar. sol. Et_2O, hot H_2O. Insol. $CHCl_3$. Heat of comb. C_p 929·5 Cal., C_v 928·9 Cal. $k = 2·5 \times 10^{-6}$ at 100°.

Mono-Me ester: $C_9H_{14}O_4$. MW, 186. Needles from pet. ether. M.p. 125°.

Di-Me ester: needles from Et_2O. M.p. 71°. Heat of comb. C_p 1273·9 Cal., C_v 1272·7 Cal.

Di-Et ester: D_4^{20} 1·011. n_{He}^{20} 1·434.

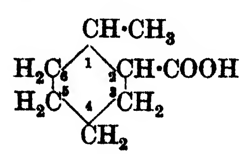
Willstätter, Jacquet, *Ber.*, 1918, **51**, 776.
Zelinsky, Glinka, *Ber.*, 1911, **44**, 2305.
Stoermer, Ladewig, *Ber.*, 1914, **47**, 1804.

Hexahydrothiophenol.
See Mercaptocyclohexane.

Hexahydrothymol.
See Menthol.

Hexahydrotoluene.
See Methylcyclohexane.

Hexahydro-o-toluic Acid (1-*Methylcyclohexane-2-carboxylic acid, 2-methylhexahydrobenzoic acid*)



$C_8H_{14}O_2$ MW, 142

"*Cis*":

B.p. 236–7°, 122–3°/10 mm. D_4^{20} 1·009. n_D^{20} 1·458. $k = 1{\cdot}64 \times 10^{-5}$. Conc. HCl ⟶ "*trans*"-form.

Amide: $C_8H_{15}ON$. MW, 141. Needles from MeOH.Aq. M.p. 151–3°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 79–81°/16 mm.

Anilide: needles from pet. ether. M.p. 66–8°.

"*Trans*":

Needles from C_6H_6. M.p. 52°. B.p. 241–2°, 125°/12·5 mm. Sol. EtOH, Et_2O, $CHCl_3$, pet. ether. Spar. sol. H_2O, C_6H_6. $k = 2{\cdot}05 \times 10^{-5}$.

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 190°. D^{20} 0·9769.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 203–4°/753 mm.

Chloride: $C_8H_{13}OCl$. MW, 160·5. B.p. 75–6°/15 mm. D^{20} 1·054. n_D^{20} 1·4653.

Amide: needles from H_2O. M.p. 180–1°.

Anilide: plates from C_6H_6–pet. ether. M.p. 148°.

Zelinsky, *Ber.*, 1908, **41**, 2679.
Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1071.
Goodwin, Perkin, *J. Chem. Soc.*, 1895, **67**, 126.
Markownikow, Sernow, *J. Russ. Phys.-Chem. Soc.*, 1893, **25**, 632.

Hexahydro-*m*-toluic Acid (1-*Methylcyclohexane*-3-*carboxylic acid*, 3-*methylhexahydrobenzoic acid*).

i-.

B.p. 245°. D_{20}^{20} 1·007.

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 196–7°. D_{20}^{20} 0·9584.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 208–10°.

Amide: $C_8H_{15}ON$. MW, 141. Leaflets from H_2O. M.p. 155–6°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 86–7°/16 mm. D_4^{25} 0·887. n_D^{25} 1·449.

d-.

B.p. 132–4°/15 mm. D_4^{20} 0·9984. n_D^{20} 1·457. $k = 1{\cdot}28 \times 10^{-5}$. $[\alpha]_D^{20} + 1{\cdot}25°$.

Chloride: $C_8H_{13}OCl$. MW, 160·5. B.p. 80–1°/15 mm.

Amide: $C_8H_{15}ON$. MW, 141. Leaflets from MeOH.Aq. M.p. 155–6°.

Gutt, *Ber.*, 1907, **40**, 2062.
Zelinsky, Gutt, *Ber.*, 1908, **41**, 2076.
Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1091.
Markownikow, Hagemann, *J. Russ. Phys.-Chem. Soc.*, 1893, **25**, 638.

Hexahydro-*p*-toluic Acid (1-*Methylcyclohexane*-4-*carboxylic acid*, 4-*methylhexahydrobenzoic acid*).

Exists in two forms.

(i) *Solid*. Leaflets from H_2O. M.p. 112–13°. B.p. 245°, 135°/16 mm. Sol. EtOH, Et_2O, $CHCl_3$, pet. ether. Spar. sol. H_2O. $k = 1{\cdot}11 \times 10^{-5}$.

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 192–4°. D_{20}^{20} 0·9532.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 207–8°.

Amide: $C_8H_{15}ON$. MW, 141. Plates from H_2O. M.p. 221°.

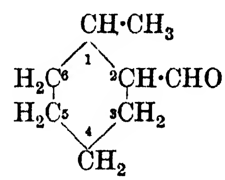
Nitrile: $C_8H_{13}N$. MW, 123. B.p. 85–7°/18 mm. D_4^{25} 0·898. n_D^{25} 1·448.

(ii) *Liquid*. B.p. 140°/20 mm.

Amide: needles from H_2O. M.p. 176–8°.

Einhorn, Willstätter, *Ann.*, 1894, **280**, 157.
Willstätter, Jaquet, *Ber.*, 1918, **51**, 777.
Chou, Perkin, *J. Chem. Soc.*, 1911, **99**, 536.
Wallach, Ritter, *Ann.*, 1911, **381**, 92.
Markownikow, Sserebrajakow, *J. Russ. Phys.-Chem. Soc.*, 1893, **25**, 646.
See also first reference above.

Hexahydro-*o*-toluic Aldehyde (1-*Methyl*-2-*aldehydocyclohexane*, 2-*methylhexahydrobenzaldehyde*)



$C_8H_{14}O$ MW, 126

Liq. with camphoraceous odour. B.p. 61–2°/15 mm.

Semicarbazone: m.p. 137–8°.

Darzens, Lefébure, *Compt. rend.*, 1906, **142**, 715.
Wallach, Beschke, *Ann.*, 1906, **347**, 339.

Hexahydro-*m*-toluic Aldehyde (1-*Methyl*-3-*aldehydocyclohexane*, 3-*methylhexahydrobenzaldehyde*).

B.p. 176–8°, 96–7°/50 mm. D_0^{20} 0·9091.

Semicarbazone: needles from EtOH. M.p. 159°.

Wallach, *Ann.*, 1906, **347**, 343.

Hexahydro-*p*-toluic Aldehyde (1-*Methyl*-4-*aldehydocyclohexane*, 4-*methylhexahydrobenzaldehyde*).

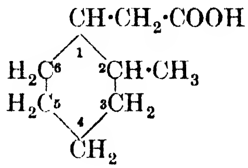
B.p. 180°, 64–5°/15 mm.

Semicarbazone : cryst. from H_2O. M.p. 154–6°.

Darzens, Lefébure, *Compt. rend.*, 1906, **142**, 715.
Harding, Haworth, Perkin, *J. Chem. Soc.*, 1908, **93**, 1954.

Hexahydrotoluidine.
See Methylcyclohexylamine.

Hexahydro-*o*-tolylacetic Acid (2-*Methylcyclohexylacetic acid*)



$C_9H_{16}O_2$ MW, 156

Liq. with odour resembling butyric acid. B.p. 145–7°/13 mm.
Amide : $C_9H_{17}ON$. MW, 155. M.p. 160–1°.

v. Braun, Münch, *Ann.*, 1928, **465**, 66.
Wallach, *Ann.*, 1912, **394**, 384.

Hexahydro-*m*-tolylacetic Acid (3-*Methylcyclohexylacetic acid*).
Active form :
B.p. 148°/18 mm. D_4^{20} 0·9847. n_D^{20} 1·495. $[\alpha]_D$ − 9° 26′.
Et ester : $C_{11}H_{20}O_2$. MW, 184. B.p. 107–10°/18 mm. D_4^{15} 0·9322. n_D^{15} 1·4442. $[\alpha]_D$ − 7° 25′.

Inactive form :
B.p. 148°/18 mm. D_4^{15} 0·9911. n_D^{15} 1·4607.
Et ester : b.p. 107–10°/18 mm. D_4^{14} 0·9338. n_D^{14} 1·4434.
Chloride : $C_9H_{15}OCl$. MW, 174·5. B.p. 95–6°/11 mm.

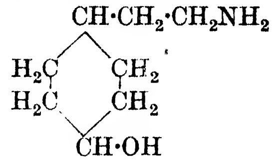
v. Braun, Teuffert, *Ber.*, 1925, **58**, 2210.

Hexahydro-*p*-tolylacetic Acid (4-*Methylcyclohexylacetic acid*).
Plates from aq. formic acid. M.p. 73–4°. Sol. most org. solvents.
Amide : cryst. M.p. 161–2°.
Chloride : b.p. 75°/7 mm.

Perkin, Pope, *J. Chem. Soc.*, 1908, **93**, 1080.
Wallach, Evans, *Chem. Zentr.*, 1907, II, 54.

Hexahydrotolylcarbinol.
See Methylcyclohexylcarbinol.

Hexahydrotyramine (4-[β-*Aminoethyl*] *cyclohexanol*, 4-*hydroxyhexahydrophenylethylamine*, 4-*hydroxycyclohexylethylamine*)

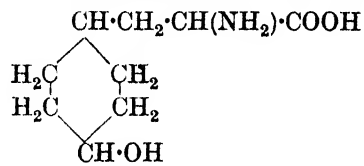


$C_8H_{17}ON$ MW, 143

Needles. M.p. 44–52°. Sol. H_2O, EtOH, AcOEt. Spar. sol. Et_2O. Insol. pet. ether.
B,HCl : m.p. 160°.
O : N-*Di*-p-*nitrobenzoyl* : m.p. 181–2°.
B_2,H_2PtCl_6 : m.p. 204–5°.
Oxalate : m.p. 211°.

Waser, Fauser, *Helv. Chim. Acta*, 1927, **10**, 262.

Hexahydrotyrosine (4-*Hydroxyhexahydrophenyl-α-alanine*, 4-*hydroxycyclohexyl-α-alanine*, 1-*amino*-2-[4-*hydroxycyclohexyl*]-*propionic acid*)



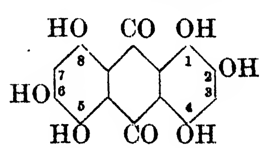
$C_9H_{17}O_3N$ MW, 187

l-.
Needles from H_2O. M.p. 285°. $[\alpha]_{656\cdot3}^{20}$ + 10·58°. Does not give Millon test.
Et ester : $C_{11}H_{21}O_3N$. MW, 215. M.p. 99–100°. B.p. 185°/11 mm. $[\alpha]_{656\cdot3}^{20}$ − 11·76°.
Hydrochloride : m.p. 201°.
B,HCl : m.p. 238°.
N-p-*Nitrobenzoyl* : m.p. 225–6°.

Waser, Brauchli, *Helv. Chim. Acta*, 1924, **7**, 747.

1 : 2 : 3 : 5 : 6 : 7-Hexahydroxyanthraquinone.
See Rufigallic Acid.

1 : 2 : 4 : 5 : 6 : 8 - Hexahydroxyanthraquinone



$C_{14}H_8O_8$ MW, 304

Dark green cryst. from AcOH. Sol. dil. alkalis to bluish-red sols.; conc. $H_2SO_4 \longrightarrow$ bluish-violet sol.

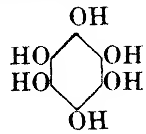
Bayer, D.R.Ps., 65,453, 81,959, 86,969.

1 : 2 : 4 : 5 : 7 : 8 - Hexahydroxyanthra - quinone (*Alizarinhexacyanin*).

Cryst. from EtOH. Violet-blue sol. in Na_2CO_3.Aq.; greenish-blue in NaOH.Aq.; blue in conc. H_2SO_4. Ox. ⟶ 2 : 5 : 7 : 8-tetrahydroxyanthradiquinone-1 : 4 : 9 : 10.

Bayer, D.R.Ps., 66,153, 68,114, 69,842.

Hexahydroxybenzene (*Hexaphenol*)



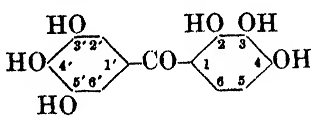
$C_6H_6O_6$ MW, 174

Needles from H_2O. Turns dark grey at 200°. Does not melt. Spar. sol. H_2O, EtOH, Et_2O, C_6H_6. Sols. turn reddish-violet in air. Reduces $AgNO_3$. Ox. ⟶ tetrahydroxy-*p*-benzoquinone. Zn dist. ⟶ benzene + diphenyl. $FeCl_3$ ⟶ violet col.

Hexa-acetyl: prisms from AcOH. M.p. 203°. Insol. EtOH, Et_2O, C_6H_6.

Wieland, Wishart, *Ber.*, 1914, **47**, 2084.
Nietzki, Benckiser, *Ber.*, 1885, **18**, 505.
Jackson, Grindley, *Am. Chem. J.*, 1895, **17**, 648.

2 : 3 : 4 : 3′ : 4′ : 5′ - Hexahydroxybenzo - phenone (4-*Galloylpyrogallol*)



$C_{13}H_{10}O_7$ MW, 278

Yellowish needles from H_2O. M.p. 272–3°.

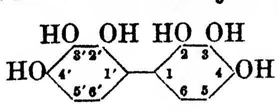
Hexa-acetyl: m.p. 132°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, **109**, 541.

Hexahydroxycyclohexane.

See Inositol.

2 : 3 : 4 : 2′ : 3′ : 4′-Hexahydroxydiphenyl



$C_{12}H_{10}O_6$ MW, 250

Needles from H_2O. Darkens at 250°. M.p. above 250°. Sol. hot H_2O, hot EtOH. Spar. sol. cold H_2O, EtOH, Et_2O, $CHCl_3$, CS_2, C_6H_6. Zn + H_2 ⟶ diphenyl.

Hexa-Me ether: $C_{18}H_{22}O_6$. MW, 334. M.p. 123°.

Barth, Goldschmiedt, *Ber.*, 1879, **12**, 1244.

2 : 4 : 5 : 2′ : 4′ : 5′-Hexahydroxydiphenyl.

Free phenol not isolated.

Hexa-Me ether: needles from EtOH or AcOH. M.p. 180°. Sol. $CHCl_3$. Spar. sol. EtOH, AcOH, C_6H_6. Insol. H_2O. HI ⟶ 2 : 3 : 6 : 7-tetrahydroxydiphenylene oxide.

Fabinyi, Széki, *Ber.*, 1910, **43**, 2682.

3 : 4 : 5 : 3′ : 4′ : 5′-Hexahydroxydiphenyl.

Cryst. from H_2O. M.p. above 300°. Sol. EtOH. Mod. sol. H_2O. Spar. sol. Et_2O, C_6H_6. Zn + H_2 ⟶ diphenyl.

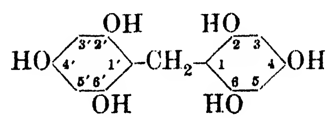
Hexa-Me ether: needles from EtOH. M.p. 126°. Sol. EtOH, AcOH.

3 : 5 : 3′ : 5′-*Tetra-Me ether*: $C_{16}H_{18}O_6$. MW, 306. M.p. about 190°. Spar. sol. H_2O, Et_2O.

Hexa-acetyl: needles from AcOH. M.p. 236°.

Liebermann, *Ann.*, 1873, **169**, 241.
Liebermann, Herrmuth, *Ber.*, 1912, **45**, 1221.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexahydroxydiphenyl-methane



$C_{13}H_{12}O_6$ MW, 264

M.p. 225° decomp. Sol. EtOH, Et_2O, AcOH. Prac. insol. H_2O, C_6H_6.

Boehm, *Ann.*, 1903, **329**, 269.

3 : 4 : 5 : 3′ : 4′ : 5′-Hexahydroxydiphenyl-methane.

M.p. 241° decomp. Sol. EtOH. Insol. H_2O.

Kahl, *Ber.*, 1898, **31**, 144.
Caro, *Ber.*, 1892, **25**, 947.

3 : 5 : 6 : 7 : 3′ : 4′-Hexahydroxyflavone.

See Quercetagetin.

3 : 5 : 7 : 8 : 3′ : 4′-Hexahydroxyflavone.

See Gossypetin.

3 : 5 : 7 : 3′ : 4′ : 5′-Hexahydroxyflavone.

See Myricetin.

Hexahydroxyisoflavone.

See Irigenol.

Hexahydro-xylene.

See Dimethylcyclohexane.

Hexahydro-xylenol.

See Dimethylcyclohexanol.

8 : 9 : 11 : 12 : 14 : 15-Hexahydroxystearic Acid

$CH_3·[CH_2·(CHOH)_2]_3·[CH_2]_7·COOH$

$C_{18}H_{36}O_8$ MW, 380

Exists in two forms sometimes termed linusinic acid and isolinusinic acids. Both on ox. ⟶

azelaic acid and propionic acid. NaOH.Aq. + $KClO_3$ ⟶ acetic, propionic and azelaic acids.

Linusinic acid (*linusic acid*): needles from H_2O. M.p. 203°. Sol. hot H_2O, EtOH.

Isolinusinic acid (*isolinusic acid*): needles. M.p. 173°. Sol. hot H_2O. Spar. sol. EtOH, cold H_2O. Insol. Et_2O, $CHCl_3$, CS_2, C_6H_6.

Bauer, *Chem. Umschau.*, 1924, **31**, 33.
Hazura, Friedrich, *Monatsh.*, 1888, **9**, 181.
Rollet, *Z. physiol. Chem.*, 1909, **62**, 430.
Goldsobel, *Chem. Zentr.*, 1910, I, 1231.

Hexaiodoacetone (*Hexaiodopropanone, periodoacetone*)

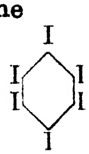
$CI_3 \cdot CO \cdot CI_3$

C_3OI_6 MW, 810

Bright yellow cryst. powder. M.p. 78°. H_2O ⟶ penta- and tetra-iodoacetones. Decomp. in most solvents. NaOH.Aq. ⟶ iodoform.

Lederer, D.R.P., 95,440.

Hexaiodobenzene



C_6I_6 MW, 834

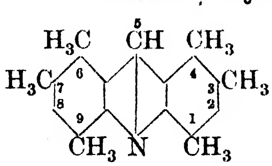
Reddish-brown needles from boiling $PhNO_2$. M.p. 340–50°. Insol. usual solvents.

Rupp, *Ber.*, 1896, **29**, 1631.

Hexalin.
See Cyclohexanol.

Hexamethylacetone.
See Pivalone.

1 : 3 : 4 : 6 : 7 : 9-Hexamethylacridine



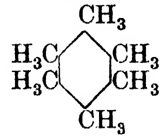
$C_{19}H_{21}N$ MW, 263

Yellow needles from EtOH, Me_2CO or ligroin. M.p. 221–2°. Sol. $CHCl_3$, ligroin. Spar. sol. EtOH, Et_2O. Insol. H_2O. Sublimes. Sols. show green fluorescence. Conc. HNO_3 ⟶ dinitro deriv.

B,HCl: red cryst. Decomp. on heating.
B,HNO_3: m.p. 163–4° decomp.
Picrate: m.p. 200–2°.

Senier, Compton, *J. Chem. Soc.*, 1907, **91**, 1934.

Hexamethylbenzene (*Mellithene, mellitene*)



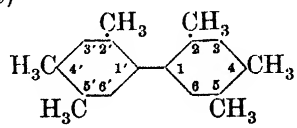
$C_{12}H_{18}$ MW, 162

Needles from EtOH. M.p. 164°. B.p. 264°. Very sol. hot EtOH, C_6H_6. Sol. EtOH. Heat of comb. C_v 1709·6 Cal. Crit. temp. 478°. Ox. ⟶ mellitic acid. HI ⟶ mesitylene + methane.

Picrate: m.p. 170°.

Smith, *Organic Syntheses*, 1930, X, 32.
Reckleben, Scheiber, *Ber.*, 1913, **46**, 2363.

2 : 4 : 5 : 2′ : 4′ : 5′ - Hexamethyldiphenyl (*Di-ψ-cumyl*)



$C_{18}H_{22}$ MW, 238

Plates from EtOH. M.p. 52°. B.p. 320°/738 mm. Sol. C_6H_6. Spar. sol. EtOH.

Ullmann, Meyer, *Ann.*, 1904, **332**, 47.

2 : 4 : 6 : 2′ : 4′ : 6′ - Hexamethyldiphenyl (*Dimesityl*).

Cryst. from EtOH. M.p. 100·5°. B.p. 296°/735 mm. Sol. Et_2O, C_6H_6. Spar. sol. EtOH. HNO_3 ⟶ tetranitro deriv. Br ⟶ 3 : 3′-dibromo deriv.

Ullmann, Meyer, *Ann.*, 1904, **332**, 48.
Moyer, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 632.

3 : 4 : 5 : 3′ : 4′ : 5′ - Hexamethyldiphenyl (*Dihemimellityl*).

Cryst. from EtOH.Aq. M.p. 132–3°.

Liebermann, Kardos, *Ber.*, 1913, **46**, 210.

Hexamethyldipyridyl.
See Dicollidyl.

Hexamethylene.
See Cyclohexane.

Hexamethylenediamine (1 : 6-*Diaminohexane*)

$H_2N \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2NH_2$

$C_6H_{16}N_2$ MW, 116

Leaflets. M.p. 42° (39–40°). Sublimes in long needles. B.p. 204–5°, 100°/20 mm. Sol. H_2O, EtOH, C_6H_6.

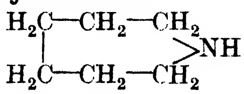
N : N′-*Dibenzoyl*: m.p. 155°.
Di-Et urethane: m.p. 84°.
B,2HCl: m.p. 248°.
B,2$(COOH)_2$: m.p. 168°.

Di-benzenesulphonyl : m.p. 154°.
B,H_2PtCl_6 : m.p. 200° decomp.
Picrate : m.p. 220°.

Curtius, Clemm, *J. prakt. Chem.*, 1900, **62**, 194 ; *Ber.*, 1896, **29**, 1167.
v. Braun, Müller, *Ber.*, 1905, **38**, 2204.

Hexamethylene Glycol.
See Hexandiol-1 : 6.

Hexamethyleneimine



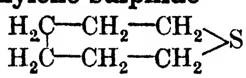
$C_6H_{13}N$ MW, 99

B.p. 138° (126–7°, 140°). Part. misc. with H_2O. D_4^{23} 0·8643. n_D^{23} 1·457.
N-*Acetyl* : b.p. 239–41°.
N-*Benzoyl* : m.p. 36°.
B,HCl : m.p. 222°.
B,$HAuCl_4$: m.p. 206°.
B_2,H_2PtCl_6 : m.p. 197° (203°).
Picrate : m.p. 146°.

Müller, Sauerwald, *Monatsh.*, 1927, **48**, 727.
v. Braun, Goll, *Ber.*, 1927, **60**, 1533.
Schmidt, *Ber.*, 1922, **55**, 1584.

Hexamethylene iodide.
See 1 : 6-Di-iodo-*n*-hexane.

Hexamethylene sulphide



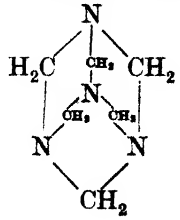
$C_6H_{12}S$ MW, 116

Colourless mobile liq. B.p. 169–71°/747 mm. D_4^{18} 0·9743. n_D^{18} 1·5044. $KMnO_4 \longrightarrow$ sulphone, m.p. 71°. Forms add. comp. with 1 mol. $HgCl_2$, m.p. 149°.
Methiodide: colourless prisms. M.p. 137·5–138·5°.

Grischkevitsch-Trochimovskii, *J. Russ. Phys.-Chem. Soc.*, 1916, **48**, 944.
v. Braun, *Ber.*, 1910, **43**, 3224.

Hexamethylene sulphone.
See under Hexamethylene sulphide.

Hexamethylenetetramine (*Aminoform, Formin, Hexa, Hexamine, Urotropine*)



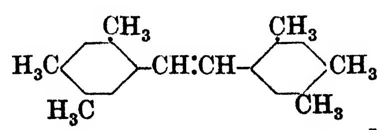
$C_6H_{12}N_4$ MW, 140

Rhombohedral cryst. from EtOH. Sol. H_2O, EtOH, $CHCl_3$. Less sol. warm H_2O than cold. Insol. Et_2O. Volatilises on heating with part. decomp. Sublimes in vacuo. Heat of comb. C_v 1005·85 Cal. Dil. acids $\longrightarrow$ formaldehyde + NH_3. HNO_2 + HCl $\longrightarrow$ trimethylenetrinitrosamine (m.p. 106°) and dinitrosopentamethylenetetramine. HNO_2 + AcOH $\longrightarrow$ formaldehyde + methylamine + NH_3. 96% HNO_3 at 0° $\longrightarrow$ trimethylenetrinitroamine (hexogen *q.v.*). $H_2S \longrightarrow$ thioformaldehyde. Br $\longrightarrow$ tetrabromide, which loses Br_2 to give a dibromide m.p. 196–200° decomp. Zn + HCl $\longrightarrow$ mainly NH_3 + trimethylamine. Stable to hot alkalis. Forms compounds with acids and metallic salts. Pptd. quantitatively by $HgCl_2$. Used as urinary antiseptic, rubber vulcanisation accelerator, and for microscopic test for Au and Hg. Citrate (Helmitol, Formamol), camphorate (Amphotropin) and other salts are used in medicine.
B,H_2O : m.p. 15° (13·5°) decomp.
B,H_2SO_4,H_2O : m.p. 108°.
B,HI : m.p. 170–1°.
Methiodide : needles from EtOH. M.p. 190° (204°) decomp. Sol. H_2O, EtOH. Insol. Et_2O, $CHCl_3$.
Picrate : m.p. 179° decomp.

Butlerow, *Ann.*, 1860, **115**, 322.
Wohl, *Ber.*, 1886, **19**, 1842.
Höland, *Ann.*, 1887, **240**, 225.
Grassi-Cristaldi, Motta, *Gazz. chim. ital.*, 1899, **29**, 43.
Chemnitius, *Chem.-Ztg.*, 1928, **52**, 735.
Landt, Adams, U.S.P., 1,774,929, (*Chem. Abstracts*, 1930, **24**, 5046).

Hexamethylethane.
See 2 : 2 : 3 : 3-Tetramethylbutane.

2 : 4 : 5 : 2′ : 4′ : 5′ - Hexamethylstilbene (*Di-ψ-cumylethylene*)

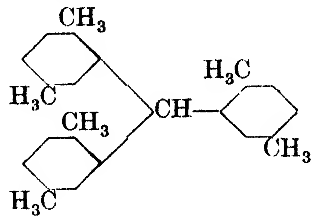


$C_{20}H_{24}$ MW, 264

Cryst. from EtOH. M.p. 161°. Mod. sol. $CHCl_3$, CS_2, C_6H_6. Prac. insol. ligroin. Shows violet fluorescence.
Picrate: $C_{20}H_{24}$, $2C_6H_3O_7N_3$, C_6H_6. Cryst. from C_6H_6. M.p. 123°.
$C_{20}H_{24}$,$C_6H_3(NO_2)_3$-1 : 3 : 5 : prisms from AcOH. M.p. 145–7°.

Elbs, *J. prakt. Chem.*, 1893, **47**, 51.

2 : 5 : 2′ : 5′ : 2″ : 5″-Hexamethyltriphenylmethane



$C_{25}H_{28}$ MW, 328

Cryst. from EtOH. M.p. 188°. Sol. Et_2O, C_6H_6. Mod. sol. EtOH.

Elbs, *J. prakt. Chem.*, 1887, **35**, 484.

Hexamine.
See Hexamethylenetetramine.

Hexanal.
See Caproic Aldehyde.

Hexandial-1 : 6.
See Adipic-dialdehyde.

Hexandiol-1 : 2 (1 : 2-*Dihydroxyhexane, butylethylene glycol,* 1-*hexene glycol*)

$CH_3{\cdot}[CH_2]_3{\cdot}CH(OH){\cdot}CH_2OH$

$C_6H_{14}O_2$ MW, 118

d-.
B.p. 110–13°/6 mm. $[\alpha]_D^{22} + 15{\cdot}2°$.
Di-1-*naphthylcarbamate* : m.p. 172–4°.

Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 834.
Levene, Haller, *J. Biol. Chem.*, 1928, **79**, 483.

Hexandiol-1 : 4 (1 : 4-*Dihydroxyhexane,* 1-*ethyltetramethylene glycol*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}[CH_2]_2{\cdot}CH_2OH$

$C_6H_{14}O_2$ MW, 118

Not solid at – 20°. B.p. 134–5°/18·5 mm. Sol. H_2O, EtOH, Et_2O. Hot dil. $H_2SO_4 \longrightarrow$ 2-ethyltetrahydrofuran.

Wohlgemuth, *Compt. rend.*, 1914, **159**, 80.

Hexandiol-1 : 5 (1 : 5-*Dihydroxyhexane,* 1-*methylpentamethylene glycol*)

$CH_3{\cdot}CH(OH){\cdot}[CH_2]_3{\cdot}CH_2OH$

$C_6H_{14}O_2$ MW, 118

B.p. 234–5°/710 mm., 140–1°/17 mm. D° 0·9809. 60% $H_2SO_4 \longrightarrow$ 2-methylpentamethylene oxide. HBr $\longrightarrow$ 1 : 5-dibromohexane.

Lipp, *Ber.*, 1885, **18**, 3282.
Perkin, *J. Chem. Soc.*, 1887, **51**, 722.

Hexandiol-1 : 6 (1 : 6-*Dihydroxyhexane, hexamethylene glycol*)

$HO{\cdot}CH_2{\cdot}[CH_2]_4{\cdot}CH_2OH$

$C_6H_{14}O_2$ MW, 118

Needles from H_2O. M.p. 42° (40°). B.p. 250°, 152°/17 mm., 151°/12 mm. Sol. H_2O, EtOH. Conc. $H_2SO_4 \longrightarrow$ hexamethylene oxide.
Mono-Me ether : $C_7H_{16}O_2$. MW, 132. B.p. 123°/31 mm.
Di-Me ether : 1 : 6-dimethoxyhexane. $C_8H_{18}O_2$. MW, 146. B.p. 180°.
Di-Et ether : 1 : 6-diethoxyhexane. $C_{10}H_{22}O_2$. MW, 174. B.p. 208°.

Haworth, Perkin, *J. Chem. Soc.*, 1894, **65**, 598.
Hamonet, *Bull. soc. chim.*, 1905, **33**, 538.
Lespieau, *Ann. chim.*, 1912, **27**, 176.

Hexandiol-2 : 3 (2 : 3-*Dihydroxyhexane,* 1-*methyl*-2-*propylethylene glycol,* 2-*hexene glycol*)

$CH_3{\cdot}[CH_2]_2{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_3$

$C_6H_{14}O_2$ MW, 118

B.p. 207° (204–6°). D° 0·9669. Sol. H_2O. $CrO_3 \longrightarrow$ butyric acid, acetic acid and CO_2.

Hecht, Munier, *Ber.*, 1878, **11**, 1154.
Eltekow, *Journal of the Russian Chemical Society*, 1882, **1**, 355.

Hexandiol-2 : 4 (2 : 4-*Dihydroxyhexane,* 1-*methyl*-3-*ethyltrimethylene glycol*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3$

$C_6H_{14}O_2$ MW, 118

B.p. 206° slight decomp., 210–11°/750 mm., 104·5–105·5°/9 mm. D_4^{21} 0·9516. n_D^{21} 1·4418. PBr_3 in Py at 140° $\longrightarrow$ 2 : 4-dibromohexane.
Diacetyl : b.p. 211°/750 mm. part. decomp., 101–2°/13 mm.
Diphenylcarbamate : m.p. 144°.

Franke, Kohn, *Monatsh.*, 1906, **27**, 1111.
Lespieau, Wakeman, *Bull. soc. chim.*, 1932, **51**, 389.

Hexandiol-2 : 5 (2 : 5-*Dihydroxyhexane,* 1 : 4-*dimethyltetramethylene glycol*)

$CH_3{\cdot}CH(OH){\cdot}[CH_2]_2{\cdot}CH(OH){\cdot}CH_3$

$C_6H_{14}O_2$ MW, 118

Exists in two forms.
(i) Solid. M.p. 43–4°.
(ii) Liquid. B.p. 212–15°, 216–18°/750 mm., 219–20°/745 mm., 120–2°/12 mm. Sol. H_2O, EtOH, Et_2O. D_4^{20} 0·9610, D_0^{24} 0·9605, D° 0·9638 (0·9759). n_D^{20} 1·4475. Dil. $H_2SO_4 \longrightarrow$ 2 : 5-dimethyltetrahydrofuran. $CrO_3 \longrightarrow$

acetic acid + CO_2. HBr ⟶ 2 : 5-dibromohexane.

Diacetyl : b.p. 230°.

Wurtz, *Ann. chim.*, 1864, **3**, 166.
Sorokin, *J. prakt. Chem.*, 1881, **23**, 18.
Duden, Lemme, *Ber.*, 1902, **35**, 1335.
Dupont, *Ann. chim.*, 1913, **30**, 526.

Hexandiol-3 : 4 (3:4-*Dihydroxyhexane*, sym.-*diethylethylene glycol*, 3-*hexene glycol*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_2{\cdot}CH_3$

$C_6H_{14}O_2$ MW, 118

Exists in three forms.
(i) M.p. above — 20°. B.p. 87–8°/15 mm.
(ii) M.p. 88°. B.p. 90–1°/15 mm.
(iii) *Meso form* : m.p. 88°. B.p. 91°/20 mm.

Sol. H_2O, EtOH, Et_2O, C_6H_6, etc. CrO_3 ⟶ propionic acid. Br water ⟶ dipropionyl.

Farmer, Laroia, Switz, Thorpe, *J. Chem. Soc.*, 1927, 2946.
Kuhn, Rebel, *Ber.*, 1927, **60**, 1570.

Hexandione-2 : 3.
See Acetylbutyryl.
Hexandione-2 : 4.
See Propionylacetone.
Hexandione-2 : 5.
See Acetonylacetone.
Hexandione-3 : 4.
See Dipropionyl.

***n*-Hexane** (*Dipropyl*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$

C_6H_{14} MW, 86

Occurs in petroleum. F.p. — 93·5° (— 95·4°). B.p. 68·95°, 68·4–68·8°/744 mm. D_4^0 0·67703, D_4^{20} 0·6603 (0·65945), D_4^{25} 0·65502. n_D^{20} 1·37506, n_D^{25} 1·37230. Heat of comb. C_p 991·2 Cal., C_v 989·2 (997·8) Cal. Cl ⟶ 1-, 2-, and 3-chlorohexanes. Br ⟶ 1-, 2-, and 3-bromohexanes. Br (+ Fe) ⟶ 1 : 2 : 3 : 4 : 5 : 6-hexabromohexane. Dil. HNO_3 ⟶ 2-nitrohexane.

Michael, *Am. Chem. J.*, 1901, **25**, 421.
Faillebin, *Bull. soc. chim.*, 1924, **35**, 160.
Corson, E.P., 279,095, (*Chem. Abstracts*, 1928, **22**, 2755).
Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1931, **53**, 1948.

Hexane-1-carboxylic Acid.
See *n*-Heptylic Acid.
Hexane-2-carboxylic Acid.
See 1-Methylcaproic Acid.
Hexane-3-carboxylic Acid.
See 1-Ethyl-*n*-valeric Acid.

Hexane-1 : 1-dicarboxylic Acid.
See *n*-Amylmalonic Acid.
Hexane-1 : 3-dicarboxylic Acid.
See 1-Propylglutaric Acid.
Hexane-1 : 4-dicarboxylic Acid.
See 1-Ethyladipic Acid.
Hexane-1 : 5-dicarboxylic Acid.
See 1-Methylpimelic Acid.
Hexane-1 : 6-dicarboxylic Acid.
See Suberic Acid.
Hexane-2 : 2-dicarboxylic Acid.
See Methylbutylmalonic Acid.
Hexane-2 : 3-dicarboxylic Acid.
See 1-Methyl-2-propylsuccinic Acid.
Hexane-2 : 4-dicarboxylic Acid.
See 1-Methyl-3-ethylglutaric Acid.
Hexane-3 : 3-dicarboxylic Acid.
See Ethylpropylmalonic Acid.
Hexane-3 : 4-dicarboxylic Acid.
1 : 2-Diethylsuccinic Acid, *q.v.*

Hexane-1 : 3 : 4 : 6-tetracarboxylic Acid

$CH_2{\cdot}COOH$
CH_2
$CH{\cdot}COOH$
$CH{\cdot}COOH$
CH_2
$CH_2{\cdot}COOH$

$C_{10}H_{14}O_8$ MW, 262

Prisms from Me_2CO–C_6H_6. M.p. 215° decomp. Sol. H_2O, EtOH, Et_2O, C_6H_6.

Di-Me ester : $C_{12}H_{18}O_8$. MW, 290. M.p. 133°.

Silberrad, *J. Chem. Soc.*, 1904, **85**, 614.
Sell, Jackson, *J. Chem. Soc.*, 1899, **75**, 515.

Hexane-2 : 2 : 3 : 4-tetracarboxylic Acid

$CH_3{\cdot}C(COOH)_2$
$CH{\cdot}COOH$
$CH_3{\cdot}CH_2{\cdot}CH{\cdot}COOH$

$C_{10}H_{14}O_8$ MW, 262

Cryst. from Me_2CO–ligroin. M.p. 170°.

Michael, Ross, *J. Am. Chem. Soc.*, 1931, **53**, 1164.

Hexane-2 : 2 : 5 : 5-tetracarboxylic Acid

$CH_3{\cdot}C(COOH)_2$
CH_2
CH_2
$CH_3{\cdot}C(COOH)_2$

$C_{10}H_{14}O_8$ MW, 262

Needles from H_2O. M.p. 200° (rapid heat.), 170° (slow heat.), decomp. Sol. H_2O, EtOH,

Et_2O. Insol. C_6H_6, ligroin. Heat ⟶ 1 : 4-dimethyladipic acid.

Tetra-Et ester : $C_{18}H_{30}O_8$. MW, 374. Cryst. from EtOH.Aq. or ligroin. M.p. 53·5°.

Kitzing, *Ber.*, 1894, **27**, 1578.
Lean, *J. Chem. Soc.*, 1894, **65**, 1004.
Noyes, Kyriakides, *J. Am. Chem. Soc.*, 1910, **32**, 1059.

Hexane-1 : 2 : 3-tricarboxylic Acid (1-*Propyltricarballylic acid*)

$CH_3[CH_2]_2·CH·COOH$
$CH·COOH$
$CH_2·COOH$

$C_9H_{14}O_6$ MW, 218

Laminæ + H_2O from H_2O. M.p. 151–2° (anhyd.). Sol. H_2O, EtOH, Et_2O. Insol. C_6H_6, ligroin. $k = 3·1 \times 10^{-4}$ at 25°.

Auwers, Köbner, v. Meyenburg, *Ber.*, 1891, **24**, 2898.

Hexane-1 : 4 : 4-tricarboxylic Acid (1-*Ethylbutane*-1 : 1 : 4-*tricarboxylic acid*)

$CH_2·COOH$
CH_2
CH_2
$CH_3·CH_2·C(COOH)_2$

$C_9H_{14}O_6$ MW, 218

M.p. 155–8° decomp. (evolution of CO_2).

Tri-Et ester : $C_{15}H_{26}O_6$. MW, 302. B.p. 205–8°/35 mm., 180–3°/28 mm.

Lean, Lees, *J. Chem. Soc.*, 1897, **71**, 1065.
Mellor, *J. Chem. Soc.*, 1901, **79**, 131.

Hexane-2 : 3 : 5-tricarboxylic Acid (1 : 4-*Dimethylbutane*-1 : 2 : 4-*tricarboxylic acid*)

$CH_3·CH·COOH$
$CH·COOH$
CH_2
$CH_3·CH·COOH$

$C_9H_{14}O_6$ MW, 218

Cryst. from $CHCl_3$–ligroin. M.p. 107°. Sol. H_2O, EtOH, Et_2O. $k = 1·61 \times 10^{-4}$ at 25°.

Henstock, Sprankling, *J. Chem. Soc.*, 1907, **91**, 357.

Hexane-2 : 4 : 4-tricarboxylic Acid

$CH_3·CH·COOH$
CH_2
$CH_3·CH_2·C(COOH)_2$

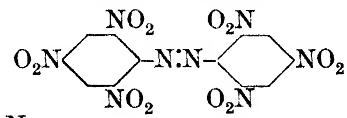
$C_9H_{14}O_6$ MW, 218

M.p. 166·5° decomp. Sol. H_2O, EtOH, Et_2O. Me_2CO, C_6H_6, AcOH. Prac. insol. CS_2, ligroin, $k = 9·7 \times 10^{-3}$ at 25°. Heat ⟶ 1-methyl-3-ethylglutaric acid.

Tri-Et ester: $C_{15}H_{26}O_6$. MW, 302. B.p. 294·3°. D_4^{20} 1·0435. n_D^{20} 1·4372.

Bischoff, *Ber.*, 1891, **24**, 1053.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitroazobenzene

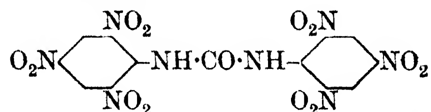


$C_{12}H_4O_{12}N_8$ MW, 452

Red prisms from AcOH or $PhNO_2$. M.p. 215–16°. Spar. sol. EtOH, Et_2O, C_6H_6.

Grandmougin, Leemann, *Ber.*, 1906, **39**, 4385; *Ber.*, 1908, **41**, 1297.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitrocarbanilide (2 : 4 : 6 : 2′ : 4′ : 6′-*Hexanitro*-sym.-*diphenylurea*, N : N′-*dipicrylurea*)

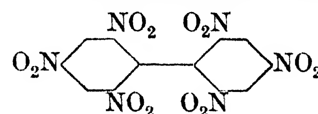


$C_{13}H_6O_{13}N_8$ MW, 482

Prisms. M.p. 203° (206–9°). Sol. hot $PhNO_2$.

Reudler, *Rec. trav. chim.*, 1914, **33**, 59, 63.
Perkin, *J. Chem. Soc.*, 1893, **63**, 1068.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitrodiphenyl

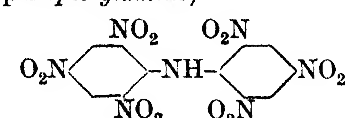


$C_{12}H_4O_{12}N_6$ MW, 424

M.p. 238°. Spar. sol. C_6H_6. Insol. EtOH, Et_2O. Separates in brown cryst. + $\frac{1}{2}C_6H_5·CH_3$ from toluene.

Ullmann, Bielecki, *Ber.*, 1901, **34**, 2179.

2 : 4 : 6 : 2′ : 4′ : 6′ - Hexanitrodiphenyl - amine (p-*Dipicrylamine*)



$C_{12}H_5O_{12}N_7$ MW, 439

Yellow prisms from AcOH. M.p. 242° decomp. Insol. H_2O, Et_2O, and most org. solvents. Reacts acid. Ammonium salt is dyestuff *Aurantia*, used in light filters and microscopic stains. Explosive, used in torpedoes. Very poisonous.

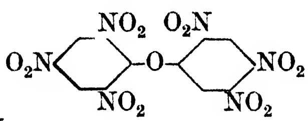
N-*Acetyl* : yellow cryst. M.p. 240° decomp.

N-*Me* : methyldipicrylamine. $C_{13}H_7O_{12}N_7$. MW, 453. Yellow cryst. from EtOH. M.p. 236–7°. Sol. AcOH, Me_2CO. Spar. sol. EtOH, Et_2O. Insol. H_2O. *See* ref.* below.

N-*Et* : ethyldipicrylamine. $C_{14}H_9O_{12}N_7$. MW, 467. Needles. M.p. 201–2°. Sol. AcOEt, Me_2CO. Spar. sol. EtOH, C_6H_6, $CHCl_3$, ligroin. *See* ref.* below.

Gnehm, *Ber.*, 1874, **7**, 1399.
Hoffman, Dame, *J. Am. Chem. Soc.*, 1919, **41**, 1013.
Marshall, U.S.P., 1,326,947, (*Chem. Abstracts*, 1920, **14**, 633).
* Mulder, *Rec. trav. chim.*, 1906, **25**, 121–2.
Vanino, Präparativen Chemie, II, 456.

2 : 4 : 5 : 2′ : 4′ : 6′-Hexanitrodiphenyl Ether

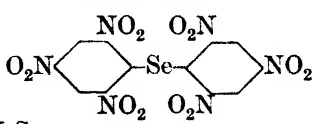


$C_{12}H_4O_{13}N_6$ MW, 440

Needles from AcOH. M.p. 269°. Sol. AcOH, $PhNO_2$. Spar. sol. EtOH, Et_2O. Insol. H_2O.

Westfälisch-Anhaltische Sprengstoffaktiengesellschaft, D.R.P., 281,053, (*Chem. Zentr.*, 1915, I, 74).
van Duin, van Lennep, *Rec. trav. chim.*, 1920, **39**, 154.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitrodiphenyl selenide (*Dipicryl selenide*)

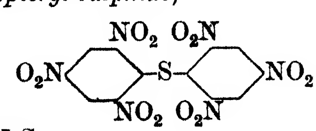


$C_{12}H_4O_{12}N_6Se$ MW, 503

M.p. above 240° decomp. Sol. AcOH, AcOEt. Spar. sol. EtOH. Explosive.

Twiss, *J. Chem. Soc.*, 1914, **105**, 1676.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitrodiphenyl sulphide (*Dipicryl sulphide*)



$C_{12}H_4O_{12}N_6S$ MW, 456

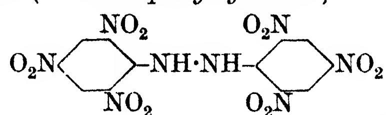
Yellow cryst. M.p. 230–1° (226°). Deflagrates at 290°. Sol. Me_2CO. Spar. sol. EtOH, Et_2O, $CHCl_3$. Insol. H_2O. Explosive.

Twiss, *J. Chem. Soc.*, 1914, **105**, 1675; D.R.P., 275,037, (*Chem. Zentr.*, 1914, II, 97).
van Duin, van Lennep, *Rec. trav. chim.*, 1920, **39**, 157.

Hexanitrodiresorcinol.

See 2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitro-3 : 5 : 3′ : 5′-tetrahydroxydiphenyl.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitrohydrazobenzene (N : N′-*Dipicrylhydrazine*)

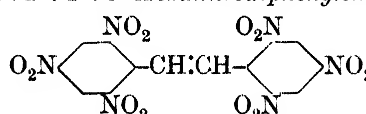


$C_{12}H_6O_{12}N_8$ MW, 454

Yellow needles from AcOH. M.p. 201–2°. Sol. EtOH, AcOH, AcOEt. Spar. sol. Et_2O, C_6H_6, ligroin. $HNO_3 \longrightarrow$ 2 : 4 : 6 : 2′ : 4′ : 6′-hexanitroazobenzene.

Leemann, Grandmougin, *Ber.*, 1908, **41**, 1296.

2 : 4 : 6 : 2′ : 4′ : 6′ - Hexanitrostilbene (2 : 4 : 6 : 2′ : 4′ : 6′-*Hexanitrodiphenylethylene*)

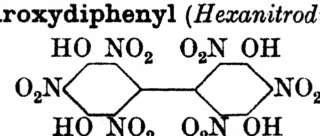


$C_{14}H_6O_{12}N_6$ MW, 450

Yellow needles from $PhNO_2$. M.p. 211° decomp. Spar. sol. Me_2CO. Insol. EtOH, Et_2O, ligroin.

Reich, Wetter, Widmer, *Ber.*, 1912, **45**, 3060.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitro-3 : 5 : 3′ : 5′-tetrahydroxydiphenyl (*Hexanitrodiresorcinol*)

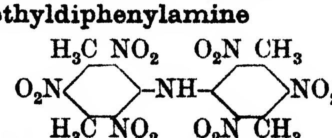


$C_{12}H_4O_{16}N_6$ MW, 488

Deflagrates at 245°. Sol. EtOH, Et_2O. Spar. sol. C_6H_6. Insol. ligroin.

Friedrichs, *Chem. Zentr.*, 1916, I, 975.

2 : 4 : 6 : 2′ : 4′ : 6′-Hexanitro-3 : 5 : 3′ : 5′-tetramethyldiphenylamine

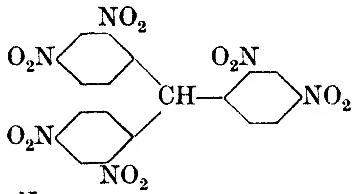


$C_{16}H_{13}O_{12}N_7$ **MW, 495**

Yellow cryst. from AcOH. M.p. 222°.

Blanksma, *Rec. trav. chim.*, 1906, **25**, 373.

2 : 4 : 2′ : 4′ : 2″ : 4″-Hexanitrotriphenylmethane



$C_{19}H_{10}O_{12}N_6$ MW, 514

Plates from Me_2CO. M.p. 260° decomp. Spar. sol. usual org. solvents.

Baeyer, Villiger, *Ber.*, 1903, **36**, 2779.

Hexanol-1.
See *n*-Hexyl Alcohol.

Hexanol-2.
See Methyl-*n*-butylcarbinol.

Hexanol-3.
See Ethylpropylcarbinol.

1-Hexanolone-2 (6-*Hexanolone*-5, 1-*hydroxy*-2-*ketohexane, hydroxymethyl butyl ketone, valerylcarbinol*, 2-*ketohexanol*-1)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_2OH$

$C_6H_{12}O_2$ MW, 116

B.p. 83–5°/15 mm.
Et ether: $C_8H_{16}O_2$. MW, 144. B.p. 79°/18 mm. Spar. sol. H_2O. *Semicarbazone*: m.p. 99°. *Oxime*: b.p. 125°/17 mm.

Levene, Haller, *J. Biol. Chem.*, 1928, **79**, 483.
Blaise, Picard, *Ann. chim.*, 1912, **25**, 257, 262.

1-Hexanolone-4 (6-*Hexanolone*-3, 1-*hydroxy*-4-*ketohexane, ethyl* 3-*hydroxypropyl ketone*, 3-*propionyl*-n-*propyl alcohol*, 3-*propionylpropanol*-1, 4-*ketohexanol*-1)

$CH_3{\cdot}CH_2CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$

$C_6H_{12}O_2$ MW, 116

B.p. 115–16°/21 mm. Dist. at atm. press. ⟶ 2-ethyl-4 : 5-dihydrofuran. NaHg ⟶ hexandiol-1 : 4.
Phenylurethane: m.p. 84°.

Wohlgemuth, *Ann. chim.*, 1914, **2**, 424.

1-Hexanolone-5.
See Acetobutyl Alcohol.

2-Hexanolone-5 (5-*Hexanolone*-2, 2-*hydroxy*-5-*ketohexane, methyl* 3-*hydroxybutyl ketone*, 5-*ketohexanol*-2, 4-*aceto*-sec.-n-*butyl alcohol*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3$

$C_6H_{12}O_2$ MW, 116

B.p. 201–5°/270 mm., 140–2°/100 mm., 80–1°/10 mm. Misc. with H_2O, EtOH, Et_2O. Insol. conc. K_2CO_3.Aq. Reduces warm Fehling's and NH_3.$AgNO_3$. $Na_2Cr_2O_7 + H_2SO_4 \longrightarrow$ acetonylacetone.
Oxime: yellow oil. Sol. H_2O, EtOH. Spar. sol. Et_2O. *Semicarbazone*: m.p. 149–50°.

Lipp, Scheller, *Ber.*, 1909, **42**, 1963.

3-Hexanolone-4.
See Diethylketol.

3-Hexanolone-5 (4-*Hexanolone*-2, 3-*hydroxy*-5-*ketohexane, methyl* 2-*hydroxybutyl ketone*, 5-*ketohexanol*-3, 1-*aceto*-sec.-n-*butyl alcohol*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2CH_3$

$C_6H_{12}O_2$ MW, 116

B.p. 90°/25 mm., 83°/15 mm. D_4^{15} 0·951. n_D^{18} 1·4368.

Pastureau, Zamenhof, *Compt. rend.*, 1926, **182**, 324.
I.G., E.P., 264,830, (*Chem. Abstracts*, 1928, **22**, 243).
Knorr, Weissenborn, Winthrop Chemical Co., U.S.P., 1,714,378, (*Chem. Abstracts*, 1929, **23**, 3477).

Hexanone-2.
See Methyl *n*-butyl Ketone.

Hexanone-3.
See Ethyl propyl Ketone.

Hexantriol-1 : 2 : 3 (1-n-*Propylglycerol*, 1 : 2 : 3-*trihydroxyhexane*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_2OH$

$C_6H_{14}O_3$ MW, 134

M.p. 60–2°. B.p. 167·5–168°/14 mm. Hygroscopic. Bitter taste.
Triacetyl: b.p. 157–9°/15 mm.

Delaby, *Compt. rend.*, 1922, **175**, 1153.

Hexantriol-1 : 2 : 4 (1 : 2 : 4-*Trihydroxyhexane*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}OH$

$C_6H_{14}O_3$ MW, 134

B.p. 190–2°/30 mm.
Triacetyl: b.p. 273–6°, 168–9°/20 mm. D^{21} 1·086.

Fournier, *Bull. soc. chim.*, 1895, **13**, 121.

Hexantriol-1 : 2 : 5 (1 : 2 : 5-*Trihydroxyhexane*)

$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2OH$

$C_6H_{14}O_3$ MW, 134

B.p. 181°/10 mm. D_4^0 1·1012. Misc. with H_2O, EtOH. Insol. Et_2O.

Traube, Lehmann, *Ber.*, 1901, **34**, 1982.
Markownikow, Kablukow, *Ber.*, 1881, **14**, 1711.

Hexantriol-2 : 3 : 4 (1-*Methyl*-3-*ethylglycerol*, 2 : 3 : 4-*trihydroxyhexane*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_3$

$C_6H_{14}O_3$ MW, 134

B.p. 256–7°, 155–156·5°/20 mm. Misc. with H_2O, EtOH.

Reif, *Ber.*, 1908, **41**, 2742.
Delaby, Morel, *Compt. rend.*, 1925, **180**, 1409.

Hexantrione-2 : 3 : 4 (2 : 3 : 4-*Triketohexane*, *methyl ethyl triketone*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CO{\cdot}CO{\cdot}CH_3$

$C_6H_8O_3$ MW, 128

Red oil. B.p. 70°/18 mm. Sol. EtOH. Spar. sol. cold H_2O. Reduces cold Fehling's.

Sachs, Alsleben, *Ber.*, 1907, **40**, 2728.

Hexantrione-2 : 3 : 5 (2 : 3 : 5-*Triketohexane*, *methyl acetonyl diketone*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CO{\cdot}CO{\cdot}CH_3$

$C_6H_8O_3$ MW, 128

Free ketone not isolated.

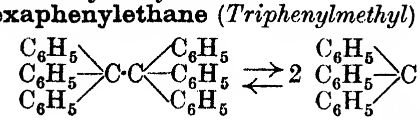
Trioxime: cryst. from EtOH. M.p. 159°.

Angelico, Calvello, *Gazz. chim. ital.*, 1904, **34**, 45.
Angeli, Marchetti, *Atti accad. Lincei*, 1907, **16**, 274.

Hexaphenol.

See Hexahydroxybenzene.

Hexaphenylethane (*Triphenylmethyl*)



$C_{38}H_{30}$ MW, 486

The dimeric form (hexaphenylethane) is a colourless solid. Cryst. from Me_2CO, Me formate or Et formate. M.p. 145–7° decomp. Part. dissociates in sol. into triphenylmethyl (yellowish-red). Benzenoid-quinonoid tautomerism in both monomeric and dimeric forms may also exist. Sol. $CHCl_3$, CCl_4, CS_2, toluene. Mod. sol. C_6H_6. Spar. sol. EtOH, Et_2O, Me_2CO, AcOEt. Prac. insol. ligroin. Heat of comb. C_v 2377·7 Cal., C_p 2380 Cal. Absorbs O from air with formation of triphenylmethyl peroxide. CrO_3 or $KMnO_4$ ⟶ triphenylcarbinol. H (+ Pt) ⟶ triphenylmethane. I ⟶ triphenylmethyl iodide. NO ⟶ nitrosotriphenylmethyl. NO_2 ⟶ nitrotriphenylmethyl and triphenylmethyl nitrite. NOCl ⟶ nitrosotriphenylmethyl and triphenylmethyl chloride. PhOH ⟶ 4-hydroxytetraphenylmethane and triphenylmethane. CH_2N_2 ⟶ hexaphenylpropane. Combines with Na. Combines with many org. solvents (hydrocarbons, ethers, aldehydes, ketones, esters, etc.) with formation of cryst. add. products readily dissociated on heating. Conducts electricity in liquid SO_2 sol.

Schlenk, Weickel, Herzenstein, *Ann.*, 1910, **372**, 17.
Schmidlin, *Ber.*, 1908, **41**, 423.
Schmidlin, Garcia-Banùs, *Ber.*, 1912, **45**, 3191.
Wieland, *Ber.*, 1915, **48**, 1096.
Arbusow, Arbusow, *Ber.*, 1929, **62**, 1874.
Gomberg, Cone, *Ber.*, 1904, **37**, 2033.
Gomberg, Schoepfle, *J. Am. Chem. Soc.*, 1917, **39**, 1658.
Gomberg, *Chemical Reviews*, 1924, **1**, 91.

1 : 1 : 1 : 3 : 3 : 3-Hexaphenylpropane

$(C_6H_5)_3C{\cdot}CH_2{\cdot}C(C_6H_5)_3$

$C_{39}H_{32}$ MW, 500

Prisms from ligroin. M.p. 216°. Sol. C_6H_6. Spar. sol. EtOH, AcOH, ligroin.

Schlenk, *Ann.*, 1912, **394**, 184.

Hexatriacontane

$CH_3{\cdot}[CH_2]_{34}{\cdot}CH_3$

$C_{36}H_{74}$ MW, 506

Plates from pet. ether. M.p. 76°. B.p. 265°/1 mm. D_0^0 0·764. Spar. sol. EtOH, Et_2O, $CHCl_3$, pet. ether. Volatile in steam.

Gascard, *Ann. chim.*, 1921, **15**, 344.

1 : 3 : 5-Hexatriene (sym.-*Divinylethylene*)

$CH_2{:}CH{\cdot}CH{:}CH{\cdot}CH{:}CH_2$

C_6H_8 MW, 80

Cis:

B.p. 78·5°/760 mm. D_4^{20} 0·7175. n_D^{20} 1·4577. Polymerises.

Trans:

B.p. 77–78·5°/764·4 mm. D_{15}^{15} 0·74229. $n_D^{13.5}$ 1·4884. Polymerises.

With Br in absence of HBr both forms give 1 : 2-dibromides; in presence of HBr 1 : 6-dibromides.

van Romburgh, van Dorssen, *J. Chem. Soc.*, 1906, **90**, I, 130.
Farmer, Laroia, Switz, Thorpe, *J. Chem. Soc.*, 1927, 2948, 2953.

2-Hexenal-1.
See 2-Propylacrolein.

1-Hexene (1-*Hexylene, butylethylene α-hexylene*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

C_6H_{12} MW, 84

F.p. − 139–40°. B.p. 63·35°. D^{14} 0·684, D_0^{20} 0·6734. n_D 1·3870. 86% $H_2SO_4 \longrightarrow$ 2-hexanol + hexylsulphonic acid. $KMnO_4 \longrightarrow$ formic and valeric acids.
Glycol: *see* Hexandiol-1 : 2.

Bourguel, *Bull. soc. chim.*, 1927, **41**, 1478.
Dykstra, Lewis, Boord, *J. Am. Chem. Soc.*, 1930, **52**, 3401.
Wilkinson, *J. Chem. Soc.*, 1931, 3057.

2-Hexene (2-*Hexylene*, sym.-*methylpropylethylene*, β-*hexylene*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_3$

C_6H_{12} MW, 84

F.p. − 149°. B.p. 68·1°. D^0 0·6831, $D^{15.5}$ 0·66888. $n_D^{15.5}$ 1·38319.
Glycol: *see* Hexandiol-2 : 3.

v. Beresteyn, *Chem. Zentr.*, 1911, II, 1017.
Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, **54**, 751.

3-Hexene (3-*Hexylene*, sym.-*diethylethylene*, γ-*hexylene*)

$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_2{\cdot}CH_3$

C_6H_{12} MW, 84

B.p. 64°/753 mm. D^{19} 0·6807. n_D 1·394.
Glycol: *see* Hexandiol-3 : 4.

Lespiau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 627.

Hexene-carboxylic Acid.
See Heptenic Acid.

Hexenic Acid.
See 2-Propylacrylic Acid, Hydrosorbic Acid, 3-Ethylidenebutyric Acid, *and* 2-Allylpropionic Acid.

Hexenic Aldehyde.
See 2-Propylacrolein.

1-Hexenol-3 (3-*Hydroxy*-1-*hexene, propylvinylcarbinol*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH{:}CH_2$

$C_6H_{12}O$ MW, 100

l-.
$[\alpha]_D$ − 28·2°.
Acid phthalate: m.p. 62–3°. *Strychnine salt*: m.p. 170–2°. *Brucine salt*: cryst. from Me_2CO. M.p. 118–20°.

dl-.
B.p. 133·5–134°. D_0^4 0·851, D_4^{22} 0·834. n_D^{26} 1·4215.
p-*Nitrobenzoyl*: m.p. 60–2°.
Allophanate: m.p. 139·5–140°.
Acid phthalate: m.p. 58–60°. $[\alpha]_D$ − 16·05° in EtOH.

Delaby, *Compt. rend.*, 1922, **175**, 967.
Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, **127**, 1176.

1-Hexenol-4 (4-*Hydroxy*-1-*hexene, ethylallylcarbinol*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH{:}CH_2$

$C_6H_{12}O$ MW, 100

B.p. 129–31°. $[\alpha]_D^{22}$ + 0·3° without solvent.

Levene, Haller, *J. Biol. Chem.*, 1928, **76**, 420.

1-Hexenol-5 (5-*Hydroxy*-1-*hexene, methylallylomethylcarbinol, methyl-γ-butenylcarbinol*)

$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_6H_{12}O$ MW, 100

B.p. 140°/759 mm. D^0 0·8614. Spar. sol. H_2O. $CrO_3 \longrightarrow$ allylacetone + acetic acid. $HBr \longrightarrow$ 2 : 5-dibromohexane.

Gardner, Perkin, *J. Chem. Soc.*, 1907, **91**, 851.

1-Hexenol-6 (6-*Hydroxy*-1-*hexene*, 4-*vinyl*-n-*butyl alcohol*, 5-*hexenyl alcohol*)

$HO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_6H_{12}O$ MW, 100

Me ether: $C_7H_{14}O$. MW, 114. Liq. with strong odour. B.p. 125°. D^0 0·8065, $n_D^{1.25}$ 1·4147.
Et ether: $C_8H_{16}O$. MW, 128. Liq. with strong odour. B.p. 143°. D^0 0·8103, $D^{12.5}$ 0·7998. $n_D^{12.5}$ 1·4184.

Dionneau, *Bull soc. chim.*, 1913, **13**, 524; *Ann. chim.*, 1915, **3**, 215.

2-Hexenol-1 (1-*Hydroxy*-2-*hexene*, 3-*propylallyl alcohol*, 2-*hexenyl alcohol*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_2OH$

$C_6H_{12}O$ MW, 100

B.p. 158–60°. D^{16} 0·8490. n_D^{16} 1·4403.
2-*Napthylurethane*: m.p. 76°.

Bouis, *Ann. chim.*, 1928, **9**, 402.

2-Hexenol-4 (4-*Hydroxy*-2-*hexene, ethylpropenylcarbinol*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH{:}CH{\cdot}CH_3$

$C_6H_{12}O$ MW, 100

Liq. with strong odour. B.p. 59½/27 mm. $D_4^{14 \cdot 4}$ 0·8422. $n_D^{14 \cdot 4}$ 1·43286. Heat with $KHSO_4$ ⟶ 2 : 4-hexadiene.

Me ether: $C_7H_{14}O$. MW, 114. B.p. 110–13°.

Auwers, Westerman, *Ber.*, 1921, **54**, 2993.
Prévost, *Ann. chim.*, 1928, **10**, 147.

3-Hexenol-1 (*1-Hydroxy-3-hexene, 3-propylidenepropyl alcohol, 3-hexenyl alcohol*)

$CH_3 \cdot CH_2 \cdot CH{:}CH \cdot CH_2 \cdot CH_2OH$

$C_6H_{12}O$ MW, 100

B.p. 156–7°, 55–6°/9 mm. D^{15} 0·8508. n_D^{20} 1·48030. $KMnO_4$ ⟶ propionic acid.

Walbaum, *J. prakt. Chem.*, 1917, **96**, 245.

1-Hexenone-3 (*Propyl vinyl ketone, 3-keto-1-hexene, butyrylethylene*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CO \cdot CH{:}CH_2$

$C_6H_{10}O$ MW, 98

B.p. 24°/10 mm. Polymerises.

Blaise, Maire, *Bull. soc. chim.*, 1908, **3**, 270.

1-Hexenone-4 (*Ethyl allyl ketone, 4-keto-1-hexene, 3-propionylpropylene*)

$CH_3 \cdot CH_2 \cdot CO \cdot CH_2 \cdot CH{:}CH_2$

$C_6H_{10}O$ MW, 98

B.p. 124–124·2° (126–7°). D_4^{20} 0·84976. n_D^{20} 1·42443. Heat of comb. C_v 857 Cal.

Oxime: b.p. 84°/13 mm.

Blaise, *Bull. soc. chim.*, 1905, **33**, 40.
Coppens, *Bull. Soc. chim. Belg.*, 1929, **38**, 310.

1-Hexenone-5.
See Allylacetone.

2-Hexenone-4 (*Ethyl propenyl ketone, 4-keto-2-hexene, 1-propionylpropylene*)

$CH_3 \cdot CH_2 \cdot CO \cdot CH{:}CH \cdot CH_3$

$C_6H_{10}O$ MW, 98

B.p. 140·4–140·6° (137°). D_4^{20} 0·85587. n_D^{20} 1·43911. 2 Mols. semicarbazide ⟶ ethyl propenyl ketone semicarbazide semicarbazone, m.p. 157° decomp.

Blaise, *Bull. soc. chim.*, 1905, **33**, 47.
Coppens, *Bull. soc. chim. Belg.*, 1929, **38**, 310.

2-Hexenone-5 (*1-Aceto-2-butylene, 5-keto-2-hexene, methyl β-butenyl ketone*)

$CH_3 \cdot CO \cdot CH_2 \cdot CH{:}CH \cdot CH_3$

$C_6H_{10}O$ MW, 98

B.p. 132·5–133·5°. D_4^{20} 0·91915. n_D^{20} 1·41806.

Baudrenghien, *Bull. soc. chim. Belg.*, 1922, **31**, 160.

3-Hexenone-2 (*Propylideneacetone, 2-keto-3-hexene, methyl α-butenyl ketone, 1-aceto-1-butylene*)

$CH_3 \cdot CH_2 \cdot CH{:}CH \cdot CO \cdot CH_3$

$C_6H_{10}O$ MW, 98

B.p. 136–7°. D_4^{16} 0·8601. n_D^{16} 1·4447.

Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 11.

Hexenyl Alcohol.
See 1-Hexenol-6, 2-Hexenol-1 *and* 3-Hexenol-1.

1-Hexine (*n-Butylacetylene*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot C{\vdots}CH$

C_6H_{10} MW, 82

B.p. 71·35°, 12·5°/75 mm. D^0 0·7336, D^{15} 0·7193. n_D^{12} 1·402.

$2C_6H_{10},Hg$: m.p. 96·2–96·4°.

Bourguel, *Ann. chim.*, 1925, **3**, 222, 380.
Grignard, Lapayre, Faki, *Compt. rend.*, 1928, **187**, 517.

2-Hexine (*Methylpropylacetylene*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot C{\vdots}C \cdot CH_3$

C_6H_{10} MW, 82

F.p. − 92°. B.p. 83·8°. D^0 0·7494, D_0^{13} 0·7377.

Harzer, *Chem. Zentr.*, 1914, II, 1171.

3-Hexine (*Diethylacetylene*)

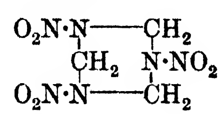
$CH_3 \cdot CH_2 \cdot C{\vdots}C \cdot CH_2 \cdot CH_3$

C_6H_{10} MW, 82

F.p. − 51°. B.p. 79–80°/770 mm. D^{20} 0·724. n_D 1·4115.

Lespiau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 627.

Hexogen (*Cyclonite, cyclotrimethylenetrinitramine, 1 : 3 : 5-trinitrohexahydro-1 : 3 : 5-triazine, trimethylenetrinitroamine, trinitrotrimethylenetriamine*)



$C_3H_6O_6N_6$ MW, 222

Cryst. from Me_2CO. M.p. 203·5°. Sol. Me_2CO, AcOH. Sp. sol. EtOH. Insol. H_2O. Explosive.

von Herz, E.P., 145,791, (*Chem. Abstracts*, 1920, **14**, 3533).
Desvergnes, *Chimie et Industrie*, 1932, **28**, 1038.

2-Hexenylcarbinol.
See 2-Heptenol-1.

n-Hexoic Acid.
See n-Caproic Acid.

n-Hexylacetylene.
See 1-Octine.

n-Hexyl Alcohol (*Hexanol*-1, 1-*hydroxyhexane*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2OH$

$C_6H_{14}O$ MW, 102

B.p. 155·2–155·7° (156·4–156·8°, 157–157·5°/755 mm.). D_0^0 0·8333, D_{20}^{20} 0·8204. n_D^{20} 1·41326.
Formyl: b.p. 153·6°. D_0^0 0·8977.
Acetyl: b.p. 169·2°. D_0^0 0·8902.
Butyryl: b.p. 205·1°. D_0^0 0·8825.
Benzoyl: b.p. 272°/770 mm. D_0^{17} 0·9985.
Et ether: *see* Ethyl *n*-hexyl Ether.
p-*Nitrophenylurethane*: m.p. 103°.

Dreger, *Organic Syntheses*, 1926, VI, 54.
Lieben, Janecek, *Ann.*, 1877, **187**, 135.
Bouveault, Blanc, D.R.P., 164,294, (*Chem. Zentr.*, 1905, II, 1700).
Derick, Bissell, *J. Am. Chem. Soc.*, 1916, **38**, 2484.
Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

Hexyl Aldehyde.
See Caproic Aldehyde.

n-Hexylamine.
See 1-Amino-*n*-hexane.

Hexylaminoethyl Alcohol.
See *N*-2-Hydroxyethylhexylamine.

n-Hexyl bromide (1-*Bromohexane*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2Br$

$C_6H_{13}Br$ MW, 165

B.p. 155·5°/743·8 mm. (153·2–153·5°/766·3 mm.), 87·8–88·2°/90 mm. D_4^0 1·1992 (1·19807), D_4^{20} 1·1763, D_4^{25} 1·16899. n_D^{20} 1·44778, n_D^{25} 1·4452.

Lieben, Janecek, *Ann.*, 1877, **187**, 137.

Hexyl chloride.
See Chlorohexane.

Hexyl 2 : 4-dihydroxyphenyl Ketone.
See 4-*n*-Heptylylresorcinol.

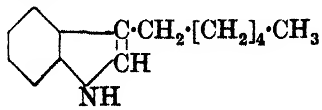
Hexylene.
See Hexene.

Hexylene Aldehyde.
See 2-Propylacrolein.

Hexyl fluoride.
See Fluorohexane.

Hexyl p-hydroxyphenyl sulphide.
See under Thiohydroquinone.

3-n-Hexylindole



$C_{14}H_{19}N$ MW, 201

Yellow liq. B.p. 212–24°/14 mm.

Korczyński, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, **56**, 906.

n-Hexyl iodide (1-*Iodohexane*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2I$

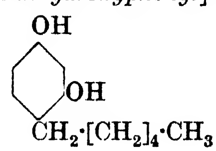
$C_6H_{13}I$ MW, 212

B.p. 179·5° (180°/763 mm.), 82°/28 mm., 73°/23 mm., 51°/6 mm. D_4^0 1·473, D_4^{20} 1·4414 (1·4387). n_D^{20} 1·4925 (1·4929).

Zelinski, Przewalski, *Chem. Zentr.*, 1908, II, 1854.
Karvonen, *Chem. Zentr.*, 1912, II, 1271.

Hexylmalonic Acid.
See Heptane-1 : 1-dicarboxylic Acid.

4-n-Hexylresorcinol (2 : 4-*Dihydroxyhexylbenzene*, 1-[2 : 4-*dihydroxyphenyl*]-*hexane*)

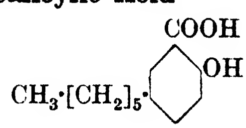


$C_{12}H_{18}O_2$ MW, 194

Needles from ligroin. M.p. 67·5–69° (68–70°). B.p. 178–80°/6–7 mm. Sol. EtOH, Et_2O, $CHCl_3$, Me_2CO. Spar. sol. ligroin. Prac. insol. H_2O. Greenish-yellow col. with $FeCl_3$ in EtOH. Urinary antiseptic.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1691.
Cox, *Rec. trav. chim.*, 1931, **50**, 850.
Hirzel, U.S.P., 1,717,105, (*Chem. Abstracts*, 1929, **23**, 3717).
Dohme, E.P., 219,922, (*Chem. Abstracts*, 1925, **19**, 705).

5-Hexylsalicylic Acid



$C_{13}H_{18}O_3$ MW, 222

Cryst. from ligroin. M.p. 86° (83–4°). Disinfectant.

Hoffmann-La Roche A.-G., Swiss P., 127,649, (*Chem. Abstracts*, 1929, **23**, 1217).
Cox, *J. Am. Chem. Soc.*, 1930, **52**, 357.

n-Hexyl n-tridecyl Ketone (*Eicosanone*-7, 7-*ketoeicosane*)

$CH_3 \cdot [CH_2]_{11} \cdot CH_2 \cdot CO \cdot CH_2 \cdot [CH_2]_4 \cdot CH_3$

$C_{20}H_{40}O$ MW, 296

B.p. 210–11°/11 mm.

Krafft, *Ber.*, 1882, **15**, 1717.

Hippuric Acid (*Benzoylaminoacetic acid, benzoylglycine*)

$C_6H_5{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}COOH$

$C_9H_9O_3N$ MW, 179

Prisms from H_2O or EtOH. M.p. 187° (188·5°). $k = 15{\cdot}7 \times 10^{-5}$ ($2{\cdot}3 \times 10^{-4}$). Sol. H_2O, EtOH, AcOEt. Spar. sol. Et_2O, $CHCl_3$, C_6H_6. Insol. CS_2, pet. ether. $H_2SO_4 + PbO_2 \longrightarrow$ benzamide. $ZnCl_2$ at 300° $\longrightarrow$ benzonitrile. Conc. $HNO_3 \longrightarrow$ oxalic acid.

Me ester: $C_{10}H_{11}O_3N$. MW, 193. Prisms. M.p. 85°. Sol. H_2O, Et_2O.

Et ester: $C_{11}H_{13}O_3N$. MW, 207. Needles from H_2O. M.p. 67·5°. D^{23} 1·043. Sol. H_2O, EtOH, Et_2O. Steam dist. $\longrightarrow$ hippuric acid.

Phenyl ester: $C_{15}H_{13}O_3N$. MW, 255. Plates from EtOH. M.p. 104°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. CS_2. Insol. pet. ether.

Chloride: $C_9H_8O_2NCl$. MW, 197·5. Indefinite m.p. Sol. C_6H_6. Insol. pet. ether.

Amide: $C_9H_{10}O_2N_2$. MW, 178. Cryst. from H_2O. M.p. 183°. Insol. cold EtOH, Et_2O. Sublimes.

Nitrile: $C_9H_8ON_2$. MW, 160. Plates from EtOH. M.p. 144°. Sol. EtOH, C_6H_6, $CHCl_3$. Spar. sol. ligroin.

Hydrazide: *see* Hippuryl hydrazide.

Baum, *Z. physiol. Chem.*, 1884, **9**, 465.
Fischer, *Ber.*, 1905, **38**, 612.
Bergell, Wülfing, *Z. physiol. Chem.*, 1910, **64**, 362.
Johnson, Burnham, *Am. Chem. J.*, 1912, **47**, 235.

Hippuric Aldehyde (*Benzoylaminoacetaldehyde*)

$C_6H_5{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CHO$

$C_9H_9O_2N$ MW, 163

Resin. Reduces Fehling's.

B,HCl: cryst. M.p. 110–15° decomp. Sol. H_2O, EtOH. Spar. sol. C_6H_6. Insol. Et_2O. Br $\longrightarrow$ hippuric acid.

Phenylhydrazone: prisms from C_6H_6. M.p. 107–8°. Sol. EtOH. Spar. sol. Et_2O, C_6H_6.

Fischer, *Ber.*, 1893, **26**, 465.

Hippuryl-α-alanine (*Hippuryl-1-aminopropionic acid*)

$C_6H_5{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}\underset{}{CH}(CH_3){\cdot}COOH$

$C_{12}H_{14}O_4N_2$ MW, 250

Needles from H_2O. M.p. 202°. Sol. EtOH. Insol. Et_2O, C_6H_6, $CHCl_3$.

Me ester: $C_{13}H_{16}O_4N_2$. MW, 264. Needles from H_2O. M.p. 136°.

Et ester: $C_{14}H_{18}O_4N_2$. MW, 278. Needles from H_2O. M.p. 124–6°. Sol. EtOH, C_6H_6, $CHCl_3$. Insol. Et_2O, ligroin.

Curtius, Lambotte, *J. prakt. Chem.*, 1904, **70**, 117.

Hippuryl-β-alanine.

See Hippuryl-2-aminopropionic Acid.

Hippurylaminoacetic Acid.

See Hippurylglycine.

***i*-Hippuryl-2-aminobutyric Acid**

$C_6H_5{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH(CH_3){\cdot}CH_2{\cdot}COOH$

$C_{13}H_{16}O_4N_2$ MW, 264

Needles from H_2O. M.p. 122°. Sol. EtOH. Insol. Et_2O, C_6H_6.

Me ester: $C_{14}H_{18}O_4N_2$. MW, 278. Needles from H_2O. M.p. 104°. Sol. EtOH. Spar. sol. C_6H_6. Insol. Et_2O.

Et ester: $C_{15}H_{20}O_4N_2$. MW, 292. Needles from H_2O. M.p. 80°. Sol. EtOH. Spar. sol. C_6H_6, Et_2O, AcOH.

Amide: $C_{13}H_{17}O_3N_3$. MW, 263. Plates from EtOH. M.p. 173°. Sol. EtOH, H_2O. Insol. Et_2O, C_6H_6.

Curtius, Gumlich, *J. prakt. Chem.*, 1904, **70**, 206.

Hippuryl-3-aminobutyric Acid

$C_6H_5{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2COOH$

$C_{13}H_{16}O_4N_2$ MW, 264

Needles from H_2O. M.p. 175°. Sol. EtOH. Insol. C_6H_6.

NH_4 salt: cryst. M.p. 161–2°.

Et ester: $C_{15}H_{20}O_4N_2$. MW, 292. Needles from H_2O. M.p. 94°. Spar. sol. Et_2O, C_6H_6.

Curtius, Müller, *J. prakt. Chem.*, 1904, **70**, 225.

Hippuryl-1-aminopropionic Acid.

See Hippuryl-α-alanine.

Hippuryl-2-aminopropionic Acid (*Hippuryl-β-alanine*)

$C_6H_5{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_{12}H_{14}O_4N_2$ MW, 250

Cryst. M.p. 183–5°. Sol. EtOH. Spar. sol. H_2O, $CHCl_3$.

Baumann, Ingvaldsen, *J. Biol. Chem.*, 1918, **35**, 276.

Hippurylglycine (*Hippurylaminoacetic acid, benzoylglycylglycine*)

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot CH_2 \cdot COOH$

$C_{11}H_{12}O_4N_2$ MW, 236

Needles from H_2O. M.p. 208° (206·5°). Sol. EtOH.Aq. Spar. sol. abs. EtOH. Insol. Et_2O, $CHCl_3$, C_6H_6, CS_2. Conc. alkalis ⟶ hippuric acid + glycine.

Et ester: $C_{13}H_{16}O_4N_2$. MW, 264. Needles from H_2O. M.p. 117°. Sol. EtOH. Spar. sol. H_2O, Et_2O, $CHCl_3$.

Amide: $C_{11}H_{13}O_3N_3$. MW, 235. Plates. M.p. 202°. Sol. EtOH. Spar. sol. Et_2O. Insol. H_2O, $CHCl_3$, C_6H_6.

Azide: $C_{11}H_{11}O_3N_5$. MW, 261. Needles. M.p. 109–10°.

Fischer, *Ber.*, 1905, **38**, 608.
Curtius, *J. prakt. Chem.*, 1916, **94**, 120.

Hippuryl hydrazide (*Benzoylaminoacethydrazide*)

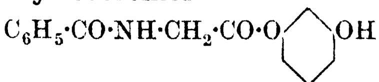
$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot NH_2$

$C_9H_{13}O_2N_3$ MW, 195

Needles. M.p. 162·5°. Mod. sol. H_2O. Sol. hot EtOH. Spar. sol. Et_2O. Reduces Fehling's. HNO_2 ⟶ hippurazide.

Curtius, *J. prakt. Chem.*, 1895, **52**, 243.

Hippurylresorcinol

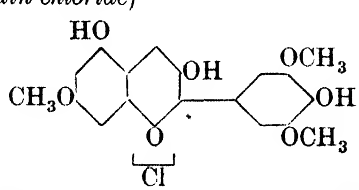


$C_{15}H_{13}O_4N$ MW, 271

Cryst. from AcOEt. M.p. 144°. Sol. EtOH, AcOH. Decomp. in alk. sol.

Fischer, *Ber.*, 1905, **38**, 2931.

Hirsutidin chloride (7 : 3′ : 5′-*Trimethoxydelphinidin chloride*)

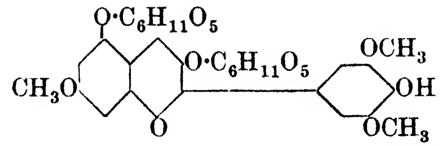


$C_{18}H_{17}O_7Cl$ MW, 380·5

Red prisms. Sol. H_2O ⟶ red col. fading on boiling: col. restored by acids. Sol. 0·1*N*/NaOH ⟶ purple-blue col. ⟶ crimson-blue (dichroic) ⟶ emerald green.

Karrer, Widmer, *Helv. Chim. Acta*, 1927, **10**, 758.
Bradley, Robinson, Schwarzenbach, *J. Chem. Soc.*, 1930, **132**, 808.

Hirsutin



$C_{30}H_{37}O_{17}$ MW, 669

Colouring matter of *Primula hirsuta*. Diglucoside of hirsutidin.

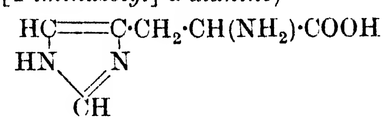
Chloride: $C_{30}H_{37}O_{17}Cl$. MW, 704·5. Opaque needles from MeOH–HCl.Aq. M.p. 150–3° decomp. NaOAc ⟶ reddish-violet col. $FeCl_3$ ⟶ stable orange col.

Robinson, Todd, *J. Chem. Soc.*, 1932, **135**, 2293.
See also first reference above.

Histamine.

See 4-[ω-Aminoethyl]-glyoxaline.

Histidine (1-*Amino*-2-*iminazolylpropionic acid*, 2-[4-*iminazolyl*]-α-*alanine*)



$C_6H_9O_2N_3$ MW, 155

Constituent of nearly all complete proteins. Sol. H_2O. Mod. sol. EtOH. $[\alpha]_D^{20}$ − 39·74° in H_2O. Dextrorotatory in HCl. Gives biuret test. Br.Aq. ⟶ red col.

Me ester: $C_7H_{11}O_2N_3$. MW, 169. *B,2HCl*: cryst. M.p. 196°.

Picrolonate: yellow needles. M.p. 220°.

Betaïne: *see* Hercynin.

Pyman, *J. Chem. Soc.*, 1916, **109**, 186.

Holarrhenine

$C_{24}H_{38}ON_2$ MW, 370

Alkaloid present in *Holarrhena congolensis*. Silky needles from AcOEt. M.p. 197–8°. Sol. EtOH, $CHCl_3$. Spar. sol. Me_2CO, Et_2O. Insol. H_2O. $[\alpha]_D$ − 7·1° in $CHCl_3$.

B,HBr: needles + $3H_2O$ from H_2O. Loses H_2O at 100°. M.p. anhyd. 265–8°. $[\alpha]_D$ (anhyd.) + 11·0°.

Acetyl deriv.: plates. M.p. 180°.

Pyman, *J. Chem. Soc.*, 1919, **115**, 163.

Holarrhimine

$C_{21}H_{36}ON_2$ MW, 332

Present in *Holarrhena antidysenterica*. Needles from AcOEt. M.p. 183°. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O, pet. ether. $[\alpha]_D^{25}$ − 14·19° in

$CHCl_3$. A diacid base. Contains no $-OCH_3$ or $-N{\cdot}CH_3$ groups. Possesses 3 active H atoms.

B,2HCl: plates from H_2O. M.p. 345° decomp. Sol. EtOH. Mod. sol. H_2O. Spar. sol. HCl.Aq. $[\alpha]^{25}_D$ − 22·80° in MeOH.

B,2HBr: plates from H_2O. M.p. 358–60° decomp.

B,H_2SO_4: m.p. 337°. Spar. sol. H_2O and all org. solvents.

B,H_2PtCl_6: powder. Darkens at 270°, chars above 300° without melting. Insol. H_2O, EtOH.

Picrate: yellow plates (hydrated) from H_2O. M.p. 108–10°. M.p. anhyd. 198–200° decomp.

Siddiqui, Pillay, *J. Indian Chem. Soc.*, 1932, **9**, 561.

Holarrhine

$C_{20}H_{38}O_3N_2$ MW, 354

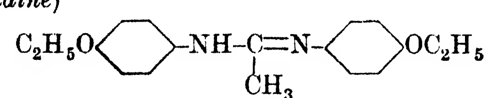
Present in *Holarrhena antidysenterica*. Needles from MeOH–AcOEt. M.p. 240°. Sol. MeOH, EtOH. Spar. sol. $CHCl_3$. Insol. AcOEt, Et_2O, pet. ether. $[\alpha]^{25}_D$ − 17·01° in MeOH. Secondary base.

B,H_2PtCl_6: darkens at 270°, chars at 300°.

Picrate: darkens at 275°, does not melt below 320°.

Siddiqui, Pillay, *J. Indian Chem. Soc.*, 1932, **9**, 562.

Holocaine (NN′-*Di*-[p-*ethoxyphenyl*]-*acetamidine*)



$C_{18}H_{20}O_2N_2$ MW, 296

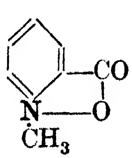
Needles. M.p. 117°. Sol. EtOH, C_6H_6, Et_2O. Spar. sol. H_2O, ligroin.

B,HCl: phenacaine. Cryst. + $1H_2O$ from H_2O. M.p. anhyd. 189°. Sol. EtOH, $CHCl_3$. Reduces $KMnO_4$ instantly. Gives positive diazo reaction. Local anæsthetic.

Tauber, D.R.P., 79,868, (*Chem. Zentr.*, 1897, I, 1100).

Kennert, *Chem. Zentr.*, 1897, II, 556.

Homarine



$C_7H_7O_2N$ MW, 137

B,HCl: needles from H_2O. M.p. 170–175° decomp. Spar. sol. MeOH, EtOH.

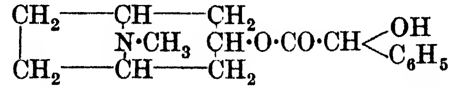
B,$HAuCl_4$: prisms from HCl. M.p. 188–90°.

B_2,H_2PtCl_6: plates from HCl. M.p. 197–8°.

Picrate: plates. M.p. 155–60°.

Hoppe-Seyler, *Z. physiol. Chem.*, 1933, **222**, 105.

Homatropine (*Phenylglycollyltropine, mandelyltropine*)



$C_{15}H_{19}O_2N$ MW, 245

Prisms from Et_2O. M.p. 99–100°. Sol. Et_2O, $CHCl_3$. Spar. sol. H_2O. Picric acid ⟶ yellow ppt. Powerful mydriatic.

B,HCl: prisms. M.p. 219–27°.

B,HBr: plates. M.p. 217–18°. Sol. H_2O. Salt commonly used in medicine.

B_2,H_2SO_4: needles. M.p. 222–6°.

Methobromide: cryst. M.p. 192–6°.

Me ether: *see* Methylhomatropine.

Chemnitius, *J. prakt. Chem.*, 1927, **117**, 144.

Homoallantoic Acid (1 : 1-*Diureidopropionic acid*)

$CH_3{\cdot}C{\cdot}[NH{\cdot}CO{\cdot}NH_2]_2{\cdot}COOH$

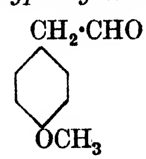
$C_5H_{10}O_4N_4$ MW, 190

Cryst. M.p. 155° decomp. Insol. H_2O. H_2O ⟶ urea + pyruvic acid.

Et ester: $C_7H_{14}O_4N_4$. MW, 218. Cryst. M.p. 200° decomp. Sol. EtOH–Py. Spar. sol. hot EtOH. Insol. H_2O and most org. solvents. H_2O at 100° ⟶ urea + pyruvic Et ester.

Simon, *Compt. rend.*, 1904, **138**, 372.

Homoanisaldehyde (p-*Methoxy-α-toluic aldehyde*, p-*methoxyphenylacetaldehyde*)



$C_9H_{10}O_2$ MW, 150

B.p. 255–6°, 117·5–118°/9 mm. Spar. sol. H_2O. D^{20}_4 1·096. n^{20}_D 1·5359. Reduces warm Fehling's.

Oxime: plates. M.p. 121° (120°).

Phenylhydrazone: m.p. 95°.

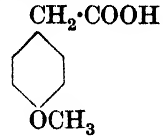
Semicarbazone: cryst. from C_6H_6. M.p. 181–2°.

Tiffeneau, *Ann. chim. phys.*, 1907, **10**, 350.

Mannich, Jacobsohn, *Ber.*, 1910, **43**, 195.

Harries, Adam, *Ber.*, 1916, **49**, 1032.

Homoanisic Acid (p-*Methoxy-α-toluic acid*, p-*methoxyphenylacetic acid*)



$C_9H_{10}O_3$ MW, 166

Plates from H_2O. M.p. 85–7°. Sol. EtOH, Et_2O.

Me ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 263–5°, 155–7°/23 mm. D^0 1·135.

Et ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 138–40°/7 mm.

Amide: $C_9H_{11}O_2N$. MW, 165. Plates from H_2O. M.p. 175°.

Chloride: $C_9H_9O_2Cl$. MW, 184·5. B.p. 143°/10 mm.

Nitrile: *p*-methoxybenzyl cyanide. C_9H_9ON. MW, 147. B.p. 285–90°. D_4^0 1·10013, D_4^{20} 1·08454. $n_D^{16\cdot 8}$ 1·53175.

Tiffeneau, *Ann. chim. phys.*, 1907, **10**, 351.
Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, **103**, 1037.
Kondo, Oshima, *Journal of the Pharmaceutical Society of Japan*, 1931, **51**, 979.

Homoanthranilic Acid.
See 3-Amino-*p*-toluic Acid.

Homoantipyrine.
See 5-Methyl-1-ethyl-2-phenylpyrazolone-3.

Homoasparagine (C-*Methylasparagine*, 1-*amino*-1-*methylsuccinic mono-amide*)

CH_3
$H_2N{\cdot}C{\cdot}COOH$
$CH_2{\cdot}CONH_2$

$C_5H_{10}O_3N_2$ MW, 146

Cryst. from EtOH. M.p. 254–6° decomp.

Amide: $C_5H_{11}O_2N_3$. MW, 145. M.p. 266–7° decomp.

Körner, Menozzi, *Atti Accad. Lincei*, 1893, **2**, ii, 370.
Migliacci, Furia, *Gazz. chim. ital.*, 1928, **58**, 103.

Homoaspartic Acid (1-*Amino*-1-*methylsuccinic acid*, C-*methylaspartic acid*)

CH_3
$H_2N{\cdot}C{\cdot}COOH$
$CH_2{\cdot}COOH$

$C_5H_9O_4N$ MW, 147

dl-.

Cryst. + $1H_2O$. M.p. 232–4°. Sol. EtOH.Aq. Spar sol. EtOH.

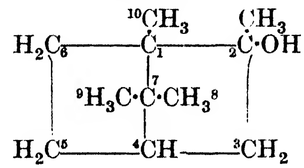
Active-.

Cryst. + $1H_2O$. M.p. 166–7°. Sol. H_2O.

Amide: *see* Homoasparagine.

Piutti, *Gazz. chim. ital.*, 1898, **28**, ii, 148, 155.

Homoborneol (2-*Methylborneol*, 2-*hydroxy*-2-*methylcamphane*, 2-*methylcamphanol*-2, 1 : 2 : 7 : 7-*tetramethylbicyclo*-[1, 2, 2,]-*heptanol*-2)

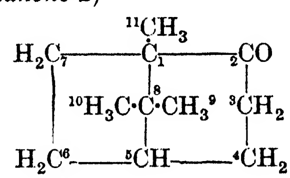


$C_{11}H_{20}O$ MW, 168

M.p. 154–6°. B.p. 193° (slight loss of H_2O). $[\alpha]_D$ + 30·79° in EtOH. Volatile in steam.

Nametkin, Schlesinger, *Ann.*, 1923, **432**, 223.
Zelinsky, *Ber.*, 1901, **34**, 2883.
Ruzicka, *Helv. Chim. Acta*, 1918, **1**, 116.

Homocamphor (1 : 8 : 8-*Trimethylbicyclo*-[1, 2, 3,]-*octanone*-2)



$C_{11}H_{18}O$ MW, 166

Cryst. mass. M.p. 189–90°. Sublimes below m.p. Sol. H_2O. Similar to camphor in solubility in org. solvents. $[\alpha]_D$ − 112·9° in C_6H_6. Volatile in steam.

Semicarbazone: needles from EtOH. M.p. 250–2°.

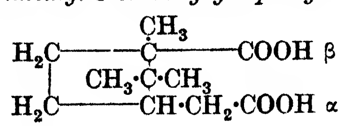
Oxime: m.p. 167–8°.

3-*Isonitroso deriv.*: plates from C_6H_6. M.p. 167–8°.

Lapworth, Royle, *J. Chem. Soc.*, 1920, **117**, 747.

β-Homocamphor.
See Homoepicamphor.

Homocamphoric Acid (1 : 2 : 2-*Trimethyl*-3-*carboxymethylcyclopentane*-1-*carboxylic acid*, 2 : 2 : 3-*trimethyl*-3-*carboxycyclopentylacetic acid*)



$C_{11}H_{18}O_4$ MW, 214

Needles from $PhNO_2$. M.p. 233°. Spar. sol. most org. solvents.

α-Et ester: $C_{13}H_{22}O_4$. MW, 242. M.p. 56°.

Di-Et ester: $C_{15}H_{26}O_4$. MW, 270. B.p. 175°.

β-Phenyl ester: $C_{17}H_{23}O_4$. MW, 291. M.p. 152–3°.

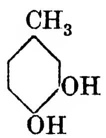
α-Et-β-phenyl ester: m.p. 51°. B.p. 221°/12 mm.

α-Nitrile: *see* Cyanocampholic Acid.

Palfray, *Ann. chim.*, 1923, **20**, 297.
Lapworth, Royle, *J. Chem. Soc.*, 1920, **117**, 750.
Haller, *Compt. rend.*, 1896, **122**, 446.

β-Homocamphoric Acid.
See Homoepicamphoric Acid.

Homocatechol (*4-Methylcatechol, 3 : 4-dihydroxytoluene*)



$C_7H_8O_2$ MW, 124

Prisms from C_6H_6. M.p. 65°. B.p. 251°, 210–15°/190 mm., 143–6°/20 mm. $D_4^{73\cdot6}$ 1·1287. $n_D^{73\cdot6}$ 1·5425. Sol. H_2O, EtOH, Et_2O. Spar. sol. ligroin. Sublimes. Reduces $NH_3.AgNO_3$ and Fehling's. $FeCl_3 \longrightarrow$ green col. Alk. sol. turns red in air.

3-Me ether: *see* Creosol.

4-Me ether: isocreosol, 4-methylguaiacol, 3-hydroxy-4-methoxytoluene. $C_8H_{10}O_2$. MW, 138. Leaflets. M.p. 37–9°. B.p. 223°. D_4^{39} 1·0742. n_D^{39} 1·5269. Sublimes. Volatile in steam. *Picrate*: m.p. 88°.

Di-Me ether: *see* Homoveratrol.

3-Et ether: 4-hydroxy-3-ethoxytoluene, 2-hydroxy-5-methylphenetole. $C_9H_{12}O_2$. MW, 152. M.p. 58°.

Di-Et ether: 3 : 4-diethoxytoluene. $C_{11}H_{16}O_2$. MW, 180. B.p. 227–30°, 123°/70 mm. D_0^0 1·0303.

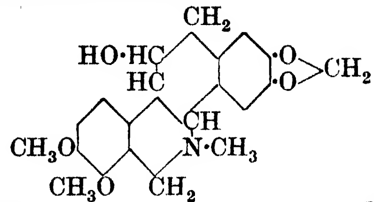
3-Me-4-Et ether: 3-methoxy-4-ethoxytoluene. $C_{10}H_{14}O_2$. MW, 166. B.p. 223°. D_0^0 1·032.

Diacetyl: b.p. 260–4°, 160°/70 mm.

Pauly, *Ber.*, 1909, **42**, 421.
De Vries, *Rec. trav. chim.*, 1909, **28**, 278.
Perkin, *J. Chem. Soc.*, 1896, **69**, 1185.
Cousin, *Compt. rend.*, 1893, **116**, 105.

Homocerebron.
See Kerasin.

α-Homochelidonine

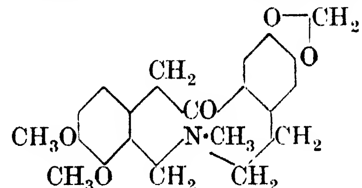


$C_{21}H_{23}O_5N$ MW, 369

Alkaloid from *Chelidonium majus*. Prisms from AcOEt. M.p. 182°. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O.

Schmidt, Selle, *Arch. Pharm.*, 1890, **228**, 441.
Späth, Kuffner, *Ber.*, 1931, **64**, 1123.

β-Homochelidonine (*α-Allocrytopine*)



$C_{21}H_{23}O_5N$ MW, 369

Occurs with other chelidonines in *Sanguinaria canadensis*, *Eschscholtzia californica*, etc. Prisms from AcOEt. M.p. 159–60°. Sol. AcOEt, $CHCl_3$. Spar. sol. EtOH, Et_2O. Sol. conc. H_2SO_4 to carmine sol. $POCl_3 \longrightarrow$ dihydroanhydroberberine methochloride, m.p. 200–1°.

B,HCl: m.p. 190°.

B,HAuCl₄: m.p. 190–2°.

Methosulphate,3H₂O: m.p. 125°.

α-Methiodide: m.p. 185°.

β-Methiodide: m.p. 211°.

Haworth, Perkin, *J. Chem. Soc.*, 1926, 445.
Gadamer, *Arch. Pharm.*, 1920, **258**, 156.
Fischer, *Arch. Pharm.*, 1901, 239, 409.
Momoya, *Chem. Abstracts*, 1919, **13**, 1459.

γ-Homochelidonine (*β-Allocryptopine*).

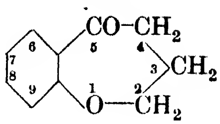
Alkaloid constituent of *Sanguinaria canadensis*. Tablets from AcOEt. M.p. 168° (170–1°). Sol. $CHCl_3$. Spar. sol. cold EtOH, Et_2O. Physical isomer of β-homochelidonine.

B,HCl,1½H₂O: m.p. 175° decomp.

B,HAuPtCl₄: m.p. 187°.

Miller, *J. Am. Pharm. Assocn.*, 1929, **18**, 12.
Konig, Tietz, *Arch. Pharm.*, 1893, **231**, **161**.
Jowett, Pyman, *J. Chem. Soc.*, 1913, **103**, 299.
See also third reference above.

5-Homochromanone



$C_{10}H_{10}O_2$ MW, 162

Oil. Sol. EtOH, Et_2O, C_6H_6, pet. ether. Warm conc. H_2SO_4 ⟶ red col.

Oxime: white plates from pet. ether. M.p. 99°.

Semicarbazone: needles from EtOH. M.p. 228–9°.

Powell, Anderson, *J. Am. Chem. Soc.*, 1931, **53**, 811.

Homocinchonidine

$C_{19}H_{22}ON_2$ MW, 294

One of the cinchona alkaloids. Prisms from EtOH. M.p. 207·5°. $[\alpha]_D$ − 107·3° in EtOH. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O. Insol. H_2O. Similar in properties to cinchonine. Recryst. of neutral sulphate ⟶ cinchonidine sulphate. Ox. ⟶ cinchonetidine, m.p. 256°.

Acetyl: $[\alpha]_D$ − 34° in EtOH.

B,HCl,2H₂O: $[\alpha]_D$ − 138° in EtOH.

$B_2,H_2SO_4,6H_2O$: $[\alpha]_D$ − 138° in EtOH.

Hesse, *Ann.*, 1880, **205**, 203; *Ber.*, 1881, **14**, 1891.

Homococaine. *See under* Ecgonine.

Homocystine (*Di-[3-amino-3-carboxy]-propyl disulphide*)

$S{\cdot}CH_2{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$
$S{\cdot}CH_2{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$

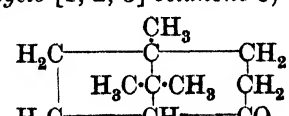
$C_8H_{16}O_4N_2S_2$ MW, 268

Plates from H_2O. M.p. 260–5° decomp. Can replace cystine as growth promoter.

Butz, du Vigneaud, *J. Biol. Chem.*, 1932, **99**, 135.

du Vigneaud, Dyer, Harmon, *J. Biol. Chem.*, 1932, **101**, 719.

Homoepicamphor (β-*Homocamphor*, 1:8:8-*trimethylbicyclo*-[1, 2, 3]-*octanone*-3)



$C_{11}H_{18}O$ MW, 166

M.p. 202–4°. $[\alpha]_D^{13}$ + 13° in MeOH. Sol. most org. solvents. Volatile in steam.

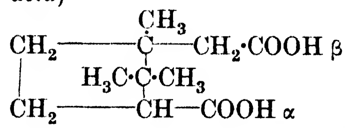
Semicarbazone: m.p. 245–7°.

Oxime: m.p. 105°.

Isonitroso deriv.: m.p. 174–5°. $[\alpha]_D^{22}$ + 175·6° in MeOH.

Salmon-Legagneur, *Compt. rend.*, 1932, **194**, 467; *Bull. soc. chim.*, 1932, **51**, 807.

Homoepicamphoric Acid (1 : 2 : 2-*Trimethyl-3-carboxycyclopentylacetic acid*, β-*homocamphoric acid*)



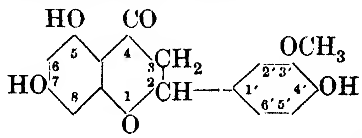
$C_{11}H_{18}O_4$ MW, 214

M.p. 220–2°. $[\alpha]_D^{18}$ + 27·2° in MeOH.

β-*Mononitrile*: $C_{11}H_{17}O_2N$. MW, 195. M.p. 155–6°. $[\alpha]_D^{20}$ + 40·1° in MeOH.

See above references.

Homoeriodictyol (*Eriodictyonone*, 5 : 7 : 4′-*trihydroxy-3′-methoxyflavanone*)



$C_{16}H_{14}O_6$ MW, 302

Occurs in leaves of *Eriodictyon glutinosum*, Benth. Needles from AcOH. M.p. 224–5°. $[\alpha]_D^{20}$ − 28·21° in EtOH. Mod. sol. EtOH, AcOH. Spar. sol. AcOEt. Insol. H_2O, $CHCl_3$, C_6H_6. $FeCl_3$ ⟶ red col. Reduces Fehling's.

7 : 4′-*Di-Me ether*: $C_{18}H_{18}O_6$. MW, 330. Needles. M.p. 136°.

Oxime: leaflets from EtOH. M.p. 224°.

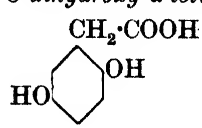
Phenylhydrazone: yellow cryst. from EtOH. M.p. 184–6°.

Shinoda, Sato, *Chem. Abstracts*, 1929, **23**, 4210.

Mossler, *Ann.*, 1907, **351**, 233.

Power, Tutin, *J. Chem. Soc.*, 1907, **91**, 887.

Homogentisic Acid (2 : 5-*Dihydroxyphenylacetic acid*, 2 : 5-*dihydroxy-α-toluic acid*)



$C_8H_8O_4$ MW, 168

Occurs in plants, and urine of alcaptonurics. Prisms + $1H_2O$ from H_2O. Plates from EtOH–$CHCl_3$. M.p. anhyd. 152–4° (146·5–147°). Sol.

H_2O, EtOH, Et_2O. Insol. $CHCl_3$, C_6H_6. Reduces Fehling's. KOH fusion ⟶ hydroquinone. Ox. ⟶ *p*-benzoquinonylacetic acid.

Me ester: *di-Me ether*, $C_{11}H_{14}O_4$. MW, 210. M.p. 45°. *Dibenzoyl*: m.p. 125°.

Et ester: $C_{10}H_{12}O_4$. MW, 196. M.p. 119–20°. *Dibenzoyl*: m.p. 130–1°.

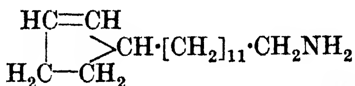
Amide: *dibenzoyl*, m.p. 204°.

Di-Me ether: $C_{10}H_{12}O_4$. MW, 196. M.p. 124·5°.

Dibenzoyl: m.p. 181°.

Wolkow, Baumann, *Z. physiol. Chem.*, 1888, **15**, 282.
Blix, *Z. physiol. Chem.*, 1932, **210**, 87.
Hahn, Stenner, *Z. physiol. Chem.*, 1929, **181**, 100.
Mörner, *Z. physiol. Chem.*, 1921, **117**, 85.

Homohydnocarpylamine (ω-*Cyclopentenyldodecylamine*, ω-*aminododecylcyclopentene*)



$C_{17}H_{33}N$ MW, 251

Cryst. from EtOH. M.p. 18°. B.p. 190°/15 mm.

B,HCl: m.p. 151° (160°).

N-*Acetyl*: m.p. 60°.

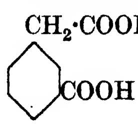
Picrate: m.p. 112°.

Naegeli, Stefanovitsch, *Helv. Chim. Acta*, 1928, **11**, 648.
Naegeli, Vogt-Markus, *Helv. Chim. Acta*, 1932, **15**, 67.

Homohydroquinone.

See Toluhydroquinone.

Homoisophthalic Acid (m-*Carboxyphenylacetic acid*, 3-*carboxy*-α-*toluic acid*)



$C_9H_8O_4$ MW, 180

Needles or plates from H_2O. M.p. 184–5°. Sol. hot H_2O, EtOH, Et_2O. Spar. sol. cold H_2O, C_6H_6, $CHCl_3$. Sublimes. Ox. ⟶ isophthalic acid.

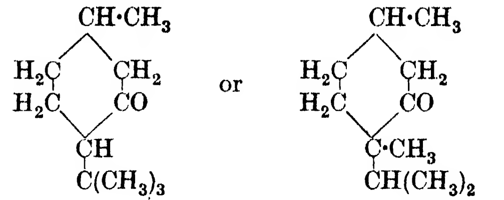
Di-nitrile: *see m*-Cyanobenzyl cyanide.

Reinglass, *Ber.*, 1891, **24**, 2417.
Komppa, Hirn, *Ber.*, 1903, **36**, 3611.

Homolevulinic Acid.

See 3-Keto-*n*-caproic Acid.

Homomenthone (1-*Methyl*-4-tert.-*butylcyclohexanone*-3, 1 : 4-*dimethyl*-4-*isopropylcyclohexanone*-3, 4(or 8)-*methylmenthone*)



$C_{11}H_{20}O$ MW, 168

B.p. 93°/11 mm. D_4^{20} 0·9050. n_D^{20} 1·4642. $[\alpha]_D^{20}$ + 43·98.

Semicarbazone: m.p. 186°.

Rupe, Schobel, Abegg, *Ber.*, 1912, **45**, 1539.

Homomestiones.

The above trivial name has been given to a number of unsaturated ketones which are here grouped together.

1. 3-Methyl-3-heptenone-5, 5-keto-3-methylheptene-3.

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH{:}\overset{CH_3}{\overset{|}{C}}{\cdot}CH_2{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 66°/18 mm., 53–4°/8 mm. $D_4^{21\cdot5}$ 0·85516. $n_D^{21\cdot5}$ 1·45073.

Semicarbazone: m.p. 162°.

2. 3-Methyl-2-heptenone-5, 5-keto-3-methylheptene-2.

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}{:}CH{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 63°/19 mm. $D_4^{21\cdot2}$ 0·85244. $n_D^{21\cdot2}$ 1·43668.

Semicarbazone: m.p. 134°.

3. 3 : 4-Dimethyl-3-hexenone-2, 1 : 2-dimethyl-1-acetobutylene-1, 3-methyl-2-acetopentene-2, 2-keto-3 : 4-dimethylhexene-3.

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}{=\!=}\overset{CH_3}{\overset{|}{C}}{\cdot}CO{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 65°/20 mm. $D_4^{17\cdot4}$ 0·86856. $n_D^{17\cdot4}$ 1·45283.

Semicarbazone: m.p. 180–2°.

4. 3 : 4-Dimethyl-2-hexenone-5, 1 : 2-dimethyl-1-acetobutylene-2, 3-methyl-4-acetopentene-2, 5-keto-3 : 4-dimethylhexene-2.

$$CH_3{\cdot}CO{\cdot}\overset{CH_3}{\overset{|}{CH}}{-}\overset{CH_3}{\overset{|}{C}}{:}CH{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 154°/750 mm., 48°/12 mm. $D_4^{19\cdot2}$ 0·85385. $n_D^{19\cdot2}$ 1·43768.

Semicarbazone: two forms, m.p's. 163° and 203–4°.

Abbot, Kon, Satchell, *J. Chem. Soc.*, 1928, 2519 *et seq.*

5. 4-Methyl-3-ethyl-3-heptenone-5, 5-keto-4-methyl-3-ethylheptene-3.

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}\overset{CH_3}{C}{=\!=}\overset{C_2H_5}{C}{\cdot}CH_2{\cdot}CH_3$$

$C_{10}H_{18}O$ MW, 154

B.p. 80°/10 mm. D_4^{19} 0·86218. n_D^{19} 1·45453. *Semicarbazone*: m.p. 153°.

6. 4-Methyl-3-ethyl-2-heptenone-5, 5-keto-4-methyl-3-ethylheptene-2.

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}\overset{CH_3}{C}H{-}\overset{C_2H_5}{C}{:}CH{\cdot}CH_3$$

$C_{10}H_{18}O$ MW, 154

B.p. 74°/10 mm. D_4^{21} 0·85640. n_D^{21} 1·44522. *Semicarbazone*: m.p. 109°.

7. 4-Methyl-4-nonenone-6, 6-keto-4-methylnonene-4.

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$$

$C_{10}H_{18}O$ MW, 154

B.p. 90–2°/16 mm. D_4^{20} 0·8608. n_D^{20} 1·45183.

8. 4-Methyl-3-nonenone-6, 6-keto-4-methylnonene-3.

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}CH_3$$

$C_{10}H_{18}O$ MW, 154

B.p. 94°/18 mm. $D_4^{21·5}$ 0·84130. $n_D^{21·5}$ 1·44291.

9. 4-Methyl-3-ethyl-3-heptenone-2, 4-methyl-3-acetoheptene-3, 2-keto-4-methyl-3-ethylheptene-3.

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{=\!=}\overset{C_2H_5}{C}{\cdot}CO{\cdot}CH_3$$

$C_{10}H_{18}O$ MW, 154

B.p. 83°/14 mm. D_4^{20} 0·85589. n_D^{20} 1·45353. *Semicarbazone*: m.p. 123°.

10. 4-Methyl-5-ethyl-3-heptenone-6, 4-methyl-5-acetoheptene-3, 6-keto-4-methyl-5-ethylheptene-3.

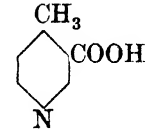
$$CH_3{\cdot}CO{\cdot}\overset{C_2H_5}{C}H{-\!-}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}CH_3$$

$C_{10}H_{18}O$ MW, 154

B.p. 69°/11 mm. D_4^{20} 0·84503. n_D^{20} 1·44050. *Semicarbazone*: m.p. 154°.

Kon, Leton, *J. Chem. Soc.*, 1931, 2502 *et seq.*

Homonicotinic Acid (4-*Methylpyridine*-3-*carboxylic acid*, 4-*methylnicotinic acid*, γ-*picoline*-3-*carboxylic acid*)



$C_7H_7O_2N$ MW, 137

Prisms from H_2O. M.p. 215–16° decomp. Hot $Ca(OH)_2$ ⟶ γ-picoline. Hot H·CHO ⟶ trimethylolhomonicotinic lactone.

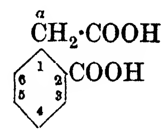
Et ester: $C_9H_{11}O_2N$. MW, 165. B.p. 118°/12 mm. *Picrate*: m.p. 137°. *Chloroplatinate*: m.p. 183° decomp.

Chloride: C_7H_6ONCl. MW, 155·5. B.p. 105°/12 mm. *Chloroplatinate*: m.p. 206–7° decomp.

B,HAuCl₄: decomp. 190° (sinters at 180°).

Gabriel, Colman, *Ber.*, 1902, **35**, 2849.
Rabe, Jantzen, *Ber.*, 1921, **54**, 925.

Homophthalic Acid (o-*Carboxy*-α-*toluic acid*, o-*carboxyphenylacetic acid*)



$C_9H_8O_4$ MW, 180

M.p. 180–1°. Sol. EtOH, hot H_2O. Spar. sol. Et_2O. Insol. $CHCl_3$, C_6H_6. k (first) = 1·91 × 10^{-6} at 25°: (second) = 0·9 × 10^{-6} at 25°. Ox. ⟶ phthalic acid.

2-*Me ester*: $C_{10}H_{10}O_4$. MW, 194. M.p. 143–5°. $k = 4·34 \times 10^{-5}$ at 25°. *Amide*: $C_{10}H_{11}O_3N$. MW, 193. M.p. 110–12°.

α-*Me ester*: m.p. 96–8°. $k = 7·64 \times 10^{-5}$ at 25°.

2-*Et ester*: $C_{11}H_{12}O_4$. MW, 208. M.p. 111—13°. $k = 4·6 \times 10^{-5}$ at 25°.

α-*Et ester*: m.p. 107–8°. $k = 7·08 \times 10^{-5}$ at 25°.

Di-Me ester: $C_{11}H_{12}O_4$. MW, 208. M.p. 39–42°. B.p. 169–74°/15 mm.

Di-Et ester: $C_{13}H_{16}O_4$. MW, 236. B.p. 291·5–292·5°.

Anhydride: $C_9H_6O_3$. MW, 162. M.p. 140·5–141°.

2-*Amide*: $C_9H_9O_3N$. MW, 179. M.p. 230° decomp. $k = 5·0 \times 10^{-5}$ at 25°.

α-*Amide*: m.p. 185–7° (184°). $k = 8·9 \times 10^{-5}$ at 25°.

α-*Nitrile*: o-carboxybenzyl cyanide. $C_9H_7O_2N$. MW, 161. M.p. 116° decomp.

Dinitrile: *see* *o*-Cyanobenzyl cyanide.
Imide: $C_9H_7O_2N$. MW, 161. M.p. 233°.
Anilide: m.p. 231·5°.

Davies, Poole, *J. Chem. Soc.*, 1928, 1616.
Dieckmann, Hardt, *Ber.*, 1919, **52**, 1141.

Homopilomalic Acid (2-*Hydroxymethylpentane*-1 : 3-*dicarboxylic acid*, 2-*hydroxymethyl*-1-*ethylglutaric acid*)

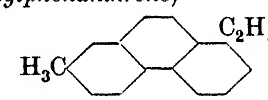
$CH_3·CH_2·CH·COOH$
$HO·CH_2·CH$
$CH_2·COOH$

$C_8H_{14}O_5$ MW, 190

Free acid unstable.
Di-Et ester: $C_{12}H_{22}O_5$. MW, 246. B.p. 293°/755 mm., 181–3°/26 mm.
Diamide: $C_8H_{16}O_3N_2$. MW, 188. Prisms from H_2O. M.p. 208° (206°). Sol. H_2O, EtOH. $[\alpha]_D^{18}$ + 20·8° in EtOH.Aq.

Jowett, *J. Chem. Soc.*, 1901, **79**, 1338.
Pinner, Schwarz, *Ber.*, 1902, **35**, 198.

Homopimanthrene (*Methylpimanthrene*, 7-*methyl*-1-*ethylphenanthrene*)



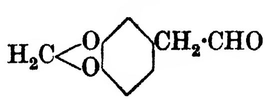
$C_{17}H_{16}$ MW, 220

Plates from EtOH. M.p. 81°.
Picrate: yellow needles from MeOH. M.p. 115–16°.
Quinoxaline deriv.: needles from AcOH. M.p. 154°.

Ruzicka, Balas, *Helv. Chim. Acta*, 1924, **7**, 875.
Ruzicka, de Graaf, Müller, *Helv. Chim. Acta*, 1932, **15**, 1300.
Haworth, *J. Chem. Soc.*, 1932, 2718.

Homopiperidinic Acid.
See 4-Amino-*n*-valeric Acid.

Homopiperonal (3 : 4-*Methylenedioxyphenylacetaldehyde*, 3 : 4-*methylenedioxy*-α-*toluic aldehyde*)

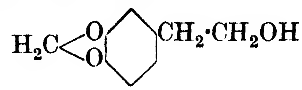


$C_9H_8O_3$ MW, 164

Cryst. from MeOH. M.p. 69°. B.p. 143–4°/10 mm., 123–5°/1 mm. D_{20} 1·295. n_D 1·57117.
Oxime: needles from EtOH.Aq. M.p. 121° (124–5°). B.p. 180–1°/10 mm.
Semicarbazone: cryst. from MeOH. M.p. 189°.
2 : 4-*Dinitrophenylhydrazone*: orange leaflets from AcOH. M.p. 140–1°.

Semmler, Bartelt, *Ber.*, 1908, **41**, 2751.
Erdtman, Robinson, *J. Chem. Soc.*, 1933, 1530.

Homopiperonyl Alcohol (2-[3 : 4-*Methylenedioxyphenyl*]-*ethyl alcohol*)

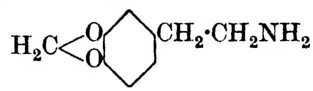


$C_9H_{10}O_3$ MW, 166

B.p. 156°/10 mm. n_D 1·54780.

Semmler, Bartelt, *Ber.*, 1908, **41**, 2752.

Homopiperonylamine (2-[3 : 4-*Methylenedioxyphenyl*]-*ethylamine*)

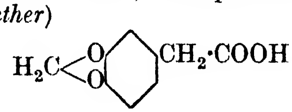


$C_9H_{11}O_2N$ MW, 165

B.p. 166°/20 mm., 146–8°/10 mm. D^{20} 1·225. n_D 1·5620.
B,HCl: m.p. 208–9° (210–11°).
Picrate: m.p. 160° decomp.

Kindler, Peschke, *Arch. Pharm.*, 1931, **269**, 70.
See also above reference.

Homopiperonylic Acid (3 : 4-*Methylenedioxyphenylacetic acid*, *homoprotocatechuic acid methylene ether*)

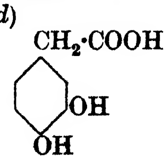


$C_9H_8O_4$ MW, 180

Cryst. from H_2O. M.p. 127°.
Me ester: $C_{10}H_{10}O_4$. MW, 194. B.p. 153–5°/10 mm. D^{20} 1·246. n_D 1·534.
Nitrile: $C_9H_7O_2N$. MW, 161. B.p. 153–6°/10 mm. D_{20} 1·231. n_D 1·53698.

Semmler, Bartelt, *Ber.*, 1908, **41**, 2752.
Stevens, *J. prakt. Chem.*, 1934, **140**, 46.
Slotta, Haberland, *J. prakt. Chem.*, 1934, **139**, 211.

Homoprotocatechuic Acid (3 : 4-*Dihydroxyphenylacetic acid*)



$C_8H_8O_4$ MW, 168

Needles from C_6H_6. M.p. 127°. Sol. H_2O, EtOH, Et_2O. Insol. pet. ether. Reduces

NH_3.$AgNO_3$ and Fehling's. $FeCl_3$ ⟶ green col. KOH fusion ⟶ protocatechuic acid.

3-*Me ether* : *see* Homovanillic Acid.

3 : 4-*Di-Me ether* : *see* Homoveratric Acid.

Methylene ether : *see* Homopiperonylic Acid.

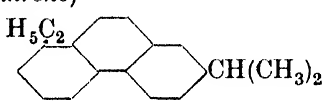
3 : 4-*Diacetyl* : cryst. from EtOH.Aq. M.p. 89–90°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Pictet, Gams, *Ber.*, 1909, **42**, 2949.

Homopyrrole.

See Methylpyrrole.

Homoretene (*Methylretene, 8-ethyl-2-isopropylphenanthrene*)



$C_{19}H_{20}$ MW, 248

Plates from EtOH. M.p. 79°.

Quinoxaline deriv. : yellow needles from AcOH. M.p. 165–6°.

Picrate: yellow ppt. from EtOH. M.p. 101–4°.

Ruzicka, Meyer, *Helv. Chim. Acta*, 1922, **5**, 590.

Ruzicka, de Graaf, Müller, *Helv. Chim. Acta*, 1932, **15**, 1300.

Haworth, *J. Chem. Soc.*, 1932, 2719.

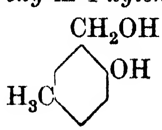
Homosalicylaldehyde.

See Hydroxytoluic Aldehyde *and* *o*-Hydroxyphenylacetaldehyde.

Homosalicylic Acid.

See Hydroxytoluic Acid.

Homosaligenin (5-*Methylsaligenin, 5-methyl-2-hydroxybenzyl alcohol, 2-hydroxy-5-methylbenzyl alcohol, 3-ω-hydroxy-*m*-4-xylenol*)

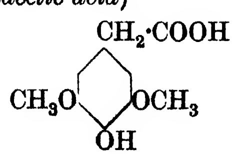


$C_8H_{10}O_2$ MW, 138

Plates from H_2O. M.p. 105°. Very sol. EtOH, Et_2O, hot H_2O. Sol. 15 parts H_2O at ord. temp.

Auwers, *Ber.*, 1907, **40**, 2531.

Homosyringic Acid (4-*Hydroxy*-3 : 5-*dimethoxyphenylacetic acid*)



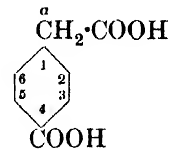
$C_{10}H_{12}O_5$ MW, 212

Needles from ligroin. M.p. 130–1°. Sol. C_6H_6. Insol. pet. ether. $FeCl_3$ ⟶ red col.

Benzoyl : needles from C_6H_6. M.p. 149–50°.

Mauthner, *J. prakt. Chem.*, 1935, **142**, 32.

Homoterephthalic Acid (p-*Carboxyphenylacetic acid*)



$C_9H_8O_4$ MW, 180

Cryst. from EtOH.Aq. M.p. 237–8°. Sol. Et_2O, C_6H_6. Sol. 100 parts H_2O at 50°, 7 parts EtOH at 30°.

Di-Et ester : $C_{13}H_{16}O_4$. MW, 236. B.p. 312–13°.

4-*Amide* : $C_9H_9O_3N$. MW, 179. M.p. 229°.

α-*Amide* : cryst. from EtOH. M.p. 261°.

Diamide: $C_9H_{10}O_2N_2$. MW, 178. M.p. 235°.

4-*Nitrile*: *p*-cyanophenylacetic acid. $C_9H_7O_2N$. MW, 161. Cryst. from EtOH. M.p. 152°.

α-*Nitrile* : cryst. from EtOH.Aq. M.p. 201°.

Dinitrile : *see* *p*-Cyanobenzyl cyanide.

α-*Amide-4-nitrile* : $C_9H_8ON_2$. MW, 160. Cryst. from EtOH.Aq. M.p. 195·5° (196°).

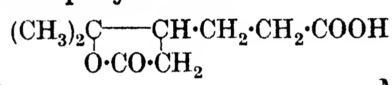
4-*Amide-α-nitrile* : plates from EtOH. M.p. 182°.

Mellinghoff, *Ber.*, 1889, **22**, 3211.

Fileti, Basso, *Gazz. chim. ital.*, 1895, **21**, 61.

Fileti, Baldracco, *J. prakt. Chem.*, 1893, **47**, 532.

Homoterpenylic Acid



$C_9H_{14}O_4$ MW, 186

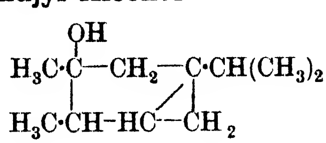
Plates from H_2O. M.p. 100–1° (100–102·5° from Et_2O). Very sol. H_2O, $CHCl_3$. Spar. sol. Et_2O.

Et ester : $C_{11}H_{18}O_4$. MW, 214. B.p. 186°/18 mm. Liq. at − 15°.

Baeyer, Villiger, *Ber.*, 1896, **29**, 1928.

Simonsen, *J. Chem. Soc.*, 1907, **91**, 190.

Homothujyl Alcohol



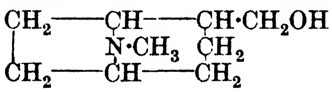
$C_{11}H_{20}O$ MW, 168

Exists in two forms.

(i) *Solid form.*
Needles from MeOH. M.p. 84°. $[\alpha]_D^{15\cdot5}$ − 30·5° in Et_2O, $[\alpha]_D^{12}$ − 26·0° in MeOH. Does not react with phenyl isocyanate.
(ii) *Liquid form.*
B.p. 204°. $[\alpha]_D^{14}$ + 35·9° in Et_2O, $[\alpha]_D^{13}$ + 33·4° in MeOH. Does not react with phenyl isocyanate.

Wallach, *Ann.*, 1908, **360**, 93.
Thomson, *J. Chem. Soc.*, 1910, **97**, 1509.

Homotropine



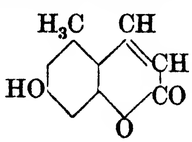
$C_9H_{17}ON$ MW, 155

Needles from ligroin. M.p. 85°. Sol. H_2O, EtOH, Et_2O. Spar. sol. pet. ether. $[\alpha]_D^{20}$ + 22·48° in EtOH. Mydriatic and local anæsthetic.
B,HCl: cryst. from EtOH–Et_2O. M.p. 192°.
B,HAuCl$_4$: cryst. M.p. 191°.
Picrate: needles from EtOH. M.p. 208–9°.
Methiodide: cryst. from EtOH. Does not melt below 300°. *B,H$_2$PtCl$_6$*: red cryst. M.p. 183°. *B,HAuCl$_4$*: yellow leaflets. M.p. 238°.
Benzoyl deriv.: *picrate*, yellow cryst. M.p. 177°.
Tropic ester: *see* Mydriasin.

v. Braun, Müller, *Ber.*, 1918, **51**, 239.

Homotropinic Acid.
See Granatic Acid.

Homoumbelliferone (*7-Hydroxy-5-methylcoumarin, 5-methylumbelliferone*)

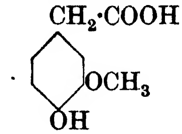


$C_{10}H_8O_3$ MW, 176

Yellow plates from Me_2CO. M.p. 248°. Sol. EtOH, Me_2CO, AcOH. Insol. H_2O, $CHCl_3$, C_6H_6. Sol. alkalis and conc. H_2SO_4 with blue fluor.
Acetyl: needles from H_2O. M.p. 126°. Sol. EtOH, Et_2O. KOH ⟶ blue fluor.
Me ether: $C_{11}H_{10}O_3$. MW, 190. Needles from EtOH.Aq. M.p. 146°. Sol. C_6H_6, $CHCl_3$. Spar. sol. EtOH, Et_2O. Conc. H_2SO_4 ⟶ blue fluor.

v. Pechmann, Welsh, *Ber.*, 1884, **17**, 1649.
Hoesch, *Ber.*, 1913, **46**, 890.

Homovanillic Acid (*Homoprotocatechuic acid 3-methyl ether, 4-hydroxy-3-methoxyphenylacetic acid, 4-hydroxy-3-methoxy-α-toluic acid*)

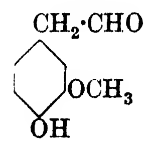


$C_9H_{10}O_4$ MW, 182

Prisms from H_2O or C_6H_6. M.p. 142° (139°). Sol. hot H_2O, EtOH, Et_2O. Spar. sol. cold C_6H_6. $FeCl_3$ ⟶ faint green col. Dist. Ca salt with $Ca(OH)_2$ ⟶ creosol. Hot dil. HCl ⟶ homoprotocatechuic acid + CH_3Cl.
Et ester: $C_{11}H_{14}O_4$. MW, 210. B.p. 180–5° 13–15 mm.
4-*Acetyl*: m.p. 140° (134°).
4-*Carbomethoxyl*: m.p. 140–1°.

Tiemann, Nagai, *Ber.*, 1877, **10**, 202, 204.
Mauthner, *Ann.*, 1909, **370**, 373.
Kitasato, *Chem. Abstracts*, 1928, **22**, 1780.

Homovanillin (*4-Hydroxy-3-methoxyphenylacetaldehyde*)

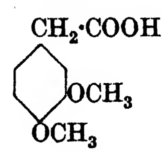


$C_9H_{10}O_3$ MW, 166

Prisms from CCl_4. M.p. 50–50·5° (165°). B.p. 111–14°/0·45 mm., 105–6°/0·25 mm. Sol. H_2O, Et_2O, pet. ether. Spar. sol. EtOH. Reduces Fehling's. Resinified by acids or alkalis.
Me ether: *see* Homoveratric Aldehyde.
Acetyl: p-*nitrophenylhydrazone*, m.p. 179°.
Oxime: m.p. 115°.
p-*Nitrophenylhydrazone*: m.p. 154·5°.
Semicarbazone: m.p. 173°.

Harries, Haarmann, *Ber.*, 1915, **48**, 39.
Harries, *Ber.*, 1915, **48**, 868.

Homoveratric Acid (*Homoveratrumic acid, 3:4-dimethoxy-α-toluic acid, 3:4-dimethoxyphenylacetic acid, homoprotocatechuic acid dimethyl ether*)



$C_{10}H_{12}O_4$ MW, 196

Needles + $1H_2O$ from H_2O. Cryst. anhyd. from C_6H_6–pet. ether. M.p. 82° (80°), anhyd. 98–9°. Sol. H_2O, EtOH, Et_2O.

Et ester: $C_{12}H_{16}O_4$. MW, 224. B.p. 191°/25 mm.

Chloride: $C_{10}H_{11}O_3Cl$. MW, 214·5. B.p. approx. 240°/25 mm.

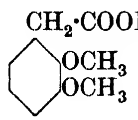
Amide: $C_{10}H_{13}O_3N$. MW, 195. M.p. 145–7°.

Nitrile: $C_{10}H_{11}O_2N$. MW, 177. M.p. 64–5°. B.p. 171–8°/10 mm.

Hydrazide: m.p. 115–16°.

Pictet, Gams, *Ber.*, 1909, **42**, 2949.
Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, **103**, 1038.
Kaufmann, Müller, *Ber.*, 1918, **51**, 127.

o-Homoveratric Acid (2 : 3-*Dimethoxy-α-toluic acid*, 2 : 3-*dimethoxyphenylacetic acid, homo-o-veratrumic acid*)



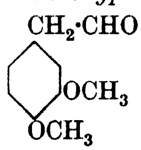
$C_{10}H_{12}O_4$ MW, 196

Cryst. from H_2O or pet. ether. M.p. 82–3°.

Amide: $C_{10}H_{13}O_3N$. MW, 195. M.p. 130–130·5°.

Späth, Mosettig, *Ann.*, 1923, **433**, 146.
Montequi, *Chem. Abstracts*, 1930, **24**, 605.

Homoveratric Aldehyde (*Homovanillin methyl ether*, 3 : 4-*dimethoxyphenylacetaldehyde*)



$C_{10}H_{12}O_3$ MW, 180

Yellow oil. B.p. 121°/0·35 mm. D_{20}^{20} 1·55. n_D^{20} 1·5426. Spar. sol. H_2O. Reduces warm Fehling's.

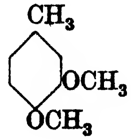
Oxime: m.p. 90–1°.

p-*Nitrophenylhydrazone*: m.p. 159°.

Semicarbazone: m.p. 181°.

Mannich, Jacobsohn, *Ber.*, 1910, **43**, 196.
Harries, Haarmann, *Ber.*, 1915, **48**, 41.
Harries, Adam, *Ber.*, 1916, **49**, 1030.

Homoveratrol (3:4-*Dimethoxytoluene, homocatechol dimethyl ether*, 4-*methylveratrol, creosol* 4-*methyl ether*)

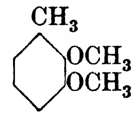


$C_9H_{12}O_2$ MW, 152

Prisms from Et_2O. M.p. 24° (21°). B.p. 219–21° (216°), 128–30°/25 mm., 116–17°/23 mm. Sol. EtOH, Et_2O. Insol. H_2O, dil. EtOH. D_4^4 1·0653, D_{15}^{15} 1·0562 (1·0491). n_D^{25} 1·5257. Ox. ⟶ veratric acid.

De Vries, *Rec. trav. chim.*, 1909, **28**, 292.
Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, **97**, 1134.

o-Homoveratrol (2 : 3-*Dimethoxytoluene*, 3-*methylveratrol*)



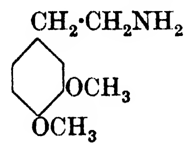
$C_9H_{12}O_2$ MW, 152

Oil. B.p. 92–3°/18 mm. Conc. H_2SO_4 ⟶ pink col. on standing.

Mosimann, Tambor, *Ber.*, 1916, **49**, 1262.

Homoveratrumic Acid.
See Homoveratric Acid.

Homoveratrylamine (3 : 4 - *Dimethoxy - phenylethylamine*, 4-[β-*aminoethyl*]-*veratrol*)



$C_{10}H_{15}O_2N$ MW, 181

M.p. 124°. B.p. 188°/15 mm. Sol. H_2O, EtOH. Insol. Me_2CO. Conc. HCl at 150° ⟶ 3 : 4-dihydroxyphenylethylamine.

B,HCl: m.p. 154–5°.

B_2,H_2PtCl_6: m.p. 196° (174°).

N-*Formyl*: m.p. 40–2°. B.p. 170°/0·01 mm.

N-*Homoveratroyl*: needles from dil. AcOH or $CHCl_3$-pet. ether. M.p. 124°. Sol. hot H_2O, $CHCl_3$, AcOH. Insol. pet. ether. Sol. conc. HCl, pptd. unchanged by H_2O.

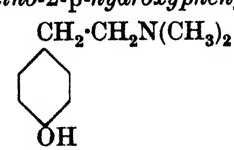
N-*Trimethylhomogalloyl*: m.p. 98°.

N-*Homopiperonyl*: m.p. 136°.

N-4-*Methoxybenzyl*: m.p. 123–5°.

Späth, Polgar, *Monatsh.*, 1929, **51**, 190.
Kindler, D.R.P., 571,794, (*Chem. Abstracts*, 1933, **27**, 4246).
Mannich, Jacobsohn, *Ber.*, 1910, **43**, 196.

Hordenine (*Anhaline*, p-β-*dimethylamino-ethylphenol, dimethyl*-p-*hydroxyphenylethylamine*, 1-*dimethylamino*-2-p-*hydroxyphenylethane*)



$C_{10}H_{15}ON$ MW, 165

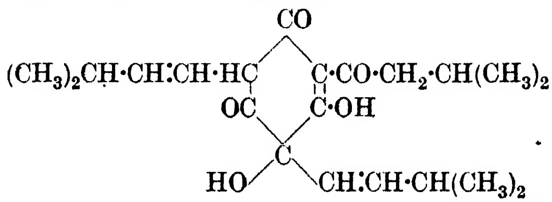
Alkaloid of barley germs and Mexican *Anhalonium Fissuratum*. Prisms. M.p. 117°. B.p. 173–4°/11 mm. Sublimes at 140–50°. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$. Spar. sol. C_6H_6. Reduces acid $KMnO_4$ and $NH_3.AgNO_3$.

B_2,H_2SO_4 : m.p. anhyd. 205° (209–11°).
B,HCl : m.p. 176–7°.
Benzoyl deriv. : m.p. 47–8°.
Picrate : m.p. 139–40°.
Methoiodide : m.p. 229–30°.

Voswinckel, *Ber.*, 1912, **45**, 1004.
Späth, Sobel, *Monatsh.*, 1920, **41**, 77.
Späth, *Monatsh.*, 1919, **40**, 129.

Humulene.
See Caryophyllene.

Humulone (*α-Lupulinic acid*)



$C_{21}H_{30}O_5$ MW, 362

One of the bitter acids from hops. Cryst. M.p. 66–66·5°. Sol. org. solvents. Spar. sol. H_2O. $[\alpha]_D^{20}$ $-232{\cdot}2°$. Reduces $NH_3.AgNO_3$. Alc. $FeCl_3$ ⟶ reddish-violet col.

o-*Phenylenediamine deriv.* : cryst. from C_6H_6. M.p. 115–17°.

Wöllmer, *Ber.*, 1916, **49**, 782.
Wieland, *Ber.*, 1925, **58**, 2012.

Hydantoic Acid (*Carbamylglycine, ureidoacetic acid, glycoluric acid,* N-*carboxymethylurea*)

$H_2N{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}COOH$

$C_3H_6O_3N_2$ MW, 118

Prisms. M.p. 180° (156°, 163°). Sol. hot H_2O, EtOH. Spar. sol. cold H_2O, cold EtOH, Et_2O. Heat of comb. C_p 308·4 Cal., C_v 308·9 Cal. Br ⟶ parabanic acid. HI at 170° ⟶ CO_2, NH_3, and glycine. Hot $FeCl_3$ ⟶ red col.

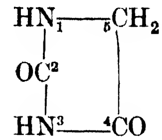
Et ester : $C_5H_{10}O_3N_2$. MW, 146. Needles from H_2O. M.p. 135°. Insol. Et_2O.

n-*Butyl ester* : $C_7H_{14}O_3N_2$. MW, 174. M.p. 119°.

Amide : $C_3H_7O_2N_3$. MW, 117. Prisms from H_2O. M.p. 180° (204°).

Baeyer, *Ann.*, 1864, **130**, 160.
Weidel, Roithner, *Monatsh.*, 1896, **17**, 188.
Lippich, *Ber.*, 1908, **41**, 2959.
Harries, Weiss, *Ber.*, 1900, **33**, 3418.
West, *J. Biol. Chem.*, 1918, **34**, 188.

Hydantoin (*Diketotetrahydroglyoxaline, glycollylurea*)



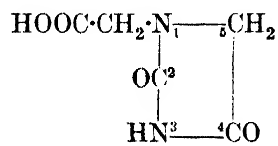
$C_3H_4O_2N_2$ MW, 100

Needles from MeOH. M.p. 220° (216°). Sol. EtOH. Spar. sol. H_2O, Et_2O. Sol. alkalis. Br ⟶ parabanic acid. H·CHO ⟶ hydroxymethylhydantoin, m.p. 125°. Hot $Ba(OH)_2$ ⟶ hydantoic acid.

1-*Acetyl* : m.p. 143–4°.
1 : 3-*Diacetyl* : m.p. 104–5°.
3-*Benzylidene* : $C_{10}H_8O_2N_2$. MW, 188. Yellow needles from EtOH. M.p. 220°.

Pauly, Sauter, *Ber.*, 1930, **63**, 2068.
Harries, Weiss, *Ber.*, 1900, **33**, 3419.
Johnson, Bengis, *J. Am. Chem. Soc.*, 1913, **35**, 1605.
Diels, Heintzel, *Ber.*, 1905, **38**, 305.
Anschütz, *Ann.*, 1889, **254**, 260.

1-Hydantoinacetic Acid (1-*Carboxymethylhydantoin*)



$C_5H_6O_4N_2$ MW, 158

Cryst. from H_2O.

Me ester: $C_6H_8O_4N_2$. MW, 172. Cryst. from C_6H_6. M.p. 114° (107–8°).

Et ester : $C_7H_{10}O_4N_2$. MW, 186. Needles from C_6H_6. M.p. 84–5°.

Amide : $C_5H_7O_3N_3$. MW, 157. Plates from H_2O. M.p. 196–7°.

Jongkees, *Rec. trav. chim.*, 1908, **27**, 324.
Bailey, Snyder, *J. Am. Chem. Soc.*, 1915, **37**, 935, 945.

3-Hydantoinacetic Acid (3-*Carboxymethylhydantoin*).

Cryst. from EtOH. M.p. 196°. Sol. H_2O, alkalis. Stable to acids, unstable to alkalis. NaOH ⟶ glycylglycine-carboxylic acid.

Et ester : needles from Et_2O. M.p. 120°. 5-*Benzylidene deriv.*, m.p. 155°.

Propyl ester : $C_8H_{12}O_4N_2$. MW, 200. M.p. 116°.

Isobutyl ester : $C_9H_{14}O_4N_2$. MW, 214. M.p. 124°.

Isoamyl ester : $C_{10}H_{16}O_4N_2$. MW, 228. M.p. 104°.

Amide: m.p. 226°.
Anilide: m.p. 218°.
5-*Benzyl*: m.p. 181–3°.
5-*Benzylidene*: m.p. 260°.

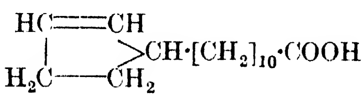
Gränacher, Landolt, *Helv. Chim. Acta*, 1927, **10**, 799.
Johnson, Renfrew, *J. Am. Chem. Soc.*, 1925, **47**, 240.
Cerchez, *Bull. soc. chim.*, 1931, **49**, 602.
Locquin, Cerchez, *Compt. rend.*, 1929, **188**, 177.

5-Hydantoinacetic Acid (5-*Carboxymethylhydantoin, malyureidic acid*).

Prisms from EtOH or H_2O. M.p. 215–16° (224–6°) decomp. Spar. sol. H_2O, EtOH. Insol. EtOH.

Lippich, *Ber.*, 1908, **41**, 2972.
Gabriel, *Ann.*, 1906, **348**, 87.
Johnson, Guest, *Am. Chem. J.*, 1912, **48**, 103.

Hydnocarpic Acid (ω-*Cyclopentenylundecylic acid*)



$C_{16}H_{28}O_2$ MW, 252

Constituent of saponifiable matter of Chaulmoogra oil. Plates from EtOH. M.p. 59–60°. Spar. sol. most org. solvents. Readily sol. $CHCl_3$. $[\alpha]_D$ + 68·1° in $CHCl_3$.

Me ester: $C_{17}H_{30}O_2$. MW, 266. M.p. 8°. B.p. 200–3°/19 mm. $[\alpha]_D$ + 62·4° in $CHCl_3$.

Et ester: $C_{18}H_{32}O_2$. MW, 280. B.p. 211°/19 mm. $[\alpha]_D$ + 51·6° in $CHCl_3$.

Amide: $C_{16}H_{29}ON$. MW, 251. Fine needles from EtOH. M.p. 112–13°. $[\alpha]_D$ + 70·2° in $CHCl_3$.

dl-*Nitrile*: $C_{16}H_{27}N$. MW, 233. Colourless liq. B.p. 155–6°/2–3 mm.. D_{25}^{25} 0·8580. n_D^{25} 1·4559.

Power, Barrowcliff, *J. Chem. Soc.*, 1905, **87**, 888.
Shriner, Adams, *J. Am. Chem. Soc.*, 1925, **47**, 2727.
Hinegardner, *J. Am. Chem. Soc.*, 1933, **55**, 2831.

Hydracetine.

β-Acetylphenylhydrazine, *q.v.*

Hydracrylic Acid (2-*Hydroxypropionic acid, β-lactic acid, ethylene-lactic acid*)

HO·CH_2·CH_2·COOH

$C_3H_6O_3$ MW, 90

Free acid exists as syrup. $k = 3{\cdot}11 \times 10^{-3}$ at 25°. Dist. ⟶ acrylic acid + H_2O. Salts on heating ⟶ diacrylic acid and paradipimelic acids. Ox. ⟶ oxalic acid + CO_2. KOH fusion ⟶ formic, acetic, oxalic and glycollic acids.

Na salt: m.p. 143°.

Me ether: *see* 2-Methoxypropionic Acid.

Et ether: 2-ethoxypropionic acid. $C_5H_{10}O_3$. MW, 118. B.p. 119°/19 mm. D_4^{15} 1·0508. $k = 3{\cdot}19 \times 10^{-3}$. *Et ester*: $C_7H_{14}O_3$. MW, 146. B.p. 63°/13 mm., 50°/7 mm. *Amide*: $C_5H_{11}O_2N$. MW, 117. M.p. 50·5°. *Nitrile*: C_5H_9ON. MW, 99. B.p. 172°. D_4^{25} 0·9189.

Phenyl ether: *see* 2-Phenoxypropionic Acid.

Me ester: $C_4H_8O_3$. MW, 104. B.p. 177–84°, 121°/94 mm., 79°/12 mm. D^{16} 1·105. n_D^{23} 1·43.

Et ester: $C_5H_{10}O_3$. MW, 118. B.p. 185–90°, 81°/13 mm. D^{20} 1·059. n_D^{23} 1·4271.

Propyl ester: $C_6H_{12}O_3$. MW, 132. B.p. 142°/107 mm., 98°/12 mm. D^{25} 1·4341. n_D^{23} 1·4341.

Isopropyl ester: b.p. 128·5°/82 mm., 95°/12 mm. D^{25} 1·058. n_D^{23} 1·4303.

Nitrile: ethylene cyanohydrin. C_3H_5ON. MW, 71. B.p. 220°, 110°/15 mm. D^0 1·059. Misc. with H_2O, EtOH. P_2O_5 ⟶ acrylic nitrile. HCl ⟶ NH_4Cl + hydracrylic and acrylic acids.

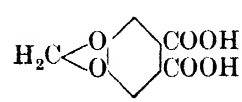
Acetyl: b.p. 205–8°.

Read, *Organic Syntheses*, 1927, VII, 55.
Kendall, McKenzie, *Organic Syntheses*, 1923, III, 57.
Palomaa, *Chem. Zentr.*, 1912, II, 596.
Palomaa, Kilpi, *Chem. Zentr.*, 1910, II, 1453.
Drushel, Holden, *Chem. Zentr.*, 1916, I, 142.

Hydracrylic Aldehyde.

See 2-Hydroxypropionaldehyde.

Hydrastic Acid (4 : 5-*Methylenedioxyphthalic acid*)



$C_9H_6O_6$ MW, 210

Prisms from H_2O. M.p. 175° decomp. (187° rapid heat.). Spar. sol. H_2O, Et_2O. Insol. $CHCl_3$, pet. ether.

Mono-Me ester: $C_{10}H_8O_6$. MW, 224. Plates from EtOH. M.p. 136°.

Di-Me ester: $C_{11}H_{10}O_6$. MW, 238. Leaflets from EtOH. M.p. 88–9°.

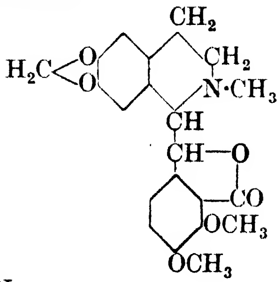
Anhydride: $C_9H_4O_5$. MW, 192. Needles from EtOH. M.p. 175°.

Imide: methylenedioxyphthalimide.

$C_9H_5O_4N$. MW, 191. Needles from AcOH. M.p. 275–7°.

Freund, *Ann.*, 1892, **271**, 375.
Stevens, Robertson, *J. Chem. Soc.*, 1927, 2790.

l-Hydrastine



$C_{21}H_{21}O_6N$ MW, 383

Alkaloid from Golden Seal (*Hydrastis canadensis*). Prisms from EtOH. M.p. 132°. $[\alpha]_D^{20}$ − 49·8° in EtOH. Bitter taste. Sol. Et_2O, $CHCl_3$, C_6H_6. Spar. sol. EtOH. Insol. H_2O. Sol. conc. H_2SO_4 to violet sol., conc. HNO_3 to orange sol. Sol. in dil. H_2SO_4 + $KMnO_4$ ⟶ blue fluor. HNO_3 ⟶ hydrastinine + opianic acid. Salts are unstable.

B,HCl: m.p. 116°. $[\alpha]_D$ + 127·3° in dil. HCl.
Picrate: m.p. 184°.

Freund, *Ann.*, 1892, **271**, 311.
Eigkman, *Rec. trav. chim.*, 1886, **5**, 291.
Freund, Will, *Ber.*, 1887, **20**, 88.

Hydrastine *a* (*Synthetic hydrastine*).

Prisms from AcOEt. M.p. 137°. Sol. $CHCl_3$. Spar. sol. cold EtOH, Et_2O.

B,HCl: m.p. 165° decomp.
Picrate: m.p. 219°.

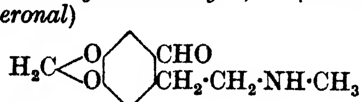
Hope, Pyman, Remfry, Robinson, *J. Chem. Soc.*, 1931, 236.
Marshall, Pyman, Robinson, *J. Chem. Soc.*, 1934, 1317.

Hydrastine *b*.

Prisms from EtOH. M.p. 151–2°. Synthetic hydrastine isomeric with hydrastine *a*.

See above references.

Hydrastinine (4 : 5 - *Methylenedioxy* - 2 - β - *methylaminoethylbenzaldehyde*, 6-β-*methylaminoethylpiperonal*)



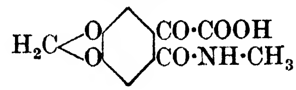
$C_{11}H_{13}O_3N$ MW, 207

Needles from pet. ether. M.p. 116–17°. Sol. non-polar solvents to colourless sols. Sol. H_2O, EtOH, etc., to yellow fluorescent sols. Alk. $KMnO_4$ ⟶ hydrastininic acid. NaOH ⟶ oxyhydrastinine, m.p. 98°.

N-*Acetyl*: needles from H_2O. M.p. 105°.
N-*Benzoyl*: m.p. 98–9°.
B,HCl: m.p. 212° decomp.
B,HI: m.p. 233–4°.
Oxime: m.p. 145–6°. *Mono-acetyl*: m.p. 90°. *Diacetyl*: m.p. 121–2°.
B_2,H_2PtCl_6: m.p. 207° decomp.
Methoiodide: m.p. 267°.

Fritsch, *Ann.*, 1895, **286**, 18.
Freund, *Ann.*, 1892, **271**, 311; *Ber.*, 1889, **22**, 2330.

Hydrastininic Acid (3 : 4-[*Methylenedioxy*-6-*methylcarbamyl*]-*benzoylformic acid*)



$C_{11}H_9O_6N$ MW, 251

Needles from H_2O. M.p. 164° decomp. Spar. sol. H_2O. Insol. $CHCl_3$. HNO_3 ⟶ hydrastic acid + $CH_3{\cdot}NH_2$.

Freund, *Ann.*, 1892, **271**, 371; *Ber.*, 1889, **22**, 1159.

Hydratropic Acid (1-*Phenylpropionic acid*, α-*methylphenylacetic acid*)

$$\begin{array}{c} C_6H_5 \\ | \\ CH_3{\cdot}CH{\cdot}COOH \end{array}$$

$C_9H_{10}O_2$ MW, 150

B.p. 264–5°, 160°/25 mm. Spar. sol. H_2O. Alk. $KMnO_4$ ⟶ atrolactinic acid.

Me ester: $C_{10}H_{12}O_2$. MW, 164. B.p. 221°, 119°/22 mm.
Et ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 230°.
Chloride: C_9H_9OCl. MW, 168·5. B.p. 97–8°/12·5 mm.
Amide: $C_9H_{11}ON$. MW, 149. Needles from EtOH.Aq. M.p. 91–2°.
Nitrile: C_9H_9N. MW, 131. B.p. 230–2°. Sol. EtOH, Et_2O.

Janssen, *Ann.*, 1889, **250**, 136.
Neure, *ibid.*, 151.
Rupe, *Ann.*, 1909, **369**, 332.
Opolski, Kowalski, Pilewski, *Ber.*, 1916, **49**, 2282.

Hydrazine-carboxylic Acid.
See Hydrazinoformic Acid.
Hydrazine-dicarboxylic Acid.
See Hydrazoformic Acid.
Hydrazinoacetic Acid

$$NH_2{\cdot}NH{\cdot}CH_2{\cdot}COOH$$

$C_2H_6O_2N_2$ MW, 90

Cryst. from EtOH. M.p. 152°.
B,HI : cryst. M.p. 156°.

Darapsky, Prabhakar, *Ber.*, 1912, **45**, 1662.

1-Hydrazinobutyric Acid

NH·NH$_2$
CH_3·CH_2·CH·COOH

$C_4H_{10}O_2N_2$ MW, 118

Cryst. M.p. 208°.

Traube, Longinescu, *Ber.*, 1896, **29**, 674.

4-Hydrazino-1-ethylbenzene.
See *p*-Ethylphenylhydrazine.

Hydrazinoisobutyric Acid

NH·NH$_2$
$(CH_3)_2$C·COOH

$C_4H_{10}O_2N_2$ MW, 118

Plates from EtOH. M.p. 237° decomp. Sol. H_2O. Insol. Et_2O, EtOH. Reduces NH_3.$AgNO_3$ and Fehling's.
B,HCl : needles from H_2O. M.p. 156–7°.
B_2,H_2SO_4 : needles from H_2O. M.p. 189°.
Et ester : $C_6H_{14}O_2N_2$. MW, 146. B.p. 93–5°/13 mm.

Thiele, Heuser, *Ann.*, 1896, **290**, 17.

1-Hydrazinoisovaleric Acid

NH·NH$_2$
$(CH_3)_2$CH·CH·COOH

$C_5H_{12}O_2N_2$ MW, 132

Plates from H_2O. M.p. 230–5° decomp. Spar. sol. H_2O.
Diacetyl deriv. : cryst. from EtOH. M.p. 205°.

Darapsky, *J. prakt. Chem.*, 1917, **96**, 283.

Hydrazinoformic Acid (*Hydrazine-carboxylic acid, carbazinic acid*)

H_2N·NH·COOH

$CH_4O_2N_2$ MW, 76

White powder. Decomp. about 90°.
Me ester : $C_2H_6O_2N_2$. MW, 90. Cryst. M.p. 75°. B.p. 108°/12 mm. Very sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6. Insol. pet. ether. Volatile in steam. *B,HCl* : m.p. 160°.
Et ester : $C_3H_8O_2N_2$. MW, 104. Cryst. M.p. 46°. B.p. 108–9°/22 mm., 93°/9 mm.
Amide : *see* Semicarbazide.

Diels, Fritzsche, *Ber.*, 1911, **44**, 3022.
Diels, *Ber.*, 1914, **47**, 2186.

***p*-Hydrazinophenol.**
See *p*-Hydroxyphenylhydrazine.

1-Hydrazinopropionic Acid

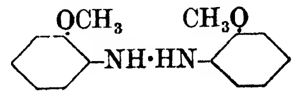
NH·NH$_2$
CH_3·CH·COOH

$C_3H_8O_2N_2$ MW, 104

Needles from EtOH. M.p. 181°. Very sol. H_2O. Insol. EtOH, Et_2O. Reduces Fehling's.
Et ester hydrochloride : $C_5H_{12}O_2N_2$,HCl. MW, 168·5. Plates from EtOH. M.p. 108–10° decomp.

Davapsky, *J. prakt. Chem.*, 1917, **96**, 281.
Bailey, Mikeska, *J. Am. Chem. Soc.*, 1916, **38**, 1782.

***o*-Hydrazoanisole** (2 : 2′-*Dimethoxyhydrazobenzene*)

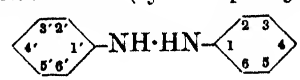


$C_{14}H_{16}O_2N_2$ MW, 244

Plates. M.p. 102°. HCl ⟶ dianisidine.

Starke, *J. prakt. Chem.*, 1899, **59**, 209.
Wülfing, D.R.P., 100,234, (*Chem. Zentr.*, 1899, I, 720).
Nelson, U.S.P., 1,469,586, (*Chem. Abstracts*, 1923, **17**, 3878).

Hydrazobenzene (sym.-*Diphenylhydrazine*)



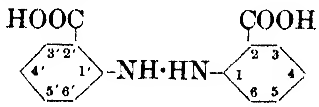
$C_{12}H_{12}N_2$ MW, 184

Plates or rhombohedra from EtOH–Et_2O. M.p. 126–7°. Sol. EtOH. Mod. sol. C_6H_6. Spar. sol. H_2O. Insol. AcOH. Decomp. at m.p. ⟶ azobenzene + aniline. HNO_2, Cl, I, O_3 ⟶ azobenzene. KOH at 100° ⟶ azobenzene + 2-hydroxyazobenzene. HCl ⟶ benzidine.
N-*Me* : $C_{13}H_{14}N_2$. MW, 198. Needles from ligroin. M.p. 75°. Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O.
NN′-*Di-Me* : $C_{14}H_{16}N_2$. MW, 212. Oil. B.p. 138°/1 mm.
NN′-*Di-Et* : $C_{16}H_{20}N_2$. MW, 240. Oil. B.p. 141°/1 mm. Volatile in steam.
N-*Acetyl* : *sym.*-diphenylacethydrazide. $C_{14}H_{14}ON_2$. MW, 226. Needles from EtOH. M.p. 159°. Spar. sol. Et_2O. Insol. H_2O. Heat. ⟶ acetanilide + azobenzene.
NN′-*Diacetyl* : yellow rhombohedra from EtOH. M.p. 105°. Sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O. Conc. H_2SO_4 ⟶ benzidine.
N-*Benzoyl* : NN′-diphenylbenzhydrazide. Exists in two forms. (i) Prisms from EtOH,

Me_2CO, or AcOH. M.p. 38–9°. (ii) Plates from C_6H_6, $CHCl_3$, or pet. ether. M.p. 126°.
NN′-Dibenzoyl: prisms from EtOH. M.p. 161–2°. Sol. Me_2CO.

Darmstädter, D.R.P., 189,312, (*Chem. Zentr.*, 1907, II, 2002).
Ismailski, Kolpenskii, Russian P., 29,172, (*Chem. Zentr.*, 1933, II, 3049).
Stern, *Ber.*, 1884, **17**, 380.
Schmidt, Schultz, *Ann.*, 1881, **207**, 327.
Freundler, *Compt. rend.*, 1903, **136**, 1553.
Rassow, *J. prakt. Chem.*, 1911, **84**, 267.
Wieland, Fressel, *Ann.*, 1912, **392**, 147.

Hydrazobenzene-2 : 2′-dicarboxylic Acid (oo′-*Hydrazobenzoic acid*)



$C_{14}H_{12}O_4N_2$ MW, 272

Plates from EtOH. M.p. 205°. Stable when dry. Damp air ⟶ azobenzene-2 : 2′-dicarboxylic acid. Hot dil. H_2SO_4 ⟶ benzidine-3 : 3′-dicarboxylic acid.
Diamide: $C_{14}H_{14}O_2N_4$. MW, 270. Needles from AcOH. M.p. 233°. Sol. Me_2CO, AcOH. Spar. sol. EtOH, Et_2O, $CHCl_3$.

Homolka, *Ber.*, 1884, **17**, 1904.
Schultz, Rohde, Vicari, *Ann.*, 1907, **352**, 129.
Heller, *Ber.*, 1910, **43**, 1914.

Hydrazobenzene-2 : 3′-dicarboxylic Acid (om′-*Hydrazobenzoic acid*).
Needles from EtOH.Aq. M.p. 206° decomp. Sol. ord. org. solvents.

Paal, Fritzweiler, *Ber.*, 1892, **25**, 3597.

Hydrazobenzene-3 : 3′-dicarboxylic Acid (mm′-*Hydrazobenzoic acid*).
Yellow flakes from EtOH.Aq. Spar. sol. EtOH. Insol. H_2O. Alk. sol. in air ⟶ azobenzene-3 : 3′-dicarboxylic acid. Reduces $NH_3.AgNO_3$.

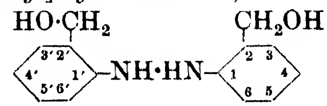
Strecker, *Ann.*, 1864, **129**, 141.

Hydrazobenzene-4 : 4′-dicarboxylic Acid (pp′-*Hydrazobenzoic acid*).
Needles from EtOH. Insol. H_2O.
Di-Et ester: $C_{18}H_{20}O_4N_2$. MW, 328. Needles from EtOH.Aq. M.p. 118°. Sol. EtOH, Me_2CO, $CHCl_3$, AcOEt. Spar. sol. pet. ether. Insol. H_2O. Oxidises readily.

Bilfinger, *Ann.*, 1865, **135**, 159.
Krösche, *Chem. Zentr.*, 1915, II, 1186.

Hydrazobenzoic Acid.
See Hydrazobenzene-dicarboxylic Acid.

***o*-Hydrazobenzyl Alcohol** (2 : 2′-*Di-[hydroxymethyl]-hydrazobenzene*)



$C_{14}H_{16}O_2N_2$ MW, 244

M.p. 200°. Undergoes benzidine rearrangement to 3 : 3′-di-[hydroxymethyl]-benzidine.
Diacetyl: m.p. above 250°.
Dibenzoyl: m.p. 107°.

Sen, Sadasivan, *J. Ind. Chem. Soc.*, 1932, **9**, 403.

***m*-Hydrazobenzyl Alcohol** (3 : 3′-*Di-[hydroxymethyl]-hydrazobenzene*).
M.p. 268°. Undergoes benzidine rearrangement to 2 : 2′-di-[hydroxymethyl]-benzidine.
Diacetyl: m.p. above 220°.

See previous reference.

Hydrazodiacetyl.
See sym.-Diacetylhydrazine.

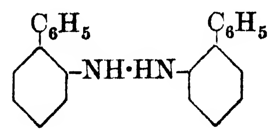
Hydrazodibenzoyl.
See sym.-Dibenzoylhydrazine.

Hydrazodibenzyl.
See sym.-Dibenzylhydrazine.

Hydrazodicarbonimide.
See Urazole.

Hydrazodicarboxylic Acid.
See Hydrazoformic Acid.

***o*-Hydrazodiphenyl** (*NN′-Di-*o*-diphenylhydrazine, NN′-di-*o*-xenylhydrazine, 2 : 2′-hydrazodiphenyl*)

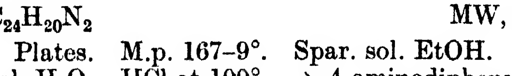


$C_{24}H_{20}N_2$ MW, 336

Needles from EtOH. M.p. 182°. Hot. conc. HCl ⟶ 3 : 3′-diphenylbenzidine.

Friebel, Rassow, *J. prakt. Chem.*, 1901, **63**, 459.

***p*-Hydrazodiphenyl** (*NN′-Di-*p*-diphenylhydrazine, NN′-di-*p*-xenylhydrazine, 4 : 4′-hydrazodiphenyl*)



$C_{24}H_{20}N_2$ MW, 336

Plates. M.p. 167–9°. Spar. sol. EtOH. Insol. H_2O. HCl at 100° ⟶ 4-aminodiphenyl.

Friebel, Rassow, *J. prakt. Chem.*, 1901, **63**, 449.

Hydrazoditoluyl.
See Ditoluylhydrazine.

Hydrazoethane.
See sym.-Diethylhydrazine.

Hydrazoformic Acid (*Hydrazo-dicarboxylic acid,* sym.*-hydrazine-dicarboxylic acid*)

HOOC·NH·NH·COOH

$C_2H_4O_4N_2$ MW, 120

Di-Me ester: $C_4H_8O_4N_2$. MW, 148. Prisms or needles. M.p. 132°. Very sol. H_2O, EtOH. Spar. sol. Et_2O. Insol. pet. ether.

Di-Et ester: $C_6H_{12}O_4N_2$. MW, 176. Prisms from H_2O. M.p. 130°. B.p. about 250° with slight decomp. Very sol. EtOH, Et_2O. Spar. sol. cold H_2O.

Diamide: $C_2H_6O_2N_4$. MW, 118. Needles from H_2O. M.p. 248°. Spar. sol. H_2O. Insol. EtOH, Et_2O. *Diacetyl deriv.*: cryst. from H_2O. M.p. above 300°.

Me ester-amide: $C_3H_7O_3N_3$. MW, 133. Cryst. from EtOH. M.p. 169–70°.

Diels, Fritzsche, *Ber.*, 1911, **44**, 3025.
Diels, Paquin, *Ber.*, 1913, **46**, 2007.
Curtius, Heidenreich, *J. prakt. Chem.*, 1895, **52**, 476.

1 : 1′-Hydrazoisobutyric Acid

$$HOOC\cdot\underset{CH_3}{\overset{CH_3}{C}}\cdot NH\cdot HN\cdot\underset{CH_3}{\overset{CH_3}{C}}\cdot COOH$$

$C_8H_{16}O_4N_2$ MW, 204

Prisms from H_2O. M.p. 223–4°. Sol. H_2O. Spar. sol. EtOH, Et_2O, AcOEt.

Di-Me ester: $C_{10}H_{20}O_4N_2$. MW, 232. Prisms from ligroin. M.p. 53–4°. B.p. 216°.

Di-Et ester: $C_{12}H_{24}O_4N_2$. MW, 260. B.p. 231–3°. D_4^{23} 0·99784.

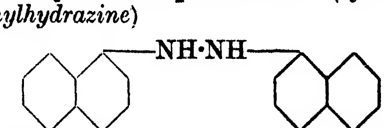
Mononitrile: $C_8H_{15}O_2N_3$. MW, 185. Cryst. from Et_2O or ligroin. M.p. 100°. Very sol. Et_2O, EtOH. Spar. sol. ligroin.

Dinitrile: $C_8H_{14}N_4$. MW, 166. Plates from Et_2O. M.p. 92–3°. Very sol. EtOH, Et_2O. Insol. H_2O.

Thiele, Heuser, *Ann.*, 1896, **290**, 21.
Gabriel, *Ber.*, 1911, **44**, 60 (*note*).

Hydrazomethane.
See sym.-Dimethylhydrazine.

1 : 1′-Hydrazonaphthalene (sym.-*Di*-1-*naphthylhydrazine*)

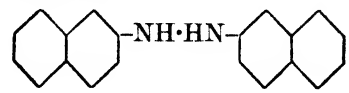


$C_{20}H_{16}N_2$ MW, 284

Colourless plates from pet. ether. M.p. 153°. Insol. H_2O. Spar. sol. EtOH, pet. ether. Sol. C_6H_6. Gradually oxidises in air ⟶ 1 : 1′-azonaphthalene. Acids ⟶ dinaphthyline.

Cumming, Howie, *J. Chem. Soc.*, 1933, 134.

2 : 2′-Hydrazonaphthalene (sym.-*Di*-2-*naphthylhydrazine*)

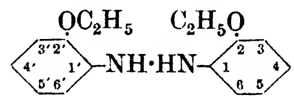


$C_{20}H_{16}N_2$ MW, 284

Red plates from C_6H_6. M.p. 140–1°. Very sol. most org. solvents. Oxidises in air ⟶ 2 : 2′-azonaphthalene.

Meisenheimer, Witte, *Ber.*, 1903, **36**, 4160.

***o*-Hydrazophenetole** (2 : 2′-*Diethoxyhydrazobenzene*)



$C_{16}H_{20}O_2N_2$ MW, 272

Needles from EtOH. M.p. 89°. Oxidises in air ⟶ 2 : 2′-diethoxyazobenzene. Conc. HCl ⟶ di-*o*-phenetidine.

Schmitt, Möhlau, *J. prakt. Chem.*, 1878, **18**, 202.

***m*-Hydrazophenetole** (3 : 3′-*Diethoxyhydrazobenzene*).
Needles, from EtOH. M.p. 118–19°.

Kinzel, *Arch. Pharm.*, 1891, **229**, 351.

***p*-Hydrazophenetole** (4 : 4′-*Diethoxyhydrazobenzene*).
Cryst. from pet. ether or EtOH. M.p. 86°. Very sol. EtOH, Et_2O, CS_2. HCl ⟶ isodiphenetidine.

Buchstab, *J. prakt. Chem.*, 1884, **29**, 300.

***o*-Hydrazophenol** (o-*Dihydroxyhydrazobenzene*)

$C_{12}H_{12}O_2N_2$ MW, 216

M.p. 148°.
Dibenzoyl deriv.: m.p. 186°.
Di-Me ether: *see o*-Hydrazoanisole.
Di-Et ether: *see o*-Hydrazophenetole.

Sen, Sadasivan, *J. Ind. Chem. Soc.*, 1932, **9**, 405.

1 : 1′-Hydrazopropionic Acid

$$HOOC\cdot\overset{CH_3}{CH}\cdot NH\cdot HN\cdot\overset{CH_3}{CH}\cdot COOH$$

$C_6H_{12}O_4N_2$ MW, 176

Needles from H_2O. M.p. 198° decomp.

Di-Me ester: $C_8H_{16}O_4N_2$. MW, 204. Cryst. from ligroin. M.p. 93°. B.p. 220°/720 mm.

Di-Et ester: $C_{10}H_{20}O_4N_2$. MW, 232. Prisms from ligroin. M.p. 78°. B.p. 245°/750 mm.

Thiele, Bailey, *Ann.*, 1898, **303**, 90.

Hydrazotoluidine.

See 5 : 5′-Diamino-2 : 2′-dimethylhydrazobenzene.

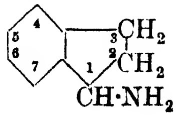
Hydrazotoluene.

See Dimethylhydrazobenzene.

Hydrazo-xylene.

See Tetramethylhydrazobenzene.

1-Hydrindamine (1-*Aminohydrindene*, α-*hydrindamine*, 1-*indanamine*)



$C_9H_{11}N$ MW, 133

Oil. B.p. 220·5°/747 mm., 96–7°/8 mm. Absorbs CO_2 rapidly. Optically resolvable into *d*- and *l*-forms.

B,HCl: m.p. 208°. Sol. H_2O, EtOH.

B,H₂SO₄: m.p. 256–7° decomp.

N-*Me*: $C_{10}H_{13}N$. MW, 147. B.p. 106–7°/15 mm.

N-*Benzoyl*: needles from EtOH. M.p. 142–3°.

Picrate: yellow prisms from H_2O. M.p. 207°.

König, *Ann.*, 1893, **275**, 348.
Courtot, Dondelinger, *Ann. chim.*, 1925, **4**, 231; *Compt. rend.*, 1924, **178**, 493.

2-Hydrindamine (2-*Aminohydrindene*, β-*hydrindamine*, 2-*indanamine*).

Colourless oil. B.p. 229°/753 mm. Absorbs CO_2 ⟶ cryst. carbonate. Salts very sol. H_2O.

B,HCl: plates from conc. HCl. M.p. 241°.

N-*Acetyl*: cryst. from EtOH.Aq. M.p. 126–7°.

N-*Benzoyl*: plates from EtOH.Aq. M.p. 155°.

Picrate: yellow prisms. M.p. 239° decomp.

Kenner, Mathews, *J. Chem. Soc.*, 1914, **105**, 746.

4-Hydrindamine (4-*Aminohydrindene*, 4-*indanamine*).

M.p. − 3°. B.p. 235°/754 mm.

N-*Acetyl*: m.p. 126°.

N-*Benzoyl*: white plates from EtOH. M.p. 136°.

Goth, *Ber.*, 1928, **61**, 1459.

5-Hydrindamine (5-*Aminohydrindene*, 5-*indanamine*).

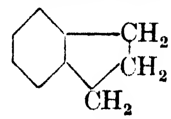
Needles from pet. ether. M.p. 37–8°. B.p. 247–9°/745 mm., 146–7°/25 mm., 131°/15 mm. Very sol. most org. solvents.

N-*Acetyl*: m.p. 106°.

N-*Benzoyl*: m.p. 137°.

Borsche, John, *Ber.*, 1924, **57**, 658.
Lindner, Bruhin, *Ber.*, 1927, **60**, 439.

Hydrindene (*Dihydroindene, indane*)

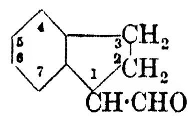


C_9H_{10} MW, 118

Oil. B.p. 177°. D_4^{20} 0·9645. n_D 1·5381.

Borsche, Pommer, *Ber.*, 1921, **54**, 102.

Hydrindene-1-aldehyde (1-*Indanaldehyde*, 1-*aldehydohydrindene*)



$C_9H_{10}O$ MW, 134

Oil. B.p. 135°/30 mm.

Oxime: cryst. from toluene. M.p. 103–4°.

Semicarbazone: needles from EtOH. M.p. 167–8°.

Tiffeneau, Orékhoff, *Bull. soc. chim.*, 1920, **27**, 789.

Hydrindene-2-aldehyde (2-*Indanaldehyde*, 2-*aldehydohydrindene*).

Oil. B.p. 122°/12 mm.

Semicarbazone: needles from EtOH. M.p. 174°.

Kenner, *J. Chem. Soc.*, 1914, **105**, 2694.

Hydrindene-5-aldehyde (5-*Indanaldehyde*, 5-*aldehydohydrindene*).

Oil. B.p. 255–7°.

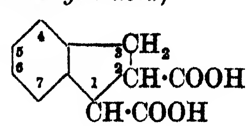
Oxime: plates from EtOH. M.p. 65°.

Gattermann, *Ann.*, 1906, **347**, 385.

Hydrindene-carboxylic Acid.

See Hydrindenic Acid.

Hydrindene-1 : 2-dicarboxylic Acid (*Indane*-1 : 2-*dicarboxylic acid*)



$C_{11}H_{10}O_4$ MW, 206

M.p. 222°. Sol. EtOH, Me_2CO. Spar. sol. Et_2O, C_6H_6.

Bougault, *Compt. rend.*, 1914, **159**, 747.

Hydrindene-2 : 2-dicarboxylic Acid (*Indane*-2 : 2-*dicarboxylic acid*).

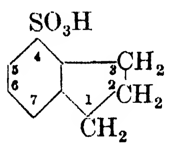
Plates from H_2O. M.p. 199°. Heat above m.p. ⟶ hydrindene-2-carboxylic acid.

Di-Et ester: $C_{15}H_{18}O_4$. MW, 262. Needles from EtOH. M.p. 38°. B.p. 186°/19 mm.

Dichloride: $C_{11}H_8O_2Cl_2$. MW, 243. Plates from pet. ether. M.p. 45°. B.p. 173–5°/20 mm.

Perkin, *J. Chem. Soc.*, 1888, **53**, 7.
Perkin, Révay, *J. Chem. Soc.*, 1894, **65**, 232.
Thole, Thorpe, *J. Chem. Soc.*, 1911, **99**, 2186.
Kenner, *J. Chem. Soc.*, 1914, **105**, 2697.

Hydrindene-4-sulphonic Acid (*Indane*-4-*sulphonic acid*)



$C_9H_{10}O_3S$ MW, 198

Amide: $C_9H_{11}O_2NS$. MW, 197. Cryst. from H_2O. M.p. 91·5–92·5°.

Spilker, *Ber.*, 1893, **26**, 1541.

Hydrindene-5-sulphonic Acid (*Indane*-5-*sulphonic acid*).

Cryst. M.p. 92°.

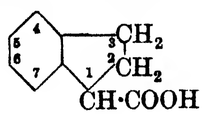
Amide: plates from H_2O. M.p. 135·5–136°. Sol. EtOH.

Chloride: $C_9H_9O_2ClS$. MW, 216·5. Cryst. from Et_2O. M.p. 47° (45°).

Anilide: needles from EtOH. M.p. 129°.

Spilker, *Ber.*, 1893, **26**, 1540.
Moschner, *Ber.*, 1900, **33**, 739.

1-Hydrindenic Acid (*Hydrindene*-1-*carboxylic acid, indane*-1-*carboxylic acid*)



$C_{10}H_{10}O_2$ MW, 162

Needles from Et_2O. M.p. 59–60°.

Tiffeneau, Orékhoff, *Bull. soc. chim.*, 1920, **27**, 789.

2-Hydrindenic Acid (*Hydrindene-2-carboxylic acid, indane-2-carboxylic acid*).

Needles from H_2O. M.p. 130°. B.p. 182–92°/18 mm. Very sol. C_6H_6. Sol. 120 parts boiling H_2O.

Me ester: $C_{11}H_{12}O_2$. MW, 176. Low melting solid. B.p. 170°/60 mm.

Chloride: $C_{10}H_9OCl$. MW, 180·5. Prisms. M.p. 35–8°. B.p. 180°/100 mm.

Amide: $C_{10}H_{11}ON$. MW, 161. Prisms from MeOH. M.p. 178°. Very sol. EtOH. Spar. sol. $CHCl_3$.

Anilide: $C_{16}H_{15}ON$. MW, 237. Plates from EtOH. M.p. 182°. Sol. AcOH. Spar. sol. $CHCl_3$, pet. ether.

Perkin, Révay, *J. Chem. Soc.*, 1894, **65**, 233.

5-Hydrindenic Acid (*Hydrindene*-β-*carboxylic acid, hydrindene-5-carboxylic acid, indane-5-carboxylic acid*).

Cryst. from EtOH.Aq. or C_6H_6. M.p. 178–9° (183°). Very sol. EtOH.

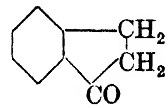
Amide: cryst. from EtOH. M.p. 137–8°.

Chloride: b.p. 140–2°/12 mm.

Anilide: needles from EtOH. M.p. 126°.

v. Braun, Kirschbaum, Schulmann, *Ber.*, 1920, **53**, 1159.
Borsch, Pommer, *Ber.*, 1921, **54**, 107.

1-Hydrindone (1-*Indanone*, 1-*ketohydrindene*)



C_9H_8O MW, 132

Plates from pet. ether. M.p. 42°. B.p. 241–2°/739 mm., 129°/13 mm., 111–16°/23 mm. Very sol. EtOH, Et_2O, $CHCl_3$. Sol. pet. ether. Spar. sol. H_2O. D_{40}^{40} 1·1028. n_D^{25} 1·561.

Oxime: needles from EtOH. M.p. 146°. Sol. EtOH, Et_2O, AcOH, C_6H_6.

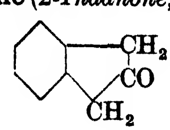
Semicarbazone: plates + $7H_2O$ from AcOH.Aq. M.p. 233° (239°). Spar. sol. EtOH.Aq. Insol. $CHCl_3$, pet. ether, C_6H_6.

Phenylhydrazone: m.p. 134–5° (in vacuo).

2 : 4-*Dinitrophenylhydrazone*: orange red cryst. M.p. 258°.

Courtot, Krolikowski, *Compt. rend.*, 1926, **182**, 322.
Revis, Kipping, *J. Chem. Soc.*, 1897, **71**, 241.
Wislicenus, König, *Ann.*, 1893, **275**, 342.

2-Hydrindone (2-*Indanone*, 2-*ketohydrindene*)



C_9H_8O MW, 132

Needles from EtOH or Et_2O. M.p. 58° (59°, 61°). Very sol. EtOH, Et_2O, Me_2CO, $CHCl_3$. Insol. H_2O. Volatile in steam. Ox. ⟶ homophthalic acid.

Oxime: needles from EtOH.Aq. or $CHCl_3$. M.p. 155° (153–4°). Very sol. EtOH, Et_2O, Me_2CO, $CHCl_3$.

Semicarbazone: needles from EtOH. M.p. 218° decomp.

Walters, *J. Soc. Chem. Ind.*, 1927, **46**, 150.

Wislicenus, Benedikt, *Ann.*, 1893, **275**, 255.

Hydrobenzoin (*Diphenylethylene glycol*, αβ-*dihydroxy*-sym.-*diphenylethane*, αβ-*dihydroxydibenzyl*)

$C_6H_5·CH(OH)·CH(OH)·C_6H_5$

$C_{14}H_{14}O_2$ MW, 214

Plates from EtOH. M.p. 138° (134°). Very sol. hot EtOH. Sol. 80 parts boiling H_2O. Ox. ⟶ benzoin.

Me ether: $C_{15}H_{16}O_2$. MW, 228. Prisms from EtOH–pet. ether. M.p. 100–2°.

Di-Me ether: $C_{16}H_{18}O_2$. MW, 242. Prisms from Et_2O. M.p. 140–2°.

Mono-acetyl: needles from AcOH.Aq. M.p. 84°. Very sol. EtOH, Et_2O, AcOH.

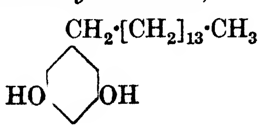
Diacetyl: prisms from Et_2O. M.p. 134° (135°). Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6.

Buck, Jenkins, *J. Am. Chem. Soc.*, 1929, **51**, 2163.

Forst, Zincke, *Ann.*, 1876, **182**, 262, 275.

Irvine, Weir, *J. Chem. Soc.*, 1907, **91**, 1390.

Hydrobilobol (3 : 5-*Dihydroxypentadecylbenzene* 5-*pentadecylresorcinol*)



$C_{21}H_{36}O_2$ MW, 320

Needles from ligroin. M.p. 89–90°. $FeCl_3$ gives no col.

Diacetyl: needles from EtOH.Aq. M.p. 56°.

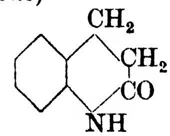
Kawamura, *Japan J. Chem.*, 1928, **3**, 103.

Furakawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, **26**, 178.

Hydrocaffeic Acid.

See 3 : 4-Dihydroxyhydrocinnamic Acid.

Hydrocarbostyril (2-*Keto*-1 : 2 : 3 : 4-*tetrahydroquinoline*, o-*aminohydrocinnamic lactam*, *dihydro*-α-*quinolone*)



C_9H_9ON MW, 147

Prisms from MeOH.Aq. M.p. 163°. Very sol. EtOH, Et_2O. Insol. H_2O.

N-*Me*: $C_{10}H_{11}ON$. MW, 161. Oil. B.p. 160°/15 mm.

N-*Benzoyl*: prisms. M.p. 155–8°.

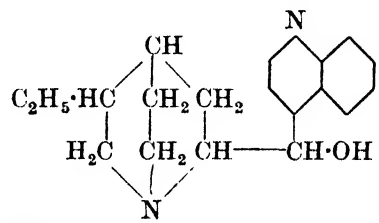
Mayer, Zütphen, Philipps, *Ber.*, 1927, **60**, 861.

Mayer, Philipps, Rupert, Schmitt, *Ber.*, 1928, **61**, 1966.

Hydrochelidonic Acid.

See 3-Ketopimelic Acid.

Hydrocinchonidine



$C_{19}H_{24}ON_2$ MW, 296

Constituent of cinchona bark. Leaflets from EtOH. M.p. 229°. $[\alpha]_D$ − 98·4° in EtOH. Spar. sol. most solvents except EtOH.

B,HCl,2H$_2$O: prisms. M.p. 202·3° anhyd. $[\alpha]_D$ − 98·4°. Very sol. H_2O, EtOH.

Methiodide: m.p. 248°.

Skita, Nord, *Ber.*, 1912, **45**, 3312.

Emde, *Helv. Chim. Acta*, 1932, **15**, 557.

Hydrocinchonine.

See Cinchotine.

Hydrocinnamaldehyde (2-*Phenylpropionaldehyde*, *benzylacetaldehyde*, *hydrocinnamic aldehyde*)

$C_6H_5·CH_2·CH_2·CHO$

$C_9H_{10}O$ MW, 134

Present in cortex of *Cinnamonium ceylanicum*, Nees, and leaves of *Cinnamonium Cassia*, Bl. B.p. 221–4°/744 mm., 104–5°/13 mm.

Di-Me acetal: $C_{11}H_{16}O_2$. MW, 180. B.p. 240°, 114°/15 mm.

Oxime: prisms from EtOH. M.p. 93–94·5°.

Semicarbazone: plates. M.p. 127°.

p-*Nitrophenylhydrazone*: m.p. 122–3°.

Fischer, Hoffa, *Ber.*, 1898, **31**, 1992.
Dollfus, *Ber.*, 1893, **26**, 1971.
Michael, Garner, *Am. Chem. J.*, 1906, **35**, 266.

Hydrocinnamic Acid (2-*Phenylpropionic acid, benzylacetic acid*)

$C_6H_5{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_9H_{10}O_2$ MW, 150

Prisms from pet. ether. M.p. 47° (48·5°). B.p. 280°/754 mm. $D_0^{48\cdot7}$ 1·07115. $k = 2{\cdot}2 \times 10^{-5}$ at 25°. Sol. EtOH, Et_2O, $CHCl_3$, CS_2, AcOH, C_6H_6. Sol. 6 to 7 parts pet. ether. Sol. 168 parts H_2O at 20°. Volatile in steam.

Me ester: $C_{10}H_{12}O_2$. MW, 164. B.p. 238–9°/756·5 mm. D^0 1·0455.

Et ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 247·2°/760 mm. D^0 1·0343, D_4^4 1·0302. n_D^{20} 1·49542.

Chloride: C_9H_9OCl. MW, 168·5. B.p. 105°/10 mm., 115–16°/11–12 mm.

Amide: $C_9H_{11}ON$. MW, 149. Needles from H_2O. M.p. 105°. Very sol. EtOH, Et_2O.

Nitrile: C_9H_9N. MW, 131. B.p. 261°, 114–18°/8 mm. D^{18} 1·0014.

Anhydride: $C_{18}H_{18}O_3$. MW, 282. B.p. 216–17°/14 mm.

Anilide: cryst. from pet. ether. M.p. 98°.

Ingersoll, *Organic Syntheses*, Collective Vol. I, 304.
Erlenmeyer, *Ann.*, 1866, **137**, 334.
Hoffmann, *Ber.*, 1885, **18**, 2740.

Hydrocinnamic Aldehyde.
See Hydrocinnamaldehyde.

Hydrocinnamoin (*Distyrylethylene glycol*, 3 : 4-*dihydroxy*-1 : 6-*diphenylhexadiene*-1 : 5, 1 : 4-*dibenzylidene*-ψ-*butylene glycol*)

$C_6H_5{\cdot}CH{:}CH{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH{:}CH{\cdot}C_6H_5$

$C_{18}H_{18}O_2$ MW, 266

Plates from EtOH. M.p. 156°. Spar. sol. EtOH, Et_2O. Heat ⟶ terphenyl.

Diacetyl: prisms from EtOH. M.p. 118–19°. Sol. $CHCl_3$. Mod. sol. EtOH, AcOH.

Dibenzoyl: m.p. 169–70°.

Thiele, *Ber.*, 1899, **32**, 1296.
Kuhn, Winterstein, *Ber.*, 1927, **60**, 433.
Kuhn, Winterstein, *Helv. Chim. Acta*, 1928, **11**, 104.

Hydrocinnamyl Alcohol (3-*Phenyl*-n-*propyl alcohol*, 3-*phenylpropanol*-1, γ-*hydroxypropylbenzene*)

$C_6H_5{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$

$C_9H_{12}O$ MW, 136

B.p. 235°, 119°/12 mm. D_{17}^{17} 1·007, D_4^{25} 0·995. n_D^{25} 1·53565.

Me ether: $C_{10}H_{14}O$. MW, 150. B.p. 206·5°, 92–4°/12 mm. D_4^{15} 0·999.

Et ether: $C_{11}H_{16}O$. MW, 164. B.p. 224°. D_{15}^{15} 0·824.

Phenyl ether: b.p. 171–2°/11 mm.

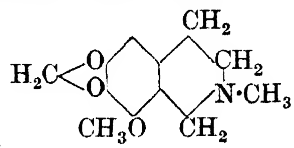
p-*Nitrobenzoyl*: cryst. from EtOH. M.p. 45–6°.

Straus, Berkow, *Ann.*, 1913, **401**, 151.

Hydroconchinene.
See Hydroquinidine.

Hydroconquinine.
See Hydroquinidine.

Hydrocotarnine (8-*Methoxy*-6 : 7-*methylenedioxy*-N-*methyltetrahydroisoquinoline*)



$C_{12}H_{15}O_3N$ MW, 221

Constituent of opium alkaloids. Cryst. + $\frac{1}{2}H_2O$ from EtOH. M.p. 55–6°. Sol. most org. solvents. Insol. H_2O, alkalis.

B,HBr: m.p. 236–7°. Spar. sol. H_2O.

B,HI: colourless needles from MeOH. M.p. 195–6°.

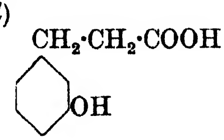
Methiodide: prisms from MeOH. M.p. 206–7°.

Beckett, Wright, *J. Chem. Soc.*, 1875, **28**, 577.
Bandow, Wolffenstein, *Ber.*, 1898, **31**, 1577.
Steiner, *Compt. rend.*, 1923, **176**, 224.

Hydrocotoin.
See under Cotoin.

***o*-Hydrocoumaric Acid.**
See Melilotic Acid.

***m*-Hydrocoumaric Acid** (m-*Hydroxyhydrocinnamic acid*)



$C_9H_{10}O_3$ MW, 166

Needles from C_6H_6–pet. ether. M.p. 111°.

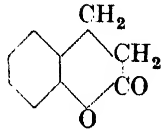
Me ether: *see m*-Methoxyhydrocinnamic Acid.

Tiemann, Ludwig, *Ber.*, 1882, **15**, 2050.
Braunstein, *Ber.*, 1882, **15**, 2051.

***p*-Hydrocoumaric Acid.**
See Phloretic Acid.

Hydrocoumarin (3 : 4-*Dihydrocoumarin*, 2-

hydroxyhydrocinnamic lactone, melilotol, melilotic lactone)



$C_9H_8O_2$ MW, 148

Occurs in *Melilotus officinalis*. Leaflets. M.p. 25°. B.p. 272°. Sol. $CHCl_3$. Mod. sol. EtOH, Et_2O. Insol. cold H_2O. KOH ⟶ melilotic acid.

Zwenger, *Ann. Suppl.*, 1867, **5**, 106.

Hydrocuprean

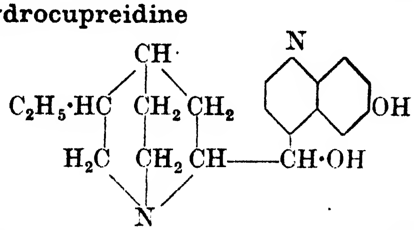
$C_{19}H_{24}ON_2$ MW, 296

Plates from $CHCl_3$–Et_2O. M.p. 173°. Sol. dil. acids, alcohols, $CHCl_3$. Insol. H_2O, pet. ether, alk. carbonates. $[\alpha]_D^{20}$ 90·0°.

B,2HCl: leaflets from EtOH–Et_2O. M.p. 191–2° (sinters at 185°).

Giemsa, Halberkann, *Ber.*, 1921, **54**, 1175.

Hydrocupreidine



$C_{19}H_{24}O_2N_2$ MW, 312

Glistening plates. M.p. 193°. Readily sol. MeOH, EtOH. Sol. Me_2CO, $CHCl_3$. Spar. sol. Et_2O. $[\alpha]_D^{20}$ + 242·5° in EtOH.

B,HCl,H_2O: needles from EtOH.Aq. M.p. 231–3°. $[\alpha]_D^{24}$ + 194·2° in H_2O.

B,2HBr: yellow plates. M.p. above 275°.

B,HI,H_2O: pink plates from H_2O. M.p. 209–12°.

B,HNO_3,H_2O: cream-coloured cryst. from EtOH.Aq. M.p. 175–80°.

Methiodide: yellow cryst. from H_2O. M.p. 295°. $[\alpha]_D^{20}$ 202·6° in 50% EtOH.

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, **41**, 827.
Giemsa, Bonath, *Ber.*, 1925, **58**, 93.
Ghosh, Chatterjee, *J. Indian Chem. Soc.*, 1932, **9**, 83.

Hydrocupreine.

Stereoisomer of hydrocupreidine (*above*). Plates from EtOH.Aq. M.p. 230° after softening at 185–90°. $[\alpha]_D^{23}$ − 159·2° in abs. EtOH.

B,HCl: needles. M.p. 280° decomp. $[\alpha]_D^{22 \cdot 5}$ − 132·3°. Sol. MeOH, EtOH. Spar. sol. $CHCl_3$, Me_2CO, H_2O.

B,2HBr: prisms from H_2O. M.p. 180–90°. Sol. MeOH, EtOH. Spar. sol. $CHCl_3$, Me_2CO.

B,HNO_3: needles. M.p. 220–2°. Readily sol. EtOH, MeOH. Sol. Me_2CO. Spar. sol. $CHCl_3$, C_6H_6.

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, **41**, 821.
Giemsa, Bonath, *Ber.*, 1925, **58**, 92.

Hydrocyanic Acid (*Prussic acid, formonitrile, hydrogen cyanide*)

HCN

CHN MW, 27

Colourless liq. Burns with violet flame. M.p. − 14°. B.p. 26°. D^{18} 0·6969. Misc. in all proportions with H_2O, EtOH, Et_2O. n_D^{19} 1·254. Heat of comb. (vapour) C_p 158·62 Cal. $k = 13 \times 10^{-10}$. Very weak acid: only faintly reddens litmus. Aq. sols. unstable. Zn + H_2SO_4 or HCl ⟶ methylamine. Warm min. acids ⟶ formic acid + ammonia. Combines with aldehydes and ketones to give cyanhydrins. HCl at − 15° ⟶ formimide chloride. Very poisonous, 0·06 gm. causing death.

Ziegler, *Organic Syntheses*, Collective Vol. I, 307.

Hydroduroquinone.

See Durohydroquinone.

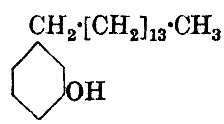
Hydrofuramide.

See Furfuramide.

Hydrogen cyanide.

See Hydrocyanic Acid.

Hydroginkgol (m-*Hydroxypentadecylbenzene, 3-pentadecylphenol, cyclogallipharol*)



$C_{21}H_{36}O$ MW, 304

Needles from pet. ether. M.p. 50·5–51°.

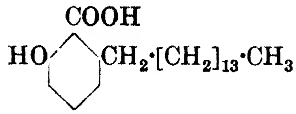
Me ether: $C_{22}H_{38}O$. MW, 318. M.p. 22°. B.p. 240–4°/15 mm.

p-*Nitrobenzoyl*: cryst. from Me_2CO. M.p. 60–61·5°.

Kawamura, *Japan J. Chem.*, 1928, **3**, 89.
Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, **24**, 304, 320.

Hydroginkgolic Acid (6-*Hydroxy*-2-*penta*-

decylbenzoic acid, 6-*pentadecylsalicylic acid*, *cyclogallipharic acid*)



$C_{22}H_{36}O_3$ MW, 348

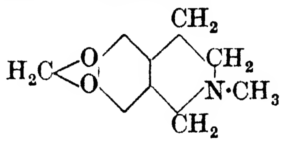
Needles from pet. ether. M.p. 86–8°. Very sol. EtOH, Me_2CO, Et_2O, C_6H_6, $CHCl_3$.

Acetyl: needles from pet. ether. M.p. 73–74·5°.

p-*Nitrobenzoyl*: needles from ligroin. M.p. 87–9°.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, **26**, 178.
See also first reference above.

Hydrohydrastinine (6 : 7-*Methylenedioxy*-N-*methyltetrahydroisoquinoline*)



$C_{11}H_{13}O_2N$ MW, 191

Cryst. M.p. 66° (60–1°). Ox. ⟶ hydrastinine. Sol. EtOH, MeOH, Me_2CO, CS_2, C_6H_6.

B,HCl: cryst. M.p. 273–4°.

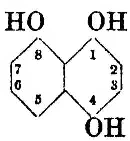
B,HBr: cryst. M.p. 272°.

B,HI: cryst. M.p. 232°.

Methiodide: needles from H_2O. M.p. 227–8°.

Fritsch, *Ann.*, 1895, **286**, 18.
Freund, Dormeyer, *Ber.*, 1891, **24**, 2734.

α-**Hydrojuglone** (1 : 4 : 8-*Trihydroxynaphthalene*)



$C_{10}H_8O_3$ MW, 176

Present in leaves of *Juglans regia*, Linn. Leaflets or needles. M.p. 168–9°. Sol. EtOH, Et_2O. Spar. sol. H_2O, C_6H_6. Insol. $CHCl_3$. Heat. ⟶ β-hydrojuglone.

Mylius, *Ber.*, 1885, **18**, 2569.
Willstätter, Wheeler, *Ber.*, 1914, **47**, 2799.

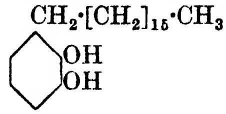
β-**Hydrojuglone** (1 : 4 : 7-*Trihydroxynaphthalene*).

Present in leaves of *Juglans regia*, Linn. Plates or needles from EtOH. M.p. 96–7°. Sol. $CHCl_3$, C_6H_6. Spar. sol. EtOH, Et_2O. Volatile in steam. $FeCl_3$ ⟶ deep red col. Heat with dil. HCl ⟶ α-hydrojuglone.

Triacetyl: prisms from EtOH. M.p. 129–30°. Insol. H_2O. Sublimes undecomp.

See previous references.

Hydrolaccol (2 : 3-*Dihydroxy*-1-*heptadecyl benzene*, 3-*heptadecylcatechol*)



$C_{23}H_{40}O_2$ MW, 348

Cryst. from pet. ether. M.p. 63–4°. B.p. 200–20°/0·05 mm.

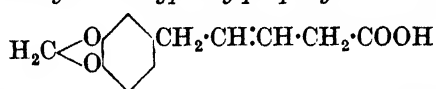
Di-Me ether: $C_{25}H_{44}O_2$. MW, 376. Prisms from EtOH. M.p. 43–4°.

Majima, *Ber.*, 1922, **55**, 197.

β-**Hydromuconic Acid.**
See Dihydromuconic Acid.

Hydrophlorone.
See 2 : 5-Dihydroxy-*p*-xylene.

α-**Hydropiperic Acid** (4-[3 : 4-*Methylenedioxyphenyl*]-2-*butylene*-1-*carboxylic acid*, 3 : 4-*methylenedioxyphenylethylidenepropionic acid*, 3 : 4-*methylenedioxyphenylpropenylacetic acid*)

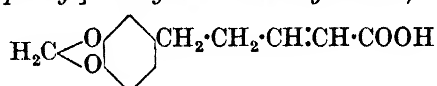


$C_{12}H_{12}O_4$ MW, 220

Cryst. from pet. ether. M.p. 75–6° (78°). NaOH ⟶ β-hydropiperic acid.

Weinstein, *Ann.*, 1885, **227**, 32.

β-**Hydropiperic Acid** (2-[3 : 4-*Methylenedioxyphenylethyl*]-*acrylic acid*, 4-[3 : 4-*methylenedioxyphenyl*]-1-*butylene*-1-*carboxylic acid*)

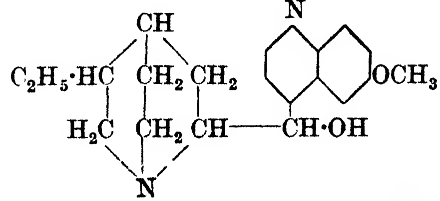


$C_{12}H_{12}O_4$ MW, 220

Needles from EtOH. M.p. 130–1°.

See previous reference.

Hydroquinidine (*Hydroconquinine*, *hydroconchinene*)



$C_{20}H_{26}O_2N_2$ MW, 326

Needles from EtOH. M.p. 168–9°. $[\alpha]^{18}_D$ + 229·6°.

B,HCl: cryst. from H_2O. M.p. 273–4°. $[\alpha]_D^{26}$ + 183·9°. Sol. MeOH, $CHCl_3$, EtOH, H_2O. Spar. sol. Me_2CO.

Rabe *et al.*, *Ber.*, 1931, **64**, 2499.
Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, **41**, 826.

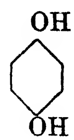
Hydroquinine.
Stereoisomer of hydroquinidine (*above*). Constituent of most cinchona barks. Needles from Et_2O or $CHCl_3$. M.p. anhyd. 172·3° (169°). $[\alpha]_D^{20}$ − 142·2° in EtOH. Easily sol. Et_2O, EtOH, $CHCl_3$, Me_2CO.

B,HCl: m.p. anhyd. 235–40°.
Benzoyl deriv.: cryst. M.p. 102–7°.
Methiodide: yellow prisms from EtOH. M.p. 233–5° decomp. after sintering at 170°. $[\alpha]_D^{20}$ − 107·6°.

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, **41**, 819, 2101.
See also first reference above.

Hydroquinol.
See Hydroquinone.

Hydroquinone (*Hydroquinol, quinol,* 1 : 4-*dihydroxybenzene*)



$C_6H_6O_2$ MW, 110

Needles from H_2O. M.p. 170·3°. Dimorphous. Stable form from H_2O; labile form on sublimation. B.p. 285°/730 mm. Very sol. hot H_2O, EtOH, Et_2O. Spar. sol. C_6H_6. Ox. ⟶ quinhydrone ⟶ *p*-benzoquinone.

Me ether: *p*-hydroxyanisole, *p*-methoxyphenol. $C_7H_8O_2$. MW, 124. Plates from H_2O. M.p. 53°. B.p. 243°. Reduces $NH_3.AgNO_3$. *Acetyl*: *p*-methoxyphenyl acetate. $C_9H_{10}O_3$. MW, 166. M.p. 31–2°. B.p. 243°/751 mm., 135°/18 mm. (Klemenc, *Monatsh.*, 1914, **35**, 85).

Di-Me ether: 1 : 4-dimethoxybenzene. $C_8H_{10}O_2$. MW, 138. Plates. M.p. 56°. B.p. 212·5°, 109°/20 mm. D_{55}^{55} 1·0526, D_{100}^{100} 1·0386.

Et ether: *p*-hydroxyphenetole, *p*-ethoxyphenol. $C_8H_{10}O_2$. MW, 138. Prisms from H_2O. M.p. 66–7°. B.p. 246–7°.

Di-Et ether: 1 : 4-diethoxybenzene. $C_{10}H_{14}O_2$. MW, 166. Prisms. M.p. 71–2°. Very sol. EtOH, Et_2O, $CHCl_3$, C_6H_6.

Phenyl ether: *see* 4-Hydroxydiphenyl Ether.
Benzyl ether: *p*-Hydroxyphenyl benzyl Ether.
Diacetyl: plates from EtOH. M.p. 121° (123–4°). Very sol. Et_2O, $CHCl_3$, hot EtOH. Sol. hot H_2O.

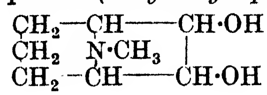
Dibenzoyl: needles. M.p. 199°.

Nietzki, *Ann.*, 1882, **215**, 127.

Hydroquinone-carboxylic Acid.
See Gentisic Acid.

Hydroquinone-dicarboxylic Acid.
See 3 : 6-Dihydroxyphthalic Acid *and* 2 : 5-Dihydroxyterephthalic Acid.

Hydroscopoline (*Dihydroxytropane*)



$C_8H_{15}O_2N$ MW, 157

Cryst. from Me_2CO–MeOH. M.p. 165°. Reduces $NH_3.AgNO_3$. HI + P ⟶ tropane.
B,HBr: m.p. 260° decomp.
Picrate: needles from EtOH. M.p. 232°.

Hess, Suchier, *Ber.*, 1915, **48**, 2063.
Hess, *Ber.*, 1918, **51**, 1011.

Hydrosorbic Acid (2-*Hexenic acid*, β-*amylene*-α-*carboxylic acid, hexenoic acid,* 2-*pentene*-1-*carboxylic acid*)

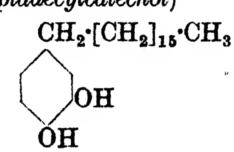
$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_2{\cdot}COOH$

$C_6H_{10}O_2$ MW, 114

M.p. 12°. B.p. 208°, 103°/9–10 mm. D_4^{23} 0·964. n_α^{23} 1·4365. $k = 2{\cdot}41 \times 10^{-5}$ at 25°.
Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 166–7°, 64°/12 mm. D_4^{20} 0·8957. n_D^{20} 1·4255. Boiling alkalis ⟶ 2-propylacrylic acid.
Chloride: C_6H_9OCl. MW, 132·5. B.p. 41–2°/ 12 mm.
Amide: $C_6H_{11}ON$. MW, 113. Plates from C_6H_6. M.p. 60°.
Nitrile: C_6H_9N. MW, 95. B.p. 103–4°/ 91 mm.
Anilide: needles. M.p. 55°.

Boxer, Linstead, *J. Chem. Soc.*, 1931, 748.
Kon, Linstead, Maclennan, *J. Chem. Soc.*, 1932, 2457.

Hydrothitsiol (3 : 4-*Dihydroxy*-1-*heptadecyl benzene,* 4-*heptadecylcatechol*)



$C_{23}H_{40}O_2$ MW, 348

Cryst. from xylene or pet. ether. M.p. 94–6°. B.p. 216–30°/0·18 mm.
Di-Me ether: $C_{25}H_{44}O_2$. MW, 376. Plates from EtOH. M.p. 56–7°.

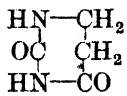
Majima, *Ber.*, 1922, **55**, 204.

Hydrothymoquinone.
See Thymohydroquinone.

Hydrotoluquinone.
See Toluhydroquinone.

Hydrotropilidene.
$\Delta^{1,3}$-Cycloheptadiene, *q.v.*

Hydrouracil (β-*Lactylurea*, 2 : 4-*diketohexahydro*-1 : 3-*diazine*, 2 : 4-*diketohexahydropyrimidine*)



$C_4H_6O_2N_2$ MW, 114

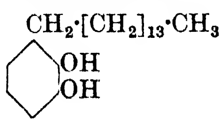
Needles from H_2O. M.p. 275°. Very sol. EtOH. Sol. MeOH. Spar. sol. $CHCl_3$, Me_2CO, AcOEt. Sol. 5 parts boiling H_2O.

Acetyl deriv.: $C_6H_8O_3N_2$. MW, 156. Needles from AcOEt. M.p. 180°. Very sol. hot EtOH, Et_2O. Sublimes.

Osazone: m.p. 163–4°.

Tafel, Weinschenk, *Ber.*, 1900, **33**, 3385.
Gabriel, *Ber.*, 1905, **38**, 635.
Brown, Johnson, *J. Am. Chem. Soc.*, 1923, **45**, 2702.

Hydrourushiol (2 : 3-*Dihydroxy*-1-*pentadecyl benzene*, 3-*pentadecylcatechol*)



$C_{21}H_{36}O_2$ MW, 320

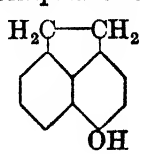
Needles from xylene or pet. ether. M.p. 58·5–59°. Very sol. EtOH, Et_2O, AcOH, $CHCl_3$, C_6H_6.

Di-Me ether: $C_{23}H_{40}O_2$. MW, 348. Prisms from EtOH. M.p. 36–7°.

Diacetyl: plates from MeOH. M.p. 50–1°.

Majima, Tahara, *Ber.*, 1915, **48**, 1606.

5-Hydroxyacenaphthene

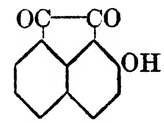


$C_{12}H_{10}O$ MW, 170

Needles from C_6H_6. M.p. 126°. B.p. 221°/40 mm.

Baeyer D.R.P., 237,266, (*Chem. Zentr.*, 1911, II, 499).

3-Hydroxyacenaphthenequinone (1-*Hydroxyacenaphthenequinone*. See numbering under Acenaphthene)



$C_{12}H_6O_3$ MW, 198

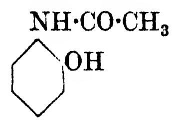
Me ether: 3-methoxyacenaphthenequinone. $C_{13}H_8O_3$. MW, 212. Yellow leaflets from AcOH. M.p. 215–16°. Spar. sol. Et_2O, C_6H_6, EtOH. Red sol. in conc. H_2SO_4.

Et ether: 3-ethoxyacenaphthenequinone. $C_{14}H_{10}O_3$. MW, 226. Cryst. from AcOH. M.p. 141–2°. More sol. than Me ether.

Staudinger, Goldstein, Schlenker, *Helv. Chim. Acta*, 1921, **4**, 350.

Hydroxyacetaldehyde.
See Glycollic Aldehyde.

***o*-Hydroxyacetanilide** (N-*Acetyl*-o-*aminophenol*)



$C_8H_9O_2N$ MW, 151

Plates from EtOH.Aq. M.p. 209° (201°). Sol. EtOH, hot H_2O. $FeCl_3 \longrightarrow$ green col.

O-*Benzoyl*: m.p. 140°.

Me ether: *o*-acetanisidide. *See under o*-Anisidine.

Et ether: *o*-acetphenetidide. *See under o*-Phenetidine.

Bamberger, *Ber.*, 1903, **36**, 2050.
Ladenburg, *Ber.*, 1876, **9**, 1526.
Bell, *J. Chem. Soc.*, 1931, 2962.

***m*-Hydroxyacetanilide** (N-*Acetyl*-m-*aminophenol*).

Needles from H_2O. M.p. 148–9°. Sol. H_2O, EtOH. Spar. sol. Et_2O, $CHCl_3$, C_6H_6.

Me ether: *m*-acetanisidide. *See under m*-Anisidine.

Et ether: *m*-acetphenetidide. *See under m*-Phenetidine.

Kehrmann, Dengler, *Ber.*, 1908, **41**, 3442.
Ikuta, *Am. Chem. J.*, 1893, **15**, 41.

***p*-Hydroxyacetanilide** (N-*Acetyl*-p-*aminophenol*).

Prisms from EtOH. M.p. 168°. Sol. hot H_2O, EtOH. Insol. cold H_2O. $H_2SO_4 + HNO_3 \longrightarrow$ 2 : 6-dinitro-4-acetylaminophenol.

O-*Acetyl*: m.p. 150–1°.

Me ether: *p*-acetanisidide. *See under p*-Anisidine.

Et ether: *p*-acetphenetidide. *See under p*-Phenetidine.

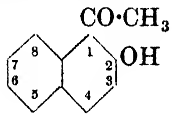
Phenacyl ether: *see* Hypnoacetin.

Friedländer, *Ber.*, 1893, **26**, 178.
Tingle, Williams, *Am. Chem. J.*, 1907, **37**, 63.
Vignolo, *Atti. accad. Lincei*, 1897, 6, I, 71.

Hydroxyacetic Acid.
See Glycollic Acid.

3-Hydroxyacetoacetic Acid Lactone.
See Tetronic Acid.

2-Hydroxy-1-acetonaphthone (1-*Aceto*-2-*naphthol*, 2-*hydroxy*-1-*acetylnaphthalene*, *methyl* 2-*hydroxy*-1-*naphthyl ketone*)



$C_{12}H_{10}O_2$ MW, 186

Light yellow needles from pet. ether. M.p. 64°.

Me ether: $C_{13}H_{12}O_2$. MW, 200. M.p. 59°.
Hydrazone: m.p. 130°.

Fries, Schimmelschmidt, *Ber.*, 1925, **58**, 2835.
Fries, Frellstedt, *Ber.*, 1921, **54**, 712.

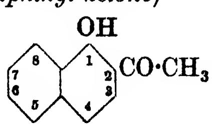
4-Hydroxy-1-acetonaphthone (4-*Aceto*-1-*naphthol*, 1-*hydroxy*-4-*acetylnaphthalene*, *methyl* 4-*hydroxy*-1-*naphthyl ketone*).

Pale yellow prisms from EtOH. M.p. 198°. Sol. alkalis, conc. H_2SO_4.

Me ether: m.p. 72°.
Et ether: $C_{14}H_{14}O_2$. MW, 214. M.p. 78–9°.
Acetyl: m.p. 140°.
Oxime: m.p. 164°.
Phenylhydrazone: m.p. 133°.

Witt, v. Braun, *Ber.*, 1914, **47**, 3219.
Gattermann, Ehrhardt, Maisch, *Ber.*, 1890, **23**, 1208.

1-Hydroxy-2-acetonaphthone (2-*Aceto*-1-*naphthol*, 1-*hydroxy*-2-*acetylnaphthalene*, *methyl* 1-*hydroxy*-2-*naphthyl ketone*)



$C_{12}H_{10}O_2$ MW, 186

Exists in two cryst. forms. (1) Greenish yellow needles from EtOH. M.p. 103°. (2) Prisms from C_6H_6 or ligroin. M.p. 98°. B.p. 325° slight decomp. Sol. AcOH, $CHCl_3$, CS_2, C_6H_6. Spar. sol. EtOH. Insol. H_2O. Lower melting form is the more sol. Sol. alkalis and conc. H_2SO_4. All sols. are weakly yellow except in ligroin, which are colourless.

Me ether: $C_{13}H_{12}O_2$. MW, 200. M.p. 49°.
Et ether: $C_{14}H_{14}O_2$. MW, 214. B.p. 320°.
Acetyl: m.p. 107°.
Oxime: m.p. 168–9°.
Semicarbazone: m.p. 245–50°.

Witt, v. Braun, *Ber.*, 1914, **47**, 3219.
Friedländer, *Ber.*, 1895, **28**, 1946.
Ullmann, *Ber.*, 1897, **30**, 1466.

3-Hydroxy-2-acetonaphthone (3-*Aceto*-2-*naphthol*, 2-*hydroxy*-3-*acetylnaphthalene*, *methyl* 3-*hydroxy*-2-*naphthyl ketone*).

Needles from ligroin. M.p. 112°. Sol. alkalis, conc. H_2SO_4.

Me ether: m.p. 48°.
Azine: m.p. 217°.

Fries, Schimmelschmidt, *Ber.*, 1925, **58**, 2835.
See also first reference above.

4-Hydroxy-2-acetonaphthone (3-*Aceto*-1-*naphthol*, 1-*hydroxy*-3-*acetylnaphthalene*, *methyl* 4-*hydroxy*-2-*naphthyl ketone*).

Needles from C_6H_6. M.p. 173–4°. Sol. EtOH, AcOH. Sol. alkalis. Sol. conc. H_2SO_4 to orange sol. Ox. ⟶ phthalic acid.

Acetyl: m.p. 108–9°.

Erdmann, Henke, *Ann.*, 1893, **275**, 292.

6-Hydroxy-2-acetonaphthone (6-*Aceto*-2-*naphthol*, 2-*hydroxy*-6-*acetylnaphthalene*, *methyl* 6-*hydroxy*-2-*naphthyl ketone*).

Prisms from C_6H_6. M.p. 171°. Yellow sols. in alkalis. Ox. ⟶ trimellitic acid.

Hydrazone: m.p. 295°.

Witt, v. Braun, *Ber.*, 1914, **47**, 3231.

Hydroxyacetone (*Acetol*, *acetylcarbinol*, *acetonyl alcohol*, 1-*propanolone*-2, *pyroracemic alcohol*, *pyruvic alcohol*, *methyl hydroxymethyl ketone*, 2-*ketopropyl alcohol*, *methylketol*)

$$CH_3 \cdot CO \cdot CH_2OH$$

$C_3H_6O_2$ MW, 74

F.p. about − 17°. B.p. 145–6°, 105–6°/200 mm., 96–7°/150 mm., 54°/18 mm. D^{20}_{20} 1·0824. n^{20}_D 1·4295. Sol. H_2O, EtOH, Et_2O. Somewhat unstable; stabilised by MeOH. Reduces $NH_3.AgNO_3$ ⟶ *r*-lactic acid. Fehling's ⟶ $H \cdot COOH + CH_3 \cdot COOH$. Gives bisulphite comp.

Me ether: *see* Methoxyacetone.
Et ether: *see* Ethoxyacetone.
Propyl ether: propyl acetonyl ether. $C_6H_{12}O_2$. MW, 116. B.p. 146°.
Isobutyl ether: isobutyl acetonyl ether. $C_7H_{14}O_2$. MW, 130. B.p. 157°/730 mm.

Isoamyl ether: isoamyl acetonyl ether. $C_8H_{16}O_2$. MW, 144. B.p. 181°/730 mm.

Acetyl: *see* Acetoxyacetone.

Salicyloyl: *see* Salacetol.

Di-Et acetal: 1-hydroxy-2 : 2-diethoxypropane, 2 : 2-diethoxypropyl alcohol. $C_7H_{16}O_3$. MW, 148. B.p. 68°/9 mm. D_0^{25} 0·9618.

Oxime: m.p. 71°.

Semicarbazone: m.p. 196°.

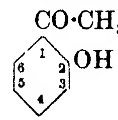
Phenylhydrazone: m.p. 103°.

Perkin, *J. Chem. Soc.*, 1891, **59**, 787.
Levene, Walti, *Organic Syntheses*, 1930, X, 1.
Hildesheimer, *Ber.*, 1910, **43**, 2804.
Nef, *Ann.*, 1904, **335**, 250.
Kling, *Ann. chim. phys.*, 1905, **5**, 496, 534.

ω-Hydroxyacetophenone.

See Phenacyl Alcohol.

o-Hydroxyacetophenone (o-*Acetophenol*, o-*acetylphenol*, *methyl* 2-*hydroxyphenyl ketone*)



$C_8H_8O_2$ MW, 136

Present in oil from *Chione glabra*. Oil. B.p. 213°/717 mm., 106°/17 mm., 96°/10 mm. D_4^{20} 1·1307. n_D^{21} 1·558. Sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O. $FeCl_3 \longrightarrow$ reddish-violet col.

Me ether: o-methoxyacetophenone, o-acetoanisole, methyl o-methoxyphenyl ketone. $C_9H_{10}O_2$. MW, 150. B.p. 245°, 131·2°/18 mm. $D_4^{23 \cdot 6}$ 1·0849. $n_D^{23 \cdot 5}$ 1·538. *Semicarbazone*: m.p. 182–3°. *Oxime*: needles. M.p. 83°. *Phenylhydrazone*: m.p. 114°.

Et ether: o-ethoxyacetophenone, o-acetophenetole, methyl o-ethoxyphenyl ketone. $C_{10}H_{12}O_2$. MW, 164. Plates from ligroin. M.p. 43° (38·5–39·5°). B.p. 243–4°. Volatile in steam.

Acetyl: needles from EtOH. M.p. 89°. Sol. EtOH, Et_2O, AcOH. Insol. H_2O.

Oxime: m.p. 117°.

Semicarbazone: m.p. 209–10°.

Azine: m.p. 198°.

Phenylhydrazone: m.p. 109–10°.

Pauly, Lockemann, *Ber.*, 1915, **48**, 30.
Tahara, *Ber.*, 1892, **25**, 1308.
Eijkmann, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 817.
Auwers, *Ann.*, 1915, **408**, 245.
Friedländer, Neudörfer, *Ber.*, 1897, **30**, 1080.

m-Hydroxyacetophenone (m-*Acetophenol*, m-*acetylphenol*, *methyl* 3-*hydroxyphenyl ketone*).

Needles. M.p. 96°. B.p. 296°, 153°/5 mm. D^{109} 1·099. n_α^{109} 1·5348. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O. Insol. ligroin.

Me ether: m-methoxyacetophenone, m-acetoanisole, methyl m-methoxyphenyl ketone. Oil. B.p. 240° (252°), 125–6°/12 mm., 99°/4 mm. $D_4^{15 \cdot 35}$ 1·0993. $n_D^{15 \cdot 35}$ 1·5583. *Semicarbazone*: m.p. 195–7°.

Et ether: m-ethoxyacetophenone, m-acetophenetole, methyl m-ethoxyphenyl ketone. B.p. 255°.

Pfeiffer, *Ann.*, 1911, **383**, 104, 141.
Besthorn, Banzhof, Jaeglé, *Ber.*, 1894, **27**, 3036.
See also third reference above.

p-Hydroxyacetophenone (p-*Acetophenol*, p-*acetylphenol*, *methyl* 4-*hydroxyphenyl ketone*).

Occurs in many natural glucosides. Needles from Et_2O or EtOH.Aq. M.p. 109°. B.p. 148°/3 mm. D^{109} 1·109. n_α^{109} 1·5577. $FeCl_3 \longrightarrow$ weak violet col. $Na_2O_2 \longrightarrow$ hydroquinone. CaO dist. $\longrightarrow$ phenol.

Me ether: p-methoxyacetophenone, p-acetoanisole, methyl p-methoxyphenyl ketone. Plates from Et_2O. M.p. 38–9°. B.p. 258°, 138–9°/15 mm. $D^{41 \cdot 1}$ 1·0818. $n_D^{41 \cdot 3}$ 1·547. *Semicarbazone*: m.p. 195–6° (181–2°). *Oxime*: needles from pet. ether. M.p. 86–7°.

Et ether: p-ethoxyacetophenone, p-acetophenetole, methyl p-ethoxyphenyl ketone. Plates from Et_2O. M.p. 39° (36–7°).

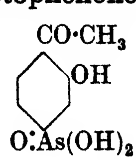
Phenyl ether: 4-acetodiphenyl ether. $C_{14}H_{12}O_2$. MW, 212. Cryst. from EtOH.Aq. M.p. 45°. B.p. 318–25°.

Oxime: m.p. 144–5°.

Semicarbazone: m.p. 198–9°.

Klingel, *Ber.*, 1885, **18**, 2691.
Pauly, Lockemann, *Ber.*, 1915, **48**, 30.
Eijkmann, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 817.
Perkin, *J. Chem. Soc.*, 1897, **71**, 810.

o-Hydroxyacetophenone-p-arsinic Acid



$C_8H_9O_5As$ MW, 260

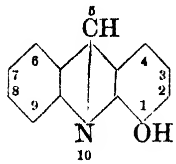
Needles from H_2O. M.p. 156°.

Gibson, Levin, *J. Chem. Soc.*, 1931, 2402.

Hydroxyacet-toluidide.
See under Aminocresol.

Hydroxy-acetylnaphthalene.
See Hydroxyacetonaphthone.

1-Hydroxyacridine. (See note under Acridine)



$C_{13}H_9ON$ MW, 195

Yellow needles from EtOH.Aq. M.p. 116·5°.
Me ether: $C_{14}H_{11}ON$. MW, 209. Light yellow needles from EtOH.Aq. M.p. 130–1°. *Picrate*: orange-red needles from EtOH. M.p. 250° decomp.
Picrate: red needles from EtOH. M.p. 216°.

Jensen, Rethwisch, *J. Am. Chem. Soc.*, 1928, **50**, 1144.

3-Hydroxyacridine.
Yellow needles from EtOH. Does not melt below 250°.
Et ether: $C_{15}H_{13}ON$. MW, 223. Yellow plates from EtOH.Aq. M.p. 99°. *B,HCl*: yellow needles from EtOH. M.p. 200° decomp. *Picrate*: yellow needles from Me_2CO. Does not melt below 250°.

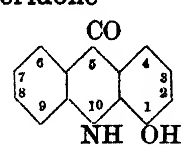
See above reference.

4-Hydroxyacridine.
Yellow cryst. from EtOH. M.p. 117°. Sol. Et_2O. Sol. conc. H_2SO_4 with green fluor.
B,HCl: orange needles. M.p. 252° decomp.
B_2,H_2SO_4: orange needles. M.p. 240°.
Picrate: orange needles. M.p. 215°.
Et ether: yellow needles. M.p. 80°. Sol. Et_2O, EtOH with bluish-green fluor. *B,HCl*: yellow needles. M.p. 220° decomp. *B_2,H_2SO_4*: yellow needles. M.p. 250°. *Picrate*: yellow needles. M.p. 255°.

Matsumura, *J. Am. Chem. Soc.*, 1927, **49**, 810.

5-Hydroxyacridine.
See Acridol.

1-Hydroxyacridone



$C_{13}H_9O_2N$ MW, 211

Yellow needles from AcOH.Aq. M.p. 300°. Sol. EtOH, AcOH with blue fluor. Spar. sol. C_6H_6. Insol. ligroin. Sol. NaOH. Sol. conc. H_2SO_4 with green fluor.
Me ether: $C_{14}H_{11}O_2N$. MW, 225. Yellow needles from AcOH.Aq. M.p. 293°. Sol. EtOH, AcOH. Spar. sol. C_6H_6. Insol. ligroin.
Et ether: $C_{15}H_{13}O_2N$. MW, 239. Yellow needles from AcOH.Aq. M.p. 320° decomp. Sol. EtOH, AcOH. Sol. conc. H_2SO_4 with green col.

Ullmann, *Ann.*, 1907, **355**, 345.
Matsumura, *J. Am. Chem. Soc.*, 1927, **49**, 810.

10-Hydroxyacridone (N-*Hydroxyacridone*).
Yellow needles from AcOH. M.p. 255–6°. Sol. conc. H_2SO_4. Spar. sol. Et_2O, C_6H_6, $CHCl_3$, EtOH, H_2O.
Me ether: yellow needles from Me_2CO.Aq. M.p. 153°. Sol. Me_2CO, AcOH, EtOH, $CHCl_3$, C_6H_6. Spar. sol. cold ligroin.

Kliegl, Fehrle, *Ber.*, 1914, **47**, 1634.

2-Hydroxyacrylic Acid.
See Formylacetic Acid.

1-Hydroxyadipic Acid

HO·CH·COOH
[CH$_2$]$_2$
CH$_2$·COOH

$C_6H_{10}O_5$ MW, 162

Cryst. from H_2O. M.p. 151°. Sol. H_2O, EtOH, Et_2O. Sublimes.
Di-Me ester: $C_8H_{14}O_5$. MW, 190. *Me ether*: $C_9H_{16}O_5$. MW, 204. B.p. 157–60°/11 mm.
Di-Et ester: $C_{10}H_{18}O_5$. MW, 218. B.p. 160–1°/17 mm. *Me ether*: $C_{11}H_{20}O_5$. MW, 232. B.p. 142–4°/12 mm. *Acetyl deriv.*: b.p. 155–60°/12 mm.

Ince, *J. Chem. Soc.*, 1895, **67**, 159.
Borsche, Manteuffel, *Ann.*, 1933, **505**, 190.

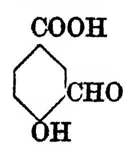
2-Hydroxy-α-alanine.
See Serine.

1-Hydroxy-β-alanine.
See Isoserine.

2-Hydroxy-1-aldehydoanthracene.
See 2-Anthrol-1-aldehyde.

2-Hydroxy-3-aldehydobenzoic Acid.
See 3-Aldehydosalicylic Acid.

4-Hydroxy-3-aldehydobenzoic Acid (4-*Hydroxy-3-formylbenzoic acid*, 4-*hydroxyisophthalaldehydic acid*)



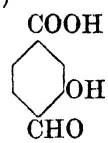
$C_8H_6O_4$ MW, 166

Prisms from H_2O. M.p. 244°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O, $CHCl_3$. Sublimes. Yellow sol. in NaOH.Aq. $FeCl_3$ ⟶ brick-red col. Ox. or KOH fusion ⟶ 4-hydroxyisophthalic acid.

Phenylhydrazone: m.p. 257–8° decomp.

Reimer, Tiemann, *Ber.*, 1876, **9**, 1274.
Chattaway, Prats, *J. Chem. Soc.*, 1927, 690.

3-Hydroxy-4-aldehydobenzoic Acid (*3-Hydroxy-4-formylbenzoic acid*, *3-hydroxyterephthalaldehydic acid*)



$C_8H_6O_4$ MW, 166

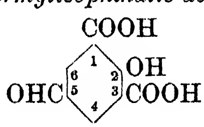
Needles. M.p. 234°. Sol. EtOH, Et_2O. Spar. sol. hot H_2O. Sublimes. Deep yellow sol. in NaOH.Aq. $FeCl_3$ ⟶ violet col. Ox. or KOH fusion ⟶ hydroxyterephthalic acid.

See first reference above.

2-Hydroxy-5-aldehydobenzoic Acid.
See 5-Aldehydosalicylic Acid.

4-Hydroxy-1-aldehydo-1 : 3-butadiene.
See Glutacondialdehyde.

2-Hydroxy-5-aldehydoisophthalic Acid (*2-Hydroxy-5-formylisophthalic acid*)



$C_9H_6O_6$ MW, 210

Needles. M.p. 237–8° decomp. Sublimes without decomp. $FeCl_3$ ⟶ cherry-red col. Sols. shew blue fluor. (alk. sol. colourless). KOH fusion ⟶ 2- and 4-hydroxyisophthalic acids. Ox. ⟶ hydroxytrimesic acid.

Reimer, *Ber.*, 1878, **11**, 795.

4-Hydroxy-5-aldehydoisophthalic Acid.
Needles from H_2O. M.p. 260° decomp. Sol. EtOH, Et_2O, hot H_2O. Spar. sol. cold H_2O. $FeCl_3$ ⟶ bluish-red col. KOH fusion ⟶ 2- and 4-hydroxyisophthalic acids. Ox. ⟶ hydroxytrimesic acid. Neutral alkali salt is colourless, basic is yellow. Both salts shew green fluor.

Reimer, *Ber.*, 1878, **11**, 793.

Hydroxyaldehydoquinaldine.
See Hydroxyquinaldine-aldehyde.

Hydroxyaldehydoquinoline.
See Hydroxyquinoline-aldehyde.

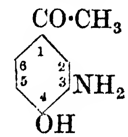
Hydroxyallylene.
See Propargyl Alcohol.

Hydroxy-aldehydo-xylene.
See Hydroxydimethylbenzaldehyde.

***p*-Hydroxy-ω-aminoacetophenone.**
See *p*-Hydroxyphenacylamine.

ω-Hydroxy-aminoacetophenone.
See Aminophenacyl Alcohol.

4-Hydroxy-3-aminoacetophenone



$C_8H_9O_2N$ MW, 151

Me ether: $C_9H_{11}O_2N$. MW, 165. Prisms from EtOH. M.p. 102°. Sol. C_6H_6. Mod. sol. Et_2O. N-*Acetyl*: prisms. M.p. 122·5°.

Bogert, Curtin, *J. Am. Chem. Soc.*, 1923, **45**, 2164.

6-Hydroxy-3-aminoacetophenone (*2-Hydroxy-5-aminoacetophenone*).
Yellow needles or plates from H_2O. M.p. 121–2° (110°). Sol. EtOH, Et_2O.

B,HCl: m.p. 155° decomp.

N-*Acetyl*: yellow cryst. from EtOH. M.p. 165°. Sol. EtOH. Spar. sol. Et_2O, $CHCl_3$. *Na salt*: yellow plates. M.p. 225° decomp. *Oxime*: needles. M.p. 160°. *Phenylhydrazone*: m.p. 207°.

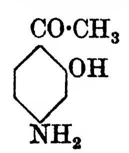
Diacetyl: m.p. 173–4°.

Oxime: m.p. 201–2° decomp.

Et ether: $C_{10}H_{13}O_2N$. MW, 179. Yellow needles. M.p. 60°. Sol. EtOH. *B,HCl*: cryst. M.p. 215°. N-*Acetyl*: needles from EtOH. M.p. 155°.

Kunckell, *Ber.*, 1901, **34**, 125; *Chem. Zentr.*, 1913, II, 2124.
Lindemann, Romanoff, *J. prakt. Chem.*, 1929, **122**, 214.

2-Hydroxy-4-aminoacetophenone



$C_8H_9O_2N$ MW, 151

Plates from EtOH.Aq. M.p. 122–3°.

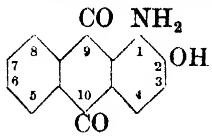
N-*Acetyl*: needles from EtOH or C_6H_6. M.p. 91°.

N-*Di-Me*: $C_{10}H_{13}O_2N$. MW, 179. Plates from ligroin. M.p. 120°. Alc. $FeCl_3$ ⟶ violet-black col.

Gibson, Levin, *J. Chem. Soc.*, 1931, 2402.
Pechmann, Schaal, *Ber.*, 1899, **32**, 3691.

Hydroxyaminoanthracene.
See Hydroxyanthramine.

2-Hydroxy-1-aminoanthraquinone



$C_{14}H_9O_3N$ MW, 239

Brown needles from EtOH. M.p. 250°. Very stable. Sol. aq. alkalis, alkali carbonates, $Ba(OH)_2$. HNO_3 in hot EtOH ⟶ 2-hydroxyanthraquinone.

N-*Acetyl*: dark brown cryst. from AcOH, golden needles from EtOH. M.p. 170°. Sol. alkalis.

Et ether: $C_{16}H_{13}O_3N$. MW, 267. Red plates. M.p. 182°. Conc. H_2SO_4 at 200° ⟶ 2-hydroxy-1-aminoanthraquinone.

Liebermann, Troschke, *Ann.*, 1876, **183**, 206.
Lagodzinski, *Ann.*, 1905, **342**, 84.
Koehler, U.S.P., 1,922,480, (*Chem. Abstracts*, 1933, **27**, 5083).

4-Hydroxy-1-aminoanthraquinone (1-*Hydroxy*-4-*aminoanthraquinone*, 4-*aminoerythroxyanthraquinone*).

Reddish-violet cryst. powder from EtOH.Aq. M.p. 207–8°. Sol. EtOH, C_6H_6 with reddish-brown col. Violet sol. in NaOH. Yellow sol. in conc. H_2SO_4.

N-*Me*: $C_{15}H_{11}O_3N$. MW, 253. Bronze cryst. Violet sols. in $CHCl_3$, AcOH. Yellow sol. in conc. HCl.

N-*Di-Me*: $C_{16}H_{13}O_3N$. MW, 267. Brownish-red needles from Py. M.p. 245°. Sol. $CHCl_3$. Orange-red sol. in conc. H_2SO_4 ⟶ bluish-red on addn. of boric acid.

N-*Phenyl*: 4-hydroxy-1-anilinoanthraquinone. $C_{20}H_{13}O_3N$. MW, 315. Blue-black needles from AcOH, dark violet needles from MeOH. M.p. 158° (153°). Sol. $CHCl_3$, AcOH. Spar. sol. EtOH. Green sol. in conc. H_2SO_4 ⟶ blue on addn. of boric acid.

Wacker, *Ber.*, 1902, **35**, 3923.
Eckert, Steiner, *Monatsh.*, 1914, **35**, 1144.
Bayer, D.R.P., 125,666, (*Chem. Zentr.*, 1901, II, 1190).
Koehler, U.S.P., 1,922,480, (*Chem. Abstracts*, 1933, **27**, 5083).

5-Hydroxy-1-aminoanthraquinone (1-*Hydroxy*-5-*aminoanthraquinone*, 5-*aminoerythroxyanthraquinone*).

Brownish-red prisms from C_6H_6. M.p. 210° (216°). Sol. EtOH, C_6H_6. Spar. sol. H_2O. Sol. NaOH. Orange sol. in conc. H_2SO_4.

Wacker, *Ber.*, 1902, **35**, 3925.
Höchst, D.R.P., 149,781, (*Chem. Zentr.*, 1904, I, 1045).

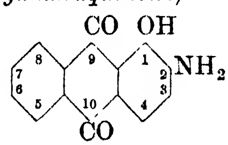
8-Hydroxy-1-aminoanthraquinone (1-*Hydroxy*-8-*aminoanthraquinone*, 8-*aminoerythroxyanthraquinone*).

Brown needles from C_6H_6. M.p. 230° (214–15°). Sol. EtOH, C_6H_6. Sol. NaOH, $Ba(OH)_2$. HNO_3 in hot EtOH ⟶ 1-hydroxyanthraquinone.

N-*Phenyl*: *phenyl ether*, 8-phenoxy-1-anilinoanthraquinone. $C_{26}H_{17}O_3N$. MW, 391. Needles. M.p. 173–4°.

Schrobsdorff, *Ber.*, 1903, **36**, 2936.
Höchst., D.R.P., 148,875, (*Chem. Zentr.*, 1904, I, 556).

1-Hydroxy-2-aminoanthraquinone (2-*Aminoerythroxyanthraquinone*)



$C_{14}H_9O_3N$ MW, 239

Brown needles from EtOH. M.p. 226–7°. Sol. Et_2O, EtOH, C_6H_6, Py. Sol. alkalis with bluish-violet col. Insol. H_2O. Sol. conc. H_2SO_4 with olive-green col. Hot alc. HNO_3 or H_3AsO_4 ⟶ 1-hydroxyanthraquinone. KOH fusion ⟶ alizarin.

N-*Acetyl*: red needles from EtOH or AcOH. M.p. 243–4°. Sol. Et_2O, EtOH, AcOH. Spar. sol. KOH.Aq.

N-*Diacetyl*: yellow cryst. M.p. 247–8°.

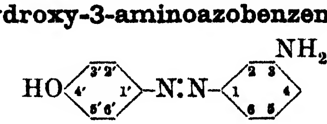
Brass, Zeigler, *Ber.*, 1925, **58**, 755.

4-Hydroxy-2-aminoanthraquinone (1-*Hydroxy*-3-*aminoanthraquinone*, 3-*aminoerythroxyanthraquinone*).

Red needles. Does not melt below 310°. Sublimes.

Scholl, Schneider, Eberle, *Ber.*, 1904, **37**, 4436.

4′-Hydroxy-3-aminoazobenzene



$C_{12}H_{11}ON_3$ **MW, 213**

Cryst. M.p. 168°.
N-*Acetyl*: red cryst. M.p. 208°.

Wallach, Schulze, *Ber.*, 1882, **15**, 3021.

4′-Hydroxy-4-aminoazobenzene.

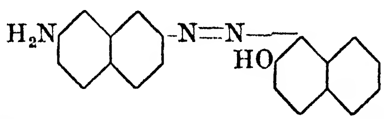
Cryst. M.p. 186°. Sol. EtOH. Orange sol. in conc. H_2SO_4.

N-*Di-Me*: $C_{14}H_{15}ON_3$. MW, 241. Plates from EtOH. M.p. 203–4°. Dil. $H_2SO_4 \longrightarrow$ red col. *Me ether*: $C_{15}H_{17}ON_3$. MW, 255. Prisms from Py or needles from EtOH. M.p. 161°. *Acetyl deriv.*: plates from EtOH. M.p. 137°.

N-*Acetyl*: plates from EtOH.Aq. M.p. 203° (198°). *Acetyl deriv.*: orange cryst. M.p. 236–7°.

Hewitt, Thomas, *J. Chem. Soc.*, 1909, **95**, 1294.
Meldola, Williams, *Chem. News*, 1899, **80**, 263.

2-Hydroxy-7′-amino-1 : 2′-azonaphthalene



$C_{20}H_{15}ON_3$ MW, 313

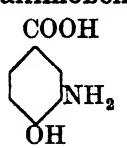
Cryst. from anisole. M.p. above 300°. Sol. Py, anisole. Spar. sol. EtOH, C_6H_6, xylene. Insol. dil. alkalis.

Kaufler, Karrer, *Ber.*, 1907, **40**, 3263.

Hydroxy-*o*-aminobenzoic Acid.
See Hydroxyanthranilic Acid.

***o*-Hydroxy-aminobenzoic Acid.**
See Aminosalicylic Acid.

4-Hydroxy-*m*-aminobenzoic Acid



$C_7H_7O_3N$ MW, 153

Prisms $+1H_2O$ from H_2O. Loses H_2O at 100°. M.p. anhyd. 210°. Sol. hot AcOH, H_2O. Spar. sol. hot EtOH. Insol. Et_2O, $CHCl_3$, C_6H_6. Dist. $\longrightarrow$ *o*-aminophenol.

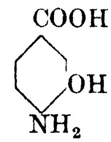
Me ester: $C_8H_9O_3N$. MW, 167. Dimorphous. (1) Needles from C_6H_6 or AcOH. M.p. 142°. (2) Needles from $CHCl_3$. M.p. 110–11°. Sol. hot H_2O, EtOH, Et_2O. Spar. sol. C_6H_6. Local anæsthetic (Orthoform New). *B,HCl*: needles from EtOH. M.p. 225°. Sol. H_2O. *B,HBr*: needles from EtOH. M.p. 232°.

Me ether: 3-aminoanisic acid, 3-amino-*p*-methoxybenzoic acid. $C_8H_9O_3N$. MW, 167. Needles from H_2O. M.p. 204°. Sol. hot EtOH, H_2O. Spar. sol. Et_2O, cold H_2O.

Et ether: 3-amino-*p*-ethoxybenzoic acid. $C_9H_{11}O_3N$. MW, 181. Cryst. M.p. 198–9°. Sol. hot EtOH, MeOH. Spar. sol. H_2O.

Einhorn, Pfyl, *Ann.*, 1900, **311**, 43.
Einhorn, Ruppert, *Ann.*, 1902, **325**, 305.
Auwers, Röhrig, *Ber.*, 1897, **30**, 992.

3-Hydroxy-*p*-aminobenzoic Acid



$C_7H_7O_3N$ MW, 153

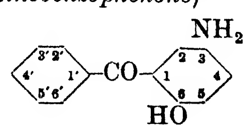
Plates from EtOH.Aq. M.p. 216°. Sol. EtOH, Me_2CO. $FeCl_3 \longrightarrow$ dark-blue col. or brown ppt.

Me ester: $C_8H_9O_3N$. MW, 167. Plates from C_6H_6 or H_2O. M.p. 120–1°. Sol. Et_2O, EtOH, Me_2CO, C_6H_6. Spar. sol. H_2O. Insol. ligroin. $FeCl_3 \longrightarrow$ brown col. Local anæsthetic (Orthoform Old).

Et ester: $C_9H_{11}O_3N$. MW, 181. Plates from $CHCl_3$–ligroin. Sol. Et_2O, EtOH, Me_2CO, C_6H_6. Spar. sol. H_2O, $CHCl_3$, ligroin. $FeCl_3 \longrightarrow$ yellowish-brown col.

Einhorn, D.R.P., 97,335, (*Chem. Zentr.*, 1898, II, 526).
See also first reference above.

6-Hydroxy-3-aminobenzophenone (2-*Hydroxy-5-aminobenzophenone*)



$C_{13}H_{11}O_2N$ MW, 213

Plates from hot H_2O. M.p. 107°.

Gattermann, *Ber.*, 1896, **29**, 3035.

4′-Hydroxy-2-aminobenzophenone.

Needles. M.p. 165°. Sol. EtOH. Spar. sol. Et_2O, C_6H_6.

Me ether: $C_{14}H_{13}O_2N$. MW, 227. Cryst from C_6H_6–pet. ether. M.p. 76°.

Stoermer, Gaus, *Ber.*, 1912, **45**, 3106.
Ullmann, Bleier, *Ber.*, 1902, **35**, 4278.

4′-Hydroxy-4-aminobenzophenone.

B,HCl: m.p. 167–70°.
Oxime: m.p. 164°.
Phenyl ether: 4-*p*-aminobenzoyldiphenyl ether. $C_{19}H_{15}O_2N$. MW, 289. M.p. 125°.

Dilthey, Blankenburg, Brandt, Huthwelker, *J. prakt. Chem.*, 1932, **135**, 36.

2-Hydroxy-5-aminobenzyl Alcohol.
See 5-Aminosaligenin.

2-Hydroxy-1-aminobutyric Acid

$CH_3{\cdot}CH(OH){\cdot}CH(NH_2){\cdot}COOH$

$C_4H_9O_3N$ MW, 119

Cryst. from 75% EtOH. M.p. 239° decomp. Very sol. hot H_2O. Insol. EtOH, Et_2O, $CHCl_3$. Sol. 2·8 parts H_2O at 14°.

B,HCl: m.p. 147–8°.

N-*Benzoyl*: cryst. from EtOH–pet. ether. M.p. 176°.

O : N-*Dibenzoyl*: cryst. from 30% EtOH. M.p. 174°.

Egoroff, *Chem. Zentr.*, 1903, II, 554.
Abderhalden, Heyns, *Ber.*, 1934, **67**, 544.

3-Hydroxy-1-aminobutyric Acid

$HO{\cdot}CH_2{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$

$C_4H_9O_3N$ MW, 119

Needles from EtOH.Aq. M.p. 187° decomp. (rapid heat.). Very sol. H_2O. Spar. sol. EtOH. Insol. Et_2O. Passes readily into the lactone.

N-*Benzoyl*: needles from H_2O. M.p. 121°.

Fischer, Blumenthal, *Ber.*, 1907, **40**, 111.
Sörensen, Andersen, *Z. physiol. Chem.*, 1908, **56**, 255, 273, 279.

1-Hydroxy-2-aminobutyric Acid (2-*Methylisoserine*)

$CH_3{\cdot}CH(NH_2){\cdot}CH(OH){\cdot}COOH$

$C_4H_9O_3N$ MW, 119

Prisms from EtOH.Aq. M.p. 200° decomp. Sol. to about 5% in H_2O at ord. temp. Spar. sol. EtOH. Insol. Et_2O.

Neuberg, *Chem. Zentr*, 1906, II, 166.

2-Hydroxy-3-aminobutyric Acid

$H_2N{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH$

$C_4H_9O_3N$ MW, 119

d-.

M.p. 214°. $[\alpha]_D^{20}$ +18·30°.

N-*Benzoyl*: m.p. 78–80° (+ $1H_2O$), 116° (anhyd.). $[\alpha]_D^{20}$ +10·0° in H_2O.

l-.

M.p. 212° decomp. $[\alpha]_D^{20}$ −20·98°.

N-*Benzoyl*: m.p. 80–1° (+$1H_2O$). 114° (anhyd.). $[\alpha]_D^{20}$ −11·84° in H_2O.

dl-.

Cryst. from EtOH.Aq. M.p. 218°. Very sol. hot H_2O. Spar. sol. cold H_2O and most org. solvents. Neutral to litmus.

B,HBr: needles from H_2O. M.p. 78°.

N-*Benzoyl*: needles from H_2O. M.p. 176–7°. *Et ester*: m.p. 99–100°. Sol. EtOH, Me_2CO, C_6H_6, AcOEt. Spar. sol. ligroin. *Amide*: prisms. M.p. 130°. *Nitrile*: needles. M.p. 128–9°.

O-*Benzoyl*: *hydrochloride*, needles from H_2O. M.p. 215° decomp.

Bergmann, Brand, Weinmann, *Z. physiol. Chem.*, 1923, **131**, 1.
Tomita, Sendju, *Z. physiol. Chem.*, 1927, **169**, 266.
Bergmann, Lissitzin, *Ber.*, 1930, **63**, 310.

1-Hydroxy-5-aminocaproic Acid

$H_2N{\cdot}CH_2{\cdot}[CH_2]_3{\cdot}CH(OH){\cdot}COOH$

$C_6H_{13}O_3N$ MW, 147

Plates from EtOH. M.p. 225–30° decomp. Very sol. H_2O. Spar. sol. MeOH, EtOH.

N-*Benzoyl*: prisms from H_2O. M.p. 108°. Very sol. EtOH, Me_2CO. Spar. sol. Et_2O.

Fischer, Zemplén, *Ber.*, 1909, **42**, 4889.

α-Hydroxy-β-aminodibenzyl (2-*Hydroxy*-1 : 2-*diphenylethylamine*, 1-*hydroxy*-2-*aminodiphenylethane*, sym.-*diphenylethanolamine*)

$C_6H_5{\cdot}CH(NH_2){\cdot}CH(OH){\cdot}C_6H_5$

$C_{14}H_{15}ON$ MW, 213

Exists in two isomeric forms.

(1) Needles from EtOH. M.p. 165° decomp. (161°). Sol. hot EtOH. Spar. sol. Et_2O. Insol. H_2O. Heat above m.p. ⟶ benzylamine + benzaldehyde.

B,HCl: decomp. at 234° (210°).

N-*Formyl*: needles from EtOH. M.p. 182–3°.

N-*Acetyl*: needles from EtOH. M.p. 196–7°.

O : N-*Diacetyl*: plates from EtOH. M.p. 212–13°.

N-*Benzoyl*: needles. M.p. 236–7°.

O : N-*Dibenzoyl*: plates. M.p. 254°.

(2) Isohydroxyaminodibenzyl, isodiphenyloxyethylamine.

d-.

Needles from C_6H_6. M.p. 114°. $[\alpha]_D$ +109·69° in EtOH.

B,HCl: cryst. from EtOH. M.p. 228°. $[\alpha]_D$ +79·57° in H_2O.

O-*Acetyl*: m.p. 159°. $[\alpha]_D$ +11·99° in EtOH. *B,HCl*: m.p. 196–7°.

N-*Benzoyl*: needles from EtOH. M.p. 215°. $[\alpha]_D$ +29·63° in MeOH.

l-.

Cryst. from C_6H_6. M.p. 114°. $[\alpha]_D$ −109·66° in EtOH.

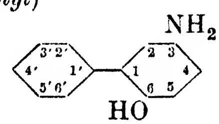
B,HCl: cryst. from EtOH. M.p. 228°. $[\alpha]_D$ −79·38° in H_2O.

O-*Acetyl*: m.p. 159°. $[\alpha]_D$ −12·39° in EtOH. *B,HCl*: m.p. 196°.
N-*Benzoyl*: m.p. 214–15°. $[\alpha]_D$ −29·42° in MeOH.

dl-.
Prisms from MeOH. M.p. 129–30°. Sol. C_6H_6, hot EtOH. Spar. sol. ligroin. HNO_3 ⟶ benzil. Heat above m.p. ⟶ benzylamine + benzaldehyde. Zn dust dist. ⟶ stilbene. HNO_2 ⟶ isohydrobenzoin.
B,HCl: plates from H_2O. M.p. 211°.
O-*Acetyl*: prisms from EtOH. M.p. 153°. *B,HCl*: m.p. 193°.
N-*Benzoyl*: needles from EtOH. M.p. 223°.
O:N-*Dibenzoyl*: cryst. from C_6H_6. M.p. 186–7°.

Erlenmeyer, jun., *Ber.*, 1897, **30**, 1525.
Söderbaum, *Ber.*, 1895, **28**, 2522.
Erlenmeyer, *Ber.*, 1899, **32**, 2378; *Ann.*, 1899, **307**, 114, 131.
Erlenmeyer, Arnold, *Ann.*, 1904, **337**, 307.

6-Hydroxy-3-aminodiphenyl (*2-Hydroxy-5-aminodiphenyl*)



$C_{12}H_{11}ON$ MW, 185

Needles from EtOH. M.p. 201° (199°). Sol. hot EtOH, C_6H_6. Spar. sol. Et_2O, $CHCl_3$. Insol. ligroin, H_2O. Ox. ⟶ 2-phenyl-*p*-benzoquinone.
B,HCl: cryst. M.p. 214°.

Borsche, Scholten, *Ber.*, 1917, **50**, 602.
Hill, Hale, *Am. Chem. J.*, 1905, **33**, 11.

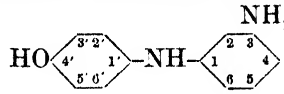
2′-Hydroxy-4-aminodiphenyl.
Needles from toluene. M.p. 181–2°. Spar. sol. H_2O. Sol. alkalis. Warm $FeCl_3$ + HCl ⟶ red col.

Bamberger, *Ann.*, 1912, **390**, 161.

4′-Hydroxy-4-aminodiphenyl (*4′-Hydroxy-xenylamine*).
Plates from EtOH.Aq. M.p. 273°. Spar. sol. C_6H_6. Prac. insol. H_2O, Et_2O, Me_2CO. $FeCl_3$ + HCl ⟶ greenish-brown col. ⟶ violet on warming.
N-*Acetyl*: plates or prisms from EtOH.Aq. M.p. 225°. Sol. EtOH, alkalis. Insol. H_2O.

Täuber, *Ber.*, 1894, **27**, 2629.
Bamberger, *Ann.*, 1912, **390**, 152.

4′-Hydroxy-2-aminodiphenylamine



$C_{12}H_{12}ON_2$ MW, 200

Colourless needles from EtOH.Aq. M.p. 149·5°. Very sol. EtOH, AcOH, boiling C_6H_6. Spar. sol. boiling H_2O. Insol. ligroin.
Et ether: $C_{14}H_{16}ON_2$. MW, 228. Needles from EtOH.Aq. M.p. 95°.

Ullmann, Fukui, *Ber.*, 1908, **41**, 624.
Jacobson, Fertsch, Fischer, *Ber.*, 1893, **26**, 683.

4′-Hydroxy-4-aminodiphenylamine.
Plates from H_2O or toluene. M.p. 166°. Very sol. EtOH, AcOH, Me_2CO. Spar. sol. ligroin.
Diacetyl deriv.: plates from toluene. M.p. 141°.
Me ether: $C_{13}H_{14}ON_2$. MW, 214. Needles from ligroin. M.p. 102°. B.p. 238°/12 mm.
Et ether: needles from ligroin. M.p. 98–9°. *Acetyl deriv.*: needles from EtOH.Aq. M.p. 134°.

Ullmann, Jüngel, *Ber.*, 1909, **42**, 1080.
Jacobson, Henrich, Klein, *Ber.*, 1893, **26**, 693.
Willstätter, Kubli, *Ber.*, 1909, **42**, 4139.

1-Hydroxy-2-aminoisobutyric Acid (*1-Methylisoserine*, *1-aminomethyl-lactic acid*)

$$\begin{matrix} H_2N{\cdot}CH_2 \\ CH_3 \end{matrix}\!\!>C(OH){\cdot}COOH$$

$C_4H_9O_3N$ MW, 119

d-.
Cryst. from EtOH.Aq. M.p. 230° decomp. Sol. H_2O, MeOH. Mod. sol. EtOH. $[\alpha]_D$ +4·34° in H_2O. Nitrosyl bromide in HBr ⟶ *d*-2-bromo-1-hydroxyisobutyric acid.
N-*Benzoyl*: needles from H_2O. M.p. 124°.

l-.
Has similar properties to *d*-. $[\alpha]_D$ −4·15° in H_2O.

dl-.
Plates from H_2O. M.p. 281° decomp. Sol. H_2O. Insol. EtOH, Me_2CO.
B,HCl: cryst. M.p. 132–4°. Hygroscopic.
Et ester: $C_6H_{13}O_3N$. MW, 147. Needles. M.p. 60°. B.p. 107°/15 mm. Sol. Et_2O, $CHCl_3$.
N-*Me*: needles from EtOH.Aq. M.p. 248°. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O, Me_2CO.
N-*Di-Me*: plates from EtOH–Me_2CO. M.p. 174°. Sol. H_2O, EtOH. Spar. sol. Me_2CO.

Insol. Et_2O. Hygroscopic. *Me ester*: b.p. 107°/35 mm.

N-*Benzoyl*: plates. M.p. 153°.

Kay, *Ann.*, 1908, **362**, 330.
Fourneau, *Bull. soc. chim.*, 1909, **5**, 230.

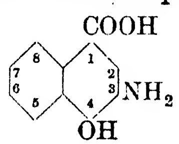
2-Hydroxy-1-aminoisopentane.
See 2-Hydroxy-2-methyl-*n*-butylamine.

4-Hydroxy-2-amino-2-methylpentane.
See Diacetonalkamine.

2-Hydroxy-4-amino-2-methylpentane.
See Dimethyl-2-aminopropylcarbinol.

1-Hydroxy-2-amino-4-methylpentane.
See 2-Amino-4-methyl-*n*-amyl Alcohol.

4-Hydroxy-3-amino-1-naphthoic Acid



$C_{11}H_9O_3N$ MW, 203

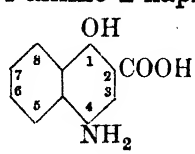
Cryst. M.p. 143° decomp. Sol. EtOH, Me_2CO. Spar. sol. hot H_2O ⟶ red col. $FeCl_3$ on alc. sol. ⟶ bluish-red col. Conc. HNO_3 ⟶ 1 : 2-naphthoquinone-4-carboxylic acid.

Heller, *Ber.*, 1912, **45**, 677.

3-Hydroxy-4-amino-1-naphthoic Acid.
Needles. M.p. 204° decomp. Hot dil. HCl ⟶ 1-amino-2-naphthol. Ox. ⟶ 1 : 2-naphthoquinone. HNO_3 ⟶ 1 : 2-naphthoquinone-4-carboxylic acid.

Lesser, Gad, *Ber.*, 1925, **58**, 2554.

1-Hydroxy-4-amino-2-naphthoic Acid



$C_{11}H_9O_3N$ MW, 203

Needles from AcOH. Insol. H_2O, EtOH, Et_2O, C_6H_6. Decomp. above 200° with loss of CO_2. Hot dry HCl ⟶ 4-amino-1-naphthol. HNO_3 ⟶ 1 : 4-naphthoquinone.

Me ether: $C_{12}H_{11}O_3N$. MW, 217. Brown needles from H_2O. M.p. 190–1° decomp. Insol. EtOH, AcOH, C_6H_6.

Nietzki, Guitermann, *Ber.*, 1887, **20**, 1276.
Froelicher, Cohen, *J. Chem. Soc.*, 1922, **121**, 1658.

3-Hydroxy-4-amino-2-naphthoic Acid.
Yellow prisms from EtOH. Decomp. at 205°. Sol. Me_2CO, EtOH, Et_2O. Spar. sol. C_6H_6, $CHCl_3$. Hot dil. H_2SO_4 ⟶ 3 : 4-dihydroxy-2-naphthoic acid.

Me ester: $C_{12}H_{11}O_3N$. MW, 217. Yellow needles from MeOH. M.p. 106°. Hot dil. H_2SO_4 ⟶ 3 : 4-dihydroxy-2-naphthoic acid Me ester. Anæsthetic.

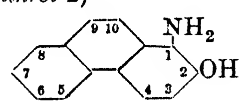
Möhlau, Kriebel, *Ber.*, 1895, **28**, 3091.
Gradenwitz, *Ber.*, 1894, **27**, 2623.
Weil, Heerdt, *Ber.*, 1922, **55**, 226.

3-Hydroxy-7-amino-2-naphthoic Acid.
Yellow needles from EtOH.Aq. M.p. 230–2° (293°). Sol. EtOH, Et_2O, $CHCl_3$, AcOEt. Spar. sol. H_2O, C_6H_6. Insol. pet. ether. $FeCl_3$ ⟶ red col. H_2SO_4 ⟶ green col. Hot dil. H_2SO_4 ⟶ 3 : 7-dihydroxy-2-naphthoic acid.

Me ether: $C_{12}H_{11}O_3N$. MW, 217. Leaflets from Py. M.p. 310°. Sol. H_2O, EtOH, AcOH, Py. Insol. Et_2O, C_6H_6. *N-acetyl*: brown prisms from EtOH.Aq. M.p. 193°.

Froelicher, Cohen, *J. Chem. Soc.*, 1922, **121**, 1658.
Heyn, U.S.P., 1,754,390, (*Chem. Abstracts*, 1930, **24**, 2895).

2-Hydroxy-1-aminophenanthrene (1-*Aminophenanthrol*-2)



$C_{14}H_{11}ON$ MW, 209

Plates from EtOH. M.p. indefinite (darkens at 210°). Sol. EtOH. Spar. sol. Et_2O, C_6H_6.

B,HCl: needles from EtOH. M.p. 250° decomp. Sol. EtOH. Spar. sol. H_2O. H_2SO_4 ⟶ cherry-red col.

N-*Acetyl*: cryst. from $PhNO_2$. M.p. 295°.

Diacetyl deriv.: needles from C_6H_6. M.p. 227°.

Triacetyl: cryst. from ligroin. M.p. 122–3°.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 1899.

9-Hydroxy-2-aminophenanthrene (2-*Amino*-9-*phenanthrol*).
White cryst. M.p. 194–5°. Very sol. EtOH. Very spar. sol. ligroin, $CHCl_3$, CCl_4.

N-*Benzoyl*: cryst. from EtOH. M.p. 160° decomp.

Schmidt, Spoun, *Ber.*, 1922, **55**, 1211.

10-Hydroxy-2-aminophenanthrene (2-*Amino*-10-*phenanthrol*).
Cryst. from EtOH. M.p. 221°.

O : N-*Diacetyl*: cryst. M.p. 182°.

O : N-*Dibenzoyl*: cryst. from EtOH. M.p. 225–6°.

Schmidt, Spoun, *Ber.*, 1922, **55**, 1210.

1-Hydroxy-4-aminophenanthrene (4-*Aminophenanthrol*-1).

Powder. Extremely sensitive to oxidation.

Triacetyl deriv.: colourless plates. M.p. 143°. Readily sol. MeOH.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 2469.

3-Hydroxy-4-aminophenanthrene (4-*Aminophenanthrol*-3).

Needles from EtOH. M.p. 159–61° (162°) decomp. Very sol. EtOH, Et_2O, Me_2CO, C_6H_6.

Triacetyl deriv.: needles from EtOH. M.p. 169–70°.

Werner, Löwenstein, Wack, Kunz, *Ann.*, 1902, **321**, 297.
Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 945.

9-Hydroxy-10-aminophenanthrene (10-*Amino-9-phenanthrol, morphigenin*).

Yellowish-brown cryst. M.p. 417° after sintering at 150°.

B,HCl: needles. M.p. above 290°.

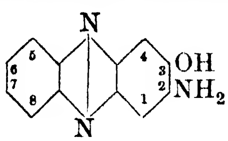
N-*Acetyl*: needles. M.p. 223–4°.

O : N-*Diacetyl*: prisms. M.p. 242°.

N-*Benzoyl*: needles from AcOH. M.p. 248–9°.

Pschorr, *Ber.*, 1902, **35**, 2733.

3-Hydroxy-2-aminophenazine



$C_{12}H_9ON_3$ MW, 211

Yellow cryst. from EtOH. Spar. sol. hot $PhNO_2$. Brownish-red sol. in conc. H_2SO_4. 20% H_2SO_4 at 200° ⟶ 2 : 3-dihydroxyphenazine.

N-*Acetyl*: reddish-brown needles from EtOH. Does not melt below 340°. Spar. sol. C_6H_6. Red sol. in H_2SO_4.

Diacetyl deriv.: needles from toluene. M.p. 230°. Sol. EtOH.

Ullmann, Mauthner, *Ber.*, 1902, **35**, 4303.

7-Hydroxy-2-aminophenazine.

Cryst. M.p. 360°. Sol. EtOH with green fluor. Insol. C_6H_6, ligroin. Conc. H_2SO_4 ⟶ violet col.

Diacetyl deriv.: yellow plates from $PhNO_2$. M.p. 275°. Spar. sol. EtOH. Insol. H_2O, C_6H_6.

Ullmann, Gnaedinger, *Ber.*, 1912, **45**, 3442.

2-Hydroxy-1-amino-2-phenylpropionic Acid (2-*Phenylserine*, 1-*amino-2-phenylhydracrylic acid*)

$C_6H_5·CH(OH)·CH(NH_2)·COOH$

$C_9H_{11}O_3N$ MW, 181

Plates $+1H_2O$ from EtOH.Aq. Decomp. at 193–4°. Sol. to 3% in H_2O at ord. temp. Spar. sol. EtOH, Et_2O.

Erlenmeyer, Früstück, *Ann.*, 1895, **284**, 41.

1-Hydroxy-2-amino-2-phenylpropionic Acid (2-*Amino-2-phenyl-lactic acid*, 2-*phenylisoserine*)

$C_6H_5·CH(NH_2)·CH(OH)·COOH$

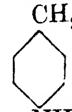
$C_9H_{11}O_3N$ MW, 181

Decomp. at 220–1°.

Erlenmeyer, *Ann.*, 1892, **271**, 155; *Ber.*, 1906, **39**, 792.

1-Hydroxy-2-*p*-aminophenylpropionic Acid (2-p-*Aminophenyl-lactic acid*)

$CH_2·CH(OH)·COOH$



NH_2

$C_9H_{11}O_3N$ MW, 181

Needles from 93% EtOH. M.p. 189–90° decomp. Sol. EtOH. Insol. Et_2O.

Erlenmeyer, Lipp, *Ann.*, 1883, **219**, 231.

1-Hydroxy-2-aminopropionaldehyde (*Isoserine aldehyde, aminolactic aldehyde*)

$H_2N·CH_2·CH(OH)·CHO$

$C_3H_7O_2N$ MW, 89

Not known in free state. Polymerises easily. Reduces $NH_3.AgNO_3$ and Fehling's Br ⟶ isoserine.

B,HCl: needles. M.p. 137–47° decomp.

B_2,H_2PtCl_6: m.p. 185° decomp.

d-.

Cryst. M.p. 42°. B.p. 107–10°/17 mm. $[\alpha]_D^{18}$ +21·5° in H_2O. Hygroscopic.

l-.

Cryst. M.p. 42°. $[\alpha]_D^{25}$ −20·5 in H_2O.

dl-.

Needles from AcOEt. M.p. 58°. B.p. 110–12°/12 mm. Hygroscopic.

Di-Et acetal: $C_7H_{17}O_3N$. MW, 163. B.p. 120–1°/14 mm. Sol. Et_2O.

Wohl, Schweitzer, *Ber.*, 1907, **40**, 97.
Wohl, Momber, *Ber.*, 1914, **47**, 3350.

2-Hydroxy-1-aminopropionic Acid.
See Serine.

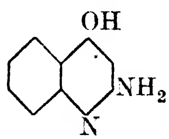
1-Hydroxy-2-aminopropionic Acid.
See Isoserine.

Hydroxy-aminopurine.
See Guanine *and* Isoguanine.

4-Hydroxy-2-aminopyrimidine.
See Isocytosine.

2-Hydroxy-6-aminopyrimidine.
Cytosine, *q.v.*

4-Hydroxy-2-aminoquinoline (2-*Amino*-4-*quinolinol*)

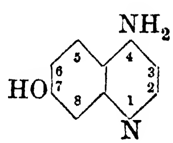


$C_9H_8ON_2$ MW, 160

Needles $+1H_2O$ from H_2O. Anhyd. rhombohedra from EtOH. M.p. 303–4°. Sol. HCl, alkalis. Spar. sol. EtOH. Forms cryst. chloroplatinate and chloroaurate.

Gabriel, *Ber.*, 1918, **51**, 1509.

6-Hydroxy-4-aminoquinoline (4-*Amino*-6-*quinolinol*)



$C_9H_8ON_2$ MW, 160

Cryst. from EtOH. M.p. 264° decomp. Sol. MeOH, EtOH. Spar. sol. H_2O, AcOH, C_6H_6. Insol. $CHCl_3$, Et_2O, pet. ether. Conc. H_2SO_4 ⟶ yellow sol. with blue fluor. HNO_3 ⟶ red sol.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Needles from C_6H_6. M.p. 120°. *B,HCl*: m.p. 249°.

John, Andraschko, *J. prakt. Chem.*, 1930, **128**, 209.

2-Hydroxy-5-aminoquinoline (5-*Aminocarbostyril*).

Needles from H_2O. M.p. 250°.

Claus, Setzer, *J. prakt. Chem.*, 1896, **53**, 396.

6-Hydroxy-5-aminoquinoline (5-*Amino*-6-*quinolinol*).

Green needles. M.p. 185°. Sol. EtOH. Spar. sol. Et_2O, C_6H_6, $CHCl_3$. $FeCl_3$ ⟶ quinolinequinone.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Yellow plates from ligroin. M.p. 154–6°. *Picrate*: red needles from EtOH.Aq. M.p. 225°.

Et ether: $C_{11}H_{12}ON_2$. MW, 188. Yellow needles $+1H_2O$ from H_2O. M.p. 76°. M.p. anhyd. 115–16°. N-*Acetyl*: m.p. 163–4°. N-*Benzoyl*: m.p. 144°.

Zincke, Wiederhold, *Ann.*, 1896, **290**, 364.
Vis, *J. prakt. Chem.*, 1893, **48**, 29.

8-Hydroxy-5-aminoquinoline (5-*Amino*-8-*quinolinol*).

Needles from C_6H_6. M.p. 143°. CrO_3 ⟶ quinolinequinone.

Me ether: yellow needles from EtOH. M.p. 156°. N-*Acetyl*: m.p. 179°. N-*Benzoyl*: m.p. 268–9°. *Picrate*: brown needles from H_2O. M.p. 126°.

Et ether: yellow plates $+1H_2O$. M.p. 70°. M.p. anhyd. 114°. Spar. sol. H_2O, EtOH. Insol. ligroin. N-*Benzoyl deriv.*: analgen. Yellow needles from EtOH. M.p. 206°. Spar. sol. H_2O. Antiseptic and antineuralgic.

N-*Acetyl*: prisms from EtOH. M.p. 221–2°. Insol. C_6H_6, Me_2CO.

O:N-*Diacetyl*: plates from EtOH. M.p. 206–7°.

O:N-*Dibenzoyl*: plates from EtOH. M.p. 205°.

Gattermann, *Ber.*, 1894, **27**, 1939.
Balaban, *J. Chem. Soc.*, 1932, 2625.
Vis, *J. prakt. Chem.*, 1892, **45**, 541.

2-Hydroxy-6-aminoquinoline (6-*Aminocarbostyril*).

Yellow plates from AcOH. Does not melt below 320°. Spar. sol. AcOH.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Plates from EtOH.Aq. M.p. 103°. Sol. EtOH, Et_2O. Mod. sol. H_2O.

Friedländer, Lazarus, *Ann.*, 1885, **229**, 246.
Feer, Königs, *Ber.*, 1885, **18**, 2397.

8-Hydroxy-6-aminoquinoline (6-*Amino*-8-*quinolinol*).

Me ether: m.p. 169° (168°). *Picrate*: orange needles from H_2O. M.p. 224°.

Balaban, *J. Chem. Soc.*, 1932, 2625.

2-Hydroxy-7-aminoquinoline (7-*Aminocarbostyril*).

Needles from H_2O. Does not melt below 250°. Sol. EtOH, H_2O. Forms cryst. salts with acids.

Friedländer, Fritsch, *Monatsh.*, 1902, **23**, 538.

8-Hydroxy-7-aminoquinoline (7-*Amino*-8-*quinolinol*).

Brown prisms from EtOH.Aq. M.p. 124°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. H_2O.

B,2HCl: needles from EtOH. M.p. 256°.

N-*Acetyl*: needles. M.p. 177°.
Picrate: reddish-brown prisms from EtOH. M.p. 205° decomp.

Matsumura, *J. Am. Chem. Soc.*, 1927, **49**, 814.

5-Hydroxy-8-aminoquinoline (8-*Amino*-5-*quinolinol*).

Cryst. Does not melt below 250°. Sol. alkalis.
N-*Acetyl*: leaflets from EtOH.Aq. M.p. 227° decomp. Spar. sol. H_2O, AcOH. Insol. C_6H_6, Me_2CO.
O : N-*Diacetyl*: needles from EtOH.Aq. M.p. 153–4°.
O : N-*Dibenzoyl*: prisms from AcOH. M.p. 180°.

Gattermann, *Ber.*, 1894, **27**, 1940.
Jacobs, Heidelberger, *J. Am. Chem. Soc.*, 1917, **39**, 2217.

6-Hydroxy-8-aminoquinoline (8-*Amino*-6-*quinolinol*).

Needles from EtOH.Aq. M.p. 185° C. Sol. EtOH. Spar. sol. Et_2O, C_6H_6, $CHCl_3$. $FeCl_3$ ⟶ quinolinequinone.
Me ether: $C_{10}H_{10}ON_2$. MW, 174. Cryst. M.p. 41°. B.p. 137–8°/1 mm. Antipyretic. *B,HCl*: needles. M.p. 228°.
Et ether: $C_{11}H_{12}ON_2$. MW, 188. Cryst. M.p. 60°. B.p. 144–5°/1 mm.

Mathëus, *Ber.*, 1888, **21**, 1645, 1887.
Schulemann, Schönhöfer, Meitzsch, U.S.P., 1,703,365, (*Chem. Abstracts*, 1929, **23**, 1995).

7-Hydroxy-8-aminoquinoline (8-*Amino*-7-*quinolinol*).

Me ether: yellow needles from EtOH.Aq. M.p. 108°. *Picrate*: red needles from EtOH.Aq. M.p. 226° decomp.

Balaban, *J. Chem. Soc.*, 1932, 2626.

3-Hydroxy-1-aminovaleric Acid

$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$

$C_5H_{11}O_3N$ MW, 133

Leaflets from EtOH.Aq. M.p. 212° decomp. Sol. H_2O. Spar. sol. EtOH. P+HI ⟶ 1-aminovaleric acid.
Lactone: $C_5H_9O_2N$. MW, 115. Oil. B.p. 123–5°/13 mm. *B,HCl*: prisms. M.p. 198–200°.

Fischer, Leuchs, *Ber.*, 1902, **35**, 3797.

4-Hydroxy-1-aminovaleric Acid

$HO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$

$C_5H_{11}O_3N$ MW, 133

Needles from MeOH.Aq. M.p. 223–4°. Sol. H_2O. Spar. sol. EtOH, Me_2CO. Insol. Et_2O, ligroin. Fusion ⟶ pyrrolidine-1-carboxylic acid.

Sörensen, *Chem. Zentr.*, 1905, II, 398.

1-Hydroxy-4-aminovaleric Acid (1-*Hydroxyhomopiperidinic acid*)

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$

$C_5H_{11}O_3N$ MW, 133

Prisms. M.p. 188–91° decomp. Sol. H_2O. Spar. sol. EtOH. Fusion ⟶ 3-hydroxypiperidone-2.

Fischer, Zemplén, *Ber.*, 1909, **42**, 4882.

Hydroxyaminoxylene.
See Aminoxylenol.

***p*-Hydroxy-*tert*.-amylbenzene.**
See p-tert.-Amylphenol.

β-Hydroxy-β-amylhydrocinnamic Acid.
See 2-Hydroxy-2-phenylcaprylic Acid.

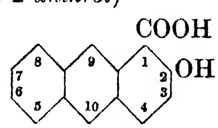
Hydroxyanisaldehyde.
See Isovanillin *and under* Resorcylic Aldehyde.

Hydroxyanisic Acid.
See Isovanillic Acid *and under* β-Resorcylic Acid.

Hydroxyanisole.
See Guaiacol, *and under* Hydroquinone *and* Resorcinol.

Hydroxyanthracene.
See Anthrol.

2-Hydroxyanthracene-1-carboxylic Acid (2-*Anthrol*-1-*carboxylic acid*, 2-*hydroxy*-α-*anthroic acid*, 1-*carboxy*-2-*anthrol*)



$C_{15}H_{10}O_3$ MW, 238

Cryst. M.p. 263–5°.

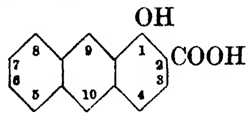
I.G., D.R.P., 564,129, (*Chem. Abstracts*, 1933, **27**, 1000).

10-Hydroxyanthracene-1-carboxylic Acid (9-*Anthrol*-4-*carboxylic acid*, 9-*hydroxy*-α-*anthroic acid*, 4-*carboxy*-ms-*anthrol*).

Cryst. from EtOH.Aq. M.p. 252–3°. Sol. EtOH, Et_2O. Ox. ⟶ anthraquinone-1-carboxylic acid.

Graebe, Juillard, *Ann.*, 1887, **242**, 255.

1-Hydroxyanthracene-2-carboxylic Acid (1-*Anthrol-2-carboxylic acid*, 1-*hydroxy*-β-*anthroic acid*, 2-*carboxy*-1-*anthrol*)



$C_{15}H_{10}O_3$ MW, 238

Cryst. M.p. 268°.

I.G., D.R.P., 559,333, (*Chem. Abstracts*, 1933, **27**, 735): D.R.P., 564,129, (*Chem. Abstracts*, 1933, **27**, 1000).

3-Hydroxyanthracene-2-carboxylic Acid (2-*Anthrol-3-carboxylic acid*, 3-*hydroxy*-β-*anthroic acid*, 3-*carboxy-2-anthrol*).

M.p. above 300°.

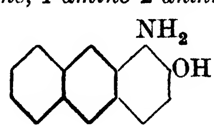
See second reference above.

9-Hydroxyanthracene-2-carboxylic Acid (9-*Anthrol-2-carboxylic acid*, 9-*hydroxy*-β-*anthroic acid*, 2-*carboxy*-ms-*anthrol*).

Yellow cryst. from EtOH.Aq. M.p. 305–10°. Sol. EtOH, AcOH. Spar. sol. Et_2O, C_6H_6. Alk. $KMnO_4$ ⟶ anthraquinone-2-carboxylic acid. $Zn+NH_3$ ⟶ anthracene-2-carboxylic acid.

Limpricht, *Ann.*, 1899, **309**, 121.
Barnett, Cook, Grainger, *Ber.*, 1924, **57**, 1779.

2-Hydroxy-1-anthramine (2-*Hydroxy*-1-*aminoanthracene*, 1-*amino-2-anthrol*)



$C_{14}H_{10}O$ MW, 194

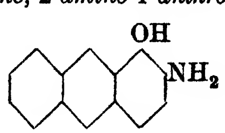
Plates from EtOH. Decomp. at 150°. Sol. EtOH, Et_2O. Spar. sol. $CHCl_3$. Conc. H_2SO_4 ⟶ yellow sol. with green fluor. ⟶ bluish-red on warming. Ox. ⟶ 1 : 2-anthraquinone.

N-*Acetyl*: plates from EtOH. Decomp. about 200–20°.

Triacetyl deriv.: plates from EtOH. M.p. 165°.

Lagodzinski, *Ann.*, 1905, **342**, 73.

1-Hydroxy-2-anthramine (1-*Hydroxy*-2-*aminoanthracene*, 2-*amino*-1-*anthrol*)



$C_{14}H_{10}O$ MW, 194

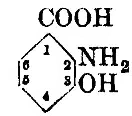
B,HCl: plates. $FeCl_3$ ⟶ 1 : 2-anthraquinone.

Triacetyl deriv.: plates or needles from AcOH. M.p. 161°. $FeCl_3$ ⟶ 1 : 2-anthraquinone.

Dienel, *Ber.*, 1906, **39**, 930.

Hydroxyanthranil.
See Benzisoxazolone.

3-Hydroxyanthranilic Acid (3-*Hydroxy*-o-*aminobenzoic acid*)



$C_7H_7O_3N$ MW, 153

Leaflets from H_2O. M.p. 164°. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$. Spar. sol. cold H_2O.

B,HCl: cryst. from conc. HCl. M.p. 198–200°. Hyd. by H_2O.

Me ether: 3-methoxyanthranilic acid, 2-amino-*m*-methoxybenzoic acid. $C_8H_9O_3N$. MW, 167. Leaflets from AcOH. M.p. 170–1°. *Acetyl*: needles. M.p. 208°.

Keller, *Arch. Pharm.*, 1908, **246**, 15, 21.
Froelicher, Cohen, *J. Chem. Soc.*, 1921, **119**, 1431.

4-Hydroxyanthranilic Acid (4-*Hydroxy*-o-*aminobenzoic acid*).

The constitution of this acid is doubtful.

Needles. M.p. 148° decomp. Very sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$, C_6H_6, toluene.

B,HCl: needles. Spar. sol. H_2O.

Me ether: 4-methoxyanthranilic acid, 2-amino-anisic acid. Plates from EtOH. M.p. 166° decomp. (172°). Very sol. EtOH, Me_2CO. Spar. sol. ligroin, $CHCl_3$, C_6H_6. Sols. show blue fluor. *Me ester*: $C_9H_{11}O_3N$. MW, 181. Needles. M.p. 75°. N-*Acetyl*: needles from MeOH. M.p. 199°.

Et ether: 4-ethoxyanthranilic acid, 2-amino-*p*-ethoxybenzoic acid. $C_9H_{11}O_3N$. MW, 181. Plates from EtOH. M.p. 174° decomp. Very sol. EtOH. Spar. sol. Et_2O, $CHCl_3$, ligroin, C_6H_6. N-*Acetyl*: plates. M.p. 182–3°.

Friedländer, Bruckner, Deutsch. *Ann.*, 1912, **388**, 46.
Ullmann, Dootson, *Ber.*, 1918, **51**, 20.

5-Hydroxyanthranilic Acid (5-*Hydroxy*-o-*aminobenzoic acid*).

Violet cryst. from H_2O. Darkens at 235°. M.p. 252° decomp. Sol. hot H_2O and most org. solvents. Spar. sol. cold H_2O. Sol. dil. acids and alkalis with blue fluor. Reduces $NH_3.AgNO_3$. $FeCl_3$ ⟶ reddish-brown col.

Me ester: $C_8H_9O_3N$. MW, 167. Yellow needles. M.p. 158°. *B,HCl*: cryst. from EtOH–AcOEt. M.p. 223°.

Et ester: $C_9H_{11}O_3N$. MW, 181. Cryst. from EtOH. M.p. 140°. *B,HCl*: m.p. 214°.

N-*Acetyl*: plates from H_2O. M.p. 227°.

Me ether: 5-methoxyanthranilic acid, 6-amino-*m*-methoxybenzoic acid. Needles from H_2O. M.p. 179–80°. Very sol. H_2O, Et_2O. *B,HCl*: m.p. 210°. *Acetyl*: m.p. 161–2°.

Et ether: 5-ethoxyanthranilic acid, 6-amino-*m*-ethoxybenzoic acid. M.p. 174°.

Puxeddu, *Gazz. chim. ital.*, 1929, **59**, 10, 489.
Gattermann, *Ber.*, 1894, **27**, 1932.
Friedländer, *Ber.*, 1916, **49**, 963.

6-Hydroxyanthranilic Acid (6-*Hydroxy*-o-*aminobenzoic acid*).

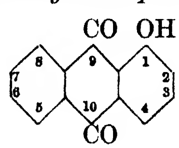
Free acid not known.

Me ether: 6-methoxyanthranilic acid, 6-amino-*o*-methoxybenzoic acid. $C_8H_9O_3N$. MW, 167. Needles from H_2O. M.p. 87°. *Amide*: $C_8H_{10}O_2N_2$. MW, 166. Needles from H_2O. M.p. 150°. *Nitrile*: $C_8H_8ON_2$. MW, 148. Needles from EtOH.Aq. M.p. 141°: N-*acetyl*, needles from EtOH. M.p. 176°.

Et ether: 6-ethoxyanthranilic acid, 6-amino-*o*-ethoxybenzoic acid. *Amide*: $C_9H_{12}O_2N_2$. MW, 180. Needles from H_2O. M.p. 169°. *Nitrile*: $C_9H_{10}ON_2$. MW, 162. Needles from H_2O. M.p. 98·5°.

Friedländer, *Ber.*, 1916, **49**, 966.
Friedländer, Bruckner, Deutsch, *Ann.*, 1912, **388**, 42.
Roberts, Wiles, Kent, *J. Chem. Soc.*, 1932, 1795.

1-Hydroxyanthraquinone (α-*Hydroxyanthraquinone*, *erythroxyanthraquinone*)



$C_{14}H_8O_3$ MW, 224

Orange-red needles from EtOH. M.p. 193°. Sublimes without decomp. Sol. EtOH, Et_2O, C_6H_6. Sol. alkalis to yellow sols. HNO_3 ⟶ phthalic acid. $NaNO_2$+conc. H_2SO_4 ⟶ quinizarin. Oleum ⟶ anthrarufin+1:2:4:5:6:8-hexahydroxyanthraquinone. Gives insol. Ba salt.

Me ether: 1-methoxyanthraquinone. $C_{15}H_{10}O_3$. MW, 238. Yellow cryst. from EtOH. M.p. 170°. Sol. C_6H_6, $CHCl_3$. Spar. sol. EtOH. *Oxime*: m.p. 198°.

Phenyl ether: 1-phenoxyanthraquinone. $C_{20}H_{12}O_3$. MW, 300. Cryst. M.p. 145°. Sublimes. Volatile in steam. *Oxime*: m.p. 175°.

p-*Tolyl ether*: $C_{21}H_{14}O_3$. MW, 314. Yellow needles from pet. ether. M.p. 128·5°.

1-*Naphthyl ether*: $C_{24}H_{14}O_3$. MW, 350. Yellow cryst. from pet. ether. M.p. 275–6°.

2-*Naphthyl ether*. Yellow cryst. from C_6H_6. M.p. 180°.

Acetyl: needles. M.p. 176–9°.

Freund, Achenbach, *Ber.*, 1910, **43**, 3259.
Laube, *Ber.*, 1906, **39**, 2245.
Graebe, Bernhard, *Ann.*, 1906, **249**, 225.

2-Hydroxyanthraquinone (β-*Hydroxyanthraquinone*).

Occurs in roots of *Oldenlandia umbellata*. Yellow needles or plates from EtOH. Yellow needles from AcOH. M.p. 306° (302°). $k = 2{\cdot}4 \times 10^{-8}$ at 18°. Sol. EtOH, Et_2O. Insol. cold H_2O. Sol. NH_4OH, alkalis to reddish-yellow sols. Sol. conc. H_2SO_4 to reddish-brown sol. HI+P ⟶ 2-anthrol. Gives sol. Ba salt.

Me ether: 2-methoxyanthraquinone. Yellow needles from EtOH. M.p. 195–6°. Begins to sublime at 100°. Sol. amyl alcohol, AcOH, C_6H_6. Spar. sol. MeOH. Insol. H_2O. Sol. conc. H_2SO_4 ⟶ 2-hydroxyanthraquinone.

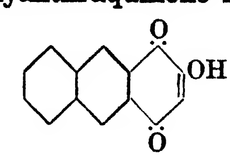
Et ether: 2-ethoxyanthraquinone. $C_{16}H_{12}O_3$. MW, 252. Yellow needles. M.p. 135°. Sol. EtOH. KOH fusion ⟶ alizarin.

Phenyl ether: 2-phenoxyanthraquinone. Cryst. from EtOH–AcOEt. M.p. 153°. Sol. most org. solvents

Acetyl: yellow needles from EtOH. M.p. 159°.

Liebermann, Haagen, *Ber.*, 1882, **15**, 1798.
Perkin, Hummel, *J. Chem. Soc.*, 1893, **63**, 1177.
Kaufler, *Ber.*, 1904, **37**, 65.

2-Hydroxyanthraquinone-1 : 4



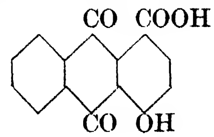
$C_{14}H_8O_3$ MW, 224

Dark yellow needles from EtOH. M.p. 235°. Sublimes without decomp. Sol. alkalis to yellow sols. Sol. conc. H_2SO_4 to red sol. Gives ppts. with $CaCl_2$, $BaCl_2$, $AgNO_3$.

Acetyl: yellow needles from EtOH. M.p. 188°.

Lagodzinski, *Ann.*, 1906, **344**, 91.

4 - Hydroxyanthraquinone - 1 - carboxylic Acid

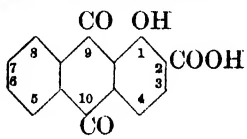


$C_{15}H_8O_5$ MW, 268

Yellow needles from H_2O. M.p. 236–8° decomp. Sol. hot H_2O. Decomp. at 270° ⟶ 1-hydroxyanthraquinone + CO_2.

Birukow, *Ber.*, 1887, **20**, 2438.

1 - Hydroxyanthraquinone - 2 - carboxylic Acid



$C_{15}H_8O_5$ MW, 268

Yellow needles from AcOH.Aq. M.p. 224–5°. Sol. usual org. solvents. Dark red sols in alkalis. Conc. H_2SO_4 ⟶ yellowish-red sol.

Phenyl ether: $C_{21}H_{12}O_5$. MW, 344. Yellow plates from ligroin. M.p. 272°.

2-*Naphthyl ether*: $C_{25}H_{14}O_5$. MW, 394. Yellow plates from AcOH. M.p. 262°.

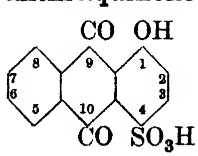
Scholl, *Monatsh.*, 1913, **34**, 1023.
Badische, D.R.P., 251,696, (*Chem. Zentr.*, 1912, II, 1502).

5 - Hydroxyanthraquinone - 2 - carboxylic Acid.

Me ether: $C_{16}H_{10}O_5$. MW, 282. Yellow needles from AcOH. M.p. 279°.

Eckert, *Monatsh.*, 1914, **35**, 294.

1 - Hydroxyanthraquinone - 4 - sulphonic Acid



$C_{14}H_8O_6S$ MW, 304

Needles from AcOH. M.p. 220°.

Na salt: reddish-brown plates. Spar. sol. H_2O.

NH_4 *salt*: reddish-brown plates. Spar. sol. H_2O.

Chloride: $C_{14}H_7O_5ClS$. MW, 322·5. Golden plates from $CHCl_3$. M.p. 246°. Sol. $CHCl_3$, AcOH, C_6H_6. Conc. H_2SO_4 ⟶ violet sol.

Anilide: needles from AcOH. M.p. 199°.

Fries, Schürmann, *Ber.*, 1919, **52**, 2188.

1 - Hydroxyanthraquinone - 5 - sulphonic Acid.

Na salt: yellow needles. Sol. hot H_2O with yellow col. Spar. sol. excess NaOH. Conc. H_2SO_4 ⟶ orange sol. unchanged by boric acid.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *K salt*: yellow sol. in H_2O.

Phenyl ether: $C_{20}H_{12}O_6S$. MW, 380. *K salt*: yellow needles. Spar. sol. H_2O. Insol. Py.

Höchst, D.R.P., 158,413, (*Chem. Zentr.*, 1905, I, 704).
Bayer, D.R.P., 205,881, (*Chem. Zentr.*, 1909, I, 881).

1 - Hydroxyanthraquinone - 6 - sulphonic Acid.

Na salt: yellow cryst. Heat with lime under press. ⟶ 1 : 6-dihydroxyanthraquinone.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *Na salt*: yellowish-brown powder. Sol. H_2O ⟶ brown col. ⟶ yellow with dil. min. acids. Conc. H_2SO_4 ⟶ deep yellow sol.

Phenyl ether: $C_{20}H_{12}O_6S$. MW, 380. NH_4 *salt*: plates. *Na salt*: long needles. Insol. Py. Conc. H_2SO_4 ⟶ orange sol. ⟶ yellow on heating.

Höchst, D.R.P., 145,188, (*Chem. Zentr.*, 1903, II, 1037).
Bayer, D.R.P., 158,531, (*Chem. Zentr.*, 1905, I, 1517).
Frobenius, Hepp, *Ber.*, 1907, **40**, 1048.

1 - Hydroxyanthraquinone - 7 - sulphonic Acid.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *Na salt*: yellowish-brown powder.

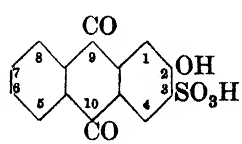
See first reference above.

1 - Hydroxyanthraquinone - 8 - sulphonic Acid.

Na salt: cryst. Sol. hot H_2O, insol. cold. Sols. in alkalis. Excess alkali ppts. neutral salt. Conc. H_2SO_4 ⟶ reddish-yellow sol.

Bayer, D.R.P., 197,607, (*Chem. Zentr.*, 1908, I, 1814).

2 - Hydroxyanthraquinone - 3 - sulphonic Acid



$C_{14}H_8O_6S$ MW, 304

Cryst. Sol. EtOH. Spar. sol. H_2O. Insol. Et_2O.

Na salt: needles + $1H_2O$ from EtOH.Aq.

Ba salt: yellowish-red cryst.

Perger, *J. prakt. Chem.*, 1878, **18**, 179.
Georgievics, *Chem. Zentr.*, 1905, I, 1515.

2-Hydroxyanthraquinone-6-sulphonic Acid.

Acid Na salt: cryst. from H_2O. Yellow sol. in hot H_2O. Spar. sol. EtOH. Insol. Et_2O, C_6H_6.

Neutral Na salt: red cryst.

Höchst, D.R.P., 106,505, (*Chem. Zentr.*, 1900, I, 741).

2-Hydroxyanthraquinone-7-sulphonic Acid.

Acid Na salt: yellowish-red cryst.

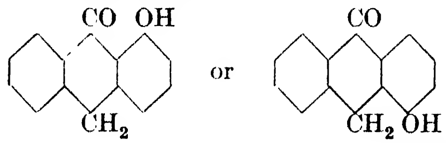
Neutral Na salt: dark red cryst.

See above reference.

Hydroxyanthroic Acid.

See Hydroxyanthracene-carboxylic Acid.

1-(or 4-)Hydroxyanthrone



$C_{14}H_{10}O_2$ MW, 210

Yellow needles or plates from C_6H_6. M.p. 133–5°. Sol. C_6H_6, CS_2, EtOH, AcOH, Py.

Me ether: $C_{15}H_{12}O_2$. MW, 224. Yellow cryst. M.p. 105°.

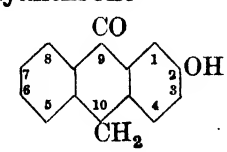
Liebermann, Mamlock, *Ber.*, 1905, **38**, 1794.

Graebe, Bernhard, *Ann.*, 1906, **349**, 224.

Höchst, D.R.P., 242,053, (*Chem. Zentr.*, 1912, I, 305).

Bayer, D.R.P., 301,452, (*Chem. Zentr.*, 1917, II, 715).

2-Hydroxyanthrone



$C_{14}H_{10}O_2$ MW, 210

Yellow needles from EtOH. M.p. 221°. Sol. EtOH, C_6H_6, hot AcOH. Spar. sol. $CHCl_3$.

Bistrzycki, Schepper, *Ber.*, 1898, **31**, 2793.

3-Hydroxyanthrone.

Needles from EtOH.Aq. M.p. 202–6°. Sol. EtOH, Et_2O.

Liebermann, Simon, *Ann.*, 1882, **212**, 28.

10-Hydroxyanthrone.

See Oxanthranol.

1-Hydroxyarachidic Acid.

See 1-Hydroxyeicosanic Acid.

β-Hydroxyatropic Acid.

See Phenylformylacetic Acid.

4-Hydroxyazelaic Acid (4-*Hydroxyheptane-1 : 7-dicarboxylic acid*)

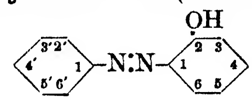
$HOOC \cdot [CH_2]_3 \cdot CH(OH) \cdot [CH_2]_3 \cdot COOH$

$C_9H_{16}O_5$ MW, 204

Leaflets from $CHCl_3$. M.p. 104–5°. Sol. H_2O, EtOH, hot $CHCl_3$. Spar. sol. Et_2O, hot C_6H_6. HI ⟶ azelaic acid.

v. Pechmann, Sidgwick, *Ber.*, 1904, **37**, 3820.

2-Hydroxyazobenzene (o-*Benzeneazophenol*)



$C_{12}H_{10}ON_2$ MW, 198

Orange red needles from Et_2O. M.p. 83°. Sol. most org. solvents. Spar. sol. H_2O. Sol. alkalis to orange-red sols. Volatile in steam. Zn + NH_3 ⟶ *o*-aminophenol + aniline.

Me ether: 2-methoxyazobenzene, *o*-benzeneazoanisole. $C_{13}H_{12}ON_2$. MW, 212. Orange-red needles from EtOH.Aq. M.p. 41°. B.p. 196–7°/14 mm. Volatile in steam.

Et ether: 2-ethoxyazobenzene, *o*-benzeneazophenetole. $C_{14}H_{14}ON_2$. MW, 226. Purple prisms from pet. ether. M.p. 44°. Very sol. org. solvents.

Acetyl: orange-red liq. M.p. −20°.

Benzoyl: orange-red needles from pet. ether. M.p. 93°.

Cu deriv.: needles from EtOH. M.p. 225–6°.

Bamberger, *Ber.*, 1900, **33**, 3192; 1902, **35**, 1610.

Tietze, *Chem. Zentr.*, 1899, II, 583.

McPherson, Lucas, *J. Am. Chem. Soc.*, 1909, **31**, 283.

3-Hydroxyazobenzene (m-*Benzeneazophenol*).

Yellow prisms from C_6H_6. M.p. 114–17°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O, ligroin. Sol. dil. alkalis, conc. H_2SO_4 to orange-red sols. Zn + NH_3 ⟶ *m*-aminophenol + aniline.

Me ether: 3-methoxyazobenzene, *m*-benzeneazoanisole. Red plates from MeOH. M.p. 32–3°. B.p. 193°/15 mm. Sol. org. solvents.

Et ether: 3-ethoxyazobenzene, *m*-benzeneazophenetole. Plates. M.p. 64°. B.p. 200°/22 mm.

Acetyl: orange plates from pet. ether. M.p. 67·5°.

Benzoyl: orange-red plates from pet. ether. M.p. 92°.

Jacobson, Hönigsberger, *Ber.*, 1903, **36**, 4102.

4-Hydroxyazobenzene (p-*Benzeneazophenol*).

Orange prisms from EtOH. M.p. 152°. B.p. 220–30°/20 mm. Sol. EtOH, Et_2O. Spar. sol. hot H_2O. Sol. dil. alkalis, conc. H_2SO_4 to yellow sols. $k = 4{\cdot}9 \times 10^{-9}$. Heat of comb. C_v 1508·5 Cal., C_p 1509·1 Cal. Reacts acid to litmus. Forms addn. comps. with amino-acids. Zn + $NH_3 \longrightarrow$ *p*-aminophenol + aniline. $HNO_3 \longrightarrow$ 2 : 4-dinitrophenol.

B,HCl: red needles. M.p. 169° decomp. Hyd. by H_2O.

B,2HNO₃: red leaflets. M.p. 75° decomp.

Me ether: 4-methoxyazobenzene, *p*-benzeneazoanisole. Brownish-yellow cryst. from pet. ether. M.p. 54–6°. B.p. 340°. Sol. most org. solvents.

Et ether: 4-ethoxyazobenzene, *p*-benzeneazophenetole. M.p. 85°. B.p. 339–40°. Sol. most org. solvents.

Propyl ether: $C_{15}H_{16}ON_2$. MW, 240. Dark orange needles. M.p. 61°.

Phenyl ether: 4-phenoxyazobenzene. $C_{18}H_{14}ON_2$. MW, 274. Golden leaflets. M.p. 116°.

Benzyl ether: $C_{19}H_{16}ON_2$. MW, 288. Golden needles. M.p. 116°.

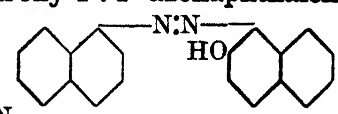
Acetyl: yellow leaflets from EtOH. M.p. 89° (84–5°).

Propionyl: red needles. M.p. 75°.

Benzoyl: yellow leaflets from EtOH. M.p. 136–8°.

Oddo, Puxeddu, *Ber.*, 1905, **38**, 2755.
Auwers, Eisenlohr, *Ann.*, 1909, **369**, 242.
Gorke, Köppe, Staiger, *Ber.*, 1908, **41**, 1157.
Ponzio, *Gazz. chim. ital.*, 1913, **43**, 560.

2-Hydroxy-1 : 1′-azonaphthalene

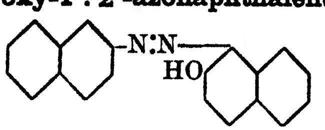


$C_{20}H_{14}ON_2$ MW, 298

Red needles. M.p. 229–30°. Spar. sol. EtOH. Insol. H_2O, alkalis, dil. acids. Violet sol. in conc. H_2SO_4.

Kunz, *Ber.*, 1898, **31**, 1531.
Meldola, Hanes, *J. Chem. Soc.*, 1894, **65**, 837.

2-Hydroxy-1 : 2′-azonaphthalene



$C_{20}H_{14}ON_2$ MW, 298

Reddish-brown needles from EtOH–aniline. M.p. 178–9°. Sublimes. Reddish-violet sol. in conc. H_2SO_4.

Acetyl: plates. M.p. 117°.

Nietzki, Goll, *Ber.*, 1886, **19**, 1282.
Meldola, Hanes, *J. Chem. Soc.*, 1894, **65**, 836.

5-Hydroxybarbituric Acid.

See Dialuric Acid.

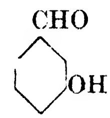
1-Hydroxybehenic Acid.

See Phellonic Acid.

o-Hydroxybenzaldehyde.

See Salicylaldehyde.

***m*-Hydroxybenzaldehyde** (m-*Aldehydophenol*)



$C_7H_6O_2$ MW, 122

Occurs naturally combined in glucoside salinigrin. Needles from hot H_2O. M.p. 108°. B.p. 240°, 191°/50 mm., 161°/20 mm. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. Insol. ligroin. Solid salts are colourless, but in sol. are yellow. $k = 1{\cdot}0 \times 10^{-8}$ at 25°. Non-volatile in steam. $FeCl_3 \longrightarrow$ weak violet col. Pptes. lead acetate. Zn + HCl $\longrightarrow$ *m*-cresol. KOH fusion $\longrightarrow$ *m*-hydroxybenzoic acid.

Me ether: *see* *m*-Methoxybenzaldehyde.

Et ether: *m*-ethoxybenzaldehyde. $C_9H_{10}O_2$. MW, 150. B.p. 245°, 151°/50 mm., 133°/16 mm. D_4^{20} 1·0768. n_D^{20} 1·5408. Volatile in steam.

Acetyl: b.p. 203°.

Oxime: cryst. from hot C_6H_6. M.p. 87–8°. After melting the oxime on recryst. has m.p. 138°. Sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$. Insol. ligroin. *B,HCl*: m.p. 140°. *Acetyl*: m.p. 122°.

Hydrazone: m.p. 104–5°.

Phenylhydrazone: m.p. 130°.

2 : 4-*Dinitrophenyhydrazone*: prisms from xylene. M.p. 259°.

Azine: m.p. 162°.

Phenylurethane: m.p. 158–60°.

Tiemann, Ludwig, *Ber.*, 1882, **15**, 2045.
Subak, *Monatsh.*, 1903, **24**, 167.
Werner, *Ber.*, 1895, **28**, 2001.
Dollfus, *Ber.*, 1892, **25**, 1912.
Clemm, *Ber.*, 1891, **24**, 826.
Pauly, Schübel, Lockemann, *Ann.*, 1911, **383**, 308.
Franzen, Eichler, *J. prakt. Chem.*, 1910, **82**, 246.

p-Hydroxybenzaldehyde (p-*Aldehydophenol*).

Occurs naturally combined in many glucosides. Needles from H_2O. M.p. 115–16°. Sublimes. Sol. hot H_2O, EtOH, Et_2O. Spar. sol. cold H_2O. n_α^{130} 1·5705. Heat of comb. C_v 793·07 Cal., C_p 793·3 Cal. $k = 2{\cdot}2 \times 10^{-8}$ at 25°. Non-volatile in steam. $FeCl_3 \longrightarrow$ weak violet col. KOH fusion $\longrightarrow$ *p*-hydroxybenzoic acid. $Na_2O_2 \longrightarrow$ hydroquinone. NaHg $\longrightarrow$ 4 : 4′-dihydroxybenzoin. Zn + HCl $\longrightarrow$ *p*-cresol. Does not give Cannizzaro reaction. HBr $\longrightarrow$ a comp., m.p. 185°; $CCl_3{\cdot}COOH \longrightarrow$ a comp., m.p. 68°.

Me ether : *see* Anisaldehyde.

Et ether : *p*-ethoxybenzaldehyde. M.p. 13–14°. B.p. 249°, 140°/20 mm. D_{21}^{21} 1·08. Anti-*oxime* : m.p. 118°. Syn-*oxime* : m.p. 157°.

Phenyl ether : 4-aldehydodiphenyl ether, *p*-phenoxybenzaldehyde. $C_{13}H_{10}O_2$. MW, 198. B.p. 191–3°/22 mm. *Oxime* : m.p. 86°.

Benzyl ether : *p*-aldehydophenyl benzyl ether. $C_{14}H_{12}O_2$. MW, 212. Needles from EtOH.Aq. M.p. 72°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O. *Oxime* : m.p. 110–12°.

Acetyl : liq. at −21°. B.p. 265°. Anti-*oxime* : m.p. 114–15°. Syn-*oxime* : m.p. 132°.

Oxime : m.p. 72–3°, 112° anhyd. *B,HCl* : m.p. 160–5°. *Acetyl* : m.p. 114–15°.

Semicarbazone : needles from EtOH. M.p. 223–5°.

Hydrazone : needles from C_6H_6. M.p. 222°.

Azine : m.p. 239–40°.

Di-Me acetal : m.p. 60–4°.

Cyanhydrin : *see under* 4-Hydroxymandelic Acid.

Herzfeld, Tiemann, *Ber.*, 1877, **10**, 64.
Gattermann, Berchelmann, *Ber.*, 1898, **31**, 1766.
Gattermann, *Ann.*, 1907, **357**, 347.
Tiemann, *Ber.*, 1886, **19**, 357.
v. Kostanecki, Schneider, *Ber.*, 1896, **29**, 1892.
Hantzsch, *Z. physik. Chem.*, 1894, **13**, 518.
Brady, Dunn, *J. Chem. Soc.*, 1914, **105**, 821.
See also fourth, sixth, and seventh references above.

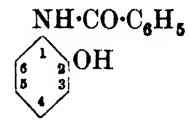
Hydroxybenzaldehyde-carboxylic Acid.

See Hydroxyaldehydobenzoic Acid *and* Aldehydosalicylic Acid.

Hydroxybenzamide.

See under Hydroxybenzoic Acid *and* Salicylic Acid.

o-Hydroxybenzanilide (N-*Benzoyl*-o-*aminophenol*)



$C_{13}H_{11}O_2N$ MW, 213

Leaflets. M.p. 167° decomp. Sol. EtOH, AcOH, C_6H_6, Me_2CO, alkalis. Mod. sol. hot H_2O. Insol. ligroin.

Me ether : benzoyl-*o*-anisidine, benz-*o*-anisidide. $C_{14}H_{13}O_2N$. MW, 227. M.p. 60°. Sol. EtOH, Et_2O.

O-*Acetyl* : needles from EtOH. M.p. 134–40°.

O-*Benzoyl* : needles from EtOH. M.p. 185°. Sol. Me_2CO, $CHCl_3$, C_6H_6. Spar. sol. EtOH, ligroin.

O-m-*Nitrobenzoyl* : m.p. 152°.

Ciamician, Silber, *Ber.*, 1905, **38**, 1181.
Hübner, *Ann.*, 1881, **210**, 387.
Mülhäuser, *Ann.*, 1881, **207**, 244.
Raiford, *J. Am. Chem. Soc.*, 1919, **41**, 2080.

m-Hydroxybenzanilide (N-*Benzoyl*-m-*aminophenol*).

Needles from toluene. M.p. 174°. Sol. EtOH, Et_2O. Spar. sol. C_6H_6.

Et ether : benzoyl-*m*-phenetidine, benz-*m*-phenetidide. $C_{15}H_{15}O_2N$. MW, 241. Needles from EtOH. M.p. 103°. Sol. Me_2CO, C_6H_6. Spar. sol. H_2O, EtOH, Et_2O, ligroin.

O-*Benzoyl* : prisms from C_6H_6. M.p. 153°. Spar. sol. Et_2O. Insol. ligroin.

Meyer, Sundmacher, *Ber.*, 1899, **32**, 2124.
Ikuta, *Am. Chem. J.*, 1893, **15**, 43.
Reverdin, Lokietek, *Bull. soc. chim.*, 1915, **17**, 408.

p-Hydroxybenzanilide (N-*Benzoyl*-p-*aminophenol*).

Fine needles. M.p. 216–17° (205°, 227°). Sol. hot AcOH. Spar. sol. H_2O, $CHCl_3$, C_6H_6, ligroin.

Me ether : benzoyl-*p*-anisidine, benz-*p*-anisidide. Leaflets from EtOH. M.p. 153–4°.

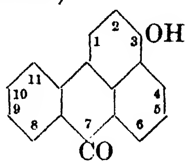
Et ether : benzoyl-*p*-phenetidine, benz-*p*-phenetidide. Leaflets from EtOH.Aq. M.p. 173°.

O-*Acetyl* : leaflets from C_6H_6. M.p. 171°.

O-*Benzoyl* : needles from MeOH. M.p. 235°.

Ciamician, Silber, *Ber.*, 1905, **38**, 1181.
Reverdin, *Ber.*, 1909, **42**, 1524.
Reverdin, Dresel, *Ber.*, 1904, **37**, 4452.

3-Hydroxybenzanthrone (See formulæ under Benzanthrone)



$C_{17}H_{10}O_2$ MW, 246

M.p. 317°.

I.G., D.R.P., 550,706, (*Chem. Abstracts*, 1932, **26**, 4830); 552,269, (*Chem. Abstracts*, 1933, **27**, 513).

4-Hydroxybenzanthrone.

Yellow needles from MeOH.Aq. M.p. 179·5°. Sol. conc. H_2SO_4 with green fluor. Spar. sol. cold dil. NaOH, more sol. hot to yellow sol.

Acetyl: cryst. from EtOH–AcOH. M.p. 200–1°.

Me ether: 4-methoxybenzanthrone. $C_{18}H_{12}O_2$. MW, 260. Yellow needles from C_6H_6. M.p. 198–9°. Sol. conc. H_2SO_4, conc. HNO_3.

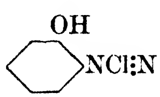
Perkin, *J. Chem. Soc.*, 1920, **117**, 696.
Perkin, Spencer, *J. Chem. Soc.*, 1922, **121**, 479.

5-Hydroxybenzanthrone.

Yellow cryst. from EtOH or xylene. M.p. 291°. Sol. H_2SO_4 with fluor. Sol. dil. NaOH.

Badische, D.R.P., 187,495, (*Chem. Zentr.*, 1907, II, 1367).

o-Hydroxybenzenediazonium chloride (o-*Phenoldiazonium chloride*)



$C_6H_5ON_2Cl$ MW, 156·5

Colourless cryst. from MeOH or EtOH–Et_2O. Quickly darkens in air. Decomp. at 152°. Very sol. H_2O. Insol. pet. ether, $CHCl_3$, C_6H_6.

Hantzsch, Davidson, *Ber.*, 1896, **29**, 1528.
Oddo, *Gazz. chim. ital.*, 1895, **25**, 336.

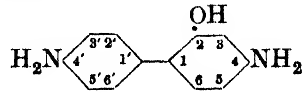
p-Hydroxybenzenediazonium chloride (p-*Phenoldiazonium chloride*).

White needles. Explodes on heating. Decomp. quickly in air.

$C_6H_5ON_2Cl,HgCl_2,H_2O$: white needles, decomp. at 156°.

See second reference above.

2-Hydroxybenzidine (2-*Hydroxy*-4 : 4′-*diaminodiphenyl*)



$C_{12}H_{12}ON_2$ MW, 200

Plates from H_2O. M.p. 226–7°. Sol. hot EtOH, hot H_2O. Spar. sol. Et_2O, C_6H_6.

Me ether: $C_{13}H_{14}ON_2$. MW, 214. Plates from C_6H_6–pet. ether. M.p. 103–103·3°. Sol. H_2O, Et_2O. *Picrate*: m.p. 220° decomp.

Hydrochloride: plates. Spar. sol. H_2O.

Picrate: yellow needles. M.p. 220° decomp.

Jacobson, Franz, Hönigsberger, *Ber.* 1903, **36**, 4072, 4113.

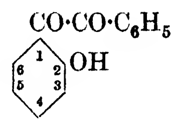
3-Hydroxybenzidine (3-*Hydroxy*-4 : 4′-*diaminodiphenyl*).

Plates from H_2O. M.p. 185°. Spar. sol. H_2O, cold EtOH, Et_2O, C_6H_6. $FeCl_3$ ⟶ deep red col.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Needles from H_2O. M.p. 134–5° (139°).

See first reference above and also Weinberg, *Ber.*, 1887, **20**, 3173.

2-Hydroxybenzil (*Phenyl 2-hydroxyphenyl diketone*)



$C_{14}H_{10}O_3$ MW, 226

Yellow plates from ligroin. M.p. 74°. Sol. EtOH, Et_2O, C_6H_6. Sol. alkalis with yellow col. Alc. $FeCl_3$ ⟶ reddish-violet col.

Me ether: $C_{15}H_{12}O_3$. MW, 240. Yellow prisms. M.p. 71·5°. 2 : 4-*Dinitrophenylhydrazone*: yellow needles from AcOH. M.p. 176–7°.

Asahina, Terasaka, *Chem. Zentr.*, 1923, III, 434.
Asahina, Asano, *Ber.*, 1929, **62**, 173.
Brass, Willig, Hanssen, *Ber.*, 1930, **63**, 2615.

4-Hydroxybenzil (*Phenyl 4-hydroxyphenyl diketone*).

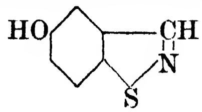
Orange needles from EtOH.Aq. M.p. 175°. Sol. org. solvents. Insol. H_2O. Yellow alc. sol. ⟶ red on addn. of alkali.

Me ether: cryst. M.p. 62–3°.

Dioxime: *hydrochloride*, needles, m.p. 155°.

Weisl, *Monatsh.*, 1905, **26**, 992.
McKenzie, Luis, Tiffeneau, Weill, *Bull. soc. chim.*, 1929, **45**, 418.

5-Hydroxybenzisothiazole



C_7H_5ONS MW, 151

Needles from H_2O, EtOH, or C_6H_6. M.p. 156°. Very sol. AcOH. Spar. sol. pet. ether.

B,HBr: colourless needles. M.p. 240° decomp. Hyd. by H_2O.

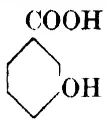
Benzoyl: hard plates from EtOH. M.p. 125°.

Fries, *Ann.*, 1927, **454**, 281.

***o*-Hydroxybenzoic Acid.**

See Salicylic Acid.

***m*-Hydroxybenzoic Acid**



$C_7H_6O_3$ MW, 138

Needles from H_2O. M.p. 200·8°. Very sol. hot H_2O, EtOH, Me_2CO. Sol. Et_2O. Spar. sol. cold H_2O, C_6H_6. $k = 8{\cdot}7 \times 10^{-5}$ at 25°.

Me ester: $C_8H_8O_3$. MW, 152. Needles from C_6H_6–pet. ether. M.p. 69° (71·5°). B.p. 280–280·5°/709 mm.

Et ester: $C_9H_{10}O_3$. MW, 166. Plates from C_6H_6. M.p. 72–3° (72–4°). B.p. 295°, 211°/65 mm. Very sol. EtOH, Et_2O. Spar. sol. H_2O.

Amide: *m*-hydroxybenzamide. $C_7H_7O_2N$. MW, 137. Plates from H_2O. M.p. 170·5°. Very sol. hot H_2O, EtOH, Et_2O. Spar. sol. cold H_2O.

Nitrile: *m*-cyanophenol, *m*-hydroxybenzonitrile. C_7H_5ON. MW, 119. Plates from H_2O. M.p. 82°. Very sol. EtOH, Et_2O, hot H_2O.

Anilide: needles from EtOH.Aq. M.p. 154–5°. Very sol. EtOH. Spar. sol. Et_2O, CS_2, C_6H_6. Insol. $CHCl_3$.

Me ether: *see* *m*-Methoxybenzoic Acid.

Et ether: *see* *m*-Ethoxybenzoic Acid.

O-*Acetyl*: *m*-acetoxybenzoic acid. $C_9H_8O_4$. MW, 180. Cryst. from xylene. M.p. 131·5°. $k = 1{\cdot}3 \times 10^{-4}$. Very sol. EtOH, Et_2O. Sol. hot H_2O.

Offermann, *Ann.*, 1894, **280**, 6.

***p*-Hydroxybenzoic Acid.**

Prisms from xylene–EtOH. M.p. 213–14°. Cryst. $+1H_2O$ from EtOH.Aq. or Me_2CO–EtOH. Very sol. EtOH. Sol. Me_2CO, Et_2O. Spar. sol. H_2O, C_6H_6. Insol. CS_2. $k = 2{\cdot}86 \times 10^{-5}$. Many of the esters possess antiseptic and fungicidal properties.

Me ester: needles from EtOH.Aq. M.p. 131°. B.p. 270–80° decomp.

Et ester: cryst. M.p. 116°. B.p. 297–8°. Very sol. EtOH, Et_2O. Spar. sol. H_2O, $CHCl_3$, pet. ether, CS_2.

Amide: *p*-hydroxybenzamide. Needles $+1H_2O$ from H_2O. M.p. 162°. Very sol. EtOH, hot H_2O. Sol. Et_2O. Spar. sol. $CHCl_3$, CS_2.

Nitrile: *p*-cyanophenol, *p*-hydroxybenzonitrile. Cryst. M.p. 113°. Very sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. $k = 3{\cdot}0 \times 10^{-8}$ at 25°.

Anilide: plates from H_2O. M.p. 196–7°. Very sol. EtOH. Spar. sol. Et_2O. Insol. $CHCl_3$.

Me ether: *see* Anisic Acid.

Et ether: *see* *p*-Ethoxybenzoic Acid.

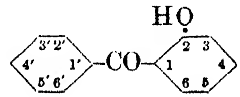
O-*Acetyl*: *p*-acetoxybenzoic acid. Plates from C_6H_6. M.p. 187–187·5°.

Hartmann, *J. prakt. Chem.*, 1877, **16**, 39.

Hydroxybenzoic Acid sulphonic Acid.

See Hydroxysulphobenzoic Acid.

2-Hydroxybenzophenone (*Phenyl 2-hydroxyphenyl ketone, 2-hydroxydiphenyl ketone, o-benzoylphenol*)



$C_{13}H_{10}O_2$ MW, 198

Plates from EtOH.Aq. M.p. 39°. B.p. 250°/560 mm. Very sol. EtOH, Et_2O, AcOH, C_6H_6. Spar. sol. pet. ether. Insol. H_2O. Yellow sols. in alkalis. KOH fusion ⟶ salicylic acid. PbO_2 ⟶ xanthone.

Me ether: 2-methoxybenzophenone, *o*-benzoylanisole. $C_{14}H_{12}O_2$. MW, 212. M.p. 39°. B.p. 210°/27 mm. *Oxime*: exists in two forms. (i) M.p. 130°, (ii) m.p. 150°.

Et ether: 2-ethoxybenzophenone, *o*-benzoylphenetole. $C_{15}H_{14}O_2$. MW, 226. M.p. 40°. B.p. 199°/20 mm. *Oxime*: m.p. 159°. *Semicarbazone*: m.p. 159–60°.

syn-*Oxime*: needles from C_6H_6. M.p. 141°. PCl_5 ⟶ salicylanilide. Formic acid ⟶ *anti*-form.

anti-*Oxime*: plates from C_6H_6. M.p. 143°. PCl_5 ⟶ 2-phenylbenzoxazole.

Phenylhydrazone: prisms from EtOH. M.p. 155°.

Ullmann, Goldberg, *Ber.*, 1902, **35**, 2811.

Bonnard, Meyer-Oulif, *Bull. soc. chim.*, 1931, **49**, 1303.

Kohler, Bruce, *J. Am. Chem. Soc.*, 1931, **53**, 1569.

3-Hydroxybenzophenone (*Phenyl 3-hydroxyphenyl ketone, 3-hydroxydiphenyl ketone, m-benzoylphenol*).

Plates from EtOH. M.p. 116°. Very sol. EtOH, Et_2O.

Me ether: 3-methoxybenzophenone, *m*-benzoylanisole. M.p. 37°. B.p. 342–3°/730 mm. Very sol. EtOH, C_6H_6. Insol. H_2O.

syn-*Oxime*: needles. M.p. 76°. KOH ⟶ *anti*-form.

anti-*Oxime*: needles from C_6H_6. M.p. 126°. HCl or heat at m.p. ⟶ *syn*-form.

See first reference above and also
Smith, *Ber.*, 1891, **24**, 4045.

4-Hydroxybenzophenone (*Phenyl 4-hydroxyphenyl ketone, 4-hydroxydiphenyl ketone, p-benzoylphenol*).

Plates from EtOH.Aq. M.p. 135°. Very sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O.

Me ether: 4-methoxybenzophenone, *p*-benzoylanisole. Prisms from Et_2O. M.p. 61–2°. B.p. 354–5°/729 mm. Very sol. EtOH, Et_2O. *Phenylhydrazone*: exists in two forms. (i) Prisms from EtOH. M.p. 132°. (ii) Cryst. from Et_2O. M.p. 90°. syn-*Oxime*: cryst. from EtOH. M.p. 115–16°. anti-*Oxime*: plates from EtOH. M.p. 137–8°.

Et ether: 4-ethoxybenzophenone. Plates from AcOH. M.p. 38–9°. B.p. 242°/40 mm.

Acetyl: needles from EtOH. M.p. 81°. Very sol. Et_2O, AcOH, C_6H_6.

Benzoyl: prisms from EtOH. M.p. 94–5°. Very sol. hot EtOH. Sol. Me_2CO, AcOEt, C_6H_6.

Phenylhydrazone: m.p. 144°.

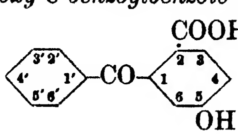
Semicarbazone: m.p. 194°.

syn-*Oxime*: needles. M.p. 81°. HCl or heat at m.p. ⟶ *anti*-form.

anti-*Oxime*: prisms from AcOH.Aq. M.p. 152°. Boiling NaOH ⟶ *syn*-form.

Blicke, Weinkauff, *J. Am. Chem. Soc.*, 1932, **54**, 1448.
Smith, *Ber.*, 1891, **24**, 4040.
Schäfer, *Ann.*, 1891, **264**, 159.

5-Hydroxybenzophenone-2-carboxylic Acid (*4-Hydroxy-*o*-benzoylbenzoic acid*)

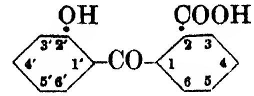


$C_{14}H_{10}O_4$ MW, 242

Leaflets. Decomp. at 220–22°. Sol. EtOH, Et_2O. Prac. insol. $CHCl_3$, C_6H_6. NaOH fusion ⟶ benzoic and 4-hydroxybenzoic acids.

Kliegl, *Ber.*, 1905, **38**, 296.

2′-Hydroxybenzophenone-2-carboxylic Acid (2-o-*Hydroxybenzoylbenzoic acid*, o-*salicyloylbenzoic acid*)



$C_{14}H_{10}O_4$ MW, 242

Cryst. from AcOH. M.p. 171–2°. Sol. EtOH, Et_2O, AcOH, hot Me_2CO, hot $PhNO_2$. Spar. sol. C_6H_6, hot H_2O. Yellow sols. in alkalis. Red sol. in conc. H_2SO_4.

Et ester: $C_{16}H_{14}O_4$. MW, 270. M.p. 62°.

Me ether: 2-*o*-methoxybenzoylbenzoic acid. $C_{15}H_{12}O_4$. MW, 256. Cryst. from toluene. M.p. 144–5°.

Ullmann, Schmidt, *Ber.*, 1919, **52**, 2106.
Bayer, D.R.P., 269,336, (*Chem. Zentr.*, 1914, I, 508).
Sieglitz, *Ber.*, 1924, **57**, 317.

3′-Hydroxybenzophenone-2-carboxylic Acid (2-m-*Hydroxybenzoyl-benzoic acid*).

M.p. 181–2°. H_2SO_4 at 100° ⟶ 1- and 2-hydroxyanthraquinones.

Et ester: prisms from C_6H_6. M.p. 91–3°.

Basler Chem. Fabr., D.R.P., 148,110, (*Chem. Zentr.*, 1904, I, 328).
Bayer, D.R.P., 279,201, (*Chem. Zentr.*, 1914, II, 1175).

4′-Hydroxybenzophenone-2-carboxylic Acid (2-p-*Hydroxybenzoyl-benzoic acid*).

Leaflets from H_2O. M.p. 213° (210°). Sol. EtOH, Et_2O, AcOH, $PhNO_2$, hot H_2O. Yellow sols. in alkalis.

Me ester: $C_{15}H_{12}O_4$. MW, 256. Cryst. from MeOH. M.p. 134°. Sol. H_2SO_4 with lemon-yellow col.

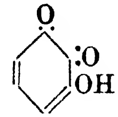
Me ether: *o*-anisoylbenzoic acid, 2-*p*-methoxybenzoylbenzoic acid. $C_{15}H_{12}O_4$. MW, 256. Leaflets from H_2O. M.p. 148° (142–3°). Sol. EtOH, Et_2O, AcOH, $CHCl_3$, toluene. Spar. sol. H_2O. *Me ester*: $C_{16}H_{14}O_4$. MW, 270. Plates from MeOH. M.p. 63°.

Et ether: 2-*p*-ethoxybenzoylbenzoic acid. $C_{16}H_{14}O_4$. MW, 270. Cryst. from toluene. M.p. 135–6°. Sol. Et_2O, C_6H_6, hot EtOH. Spar. sol. hot H_2O.

Phenyl ether: 2-*p*-phenoxybenzoylbenzoic acid. $C_{20}H_{14}O_4$. MW, 318. Needles from EtOH.Aq. M.p. 163·5°. Sol. EtOH, Et_2O, AcOH, C_6H_6. Insol. ligroin. Sol. conc. H_2SO_4 with red col.

Friedländer, *Ber.*, 1893, **26**, 176.
Meyer, Turnau, *Monatsh.*, 1909, **30**, 486.
Grande, *Gazz. chim. ital.*, 1890, **20**, 124.
Kipper, *Ber.*, 1905, **38**, 2492.
Ullmann, Schmidt, *Ber.*, 1919, **52**, 2106.

3-Hydroxy-o-benzoquinone (3-*Hydroxy*-o-*quinone*)



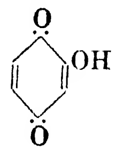
$C_6H_4O_3$ MW, 124

Me ether: 3-methoxy-o-benzoquinone. $C_7H_6O_3$. MW, 138. Red prisms or needles. M.p. 115–20°. Sol. $CHCl_3$. Spar. sol. C_6H_6. Sols. in H_2O, EtOH, Et_2O and dil H_2SO_4 are red.

Et ether: $C_8H_8O_3$. MW, 152. *Oxime*: m.p. 102°.

Willstätter, Müller, *Ber.*, 1911, **44**, 2179.

Hydroxy-p-benzoquinone (*Hydroxyquinone*)



$C_6H_4O_3$ MW, 124

Yellow plates from C_6H_6. Darkens on exposure to light. Blackens at 124°. Sol. Me_2CO, EtOH. Sols. are stable. Aq. sol. reacts acid.

Me ether: methoxy-p-benzoquinone, methoxyquinone. $C_7H_6O_3$. MW, 138. Yellow needles from H_2O. M.p. 145° (140°). Sublimes at 80–90° in long needles. Sol. EtOH. Spar. sol. H_2O, ligroin. Conc. $H_2SO_4 \longrightarrow$ blue sol. $\longrightarrow$ green on dilution.

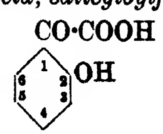
Et ether: ethoxy-p-benzoquinone, ethoxyquinone. $C_8H_8O_3$. MW, 152. Yellow needles. M.p. 119–20° (117°). Sol. EtOH, Et_2O. Mod. sol. H_2O. Volatile in steam. Sublimes.

Willstätter, Müller, *Ber.*, 1911, **44**, 2180.
Bechhold, *Ber.*, 1889, **22**, 2381.
Will, Pukall, *Ber.*, 1887, **20**, 1132.
Jacobson, Huber, *Ann.*, 1909, **369**, 14.
Gomberg, Stone, *J. Am. Chem. Soc.*, 1916, **38**, 1594.

Hydroxybenzoylbenzoic Acid.

See Hydroxybenzophenone-carboxylic Acid *and* Benzoylsalicylic Acid.

2-Hydroxybenzoylformic Acid (2-*Hydroxyphenylglyoxylic acid, salicyloylformic acid*)



$C_8H_6O_4$ MW, 166

Yellow plates from C_6H_6–ligroin. M.p. 56–7° (41–2°).

Et ester: $C_{10}H_{10}O_4$. MW, 194. M.p. 15°. Decomp. on dist. in vacuo.

Acetyl: needles from H_2O. M.p. 101–6° (+ $1H_2O$), 134·5–135·5° (anhyd.). *Me ester*: plates from MeOH. M.p. 109–10°. *Amide*: prisms from EtOH. M.p. 170° decomp. *Nitrile*: plates from AcOH. M.p. 110–11°. B.p. 149–51°/14 mm.

Oxime: needles from EtOH.Aq. M.p. 149° decomp.

Phenylhydrazone: yellow needles from EtOH.Aq. M.p. 148°.

Stoermer, *Ber.*, 1909, **42**, 201.
Anschütz, *Ann.*, 1909, **368**, 85.
Fries, Pfaffendorf, *Ber.*, 1912, **45**, 157.

3-Hydroxybenzoylformic Acid (3-*Hydroxyphenylglyoxylic acid*).

Me ether–nitrile: 3-methoxybenzoyl cyanide. $C_9H_7O_2N$. MW, 161. Cryst. from C_6H_6–pet. ether. M.p. 111–12°. Very sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin.

Mauthner, *Ber.*, 1909, **42**, 192.

4-Hydroxybenzoylformic Acid (4-*Hydroxyphenylglyoxylic acid*).

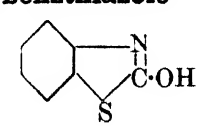
Needles from Et_2O–C_6H_6–ligroin. M.p. 177–8° (172–3°). Sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$, C_6H_6. Insol. ligroin.

Me ether: anisoylformic acid. $C_9H_8O_4$. MW, 180. Needles from C_6H_6. M.p. 89° (93°). Very sol. EtOH, Et_2O. Sol. C_6H_6. Spar. sol. pet. ether. *Oxime*: cryst. M.p. 145–6°. *Semicarbazone*: m.p. 201° decomp. *Amide*: $C_9H_9O_3N$. MW, 179. Needles from C_6H_6. M.p. 151–2°. *Nitrile*: 4-methoxybenzoyl cyanide, anisoyl cyanide. $C_9H_7O_2N$. MW, 161. Needles from C_6H_6–ligroin. M.p. 63–4°.

Et ether: $C_{10}H_{10}O_4$. MW, 194. Prisms + H_2O from H_2O. M.p. 52°. Cryst. from C_6H_6. M.p. 125° decomp. *Phenylhydrazone*: m.p. 153°. *Nitrile*: $C_{10}H_9O_2N$. MW, 175. Cryst. from pet. ether. M.p. 43°.

Fromhertz, *Z. physiol. Chem.*, 1910, **70**, 355.
Bouveault, *Bull. soc. chim.*, 1898, **19**, 75.
Mauthner, *Ber.*, 1909, **42**, 191.
Vorländer, *Ber.*, 1911, **44**, 2464.

2-Hydroxybenzthiazole



C_7H_5ONS MW, 151

M.p. 136°. Sol. EtOH, Et_2O. Insol. H_2O.

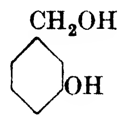
Et ether: C_9H_9ONS. MW, 179. M.p. 25°. B.p. above 360°.
Acetyl: prisms from EtOH. M.p. 60°.

Hofmann, *Ber.*, 1879, **12**, 1128.
Jacobson, *Ber.*, 1886, **19**, 1811.

Hydroxybenzylacetophenone.
See Hydroxyphenylpropiophenone.

***o*-Hydroxybenzyl Alcohol.**
See Saligenin.

***m*-Hydroxybenzyl Alcohol** (ω-*Hydroxy*-m-*cresol*)



$C_7H_8O_2$ MW, 124

Cryst. from C_6H_6. M.p. 73° (67°). Very sol. EtOH, Et_2O, hot H_2O. Spar. sol. $CHCl_3$.
Acetyl: *m*-hydroxybenzyl acetate. Cryst. M.p. 55°. Very sol. EtOH, Et_2O. Spar. sol. H_2O.
Diacetyl: b.p. about 290°. Very sol. EtOH, Et_2O.
3-*Me ether*: *m*-methoxybenzyl alcohol. $C_8H_{10}O_2$. MW, 138. B.p. 252°, 129·5°/9 mm.

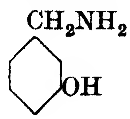
Mettler, *Ber.*, 1905, **38**, 1752.
Tiemann, Ludwig, *Ber.*, 1882, **15**, 2047.
v. den Velden, *J. prakt. Chem.*, 1877, **15**, 165.

***p*-Hydroxybenzyl Alcohol** (ω-*Hydroxy*-p-*cresol*).
Prisms or needles from H_2O. M.p. 124·5–125·5°. Very sol. EtOH, Et_2O, H_2O. Spar. sol. C_6H_6. Insol. $CHCl_3$, pet. ether.
Acetyl: *p*-hydroxybenzyl acetate. Needles from H_2O. M.p. 84°.
Diacetyl: needles. M.p. 75°. B.p. 155–7°/11 mm.
Me ether: *see* Anisyl Alcohol.

Auwers, Daecke, *Ber.*, 1899, **32**, 3374.

***o*-Hydroxybenzylamine.**
See Salicylamine.

***m*-Hydroxybenzylamine** (ω-*Amino*-m-*cresol*)



C_7H_9ON MW, 123

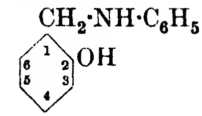
B,HCl: m.p. 160°.
Me ether: *m*-methoxybenzylamine. $C_8H_{11}ON$. MW, 137. B.p. 103–4°/6 mm. *Picrate*: prisms from MeOH. M.p. 181°. *Benzoyl*: needles from $CHCl_3$–ligroin. M.p. 95°. p-*Nitrobenzoyl*: needles from MeOH. M.p. 124°.

Shoppee, *J. Chem. Soc.*, 1932, 702.

***p*-Hydroxybenzylamine** (ω-*Amino*-p-*cresol*).
Plates $+1H_2O$ from H_2O. M.p. 95° decomp.
B,HCl: plates from EtOH. M.p. 195°.
B,HI: m.p. 198–200°.
Me ether: *see* Anisamine.

Salkowski, *Ber.*, 1889, **22**, 2142.
Tiffeneau, *Bull. soc. chim.*, 1911, **9**, 823.

***o*-Hydroxybenzylaniline**



$C_{13}H_{13}ON$ MW, 199

Leaflets from EtOH or ligroin. M.p. 113°. Sol. EtOH, Et_2O, acids, alkalis. Spar. sol. H_2O, ligroin.
B,HCl: m.p. 131°.
B_2,H_2PtCl_6: m.p. 184° decomp.
Acetyl deriv.: m.p. 93°.

Paal, Senninger, *Ber.*, 1894, **27**, 1802.
Emmerich, *Ann.*, 1887, **241**, 344.

***m*-Hydroxybenzylaniline.**
Prisms from EtOH.Aq. M.p. 103–4°. Sol. Me_2CO, EtOH, $CHCl_3$, C_6H_6. Spar. sol. H_2O, cold ligroin.
N-*Nitroso*: m.p. 87·5–88°.

Bamberger, Müller, *Ann.*, 1900, **313**, 113.

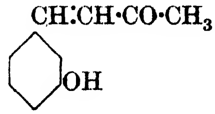
***p*-Hydroxybenzylaniline.**
Needles from EtOH, m.p. 208°. Prisms from C_6H_6, m.p. 156°.
Me ether: $C_{14}H_{15}ON$. MW, 213. Prisms from MeOH. M.p. 64·5°. Sol. Et_2O, $CHCl_3$, C_6H_6, ligroin. *B,HCl*: m. p. 163°. N-*Acetyl*: m.p. 54°.
Et ether: $C_{15}H_{17}ON$. MW, 227. Plates from MeOH. M.p. 65°.

Emmerich, *Ann.*, 1887, **241**, 355.
Bischoff, Fröhlich, *Ber.*, 1906, **39**, 3966.
Steinhart, *Ann.*, 1887, **241**, 337.
Fritsch, *Ann.*, 1901, **315**, 141.

Hydroxybenzyl cyanide.
See under Hydroxyphenylacetic Acid.

***o*-Hydroxybenzylideneacetone.**
See Salicylideneacetone.

m-Hydroxybenzylideneacetone (*Methyl 3-hydroxystyryl ketone*)



$C_{10}H_{10}O_2$ MW, 162

Me ether: *m*-methoxybenzylideneacetone. B.p. 173°/8 mm. *Phenylhydrazone*: m.p. 116–17°. *Semicarbazone*: needles from EtOH. M.p. 197–8°. Sol. hot EtOH, C_6H_6, AcOH. Insol. ligroin.

Bauer, Vogel, *J. prakt. Chem.*, 1913, **88**, 332.

p-Hydroxybenzylideneacetone (*Methyl 4-hydroxystyryl ketone*).

Needles from H_2O. M.p. 102–3°. Sol. EtOH, AcOH. Spar. sol. H_2O. Orange-yellow sols. in alkalis.

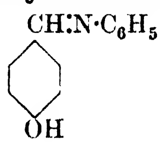
Acetyl: needles from EtOH.Aq. M.p. 80–1°. Sol. EtOH, AcOH.

Me ether: *see* Anisylideneacetone.

Zincke, Mühlhausen, *Ber.*, 1903, **36**, 134.

o-Hydroxybenzylideneaniline.
See Salicylideneaniline.

p-Hydroxybenzylideneaniline



$C_{13}H_{11}ON$ MW, 197

Yellow plates from EtOH. M.p. 194–5° (190–1°). Sol. EtOH, Et_2O. Spar. sol. $CHCl_3$, C_6H_6. Insol. H_2O.

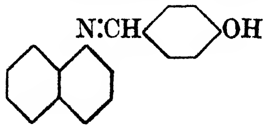
Me ether: *see* Anisylideneaniline.

Herzfeld, *Ber.*, 1877, **10**, 1271.
Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2464.

Hydroxy-benzylideneaniline.
See Benzylideneaminophenol.

o-Hydroxybenzylidene-1-naphthylamine.
See Salicylidene-1-naphthylamine.

p-Hydroxybenzylidene-1-naphthylamine



$C_{17}H_{13}ON$ MW, 247

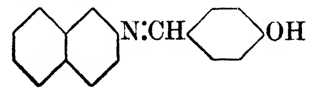
Plates from xylene. M.p. 191–191·5°.

Me ether: anisylidene-1-naphthylamine. $C_{18}H_{15}ON$. MW, 261. Plates from EtOH. M.p. 100–1°. *B,HCl*: m.p. 211° decomp.

Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2470.
Pope, Fleming, *J. Chem. Soc.*, 1908, **93**, 1916.

o-Hydroxybenzylidene-2-naphthylamine.
See Salicylidene-2-naphthylamine.

p-Hydroxybenzylidene-2-naphthylamine



$C_{17}H_{13}ON$ MW, 247

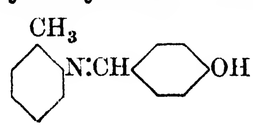
Yellow plates from EtOH. M.p. 231·5° (220°).

Me ether: anisylidene-2-naphthylamine. $C_{18}H_{15}ON$. MW, 261. Plates from EtOH. M.p. 98°.

Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2471.
Emmerich, *Ann.*, 1887, **241**, 356.
Steinhart, *ibid.*, 341.

Hydroxybenzylidenepropionic Acid.
See *p*-Hydroxystyrylacetic Acid *and* Styrylglycollic Acid.

p-Hydroxybenzylidene-o-toluidine

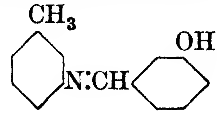


$C_{14}H_{13}ON$ MW, 211

Prisms from EtOH. M.p. 171–2°. Exhibits phototropy.

Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2464.

m-Hydroxybenzylidene-m-toluidine



$C_{14}H_{13}ON$ MW, 211

Prisms from C_6H_6–pet. ether. M.p. 106–7°. Sol. most org. solvents.

Senier, Shepheard, *J. Chem. Soc.*, 1909, **95**, 1951.

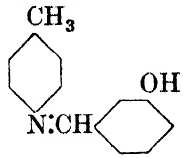
p-Hydroxybenzylidene-m-toluidine.

Yellow plates from EtOH, colourless cryst. from C_6H_6. M.p. 181°. Sol. Et_2O, C_6H_6 to colourless sols. Sol. EtOH, AcOH, AcOEt, $CHCl_3$ to yellow sols. Exhibits phototropy.

Me ether: $C_{15}H_{15}ON$. MW, 225. Plates from EtOH. M.p. 59°. *Hydrochloride*: m.p. 174°.

See above reference.

m-Hydroxybenzylidene-p-toluidine



$C_{14}H_{13}ON$ MW, 211

Leaflets from $CHCl_3$–ligroin. M.p. 129°.

Bayer, D.R.P., 105,006, (*Chem. Zentr.*, 1899, II, 1078).

p-Hydroxybenzylidene-p-toluidine.
Orange leaflets from EtOH. M.p. 218°. Sol. hot EtOH, Et_2O. Spar. sol. H_2O, $CHCl_3$, C_6H_6. Exhibits phototropy.

Herzfeld, *Ber.*, 1877, **10**, 2196.
Senier, Forster, *J. Chem. Soc.*, 1914, **105**, 2465.

3-Hydroxy-2-benzyl-n-valeric Acid (2-α-*Hydroxyethyl*-3-*phenylbutyric acid*)

$$CH_3{\cdot}CH(OH){\cdot}\underset{}{\overset{CH_2\cdot C_6H_5}{\overset{|}{C}}}H{\cdot}CH_2{\cdot}COOH$$

$C_{12}H_{16}O_3$ MW, 208

Prisms + $1H_2O$ from H_2O. M.p. 55–6°, anhyd. 75–6°. Sol. hot H_2O.

Lactone: benzylvalerolactone. $C_{12}H_{14}O_2$. MW, 190. Cryst. from CS_2. M.p. 86°. Sol. toluene. Spar. sol. hot H_2O.

Erdmann, *Ann.*, 1889, **254**, 202, 215.

4-Hydroxy-1:2-butadiene (*Hydroxymethylallene, vinylidene-ethyl alcohol*, 3-*methyleneallyl alcohol*)

$$HO{\cdot}CH_2{\cdot}CH{:}C{:}CH_2$$

C_4H_6O MW, 70

Lachrymatory liq. with pungent odour. B.p. 126–8°/756 mm., 68–70°/53 mm. D_4^{20} 0·9164. n_D^{20} 1·4759. Misc. with H_2O and most org. solvents.

Acetyl: b.p. 140–140·5°/780 mm., 85–6°/125 mm. D_4^{20} 0·9641. n_D^{20} 1·4504.

Carothers, Berchet, *J. Am. Chem. Soc.*, 1933, **55**, 2812.

Hydroxybutane.
See Butyl Alcohol.
Hydroxybutane-dicarboxylic Acid.
See Ethylmalic Acid.
γ-Hydroxy-α-butenylbenzene.
See Methylstyrylcarbinol.
Hydroxybutylbenzene.
See Butylphenol *and* Phenylbutyl Alcohol.
3-Hydroxy-1-butylene.
See Methylvinylcarbinol.
1-Hydroxy-2-butylene.
See Crotonyl Alcohol.
3-ω-Hydroxybutylindole.
See 4-[3-Indolyl]-*n*-butyl Alcohol.
4-Hydroxybutyl phenyl Ketone.
See ω-Hydroxyvalerophenone.
2-Hydroxybutyraldehyde.
See Aldol.

1-Hydroxybutyric Acid

$$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$$

$C_4H_8O_3$ MW, 104

d-.
Isobutyl ester: $C_8H_{16}O_3$. MW, 160. B.p. 196°. D^{15} 0·944. n_D 1·4182. $[\alpha]_D + 7·7°$.

l-.
Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 165–70°. D^{15} 0·978. n_D 1·4101. $[\alpha]_D - 1·9°$.

dl-.
Cryst. M.p. 43–4°. B.p. 225–60° decomp. and anhydride formation, 140°/14 mm. Sublimes at 60–70°. $k = 7·5 \times 10^{-5}$.

Et ester: b.p. 167°. D^{10} 0·9952. *Acetyl*: b.p. 198°.

Nitrile: propionaldehyde cyanhydrin. C_4H_7ON. MW, 85. B.p. 102–3°/23 mm. D^{15} 0·9690. n_D^{15} 1·4175. *Acetyl*: b.p. 102–3°/23 mm. D^0 1·019.

Acetyl: cryst. from CS_2. M.p. 43°.

Me ether: 1-methoxybutyric acid. $C_5H_{10}O_3$. MW, 118. Liq. Sol. H_2O, EtOH, Et_2O. *Me ester*: $C_6H_{12}O_3$. MW, 132. B.p. 150–5°. *Et ester*: $C_7H_{14}O_3$. MW, 146. B.p. 159–61°(148°). D^{24} 0·9223.

Et ether: 1-ethoxybutyric acid. $C_6H_{12}O_3$. MW, 132. Liq. Sol. H_2O, EtOH, Et_2O. *Me ester*: $C_7H_{14}O_3$. MW, 146. B.p. 156–8°. *Et ester*: $C_8H_{16}O_3$. MW, 160. B.p. 166–70° (168·5°). D^{22} 0·8804.

Bischoff, Walden, *Ann.*, 1894, **279**, 102.
Anschütz, Motschmann, *Ann.*, 1912, **392**, 103.
Guye, Jordan, *Bull. soc. chim.*, 1896, **15**, 475.
Duvillier, *Ann. chim. phys.*, 1879, **17**, 532.

2-Hydroxybutyric Acid

$$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH$$

$C_4H_8O_3$ MW, 104

d-.
Na salt: cryst. from EtOH.

Quinine salt: $C_{20}H_{24}O_2N_2,C_4H_8O_3,H_2O$. Needles + $1H_2O$ from H_2O. M.p. 108–14°, anhyd. 126·5–127·5°. $[\alpha]_D^{17}$ − 126·2° in EtOH.
Nitrile: 1-cyanoisopropyl alcohol. C_4H_7ON. MW, 85. B.p. 99–100°/15 mm. $[\alpha]_D^{18}$ + 8·78°.

l-.

Cryst. Very hygroscopic. M.p. 49–50°. Very sol. H_2O, EtOH, Et_2O. Insol. C_6H_6. $[\alpha]_D^{16}$ − 24·9°.
Quinine salt: needles + $4\frac{1}{2}H_2O$. M.p. 60–70°, anhyd. 124–6°. $[\alpha]_D^{15}$ − 129·9° in EtOH.
Me ester: $C_5H_{10}O_3$. MW, 118. B.p. 67–68·5°/13 mm. D_{20}^{20} 1·058. $[\alpha]_D^{20}$ − 21·09°.
Nitrile: b.p. 99–100°/15 mm. $[\alpha]_D^{18}$ − 10·03° in H_2O.
Amide: $C_4H_9O_2N$. MW, 103. Cryst. from AcOEt. M.p. 99–100°. $[\alpha]_D^{20}$ − 22·49° in MeOH.

dl-.

Hygroscopic syrup. B.p. 130°/12–14 mm. Volatile in steam. $k = 5{\cdot}1 \times 10^{-5}$ ($3{\cdot}4 \times 10^{-5}$).
Me ester: b.p. 67–8°/12–13 mm.
Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 178–80°, 76–7°/15 mm. D_4^{17} 1·012. n_D^{17} 1·422. *Acetyl*: b.p. 92–4°/8 mm.
Amide: prisms from H_2O. M.p. 84–7°.
Nitrile: b.p. 220–1°/757 mm., 123–5°/22 mm. D^9 1·0134. *Acetyl*: b.p. 210°/765 mm.
Acetyl: b.p. 93–4°/0·5 mm. D^{18} 1·1346. n_D 1·4282.

McKenzie, *J. Chem. Soc.*, 1902, **81**, 1402.
Fischer, Scheibler, *Ber.*, 1909, **42**, 1221.
Anschütz, Motschmann, *Ann.*, 1912, **392**, 106.
Vavon, *Ann. chim.*, 1914, **1**, 180.

3-Hydroxybutyric Acid

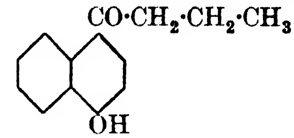
HO·CH₂·CH₂·CH₂·COOH

$C_4H_8O_3$ MW, 104

Liq. at − 17°. Readily reverts to lactone. $k = 1{\cdot}93 \times 10^{-5}$ at 25°.
Nitrile: 3-cyanopropyl alcohol. C_4H_7ON. MW, 85. B.p. 238–40°/765 mm., 150–1°/68 mm., 140°/30 mm. D^8 1·0290. *Acetyl*: b.p. 237°.
Lactone: *see* Butyrolactone.
Me ether: 3-methoxybutyric acid. $C_5H_{10}O_3$. MW, 118. B.p. 105–105·5°/7 mm. D_4^{20} 1·0596. n_D^{20} 1·42509.
Et ether: 3-ethoxybutyric acid. $C_6H_{12}O_3$. MW, 132. B.p. 116·5–117°/8 mm. D_4^{20} 1·0194. n_D^{20} 1·42531.

Henry, *Chem. Zentr.*, 1898, I, 984.
Palomaa, Kenetti, *Ber.*, 1931, 64, 800.

4-Hydroxy-1-butyronaphthone (4-*Butyryl-1-naphthol, propyl 4-hydroxy-1-naphthyl ketone*)

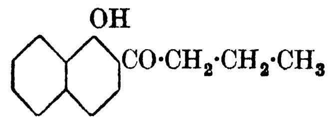


$C_{14}H_{14}O_2$ MW, 214

Me ether: 4-methoxybutyronaphthone. $C_{15}H_{16}O_2$. MW, 228. Leaflets from EtOH. M.p. 49–50°. *Picrate*: red needles. M.p. 90°.

Rousset, *Bull. soc. chim.*, 1896, **15**, 634.

1-Hydroxy-2-butyronaphthone (2-*Butyryl-1-naphthol, propyl 1-hydroxy-2-naphthyl ketone*)



$C_{14}H_{14}O_2$ MW, 214

Needles from Et_2O. M.p. 78°.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, **43**, 97.

β-Hydroxybutyrophenone (*Ethylbenzoylcarbinol, 1-benzoylpropyl alcohol, 1-hydroxypropyl phenyl ketone*)

C₆H₅·CO·CH(OH)·CH₂·CH₃

$C_{10}H_{12}O_2$ MW, 164

Acetyl: yellow oil. B.p. 164–70°/25–30 mm. Sol. EtOH, Et_2O. Insol. H_2O.

Collett, *Compt. rend.*, 1897, **125**, 354.

γ-Hydroxybutyrophenone (*Methylphenacylcarbinol, 1-benzoylisopropyl alcohol, 2-hydroxypropyl phenyl ketone*)

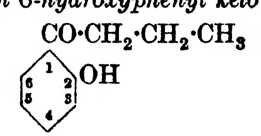
C₆H₅·CO·CH₂·CH(OH)·CH₃

$C_{10}H_{12}O_2$ MW, 164

Oil. B.p. 150–2°/12 mm.
Me ether: γ-methoxybutyrophenone. $C_{11}H_{14}O_2$. MW, 178. Oil. B.p. 119–21°/8 mm. D_4^{20} 1·0349. n_D^{20} 1·5168.

Staudinger, Kon, *Ann.*, 1911, **384**, 124.
Dufraisse, Demontvignier, *Bull. soc. chim.*, 1927, **41**, 847.

***o*-Hydroxybutyrophenone** (o-*Butyrylphenol, propyl* o-*hydroxyphenyl ketone*)



$C_{10}H_{12}O_2$ MW, 164

Cryst. M.p. 10° (8°). B.p. 124–6°/14 mm., 119°/9 mm. D^{24} 1·0683. $n_D^{25·5}$ 1·5375.

Semicarbazone: cryst. from EtOH. M.p. 192–3°.

Phenylhydrazone: yellow cryst. M.p. 91–2°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 286.

Sandulesco, Girard, *Bull. soc. chim.*, 1930, **47**, 1308.

Morgan, Hickinbottom, *J. Chem. Soc.*, 1921, **119**, 1885.

***m*-Hydroxybutyrophenone** (m-*Butyrylphenol, propyl* m-*hydroxyphenyl ketone*).

Plates from C_6H_6–pet. ether. M.p. 63°.

p-*Nitrophenylhydrazone*: orange-yellow needles from C_6H_6. M.p. 160°.

Morgan, Hickinbottom, *J. Chem. Soc.*, 1921, **119**, 1884.

***p*-Hydroxybutyrophenone** (p-*Butyrylphenol, propyl* p-*hydroxyphenyl ketone*).

Plates from ligroin. M.p. 91°. B.p. 187–8°/9 mm. Sol. EtOH. Spar. sol. hot H_2O.

Me ether: *p*-methoxybutyrophenone, propyl *p*-methoxyphenyl ketone, *p*-butyrylanisole. $C_{11}H_{14}O_2$. MW, 178. M.p. 21–2°. B.p. 275°, 158–9°/19 mm. *Semicarbazone*: cryst. M.p. 183°.

Et ether: *p*-ethoxybutyrophenone, propyl *p*-ethoxyphenyl ketone, *p*-butyrylphenetole. $C_{12}H_{16}O_2$. MW, 192. Cryst. B.p. 173–4°/23 mm.

Benzoyl: cryst. from EtOH. M.p. 107–107·5°.

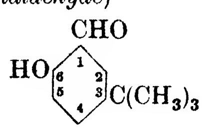
Baranger, *Bull. soc. chim.*, 1931, **49**, 1216.

Sandulesco, Girard, *Bull. soc. chim.*, 1930, **47**, 1308.

Klages, *Ber.*, 1902, **35**, 2266.

Perkin, *J. Chem. Soc.*, 1889, **55**, 548.

6-Hydroxy-3-*tert*.-butylbenzaldehyde (5-tert.-*Butylsalicylaldehyde*)



$C_{11}H_{14}O_2$ MW, 178

Liq. at −18°. B.p. 251–2°. D^{20} 1·039. $FeCl_3 \longrightarrow$ violet col.

Me ether: $C_{12}H_{16}O_2$. MW, 192. B.p. 274–6°.

Benzyl ether: $C_{18}H_{20}O_2$. MW, 268. Prisms from MeOH. M.p. 70–71°.

Oxime: needles from pet. ether. M.p. 112°. Sol. H_2O, Et_2O, $CHCl_3$, C_6H_6.

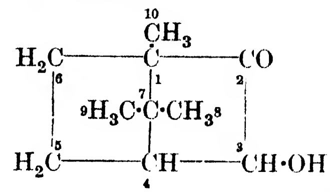
Phenylhydrazone: plates. M.p. 178°.

Dains, Rothrock, *Am. Chem. J.*, 1894, **16**, 635.

2-Hydroxycamphane.

Borneol, *q.v.*

3-Hydroxycamphor



$C_{10}H_{16}O_2$ MW, 168

M.p. 211–12° (198°, 193–5°). Sol. pet. ether. $[\alpha]_D^{19}$ + 18·9°. $CrO_3 \longrightarrow$ camphorquinone.

Acetyl: m.p. 63–4°.

Me ether: $C_{11}H_{18}O_2$. MW, 182. B.p. 81°/4 mm.

Semicarbazone: m.p. 223–4°.

Shimamoto, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, **25**, 56.

Ishidate, *Chem. Abstracts*, 1928, **22**, 3406.

Bredt, Ahrens, *J. prakt. Chem.*, 1926, **112**, 273.

4-Hydroxycamphor.

Cryst. from pet. ether. M.p. 250°. Very sol. most org. solvents. Spar. sol. H_2O, pet. ether. $[\alpha]_D^{17}$ − 16° in EtOH.

Acetyl: oil. B.p. 132°/11 mm.

Oxime: cryst. from toluene. M.p. 212°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 236–8°.

Houben, Pfankuck, *Ann.*, 1931, **489**, 217.

5-Hydroxycamphor (p-*Hydroxycamphor*).

Needles from ligroin. M.p. 222·5–223·5° (210°). Easily sol. EtOH, Et_2O, C_6H_6, AcOH. Spar. sol. pet. ether. Sol. to 3·4% in H_2O at 15°. $[\alpha]_D^{19·5}$ + 41·0° in EtOH. $[\alpha]_D^{16}$ + 47·4°.

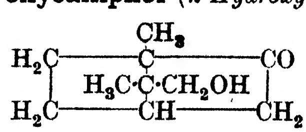
Acetyl: oil. B.p. 165–7°/22 mm., 149–50°/25 mm. $[\alpha]_D^{24}$ + 22·5° in EtOH. *Semicarbazone*: needles from EtOH. M.p. 223–4° (237–8°).

Semicarbazone: needles from EtOH. M.p. 232·5–233·5° (222°).

Asahina, Ishidate, *Ber.*, 1934, **67**, 73.

Takeuchi, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, **25**, 70.

8-Hydroxycamphor (π-*Hydroxycamphor*)



$C_{10}H_{16}O_2$ MW, 168

Exists in *cis* and *trans* forms.

Cis :

Cryst. from pet. ether. M.p. 233–4°. Sol. to 8% in H_2O at 15°. $[\alpha]_D^{15}$ + 40·68°.

Acetyl : b.p. 160°/22 mm. *Semicarbazone* : needles from AcOEt. M.p. 210–11°.

Semicarbazone : prisms from AcOEt. M.p. 216–17°.

Trans :

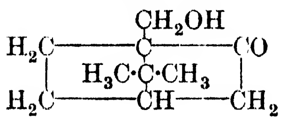
Prisms from ligroin. M.p. 233°. Very sol. EtOH, Et_2O, C_6H_6. Spar. sol. pet. ether. Sol. to 12·5% in H_2O at 18°. $[\alpha]_D^{15}$ + 62·20°.

Acetyl : oil. B.p. 176°/47 mm. *Semicarbazone* : cryst. from EtOH.Aq. M.p. 234–5° decomp.

Semicarbazone : needles from AcOEt. M.p. 224–5°.

Asahina, Ishidate, *Ber.*, 1934, **67**, 76.
Shimamoto, *Sci. Papers Inst. Phys. Chem. Research Tokyo*, 1934, **25**, 53.

10-Hydroxycamphor (β-*Hydroxycamphor*)



$C_{10}H_{16}O_2$ MW, 168

Cryst. from pet. ether. M.p. 216° (220°). $[\alpha]_D^{21}$ 51·9° in EtOH.

Acetyl : b.p. 148°/16 mm., 128–30°/3–4 mm. *Semicarbazone* : needles from EtOH.Aq. M.p. 163°.

Semicarbazone : prisms from EtOH.Aq. M.p. 213° (200°).

Iki, *Sci. Papers Inst. Phys. Chem. Research Tokyo*, 1934, **25**, 81.
Asahina, Ishidate, *Ber.*, 1934, **67**, 1202.

1-Hydroxycapric Acid (α-*Hydroxycapric acid*)

$CH_3{\cdot}[CH_2]_7{\cdot}CH(OH){\cdot}COOH$

$C_{10}H_{20}O_3$ MW, 188

Cryst. from $CHCl_3$ or pet. ether. M.p. 70·5°. Dist. at ord. press. ⟶ nonyl aldehyde.

Me ester : $C_{11}H_{22}O_3$. MW, 202. Cryst. from pet. ether. M.p. 30°.

Acetyl : cryst. from pet. ether. M.p. 40°.

Anilide : m.p. 79°.

Bagard, *Bull. soc. chim.*, 1907, **1**, 350.

3-Hydroxycapric Acid (γ-*Hydroxycapric acid*)

$CH_3{\cdot}[CH_2]_5{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_{10}H_{20}O_3$ MW, 188

Cryst. Readily dehydrates to lactone.

Lactone : $C_{10}H_{18}O_2$. MW, 170. B.p. 281°. Volatile in steam. Spar. sol. H_2O. $Ba(OH)_2$ ⟶ Ba salt of 3-hydroxycapric acid.

Fittig, Schneegans, *Ann.*, 1885, **227**, 93.

9-Hydroxycapric Acid

$HO{\cdot}CH_2{\cdot}[CH_2]_8{\cdot}COOH$

$C_{10}H_{20}O_3$ MW, 188

Cryst. from Et_2O–pet. ether. M.p. 75° (75·5–76·5°). Sol. Et_2O. Spar. sol. pet. ether.

Me ester : $C_{11}H_{22}O_3$. MW, 202. M.p. 34–5°. B.p. 154°/7 mm., 145–7°/3 mm. D^{20} 0·9618. n_D 1·4471. *Acetyl* : m.p. 15°. B.p. 175°/17 mm., 163°/10 mm. *Phenylurethane* : cryst. from Et_2O–pet. ether. M.p. 54–5°.

Amyl ester : $C_{15}H_{30}O_3$. MW, 258. B.p. 179–80°/8 mm. *Acetyl* : b.p. 210°/15 mm.

Acetyl : m.p. 36–7°. B.p. 213°/15 mm., 172–4°/2 mm. Very sol. pet. ether.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 474.
Lycan, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 628.
Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1926, **9**, 1074.
Grün, Wirth, *Ber.*, 1922, **55**, 2211.

1-Hydroxycaproic Acid

$CH_3{\cdot}[CH_2]_3{\cdot}CH(OH){\cdot}COOH$

$C_6H_{12}O_3$ MW, 132

l-.

Prisms from Et_2O. M.p. 60°. $[\alpha]_D^{20}$ − 4·68° in EtOH. Very sol. H_2O, EtOH, Et_2O, $CHCl_3$.

dl-.

Prisms from Et_2O. M.p. 60° (60–2°). Very sol. H_2O, EtOH, Et_2O, $CHCl_3$.

Amide : $C_6H_{13}O_2N$. MW, 131. M.p. 140–2°. Very sol. EtOH, boiling H_2O. Spar. sol. cold H_2O.

Et ether : 1-ethoxycaproic acid. $C_8H_{16}O_3$. MW, 160. B.p. 124–5°/10 mm. *Et ester* : $C_{10}H_{20}O_3$. MW, 188. B.p. 93°/16 mm., 87–9°/13 mm. *Chloride* : $C_8H_{15}O_2Cl$. MW, 178·5. B.p. 69°/9 mm. *Amide* : $C_8H_{17}O_2N$. MW, 159. Plates from pet. ether. M.p. 78°.

Aberhalden, Weil, *Z. physiol. Chem.*, 1913, **84**, 50.
Blaise, Picard, *Ann. chim.*, 1912, **26**, 282.
Marvel, MacCorquodale, Kendall, Lazier, *J. Am. Chem. Soc.*, 1924, **46**, 2840.

2-Hydroxycaproic Acid

$CH_3·[CH_2]_2·CH(OH)·CH_2·COOH$

$C_6H_{12}O_3$ MW, 132

Oil. Very sol. H_2O. Boil with NaOH ⟶ 2-propylacrylic acid. Ba and Ag salts sol. H_2O.

Fittig, Baker, *Ann.*, 1894, **283**, 124.

3-Hydroxycaproic Acid

$CH_3·CH_2·CH(OH)·[CH_2]_2·COOH$

$C_6H_{12}O_3$ MW, 132

Free acid not isolated: reverts to lactone.

NH_4 salt: cryst. M.p. 90° decomp.

Ag salt: colourless needles.

Ca salt: glassy solid.

Amide: $C_6H_{13}O_2N$. MW, 131. Prisms from $CHCl_3$. M.p. 74°.

Lactone: *see* 3-Caprolactone.

Fittig, Dubois, *Ann.*, 1890, **256**, 152.
Fittig, Hjelt, *Ann.*, 1881, **208**, 68.

4-Hydroxycaproic Acid

$CH_3·CH(OH)·[CH_2]_3·COOH$

$C_6H_{12}O_3$ MW, 132

Free acid passes immediately into the lactone.

Ag salt: cryst. from H_2O.

Ba salt: amorph. Very sol. H_2O. Sol. boiling EtOH.

Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 94–5°/2 mm. D_{25}^{25} 0·9832. n_D^{25} 1·4315.

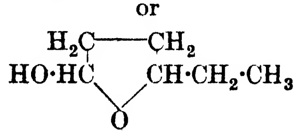
Lactone: *see* 4-Caprolactone.

Lease, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 807.

3-Hydroxy-*n*-caproic Aldehyde (*5-Hydroxy-2-ethyltetrahydrofuran*)

$CH_3·CH_2·CH(OH)·CH_2·CH_2·CHO$

or



$C_6H_{12}O_2$ MW, 116

Exists in both cyclic and acyclic forms. B.p. 77–80°/11 mm. D_4^{18} 1·004. n_D^{18} 1·4368. Misc. with most org. solvents. Spar. sol. H_2O. Reduces Fehling's and $NH_3.AgNO_3$. Sol. conc. H_2SO_4 to red sol.

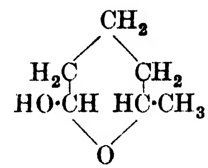
Me ether: 5-methoxy-2-ethyltetrahydrofuran, semi-acetal of 3-hydroxy-*n*-caproic aldehyde. $C_7H_{14}O_2$. MW, 130. B.p. 139–45°. D_4^{18} 0·9225. n_D^{18} 1·4164.

Helferich, *Ber.*, 1919, **52**, 1811.

4-Hydroxy-*n*-caproic Aldehyde (*6-Hydroxy-2-methyltetrahydropyran*)

$CH_3·CH(OH)·CH_2·CH_2·CH_2·CHO$

or



$C_6H_{12}O_2$ MW, 116

Exists in both cyclic and acyclic forms. B.p. 71–8°/11 mm. D_4^{18} 1·0065. n_D^{18} 1·4452. Misc. with most org. solvents. Spar. sol. H_2O. Reduces Fehling's and $NH_3.AgNO_3$. Ox. ⟶ 4-hydroxy-*n*-caproic acid.

Me ether: 6-methoxy-2-methyltetrahydropyran, semi-acetal of 4-hydroxy-*n*-caproic aldehyde. $C_7H_{14}O_2$. MW, 130. B.p. 71–6°/110 mm. D_4^{18} 0·9232. n_D^{18} 1·4211.

p-*Bromophenylhydrazone*: m.p. 85°.

Helferich, Malkomes, *Ber.*, 1922, **55**, 706.

1-Hydroxycaprylic Acid

$CH_3·[CH_2]_5·CH(OH)·COOH$

$C_8H_{16}O_3$ MW, 160

Plates. M.p. 69·5°. Very sol. EtOH, Et_2O. Spar sol. H_2O. $k = 1·55 \times 10^{-4}$.

Et ester: $C_{10}H_{20}O_3$. MW, 188. B.p. 229–30°/715 mm.

Amide: $C_8H_{17}O_2N$. MW, 159. Plates. M.p. 150°.

Nitrile: heptaldehyde cyanhydrin. $C_8H_{15}ON$. MW, 141. M.p. −10°. B.p. 143·5–144°/19 mm. D^{17} 0·9048.

Erlenmeyer, Sigel, *Ann.*, 1875, **177**, 103.
Böeseken, *Rec. trav. chim.*, 1918, **37**, 165.

3-Hydroxycaprylic Acid

$CH_3·[CH_2]_3·CH(OH)·[CH_2]_2·COOH$

$C_8H_{16}O_3$ MW, 160

Free acid passes immediately to the lactone.

Lactone: 3-caprylolactone. $C_8H_{14}O_2$. MW, 142. B.p. 132–3°/20 mm.

Blaise, Koehler, *Bull. soc. chim.*, 1910, **7**, 414.

5-Hydroxycaprylic Acid

$CH_3·CH_2·CH(OH)·[CH_2]_4·COOH$

$C_8H_{16}O_3$ MW, 160

Viscous liq. Slow dist. in vacuo ⟶ lactone.

Lactone: 5-caprylolactone. $C_8H_{14}O_2$. MW, 142. Colourless liq. B.p. 114–15°/10 mm.

Blaise, Koehler, *Bull. soc. chim.*, 1910, **7**, 413.

7-Hydroxycaprylic Acid

$HO \cdot CH_2 \cdot [CH_2]_6 \cdot COOH$

$C_8H_{16}O_3$ MW, 160

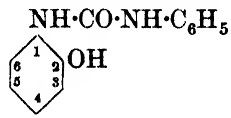
Needles from H_2O. M.p. 58°. Very sol. C_6H_6, EtOH. Sol. H_2O. Spar. sol. pet. ether.

Me ester: $C_9H_{18}O_3$. MW, 174. B.p. 137–8°/8 mm. D_{20}^{20} 0·992.

Acetyl: $C_{10}H_{18}O_4$. MW, 202. M.p. 9–10°. B.p. 155–8°/1·5 mm. D_{20}^{20} 1·042.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 466.

o-Hydroxycarbanilide (o-*Hydroxy*-sym.-*diphenylurea*)



$C_{13}H_{12}O_2N_2$ MW, 228

Cryst. M.p. 165–6°. Sol. H_2O, EtOH, Et_2O.

Et ether: $C_{15}H_{16}O_2N_2$. MW, 256. Needles from EtOH. M.p. 169–70°.

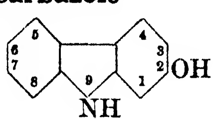
Leuckart, *J. prakt. Chem.*, 1890, **41**, 327.

p-Hydroxycarbanilide (p-*Hydroxy*-sym.-*diphenylurea*).

Needles from AcOH. M.p. 221°. Sol. hot EtOH. Spar. sol. hot H_2O, Et_2O, C_6H_6.

Fischer, *Ber.*, 1900, **33**, 1701 (*Note*).

2-Hydroxycarbazole



$C_{12}H_9ON$ MW, 183

Leaflets. M.p. 276°. Sol. usual org. solvents.

Et ether: $C_{14}H_{13}ON$. MW, 211. M.p. 217°.

Acetyl deriv.: m.p. 188°.

Ballauf, Muth, Schmelzer, U.S.P., 1,807,682, (*Chem. Abstracts*, 1931, **25**, 4412).

Ballauf, Schmelzer, U.S.P., 1,834,015, (*Chem. Abstracts*, 1932, **26**, 1000).

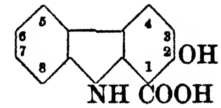
3-Hydroxycarbazole.

Needles from xylene. M.p. 260–1°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O, ligroin.

Diacetyl: m.p. 113–14°.

Ruff, Stein, *Ber.*, 1901, **34**, 1683.

2-Hydroxycarbazole-1-carboxylic Acid



$C_{13}H_9O_3N$ MW, 227

Cryst. M.p. 271–2°.

I.G., D.R.P., 512,234, (*Chem. Abstracts*, 1931, **25**, 966).

1-Hydroxycarbazole-2-carboxylic Acid.

Cryst. M.p. 233–4°.

See previous reference.

2-Hydroxycarbazole-3-carboxylic Acid.

Cryst. M.p. 273–4°.

See previous reference.

Hydroxycarbostyril.

See Dihydroxyquinoline.

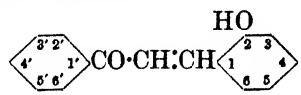
4-Hydroxy-3-carboxyazobenzene.

See 5-Benzeneazosalicylic Acid.

1-Hydroxy-2-carboxymethylhydrindene.

See 1-Hydroxyhydrindenyl-2-acetic Acid.

2-Hydroxychalkone (ω-*Salicylideneacetophenone*, ω-o-*hydroxybenzylideneacetophenone*, *phenyl 2-hydroxystyryl ketone*)



$C_{15}H_{12}O_2$ MW, 224

Yellow plates from EtOH. M.p. 153–4°. Sol. EtOH. Spar. sol. $CHCl_3$, CS_2. NaHg ⟶ 3-[*o*-hydroxyphenyl]-1-phenylpropyl alcohol. NaOH ⟶ flavanone.

Me ether: phenyl *o*-methoxystyryl ketone. $C_{16}H_{14}O_2$. MW, 238. Yellow needles from pet. ether. M.p. 64–5°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. ligroin. *Oxime*: m.p. 135–45°.

Acetyl: m.p. 68–9°.

Phenylhydrazone: m.p. 136°.

Harries, Busse, *Ber.*, 1896, **29**, 378.
Löwenbein, *Ber.*, 1924, **57**, 1515.
Auwers, Brink, *Ann.*, 1932, **493**, 223.
Bablich, Kostanecki, *Ber.*, 1896, **29**, 235.

3-Hydroxychalkone (ω-m-*Hydroxybenzylideneacetophenone*, *phenyl 3-hydroxystyryl ketone*).

Plates from dil. EtOH. M.p. 159–60°. Sol. EtOH, C_6H_6, $CHCl_3$. Spar. sol. CS_2. NaOH ⟶ dark yellow col. Conc. H_2SO_4 ⟶ yellow col.

Me ether: phenyl *m*-methoxystyryl ketone. Yellow plates from MeOH. M.p. 65°. B.p.

247°/12 mm. Sol. org. solvents. Insol. H_2O. *Oxime*: m.p. 75–95°.

Et ether: phenyl *m*-ethoxystyryl ketone. $C_{17}H_{16}O_2$. MW, 252. Prisms from EtOH. M.p. 75°.

Acetyl: m.p. 102–3°.

See last two references above and also
Bauer, Vogel, *J. prakt. Chem.*, 1913, **88**, 334.

4-Hydroxychalkone (ω-p-*Hydroxybenzylideneacetophenone, phenyl* 4-*hydroxystyryl ketone*).

Yellow cryst. from C_6H_6. M.p. 182–3°. Dil. NaOH ⟶ yellow col. Conc. H_2SO_4 ⟶ orange col. KOH ⟶ acetophenone + 4-hydroxybenzaldehyde.

Me ether: *see* Anisylideneacetophenone.

Et ether: phenyl *p*-ethoxystyryl ketone. Dark yellow plates. M.p. 63°.

Acetyl: m.p. 129–31°.

Skriner, Kurosawa, *J. Am. Chem. Soc.*, 1930, **52**, 2538.
Kostanecki, Schneider, *Ber.*, 1896, **29**, 1892.

2′-Hydroxychalkone (2-*Hydroxy*-ω-*benzylideneacetophenone*, o-*hydroxyphenyl styryl ketone*, β-*salicyloylstyrene*).

Yellow needles from EtOH. M.p. 88–9°. EtOH + dil. HCl ⟶ 4-ketoflavan.

Me ether: *o*-methoxyphenyl styryl ketone. $C_{16}H_{14}O_2$. MW, 238. Yellow oil. B.p. 226°/11·5 mm. *Oxime*: m.p. 135–40°.

Acetyl: m.p. 51–2°.

Auwers, Brink, *Ann.*, 1932, **493**, 223.
Feuerstein, Kostanecki, *Ber.*, 1898, **31**, 715.

3′-Hydroxychalkone (3-*Hydroxy*-ω-*benzylideneacetophenone*, m-*hydroxyphenyl styryl ketone*, β-m-*hydroxybenzoylstyrene*).

Plates from dil. EtOH. M.p. 126°. NaOH ⟶ yellow col. Conc. H_2SO_4 ⟶ yellowish-red col.

Me ether: *m*-methoxyphenyl styryl ketone. M.p. 41–2°. B.p. 236–8°/12 mm. *Oxime*: m.p. 132–7°.

Acetyl: m.p. 101°.

See first reference above and also
Kostanecki, Tambor, *Ber.*, 1899, **32**, 1924.

4′-Hydroxychalkone (4-*Hydroxy*-ω-*benzylideneacetophenone*, p-*hydroxyphenyl styryl ketone*, β-p-*hydroxybenzoylstyrene*).

Yellow needles from dil. EtOH. M.p. 172–3°. Dil. NaOH ⟶ yellow col. Conc. H_2SO_4 ⟶ yellowish-red col. KOH ⟶ benzoic acid + 4-hydroxyacetophenone.

Me ether: *p*-methoxyphenyl styryl ketone, β-anisoylstyrene. Needles. M.p. 107°. *Perchlorate*: m.p. 63–78°. *Oxime*: m.p. 140–2°.

Et ether: $C_{17}H_{16}O_2$. MW, 252. Needles from EtOH. M.p. 74–5°.

Phenyl ether: 4-cinnamoyldiphenyl ether. $C_{21}H_{16}O_2$. MW, 300. Plates. M.p. 85°. Sol. EtOH, Me_2CO, Et_2O. Spar. sol. ligroin.

Acetyl: m.p. 90°.

Glucoside: m.p. 195°.

Dilthey, *Ber.*, 1919, **52**, 1203.
Skriner, Kurosawa, *J. Am. Chem. Soc.*, 1930, **52**, 2539.
Auwers, Brink, *Ann.*, 1932, **493**, 223.
See also last reference above.

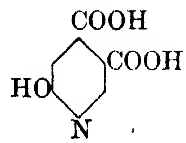
γ-Hydroxychalkone.

See Dibenzoylmethane.

3-Hydroxycholanic Acid.

See Lithocholic Acid.

6-Hydroxycinchomeronic Acid (2-*Hydroxypyridine*-4 : 5-*dicarboxylic acid*)

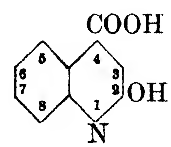


$C_7H_5O_5N$ MW, 184

Rhombohedra from dil. HCl. M.p. 287–9°. Insol. H_2O, EtOH, Et_2O. No col. with $FeCl_3$. Ac_2O at 200° ⟶ 2-hydroxynicotinic acid.

Weidel, Strache, *Monatsh.*, 1886, **7**, 280.

2-Hydroxycinchoninic Acid (2-*Hydroxyquinoline*-4-*carboxylic acid, carbostyril*-4-*carboxylic acid*)



$C_{10}H_7O_3N$ MW, 189

Needles from H_2O. M.p. above 310°. Sol. boiling H_2O, EtOH, AcOH. Spar. sol. cold H_2O. $KMnO_4$ ⟶ oxalic acid + NH_3.

Me ester: $C_{11}H_9O_3N$. MW, 203. Needles from H_2O. M.p. 242–3°.

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from EtOH.Aq. M.p. 206–7°.

Et ether: 2-ethoxyquinoline-4-carboxylic acid. $C_{12}H_{11}O_3N$. MW, 217. Needles from H_2O. M.p. 145–6°. Heat ⟶ Et ester of parent acid.

Et ester: $C_{14}H_{15}O_3N$. MW, 245. Needles. M.p. 86°.

Borsche, Jacobs, *Ber.*, 1914, **47**, 359.
Königs, Koerner, *Ber.*, 1883, **16**, 2152.
Wojahn, *Arch. Pharm.*, 1931, **269**, 422.

6-Hydroxycinchoninic Acid (*6-Hydroxyquinoline-4-carboxylic acid, xanthoquininic acid*).

Plates from H_2O. M.p. 320° decomp. Very sol. AcOH, dil. HCl. Spar. sol. most org. solvents. $FeCl_3 \longrightarrow$ blood red col.

Et ester: m.p. 185·5°.

Amide: $C_{10}H_8O_2N_2$. MW, 188. Needles from MeOH. M.p. 264°. N-*Di-Et*: cryst. from MeOH. M.p. 119°.

Chloride: $C_{10}H_6O_2NCl$. MW, 207·5. Orange cryst. M.p. 158° decomp.

Me ether: *see* Quininic Acid.

Et ether: 6-ethoxyquinoline-4-carboxylic acid. Yellow needles from propyl alcohol. M.p. 278°.

Methochloride: yellow plates. M.p. 295°.

Methiodide: orange-yellow needles from EtOH. M.p. 302°.

Claus, Brandt, *Ann.*, 1894, **282**, 93.
John, *J. prakt. chem.*, 1930, **128**, 194.

7-Hydroxycinchoninic Acid (*7-Hydroxyquinoline-4-carboxylic acid*).

Me ether: 7-methoxyquinoline-4-carboxylic acid. $C_{11}H_9O_3N$. MW, 203. M.p. 273°. Sublimes readily in high vacuum at 160°. *Nitrile*: 7-hydroxy-4-cyanoquinoline. $C_{11}H_8ON_2$. MW, 184. Cryst. from EtOH.Aq. M.p. 153–4°.

Späth, Brunner, *Ber.*, 1924, **57**, 1250.

8-Hydroxycinchoninic Acid (*8-Hydroxyquinoline-4-carboxylic acid*).

Bright yellow powder. M.p. 254–6°. Sol. hot EtOH, AcOH. Spar. sol. boiling H_2O, C_6H_6.

Weidel, Cobenzl, *Monatsh.*, 1880, **1**, 867.

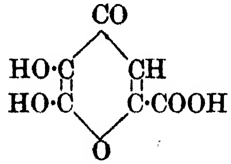
Hydroxycinnamaldehyde.

See Coumaraldehyde.

Hydroxycinnamic Acid.

See Coumaric Acid.

6-Hydroxycomenic Acid (*5:6-Dihydroxy-γ-pyrone-2-carboxylic acid*)



$C_6H_4O_6$ MW, 172

Needles + $3H_2O$ from H_2O. M.p. 275°. Sol. H_2O, EtOH. Spar. sol. Et_2O. Insol. $CHCl_3$. $FeCl_3 \longrightarrow$ intense violet col. NH_4OH at 150° $\longrightarrow$ 4:5:6-trihydroxypicolinic acid.

Di-Me ether: 5:6-dimethoxy-γ-pyrone-2-carboxylic acid. $C_8H_8O_6$. MW, 200. Plates from H_2O. M.p. 242°. *Me ester*: $C_9H_{10}O_6$. MW, 214. Needles from MeOH. M.p. 97°.

Me ester: $C_7H_6O_6$. MW, 186. Needles from MeOH. M.p. 222°.

Et ester: $C_8H_8O_6$. MW, 200. Prisms from EtOH. M.p. 204°. *Diacetyl*: needles from EtOH. M.p. 75°.

Peratoner, Castellana, *Gazz. chim. ital.*, 1906, **36**, 4, 21.
Ost, *J. prakt. Chem.*, 1881, **23**, 441.
Tickle, Collie, *J. Chem. Soc.*, 1902, **81**, 1006.
Azzarello, *Atti accad. Lincei*, 1905, **14**, 163.

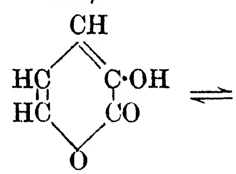
α-Hydroxyconiine.

See Conhydrine.

5-Hydroxyconiine.

See ψ-Conhydrine, Addendum Vol. I.

Hydroxycoumalin (*3-Hydroxy-α-pyrone, isopyromucic acid*)



$C_5H_4O_3$ MW, 112

M.p. (+ $2H_2O$) 80–5°, anhyd. 95° (91°). B.p. 112°/20 mm. Sol. to 4·5% in H_2O at 0°. Sol. EtOH, Et_2O, $CHCl_3$, hot C_6H_6. Spar. sol. CS_2. Decomp. by dil. alkalis. Reduces Fehling's and $NH_3.AgNO_3$.

Me ether: 3-methoxy-α-pyrone. $C_6H_6O_3$. MW, 126. Colourless needles. M.p. 60°. B.p. 130–5°/20 mm. Sol. H_2O, EtOH. Mod. sol. Et_2O.

Et ether: 3-ethoxy-α-pyrone. $C_7H_8O_3$. MW, 140. M.p. 52°. Sol. H_2O, EtOH.

Benzyl ether: prisms. M.p. 71°. Insol. H_2O.

Anhydride: $C_{10}H_6O_5$. MW, 206. White needles from EtOH. M.p. 73°. B.p. 235° slight decomp.

Phenylhydrazone: needles. M.p. 77°.

Acetyl: cryst. M.p. 28°. B.p. 152°/20 mm. Sol. most org. solvents. Spar. sol. H_2O.

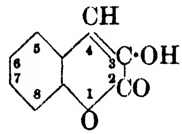
Benzoyl: prisms from EtOH. M.p. 85°. Sol. org. solvents. Spar. sol. H_2O.

Chavanne, *Bull. soc. chim.*, 1903, **29**, 402; *Ann. chim.*, 1904, **3**, 536.

α-Hydroxy-*p*-coumaric Acid.

See 4-Hydroxyphenylpyruvic Acid.

3-Hydroxycoumarin (*α-Hydroxy*-o-*coumaric lactone*)



$C_9H_6O_3$ MW, 162

Needles from EtOH or C_6H_6. M.p. 153°. Sol. H_2O and most org. solvents.

Me ether: 3-methoxycoumarin. $C_{10}H_8O_3$. MW, 176. Needles from EtOH. M.p. 162°.

Phenylhydrazone: yellow leaflets from EtOH. M.p. 173–4°.

Erlenmeyer, Stadlin, *Ann.*, 1904, **337**, 292.
Plöchl, Wolfrum, *Ber.*, 1885, **18**, 1185.
Heilbron, Hill, Walls, *J. Chem. Soc.*, 1931, 1702.

4-Hydroxycoumarin (*Benzotetronic acid, β-hydroxy*-o-*coumaric lactone*).

Needles from H_2O. M.p. 206°. Very sol. EtOH, Et_2O, hot H_2O. $FeCl_3 \longrightarrow$ brown col.

Me ether: 4-methoxycoumarin. Colourless flakes from H_2O. M.p. 124°.

Et ether: $C_{11}H_{10}O_3$. MW, 190. Yellow plates from Et_2O. M.p. 136°. B.p. 174°/14 mm.

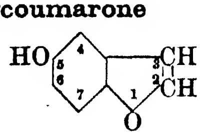
Acetyl: needles from C_6H_6. M.p. 103°.

Anschütz, *Ann.*, 1909, **367**, 196.
Heilbron, Hill, *J. Chem. Soc.*, 1927, 1707.

7-Hydroxycoumarin.

See Umbelliferone.

5-Hydroxycoumarone



$C_8H_6O_2$ MW, 134

Me ether: $C_9H_8O_2$. MW, 148. B.p. 230–40°.

Stoermer, *Ann.*, 1900, **312**, 335.
Dumont, Kostanecki, *Ber.*, 1909, **42**, 913.

6-Hydroxycoumarone.

Me ether: b.p. 232–3°. D^{16} 1·1567. n_D^{18} 1·5664. Sol. EtOH, Et_2O. Insol. H_2O. Volatile in steam. Resinifies in conc. H_2SO_4. *Picrate*: m.p. 64–5°.

Et ether: $C_{10}H_{10}O_2$. MW, 162. Leaflets. M.p. 10°. B.p. 230°/10 mm. Sol. conc. H_2SO_4: addn. of $FeCl_3 \longrightarrow$ intense violet col.

See above references.

ω-Hydroxycresol.

See Hydroxybenzyl Alcohol *and* Saligenin.

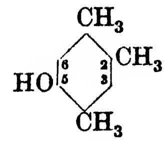
2-Hydroxycrotonic Acid.

See Acetoacetic Acid.

Hydroxycumene.

See Isopropylphenol.

5-Hydroxy-ψ-cumene (*5-Hydroxy*-1 : 2 : 4-*trimethylbenzene, ψ-cumenol*, 2 : 4 : 5-*trimethylphenol*)



$C_9H_{12}O$ MW, 136

Needles from H_2O. M.p. 70·5–71·5°. Sol. EtOH, Et_2O. Insol. cold H_2O. $k = 0{\cdot}28 \times 10^{-10}$ at 25°.

Me ether: 2 : 4 : 5-trimethylanisole. $C_{10}H_{14}O$. MW, 150. B.p. 213–14°.

Et ether: 2:4:5-trimethylphenetole. $C_{11}H_{16}O$. MW, 164. B.p. 223–4°.

Isoamyl ether: $C_{14}H_{22}O$. MW, 206. B.p. 265–6°.

Benzyl ether: $C_{16}H_{18}O$. MW, 226. Prisms from EtOH. M.p. 45°.

Acetyl: needles from pet. ether. M.p. 34–34·5°. B.p. 245–6°.

Hofmann, *Ber.*, 1884, **17**, 1917.
Bamberger, Blangey, *Ann.*, 1911, **384**, 307.
Auwers, Bundesmann, Wieners, *Ann.*, 1926, **447**, 183.

6-Hydroxy-ψ-cumene (*6-Hydroxy*-1 : 2 : 4-*trimethylbenzene, iso-ψ-cumenol*, 2 : 3 : 5-*trimethylphenol*).

Needles from H_2O or pet. ether. M.p. 95–6°. B.p. 233°/760 mm.

Me ether: 2 : 3 : 5-trimethylanisole. B.p. 214–16°/755 mm.

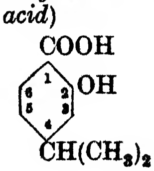
Acetyl: b.p. 241°.

Benzoyl: prisms from pet. ether. M.p. 50°.

Phenylurethane: needles from pet. ether. M.p. 174°.

Auwers, Saurwein, *Ber.*, 1922, **55**, 2388.
Auwers, Bundesmann, Wieners, *Ann.*, 1926, **447**, 192.
Kruber, Schmitt, *Ber.*, 1931, **64**, 2274.

2-Hydroxycuminic Acid (*4-Isopropylsalicylic acid, isohydroxycuminic acid*, o-*hydroxy*-p-*isopropylbenzoic acid*)



$C_{10}H_{12}O_3$ MW, 180

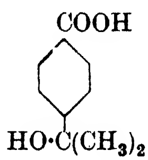
Needles from H_2O. M.p. 96–7°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. Volatile in steam. $FeCl_3$ ⟶ intense reddish-violet col. Dry dist. ⟶ *m*-isopropylphenol.

Heymann, Koenigs, *Ber.*, 1886, **19**, 3314.
Jacobsen, *Ber.*, 1878, **11**, 1061.

3-Hydroxycuminic Acid (m-*Hydroxy*-p-*isopropylbenzoic acid, thymohydroxycuminic acid*).
Prisms from H_2O. M.p. 141–3°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O. KOH ⟶ hydroxyterephthalic + *m*-hydroxybenzoic acids.
Et ester : $C_{12}H_{16}O_3$. MW, 208. Prisms from H_2O. M.p. 73–5°.

Barth, *Ber.*, 1878, **11**, 1571.
Heymann, Koenigs, *Ber.*, 1886, **19**, 3307.

α-Hydroxycuminic Acid (p-α-*Hydroxyisopropylbenzoic acid*)

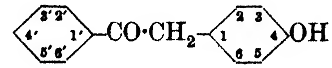


$C_{10}H_{12}O_3$ MW, 180

Prisms from H_2O. M.p. 156–7°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Ox. ⟶ acetophenone + terephthalic acid. Ac_2O ⟶ *p*-isopropenylbenzoic acid.
Amide : $C_{10}H_{13}O_2N$. MW, 179. Needles from H_2O. M.p. 144–5°.
Nitrile : $C_{10}H_{11}ON$. MW, 161. Needles from pet. ether. M.p. 51–2°.

Meyer, *Ann.*, 1883, **219**, 249.
Fileti, Abbona, *Gazz. chim. ital.*, 1891, **21**, 400.

Hydroxycyclobutane.
See Cyclobutanol.
4-Hydroxycyclohexyl-α-alanine.
See Hexahydrotyrosine.
4-Hydroxycyclohexylethylamine.
See Hexahydrotyramine.
Hydroxycyclopentane.
See Cyclopentanol.
Hydroxycymene.
See Dimethyl-tolylcarbinol, Isopropylcresol, Carvacrol, *and* Thymol.
Hydroxydecahydronaphthalene.
See Decahydronaphthol.
3-Hydroxydecane.
See Ethyl-*n*-heptylcarbinol.
4-Hydroxydeoxybenzoin (p-*Phenacylphenol, phenyl 4-hydroxybenzyl ketone, ω-benzoyl*-p-*cresol*)



$C_{14}H_{12}O_2$ MW, 212

Cryst. from H_2O. M.p. 129°. Sol. NaOH.
Acetyl : plates. M.p. 87°.

Ney, *Ber.*, 1888, **21**, 2449.

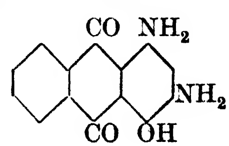
2′-Hydroxydeoxybenzoin (o-*Hydroxyphenyl benzyl ketone, ω-salicyloyltoluene*).
Plates from ligroin. M.p. 60°.
2 : 4-*Dinitrophenylhydrazone* : orange plates from AcOH. M.p. 219°.

Chadha, Mahal, Venkataraman, *J. Chem. Soc.*, 1933, 1461.

4′-Hydroxydeoxybenzoin (p-*Hydroxyphenyl benzyl ketone*).
Needles from EtOH.Aq., yellow cryst. from H_2O. M.p. 151° (142°). Sol. EtOH, Et_2O, AcOH, C_6H_6. Sol. 150 parts boiling H_2O.
Me ether : *p*-methoxyphenyl benzyl ketone, ω-anisoyltoluene. $C_{15}H_{14}O_2$. MW, 226. Needles from MeOH. M.p. 77–8°. B.p. 360°. *Oxime* : m.p. 111°.
Acetyl : cryst. M.p. 82°. Sol. Et_2O. Spar. sol. EtOH.
Oxime : cryst. M.p. 85°. Sol. Et_2O, AcOH. Spar. sol. EtOH.
2 : 4-*Dinitrophenylhydrazone* : orange plates from AcOH. M.p. 224°.

See above reference and also
Weisl, *Monatsh.*, 1905, **26**, 984.
Meisenheimer, Jochelson, *Ann.*, 1907, **355**, 291.
Ney, *Ber.*, 1888, **21**, 2450.

4-Hydroxy-1 : 3-diaminoanthraquinone



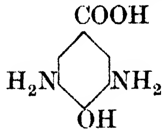
$C_{14}H_{10}O_3N_2$ MW, 254

Dark red cryst. from AcOH. M.p. 266°.

Höchst, D.R.P., 183,332, (*Chem. Zentr.*, 1907, II, 765).

2-Hydroxy-3 : 5-diaminobenzoic Acid.
See 3 : 5-Diaminosalicylic Acid.

4-Hydroxy-3 : 5-diaminobenzoic Acid



$C_7H_8O_3N_2$ MW, 168

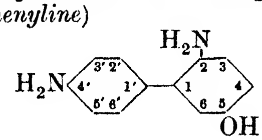
Brown plates. M.p. 205°. Oxidises rapidly in air.

B,HCl: needles. M.p. about 260° decomp. Very sol. H_2O.

Sulphate: prismatic needles. Sol. H_2O.

Reverdin, *Bull. soc. chim.*, 1908, **3**, 593.

5-Hydroxy-2 : 4′-diaminodiphenyl (5-*Hydroxydiphenyline*)



$C_{12}H_{12}ON_2$ MW, 200

Needles from C_6H_6. M.p. 148°. Sol. EtOH, Me_2CO, hot H_2O. Spar. sol. C_6H_6. Insol. Et_2O, ligroin.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Leaflets. M.p. 97°. Sol. EtOH, C_6H_6. 2 : 4′-N-*Diacetyl*: m.p. 191°.

2 : 4′-N-*Diacetyl*: m.p. 269°.

2 : 4′-N-*Dibenzoyl*: m.p. 221°.

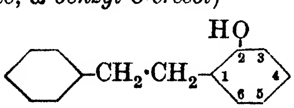
Tribenzoyl deriv.: needles from EtOH. M.p. 177–8°.

Jacobson, Tigges, *Ann.*, 1898, **303**, 344.

Hydroxy-4 : 4′-diaminodiphenyl.
See Hydroxybenzidine.

α-Hydroxy-4 : 4′-diaminotriphenylmethane.
See 4 : 4′-Diaminotriphenylcarbinol.

2-Hydroxydibenzyl (1-*Phenyl*-2-o-*hydroxyphenylethane*, *ω-benzyl*-o-*cresol*)



$C_{14}H_{14}O$ MW, 198

White plates from EtOH.Aq. M.p. 81° (83·5°).

Me ether: $C_{15}H_{16}O$. MW, 204. Oil. B.p. 295°.

Kostanecki, Rost, Szabrański, *Ber.*, 1905, **38**, 943.

4-Hydroxydibenzyl (1-*Phenyl*-2-p-*hydroxyphenylethane*, *ω-benzyl*-p-*cresol*).

Plates from EtOH.Aq. M.p. 100–1°. Very sol. EtOH, C_6H_6. Spar. sol. ligroin, pet. ether.

Me ether: plates from EtOH. M.p. 61°.

Phenylurethane: plates from EtOH or ligroin. M.p. 150°.

Stoermer, Kippe, *Ber.*, 1903, **36**, 4009.
Freund, Remse, *Ber.*, 1890, **23**, 2865.

α-Hydroxydibenzyl.
See Phenylbenzylcarbinol.

Hydroxy-dibenzylacetic Acid.
See Dibenzylglycollic Acid.

1-[3-Hydroxy-2 : 4-dicarboxyphenoxy]-isobutyric Acid.
See Nicouic Acid.

Hydroxydiethoxypropane.
See under Glycerol *and* Hydroxyacetone.

2-Hydroxydiethylamine (N-*Ethylethanolamine*, 2-*ethylaminoethyl alcohol*, *ethyl-hydroxyethyl-amine*)

$$CH_3{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH_2OH$$

$C_4H_{11}ON$ MW, 89

Oil. B.p. 169–70°. D_4^{20} 0·914. n_D^{20} 1·444. Sol. H_2O, EtOH, Et_2O. Spar. volatile in steam. Fumes in air.

B,HCl: needles. Hygroscopic.

B_2,H_2PtCl_6: orange-yellow cryst. from EtOH. M.p. about 146°. Very hygroscopic.

$B,HAuCl_4$: yellow needles from H_2O. M.p. 127°.

Picrate: prisms. M.p. 125–6°.

Schotte, Priewe, Roescheisen, *Z. physiol. Chem.*, 1928, **174**, 144.
Knorr, Schmidt, *Ber.*, 1898, **31**, 1073.

2-Hydroxydiethyl Ether (*Ethyl 2-hydroxyethyl ether*, *ethylene glycol ethyl ether*, 2-*ethoxyethyl alcohol*)

$$CH_3{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_2OH$$

$C_4H_{10}O_2$ MW, 90

B.p. 134·8°/743 mm. D_{15}^{15} 0·93535. n_D^{20} 1·40797. Solvent for lacquers, etc.

Benzoyl: b.p. 260–1°/738·5 mm. D_{25}^{25} 1·0585. n_D^{25} 1·4969.

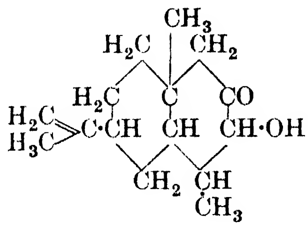
p-*Nitrobenzoyl*: b.p. 163·5–164·5°/4 mm. D_{25}^{25} 1·2086. n_D^{25} 1·5220.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, **46**, 1503.
Conn, Collett, Lazzell, *J. Am. Chem. Soc.*, 1932, **54**, 4370.
I.G., D.R.P., 558,646, (*Chem. Abstracts*, 1933, **27**, 512).
Carbide and Carbon Chemicals Corp., U.S.P., 1,732,356, (*Chem. Abstracts*, 1930, **24**, 127).

Hydroxydifurylacetic Acid.
See Furilic Acid.

Hydroxydigitoxin.
See Gitoxigenin.

2-Hydroxy-1 : 2-dihydroeremophilone



$C_{15}H_{24}O_2$ MW, 236

Constituent of oil of *Eremophila Mitchelli.* Prisms from MeOH. M.p. 102–3°. $[\alpha]_{5461}$ + 94° in MeOH. Readily sol. most org. solvents except MeOH, EtOH. Insol. H_2O. Reduces Fehling's.

Diacetyl deriv.: prisms from MeOH. M.p. 69–70°.

3 : 5-*Dinitrobenzoyl*: needles from MeOH. M.p. 145–6° after sintering at 139–40°.

2 : 4-*Dinitrophenylhydrazone*: golden-yellow needles from EtOH. M.p. 239–41° decomp.

Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2757.

4-Hydroxy-3 : 5-dimethoxybenzaldehyde.
See Syringa-aldehyde.

4-Hydroxy-3 : 5-dimethoxybenzoic Acid.
See Syringic Acid.

3-Hydroxy-4 : 5-dimethoxybenzoic Acid.
See under Gallic Acid.

8-Hydroxy-6 : 7-dimethoxycoumarin.
See under Fraxetin.

Hydroxy-dimethoxy-phenylacetic Acid.
See Iridic Acid *and* Homosyringic Acid.

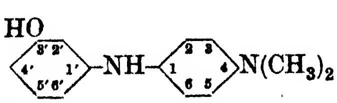
4-Hydroxy-2-[3 : 4-dimethoxyphenylethyl]-quinoline.
See Galipoline.

Hydroxydimethoxypropane.
See under Glycerol.

6-Hydroxy-7 : 8-dimethoxy-1 : 2 : 3 : 4-tetrahydroisoquinoline.
See Anhalamine.

3-Hydroxy-4 : 5-dimethoxytoluene.
See Iridol.

3′-Hydroxy-4-dimethylaminodiphenylamine



$C_{14}H_{16}ON_2$ MW, 228

Leaflets from H_2O. M.p. 99°. Very sol. EtOH, Et_2O, Me_2CO. Sol. $CHCl_3$, C_6H_6. Insol. cold H_2O, ligroin.

B,HCl: needles. M.p. 207°.

B_2,H_2SO_4: prisms. M.p. 193°.

O : N-*Diacetyl*: needles. M.p. 101°. Very sol. EtOH, Et_2O, AcOEt, Me_2CO, C_6H_6. Insol. ligroin.

O : N-*Dibenzoyl*: m.p. 112°. Very sol. EtOH, AcOEt, Me_2CO, C_6H_6, toluene. Insol. Et_2O, ligroin.

Methiodide: needles. M.p. 199·5–200°. Very sol. EtOH, hot H_2O, Py. Insol. Et_2O, C_6H_6.

Ethiodide: m.p. 180°. Very sol. EtOH, hot H_2O, $CHCl_3$. Spar. sol. Et_2O, C_6H_6.

N-*Nitroso*: needles. M.p. 125·5°.

Gnehm, Weber, *Ber.*, 1902, **35**, 3087; *J. prakt. Chem.*, 1904, **69**, 232.

4′-Hydroxy-4-dimethylaminodiphenylamine.

Prisms from C_6H_6. M.p. 161–2°. Very sol. EtOH, Et_2O, AcOH, hot C_6H_6. Spar. sol. H_2O.

O : N-*Diacetyl*: needles from EtOH.Aq. M.p. 131°. Very sol. EtOH, AcOEt, toluene. Spar. sol. Et_2O. Insol. H_2O.

O : N-*Dibenzoyl*: plates from toluene. M.p. 210°. Sol. EtOH, C_6H_6. Insol. Et_2O, H_2O, pet. ether.

Methiodide: needles from H_2O. M.p. 218°.

Ethiodide: needles. M.p. 206°.

Gnehm, Bots, *Ber.*, 1902, **35**, 3086; *J. prakt. Chem.*, 1904, **69**, 164.

1-Hydroxy-2-dimethylaminoisobutyric Acid

$$(CH_3)_2N\cdot CH_2\cdot \overset{CH_3}{C}(OH)\cdot COOH$$

$C_6H_{13}O_3N$ MW, 147

Hygroscopic plates from EtOH–Me_2CO. M.p. 174°. Very sol. H_2O, EtOH. Spar. sol. Me_2CO. Insol. Et_2O. Neutral to litmus. Sweet taste.

Me ester: $C_7H_{15}O_3N$. MW, 161. B.p. 107–8°/35 mm., 84°/20 mm.

Et ester: $C_8H_{17}O_3N$. MW, 175. B.p. 108°/32 mm., 85°/15 mm. Sol. H_2O and org. solvents.

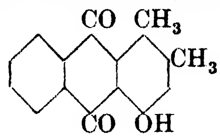
Amide: $C_6H_{14}O_2N_2$. MW, 146. Needles. M.p. 102°. Very sol. H_2O, EtOH, hot Me_2CO. Spar. sol. C_6H_6.

Benzoyl: cryst. from EtOH. M.p. 182°.

Fourneau, *Bull. soc. chim.*, 1909, **5**, 237.

α-Hydroxy-β-dimethylaminopropylbenzene.
See N-Methylephedrine.

4-Hydroxy-1 : 2-dimethylanthraquinone



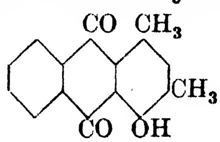
$C_{16}H_{12}O_3$ MW, 252

Golden needles from Me_2CO. M.p. 169°.

Acetyl: yellow needles from EtOH. M.p. 154°.

Fairbourne, Gauntlett, *J. Chem. Soc.*, 1923, **123**, 1139.
Fairbourne, Foster, *J. Chem. Soc.*, 1930, 1276.

4-Hydroxy-1 : 3-dimethylanthraquinone



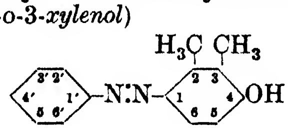
$C_{16}H_{12}O_3$ MW, 252

Prismatic needles from AcOH. M.p. 173–5°.

Me ether: $C_{17}H_{14}O_3$. MW, 266. Cryst. from AcOH. M.p. 176–7°. Sol. AcOH. Spar. sol. EtOH, C_6H_6.

Bentley, Gardner, Weizmann, *J. Chem. Soc.*, 1907, **71**, 1635.

4-Hydroxy-2 : 3-dimethylazobenzene (6-*Benzeneazo*-o-3-*xylenol*)



$C_{14}H_{14}ON_2$ MW, 226

Prisms from ligroin. M.p. 129–30°. Sol. most org. solvents.

Benzoyl: red needles from EtOH. M.p. 151–2°.

Auwers, Michaelis, *Ber.*, 1914, **47**, 1293.

5-Hydroxy-2 : 4-dimethylazobenzene (6-*Benzeneazo*-m-4-*xylenol*).

Orange-yellow needles from ligroin–pet. ether. M.p. 114°. Sol. MeOH, EtOH, Me_2CO, AcOH, C_6H_6, hot ligroin.

Benzoyl: orange needles from EtOH. M.p. 115°. Sol. AcOH. Spar. sol. EtOH.

Bamberger, Reber, *Ber.*, 1907, **40**, 2264.

4-Hydroxy-2 : 5-dimethylazobenzene (5-*Benzeneazo*-p-2-*xylenol*).

Orange-yellow prisms from ligroin. M.p. 92°. Sol. EtOH, AcOH, C_6H_6. Spar. sol. ligroin, pet. ether.

Benzoyl: orange-yellow needles from ligroin. M.p. 136–7°.

Auwers, Michaelis, *Ber.*, 1914, **47**, 1289.

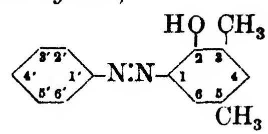
4-Hydroxy-2 : 6-dimethylazobenzene (2-*Benzeneazo*-m-5-*xylenol*).

Orange-yellow needles from ligroin. M.p. 104–5°. Sol. most org. solvents. Spar. sol. ligroin.

Benzoyl: red needles from MeOH. M.p. 94–5°. Spar. sol. cold MeOH.

Auwers, Michaelis, *Ber.*, 1914, **47**, 1291.

2-Hydroxy-3 : 5-dimethylazobenzene (5-*Benzeneazo*-m-4-*xylenol*)



$C_{14}H_{14}ON_2$ MW, 226

Red needles from EtOH. M.p. 90° (175°). Sol. EtOH, Et_2O, AcOH, C_6H_6, ligroin.

Acetyl: yellow needles from ligroin. M.p. 68°.

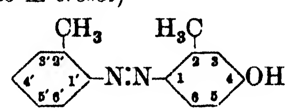
Auwers, *Ann.*, 1909, **365**, 291, 295.

4-Hydroxy-3 : 5-dimethylazobenzene (5-*Benzeneazo*-m-2-*xylenol*).

Yellow needles from ligroin. M.p. 95–6°. Sol. most org. solvents.

Auwers, Markovits, *Ber.*, 1908, **41**, 2340.

4-Hydroxy-2 : 2′-dimethylazobenzene (6-o-*Tolueneazo*-m-*cresol*)



$C_{14}H_{14}ON_2$ MW, 226

Red cryst. + H_2O from H_2O. M.p. 83°: anhyd. cryst. from C_6H_6, m.p. 112°. Sol. EtOH, Et_2O, C_6H_6.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Deep red needles from EtOH. M.p. 64°. Sol. EtOH, Et_2O, C_6H_6, ligroin.

B,HCl: m.p. 157°.

Farmer, Hantzsch, *Ber.*, 1899, **32**, 3099.
Jacobson *et al.*, *Ann.*, 1895, **287**, 187.

4-Hydroxy-3 : 2′-dimethylazobenzene (5-o-*Tolueneazo*-o-*cresol*).

Red prisms from EtOH. M.p. 132°. Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Red cryst. from ligroin. M.p. 35–7°. Sol. EtOH. Spar. sol. Et_2O.

Noelting, Werner, *Ber.*, 1890, **23**, 3259.

4-Hydroxy-2 : 3′-dimethylazobenzene (6-m-*Tolueneazo*-m-*cresol*).

Orange plates from C_6H_6. M.p. 106–7°. Sol. Et_2O, C_6H_6, ligroin. Spar. sol. EtOH.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Red prisms from EtOH. M.p. 73°. Sol. most org. solvents.

Jacobson *et al.*, *Ann.*, 1895, **287**, 187.

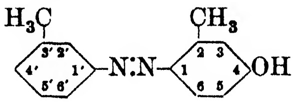
4-Hydroxy-2 : 4′-dimethylazobenzene (6-p-*Tolueneazo*-m-*cresol*),

Prisms from C_6H_6. M.p. 135°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Orange-red plates from EtOH. M.p. 64°. Sol. EtOH, Et_2O, C_6H_6, ligroin.

Jacobson *et al.*, *Ann.*, 1895, **287**, 189.

4-Hydroxy-3 : 3′-dimethylazobenzene (5-m-*Tolueneazo*-o-*cresol*)



$C_{14}H_{14}ON_2$ MW, 226

Golden needles from C_6H_6. M.p. 115°. Sol. EtOH, Et_2O, C_6H_6.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Reddish-yellow plates from EtOH. M.p. 46–7°. Sol. EtOH, Et_2O, C_6H_6.

Jacobson *et al.*, *Ann.*, 1895, **287**, 185.

4-Hydroxy-3 : 4′-dimethylazobenzene (5-p-*Tolueneazo*-o-*cresol*).

Orange cryst. M.p. 163°. Sol. most org. solvents.

Et ether: $C_{16}H_{18}ON_2$. MW, 254. Orange-yellow needles. M.p. 73–4°. B.p. 251°/42 mm.

Noelting, Werner, *Ber.*, 1890, **23**, 3261.

6-Hydroxy-3 : 4′-dimethylazobenzene (3-p-*Tolueneazo*-p-*cresol*).

Red cryst. from toluene. M.p. 112–13°. Sol. hot EtOH, Et_2O, $CHCl_3$. Spar. sol. cold EtOH.

Et ether: red needles from EtOH. M.p. 43°. B.p. 253–5°/63 mm.

Acetyl: yellow needles from AcOH. M.p. 91°.

Propionyl: dark red leaflets from ligroin. M.p. 62°. Sol. EtOH, C_6H_6. Spar. sol. EtOH, AcOH, ligroin.

Benzoyl: yellow needles from EtOH. M.p. 95°.

Noelting, Kohn, *Ber.*, 1884, **17**, 354.
Jacobson, Piepenbrink, *Ber.*, 1894, **27**, 2706.

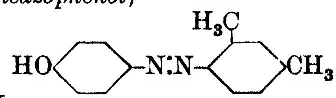
2-Hydroxy-4 : 4′-dimethylazobenzene (4-p-*Tolueneazo*-m-*cresol*).

Orange-red cryst. from ligroin. M.p. 148°. Sol. hot ligroin. Spar. sol. alkalis.

Benzoyl: orange needles from ligroin. M.p. 93°. Sol. cold EtOH, hot C_6H_6.

McPherson, Boord, *J. Am. Chem. Soc.*, 1911, **33**, 1531.

4′-Hydroxy-2 : 4-dimethylazobenzene (p-4-m-*Xyleneazophenol*)



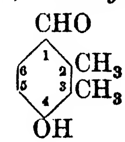
$C_{14}H_{14}ON_2$ MW, 226

Brown prisms from C_6H_6. M.p. 134°. Sol. EtOH, Et_2O.

Et ether: *p*-4-*m*-xyleneazophenetole. $C_{16}H_{18}ON_2$. MW, 254. Red needles from EtOH. M.p. 97°. Spar. sol. EtOH.

Jacobson, *Ann.*, 1895, **287**, 211.

4-Hydroxy-2 : 3-dimethylbenzaldehyde (2 : 3-*Dimethyl*-p-*hydroxybenzaldehyde*, 3-*hydroxy*-6-*aldehydo*-o-*xylene*, 6-*aldehydo*-o-3-*xylenol*)



$C_9H_{10}O_2$ MW, 150

Plates from toluene. M.p. 172°.

Azine: yellow needles from EtOH. M.p. 254°.

Phenylhydrazone: plates from EtOH.Aq. M.p. 165°.

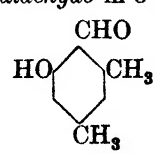
Gattermann, *Ann.*, 1907, **357**, 326.

6-Hydroxy-2 : 3-dimethylbenzaldehyde (5 : 6-*Dimethyl*-o-*hydroxybenzaldehyde*, 5 : 6-*dimethylsalicylaldehyde*, 4-*hydroxy*-3-*aldehydo*-o-*xylene*, 3-*aldehydo*-o-4-*xylenol*).

Needles from pet. ether. M.p. 72°.

Clayton, *J. Chem. Soc.*, 1910, **97**, 1404.

6-Hydroxy-2 : 4-dimethylbenzaldehyde (4 : 6-*Dimethylsalicylaldehyde*, 5-*hydroxy*-6-*aldehydo*-m-*xylene*, 4-*aldehydo*-m-5-*xylenol*)



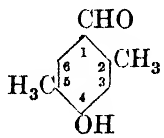
$C_9H_{10}O_2$ MW, 150

Needles from MeOH.Aq. M.p. 48–9°. Very sol. most org. solvents. Sol. alkalis with yellow col. Volatile in steam.

Me ether: $C_{10}H_{12}O_2$. MW, 164. Needles from MeOH. M.p. 48–9°.
Oxime: needles from EtOH.Aq. M.p. 130°.
Semicarbazone: cryst. powder from AcOH. M.p. 240°.
Phenylhydrazone: needles from pet. ether. M.p. 126·5–127°.
Anil: yellow needles from MeOH. M.p. 88·5–89°.

Auwers, Saurwein, *Ber.*, 1922, **55**, 2379.
Lindemann, Pickert, *Ann.*, 1927, **456**, 280.

4-Hydroxy-2 : 5-dimethylbenzaldehyde
(2 : 5-*Dimethyl*-p-*hydroxybenzaldehyde*, 2-*hydroxy*-5-*aldehydo*-p-*xylene*, 5-*aldehydo*-p-2-*xylenol*)



$C_9H_{10}O_2$ MW, 150

Needles from H_2O. M.p. 132–3° (129–30°).
Oxime: needles from H_2O. M.p. 155°.
Phenylhydrazone: plates from AcOH.Aq. M.p. 164°.
Azine: yellow needles from EtOH. M.p. 280° decomp.

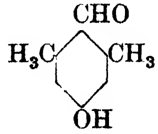
Gattermann, *Ann.*, 1907, **357**, 323.
Auwers, Winternitz, *Ber.*, 1902, **35**, 470.

6-Hydroxy-2 : 5-dimethylbenzaldehyde
(3 : 6-*Dimethylsalicylaldehyde*, 2-*hydroxy*-3-*aldehydo*-p-*xylene*, 3-*aldehydo*-p-2-*xylenol*).

Yellow needles. M.p. 62–3°.

Anselmino, *Ber.*, 1902, **35**, 4108.

4-Hydroxy-2 : 6-dimethylbenzaldehyde
(2 : 6-*Dimethyl*-p-*hydroxybenzaldehyde*, 5-*hydroxy*-2-*aldehydo*-m-*xylene*, 2-*aldehydo*-m-5-*xylenol*)



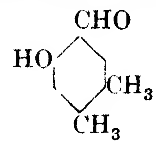
$C_9H_{10}O_2$ MW, 150

Needles from EtOH. M.p. 189–90°.
Me ether: 2 : 6-dimethylanisaldehyde. $C_{10}H_{12}O_2$. MW, 164. Needles. M.p. 45–7°. B.p. 271–2°. *Oxime*: plates. M.p. 121·5°.
Et ether: $C_{11}H_{14}O_2$. MW, 178. Oil. B.p. 279–80°. *Oxime*: needles from H_2O. M.p. 100°.
Oxime: plates from EtOH.Aq. M.p. 196°.

Azine: yellow needles from EtOH. M.p. 240°.

Gattermann, *Ann.*, 1907, **357**, 328.
Auwers, Borsche, *Ber.*, 1915, **48**, 1714.

6-Hydroxy-3 : 4-dimethylbenzaldehyde
(4 : 5-*Dimethylsalicylaldehyde*, 5-*hydroxy*-4-*aldehydo*-o-*xylene*, 5-*aldehydo*-o-4-*xylenol*)

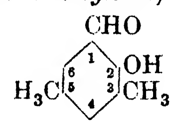


$C_9H_{10}O_2$ MW, 150

Cryst. from EtOH. M.p. 71°. Sol. alkalis and most org. solvents.
Azine: yellow cryst. powder. M.p. 317° decomp.
Phenylhydrazone: needles from EtOH.Aq. M.p. 195°.

Auwers, *Ber.*, 1899, **32**, 3598.
Clayton, *J. Chem. Soc.*, 1910, **97**, 1404.
See also first reference above.

2-Hydroxy-3 : 5-dimethylbenzaldehyde
(3 : 5-*Dimethyl*-o-*hydroxybenzaldehyde*, 3 : 5-*dimethylsalicylaldehyde*, 4-*hydroxy*-5-*aldehydo*-m-*xylene*, 5-*aldehydo*-m-4-*xylenol*)



$C_9H_{10}O_2$ MW, 150

M.p. about 15°. B.p. 222°.
Oxime: needles. M.p. 138·5–139·5°.

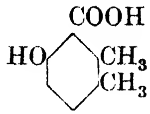
Bamberger, Weiler, *J. prakt. Chem.*, 1898, **58**, 351.

4-Hydroxy-3 : 5-dimethylbenzaldehyde
(3 : 5-*Dimethyl*-p-*hydroxybenzaldehyde*, 2-*hydroxy*-5-*aldehydo*-m-*xylene*, 5-*aldehydo*-m-2-*xylenol*, p-*hydroxymesitylenic aldehyde*).

Leaflets. M.p. 115–16° (113·5–114°). Sol. hot H_2O, AcOH.
Benzoyl: m.p. 105°. *Phenylhydrazone*: m.p. 184°.
Me ether: 3 : 5-dimethylanisaldehyde. $C_{10}H_{12}O_2$. MW, 164. B.p. 257°.
Et ether: $C_{11}H_{14}O_2$. MW, 178. B.p. 265·5°.
Oxime: needles. M.p. 169·5°. *Hydrochloride*: m.p. 157°.
Phenylhydrazone: cryst. from MeOH.Aq. M.p. 143°.
Azine: yellow needles. M.p. 262°.

Gattermann, *Ann.*, 1907, **357**, 363.
Thiele, Eichwede, *Ann.*, 1900, **311**, 367.

6-Hydroxy-2 : 3-dimethylbenzoic Acid (5 : 6-*Dimethylsalicylic acid*, o-4-*xylenol-3-carboxylic acid*)

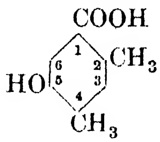


$C_9H_{10}O_3$ MW, 166

Needles from EtOH.Aq. M.p. 142–3°.

Clayton, *J. Chem. Soc.*, 1910, **97**, 1405.

5-Hydroxy-2 : 4-dimethylbenzoic Acid (m-4-*Xylenol-6-carboxylic acid*)



$C_9H_{10}O_3$ MW, 166

Needles from toluene. M.p. 170–1°. Sol. EtOH, AcOH, Me_2CO, hot toluene, hot C_6H_6. Insol. $CHCl_3$, pet. ether.

Acetyl: needles from Me_2CO–pet. ether. M.p. 134°.

Meldrum, Kapadia, *J. Indian Chem. Soc.*, 1932, **9**, 490.

6-Hydroxy-2 : 4-dimethylbenzoic Acid (4 : 6-*Dimethylsalicylic acid*, m-5-*xylenol-4-carboxylic acid*).

M.p. 166°.

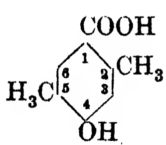
Nitrile: 5 - hydroxy - 4 - cyano - *m* - xylene. C_9H_9ON. MW, 147. Needles from H_2O. M.p. 177–8°. Very sol. MeOH, EtOH, AcOH. Spar. sol. C_6H_6. *Acetyl*: white cryst. M.p. 49–50°.

Me ether: $C_{10}H_{12}O_3$. MW, 180. Plates. M.p. 167·5–168°. Very sol. hot H_2O, EtOH. Spar. sol. C_6H_6. Insol. ligroin. *Me ester*: $C_{11}H_{14}O_3$. MW, 194. B.p. 261–3°.

Bayer, D.R.P., 254,122, (*Chem. Zentr.*, 1913, I, 133).

Auwers, Saurwein, *Ber.*, 1922, **55**, 2380.

4-Hydroxy-2 : 5-dimethylbenzoic Acid (4-*Hydroxyisoxylic acid*, p-2-*xylenol-5-carboxylic acid*)



$C_9H_{10}O_3$ MW, 166

Cryst. from H_2O. M.p. 182–4°.

Nitrile: 2 - hydroxy - 5 - cyano - *p* - xylene. C_9H_9ON. MW, 147. Cryst. from $CHCl_3$. M.p. 163–5°.

Me ether: 2 : 5-dimethylanisic acid. $C_{10}H_{12}O_3$. MW, 180. Plates from 50% AcOH. M.p. 163–5°.

Houben, Fischer, *Ber.*, 1930, **63**, 2461, 2469.

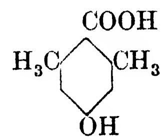
Clemo, Haworth, Walton, *J. Chem. Soc.*, 1929, 2377.

6-Hydroxy-2 : 5-dimethylbenzoic Acid (6-*Hydroxyisoxylic acid*, p-2-*xylenol-3-carboxylic acid*).

Silky needles from H_2O. M.p. 195°. Volatile in steam. Very sol. EtOH, Et_2O. $FeCl_3 \longrightarrow$ bluish-violet col.

Stollé, Knebel, *Ber.*, 1921, **54**, 1220.

4-Hydroxy-2 : 6-dimethylbenzoic Acid (4-*Hydroxy*-m-*xylic acid*, m-5-*xylenol-2-carboxylic acid*)



$C_9H_{10}O_3$ MW, 166

Plates from H_2O. M.p. 185° decomp. Very sol. EtOH. Spar. sol. C_6H_6, $CHCl_3$. $FeCl_3 \longrightarrow$ brown col.

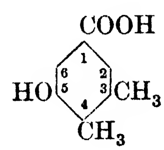
Et ester: $C_{11}H_{14}O_3$. MW, 194. Plates from EtOH. M.p. 98°.

Me ether nitrile: 2 : 6-dimethylanisonitrile. $C_{10}H_{11}ON$. MW, 161. M.p. 85–7°.

Rabe, Spence, *Ann.*, 1905, **342**, 351.

Houben, Fischer, *Ber.*, 1930, **63**, 2470.

5-Hydroxy-3 : 4-dimethylbenzoic Acid (5-*Hydroxy*-o-*xylic acid*, o-3-*xylenol-5-carboxylic acid*)



$C_9H_{10}O_3$ MW, 166

Plates from AcOH. M.p. 203–4°. Sublimes partially undecomp. Readily sol. EtOH, Et_2O. Mod. sol. AcOH, H_2O. Spar. sol. $CHCl_3$, pet. ether, CS_2, C_6H_6.

Me ester: $C_{10}H_{12}O_3$. MW, 180. Cryst. from C_6H_6. M.p. 148–9°.

Et ester: $C_{11}H_{14}O_3$. MW, 194. Needles from pet. ether. M.p. 134–5°.

Acetyl: needles from C_6H_6. M.p. 141–2°.

Me ether: cryst. from 50% EtOH. M.p. 170–1°.

Et ether : prismatic needles from MeOH. M.p. 173–4°. *Et ester* : prisms from MeOH.Aq. M.p. 50–1°.

Perkin, *J. Chem. Soc.*, 1899, **75**, 187.

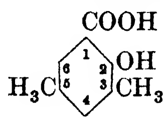
6-Hydroxy-3 : 4-dimethylbenzoic Acid (4 : 5-*Dimethylsalicylic acid*, 6-*hydroxy*-o-*xylic acid*, o-4-*xylenol*-5-*carboxylic acid*).

Prisms from EtOH.Aq. M.p. 199°. Very sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. Slightly volatile in steam. $FeCl_3$ ⟶ intense bluish-violet col.

Me ether : needles from MeOH. M.p. 142·5–143·5°. Very sol. EtOH, C_6H_6. Sol. Et_2O, pet. ether. Spar. sol. ligroin.

Auwers, Risse, *Ber.*, 1931, **64**, 2221.
Clayton, *J. Chem. Soc.*, 1910, **97**, 1404.

2-Hydroxy-3 : 5-dimethylbenzoic Acid (3 : 5-*Dimethylsalicylic acid*, 2-*hydroxy*-sym.-m-*xylic acid*, m-4-*xylenol*-5-*carboxylic acid*)



$C_9H_{10}O_3$ MW, 166

Needles from EtOH.Aq. M.p. 179°. Very sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. Slightly volatile in steam. Sublimes in needles. $FeCl_3$ ⟶ blue col.

Jacobsen, *Ann.*, 1879, **195**, 274: *Ber.*, 1881, **14**, 44.

4-Hydroxy-3 : 5-dimethylbenzoic Acid (4-*Hydroxymesitylenic acid*, 4-*hydroxy*-sym.-m-*xylic acid*, m-2-*xylenol*-5-*carboxylic acid*).

Needles from H_2O. M.p. 218° (223°). Sublimes. Very sol. EtOH, Et_2O. Insol. H_2O, $CHCl_3$.

Me ester : $C_{10}H_{12}O_3$. MW, 180. Needles from H_2O. M.p. 130°.

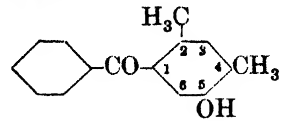
Et ester : $C_{11}H_{14}O_3$. MW, 194. Prisms from EtOH. M.p. 113°.

Nitrile : 2-hydroxy-5-cyano-*m*-xylene. C_9H_9ON. MW, 147. Needles from ligroin. M.p. 126°. *Acetyl* : needles from ligroin. M.p. 98°.

Thiele, Eichwede, *Ann.*, 1900, **311**, 372.
Jacobsen, *Ber.*, 1879, **12**, 606.

α-Hydroxydimethylbenzoic Acid.
See Hydroxymethyl-toluic Acid.

5-Hydroxy-2 : 4-dimethylbenzophenone (*Phenyl 5-hydroxy-2 : 4-dimethylphenyl ketone*, 6-*benzoyl*-m-4-*xylenol*)



$C_{15}H_{14}O_2$ MW, 226

Colourless needles from C_6H_6–ligroin. M.p. 140–1°. Very sol. Et_2O, EtOH, C_6H_6. Spar. sol. ligroin.

Oxime : needles from C_6H_6. M.p. 182–3°. Very sol. Et_2O, EtOH. Spar. sol. C_6H_6, ligroin.

Me ether : $C_{16}H_{16}O_2$. MW, 240. Oil. B.p. 199–200°/12–13 mm. *Oximes* : (α) M.p. 138–9°, b.p. 218°/10 mm. (β) M.p. 119–20°.

Et ether : $C_{17}H_{18}O_2$. MW, 254. Oil. B.p. 190–1°/10 mm. *Oximes* : (α) M.p. 148–9°. (β) M.p. 133–4°.

Meisenheimer, Hanssen, Wächterowitz, *J. prakt. Chem.*, 1928, **119**, 325.

4-Hydroxy-2 : 5-dimethylbenzophenone (*Phenyl 4-hydroxy-2 : 5-dimethylphenyl ketone*, 5-*benzoyl*-p-2-*xylenol*).

Needles from C_6H_6–ligroin. M.p. 166–7°. Very sol. Et_2O, EtOH, C_6H_6. Spar. sol. ligroin.

Acetyl : m.p. 62–62·5°.

Me ether : $C_{16}H_{16}O_2$. MW, 240. Needles from pet. ether. M.p. 60–1°. B.p. 202–4°/12–13 mm.

Meisenheimer, Hanssen, Wächterowitz, *J. prakt. Chem.*, 1928, **119**, 342.

2-Hydroxy-3 : 5-dimethylbenzophenone (*Phenyl 2-hydroxy-3 : 5-dimethylphenyl ketone*, 5-*benzoyl*-m-4-*xylenol*).

Oil. B.p. 202°/20 mm.

Oxime : m.p. 153–4°.

Meisenheimer, Hanssen, Wächterowitz, *J. prakt. Chem.*, 1928, **119**, 338.

4-Hydroxy-3 : 5-dimethylbenzophenone (*Phenyl 4-hydroxy-3 : 5-dimethylphenyl ketone*, 5-*benzoyl*-m-2-*xylenol*).

Plates from AcOH.Aq. M.p. 141–2°. Very sol. EtOH, AcOH. Spar. sol. C_6H_6, ligroin.

Me ether : $C_{16}H_{16}O_2$. MW, 240. Cryst. M.p. 44°.

Auwers, Markovits, *Ber.*, 1908, **41**, 2339.
Auwers, Janssen, *Ann.*, 1930, **483**, 44.

3-Hydroxy-2 : 2-dimethylbutane.
See Methyl-*tert*.-butylcarbinol.

2-Hydroxy-1 : 1-dimethylbutyric Acid (1 : 1 : 2-*Trimethylhydracrylic acid*)

$$CH_3$$
$$CH_3{\cdot}CH(OH){\cdot}C{\cdot}COOH$$
$$CH_3$$

$C_6H_{12}O_3$ MW, 132

Hygroscopic cryst. M.p. 34° (31°). B.p. 150°/22 mm., 148°/15 mm. $k = 2{\cdot}2 \times 10^{-5}$. Very sol. H_2O, EtOH, Et_2O. Sol. hot ligroin.

Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 194–5°, 93–4°/18 mm., 91°/13 mm. D^0 0·9974. Very sol. EtOH, Et_2O, C_6H_6. Insol. H_2O. *Acetyl*: b.p. 110°/24 mm.

Anhydride: $C_{12}H_{22}O_5$. MW, 246. B.p. 200–3°/15 mm.

Lactone: $C_6H_{10}O_2$. MW, 114. B.p. 63–5°/14 mm.

Acetyl: cryst. from pet. ether. M.p. 58°. B.p. 147°/12 mm.

Salkowski, *J. prakt. Chem.*, 1923, **106**, 263.
Courtot, *Bull. soc. chim.*, 1906, **35**, 114.
Bouveault, *Bull. soc. chim.*, 1899, **21**, 1063.

2′-Hydroxy-1 : 1-dimethylbutyric Acid. *See* 1-Methyl-1-ethylhydracrylic Acid.

1-Hydroxy-1 : 2-dimethylbutyric Acid (1 : 2 : 2-*Trimethyl-lactic acid*, 1-*hydroxy*-1-*methyl-isovaleric acid*)

$$H_3C \quad CH_3$$
$$CH_3{\cdot}CH{\cdot}C(OH){\cdot}COOH$$

$C_6H_{12}O_3$ MW, 132

Cryst. M.p. 75–7° (63°). Very sol. H_2O, EtOH, Et_2O. $k = 1{\cdot}35 \times 10^{-4}$ at 25°.

Nitrile: methyl isopropyl ketone cyanhydrin. $C_6H_{11}ON$. MW, 113. B.p. 182°/764 mm., 97°/19 mm. D^{18} 0·9249. n_D^{13} 1·42885. Sol. EtOH, Et_2O. Insol. H_2O. *Acetyl*: b.p. 212°/764 mm. D^{18} 0·9750. Insol. H_2O.

Perkin, *J. Chem. Soc.*, 1896, **69**, 1486.
Pomeranz, *Monatsh.*, 1897, **18**, 577.
Henry, *Chem. Zentr.*, 1899, I, 195.

2-Hydroxy-1 : 2-dimethylbutyric Acid (2-*Hydroxy*-1-*methylisovaleric acid*, 1 : 2 : 2-*trimethylhydracrylic acid*)

$$CH_3 \quad CH_3$$
$$CH_3{\cdot}C(OH){\cdot}CH{\cdot}COOH$$

$C_6H_{12}O_3$ MW, 132

Oil. Decomp. on boiling to trimethylacrylic acid. $k = 3{\cdot}33 \times 10^{-5}$.

Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 189–189·5°/746 mm., 105°/30 mm.

Perkin, Thorpe, *J. Chem. Soc.*, 1896, **69**, 1482.
Ewan, *J. Chem. Soc.*, 1896, **69**, 1483.

1-Hydroxy-2 : 2-dimethylbutyric Acid (2 : 2 : 2-*Trimethyl-lactic acid*, 1-*hydroxy*-2 : 2 : 2-*trimethylpropionic acid*)

$$CH_3$$
$$CH_3{\cdot}C{\cdot}CH(OH){\cdot}COOH$$
$$CH_3$$

$C_6H_{12}O_3$ MW, 132

Cryst. from H_2O. M.p. 87–8°. Very sol. H_2O, Et_2O.

Glücksmann, *Monatsh.*, 1889, **10**, 779; 1891, **12**, 356.

3-Hydroxy-2 : 2-dimethylbutyric Acid (2-*Hydroxymethyl-isovaleric acid*)

$$CH_3$$
$$HO{\cdot}CH_2{\cdot}C{\cdot}CH_2{\cdot}COOH$$
$$CH_3$$

$C_6H_{12}O_3$ MW, 132

Lactone: $C_6H_{10}O_2$. MW, 114. Cryst. mass. M.p. 55–7°. B.p. 207–8°. Volatile in steam.

Windaus, Klanhardt, *Ber.*, 1921, **54**, 587.

Hydroxy-dimethylcyclohexane. *See* Dimethylcyclohexanol.

2-Hydroxy-1 : 1-dimethylglutaric Acid

$$(CH_3)_2C{\cdot}COOH$$
$$CH{\cdot}OH$$
$$CH_2{\cdot}COOH$$

$C_7H_{12}O_5$ MW, 176

Prisms from H_2O. M.p. 158–60°. Very sol. H_2O, EtOH. Spar. sol. Et_2O, ligroin, C_6H_6.

Perkin, Smith, *J. Chem. Soc.*, 1903, **83**, 12.

2-Hydroxy-1 : 3-dimethylglutaric Acid

$$CH_3{\cdot}CH{\cdot}COOH$$
$$CH{\cdot}OH$$
$$CH_3{\cdot}CH{\cdot}COOH$$

$C_7H_{12}O_5$ MW, 176

Exists in two forms, solid and liquid.

Solid form:

Needles from Me_2CO. M.p. 136–7°. Very sol. H_2O, Et_2O, EtOH, Me_2CO, AcOH, formic acid. Spar. sol. CS_2, $CHCl_3$, pet. ether, C_6H_6. $k = 1{\cdot}08 \times 10^{-4}$ at 25°.

Acetyl: m.p. 120–1°. Sol. Et_2O, $CHCl_3$. Insol. ligroin. $k = 2 \times 10^{-4}$ at 25°.

Et ester: $C_9H_{16}O_5$. MW, 204. Oil. B.p. 270–1°.

Anhydride : $C_7H_{10}O_4$. MW, 158. M.p. 109–10°.

Liquid form :
Acetyl : cryst. M.p. 82·5–83·5°.

Reformatski, *Chem. Zentr.*, 1898, II, 886.

Hydroxydimethylheptane.
See Dimethylheptanol, Dimethyl-*n*-heptyl Alcohol, Di-isobutylcarbinol, *and* Di-*sec.*-butylcarbinol.

Hydroxydimethylhexane.
See Dimethylhexanol *and* Dimethyl-*n*-hexyl Alcohol.

2-Hydroxy-1 : 1-dimethylisoamylacetic Acid (*2-Hydroxy-*1 : 1 : 4-*trimethylcaproic acid, 2-hydroxy-*1 : 1-*dimethylisoheptylic acid*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH(OH){\cdot}\overset{CH_3}{\underset{CH_3}{C}}{\cdot}COOH$$

$C_9H_{18}O_3$ MW, 174

Leaflets from H_2O. M.p. 81°. Sol. EtOH, Et_2O. $k = 1{\cdot}47 \times 10^{-5}$ at 25°. Dist. with dil. $H_2SO_4 \longrightarrow$ lactone.

Et ester : $C_{11}H_{22}O_3$. MW, 202. Oil. B.p. 173–5°/140–5 mm.

Lactone : $C_9H_{16}O_2$. MW, 156. B.p. 221–2°/742 mm.

Coucoulesco, *Chem. Zentr.*, 1924, I, 1354.

2-Hydroxy-1 : 1-dimethylisocaproic Acid (*2-Hydroxy-*1 : 1 : 3-*trimethyl-*n-*valeric acid,* 1 : 1-*dimethyl-2-isopropylhydracrylic acid*)

$$(CH_3)_2CH{\cdot}CH(OH){\cdot}\overset{CH_3}{\underset{CH_3}{C}}{\cdot}COOH$$

$C_8H_{16}O_3$ MW, 160

Cryst. M.p. 92°. Very sol. EtOH. Sol. Et_2O. Sol. to 2·03% in H_2O at 19°. $k = 2{\cdot}2 \times 10^{-5}$ at 25°.

Et ester : $C_{10}H_{20}O_3$. MW, 188. Oil. B.p. 221–2°/738·5 mm., 160°/140 mm.

Reformatski, *Ber.*, 1895, **28**, 2842.
Franke, *Monatsh.*, 1896, **17**, 675.
Franke, Kohn, *Monatsh.*, 1898, **19**, 357.

2-Hydroxy-1 : 2-dimethylisocaproic Acid (*2-Hydroxy-*1 : 2 : 3-*trimethyl-*n-*valeric acid,* 1 : 2-*dimethyl-2-isopropylhydracrylic acid*)

$$(CH_3)_2CH{\cdot}\overset{CH_3}{C}(OH){\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_8H_{16}O_3$ MW, 160

Syrup. B.p. 136–40°/9·5 mm. Spar. sol. H_2O.

Et ester : $C_{10}H_{20}O_3$. MW, 188. B.p. 90–93·5°/11·5 mm. $D_4^{17·5}$ 0·977.

Lactone : $C_8H_{14}O_2$. MW, 142. Needles. M.p. 47·5°. B.p. 90·5–93°/10 mm.

Willstätter, Hatt, *Ann.*, 1919, **418**, 148.

1-Hydroxy-1 : 3-dimethylisocaproic Acid (*1-Hydroxy-*1 : 3 : 3-*trimethyl-*n-*valeric acid,* 1-*methyl-*2-tert.-*butyl-lactic acid*)

$$CH_3{\cdot}\overset{CH_3}{\underset{CH_3}{C}}{\cdot}CH_2{\cdot}\overset{CH_3}{C}(OH){\cdot}COOH$$

$C_8H_{16}O_3$ MW, 160

Needles or prisms. M.p. 117°. Distils above 300° with part. decomp. Very sol. EtOH, Et_2O. Sol. H_2O.

Butlerow, *Ber.*, 1882, **15**, 1575.

2-Hydroxy-1 : 1-dimethylisovaleric Acid (*2-Hydroxy-*1 : 1 : 2-*trimethylbutyric acid, tetramethylhydracrylic acid*)

$$(CH_3)_2C(OH){\cdot}\overset{CH_3}{\underset{CH_3}{C}}{\cdot}COOH$$

$C_7H_{14}O_3$ MW, 146

Cryst. from ligroin. M.p. 153° decomp. B.p. 192–3°. Very sol. H_2O, EtOH, Et_2O. $k = 4{\cdot}35 \times 10^{-5}$ at 25°.

Et ester : $C_9H_{18}O_3$. MW, 174. B.p. 196–7°, 91°/17 mm. Very sol. EtOH, Et_2O. *Acetyl* : b.p. 119°/23 mm.

Reformatski, Plesconossow, *Ber.*, 1895, **28**, 2839.

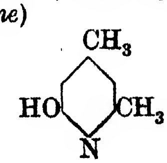
4-Hydroxy-2 : 6-dimethyloctane.
See Isobutyl-*active*amylcarbinol.

3-Hydroxy-2 : 2-dimethylpentane.
See Ethyl-*tert.*-butylcarbinol.

2-Hydroxy-1 : 1-dimethylpropionaldehyde.
See Hydroxypivalic Aldehyde.

2-Hydroxy-1 : 1-dimethylpropionic Acid.
See Hydroxypivalic Acid.

6-Hydroxy-2 : 4-dimethylpyridine (4 : 6-*Dimethyl-α-pyridone, ψ-lutidostyril, 6-hydroxy-αγ-lutidine, α-lutidone*)

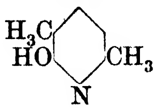


C_7H_9ON MW, 123

Cryst. from H_2O. M.p. 180°. Sublimes in needles. Very sol. EtOH, $CHCl_3$. Sol. hot H_2O. Spar. sol. cold H_2O, Et_2O, ligroin, C_6H_6.

Knoevenagel, Cremer, *Ber.*, 1902, **35**, 2395.

6-Hydroxy-2 : 5-dimethylpyridine (3 : 6-*Dimethyl-α-pyridone*, 6-*hydroxy-αβ′-lutidine*)

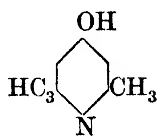


C_7H_9ON MW, 123

Cryst. + $\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 138°. Very sol. EtOH, H_2O. $FeCl_3$ ⟶ reddish-violet col.

Errera, *Ber.*, 1901, **34**, 3696.

4-Hydroxy-2 : 6-dimethylpyridine (2 : 6-*Dimethyl-γ-pyridone*, *γ-lutidone*, 4-*hydroxy-αα′-lutidine*)



C_7H_9ON MW, 123

Cryst. from H_2O M.p. 227·5–229° (225°). B.p. 349–51°. Very sol. H_2O, EtOH. Spar. sol. Et_2O, $CHCl_3$, C_6H_6. $FeCl_3$ ⟶ brownish-red col.

Me ether: $C_8H_{11}ON$. MW, 137. B.p. 203°. D^{24}_{15} 1·011.

Et ether: $C_9H_{13}ON$. MW, 151. B.p. 215°, 107–8°/19 mm. D^{25} 0·9822. n^{25}_D 1·5018. *Methiodide*: cryst. from H_2O. M.p. 195–6°. *Picrate*: m.p. 113–14°.

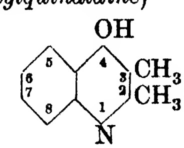
B_2,H_2PtCl_6: plates from H_2O. M.p. 224–5°.

Methiodide: prisms from H_2O. M.p. 242°.

Picrate: cryst. from EtOH. M.p. 219–20°.

Rassweiler, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 2763.

4-Hydroxy-2 : 3-dimethylquinoline (4-*Hydroxy-3-methylquinaldine*)



$C_{11}H_{11}ON$ MW, 173

Prisms + $1H_2O$ from H_2O. Sublimes at about 300°. M.p. 315°. Spar. sol. EtOH.

Conrad, Limpach, *Ber.*, 1891, **24**, 2991.
Mander-Jones, Trikojus, *Chem. Abstracts*, 1933, **27**, 1350.

5-Hydroxy-2 : 4-dimethylquinoline (5-*Hydroxy-4-methylquinaldine*).

Brown needles from EtOH. M.p. 200°.

Bülow, Issler, *Ber.*, 1903, **36**, 4017.

6-Hydroxy-2 : 4-dimethylquinoline (6-*Hydroxy-4-methylquinaldine*).

Prisms from EtOH. M.p. 214°. Distils with decomp. at 360°. Very sol. Me_2CO. Sol. EtOH. Spar. sol. Et_2O. Insol. H_2O, C_6H_6. Sol. dil. acids and alkalis. $FeCl_3$ ⟶ brown col.

B,HCl: yellow needles from EtOH. Sublimes.

Et ether: $C_{13}H_{15}ON$. MW, 201. Cryst. from pet. ether. B.p. 314–16°.

B_2,H_2PtCl_6: dark yellow needles. Decomp. above 110°. Spar. sol. H_2O, EtOH.

Picrate: yellow plates from EtOH. M.p. 225° decomp. Spar. sol. EtOH, Me_2CO, $CHCl_3$, C_6H_6.

Engler, Bauer, *Ber.*, 1889, **22**, 214.
Palkin, Harris, *Ind. Eng. Chem.*, 1922, **14**, 704.
Clarke, Taylor, U.S.P., 1,701,144, (*Chem. Abstracts*, 1929, **23**, 1420).

7-Hydroxy-2 : 4-dimethylquinoline (7-*Hydroxy-4-methylquinaldine*).

Needles from EtOH. M.p. 218°.

Bülow, Issler, *Ber.*, 1903, **36**, 4016.

8-Hydroxy-2 : 4-dimethylquinoline (8-*Hydroxy-4-methylquinaldine*).

Prisms from Et_2O. M.p. 65°. B.p. 281°. Very sol. EtOH, Me_2CO. Sol. Et_2O, $CHCl_3$, C_6H_6. Volatile in steam. Sublimes. Br in EtOH ⟶ yellow cryst. ppt.

B,HCl: yellow plates from EtOH. Sublimes without melting. Very sol. H_2O. Insol. Et_2O.

Picrate: plates or prisms from EtOH. M.p. 207°. Spar. sol. EtOH, Me_2CO, C_6H_6.

Engler, Bauer, *Ber.*, 1889, **22**, 211.

4-Hydroxy-2 : 6-dimethylquinoline (4-*Hydroxy-6-methylquinaldine*, 4-*hydroxy*-p-*toluquinaldine*).

Cryst. + $1H_2O$ from H_2O. M.p. 274–5° anhyd. $FeCl_3$ ⟶ brownish-red col.

B_2,H_2PtCl_6: orange-yellow prisms from H_2O. M.p. 228°.

Conrad, Limpach, *Ber.*, 1888, **21**, 525.

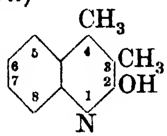
4-Hydroxy-2 : 8-dimethylquinoline (4-*Hydroxy-8-methylquinaldine*, 4-*hydroxy*-o-*toluquinaldine*).

Plates + $1H_2O$ from H_2O. M.p. 260–1° anhyd. Partly sublimes at m.p. Very sol. EtOH. Spar. sol. H_2O, Et_2O, $CHCl_3$, C_6H_6.

B_2,H_2PtCl_6: yellow needles. Decomp. at 250–70°. Very sol. H_2O, EtOH.

Conrad, Limpach, *Ber.*, 1888, **21**, 524.

2-Hydroxy-3 : 4-dimethylquinoline (3 : 4-*Dimethylcarbostyril*)



$C_{11}H_{11}ON$ MW, 173

Cryst. from AcOH. M.p. 266° (262°). Spar. sol. hot NaOH.

Knorr, *Ann.*, 1888, **245**, 359.
Camps, *Arch. Pharm.*, 1899, **237**, 676.

2-Hydroxy-4 : 6-dimethylquinoline (4 : 6-*Dimethylcarbostyril*).

Prisms from EtOH. M.p. 249–50°. Sol. hot EtOH. Spar. sol. H_2O, Et_2O, $CHCl_3$, ligroin, C_6H_6. Sol. alkalis and dil. acids. Salts hyd. by H_2O.

Knorr, *Ann.*, 1888, **245**, 365.
Ewins, King, *J. Chem. Soc.*, 1913, **103**, 110.

2-Hydroxy-4 : 7-dimethylquinoline (4 : 7-*Dimethylcarbostyril*).

Cryst. from AcOH.Aq. M.p. 220°. Spar. sol. hot H_2O. Insol. cold H_2O. Salts hyd. by H_2O.

Chloroplatinate : yellow needles from HCl. M.p. 233–4°.

Knorr, *Ann.*, 1888, **245**, 370.
Ewins, King, *J. Chem. Soc.*, 1913, **103**, 109.

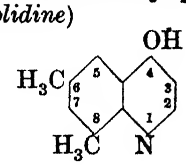
2-Hydroxy-4 : 8-dimethylquinoline (4 : 8-*Dimethylcarbostyril*).

Plates from AcOH.Aq. M.p. 217–18°. Spar. sol. cold H_2O, more sol. hot. Salts hyd. by H_2O.

Ewins, King, *J. Chem. Soc.*, 1913, **103**, 107.

2-Hydroxy-6 : 8-dimethylquinoline.
See Cytisoline.

4-Hydroxy-6 : 8-dimethylquinoline (4-*Hydroxy-β-cytisolidine*)



$C_{11}H_{11}ON$ MW, 173

Needles from H_2O. M.p. 219–21°.

Späth, *Monatsh.*, 1919, **40**, 111.

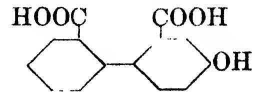
5-Hydroxy-6 : 8-dimethylquinoline (5-*Hydroxy-β-cytisolidine*).

Plates from $CHCl_3$. M.p. 197–8°. Very sol. EtOH. Sol. hot H_2O, $CHCl_3$, C_6H_6. Sublimes in needles.

Noelting, Trautmann, *Ber.*, 1890, **23**, 3683.

α-Hydroxydinaphthylmethane.
See Dinaphthylcarbinol.

4-Hydroxydiphenic Acid (4-*Hydroxydiphenyl-2 : 2′-dicarboxylic acid*)



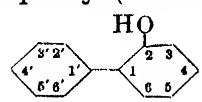
$C_{14}H_{10}O_5$ MW, 258

Prisms from H_2O. M.p. 245–6°. Very sol. EtOH, Et_2O. Sol. H_2O. Spar. sol. C_6H_6.

Schmidt, Schall, *Ber.*, 1905, **38**, 3770.

Hydroxydiphenoxypropane.
See under Glycerol.

2-Hydroxydiphenyl (o-*Phenylphenol*)



$C_{12}H_{10}O$ MW, 170

Needles from pet. ether. M.p. 56°. B.p. 275°, 145°/14 mm.

Me ether : $C_{13}H_{12}O$. MW, 184. Prisms from pet. ether. M.p. 29°. B.p. 274°.

Et ether : $C_{14}H_{14}O$. MW, 198. Prisms from pet. ether. M.p. 34°. B.p. 276°.

Acetyl : needles from pet. ether. M.p. 62–3°. B.p. 164–5°/15 mm.

Hirsch, *Ber.*, 1890, **23**, 3710.
Honigschmid, *Monatsh.*, 1901, **22**, 566.
Späth, *Monatsh.*, 1914, **35**, 328.
Auwers, Wittig, *J. prakt. Chem.*, 1924, **108**, 105.
Gesellschaft für Teerverwertung, D.R.P., 492,064, (*Chem. Abstracts*, 1930, **24**, 2475).
Finzi, *Gazz. chim. ital.*, 1931, **61**, 41.

3-Hydroxydiphenyl (m-*Phenylphenol*).

Needles from H_2O or pet. ether. M.p. 78° (75°). Sol. EtOH, C_6H_6. Spar. sol. H_2O, pet. ether. Volatile in steam.

Et ether : cryst. M.p. 34°. B.p. 305°. Sol. usual org. solvents.

Benzoyl : plates from EtOH. M.p. 60–1°.

Jacobson, Loeb, *Ber.*, 1903, **36**, 4085.
Errara, La Spada, *Gazz. chim. ital.*, 1905, **35**, 552.
Jacobson, Franz, Hönigsberger, *Ber.*, 1903, **36**, 4075.

4-Hydroxydiphenyl (p-*Phenylphenol*).

Needles or plates from EtOH.Aq. M.p. 164–5° (160–2°). B.p. 305–8°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. pet. ether. Spar. volatile in steam. Sublimes.

Me ether: $C_{13}H_{12}O$. MW, 184. Plates from EtOH. M.p. 90°.

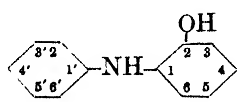
Acetyl: plates from EtOH. M.p. 88–9°.

Benzoyl: cryst. M.p. 121° (150°).

p-*Toluenesulphonyl*: plates from AcOH. M.p. 177°.

Hirsch, *Ber.*, 1890, **23**, 3708.
Kaiser, *Ann.*, 1890, **257**, 101.
Friebel, Rassow, *J. prakt. Chem.*, 1901, **63**, 453.
Werner, Rekner, *Ann.*, 1902, **322**, 167.
Raiford, Colbert, *J. Am. Chem. Soc.*, 1925, **47**, 1456.
Bell, Kenyon, *J. Chem. Soc.*, 1926, 3049.
Finzi, *Gazz. chim. ital.*, 1931, **61**, 38.
Booth, U.S.P., 1,925,367, (*Chem. Abstracts*, 1933, **27**, 5342).

2-Hydroxydiphenylamine (o-*Anilinophenol*)



$C_{12}H_{11}ON$ MW, 185

Prisms from H_2O. M.p. 69–70° (68°). B.p. 180–9°/20 mm. Sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O, C_6H_6. Reduces Fehling's. $FeCl_3 \longrightarrow$ blue-black col.

N-*Acetyl*: needles from pet. ether. M.p. 144–6°. Very sol. EtOH, Me_2CO, $CHCl_3$, AcOH, AcOEt. Spar. sol. pet. ether, Et_2O, CS_2, C_6H_6.

Me ether: *N*-phenyl-*o*-anisidine. $C_{13}H_{13}ON$. MW, 199. B.p. 325–6°/732 mm. (320–5°/730 mm.). Darkens in air. Misc. with EtOH, Et_2O.

Deninger, *J. prakt. Chem.*, 1894, **50**, 89.
Gambarjan, *Ber.*, 1909, **42**, 4012.
Ullmann, Kipper, *Ann.*, 1907, **355**, 344.
Goldberg, D.R.P., 187,870, (*Chem. Zentr.*, 1907, II, 1465).

3-Hydroxydiphenylamine (m-*Anilinophenol*).

Leaflets from H_2O. M.p. 81·5–82°. B.p. 340°. Very sol. EtOH, Et_2O, Me_2CO. Spar. sol. H_2O, ligroin. Sol. dil. acids and alkalis. Salts hyd. by cold H_2O.

O-*Benzoyl*: needles from EtOH. M.p. 125·5–126·5°. Very sol. Et_2O, C_6H_6. Sol. EtOH, AcOH. Spar sol. ligroin.

N-*Benzoyl*: cryst. from EtOH.Aq. M.p. 201°.

Calm, *Ber.*, 1883, **16**, 2787.
Merz, Weith, *Ber.*, 1881, **14**, 2345.
Auwers, *Ann.*, 1909, **364**, 171 (Note).

4-Hydroxydiphenylamine (p-*Anilinophenol*).

Leaflets from H_2O. M.p. 73°. B.p. 330°, 215–16°/12 mm. Very sol. EtOH, Et_2O, $CHCl_3$, warm C_6H_6. Spar. sol. H_2O, ligroin.

O : N-*Diacetyl*: prisms from C_6H_6–ligroin. M.p. 120°. Very sol. EtOH, Et_2O, AcOH, hot C_6H_6.

O-*Benzoyl*: yellowish-white plates from ligroin. M.p. 114–15°.

O : N-*Dibenzoyl*: yellow prisms from EtOH. M.p. 175°. Sol. Et_2O, AcOH, C_6H_6. Spar. sol. cold EtOH.

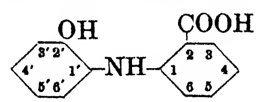
p-*Toluenesulphonyl*: plates from EtOH. M.p. 126·5°. Sol. $CHCl_3$, C_6H_6. Spar. sol. EtOH, AcOH, petrol.

Me ether: *N*-phenyl-*p*-anisidine. $C_{13}H_{13}ON$. MW, 199. Prisms from EtOH. M.p. 105°. B.p. 195°/12 mm.

Et ether: *N*-phenyl-*p*-phenetidine. $C_{14}H_{15}ON$. MW, 213. Needles from ligroin. M.p. 73–4°. B.p. 348°. Very sol. Et_2O, C_6H_6. Spar. sol. ligroin.

Philip, Calm, *Ber.*, 1884, **17**, 2431.
Willstätter, Kubli, *Ber.*, 1909, **42**, 4138.
Bradfield, Cooper, Orton, *J. Chem. Soc.*, 1927, 2856.

2′-Hydroxydiphenylamine-2-carboxylic Acid (N-o-*Hydroxyphenylanthranilic acid*)



$C_{12}H_{11}O_3N$ MW, 317

Needles from EtOH.Aq. M.p. 190°. Sol. hot EtOH, hot C_6H_6. Spar. sol. cold EtOH, cold C_6H_6, ligroin. Insol. H_2O.

Me ether: $C_{13}H_{13}O_3N$. MW, 331. Needles from C_6H_6. M.p. 176°. Sol. EtOH, AcOH. Spar. sol. C_6H_6. Heat $\longrightarrow$ 2-methoxydiphenylamine. Conc. $H_2SO_4 \longrightarrow$ 4-methoxyacridone.

Ullmann, Kipper, *Ann.*, 1907, **355**, 342.

3′-Hydroxydiphenylamine-2-carboxylic Acid (N-m-*Hydroxyphenylanthranilic acid*).

Me ether: needles from C_6H_6–ligroin. M.p. 132°. Sol. EtOH, AcOH, C_6H_6. Spar. sol. ligroin. Insol. H_2O.

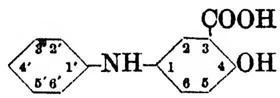
See above reference.

4′-Hydroxydiphenylamine-2-carboxylic Acid (N-p-*Hydroxyphenylanthranilic acid*).

Et ether: $C_{14}H_{15}O_3N$. MW, 345. Needles from AcOH.Aq. M.p. 209°. Sol. hot EtOH, AcOH, C_6H_6. Insol. H_2O, ligroin.

Ullmann, Kipper, *Ann.*, 1907, **355**, 344.

4-Hydroxydiphenylamine-3-carboxylic Acid (5-*Anilinosalicylic acid*)



$C_{12}H_{11}O_3N$ MW, 317

Needles from H_2O. M.p. 217·5°. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. $FeCl_3$ ⟶ violet col.

Dierbach, *Ann.*, 1893, **273**, 120.

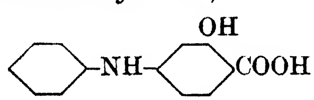
5-Hydroxydiphenylamine-3-carboxylic Acid.

M.p. 220°.

Anilide: m.p. 160–1°.

I.G., E.P., 355,114, (*Chem. Zentr.*, 1931, II, 3663).

3-Hydroxydiphenylamine-4-carboxylic Acid (4-*Anilinosalicylic acid*)

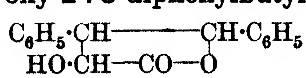


$C_{12}H_{11}O_3N$ MW, 317

Cryst. from EtOH.Aq. M.p. 180–1°. Alc. $FeCl_3$ ⟶ red col.

Laska, Haller, D.R.P., 515,208, (*Chem. Zentr.*, 1931, I, 1828).

1-Hydroxy-2 : 3-diphenylbutyrolactone



$C_{16}H_{14}O_3$ MW, 254

Exists in four forms.

(i) Needles from $CHCl_3$–ligroin. M.p. 127°. Sol. hot EtOH, $CHCl_3$, C_6H_6. Spar. sol. H_2O, Et_2O, ligroin.

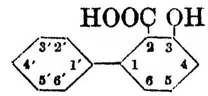
(ii) Cryst. from EtOH. M.p. 170°. Has same solubilities and chemical reactions as (i).

(iii) Cryst. powder from $CHCl_3$–ligroin. Sol. hot $CHCl_3$.

(iv) Needles from EtOH. M.p. 171°. Almost insol. $CHCl_3$.

Erlenmeyer, Lux, *Ber.*, 1898, **31**, 2224.
Erlenmeyer, *Ber.*, 1905, **38**, 3121.

3-Hydroxydiphenyl-2-carboxylic Acid (6-*Hydroxy-2-phenylbenzoic acid*, 6-*phenylsalicylic acid*)



$C_{13}H_{10}O_3$ MW, 214

Needles or plates from H_2O. M.p. 195°. Very sol. $CHCl_3$. Volatile in steam. $FeCl_3$ ⟶ violet col. H_2SO_4 ⟶ deep red. col.

Et ester: $C_{15}H_{14}O_3$. MW, 242. Plates from EtOH. M.p. 46–7°.

Heyl, *Ber.*, 1898, **31**, 3034; *J. prakt. Chem.*, 1899, **59**, 456.

5-Hydroxydiphenyl-2-carboxylic Acid (4-*Hydroxy-2-phenylbenzoic acid*).

Cryst. from H_2O. M.p. (+ $1H_2O$) 123°, (anhyd.) 147°. Very sol. EtOH. Sol. pet. ether, C_6H_6. Spar. sol. cold H_2O.

Errera, La Spada, *Gazz. chim. ital.*, 1905, **35**, 549.

6-Hydroxydiphenyl-2-carboxylic Acid (3-*Hydroxy-2-phenylbenzoic acid*).

Cryst. + $1H_2O$ from EtOH. M.p. anhyd. 154°. Very sol. EtOH, Et_2O. Spar. sol. cold H_2O.

Me ester: $C_{14}H_{12}O_3$. MW, 228. Cryst. from Et_2O. M.p. 84–5°. Distils undecomp.

Et ester: $C_{15}H_{14}O_3$. MW, 242. Plates from Et_2O. M.p. 111°.

Amide: $C_{13}H_{11}O_2N$. MW, 213. Needles from EtOH. M.p. 262–3°. Sol. hot EtOH. Spar. sol. H_2O, Et_2O, C_6H_6.

Graebe, Schestakow, *Ann.*, 1895, **284**, 320.

2′-Hydroxydiphenyl-2-carboxylic Acid.

Passes immediately on formation into its lactone.

Lactone: dibenz-α-pyrone, 3 : 4-benzcoumarin. $C_{13}H_8O_2$. MW, 196. Needles from EtOH. M.p. 92·5°. Distils with slight decomp. Very sol. EtOH, Et_2O.

Richter, *J. prakt. Chem.*, 1883, **28**, 294.
Graebe, Schestakow, *Ann.*, 1895, **284**, 308, 317.

4′-Hydroxydiphenyl-2-carboxylic Acid.

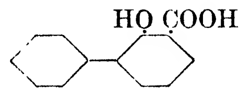
Prisms from H_2O. M.p. 206·5° (205°). Sol. hot H_2O. Insol. C_6H_6.

Griess, *Ber.*, 1888, **21**, 981.
Graebe, Schestakow, *Ann.*, 1895, **284**, 317, 323.

4′-Hydroxydiphenyl-4-carboxylic Acid.
M.p. 290°.

I.G., F.P., 735,846, (*Chem. Abstracts*, 1933, **27**, 1001).

2-Hydroxydiphenyl-3-carboxylic Acid (2-*Hydroxy-3-phenylbenzoic acid, 3-phenylsalicylic acid*)



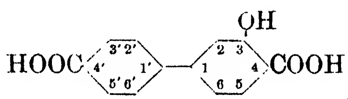
$C_{13}H_{10}O_3$ MW, 214

M.p. 180°.

v. Heyden, D.R.P., 61,125.

4-Hydroxydiphenyl-2 : 2′-dicarboxylic Acid.
See 4-Hydroxydiphenic Acid.

3-Hydroxydiphenyl-4 : 4′-dicarboxylic Acid

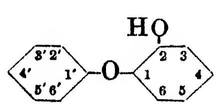


$C_{14}H_{10}O_5$ MW, 258

Needles from MeOH or AcOH. M.p. 324–5° decomp. Very sol. EtOH, AcOEt. Almost insol. $CHCl_3$, CS_2, C_6H_6.
4-*Me ester*: $C_{15}H_{12}O_5$. MW, 272. Needles from C_6H_6. M.p. 215–16°. Very sol. EtOH, Et_2O, $CHCl_3$.
4′-*Me ester*: plates from EtOH. M.p. 240–241·5° decomp. Very sol. MeOH, Et_2O, $CHCl_3$, C_6H_6.
Di-Me ester: $C_{16}H_{14}O_5$. MW, 286. Plates or needles from EtOH. M.p. 168°. *Acetyl*: needles from EtOH.Aq. M.p. 119°.

Mudrovčić, *Monatsh.*, 1913, **34**, 1432.

2-Hydroxydiphenyl Ether (*Catechol phenyl ether*)



$C_{12}H_{10}O_2$ MW, 186

Needles from H_2O, EtOH, or pet. ether. M.p. 106–7°. B.p. 151–5°/11 mm. Sol. EtOH, hot Et_2O, C_6H_6, AcOH, CS_2. Spar. sol. H_2O, pet. ether. Spar. volatile in steam.
Me ether: guaiacol phenyl ether. $C_{13}H_{12}O_2$. MW, 200. Needles from ligroin. M.p. 79° (77°). B.p. 288°. Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O. Spar. volatile in steam.
Acetyl: b.p. 358–60°.
Benzoyl: cryst. M.p. 48·5°.

Norris, Macintire, Corse, *Am. Chem. J.*, 1903, **29**, 127.
Fichter, Brunner, *Bull. soc. chim.*, 1916, **19**, 286.
Fritzche, D.R.P., 269,543, (*Chem. Zentr.*, 1914, I, 591).
Lock, *Monatsh.*, 1930, **55**, 167.

3-Hydroxydiphenyl Ether (*Resorcinol phenyl ether*).
B.p. 185°/12 mm., 150°/4·5 mm.
Me ether: b.p. 303°/745 mm.

Klarmann, Gatyas, Shternov, *J. Am. Chem. Soc.*, 1931, **53**, 3405.
Lock, *Monatsh.*, 1930, **55**, 180.

4-Hydroxydiphenyl Ether (*Hydroquinone phenyl ether*).
Needles from H_2O or ligroin. M.p. 84–5°. B.p. 175–7°/10 mm. Sol. usual org. solvents.
Me ether: b.p. 163–5°/14 mm.
Benzoyl: needles from EtOH or ligroin. M.p. 97–8°.

Häussermann, Bauer, *Ber.*, 1896, **29**, 2085.
Oesterlin, *Monatsh.*, 1931, **57**, 31.
Lock, *Monatsh.*, 1930, **55**, 183.

2-Hydroxy-1 : 2-diphenylethylamine.
See α-Hydroxy-β-aminodibenzyl.

N-Hydroxydiphenylformamidine

$$C_6H_5\cdot N{:}CH\cdot \underset{OH}{N}\cdot C_6H_5$$

$C_{13}H_{12}ON_2$ MW, 212

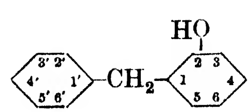
Needles from C_6H_6, m.p. 130–1° (126–7°): needles + $1H_2O$ from H_2O, m.p. 107–17°. Sol. EtOH, Me_2CO, hot H_2O, $CHCl_3$, C_6H_6, dil. min. acids. Spar. sol. pet. ether, cold H_2O. Forms metallic salts. Hot dil. H_2SO_4 ⟶ formic acid + aniline + *p*-aminophenol. Hot H_2O ⟶ aniline + formylphenylhydroxylamine. Ac_2O ⟶ diphenylurea.

Ley, *Ber.*, 1902, **35**, 1452.

5-Hydroxydiphenyline.
See 5-Hydroxy-2 : 4′-diaminodiphenyl.

1-Hydroxy-2 : 2′-diphenylisobutyric Acid.
See Dibenzylglycollic Acid.

2-Hydroxydiphenylmethane (*o-Benzylphenol*)



$C_{13}H_{12}O$ MW, 184

Exists in two forms. (i) *Stable*: m.p. 52°. (ii) *Labile*: m.p. 21°. B.p. 312°, 175°/18 mm.
Me ether: *o*-benzylanisole. $C_{14}H_{14}O$. MW, 198. M.p. 30°. B.p. 159–60°/12 mm. *Phenylurethane*: cryst. from C_6H_6. M.p. 115°.
Phenylurethane: needles from ligroin. M.p. 117·5–118°.

Claisen, *Ann.*, 1925, **442**, 239.
Stoermer, Frick, *Ber.*, 1924, **57**, 27.

4-Hydroxydiphenylmethane (*p-Benzylphenol*).
Cryst. from EtOH. M.p. 84°. B.p. 320–2° (325–30°), 198–200°/10 mm. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, AcOH, caustic alkalis. Mod. sol. hot H_2O.
Me ether: *p*-benzylanisole. $C_{14}H_{14}O$. MW, 198. Cryst. M.p. 20°. B.p. 305°, 177°/10 mm., 157–8°/8 mm.
Et ether: *p*-benzylphenetole. $C_{15}H_{16}O$. MW, 212. Oil. B.p. 317°, 217°/37 mm. D^{24} 1·038. Volatile in steam.
Acetyl: b.p. 317°. D_4^0 1·1168. Decomp. in moist air.
Benzoyl: m.p. 87°.

Clemmensen, *Ber.*, 1914, **47**, 682.
Späth, *Monatsh.*, 1913, **34**, 2007.
Klages, Allendorff, *Ber.*, 1898, **31**, 1001.
Paternò, Fileti, *Gazz. chim. ital.*, 1875, **5**, 382.

α-Hydroxydiphenylmethane.
Benzhydrol, *q.v.*
4 - Hydroxydiphenylmethane - 3 - carboxylic Acid.
See 5-Benzylsalicylic Acid.
1-Hydroxy-1 : 1-diphenylpropane (*1 : 1-Diphenylpropyl alcohol, ethyldiphenylcarbinol, α-ethylbenzhydrol, α-hydroxy-α-ethyldiphenylmethane*)

$$(C_6H_5)_2C(OH)\cdot CH_2\cdot CH_3$$

$C_{15}H_{16}O$ MW, 212

Cryst. from EtOH. M.p. 95° (91–2°). B.p. 171–3°/14 mm., 175–80°/17 mm.
Et ether: $C_{17}H_{20}O$. MW, 240. Cryst. M.p. 160–1°.

Hell, Bauer, *Ber.*, 1904, **37**, 231.
Schorigin, *Ber.*, 1908, **41**, 2715.
Konowalow, Dobrowolski, *Chem. Zentr.*, 1905, II, 826.

1-Hydroxy-1 : 2-diphenylpropane (*1 : 2-Diphenylpropyl alcohol, β-hydroxy-α-methyldibenzyl*)

$$C_6H_5\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH(OH)\cdot C_6H_5$$

$C_{15}H_{16}O$ MW, 212

B.p. 195–200°/20 mm., 180–2°/19 mm.

Tiffeneau, *Ann. chim.*, 1907, **10**, 192, 353.

2-Hydroxy-1 : 2-diphenylpropane (*Methylphenylbenzylcarbinol, 1 : 2-diphenylisopropyl alcohol, α-hydroxy-α-methyldibenzyl*)

$$C_6H_5\cdot \overset{CH_3}{\overset{|}{C}}(OH)\cdot CH_2\cdot C_6H_5$$

$C_{15}H_{16}O$ MW, 212

Cryst. from ligroin. M.p. 50–1°. B.p. 289–92°, 175°/15 mm.

Hell, *Ber.*, 1904, **37**, 457.
Sabatier, Murat, *Ann. chim.*, 1915, **4**, 288.

3-Hydroxy-1 : 2-diphenylpropane (*2 : 3-Diphenylpropyl alcohol, α-hydroxymethyldibenzyl*)

$$C_6H_5\cdot \overset{CH_2OH}{\overset{|}{C}H}\cdot CH_2\cdot C_6H_5$$

$C_{15}H_{16}O$ MW, 212

Oil. B.p. 300–2°. Sol. EtOH, Et_2O.

Freund, Remse, *Ber.*, 1890, **23**, 2863.

1-Hydroxy-1 : 3-diphenylpropane (*1 : 3-Diphenylpropyl alcohol*)

$$C_6H_5\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot C_6H_5$$

$C_{15}H_{16}O$ MW, 212

Viscous oil. B.p. 330–2°, 192–4°/12 mm.

Dieckmann, Kämmerer, *Ber.*, 1906, **39**, 3049.
Bauer, *Compt. rend.*, 1912, **154**, 1094.

2-Hydroxy-1 : 3-diphenylpropane.
See Dibenzylcarbinol.
1-Hydroxy-2 : 2-diphenylpropane (*2 : 2-Diphenylpropyl alcohol, α-methyl-α-hydroxymethyldiphenylmethane, α-methylbenzhydrylcarbinol*)

$$CH_3\cdot \underset{C_6H_5}{\underset{|}{\overset{C_6H_5}{\overset{|}{C}}}}\cdot CH_2OH$$

$C_{15}H_{16}O$ MW, 212

B.p. 186–7°/15 mm. D_0^0 1·0968, D_{20}^{20} 1·0835.
Acetyl: b.p. 182–3°/14 mm.
Phenylurethane: m.p. 148–9°.

Faworski, Korolew, *Chem. Zentr.*, 1923, III, 668.

Hydroxydiphenylpropylene - carboxylic Acid.
See Hydroxydiphenylvinylacetic Acid.
Hydroxy-*sym*.-diphenylurea.
See Hydroxycarbanilide.

3-Hydroxy-*unsym.*-diphenylurea (*Diphenylcarbamhydroxamic acid*, N-*diphenylcarbamylhydroxylamine*)

$(C_6H_5)_2N{\cdot}CO{\cdot}NH{\cdot}OH$

$C_{13}H_{12}O_2N_2$ MW, 228

M.p. 134–134·5°. Colourless sol. in H_2SO_4, blue col. with addn. of HNO_3.

Acetyl: m.p. 126·5–127°.

Hurd, *J. Am. Chem. Soc.*, 1923, **45**, 1485.

1-Hydroxy-1 : 2-diphenylvinylacetic Acid (3-*Hydroxy*-2 : 3-*diphenylpropylene-3-carboxylic acid*, 2-*methylene*-1 : 2-*diphenyl-lactic acid*, *isocinnamenylmandelic acid*)

$CH_2{:}C(C_6H_5){-}C(C_6H_5)(OH){\cdot}COOH$

$C_{16}H_{14}O_3$ MW, 254

Needles from C_6H_6. M.p. 161° decomp. Sol. hot C_6H_6. Spar. sol. hot H_2O, cold C_6H_6.

Acetyl: needles from C_6H_6. M.p. 145–6°.

Japp, Lander, *J. Chem. Soc.*, 1897, **71**, 135.

1-Hydroxy-2 : 3-diphenylvinylacetic Acid (3-*Hydroxy*-1 : 2-*diphenylpropylene-3-carboxylic acid*, 2-*phenyl*-2-*benzylidenelactic acid*)

$C_6H_5{\cdot}CH{:}C(C_6H_5){\cdot}CH(OH){\cdot}COOH$

$C_{16}H_{14}O_3$ MW, 254

Needles from $CHCl_3$–ligroin. M.p. 125°. Sol. EtOH, Et_2O, Me_2CO, $CHCl_3$, C_6H_6. Boiling NaOH.Aq. ⟶ dibenzyl + oxalic acid.

Me ester: $C_{17}H_{16}O_3$. MW, 268. Needles from ligroin. M.p. 89°. Sol. EtOH, Et_2O, $CHCl_3$, CS_2, C_6H_6. Spar. sol. H_2O, cold ligroin.

Erlenmeyer, *Ann.*, 1904, **333**, 190.
Erlenmeyer, Lux, *Ber.*, 1898, **31**, 2228.

1-Hydroxydipropylacetic Acid (*Dipropylglycollic acid*)

$(CH_3{\cdot}CH_2{\cdot}CH_2)_2C(OH){\cdot}COOH$

$C_8H_{16}O_3$ MW, 160

Needles from H_2O. M.p. 80–1° (78°). Sol. EtOH, Et_2O. Spar. sol. cold H_2O. Sublimes. Volatile in steam.

Et ester: $C_{10}H_{20}O_3$. MW, 188. B.p. 208–10°.

Basse, Klinger, *Ber.*, 1898, **31**, 1218.
Crichton, *J. Chem. Soc.*, 1906, **89**, 932.

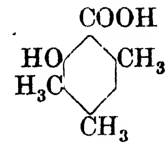
***o*-Hydroxydithiobenzoic Acid.**
See Dithiosalicylic Acid.

1-Hydroxydocosene.
See Erucyl Alcohol.

3-Hydroxydodecane.
See Ethylnonylcarbinol.

1-Hydroxydotriacontane.
See Laccerol.

6-Hydroxydurylic Acid (6-*Hydroxy*-2 : 4 : 5-*trimethylbenzoic acid*, 3 : 4 : 6-*trimethylsalicylic acid*)



$C_{10}H_{12}O_3$ MW, 180

Needles from EtOH.Aq. M.p. 148°. Spar. sol. H_2O. Sublimes. Alc. $FeCl_3$ ⟶ blue col. HCl at 200° ⟶ 6-hydroxy-ψ-cumene.

Jacobsen, Schnapauff, *Ber.*, 1885, **18**, 2844.

1-Hydroxyeicosanic Acid (1-*Hydroxyarachidic acid*)

$CH_3{\cdot}[CH_2]_{16}{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$

$C_{20}H_{40}O_3$ MW, 328

Leaflets from C_6H_6–pet. ether. M.p. 91–2°. Sol. most org. solvents.

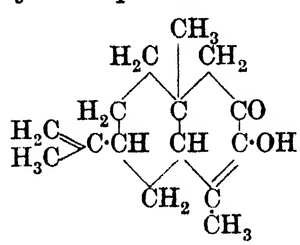
Me ester: $C_{21}H_{42}O_3$. MW, 342. Needles. M.p. 62–4°.

Et ester: $C_{22}H_{44}O_3$. MW, 356. Cryst. from EtOH. M.p. 62–3°.

Et ether: $C_{22}H_{44}O_3$. MW, 356. Needles from AcOH. M.p. 53–6°. *Et ester*: $C_{24}H_{48}O_3$. MW, 384. Needles from EtOH. M.p. 35–7°.

Baczewski, *Monatsh.*, 1896, **17**, 534.

2-Hydroxyeremophilone



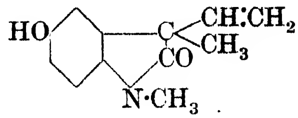
$C_{15}H_{22}O_2$ MW, 234

Constituent of oil of *Eremophila Mitchelli*. Prisms from MeOH. M.p. 66–7°. B.p. 189–90°/22 mm. D_{25}^{25} 1·0620. n_D^{25} 1·5564. $[\alpha]_{5461}$ + 153° in MeOH. Resinifies rapidly in air. Reduces Fehling's and $NH_3.AgNO_3$. $FeCl_3$ ⟶ bluish-black col. Sol. $NaHSO_3$.Aq.

Benzoyl: prisms from MeOH. M.p. 119–20°. $[\alpha]_{5461}$ + 162° in AcOEt.

Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2754.

Hydroxyeserolene (*ψ-Geneserolene, oxeserolene*)



$C_{12}H_{13}O_2N$ MW, 203

Needles. M.p. 215° (224°). Spar. sol. H_2O.
Picrate : m.p. 215°.

Polonowski, Polonowski, *Compt. rend.*, 1925, **180**, 73; *Bull. soc. chim.*, 1918, **23**, 347, 354.

Hydroxyethanesulphonic Acid.
See Isethionic Acid.

2-Hydroxy-5-ethoxybenzaldehyde.
See under Gentisic Aldehyde.

2-Hydroxy-5-ethoxybenzoic Acid.
See under Gentisic Acid.

3-Hydroxy-4-ethoxy-1-propenylbenzene.
See Isosafroeugenol.

ω-Hydroxy-4-ethylacetophenone.
See 4-Ethylphenacyl Alcohol.

1-Hydroxyethylacetylene.
See 1-Methylpropargyl Alcohol.

2-Hydroxyethyl allyl Ether.
See under Ethylene Glycol.

Hydroxyethylamine.
See Aminoethyl Alcohol.

2-Hydroxyethyl *n*-amyl Ether (*Ethylene glycol* n-*amyl ether*)

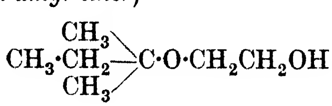
$$CH_3\cdot[CH_2]_4\cdot O\cdot CH_2\cdot CH_2OH$$

$C_7H_{16}O_2$ MW, 132

B.p. 181°/745 mm. D_{15}^{15} 0·8926.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, **46**, 1503.

2-Hydroxyethyl *tert.*-amyl Ether (*Ethylene glycol* tert.-*amyl ether*)



$C_7H_{16}O_2$ MW, 132

B.p. 50–5°/3 mm. D_4^{20} 0·8993.

Baatfsche Petroleum Maatschappij, F.P., 739,266, (*Chem. Zentr.*, 1933, II, 607).

Hydroxy-ethylaniline.
See Ethylaminophenol.

β-Hydroxyethylaniline (2-*Anilinoethyl alcohol*)

$$C_6H_5\cdot NH\cdot CH_2\cdot CH_2OH$$

$C_8H_{11}ON$ MW, 137

B.p. 286°, 167°/17 mm. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. KOH fusion ⟶ indoxyl.

p-*Tolyl ether* : $C_{15}H_{17}ON$. MW, 227. Plates from EtOH. M.p. 55°.

2-*Naphthyl ether* : $C_{18}H_{17}ON$. MW, 263. Plates from EtOH. M.p. 75°.

O-*Benzoyl* : $C_{15}H_{15}O_2N$. MW, 241. Needles from EtOH. M.p. 77°.

Knorr, *Ber.*, 1889, **22**, 2092.
Auwers, Bergs, *Ann.*, 1904, **332**, 209.
Schreiber, *Ber.*, 1891, **24**, 192.

Hydroxy-ethylbenzene.
See Ethylphenol.

Hydroxyethylbenzene.
See Phenylethyl Alcohol *and* Methylphenylcarbinol.

Hydroxyethylbutylamine.
See *n*-Butylaminoethyl Alcohol.

1-Hydroxyethyl *n*-butyl Ether

$$CH_3\cdot[CH_2]_3\cdot O\cdot CH(OH)\cdot CH_3$$

$C_6H_{14}O_2$ MW, 118

Acetyl : b.p. 166–72°, 54–54·5°/19 mm. D_4^{20} 0·9122. n_D^{20} 1·4709.

Henze, Murchison, *J. Am. Chem. Soc.*, 1933, **55**, 4255.
I.G., D.R.P., 566,033, (*Chem. Abstracts*, 1933, **27**, 996).

2-Hydroxyethyl *n*-butyl Ether (*Ethylene glycol butyl ether*)

$$CH_3\cdot[CH_2]_3\cdot O\cdot CH_2\cdot CH_2OH$$

$C_6H_{14}O_2$ MW, 118

B.p. 170·6°/743 mm. D_{15}^{15} 0·9011.

Benzoyl : b.p. 156·5–157°/14·5 mm., 131·6–132·6°/3 mm. D_{25}^{25} 1·0277. n_D^{25} 1·4925.

p-*Nitrobenzoyl* : b.p. 179–80°/3·5 mm. D_{25}^{25} 1·1518. n_D^{25} 1·5125.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, **46**, 1503.
Conn, Collett, Lazzell, *J. Am. Chem. Soc.*, 1932, **54**, 4370.

2-Hydroxyethyl *tert.*-butyl Ether (*Ethylene glycol* tert.-*butyl ether*)

$$(CH_3)_3C\cdot O\cdot CH_2\cdot CH_2OH$$

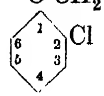
$C_6H_{14}O_2$ MW, 118

B.p. 150–3°. D_4^{20} 0·8970.

I.G., F.P., 39,773, (Addn. to F.P. 610,282) (*Chem. Abstracts*, 1932, **26**, 4826).
Bataafsche Petroleum Maatschappij, F.P., 739,266, (*Chem. Zentr.*, **1933**, II, 607).

2-Hydroxyethyl *o*-chlorophenyl Ether (*Ethylene glycol* o-*chlorophenyl ether*)

$O{\cdot}CH_2{\cdot}CH_2OH$



$C_8H_9O_2Cl$ MW, 172·5

Oil. B.p. 159–61°/22 mm.

p-*Nitrobenzoyl* : pale yellow plates from EtOH. M.p. 81–2°.

Boyd, Marle, *J. Chem. Soc.*, 1914, **105**, 2136.

2-Hydroxyethyl *m*-chlorophenyl Ether (*Ethylene glycol* m-*chlorophenyl ether*).

Oil. B.p. 163–4°/22 mm.

p-*Nitrobenzoyl* : pale yellow cryst. from EtOH. M.p. 104°.

See above reference.

2-Hydroxyethyl *p*-chlorophenyl Ether (*Ethylene glycol* p-*chlorophenyl ether*).

Cryst. M.p. about 28°.

p-*Nitrobenzoyl* : pale yellow needles from EtOH. M.p. 90–1°.

See previous reference.

α-Hydroxyethylcyclobutane.
See Methylcyclobutylcarbinol.

α-Hydroxyethylcyclohexane.
See Methylcyclohexylcarbinol.

α-Hydroxyethylcyclopropane.
See Methylcyclopropylcarbinol.

Hydroxyethylene dibromide.
See 1 : 2-Dibromoethyl Alcohol.

***N*-[2-Hydroxyethyl]-di-isoamylamine** (2-*Di-isoamylaminoethyl alcohol*)

$[(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2]_2N{\cdot}CH_2{\cdot}CH_2OH$

$C_{12}H_{27}ON$ MW, 201

Oil. B.p. 247–8°/748 mm. D_4^{20} 0·8492. n_D^{20} 1·4435. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O.

Picrolonate : yellow plates from EtOH.Aq. M.p. about 88°. Sol. EtOH.

Matthes, *Ann.*, 1901, **316**, 315.
Einhorn, Fiedler, Ladisch, Uhlfelder, *Ann.*, 1909, **371**, 148.

***N*-[2-Hydroxyethyl]-di-isobutylamine** (2-*Di-isobutylaminoethyl alcohol*)

$[(CH_3)_2CH{\cdot}CH_2]_2N{\cdot}CH_2{\cdot}CH_2OH$

$C_{10}H_{23}ON$ MW, 173

Oil. B.p. 213–14°/754 mm. D_4^{20} 0·8407. n_D^{20} ·4355. Sol. EtOH, Et_2O, $CHCl_3$, ligroin.

B,HAuCl$_4$: yellow cryst. M.p. 86–8°. Spar. sol. H_2O, EtOH.

Picrate : yellow prisms from EtOH.Aq. M.p. 123–5°. Spar. sol. H_2O, EtOH.

Picrolonate : yellow needles from EtOH.Aq. M.p. 134–5° decomp.

Matthes, *Ann.*, 1901, **316**, 312.
Einhorn, Fiedler, Uhlfelder, *Ann.*, 1909, **371**, 146.

***N*-[2-Hydroxyethyl]-di-isopropylamine** (2-*Di-isopropylaminoethyl alcohol*)

$[(CH_3)_2CH]_2N{\cdot}CH_2{\cdot}CH_2OH$

$C_8H_{19}ON$ MW, 145

Oil. B.p. 187–92°.

Einhorn, Fiedler, Uhlfelder, *Ann.*, 1909, **371**, 145.

α-Hydroxy-α-ethyldiphenylmethane.
See 1-Hydroxy-1 : 1-diphenylpropane.

***N*-[2-Hydroxyethyl]-dipropylamine** (2-*Dipropylaminoethyl alcohol*)

$(CH_3{\cdot}CH_2{\cdot}CH_2)_2N{\cdot}CH_2{\cdot}CH_2OH$

$C_8H_{19}ON$ MW, 145

Oil. B.p. 195–6°/748 mm. D_4^{20} 0·8576. n_D^{20} 1·4402. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Picrate : yellow leaflets from EtOH. M.p. 80–2°.

Picrolonate : plates from EtOH.Aq. M.p. 128–30°.

Matthes, *Ann.*, 1901, **316**, 312.

2-α-Hydroxyethylfuran.
See Methyl-2-furylcarbinol.

Hydroxyethylguanidine.
See Guanidinoethyl Alcohol.

***N*-2-Hydroxyethylheptylamine** (2-*Heptylaminoethyl alcohol*)

$CH_3{\cdot}[CH_2]_6{\cdot}NH{\cdot}CH_2{\cdot}CH_2OH$

$C_9H_{21}ON$ MW, 159

Cryst. M.p. 35°. B.p. 250–3°/751 mm. D_4^{20} 0·8819. n_D^{20} 1·4510. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Picrate : yellow needles from H_2O. M.p. 70–1°. Sol. EtOH. Spar. sol. H_2O.

Picrolonate : brown leaflets from EtOH.Aq. M.p. 196°. Sol. EtOH. Spar. sol. H_2O.

Matthes, *Ann.*, 1901, **315**, 115.

3-Hydroxy-3-ethyl-*n*-hexane.
See Diethylpropylcarbinol.

***N*-2-Hydroxyethylhexylamine** (2-*Hexylaminoethyl alcohol*)

$CH_3{\cdot}[CH_2]_5{\cdot}NH{\cdot}CH_2{\cdot}CH_2OH$

$C_8H_{19}ON$ MW, 145

B.p. 231°/747 mm. D_4^{20} 0·8829. n_D^{20} 1·4472. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Picrate: yellow prisms from EtOH.Aq. M.p. 80°. Sol. EtOH. Spar. sol. H_2O.

Picrolonate: brown plates from EtOH.Aq. M.p. 208–10° decomp. Sol. EtOH. Spar. sol. H_2O.

Matthes, *Ann.*, 1901, **315**, 114.

β-Hydroxy-β-ethylhydrocinnamic Acid.
See 2-Hydroxy-2-phenyl-*n*-valeric Acid.

2-Hydroxyethylidene bromide.
2 : 2-Dibromoethyl Alcohol, *q.v.*

3-ω-Hydroxyethylindole.
See Tryptophol.

***N*-2-Hydroxyethylisoamylamine.**
See 2-Isoamylaminoethyl Alcohol.

***N*-2-Hydroxyethylisobutylamine.**
See 2-Isobutylaminoethyl Alcohol.

2-Hydroxyethyl isobutyl Ether (*Ethylene glycol isobutyl ether*)

$(CH_3)_2CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_2OH$

$C_6H_{14}O_2$ MW, 118

B.p. 157–8°. D_{15}^{15} 0·8950.

I.G., F.P., 39,773, (Addn. to F.P. 610,282) (*Chem. Abstracts*, 1932, **26**, 4826): E.P., 271,169, (*Chem. Abstracts*, 1928, **22**, 1596).
Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, **46**, 1503.

***N*-2-Hydroxyethylisopropylamine.**
See 2-Isopropylaminoethyl Alcohol.

2-Hydroxyethyl isopropyl Ether (*Ethylene glycol isopropyl ether*)

$(CH_3)_2CH{\cdot}O{\cdot}CH_2{\cdot}CH_2OH$

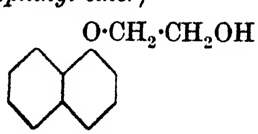
$C_5H_{12}O_2$ MW, 104

B.p. 144°/743 mm. D_{15}^{15} 0·9115.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, **46**, 1503.

α-Hydroxyethylnaphthalene.
See Methylnaphthylcarbinol.

2-Hydroxyethyl 1-naphthyl Ether (*Ethylene glycol α-naphthyl ether*)

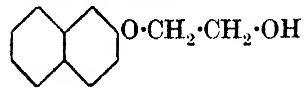


$C_{12}H_{12}O_2$ MW, 188

Plates from Et_2O–pet. ether. M.p. 42°.

Boyd, Marle, *J. Chem. Soc.*, 1914, **105**, 2135.

2-Hydroxyethyl 2-naphthyl Ether (*Ethylene glycol β-naphthyl ether*)



$C_{12}H_{12}O_2$ MW, 188

Cryst. from C_6H_6. M.p. 76°.

Rindfusz, Ginnings, Harnack, *J. Am. Chem. Soc.*, 1920, **42**, 164.
See also above reference.

1-Hydroxy-2-ethylpelargonic Acid (*1-Hydroxy-2-ethylnonoic acid*)

$$CH_3{\cdot}[CH_2]_4{\cdot}CH_2{\cdot}\underset{}{\overset{C_2H_5}{CH}}{\cdot}CH(OH){\cdot}COOH$$

$C_{11}H_{22}O_3$ MW, 202

Cryst. from pet. ether. M.p. 47°.

Et ester: $C_{13}H_{26}O_3$. MW, 230. B.p. 148–50°/15 mm.

Bagard, *Bull. soc. chim.*, 1907, **1**, 361.

***p*-β-Hydroxyethylphenol.**
See Tyrosol.

2-α-Hydroxyethyl-3-phenylbutyric Acid.
See 3-Hydroxy-2-benzyl-*n*-valeric Acid.

2-Hydroxyethyl phenyl Ether (*2-Phenoxyethyl alcohol, ethylene glycol phenyl ether*)

$C_6H_5{\cdot}O{\cdot}CH_2{\cdot}CH_2OH$

$C_8H_{10}O_2$ MW, 138

Oil. B.p. 237°, 165°/80 mm., 134–5°/18 mm. D^{22} 1·102. n_D^{20} 1·534. Sol. EtOH, Et_2O. Insol. H_2O. Sol. KOH.Aq. Heat. with $ZnCl_2 \longrightarrow$ coumaran. Esters are used as perfumes and flavourings.

Et ether: 1-ethoxy-2-phenoxyethane. $C_{10}H_{14}O_2$. MW, 166. B.p. 230°. D^{11} 1·018. Insol. H_2O.

Phenyl ether: *see under* Ethylene Glycol.

Acetyl: b.p. 241–3°.

Propionyl: b.p. 121°/4 mm.

Butyryl: b.p. 129–31°/4 mm.

Benzoyl: m.p. 64°.

Cinnamoyl: m.p. 64°.

p-*Toluenesulphonyl*: m.p. 80°.

Roithner, *Monatsh.*, 1894, **15**, 674.
Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, **26**, 1617).
Bentley, Haworth, Perkin, *J. Chem. Soc.*, 1896, **69**, 164.
Smith, Niederl, *J. Am. Chem. Soc.*, 1931, **53**, 808.

Hydroxyethyl phenyl Ketone.
See β- *and* γ-hydroxypropiophenone.

***N*-2-Hydroxyethylpropylamine.**
See 2-Propylaminoethyl Alcohol.

2-Hydroxyethyl propyl Ether (*Ethylene glycol propyl ether*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot O \cdot CH_2 \cdot CH_2OH$

$C_5H_{12}O_2$ MW, 104

B.p. 150°/743 mm. D^{15}_{15} 0·9141.

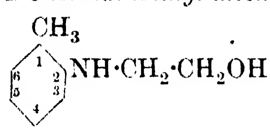
I.G., E.P., 271,169, (*Chem. Abstracts*, 1928, **22**, 1596).
Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, **46**, 1503.

Hydroxyethylsuccinic Acid.
See Ethylmalic Acid.

5-Hydroxy-2-ethyltetrahydrofuran.
See 3-Hydroxy-*n*-caproic Aldehyde.

α-Hydroxyethyltoluene.
See Methyltolylcarbinol.

***N*-β-Hydroxyethyl-*o*-toluidine** (*2-o-Toluidinoethanol, 2-o-toluidinoethyl alcohol*)



$C_9H_{13}ON$ MW, 151

Straw-coloured oil. B.p. 172°/12 mm., 145–50°/3 mm. D^{25}_{20} 1·0962. n^{20}_D 1·5675.

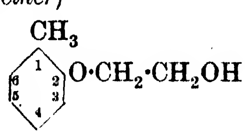
Dains, Brewster, Blair, Thompson, *J. Am. Chem. Soc.*, 1922, **44**, 2639.
Adams, Segur, *J. Am. Chem. Soc.*, 1923, **45**, 788.

***N*-β-Hydroxyethyl-*p*-toluidine** (*2-p-Toluidinoethanol, 2-p-toluidinoethyl alcohol*).

Plates from Et_2O–ligroin. M.p. 42–3°. B.p. 153–5°/4 mm.

See second reference above.

2-Hydroxyethyl *o*-tolyl Ether (*Ethylene glycol o-tolyl ether*)



$C_9H_{12}O_2$ MW, 152

Oil. B.p. 141°/19 mm. D^{29} 1·079. n^{27}_D 1·528.
Isobutyryl: b.p. 128–30°/4 mm.
p-*Nitrobenzoyl*: plates from EtOH. M.p. 78·5–79·5°.

Boyd, Marle, *J. Chem. Soc.*, 1914, **105**, 2133.
Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, **26**, 1617).
Rindfusz, Ginnings, Harnack, *J. Am. Chem. Soc.*, 1920, **42**, 161.

2-Hydroxyethyl *m*-tolyl Ether (*Ethylene glycol m-tolyl ether*).

Oil. B.p. 145–7°/19 mm.
p-*Nitrobenzoyl*: plates from EtOH. M.p. 80·5–81·5°.

See first reference above.

2-Hydroxyethyl *p*-tolyl Ether (*Ethylene glycol p-tolyl ether*).

Prisms from pet. ether. M.p. 44–5°.
Isobutyryl: b.p. 124–5°/3 mm.

Boyd, Marle, *J. Chem. Soc.*, 1914, **105**, 2134.
Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, **26**, 1617).

***N*-2-Hydroxyethylurea** (*Ureidoethyl alcohol, carbamylethanolamine*)

$H_2N \cdot CO \cdot NH \cdot CH_2 \cdot CH_2OH$

$C_3H_8O_2N_2$ MW, 104

Cryst. from EtOH. M.p. 95°. Sol. H_2O. EtOH, MeOH.
Diacetyl deriv.: m.p. 102°.
Benzoyl deriv.: m.p. 129°.
Et ether: $C_5H_{12}O_2N_2$. MW, 132. Cryst. M.p. 56°. Sol. H_2O, EtOH. Insol. Et_2O.

Franchimont, *Rec. trav. chim.*, 1894, **13**, 488.
Knorr, Meyer, *Ber.*, 1905, **38**, 3131.
Gabriel, *Ber.*, 1917, **50**, 826.

***N'*-Hydroxy-*N*-ethylurea** (*Ethylglycylhydroxylamine*)

$CH_3 \cdot CH_2 \cdot NH \cdot CO \cdot NH \cdot OH$

$C_3H_8O_2N_2$ MW, 104

M.p. 129° decomp. Sol. H_2O. Mod. sol. EtOH.

Francesconi, Parrozzani, *Gazz. chim. ital.*, 1901, **31**, 344.

2-Hydroxy-2-ethylvaleric Acid (*2:2-Diethylhydracrylic acid*)

$$CH_3 \cdot CH_2 \cdot \underset{CH_2 \cdot CH_3}{C(OH)} \cdot CH_2 \cdot COOH$$

$C_7H_{14}O_3$ MW, 146

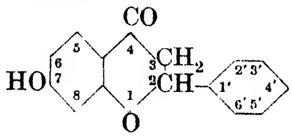
Needles. M.p. 38–9°. Sol. H_2O, EtOH, Et_2O. $k = 3{\cdot}03 \times 10^{-5}$ at 25°. Dist. with dil. H_2SO_4 $\longrightarrow$ 2:2-diethylacrylic acid.
Et ester: $C_9H_{18}O_3$. MW, 174. B.p. 77°/14 mm. D^{20}_4 0·90432. n^{20}_D 1·4440.

Schirokow, *J. prakt. Chem.*, 1881, **23**, 201.
Fichter, Kiefer, Bernouilli, *Ber.*, 1909, **42**, 4712.
Kon, Nargund, *J. Chem. Soc.*, 1932, 2462.

ω-Hydroxyeugenol.
See Lubanol.

4-Hydroxyflavan.
See Flavanol.

7-Hydroxyflavanone



$C_{15}H_{12}O_3$ MW, 240

Needles from toluene. M.p. 189°. Sol. EtOH, AcOH. Insol. H_2O. Yellow sol. in NaOH.Aq.
Me ether: $C_{16}H_{14}O_3$. MW, 254. M.p. 89°.
Acetyl: m.p. 98°.

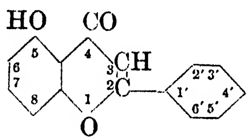
Ellison, *J. Chem. Soc.*, 1927, 1722.
Shinoda, *Chem. Abstracts*, 1928, **22**, 2947.

4′-Hydroxyflavanone.
Me ether: m.p. 92–4°. PCl_5 ⟶ 4′-methoxyflavone.

Hattori, *Chem. Abstracts*, 1926, **20**, 2162.

3-Hydroxyflavone.
See Flavonol.

5-Hydroxyflavone (5-*Hydroxy*-2-*phenylchromone*)



$C_{15}H_{10}O_3$ MW, 238

M.p. 156–7°.
Acetyl: m.p. 145°.
Me ether: $C_{16}H_{12}O_3$. MW, 252. M.p. 135°.

Simonis, Danshevski, *Ber.*, 1926, **59**, 2914.
Sugasawa, *Chem. Abstracts*, 1934, **28**, 6717.

6-Hydroxyflavone (6-*Hydroxy*-2-*phenylchromone*).
Yellow needles from EtOH.Aq. M.p. 231–2°. NaOH ⟶ greenish-yellow col.
Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from EtOH.Aq. or ligroin. Prisms from C_6H_6. M.p. 146–7°.
Acetyl: m.p. 157–8°.

Kostanecki, Levi, Tambor, *Ber.*, 1899, **32**, 331.

7-Hydroxyflavone (7-*Hydroxy*-2-*phenylchromone*).
Needles from dil. EtOH. M.p. 240°. NaOH ⟶ yellow col.
Me ether: $C_{16}H_{12}O_3$. MW, 252. Needles from EtOH. M.p. 110–11°.
Et ether: needles. M.p. 138–9°. H_2SO_4 ⟶ blue fluor.
Acetyl: m.p. 129–30°.

Emilewicz, Kostanecki, *Ber.*, 1899, **32**, 312.

2′-Hydroxyflavone (2-o-*Hydroxyphenylchromone*).
Plates from EtOH. M.p. 249–50°. Conc. H_2SO_4 ⟶ greenish-yellow col. NaOEt ⟶ salicylic acid + *o*-hydroxyacetophenone.
Me ether: prisms from CS_2. M.p. 103°.
Acetyl: m.p. 88·5–89°.

Bogert, Marcus, *J. Am. Chem. Soc.*, 1919, **41**, 95.

3′-Hydroxyflavone (2-m-*Hydroxyphenylchromone*).
Prisms from dil. EtOH. M.p. 208°.
Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from dil. EtOH. M.p. 118°.
Acetyl: m.p. 97°.

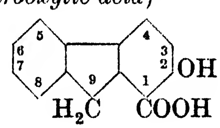
Kostanecki, Tambor, *Ber.*, 1901, **34**, 1692.

4′-Hydroxyflavone (2-p-*Hydroxyphenylchromone*).
Needles from EtOH–Py. M.p. 269–70°. Sol. dil. NaOH. Spar. sol. hot EtOH.
Me ether: $C_{16}H_{12}O_3$. MW, 252. M.p. 158·5°.
Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from EtOH. M.p. 139–40°.
Acetyl: m.p. 136°.

Grossmann, Kostanecki, *Ber.*, 1900, **33**, 2516.
Hattori, *Chem. Abstracts*, 1926, **20**, 2162.

Hydroxyfluorene.
See Fluorenol.

2-Hydroxyfluorene-1-carboxylic Acid (2-*Fluorenol*-1-*carboxylic acid*)



$C_{14}H_{10}O_3$ MW, 226

Yellow cryst. from EtOH. M.p. 236–40°. Easily sol. EtOH. $FeCl_3$ ⟶ blue col.
o-*Toluidide*: m.p. 178–80°.

Ballauf, Schmelzer, D.R.P., 530,293, (*Chem. Zentr.*, 1930, II, 3852).

2-Hydroxyfluorene-3-carboxylic Acid (2-*Fluorenol*-3-*carboxylic acid*).
Grey cryst. from EtOH. M.p. 256–60°. Spar. sol. EtOH. $FeCl_3$ ⟶ blue col.
o-*Toluidide*: m.p. 221°.

See above reference.

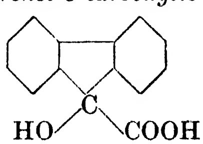
9-Hydroxyfluorene-4-carboxylic Acid (*9-Fluorenol-4-carboxylic acid*).

Cryst. from H_2O. M.p. 203°. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. cold H_2O. Sol. conc. H_2SO_4 to green sol. $KMnO_4 \longrightarrow$ fluorenone - 4 - carboxylic acid. P + HI $\longrightarrow$ fluorene.

Amide: $C_{14}H_{11}O_2N$. MW, 225. Leaflets from H_2O. M.p. 206–10°. Sublimes.

Graebe, Aubin, *Ann.*, 1888, **247**, 284.
Wegerhoff, *Ann.*, 1889, **252**, 29.

9-Hydroxyfluorene-9-carboxylic Acid (*α-Hydroxydiphenyleneacetic acid, diphenyleneglycollic acid, 9-fluorenol-9-carboxylic acid*)



$C_{14}H_{10}O_3$ MW, 226

Leaflets + $\frac{1}{2}H_2O$ from H_2O, m.p. 125°; anhyd. 169°. Spar. sol. cold H_2O, C_6H_6. $k = 1{\cdot}0 \times 10^{-3}$ at 25°. Ox. $\longrightarrow$ fluorenone. P + HI $\longrightarrow$ fluorenone-9-carboxylic acid.

Me ester: $C_{15}H_{12}O_3$. MW, 240. Cryst. from Me_2CO.Aq. M.p. 160°. *Acetyl*: leaflets from EtOH. M.p. 147–8°.

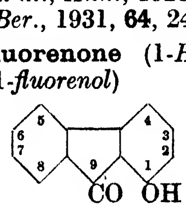
Et ester: $C_{16}H_{14}O_3$. MW, 254. Prisms from EtOH.Aq. M.p. 96° (92°). *Acetyl*: prisms from EtOH. M.p. 103–4°.

Me ether: $C_{15}H_{12}O_3$. MW, 240. Needles from EtOH. M.p. 181° decomp. *Me ester*: $C_{16}H_{14}O_3$. MW, 254. M.p. 124°. *Et ester*: $C_{17}H_{16}O_3$. MW, 268. Needles. M.p. 72°.

Et ether: $C_{16}H_{14}O_3$. MW, 254. Cryst. M.p. 169°. *Me ester*: $C_{17}H_{16}O_3$. MW, 268. Needles from EtOH.Aq. M.p. 77–8°.

Staudinger, *Ber.*, 1906, **39**, 3062.
Klinger, *Ann.*, 1912, **390**, 373.
Schmidt, Mezger, *Ber.*, 1906, **39**, 3897.
Baeyer, Friedländer, *Ber.*, 1877, **10**, 126.
Schlenk *et al.*, *Ann.*, 1928, **463**, 98.
Kliegel, *Ber.*, 1931, **64**, 2420.

1-Hydroxyfluorenone (*1-Hydroxy-9-keto-fluorene, 9-keto-1-fluorenol*)



$C_{13}H_8O_2$ MW, 196

Yellow needles. M.p. 115°. Sol. C_6H_6, AcOH. Volatile in steam. KOH fusion $\longrightarrow$ 3-hydroxydiphenyl-2-carboxylic acid. Conc. $H_2SO_4 \longrightarrow$ wine-red col.

Me ether: $C_{14}H_{10}O_2$. MW, 210. Yellow needles from EtOH. M.p. 141·5–142·5°.

Et ether: $C_{15}H_{12}O_2$. MW, 224. Yellow plates from EtOH. M.p. 99–100°.

Benzyl ether: $C_{20}H_{14}O_2$. MW, 286. Yellow needles from ligroin. M.p. 93–4°.

Acetyl: plates or needles from EtOH.Aq. M.p. 130–1°.

Benzoyl: m.p. 128–9°.

Oxime: yellow needles from C_6H_6. M.p. 169–70°.

Phenylhydrazone: m.p. 173–4°.

Staedel, *Ber.*, 1895, **28**, 113.
Heyl, *J. prakt. Chem.*, 1899, **59**, 447.

2-Hydroxyfluorenone (*2-Hydroxy-9-keto-fluorene, 9-keto-2-fluorenol*).

Red needles from AcOH.Aq. M.p. 210–11°. Spar. sol. hot H_2O, EtOH, Et_2O. Sublimes.

Me ether: yellow needles from EtOH. M.p. 77–8°.

Hydrazone: yellow needles. M.p. 201–2°.

Ketazine: brown powder. M.p. 301–3°.

Diels, *Ber.*, 1901, **34**, 1767.
Werner, Rekner, Schwabacher, *Ann.*, 1902, **322**, 168.
Gerhardt, *Monatsh.*, 1920, **41**, 199.
Patrizietti, *Chem. Zentr.*, 1934, II, 3617.

3-Hydroxyfluorenone (*3-Hydroxy-9-keto-fluorene, 9-keto-3-fluorenol*).

Yellow needles from EtOH. M.p. 228–9° (225°). Sol. EtOH, AcOH, xylene. Spar. sol. C_6H_6. Insol. H_2O. Violet sol. in conc. H_2SO_4.

Me ether: yellow plates from C_6H_6–pet. ether. M.p. 99° (96–7°). Sol. EtOH, C_6H_6, AcOH. Violet-red sol. in conc. H_2SO_4.

Acetyl: yellow needles from EtOH.Aq. M.p. 115°.

Oxime: brown cryst. from C_6H_6. M.p. 187–8° decomp. Sol. EtOH, AcOH. Mod. sol. C_6H_6. Spar. sol. hot H_2O.

Ullmann, Bleier, *Ber.*, 1902, **35**, 4278.
Errara, La Spada, *Gazz. chim. ital.*, 1905, **35**, 546.
Bardout, *Chem. Abstracts*, 1932, **26**, 1275.

4-Hydroxyfluorenone (*4-Hydroxy-9-keto-fluorene, 9-keto-4-fluorenol*).

Orange-red cryst. from EtOH. M.p. 249°. Sol. EtOH, Et_2O. Spar. sol. hot H_2O. KOH fusion $\longrightarrow$ 6-hydroxydiphenyl-2-carboxylic acid + 2′-hydroxydiphenyl-2-carboxylic acid.

Graebe, Schestakow, *Ann.*, 1895, **284**, 315.

Hydroxyformylacetic Acid.
See Hydroxypyruvic Acid.

Hydroxyfumaric Acid.
See Oxalacetic Acid.

2-Hydroxyglutamic Acid (2-*Hydroxy*-1-*aminopropane*-1 : 3-*dicarboxylic acid*, 2-*hydroxy*-1-*aminoglutaric acid*)

$HOOC{\cdot}CH_2{\cdot}CH(OH){\cdot}CH(NH_2){\cdot}COOH$

$C_5H_9O_5N$ MW, 163

***d*-.**
Prisms from H_2O. Sinters at 100°. Sol. H_2O, AcOH. Spar. sol. MeOH. Insol. EtOH, Et_2O. HI at 150° ⟶ *d*-glutamic acid.
Brucine salt: m.p. 200° decomp. $[\alpha]_D^{20} - 25{\cdot}0°$.
Strychnine salt : m.p. about 245°.

dl-.
M.p. anhyd. 195° decomp. Sol. H_2O. Insol. EtOH.
B,HCl : m.p. 187° decomp.
Et ester : $C_7H_{13}O_5N$. MW, 191. *Hydrochloride* : m.p. 168·5°.

Dakin, *Biochem. J.*, 1918, **12**, 306; *Chem. Zentr.*, 1920, I, 681.
Harington, Randall, *Biochem. J.*, 1931, **25**, 1923.

1-Hydroxyglutaric Acid (1-*Hydroxypropane*-1 : 3-*dicarboxylic acid*)

$HOOC{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$

$C_5H_8O_5$ MW, 148

d-.
Cryst. from Et_2O. M.p. 72°. $[\alpha]_D^{19} + 1{\cdot}76°$ in H_2O. HI at 120° ⟶ glutaric acid.
Di-Na salt : $[\alpha]_D^{22} + 8{\cdot}58°$ in H_2O.

l-.
Cryst. M.p. 72–3°. $[\alpha]_D - 1{\cdot}98°$ in H_2O.
Di-Na salt : $[\alpha]_D^{19} - 8{\cdot}65°$ in H_2O.

dl-.
Cryst. M.p. 72°. Evaporation of aq. sol. ⟶ butyrolactone-γ-carboxylic acid.

v. Lippmann, *Ber.*, 1882, **15**, 1156.
Karrer, Kaase, *Helv. Chim. Acta*, 1919, **2**, 446.

2-Hydroxyglutaric Acid (2-*Hydroxypropane*-1 : 3-*dicarboxylic acid*)

$HOOC{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH$

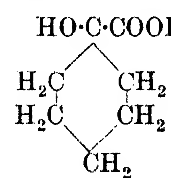
$C_5H_8O_5$ MW, 148

Needles from H_2O. M.p. 95°. Sol. H_2O, EtOH. Spar. sol. Et_2O. Vacuum dist. ⟶ vinylacetic acid + glutaconic acid + glutaconic anhydride. HI at 180° ⟶ glutaric acid. NaOH or 60% H_2SO_4 ⟶ glutaconic acid. CH_3COCl in the cold ⟶ 2-acetoxyglutaric anhydride.
Di-Et ester : $C_9H_{16}O_5$. MW, 204. B.p. 156–7°/23 mm., 150–1°/11 mm. *Acetyl* : b.p. 153–4°/11 mm.
Monoamide : $C_5H_9O_4N$. MW, **147**. Cryst. from EtOH–Et_2O. M.p. 108°. Sol. H_2O, MeOH, EtOH.
Acetyl : m.p. 65–6°. $k = 1{\cdot}57 \times 10^{-4}$.

Dakin, *Biochem. J.*, 1919, **13**, 415.
Lutz, *Chem. Zentr.*, 1910, I, 908.
v. Pechmann, Jenisch, *Ber.*, 1891, **24**, 3250.

Hydroxygranatanine.
See Granatoline.
Hydroxyhemimellitene.
See Hemimellitenol.
14-Hydroxyheptacosane.
See Heptacosanol-14.
4-Hydroxy-1 : 5-heptadiene.
See Propenylallylcarbinol.
Hydroxyheptane.
See *n*-Heptyl Alcohol, Methyl-*n*-amylcarbinol, Ethyl-*n*-butylcarbinol, *and* Dipropylcarbinol.
4-Hydroxyheptadi-ine-2 : 5.
See 2 : 5-Heptadi-inol-4.
Hydroxyheptane-dicarboxylic Acid.
See Hydroxyazelaic Acid.

1-Hydroxyhexahydrobenzoic Acid (*Cyclohexanol*-1-*carboxylic acid*)



$C_7H_{12}O_3$ MW, 144

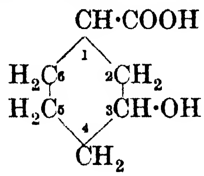
Prisms from H_2O or EtOH. M.p. 108–9° (107°). Sol. EtOH, Et_2O, C_6H_6. Mod. sol. H_2O. P + HI at 200° ⟶ hexahydrobenzoic acid.
Me ester : $C_8H_{14}O_3$. MW, 158. B.p. 103°/17 mm., 96°/16 mm.
Et ester : $C_9H_{16}O_3$. MW, 172. Prisms or needles. M.p. 20–2°. B.p. 99–100°/15 mm., 111°/18 mm. D_4^{17} 1·0471. n_D^{17} 1·457.
Amide: $C_7H_{13}O_2N$. MW, 143. Needles from AcOEt. M.p. 128–9° (124°). Sol. EtOH, Me_2CO, AcOH, hot AcOEt. Mod. sol. C_6H_6. Spar. sol. pet. ether. *Benzoate* : m.p. 118°.
Nitrile : cyclohexanone cyanhydrin. $C_7H_{11}ON$. MW, 125. M.p. 29°. B.p. 125–6°/

17·5 mm. Sol. H_2O. Insol. usual org. solvents. *Benzoate*: cryst. m.p. 71°.

Ultée, *Rec. trav. chim.*, 1909, **28**, 4, 19.
Tarbouriech, *Compt. rend.*, 1909, **149**, 604.
Aloy, Rabaut, *Compt. rend.*, 1913, **156**, 1548.
Meerwein, *Ann.*, 1913, **396**, 239.
Auwers, Krollpfeiffer, *Ber.*, 1915, **48**, 1392.
Boeseken, Lutgerhost, *Rec. trav. chim.*, 1932, **51**, 164.

2-Hydroxyhexahydrobenzoic Acid.
See Hexahydrosalicylic Acid.

3-Hydroxyhexahydrobenzoic Acid (*Cyclohexanol-3-carboxylic acid*)



$C_7H_{12}O_3$ MW, 144

Cis:
Plates from AcOEt. M.p. 132°. Sol. EtOH, Et_2O, H_2O.
Me ester: $C_8H_{14}O_3$. MW, 158. B.p. 140–50°/14 mm.
Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 148–58°/14 mm.
Amide: $C_7H_{13}O_2N$. MW, 143. Plates from H_2O. M.p. 161°.

Trans:
Cryst. from Et_2O. M.p. 119–20°. Sol. H_2O, EtOH. Spar. sol. Et_2O.

Einhorn, Coblitz, D.R.P., 81,443; *Ann.*, 1896, **291**, 298.
Perkin, Tattersall, *J. Chem. Soc.*, 1907, **91**, 482.
Schwenk, Jordan, U.S.P., 1,877,991, (*Chem. Abstracts*, 1933, **27**, 311).
Balas, Srol, *Chem. Zentr.*, 1930, II, 1072.

4-Hydroxyhexahydrobenzoic Acid (*Cyclohexanol-4-carboxylic acid*).

Cis:
Needles or prisms from pet. ether. M.p. 152°. Sol. Et_2O, C_6H_6, pet. ether. Slightly sol. Me_2CO, H_2O.
Lactone: cryst. from Et_2O. M.p. 109–10°.

Trans:
Needles from Me_2CO. M.p. 120–1°.

Perkin, *J. Chem. Soc.*, 1904, **85**, 430.
See also last reference above.

6-Hydroxyhexahydrophenyl-α-alanine.
See Hexahydrotyrosine.

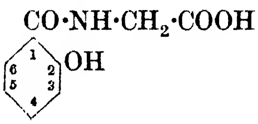
4-Hydroxyhexahydrophenylethylamine.
See Hexahydrotyramine.

Hydroxyhexahydrotoluic Acid.
See Methylcyclohexanol-carboxylic Acid.

Hydroxyhexane.
See *n*-Hexyl Alcohol, Methyl-*n*-butylcarbinol, *and* Ethylpropylcarbinol.

Hydroxyhexene.
See Hexenol.

2-Hydroxyhippuric Acid (*Salicyloylaminoacetic acid, o-hydroxybenzoylglycine, salicyloylglycine*)



$C_9H_9O_4N$ MW, 195

Needles from H_2O or EtOH–C_6H_6. M.p. 170–2° (164°). Sol. EtOH, MeOH, Me_2CO, AcOEt. Spar. sol. H_2O, Et_2O, C_6H_6, $CHCl_3$, pet. ether. Strong acid. $FeCl_3 \longrightarrow$ violet col.
Et ester: $C_{11}H_{13}O_4N$. MW, 223. Needles from H_2O or Et_2O. M.p. 88°.

Bondi, *Z. physiol. Chem.*, 1907, **52**, 172.
Fischer, *Ber.*, 1909, **42**, 221.
Schroeter, *Ber.*, 1919, **52**, 2226.

3-Hydroxyhippuric Acid (*3-Hydroxybenzoylaminoacetic acid, m-hydroxybenzoylglycine*).
Needles from H_2O. Sol. EtOH, Et_2O. Spar. sol. cold H_2O. Conc. HCl $\longrightarrow$ glycine + *m*-hydroxybenzoic acid.

Baumann, Herter, *Z. physiol. Chem.*, 1877, **1**, 260.
Conrad, *J. prakt. Chem.*, 1877, **15**, 259.

4-Hydroxyhippuric Acid (*4-Hydroxybenzoylaminoacetic acid, p-hydroxybenzoylglycine*).
Prisms from H_2O. M.p. 240° decomp. Sol. hot EtOH. Spar. sol. hot Me_2CO, AcOEt. Insol. Et_2O, C_6H_6, $CHCl_3$, pet. ether. Millon's reagent $\longrightarrow$ red col.
Me ether: *see* Anisoylglycine.

Baumann, Herter, *Z. physiol. Chem.*, 1877, **1**, 260.
Fischer, *Ber.*, 1908, **41**, 2880.
Matsuo, *J. Biol. Chem.*, 1918, **35**, 295.

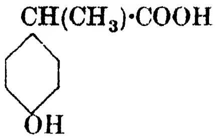
1-Hydroxyhomopiperidinic Acid.
See 1-Hydroxy-4-aminovaleric Acid.

α-Hydroxyhomopiperonylic Acid.
See 3 : 4-Methylenedioxymandelic Acid.

α-Hydroxyhydratropic Acid.
Atrolactinic Acid, *q.v.*

β-Hydroxyhydratropic Acid.
See Tropic Acid.

4-Hydroxyhydratropic Acid (1-p-*Hydroxyphenylpropionic acid*)



$C_9H_{10}O_3$ MW, 166

l-.

Me ether: 1-*p*-methoxyphenylpropionic acid. $C_{10}H_{12}O_3$. MW, 180. M.p. 57°. $[\alpha]_D^t$ − 67° 40′ in 96% EtOH.

dl.-

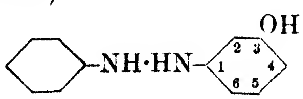
Needles from H_2O, prisms from Et_2O. M.p. 130°. Sol. hot H_2O, EtOH, Et_2O. Spar. sol. cold H_2O. Insol. CS_2.

Me ether: $C_{10}H_{12}O_3$. MW, 180. Prisms from Et_2O–pet. ether. M.p. 57°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. cold pet. ether, cold H_2O.

Et ether: $C_{11}H_{14}O_3$. MW, 194. Cryst. from H_2O. M.p. 68°. Sol. hot H_2O, Et_2O, EtOH.

Bougault, *Ann. chim.*, 1902, **25**, 519, 530.

3-Hydroxyhydrazobenzene (3-*Hydroxy*-sym.-*diphenylhydrazine*, sym.-*phenyl*-m-*hydroxyphenylhydrazine*)



$C_{12}H_{12}ON_2$ MW, 200

Needles from C_6H_6–ligroin. M.p. 126–126·5°. Sol. hot H_2O, EtOH, Et_2O. Spar. sol. ligroin. Min. acids ⟶ 2-hydroxybenzidine.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Needles. M.p. 74–5°.

Jacobson, Hönigsberger, *Ber.*, 1903, **36**, 4112.

4-Hydroxyhydrazobenzene (4-*Hydroxy*-sym.-*diphenylhydrazine*, sym.-*phenyl*-p-*hydroxyphenylhydrazine*).

Et ether: m.p. 86°.

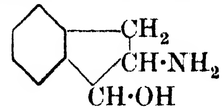
Acetyl: needles from C_6H_6–ligroin. M.p. 114–15°. Sol. EtOH, C_6H_6. Spar. sol. ligroin. Insol. alkalis.

Benzoyl: prisms. M.p. 173°. Sol. EtOH, Et_2O, C_6H_6.

Goldschmidt, Brubacher, *Ber.*, 1891, **24**, 2309.

Jacobson, Hugershoff, *Ber.*, 1903, **36**, 3848.

1-Hydroxy-2-hydrindamine (2-*Aminoindanol*-1, 1-*hydroxy*-2-*aminohydrindene*)

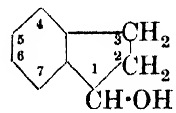


$C_9H_{11}ON$ MW, 149

Plates from Et_2O. M.p. 132–3°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6. HNO_2 ⟶ hydrindene glycol.

Spilker, *Ber.*, 1893, **26**, 1542.

1-Hydroxyhydrindene (1-*Indanol*, 1-*hydroxyindane*)



$C_9H_{10}O$ MW, 134

Plates from pet. ether. M.p. 54. B.p. 128°/12 mm. Very sol. EtOH, $CHCl_3$, C_6H_6. Spar. sol. pet. ether, H_2O.

Acetyl: oil. B.p. 241°, 135°/15 mm.

Me ether: $C_{10}H_{12}O$. MW, 148. Oil. B.p. about 98°/10 mm.

Et ether: $C_{11}H_{14}O$. MW, 162. Oil. B.p. 106–9°/16 mm.

Weissgerber, *Ber.*, 1911, **44**, 1445.

4-Hydroxyhydrindene (4-*Indanol*, 4-*hydroxyindane*).

Cryst. from pet. ether. M.p. 47–51°. B.p. 120°/12 mm.

Me ether: oil. B.p. 225–7°.

Goth, *Ber.*, 1928, **61**, 1459.

Moschner, *Ber.*, 1901, **34**, 1258.

5-Hydroxyhydrindene (5-*Indanol*, 5-*hydroxyindane*).

Needles from pet. ether. M.p. 55°. B.p. 255°. Very sol. EtOH, Et_2O. Spar. sol. hot H_2O, pet. ether.

Me ether: oil. B.p. 233–4°.

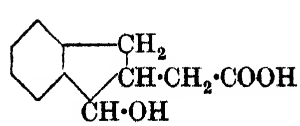
Et ether: oil. B.p. 246°.

Benzoyl: plates from EtOH. M.p. 106–7°.

Borsche, John, *Ber.*, 1924, **57**, 659.

Moschner, *Ber.*, 1900, **33**, 739.

1-Hydroxyhydrindenyl-2-acetic Acid (1-*Indanol*-2-*acetic acid*, 1-*hydroxy*-2-*carboxymethylhydrindene*)



$C_{11}H_{12}O_3$ **MW, 192**

Cis:

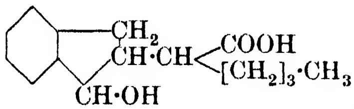
Lactone: $C_{11}H_{10}O_2$. MW, 174. Cryst. from pet. ether. M.p. 73°. Sol. EtOH, MeOH, C_6H_6, Et_2O, NH_3, NaOH. Insol. $NaHCO_3$.

Trans:

Cryst. from hot H_2O, dil. EtOH, or C_6H_6–Me_2CO. M.p. 131°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O, C_6H_6.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1299.

α-1-Hydroxyhydrindenyl-2-*n*-hexoic Acid



$C_{15}H_{20}O_3$ MW, 248

Cis:

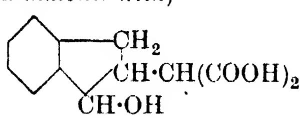
Lactone: $C_{15}H_{18}O_2$. MW, 230. Cryst. from pet. ether or EtOH. M.p. 105°.

Trans:

Cryst. from C_6H_6. M.p. 122°.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1302.

1-Hydroxyhydrindenyl-2-malonic Acid (1-*Indanol-2-malonic acid*)



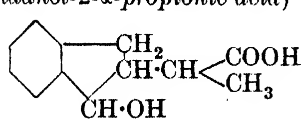
$C_{12}H_{12}O_5$ MW, 236

Trans:

Cryst. from H_2O or EtOH–C_6H_6. M.p. 118°. Spar. sol. Et_2O, C_6H_6. Heat at 120–30° ⟶ *trans*-1-hydroxyhydrindenyl-2-acetic acid.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1299.

α-1-Hydroxyhydrindenyl-2-propionic Acid (1-*Indanol-2-α-propionic acid*)



$C_{12}H_{14}O_3$ MW, 206

Cis:

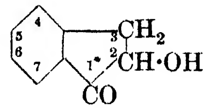
Lactone: $C_{12}H_{12}O_2$. MW, 188. Cryst. from pet. ether. M.p. 102°.

Trans:

Cryst. from C_6H_6–Me_2CO. M.p. 131°.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1302.

2-Hydroxyhydrindone (2-*Hydroxyindanone*)



$C_9H_8O_2$ MW, 148

M.p. 40°. B.p. 128–33°/1 mm. Reduces cold Fehling's.

Acetyl: b.p. 137°/1 mm.

Phenylurethane: cryst. M.p. 133–4°.

Ishiwara, *J. prakt. Chem.*, 1924, **108**, 194.

5-Hydroxyhydrindone (5-*Hydroxyindanone*).

Yellow prisms from EtOH. M.p. 183° decomp. Sol. Et_2O, C_6H_6, hot EtOH. Spar. sol. pet. ether.

Me ether: $C_{10}H_{10}O_2$. MW, 162. Needles from H_2O. M.p. 110°. Sol. usual org. solvents. Spar. sol. Et_2O, pet. ether. *Semicarbazone*: leaflets from AcOH.Aq. M.p. 239°. *Oxime*: needles from MeOH. M.p. 151°.

Semicarbazone: cryst. from EtOH. M.p. 223° decomp.

Auwers, Hilliger, *Ber.*, 1916, **49**, 2412.
Ingold, Piggott, *J. Chem. Soc.*, 1923, **123**, 1503.

6-Hydroxyhydrindone (6-*Hydroxyindanone*).

Needles from H_2O. M.p. 151–3°. $FeCl_3$ ⟶ violet col.

Me ether: plates from EtOH. M.p. 109°. *Oxime*: needles from EtOH. M.p. 133°.

Ingold, Piggott, *J. Chem. Soc.*, 1923, **123**, 1492.

7-Hydroxyhydrindone (7-*Hydroxyindanone*).

Cryst. from EtOH. M.p. 111°. B.p. 144°/20 mm. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. pet. ether. Volatile in steam.

Acetyl: cryst. from Et_2O. M.p. 78°.

Semicarbazone: micro-cryst. from EtOH. M.p. 243°.

See previous reference and also
Auwers, Hilliger, *Ber.*, 1916, **49**, 2412.

α-Hydroxyhydrocinnamic Acid (2-*Phenyllactic acid*, 1-*hydroxy-2-phenylpropionic acid*)

$C_6H_5{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$

$C_9H_{10}O_3$ MW, 166

d-.

Needles from H_2O. M.p. 124–6° (122°). Sol.

hot H_2O, MeOH, EtOH, Me_2CO, Et_2O, AcOEt, hot C_6H_6. Spar. sol. $CHCl_3$, pet. ether, CS_2. $[\alpha]_D^{20}$ + 22·2° in H_2O.

Me ester : $C_{10}H_{12}O_3$. MW, 180. M.p. 48·5°.

Et ester : $C_{11}H_{14}O_3$. MW, 194. Needles from H_2O. M.p. 46–7°. B.p. 152–4°/20 mm. $[\alpha]_D^{17·5}$ + 22·5° in C_6H_6.

Amide : $C_9H_{11}O_2N$. MW, 165. Plates from C_6H_6. M.p. 112–13°. $[\alpha]_D^{20}$ + 81·4° in EtOH.

Et-amide : $C_{11}H_{15}O_2N$. MW, 193. Plates from C_6H_6–pet. ether. M.p. 56–56·5°. Sol. H_2O, EtOH, Et_2O, C_6H_6. Spar. sol. pet. ether.

l-.

Needles from H_2O. M.p. 124–5°. $[\alpha]_D^{12}$ −18·7° in EtOH. Sol. H_2O, EtOH, Et_2O.

Me ester : needles from EtOH. M.p. 48·5°. B.p. 155°/17 mm. $[\alpha]_D^{18·5}$ + 6·4°.

Et ester : m.p. 46–7°. B.p. 159–60°/26 mm. $[\alpha]_D^{13}$ − 22·6° in C_6H_6.

dl-.

Cryst. from $CHCl_3$ or C_6H_6. M.p. 97–8°. $k = 1·93 \times 10^{-4}$ at 25°. Dil. H_2SO_4 at 200° ⟶ 2-phenylnaphthalene.

Me ester **: m.p. 33°. B.p. 143°/15 mm.**

Et ester : b.p. 156°/20 mm.

Phenyl ether : $C_{15}H_{14}O_3$. MW, 242. M.p. 81°. Sol. hot H_2O, EtOH. Insol. cold H_2O.

Amide : plates from C_6H_6. M.p. 111–12°. Sol. H_2O, EtOH. Spar. sol. C_6H_6.

Nitrile : phenylacetaldehyde cyanhydrin. C_9H_9ON. MW, 147. Needles from C_6H_6. M.p. 57–8°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. hot pet. ether.

Acetyl : m.p. 72°.

Darapsky, *J. prakt. Chem.*, 1917, **96**, 308.
McKenzie, Wren, *J. Chem. Soc.*, 1910, **97**, 1358.
Dakin, Dudley, *J. Biol. Chem.*, 1914, **18**, 44.
Biquard, *Ann. chim.*, 1933, **20**, 137.

β-Hydroxyhydrocinnamic Acid (*2-Phenylhydracrylic acid, 2-hydroxy-2-phenylpropionic acid*)

$C_6H_5·CH(OH)·CH_2·COOH$

$C_9H_{10}O_3$ MW, 166

d-.

Cryst. from C_6H_6. M.p. 115–16°. $[\alpha]_D^{16}$ +19·2° in EtOH. Conc. HCl ⟶ cinnamic acid.

Me ester : $C_{10}H_{12}O_3$. MW, 180. $[\alpha]_D$ +14·1° in EtOH.

Amide : $C_9H_{11}O_2N$. MW, 165. Needles from C_6H_6. M.p. 105–6°. $[\alpha]_D^{13}$ + 38·4° in EtOH. Sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$, C_6H_6, CS_2.

l-.

Needles from C_6H_6. M.p. 115–16°. $[\alpha]_D$ − 18·9° in EtOH.

Me ester : $[\alpha]_D$ − 17·0° in EtOH.

Et-amide : $C_{11}H_{15}O_2N$. MW, 193. Needles from C_6H_6–pet. ether. M.p. 108–9°. $[\alpha]_D^{15·5}$ − 26·2° in EtOH. Sol. H_2O, EtOH, Et_2O, $CHCl_3$. Spar. sol. pet. ether, C_6H_6, CS_2.

dl-.

Prisms from H_2O. M.p. 96°. Sol. H_2O, MeOH, EtOH, Me_2CO. Spar. sol. pet. ether, C_6H_6. $k = 4·0 \times 10^{-5}$ at 25°.

Me ester : b.p. 158–61°/17–18 mm.

Et ester : $C_{11}H_{14}O_3$. MW, 194. B.p. 160°/15–16 mm., 135°/9–10 mm. Sol. H_2O.

Me ether : $C_{10}H_{12}O_3$. MW, 180. Plates from pet. ether. M.p. 98°. Sol. EtOH, Et_2O, $CHCl_3$, AcOEt, CCl_4, C_6H_6, warm pet. ether. *Me ester* : $C_{11}H_{14}O_3$. MW, 194. B.p. 253°.

Et ether : $C_{11}H_{14}O_3$. MW, 194. Plates from pet. ether. M.p. 75°. Sol. H_2O. *Me ester* : $C_{12}H_{16}O_3$. MW, 208. B.p. 256°.

Phenyl ether : $C_{15}H_{14}O_3$. MW, 242. Needles from C_6H_6. M.p. 150–1°.

Acetyl : m.p. 100–1°.

Posner, *Ber.*, 1905, **38**, 2319.
Schrauth, Schoeller, Struensee, *Ber.*, 1911, **44**, 1436.
See also first reference above.

2-Hydroxyhydrocinnamic Acid.
See Melilotic Acid.

3-Hydroxyhydrocinnamic Acid.
See m-Hydrocoumaric Acid.

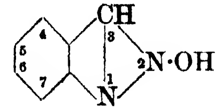
4-Hydroxyhydrocinnamic Acid.
See Phloretic Acid.

Hydroxyhydroquinone.
See 1 : 2 : 4-Trihydroxybenzene.

5-Hydroxy-2-hydroxymethyl-γ-pyrone.
See Kojic Acid.

Hydroxyindane.
See Hydroxyhydrindene.

2-Hydroxyindazole (N-*Hydroxyindazole, 2-indazolol*)



$C_7H_6ON_2$ MW, 134

Needles from H_2O. M.p. 139–139·5°. Sol. EtOH, hot C_6H_6. Mod. sol. Et_2O, ligroin. Spar. sol. H_2O, pet. ether. $FeCl_3$ ⟶ orange-red col. Sn + HCl ⟶ indazole. Polymerises.

Bamberger, Demuth, *Ber.*, **1902, 35, 1891.**

3-Hydroxyindazole (3-*Indazolol*).

Plates from EtOH or AcOH. M.p. 206°. Sol. Me_2CO, hot AcOEt. Spar. sol. H_2O, Et_2O, C_6H_6. Alc. $FeCl_3 \longrightarrow$ blue col.

2-*Acetyl*: cryst. from AcOH. M.p. 188°. Sol. hot AcOH. Spar. sol. H_2O, EtOH, Me_2CO, C_6H_6, AcOEt. Insol. Et_2O, $CHCl_3$. No col. with alc. $FeCl_3$.

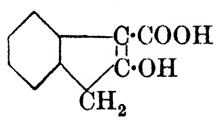
Heller, Köhler, *Ber.*, 1923, **56**, 1598.
Hantzsch, *Ber.*, 1925, **58**, 680.

6-Hydroxyindazole (6-*Indazolol*).

Plates from H_2O. M.p. 215–16°. Sol. hot H_2O. Spar. sol. Et_2O. Sublimes.

Witt, Nölting, Grandmougin, *Ber.*, 1890, **23**, 3641; *Ber.*, 1892, **25**, 3152.
Fries, Roth, *Ann.*, 1914, **404**, 84.

2-Hydroxyindene-3-carboxylic Acid (2-*Hydroxyindene-1-carboxylic acid*)



$C_{10}H_8O_3$ MW, 176

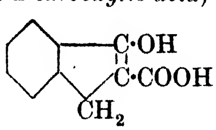
Et ester: $C_{12}H_{12}O_3$. MW, 204. Cryst. from EtOH. M.p. 68–9°. Reacts acid. Alc. $FeCl_3 \longrightarrow$ intense blue col.

Cu salt: greyish-brown cryst., m.p. 222°.

Nitrile: $C_{10}H_7ON$. MW, 157. Leaflets from EtOH.Aq. M.p. 172° decomp. Sol. AcOH. *Me ether*: $C_{11}H_9ON$. MW, 171. Needles from MeOH. M.p. 88°. B.p. 195°/25 mm. *Et ether*: $C_{12}H_{11}ON$. MW, 185. Needles from EtOH. M.p. 84°. B.p. 212°/25 mm. *Benzoate*: needles from EtOH. M.p. 123°.

Moore, Thorpe, *J. Chem. Soc.*, 1908, **93**, 178.
Dieckmann, *Ber.*, 1922, **55**, 2489.

3-Hydroxyindene-2-carboxylic Acid (1-*Hydroxyindene-2-carboxylic acid*)



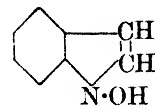
$C_{10}H_8O_3$ MW, 176

Et ester: $C_{12}H_{12}O_3$. MW, 204. Oil. B.p. 185°/20 mm. *Cu salt*: cryst. from C_6H_6 or $CHCl_3$, m.p. 195–9°.

Nitrile: $C_{10}H_7ON$. MW, 157. Needles from EtOH.Aq. M.p. 73°. Steam + dil. $H_2SO_4 \longrightarrow$ 1-hydrindone. Alc. $FeCl_3 \longrightarrow$ green col. *Me ether*: $C_{11}H_9ON$. MW, 171. Oil. B.p. 185°/20 mm. *Benzoate*: needles from EtOH. M.p. 101·5°.

See last reference above and also
Mitchell, Thorpe, *J. Chem. Soc.*, 1910, **97**, 2277.

***N*-Hydroxyindole** (1-*Hydroxyindole*, 1-*indolol*)



C_8H_7ON MW, 133

Brown cryst. M.p. 160°. Insol. dil. min. acids. Does not form picrate. Conc. $H_2SO_4 \longrightarrow$ intense green col.

Ingraffia, *Gazz. chim. ital.*, 1933, **63**, 175.

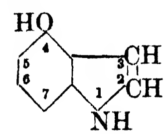
2-Hydroxyindole.

See Oxindole.

3-Hydroxyindole.

See Indoxyl.

4-Hydroxyindole (4-*Indolol*)



C_8H_7ON MW, 133

Me ether: C_9H_9ON. MW, 147. Needles from pet. ether. M.p. 69·5°. *Picrate*: red needles from EtOH. M.p. 159–60°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 328.

5-Hydroxyindole (5-*Indolol*).

Me ether: C_9H_9ON. MW, 147. Needles from pet. ether. M.p. 55°. B.p. 176–8°/17 mm. Spar. sol. hot H_2O. Slightly volatile in steam. N-*Acetyl*: needles from EtOH. M.p. 82°. B.p. 210–11°/25 mm. *Picrate*: red needles from EtOH. M.p. 145°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 322.

6-Hydroxyindole (6-*Indolol*).

Me ether: C_9H_9ON. MW, 147. Plates from pet. ether. M.p. 91–2°. *Picrate*: red needles from C_6H_6–pet. ether. M.p. 137°.

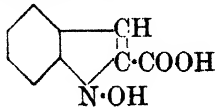
Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1922, **121**, 1879.

7-Hydroxyindole (7-*Indolol*).

Me ether: C_9H_9ON. MW, 147. B.p. 157°/17 mm., 159–61°/21 mm. Volatile in steam. *Picrate*: red needles. M.p. 156°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 327.

N-Hydroxyindole-2-carboxylic Acid (*1-Indolol-2-carboxylic acid*)



$C_9H_7O_3N$ MW, 177

Prisms from Me_2CO.Aq. M.p. 159·5° decomp. Sol. EtOH, Me_2CO, Et_2O, AcOH. Mod. sol. H_2O. Spar. sol. C_6H_6, $CHCl_3$, ligroin. $FeCl_3 \longrightarrow$ blue col. Reduces warm Fehling's. Conc. $H_2SO_4 \longrightarrow$ blue col. on warming. Cold conc. $H_2SO_4 \longrightarrow$ indigo. Zn + AcOH $\longrightarrow$ indole-1-carboxylic acid. CrO_3 + AcOH $\longrightarrow$ isatin.

Me ester: $C_{10}H_9O_3N$. MW, 191. Needles from ligroin. M.p. 100–1°.

Et ester: $C_{11}H_{11}O_3N$. MW, 205. Prisms from ligroin. M.p. 65°. Volatile in steam. *Acetyl*: needles from EtOH. M.p. 76–7°. *Benzoyl*: cryst. from EtOH. M.p. 104–5°.

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from Me_2CO.Aq. M.p. 185° decomp. Sol. hot EtOH, Et_2O, C_6H_6, Me_2CO. Spar. sol. H_2O, ligroin. Does not reduce Fehling's. NaHg $\longrightarrow$ indole-2-carboxylic acid. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Cryst. from ligroin. M.p. 68°. Sol. usual org. solvents. *Chloride*: $C_{10}H_8O_2NCl$. MW, 209·5. Needles from ligroin. M.p. 61°. Sol. usual org. solvents. *Amide*: $C_{10}H_{10}O_2N_2$. MW, 190. Plates from H_2O. M.p. 108°. Sol. most org. solvents. Spar. sol. H_2O, ligroin.

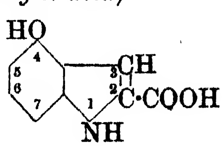
Acetyl: needles from Me_2CO.Aq. M.p. 161°. Sol. EtOH, Et_2O, Me_2CO. Spar. sol. H_2O, ligroin.

Benzoyl: cryst. from C_6H_6. M.p. 151° decomp. Sol. hot EtOH, Et_2O, Me_2CO, $CHCl_3$. Spar. sol. ligroin.

Reissert, *Ber.*, 1896, **29**, 646.
Gabriel, Gerhardt, Wolter, *Ber.*, 1923, **56**, 1025.

3-Hydroxyindole-2-carboxylic Acid.
See Indoxylic Acid.

4-Hydroxyindole-2-carboxylic Acid (*4-Indolol-2-carboxylic acid*)



$C_9H_7O_3N$ MW, 177

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O. M.p. 234–5° decomp. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from EtOH. M.p. 143·5°. *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 161·5°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 312.

5-Hydroxyindole-2-carboxylic Acid (*5-Indolol-2-carboxylic acid*).

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O. M.p. 196–7° decomp. Sol. EtOH, Et_2O, AcOH. Spar. sol. hot H_2O, C_6H_6. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from MeOH. M.p. 177°. *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 156°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 309.

6-Hydroxyindole-2-carboxylic Acid (*6-Indolol-2-carboxylic acid*).

Me ether: $C_{10}H_9O_3N$. MW, 191. Sandy cryst. M.p. 196–7°. Sol. EtOH, AcOH. Above m.p. $\longrightarrow$ 6-methoxyindole.

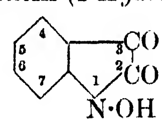
Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1921, **119**, 1632.

7-Hydroxyindole-2-carboxylic Acid (*7-Indolol-2-carboxylic acid*).

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O. M.p. 182°. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from MeOH. M.p. 120°. *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 114°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 311.

N-Hydroxyisatin (*1-Hydroxyisatin*)



$C_8H_5O_3N$ MW, 163

Orange-red needles from AcOH. M.p. 200–1° (192–3°). Sol. EtOH, Me_2CO. Spar. sol. H_2O, Et_2O. Sol. Na_2CO_3, $NaHCO_3$, $\longrightarrow$ violet col. Conc. $H_2SO_4 \longrightarrow$ brownish-red col. $\longrightarrow$ blue on addn. of C_6H_6. Hot dil. $H_2SO_4 \longrightarrow$ anthroxanic acid.

Acetyl: orange-red plates from C_6H_6. M.p. 151–2°.

Mono-phenylhydrazone: yellow cryst. from EtOH. M.p. 220° (218–19°).

Di-phenylhydrazone: orange cryst. from EtOH. M.p. 173° (169°) decomp.

Heller, *Ber.*, 1906, **39**, 2345.
Alessandri, *Gazz. chim. ital.*, 1927, **57**, 195.
Arndt, Eistert, Partale, *Ber.*, 1927, **60**, 1367.

5-Hydroxyisatin.

Me ether: $C_9H_7O_3N$. MW, 177. Reddish-brown powder. M.p. 201–2°. Sol Me_2CO, AcOH. Mod. sol. EtOH, AcOEt. Spar. sol. H_2O, Et_2O, C_6H_6, $CHCl_3$. Insol. pet. ether, CS_2, CCl_4.

Anil: $C_{15}H_{12}O_2N_2$. MW, 252. Orange needles from amyl alcohol. M.p. 223°. Sol. Me_2CO, $CHCl_3$, AcOH. Mod. sol. AcOEt. Spar. sol. EtOH, Et_2O, C_6H_6, CS_2.

N-*Acetyl*: red prisms or needles from $CHCl_3$–pet. ether. M.p. 144–5°. Sol Me_2CO, C_6H_6, $CHCl_3$, AcOH, AcOEt. Spar. sol. EtOH, Et_2O, CS_2, CCl_4. Insol. H_2O, pet. ether.

Halberkann, *Ber.*, 1921, **54**, 3087.

α-Hydroxyisoamylbenzene.
See Isobutylphenylcarbinol.

Hydroxyisoamylbenzene.
See Isoamylphenol.

1-Hydroxyisobutane-1 : 1-dicarboxylic Acid.
See Isopropyltartronic Acid.

Hydroxyisobutylacetic Acid.
See Hydroxyisocaproic Acid.

2-Hydroxyisobutylamine.
See Aminotrimethylcarbinol.

α-Hydroxyisobutylbenzene.
See Isopropylphenylcarbinol.

β-Hydroxyisobutylbenzene.
See Dimethyl-benzylcarbinol.

1-Hydroxyisobutyraldehyde

$$(CH_3)_2C(OH)\cdot CHO$$

$C_4H_8O_2$ MW, 88

B.p. 137°, 50–5°/32 mm. Polymerises.

Franke, *Monatsh.*, 1900, **21**, 213, 1127.
Dworzak, Pierri, *Monatsh.*, 1929, **52**, 144.
Avy, *Bull. soc. chim.*, 1931, **49**, 15.

1-Hydroxyisobutyric Acid (*Acetonic acid*)

$$(CH_3)_2C(OH)\cdot COOH$$

$C_4H_8O_3$ MW, 104

Hygroscopic prisms. Sublimes at 50°. M.p. 79°. B.p. 212°, 114°/12 mm., 84°/1·5 mm. Volatile in steam. Very sol. H_2O, EtOH, Et_2O, hot C_6H_6. Spar. sol. cold C_6H_6. $k = 1{\cdot}06 \times 10^{-4}$ at 25°.

Me ester: $C_5H_{10}O_3$. MW, 118. B.p. 137°.

Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 150°.

Amide: $C_4H_9O_2N$. MW, 103. Plates from Me_2CO. M.p. 98° (96°). B.p. 260°. Very sol. EtOH, H_2O.

Nitrile: acetone cyanhydrin. C_4H_7ON. MW, 85. M.p. − 19°. B.p. 82°/23 mm. D_4^{20} 0·93. n_D^{2} ·1·3996. Very sol. H_2O and most org. solvents except pet. ether.

Me ether: 1-methoxyisobutyric acid. $C_5H_{10}O_2$. MW, 118. *Me ester*: $C_6H_{12}O_2$. MW, 132. B.p. 134–7°/755 mm.

Et ether: 1-ethoxyisobutyric acid. $C_6H_{12}O_3$. MW, 132. B.p. 180°/741 mm. D_{16}^{16} 1·0101. Sol. hot H_2O.

Acetyl: 1-acetoxyisobutyric acid. Needles from CS_2. M.p. 61°. *Nitrile*: b.p. 180–2°. D^{19} 0·997.

Anschütz, Motschmann, *Ann.*, 1912, **392**, 108.
Hepworth, *J. Chem. Soc.*, 1919, **115**, 1207.
Bucherer, Grotee, *Ber.*, 1906, **39**, 1225.
Rule, Harrower, *J. Chem. Soc.*, 1930, 2326.

2-Hydroxyisobutyric Acid (1-*Methylhydracrylic acid*)

$$\begin{matrix}HO\cdot CH_2\\CH_3\end{matrix}\!\!>CH\cdot COOH$$

$C_4H_8O_3$ MW, 104

Liq. Misc. with H_2O.

Na salt: cryst. from EtOH.

Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 76°/8 mm.

Acetyl: 2-acetoxyisobutyric acid. B.p. 132°/8 mm. *Et ester*: b.p. 75°/7 mm.

Lactone: $C_4H_6O_2$. MW, 86. B.p. 49–50°/10 mm. D_{20}^{20} 1·053.

Phenylurethane: m.p. 122°.

Blaise, Herman, *Ann. chim.*, 1909, **17**, 390.
Johannson, *Chem. Zentr.*, 1916, II, 558.

1-Hydroxyisocaproic Acid (*Leucic acid, leucinic acid, 1-hydroxyisobutylacetic acid*)

$$(CH_3)_2CH\cdot CH_2\cdot CH(OH)\cdot COOH$$

$C_6H_{12}O_3$ MW, 132

d-.

Prisms from Et_2O–pet. ether. M.p. 80–1°. $[\alpha]_D^{20}$ + 26·3° (27·6° in 1% NaOH).

l-.

Cryst. from Et_2O. M.p. 81–2° after sintering at 78°. $[\alpha]_D^{20}$ − 27·8° in 1% NaOH. Sublimes. Very sol. H_2O, EtOH, Et_2O.

Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 79–80°/12 mm. $[\alpha]_D^{20}$ − 11·07°.

Acetyl: b.p. 155–7°/20 mm. *Me ester*: b.p. 103–4°/20 mm. *Et ester*: b.p. 120–1°/20 mm. *Chloride*: b.p. 87°/7 mm.

dl-.

Plates from Et_2O–pet. ether. M.p. 76–7°.

Et ester: b.p. 80–1°/16 mm. Very sol. EtOH, Et_2O. Spar. sol. H_2O.

Amide: $C_6H_{13}O_2N$. MW, 131. M.p. 51–2°.

Nitrile: isovaleraldehyde cyanhydrin. $C_6H_{11}ON$. MW, 113. Decomp. on dist. to isovaleraldehyde + HCN. *Acetyl*: b.p. 204°. D^{19} 0·960.

Scheibler, Wheeler, *Ber.*, 1911, **44**, 2686.
Henry, *Chem. Zentr.*, 1898, II, 662.
Abderhalden, Weil, *Z. physiol. Chem.*, 1913, **84**, 53.
Kodama, *Chem. Abstracts*, 1923, **17**, 2562.

2-Hydroxyisocaproic Acid (*2-Hydroxyisobutylacetic acid*)

$(CH_3)_2CH{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH$

$C_6H_{12}O_3$ MW, 132

Syrup. B.p. 173–5°/43 mm., 165–6°/35 mm. Very sol. most org. solvents.

Et ether: 2-ethoxyisocaproic acid. $C_8H_{16}O_3$. MW, 160. *Et ester*: $C_{10}H_{20}O_3$. MW, 188. Oil. B.p. 75°/8 mm.

Linstead, *J. Chem. Soc.*, 1929, 2509.
Wogrinz, *Monatsh.*, 1903, **24**, 250.

3-Hydroxyisocaproic Acid (*3-Hydroxyisobutylacetic acid*)

$(CH_3)_2C(OH){\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_6H_{12}O_3$ MW, 132

Passes readily into the lactone.

NH_4 salt: cryst. from EtOH. M.p. 127°.

Ag salt: needles from H_2O. Very sol. hot H_2O.

Ba salt: cryst. from EtOH. Very sol. H_2O. Spar. sol. EtOH.

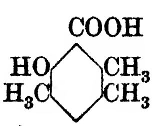
Amide: $C_6H_{13}O_2N$. MW, 131. Plates from $CHCl_3$. M.p. 101°. Very sol. EtOH. Spar. sol. $CHCl_3$. Insol. Et_2O, CS_2, C_6H_6.

Lactone: $C_6H_{10}O_2$. MW, 114. M.p. 10°. B.p. 205–7°, 95°/20 mm. $D_4^{16\cdot2}$ 1·01460. $n_D^{16\cdot2}$ 1·43541. Sol. 2 parts H_2O.

Ström, *J. prakt. Chem.*, 1893, **48**, 220.
Hepworth, *J. Chem. Soc.*, 1919, **115**, 1208.

Hydroxyisodurene.
See Isodurenol.

6-Hydroxy-γ-isodurylic Acid (*6-Hydroxy-2 : 3 : 5-trimethylbenzoic acid*, *3 : 5 : 6-trimethylsalicylic acid*)

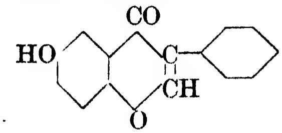


$C_{10}H_{12}O_3$ MW, 180

Needles from EtOH. M.p. 181°. Sol. Et_2O. Spar. sol. other solvents. Sublimes. Alc. $FeCl_3$ ⟶ blue col. Heat above m.p. ⟶ 5-hydroxy-ψ-cumene.

Krohn, *Ber.*, 1888, **21**, 884.

7-Hydroxyisoflavone



$C_{15}H_{10}O_3$ MW, 238

Leaflets from EtOH. M.p. 215°. H_2SO_4 ⟶ sky-blue fluorescence.

Acetyl: needles from EtOH. M.p. 139°.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Plates from EtOH. M.p. 156°.

Benzyl ether: plates from EtOH. M.p. 171°.

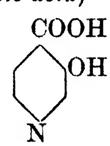
Mahal, Rai, Venkataraman, *J. Chem. Soc.*, 1934, 1121.
Baker, Robinson, *J. Chem. Soc.*, 1925, 1986.

2-Hydroxyisoheptane.
See 2-Methylhexanol-2.

3-Hydroxyisohexane.
See Ethylisopropylcarbinol.

α-Hydroxyisohexylbenzene.
See Isoamylphenylcarbinol.

3-Hydroxyisonicotinic Acid (*3-Hydroxypyridine-4-carboxylic acid*)

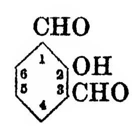


$C_6H_5O_3N$ MW, 139

Leaflets or needles from H_2O. M.p. 315° (312°) decomp. Heat ⟶ 3-hydroxypyridine.

Kirpal, *Monatsh.*, 1902, **23**, 936.
Meyer, Graf, *Ber.*, 1928, **61**, 2214.

2-Hydroxyisophthalaldehyde (*2 : 6-Dialdehydophenol*)



$C_8H_6O_3$ MW, 150

Yellow needles from H_2O. M.p. 125° (88°). $FeCl_3$ ⟶ reddish-violet col. KOH fusion ⟶ 2-hydroxyisophthalic acid. Volatile in steam. Forms bisulphite comp.

Voswinckel, *Ber.*, 1882, **15**, 2023.
Weil, Brimmer, *Ber.*, 1922, **55**, 304.

4-Hydroxyisophthalaldehyde (2 : 4-*Dialdehydophenol*).

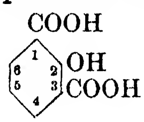
Yellow needles from H_2O. M.p. 113° (108°). Sol. Et_2O, $CHCl_3$. Mod. sol. EtOH. Spar. sol. hot H_2O. Insol. ligroin. $FeCl_3 \longrightarrow$ red col. KOH fusion $\longrightarrow$ 4-hydroxyisophthalic acid. Forms bisulphite comp.

Voswinckel, *Ber.*, 1882, **15**, 2022.
Weil, Brimmer, *Ber.*, 1922, **55**, 305.

4-Hydroxyisophthalaldehydic Acid.
See 4-Hydroxy-3-aldehydobenzoic Acid.

6-Hydroxyisophthalaldehydic Acid.
5-Aldehydosalicylic Acid, *q.v.*

2-Hydroxyisophthalic Acid



$C_8H_6O_5$ MW, 182

Needles + $1H_2O$ from H_2O, m.p. 239°; anhyd. 243–4°. Very sol. EtOH, Et_2O. Mod. sol. $CHCl_3$. Sol. 700 parts cold H_2O, 35–40 parts boiling H_2O. $FeCl_3 \longrightarrow$ cherry-red col. Aq. and alc. sols. show blue fluor.

Mono-Me ester: $C_9H_8O_5$. MW, 196. Needles. M.p. 135°. *Amide*: $C_9H_9O_4N$. MW, 195. Needles from H_2O or MeOH. M.p. 185°.

Di-Me ester: $C_{10}H_{10}O_5$. MW, 210. M.p. 72°. Very sol. EtOH, Et_2O, C_6H_6.

Mono-amide: $C_8H_7O_4N$. MW, 181. Needles from H_2O or MeOH. M.p. 245° decomp. $FeCl_3 \longrightarrow$ wine-red col.

Me ether: 2-methoxyisophthalic acid. $C_9H_8O_5$. MW, 196. Prisms from H_2O. M.p. 216–18° with decomp. and sublimation. Very sol. H_2O, EtOH, Et_2O. $FeCl_3 \longrightarrow$ yellow ppt.

Tiemann, Reimer, *Ber.*, 1877, **10**, 1570.
Graebe, Kraft, *Ber.*, 1906, **39**, 799.
Wohl, *Ber.*, 1910, **43**, 3486.

4-Hydroxyisophthalic Acid.

Needles from H_2O. M.p. 310°. Very sol. EtOH, Et_2O, hot AcOH. Sol. 5000 parts H_2O at 10°, 158·5 parts at 100°. $FeCl_3 \longrightarrow$ cherry-red col.

Di-Me ester: needles from MeOH.Aq. M.p. 96°.

Mono-Et ester: $C_{10}H_{10}O_5$. MW, 210. Plates from EtOH.Aq. M.p. 194–5°.

Di-Et ester: $C_{12}H_{14}O_5$. MW, 238. Needles from EtOH. M.p. 52°. Sol. most org. solvents. Insol. H_2O.

Diamide: $C_8H_8O_3N_2$. MW, 180. Plates from EtOH. M.p. 250°. Spar. sol. hot EtOH.

Me ether: 4-methoxyisophthalic acid. Needles from H_2O. M.p. 261°. Very sol. EtOH. Sol. Et_2O. Insol. H_2O, $CHCl_3$, C_6H_6.

Schall, *Ber.*, 1879, **12**, 828.
Ost, *J. prakt. chem.*, 1876, **14**, 104.
Loewenhertz, *Ber.*, 1892, **25**, 2796.

5-Hydroxyisophthalic Acid.

Needles + $2H_2O$ from H_2O. M.p. 284–5° (288°). Sublimes in needles. Very sol. EtOH, Et_2O. Sol. C_6H_6. Sol. 3280 parts H_2O at 5°, 5·4 parts at 100°.

Di-Me ester: needles. M.p. 159–60°.

Di-Et ester: prisms. M.p. 103°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

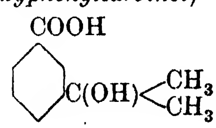
Me ether: 5-methoxyisophthalic acid. Needles from AcOH. M.p. 270°.

Kruber, Schmidt, *Ber.*, 1931, **64**, 2276.
Heine, *Ber.*, 1880, **13**, 494.
Lönnies, *ibid.*, 705.

3-Hydroxy-4-isopropyl-6-aldehydo-*o*-toluic Acid.
See Formylthymotinic Acid.

α-Hydroxyisopropylbenzene.
See Dimethyl-phenylcarbinol.

3-α-Hydroxyisopropylbenzoic Acid (*Dimethyl*-m-*carboxyphenylcarbinol*)



$C_{10}H_{12}O_3$ MW, 180

Plates from H_2O. M.p. 123–4°.

Wallach, *Ann.*, 1893, **275**, 159.

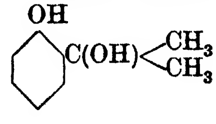
Hydroxy-4-isopropylbenzoic Acid.
See Hydroxycuminic Acid.

4-Hydroxy-2-isopropylcoumarone.
See Isotubanol.

4-Hydroxy-2-isopropylcoumarone-5-carboxylic Acid.
See Isotubaic Acid.

Hydroxyisopropylmalonic Acid.
See Isopropyltartronic Acid.

2-α-Hydroxyisopropylphenol (2-o-*Hydroxyphenylisopropyl alcohol*, *dimethyl-o-hydroxyphenylcarbinol*, *α-2-dihydroxyisopropylbenzene*)



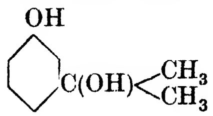
$C_9H_{12}O_2$ MW, 152

B.p. 135°/15 mm. Dist. at 760 mm. $\longrightarrow$ *o*-isopropylphenol.

Me ether: 2-α-hydroxyisopropylanisole. $C_{10}H_{14}O_2$. MW, 166. M.p. 15°. B.p. 239°.

Hoering, Baum, D.R.P., 208,886, (*Chem. Zentr.*, 1909, I, 1522).
Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, **3**, 315.

3-α-Hydroxyisopropylphenol (2-m-*Hydroxyphenylisopropyl alcohol, dimethyl*-m-*hydroxyphenylcarbinol, α-3-dihydroxyisopropylbenzene*)



$C_9H_{12}O_2$ MW, 152

Prisms from H_2O or C_6H_6. M.p. 105–6°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O. $FeCl_3 \longrightarrow$ blue col.

Me ether: 3-α-hydroxyisopropylanisole. Needles from pet. ether. M.p. 34°. B.p. 242°/ 770 mm.

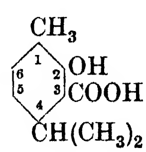
Auwers, *Ann.*, 1917, **413**, 305.
Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, **3**, 316.

α-Hydroxy-4-isopropylphenylacetic Acid.
See 4-Isopropylmandelic Acid.

Hydroxyisopropyltoluene.
See Dimethyl-tolylcarbinol, Carvacrol, and Thymol.

Hydroxy-4-isopropyl-*o*-toluic Acid.
See Thymotinic Acid.

2-Hydroxy-4-isopropyl-*m*-toluic Acid (3-*Methyl*-6-*isopropylsalicylic acid*, o-*carvacrotinic acid, carvacrol*-3-*carboxylic acid*, 4-*isopropyl*-o-*cresotinic acid*)



$C_{11}H_{14}O_3$ MW, 194

Needles from H_2O. M.p. 136° (133–4°). Sol. EtOH, Et_2O. Spar. sol. cold H_2O. Sublimes. $FeCl_3 \longrightarrow$ bluish-violet col.

Kekulé, Fleischer, *Ber.*, 1873, **6**, 1089.

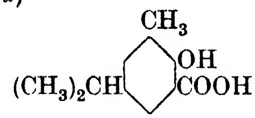
6-Hydroxy-4-isopropyl-*m*-toluic Acid (p-*Carvacrotinic acid, carvacrol*-6-*carboxylic acid*).

Me ether: 2-methyl-5-isopropylanisic acid. $C_{12}H_{16}O_3$. MW, 208. Needles from EtOH.Aq. M.p. 154–5°. *Amide*: $C_{12}H_{17}O_2N$. MW, 207. Needles from EtOH.Aq. M.p. 163–4°.

Et ether: $C_{13}H_{18}O_3$. MW, 222. Needles from H_2O. M.p. 133°. *Amide*: $C_{13}H_{19}O_2N$. MW, 221. Needles from EtOH.Aq. M.p. 133–4°.

Gattermann, *Ber.*, 1899, **32**, 1120.

2-Hydroxy-5-isopropyl-*m*-toluic Acid (3-*Methyl*-5-*isopropylsalicylic acid*, 5-*isopropyl*-o-*cresotinic acid*)



$C_{11}H_{14}O_3$ MW, 194

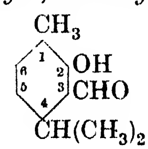
Needles from H_2O. M.p. 147°. Sol. EtOH. Insol. cold H_2O. $FeCl_3 \longrightarrow$ bluish-violet col.

Me ester: $C_{12}H_{16}O_3$. MW, 208. Needles from EtOH. M.p. 148°.

Jesurun, *Ber.*, 1886, **19**, 1414.

Hydroxy-4-isopropyl-*o*-toluic Aldehyde.
See Thymotinic Aldehyde.

2-Hydroxy-4-isopropyl-*m*-toluic Aldehyde (o-*Carvacrotinic aldehyde*, 3-*methyl*-6-*isopropylsalicylaldehyde*, 3-*aldehydocarvacrol*)



$C_{11}H_{14}O_2$ MW, 178

Oil. Volatile in steam. Alc. $FeCl_3 \longrightarrow$ dark green col.

Lustig, *Ber.*, 1886, **19**, 14.
Gattermann, *Ann.*, 1907, **357**, 330.

6-Hydroxy-4-isopropyl-*m*-toluic Aldehyde (p-*Carvacrotinic aldehyde*, 5-*aldehydocarvacrol*).

Leaflets from ligroin. Needles from H_2O or AcOH.Aq. M.p. 96°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. hot H_2O. Non-volatile in steam. No col. with $FeCl_3$.

Me ether: $C_{12}H_{16}O_2$. MW, 208. B.p. 275°. *Azine*: m.p. 184–5°.

Phenylhydrazone: plates from AcOH. M.p. 109°.

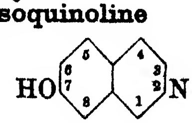
Azine: yellow cryst. from EtOH. M.p. 238–40°.

Nordmann, *Ber.*, 1884, **17**, 2633.
Lustig, *Ber.*, 1886, **19**, 16.
Gattermann, *Ann.*, 1907, **357**, 329.

α-Hydroxy-4-isopropyl-α-toluic Acid.
See 4-Isopropylmandelic Acid.

1-Hydroxyisoquinoline.
See Isocarbostyril.

7-Hydroxyisoquinoline



C_9H_7ON MW, 145

Plates from EtOH. M.p. 226–7°. Spar. sol. EtOH.

Me ether: $C_{10}H_9ON$. MW, 159. Needles from ligroin. M.p. 49°. B.p. 182–6°/34 mm. Sol. EtOH. Dil. acids ⟶ bluish-violet fluor. *B,HCl*: m.p. 221°. *B_2,H_2PtCl_6*: needles. M.p. 235–6° decomp. *Picrate*: m.p. 194–5°. *Methiodide*: m.p. 196–7°. *Ethiodide*: m.p. 178–9°.

Et ether: $C_{11}H_{11}ON$. MW, 173. M.p. 7–9°. B.p. 199°/50 mm., 182–3°/27 mm. D_D^{20} 1·0768. n_D 1·6062. *Picrate*: m.p. 202°. *B_2,H_2PtCl_6*: red needles. M.p. 245°. *Methiodide*: m.p. 193–4°. *Ethiodide*: m.p. 122–3°.

B_2,H_2PtCl_6: reddish-yellow needles. M.p. 252° decomp.

Fritsch, *Ann.*, 1895, **286**, 12, D.R.Ps., 85,566, 86,561.

8-Hydroxyisoquinoline.

Prisms from EtOH. M.p. 130°. Sol. EtOH. Insol. C_6H_6, ligroin. Sublimes in needles.

B,HCl: yellow needles. M.p. 207°.

Methochloride: yellow needles + $1\frac{1}{2}H_2O$. M.p. anhyd. 259°.

Methiodide: yellow needles. M.p. 239°.

Ethiodide: yellow needles. M.p. 275°.

Claus, Raps, *J. prakt. Chem.*, 1892, **45**, 244.

Claus, Gutzeit, *J. prakt. Chem.*, 1895, **52**, 10.

Weissgerber, *Ber.*, 1914, **47**, 3180.

Hydroxyisoquinoline-carboxylic Acid.

See Isocarbostyril-carboxylic Acid.

1-Hydroxyisovaleric Acid

$(CH_3)_2CH·CH(OH)·COOH$

$C_5H_{10}O_3$ MW, 118

M.p. 86°. Sol. H_2O, EtOH, Et_2O. Ox. ⟶ isobutyric acid. Conc. HCl ⟶ H·COOH + isobutyraldehyde.

Et ester: $C_7H_{14}O_3$. MW, 146. B.p. 174–6°. Spar. sol. H_2O.

Amide: $C_5H_{11}O_2N$. MW, 117. M.p. 104°.

Nitrile: isobutyraldehyde cyanhydrin. C_5H_9ON. MW, 99. Liq. at − 17°. B.p. 106°/22 mm. D^{16} 0·9543. n_D^{16} 1·4221. Sol. EtOH, Et_2O. Spar. sol. pet. ether. *Acetyl*: B.p. 193°. D^{19} 0·9745.

Schmidt, Sachtleben, *Ann.*, 1878, **193**, 106.

Lipp, *Ann.*, 1880, **205**, 24.

Nicolle, *Bull. soc. chim.*, 1926, **39**, 55.

2-Hydroxyisovaleric Acid

$(CH_3)_2C(OH)·CH_2·COOH$

$C_5H_{10}O_3$ MW, 118

Syrup. Sol. H_2O, EtOH, Et_2O. HI ⟶ 2-iodoisovaleric acid.

Et ester: b.p. 180°; 70°/13 mm.

Nitrile: m.p. − 12°. B.p. 210–12°, 130–2°/30 mm. D^{20} 0·9676. n_D^{20} 1·4291. Sol. EtOH, Et_2O. Spar. sol. H_2O. *Acetyl*: b.p. 198–200°. D^{18} 0·9951. n_D^{18} 1·4193.

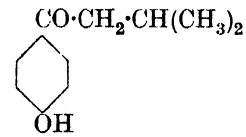
Kohn, *Monatsh.*, 1903, **24**, 767.

v. Miller, *Ann.*, 1880, **200**, 274.

Semljanizin, Saizew, *Ann.*, 1879, **197**, 73.

Lemaire, *Rec. trav. chim.*, 1910, **29**, 59.

***p*-Hydroxyisovalerophenone** (*4-Isovalerylphenol, isobutyl* p-*hydroxyphenyl ketone*)



$C_{11}H_{14}O_2$ MW, 178

Prisms from Et_2O. M.p. 97–8°. Sol. ord. org. solvents.

Auwers, *Ber.*, 1903, **36**, 3891.

1-Hydroxy-2-keto-1 : 2-difurylethane.

See αα-Furoin.

3-Hydroxy-2-ketodihydroindole.

See Dioxindole.

3-Hydroxy-4-keto-2 : 5-dimethylhexane.

See Isobutyroin.

Hydroxyketoheptane.

See Heptanolone.

Hydroxy-keto-hexane.

See Hexanolone.

2-Hydroxy-4-keto-2-methylpentane.

See Diacetone Alcohol.

1-Hydroxy-3-keto-3-phenyl-*n*-butyric Acid.

See Phenacylglycollic Acid.

2-Hydroxy-1-ketopropionaldehyde.

See Glycerosone.

***o*-Hydroxylaminobenzoic Anhydride.**

See Benzisoxazolone.

1-Hydroxylauric Acid

$CH_3·[CH_2]_9·CH(OH)·COOH$

$C_{12}H_{24}O_3$ MW, 216

Cryst. from $CHCl_3$. M.p. 73–4°.

Et ester: $C_{14}H_{28}O_3$. MW, 244. Cryst. from pet. ether. M.p. 43°. *Acetyl*: b.p. 172–3°/13 mm.

Acetyl: cryst. from pet. ether. M.p. 47°.

Guérin, *Bull. soc. chim.*, 1903, **29**, 1124.

3-Hydroxylauric Acid

$CH_3\cdot[CH_2]_7\cdot CH(OH)\cdot CH_2\cdot CH_2\cdot COOH$

$C_{12}H_{24}O_3$ MW, 216

Needles from C_6H_6–pet. ether. M.p. 62·5–63·5°. Heat ⟶ lactone.

Lactone: yellow liq. B.p. 170–1°/11 mm. D_{15} 0·9382.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 114.

11-Hydroxylauric Acid.

See Sabinic Acid.

Hydroxylepidine.

See Hydroxy-4-methylquinoline.

Hydroxylepidine-carboxylic Acid.

See Hydroxy-methylquinoline-carboxylic Acid.

1-Hydroxylignoceric Acid.

See Cerebronic Acid, Addendum Vol. I, p. 697.

Hydroxylutidine.

See Hydroxydimethylpyridine.

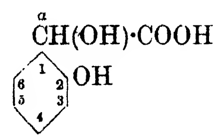
Hydroxymaleic Acid.

See Oxalacetic Acid.

Hydroxymalonic Acid.

See Tartronic Acid.

2-Hydroxymandelic Acid (*2-Hydroxyphenylglycollic acid, 2-α-dihydroxyphenylacetic acid, 2-α-dihydroxy-α-toluic acid*)



$C_8H_8O_4$ MW, 168

d-.

2-*Et ether*: $C_{10}H_{12}O_4$. MW, 196. Cryst. from H_2O. M.p. 125·5–126·5°. $[\alpha]_D^{20}$ + 145·5° in EtOH. *Me ester*: $C_{11}H_{14}O_4$. MW, 210. Cryst. $[\alpha]_D^{20}$ + 115° in EtOH. *Amide*: $C_{10}H_{13}O_3N$. MW, 195. Cryst. from C_6H_6. M.p. 124·5–125·5°. $[\alpha]_D^{20}$ + 125° in EtOH.

l-.

2-*Et ether*: cryst. from H_2O. M.p. 125·5–126·5°. $[\alpha]_D^{20}$ − 144·9° in EtOH. *Me ester*: cryst. from C_6H_6–ligroin. M.p. 30–31°. B.p. 84–6°/0·02 mm. $[\alpha]_D^{20}$ − 130° in EtOH. *Amide*: cryst. from C_6H_6. M.p. 124·5–125·5°. $[\alpha]_D^{20}$ − 124° in EtOH.

dl-.

Oil.

2-*Me ether*: $C_9H_{10}O_4$. MW, 182. *Et ester*: $C_{11}H_{14}O_4$. MW, 210. B.p. 108°/14 mm. D_{21}^{21} 1·16. n_D^{21} 1·521. *Nitrile*: $C_9H_9O_2N$. MW, 163. Cryst. from C_6H_6. M.p. 71°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, ligroin. Insol. H_2O. *Benzoate of nitrile*: cryst. from EtOH. M.p. 87–8°.

2-*Et ether*: cryst. from C_6H_6. M.p. 102·5–103·5°. *Me ester*: cryst. from C_6H_6. M.p. 71–2°. *Amide*: cryst. from C_6H_6. M.p. 102·5–103·5°. *Nitrile*: $C_{10}H_{11}O_2N$. MW, 177. Cryst. M.p. 86–9°.

Baeyer, Fritsch, *Ber.*, 1884, **17**, 974.

Francis, Davis, *J. Chem. Soc.*, 1909, **95**, 1405.

Bistrzycki, Paulus, Perrin, *Ber.*, 1911, **44**, 2611.

Lévy, Pernot, *Bull. soc. chim.*, 1931, **49**, 1729.

Weissberger, Dym, *Ann.*, 1933, **502**, 79.

3-Hydroxymandelic Acid (*3-Hydroxyphenylglycollic acid, 3-α-dihydroxyphenylacetic acid, 3-α-dihydroxy-α-toluic acid*).

3-*Me ether*: $C_9H_{10}O_4$. MW, 182. *Et ester*: $C_{11}H_{14}O_4$. MW, 210. B.p. 169°/14 mm. D_{19}^{19} 1·17. n_D^{19} 1·519.

Lévy, Pernot, *Bull. soc. chim.*, 1931, **49**, 1729.

4-Hydroxymandelic Acid (*4-Hydroxyphenylglycollic acid, 4-α-dihydroxyphenylacetic acid, 4-α-dihydroxy-α-toluic acid*).

d-.

Plates + $1H_2O$ from H_2O. M.p. anhyd. 103–4°. $[\alpha]_D$ + 144·4° in H_2O.

4-*Me ether*: $C_9H_{10}O_4$. MW, 182. Cryst. + $2H_2O$ from H_2O. M.p. 104–5°. $[\alpha]_D^{19}$ + 146·1°.

l-.

Cryst. + $\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 102–3°. $[\alpha]_D$ − 144·4° in H_2O.

4-*Me ether*: cryst. + $2H_2O$ from H_2O. M.p. 104–5°. $[\alpha]_D^{16}$ − 145·24°.

dl-.

Plates + $1H_2O$ from H_2O, needles + $1H_2O$ from Et_2O–ligroin. M.p. anhyd. 107–8° (106°).

4-*Me ether*: prisms or plates from Et_2O–ligroin. M.p. 108–9°. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$. D^{16} 1·397. *Et ester*: $C_{11}H_{14}O_4$. MW, 210. Needles from H_2O or ligroin. M.p. 47–8°. MW, 181. Plates from EtOH.Aq. M.p. 163–4° (159°). Insol. H_2O, Et_2O. *Benzoate of amide*: cryst. M.p. 155°. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O. Insol. H_2O. *Nitrile*: anisaldehyde cyanhydrin. $C_9H_9O_2N$. MW, 163. Cryst. from C_6H_6–pet. ether. M.p. 67° (57–8°, 63°). Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. *Benzoate of nitrile*: leaflets from EtOH. M.p. 66–7°.

Amide: $C_8H_9O_3N$. MW, 167. *Dib*[illegible] cryst. from EtOH. M.p. 183–4°. Insol.

Nitrile: *p*-hydroxybenzaldehyde cyanhydrin. $C_8H_7O_2N$. MW, 149. *Dibenzoyl*: needles from $CHCl_3$–Et_2O. M.p. 143–4°. Insol. H_2O, Et_2O.

Knorr, *Ber.*, 1904, **37**, 3173.
McCombie, Parry, *J. Chem. Soc.*, 1909, **95**, 585.
Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, **42**, 831.
Ellinger, Kotake, *Z. physiol. Chem.*, 1910, **65**, 409.
Bistrzycki, Paulus, Perrin, *Ber.*, 1911, **44**, 2597.
Aloy, Rabaut, *Bull. soc. chim.*, 1912, **11**, 390.

Hydroxymesitylene.
See Mesitol.

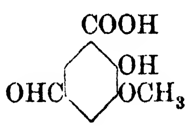
Hydroxymesitylenic Acid.
See 4-Hydroxy-3 : 5-dimethylbenzoic Acid.

4-Hydroxy-2-methoxyacetophenone.
See Isopæonol.

4-Hydroxy-3-methoxyacetophenone.
See Acetovanillone.

2-Hydroxy-4-methoxyacetophenone.
See Pæonol.

2-Hydroxy-3-methoxy-5-aldehydobenzoic Acid (*6-Hydroxy-5-methoxyisophthalaldehydic acid, 3-methoxy-5-aldehydosalicylic acid*)



$C_9H_8O_5$ MW, 196

Cryst. from Me_2CO. M.p. 272°. $FeCl_3 \longrightarrow$ blue col.

Perkin, Stoyle, *J. Chem. Soc.*, 1923, **123**, 3175.

4-Hydroxy-3-methoxy-5-aldehydobenzoic Acid.
See 5-Aldehydovanillic Acid.

2-Hydroxy-4-methoxy-3-aldehydoquinoline.
See Dictamnal.

Hydroxymethoxyallylbenzene.
See Chavibetol *and* Eugenol.

Hydroxymethoxybenzyl Alcohol.
See Vanillyl Alcohol *and* Isovanillyl Alcohol.

2-[4-Hydroxy-3-methoxybenzyl]-3-[4-hydroxy-3-methoxybenzylidene]-butane.
See Guaiaretic Acid.

4-Hydroxy-3-methoxycinnamaldehyde
See Ferula-aldehyde.

4-Hydroxy-3-methoxycinnamic Acid.
See Ferulic Acid.

3-Hydroxy-4-methoxycinnamic Acid.
See Isoferulic Acid.

***p*-Hydroxy-*m*-methoxycinnamyl Alcohol.**
See Coniferyl Alcohol.

Hydroxymethoxydimethylbenzaldehyde.
See Rhizonaldehyde *and* Isorhizonaldehyde.

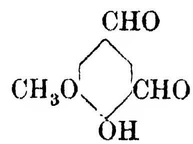
Hydroxymethoxydimethylbenzoic Acid.
See Rhizonic Acid *and* Isorhizonic Acid.

8-Hydroxy-6-methoxy-7-ethoxycoumarin.
See under Fraxetin.

7-Hydroxy-4′-methoxyflavone.
See Pratol.

7-Hydroxy-4′-methoxyisoflavone.
See Formo-ononetin.

4-Hydroxy-5-methoxyisophthalaldehyde (*3 : 5-Dialdehydoguaiacol*)



$C_9H_8O_4$ MW, 180

Yellow needles from EtOH. M.p. 119–21°.

Me ether: 4 : 5-dimethoxyisophthalaldehyde, 3 : 5-dialdehydoveratrol. $C_{10}H_{10}O_4$. MW, 194. Needles from H_2O. M.p. 123–4°.

Monoxime: needles from C_6H_6. M.p. 166–7°.

Dioxime: cryst. from EtOH. M.p. 185–6°.

Di-phenylhydrazone: yellow powder from EtOH. M.p. 188–91°.

Di-p-nitrophenylhydrazone: needles from $PhNO_2$. M.p. 286–7° decomp.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, **13**, 485.

4-Hydroxy-3-methoxyphenylacetaldehyde.
See Homovanillin.

4-Hydroxy-3-methoxyphenylacetic Acid.
See Homovanillic Acid.

Hydroxymethoxyphenylallyl Alcohol.
See Lubanol.

Hydroxymethoxypropenylbenzene.
See Isochavibetol *and* Isoeugenol.

4-Hydroxy-3-methoxy-1-propylbenzene.
See Cœrulignol.

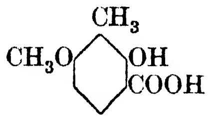
3-Hydroxy-4-methoxystyrene.
See Hesperetol.

5-Hydroxy-3-methoxy-*o*-toluic Acid.
See Isoeverninic Acid.

3-Hydroxy-5-methoxy-*o*-toluic Acid.
See Everninic Acid.

5-Hydroxy-4-methoxy-*m*-toluic Acid.
See under 4 : 5-Dihydroxy-*m*-toluic Acid.

2-Hydroxy-6-methoxy-*m*-toluic Acid (2-*Hydroxy-3-methylanisic acid*)



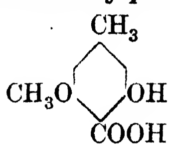
$C_9H_{10}O_4$ MW, 182

Needles from EtOH. M.p. 215–16° (210°) decomp.

Me ester: $C_{10}H_{12}O_4$. MW, 196. Needles from EtOH. M.p. 76–7°. Sol. EtOH, spar. sol. pet. ether.

Herzig, Wenzel, Haiser, *Monatsh.*, 1903, **24**, 905.
Jones, Robertson, *J. Chem. Soc.*, 1932, 1690.

3-Hydroxy-5-methoxy-*p*-toluic Acid



$C_9H_{10}O_4$ MW, 182

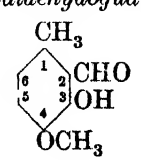
Cryst. from EtOH. M.p. 171–2° (169–70°) decomp.

Me ester: $C_{10}H_{12}O_4$. MW, 196. Needles from MeOH. M.p. 95–7°.

Herzig, Wenzel, Kurzweil, *Monatsh.*, 1903, **24**, 897.
Asahina, Ihara, *Ber.*, 1929, **62**, 1203.

5-Hydroxy-3-methoxy-*o*-toluic Aldehyde.
See Isoeverninaldehyde.

3-Hydroxy-4-methoxy-*o*-toluic Aldehyde (4-*Methyl-3-aldehydoguaiacol*)



$C_9H_{10}O_3$ MW, 166

Cryst. from H_2O. M.p. 61–2°.

Semicarbazone: needles from H_2O. Decomp. at 210° without melting.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, **13**, 480.

5-Hydroxy-4-methoxy-*o*-toluic Aldehyde.

Needles from EtOH. M.p. 175° (165°). Sol. Et_2O.

Semicarbazone: plates from EtOH. M.p. 207°.

Heyden, D.R.P., 91,170.
Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, **13**, 479.

3-Hydroxy-5-methoxy-*o*-toluic Aldehyde.
See Everninaldehyde.

6-Hydroxy-5-methoxy-*o*-toluic Aldehyde (3-*Hydroxy-2-methylanisaldehyde*, 3-*methyl-4-aldehydoguaiacol*).

Leaflets from H_2O. M.p. 133–5°. Sol. MeOH. Spar. sol. H_2O. $FeCl_3$ in MeOH ⟶ green col.

Me ether: 3-methyl-4-aldehydoveratrol. $C_{10}H_{12}O_3$. MW, 180. Needles from pet. ether. M.p. 52–3°.

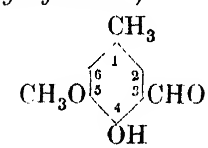
Perkin, *J. Chem. Soc.*, 1916, **109**, 914.

5-Hydroxy-6-methoxy-*o*-toluic Aldehyde (6-*Methyl-5-aldehydoguaiacol*).

Cryst. from H_2O. M.p. 104·5–105·5°.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, **13**, 482.

4-Hydroxy-5-methoxy-*m*-toluic Aldehyde (3-*Methoxy-5-methylsalicylaldehyde*, 5-*methyl-3-aldehydoguaiacol*)



$C_9H_{10}O_3$ MW, 166

Yellow oil. B.p. 270–5°. Alc. $FeCl_3$ ⟶ green col.

Tiemann, Koppe, *Ber.*, 1881, **14**, 2026.

6-Hydroxy-5-methoxy-*m*-toluic Aldehyde (3-*Methyl-4-aldehydoguaiacol*).

Yellow needles from H_2O. M.p. 99°.

Phenylhydrazone: plates from EtOH. M.p. 125°

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, **13**, 477.

***N*-Hydroxymethylacetamide** (*Methylol-acetamide, acetylaminomethanol, acetylamino-carbinol, acetylaminomethyl alcohol*)

$CH_3 \cdot CO \cdot NH \cdot CH_2OH$

$C_3H_7O_2N$ MW, 89

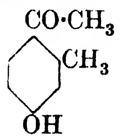
Cryst. M.p. about 50–2°. Sol. H_2O, EtOH,

$CHCl_3$. Mod. sol. glycerol. Insol. Et_2O. Reduces $NH_3.AgNO_3$.

Kalle, D.R.P., 164,610, (*Chem. Zentr.*, 1905, II, 1751).
Einhorn, Ladisch, *Ann.*, 1905, **343**, 265.
Walter, E.P., 291,712, (*Chem. Abstracts*, 1929, **23**, 1136).

ω-Hydroxy-4-methylacetophenone.
See p-Methylphenacyl Alcohol.

4-Hydroxy-2-methylacetophenone (6-*Aceto*-m-*cresol, methyl* 4-*hydroxy*-o-*tolyl ketone*)



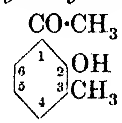
$C_9H_{10}O_2$ MW, 150

White cryst. from EtOH. M.p. 128°. B.p. 313°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O. D^{135} 1·0592. n_α^{135} 1·5369. $FeCl_3 \longrightarrow$ violet col. Does not form oxime.

Me ether: $C_{10}H_{12}O_2$. MW, 164. M.p. 12°. B.p. 268°, 150°/20 mm. D^{15} 1·0867. n_α^{15} 1·5503.
Et ether: $C_{11}H_{14}O_2$. MW, 178. M.p. 22°. B.p. 195°/80 mm., 155°/18 mm. D^{77} 1·0034. n_α^{77} 1·5142.

Nencki, Stoeber, *Ber.*, 1897, **30**, 1770.
Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

2-Hydroxy-3-methylacetophenone (3-*Aceto*-o-*cresol, methyl* 2-*hydroxy*-m-*tolyl ketone*)



$C_9H_{10}O_2$ MW, 150

B.p. 106–7°/10·5 mm.
Semicarbazone: needles from EtOH. M.p. 228°.
Phenylhydrazone: m.p. 122°.
Azine: orange needles from EtOH. M.p. 237°.

Anschültz, Schöll, *Ann.*, 1911, **379**, 342.

4-Hydroxy-3-methylacetophenone (5-*Aceto* o-*cresol, methyl* 4-*hydroxy*-m-*tolyl ketone*).

Prisms from H_2O. M.p. 104°. Sol. hot H_2O, EtOH, Et_2O. $FeCl_3 \longrightarrow$ yellowish-brown col.

Klingel, *Ber.*, 1885, **18**, 2699.
Nencki, Stoeber, *Ber.*, 1897, **30**, 1770.

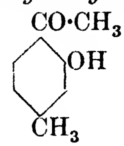
6-Hydroxy-3-methylacetophenone (3-*Aceto*-p-*cresol, methyl* 6-*hydroxy*-m-*tolyl ketone*).

Prisms from petrol. M.p. 50°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Sol. alkalis, conc. H_2SO_4. Spar. sol. H_2O. D_4^{53} 1·0797. n_D^{53} 1·541. $FeCl_3 \longrightarrow$ bluish-violet col.

Me ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 254°, 132°/11 mm. D_4^{13} 1·0694. n_D^{13} 1·538. *Semicarbazone*: m.p. 199°.
Oxime: needles from EtOH. M.p. 145°.
Semicarbazone: needles from EtOH. M.p. 212°.

Auwers, *Ann.*, 1909, **364**, 166.
Anschültz, Scholl, *Ann.*, 1911, **379**, 347.

2-Hydroxy-4-methylacetophenone (4-*Aceto*-m-*cresol, methyl* 2-*hydroxy*-p-*tolyl ketone*)



$C_9H_{10}O_2$ MW, 150

Cryst. M.p. 21°. B.p. 245°, 126°/20 mm., 103°/7 mm. D^{13} 1·1012. n_α^{13} 1·5527. $FeCl_3 \longrightarrow$ violet col.

Me ether: $C_{10}H_{12}O_2$. MW, 164. M.p. 37°. B.p. 265°. D^{78} 1·0154. n_α^{78} 1·5093. *Oxime*: m.p. 136°.
Et ether: $C_{11}H_{14}O_2$. MW, 178. M.p. 71°. B.p. 140°/10 mm. D^{78} 0·9865. n_α^{78} 1·4998. *Oxime*: m.p. 132°.
Oxime: m.p. 103°.
Semicarbazone: needles from EtOH. M.p. 214°.

Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

Hydroxymethylacetylene.
See Propargyl Alcohol.

Hydroxymethyl-allene.
See 4-Hydroxy-1 : 2-butadiene.

α-Hydroxy-β-methylaminopropylbenzene.
See Ephedrine.

Hydroxymethyl *n*-amyl Ketone.
See 1-Heptanolone-2.

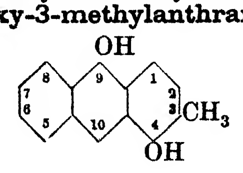
3-Hydroxy-2-methylanisaldehyde.
See 6-Hydroxy-5-methoxy-*o*-toluic Aldehyde.

6-Hydroxy-2-methylanisaldehyde.
See Everninaldehyde.

6-Hydroxy-2-methylanisic Acid.
See Everninic Acid.

2-Hydroxy-3-methylanisic Acid.
See 2-Hydroxy-6-methoxy-*m*-toluic Acid.

4-Hydroxy-3-methylanthranol

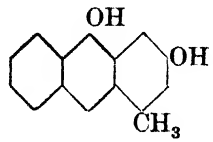


$C_{15}H_{12}O_2$ MW, 224

Cryst. from MeOH. M.p. 197°.

Perkin, Haddock, *J. Chem. Soc.*, 1933, 1519.

2-Hydroxy-4-methylanthranol (*2-Hydroxy-4-methyl-9-anthrone*)

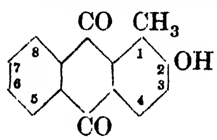


$C_{15}H_{12}O_2$ MW, 224

Needles from EtOH. M.p. 224°.
Diacetyl: prisms from EtOH. M.p. 172–3°.

Bistrzycki, de Schepper, *Ber.*, 1898, **31**, 2795.

2-Hydroxy-1-methylanthraquinone



$C_{15}H_{10}O_3$ MW, 238

Yellow needles from AcOH. M.p. above 300°. Sol. EtOH, C_6H_6, alkalis.
Me ether: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from MeOH. M.p. 184°. Sol. AcOH, EtOH. Sublimes. $H_2SO_4 \longrightarrow$ scarlet sol.

Bentley, Gardner, Weizmann, *J. Chem. Soc.*, 1907, **91**, 1631.

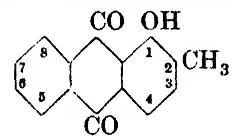
3-Hydroxy-1-methylanthraquinone.
Cryst. from EtOH. M.p. 285° (299–300°).
Me ether: $C_{16}H_{12}O_3$. MW, 252. Cryst. from MeOH. M.p. 128–9°.
Acetyl: cryst. M.p. 151–2° (134–5°).

Keimatsu, Hirano, Tanabe, *Journal of the Pharmaceutical Society, Japan*, 1929, **49**, 531.
See also Bistrzycki, de Schepper, *Ber.*, 1898, **31**, 2795.

4-Hydroxy-1-methylanthraquinone.
Brown needles from AcOH. M.p. 175–6° (170°). Sublimes in red needles. Sol. C_6H_6, AcOH, toluene, warm ligroin. Bluish-red sols. in alkalis. Insol. NH_3, Na_2CO_3. Conc. $H_2SO_4 \longrightarrow$ orange-red sol.
Me ether: $C_{16}H_{12}O_3$. MW, 252. Orange-yellow needles from EtOH or AcOH. M.p. 128°. Sol. hot EtOH, Et_2O, C_6H_6. Conc. $H_2SO_4 \longrightarrow$ orange sol.
Acetyl: yellow needles from AcOH. M.p. 179—80°.

Baeyer, Drewson, *Ann.*, 1882, **212**, 346.
Ullmann, Schmidt, *Ber.*, 1919, **52**, 2103.
Ullmann, D.R.P., 292, 066, (*Chem. Zentr.*, 1916, I, 1211).
Fischer, Sapper, *J. prakt. Chem.*, 1911. **83**, 207.

1-Hydroxy-2-methylanthraquinone



$C_{15}H_{10}O_3$ MW, 238

Orange-yellow needles from EtOH. M.p. 184–5° (178°). Sol. Et_2O, C_6H_6. Spar. sol. EtOH. Insol. H_2O, NH_3. Conc. $H_2SO_4 \longrightarrow$ orange-red sol.
Me ether: $C_{16}H_{12}O_3$. MW, 252. Cryst. M.p. 156–7°.
Phenyl ether: $C_{21}H_{14}O_3$. MW, 314. Yellow cryst. from AcOH. M.p. 190°. Sol. C_6H_6, $PhNO_2$. Insol. EtOH, Et_2O. Conc. $H_2SO_4 \longrightarrow$ wine-red sol.
Acetyl: orange-yellow plates from EtOH. M.p. 177°.

Römer, Link, *Ber.*, 1883, **16**, 700.
Holdermann, *Ber.*, 1906, **39**, 1257.
Ullmann, Bincer, *Ber.*, 1916, **49**, 743.
Eder, Widmer, Bütler, *Helv. Chim. Acta*, 1924, **7**, 353.
Keimatsu, Hirano, *Journal of the Pharmaceutical Society, Japan*, 1929, **49**, 144.

3-Hydroxy-2-methylanthraquinone.
Yellow plates. M.p. 260–2° decomp. Sublimes in yellow plates. Sol. EtOH, Et_2O, AcOH.
Acetyl: yellow needles from AcOH. M.p. 177°. Sol. C_6H_6. Spar. sol. EtOH.

Baeyer, Fraude, *Ann.*, 1880, **202**, 163.
Bistrzycki, Zen-Ruffinen, *Helv. Chim. Acta*, 1920, **3**, 378.

4-Hydroxy-2-methylanthraquinone.
Yellow needles from AcOH. M.p. 178°. Sol. EtOH, Me_2CO, C_6H_6, $PhNO_2$. Mod. sol. Et_2O, ligroin. Conc. $H_2SO_4 \longrightarrow$ orange-red sol. Bluish-red sols. in alkalis.
Me ether: cryst. M.p. 142–3°.
Acetyl: yellowish-green needles from EtOH. M.p. 156–7°. Sol. AcOH. Insol. H_2O. Conc. $H_2SO_4 \longrightarrow$ orange-yellow sol.

Benzoyl: yellowish-green cryst. from EtOH. M.p. 228–9°. Sol. AcOH. Insol. H_2O.

Schmidt, Ullmann, *Ber.*, 1919, **52**, 2113.
Eder, Widmer, Bütler, *Helv. Chim. Acta*, 1924, **7**, 353.
Keimatsu, Hirano, Tanabe, *Journal of the Pharmaceutical Society, Japan*, 1929, **49**, 538.
Keimatsu, Hirano, *Journal of the Pharmaceutical Society, Japan*, 1931, **51**, 909.

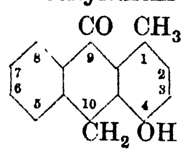
5-Hydroxy-2-methylanthraquinone.
Yellow needles from AcOH. M.p. 147°.
Acetyl: cryst. from EtOH. M.p. 172°.

Mitter, Sarkar, *J. Indian Chem. Soc.*, 1930, **7**, 625.

6-Hydroxy-2-methylanthraquinone.
Yellow plates from EtOH. M.p. 278°.
Me ether: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from EtOH. M.p. 177°.
Acetyl: yellow plates from EtOH. M.p. 145–7°.

Mitter, Sarkar, *J. Indian Chem. Soc.*, 1930, **7**, 627.

4-Hydroxy-1-methylanthrone

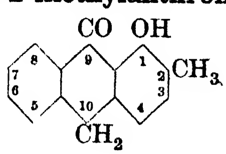


$C_{15}H_{12}O_2$ MW, 224

Needles from C_6H_6–pet. ether. M.p. 226–7°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, **52**, 4891.

1-Hydroxy-2-methylanthrone



$C_{15}H_{12}O_2$ MW, 224

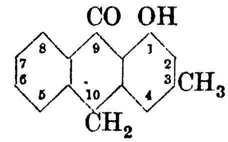
Yellow needles from C_6H_6–pet. ether or MeOH. M.p. 136–7°.
Diacetyl: prisms from EtOH. M.p. 180–2°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, **52**, 4891.
Perkin, Haddock, *J. Chem. Soc.*, 1933, 1519.

4-Hydroxy-2-methylanthrone.
Light brown needles from C_6H_6–pet. ether. M.p. 258–9°.

See first reference above.

1-Hydroxy-3-methylanthrone



$C_{15}H_{12}O_2$ MW, 224

Yellow needles from C_6H_6–pet. ether. M.p. 158–9°.

Steyermark, Gardner, *J. Amer. Chem. Soc.*, 1930, **52**, 4891.

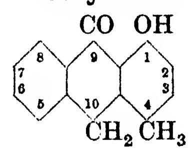
2-Hydroxy-3-methylanthrone.
Prisms from AcOH. M.p. 276–7°. Spar. sol. EtOH, Me_2CO, $CHCl_3$, xylene.

Bistrzycki, Zen-Ruffinen, *Helv. Chim. Acta*, 1920, **3**, 374.

4-Hydroxy-3-methylanthrone.
Needles from C_6H_6–pet. ether. M.p. 207–8°.

Steyermark, Gardner, *J. Amer. Chem. Soc.*, 1930, **52**, 4891.

1-Hydroxy-4-methylanthrone



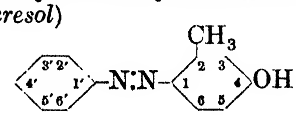
$C_{15}H_{12}O_2$ MW, 224

Yellow needles from C_6H_6–pet. ether. M.p. 167–8°.

See previous reference.

2-Hydroxy-4-methylanthrone.
See 2-Hydroxy-4-methylanthranol.

4-Hydroxy-2-methylazobenzene (6-*Benzeneazo*-m-*cresol*)



$C_{13}H_{12}ON_2$ MW, 212

Yellow needles from ligroin. M.p. 109°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6.
B,HCl: m.p. 185°.
Et ether: $C_{15}H_{16}ON_2$. MW, 240. Orange needles. M.p. 51–2°. Sol. EtOH, Et_2O, ligroin.

Noelting, Kohn, *Ber.*, 1884, **17**, 366.
Jacobson *et al.*, *Ann.*, 1895, **287**, 147.

4'-Hydroxy-2-methylazobenzene (o-*Tolueneazo*-p-*phenol*).
Red needles from C_6H_6–ligroin. M.p. 107–8°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. ligroin. Sol. alkalis.
B,HCl: m.p. 141° decomp.

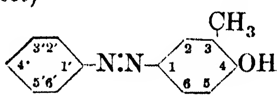
Me ether: *o*-tolueneazo-*p*-anisole. $C_{14}H_{14}ON_2$. MW, 226. Brown needles. M.p. 59°.

Et ether: *o* - tolueneazo - *p* - phenetole. $C_{15}H_{16}ON_2$. MW, 240. Orange plates. M.p. 53°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O.

Acetyl: red leaflets. M.p. 68°.

Noelting, Werner, *Ber.*, 1890, **23**, 3257.
Grandmougin, Freimann, *J. prakt. Chem.*, 1908, **78**, 388.
Farmer, Hantzsch, *Ber.*, 1899, **32**, 3097.

4-Hydroxy-3-methylazobenzene (5-*Benzeneazo*-o-*cresol*)



$C_{13}H_{12}ON_2$ MW, 212

Yellow needles from EtOH. M.p. 128–30°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, dil. alkalis. Spar. sol. hot H_2O.

Et ether: $C_{15}H_{16}ON_2$. MW, 240. Orange needles from EtOH. M.p. 60°. Sol. EtOH, Et_2O, C_6H_6.

Acetyl: yellow plates. M.p. 81–2°.

Benzoyl: yellow needles. M.p. 110°.

Liebermann, Kostanecki, *Ber.*, 1884, **17**, 877.
Noelting, Kohn, *Ber.*, 1884, **17**, 363.

6-Hydroxy-3-methylazobenzene (3-*Benzeneazo*-p-*cresol*).

Golden leaflets from C_6H_6. M.p. 108–9°. Sol. EtOH, Et_2O, $CHCl_3$. Sol. conc. H_2SO_4 to brown sol. Sol. dil. alkalis. Sublimes. Volatile in steam.

Et ether: $C_{15}H_{16}ON_2$. MW, 240. Red leaflets from EtOH. M.p. 48°. Sol. EtOH, Et_2O, C_6H_6.

Acetyl: orange-red needles. M.p. 67–8°. Sol. EtOH, Et_2O, Me_2CO, $CHCl_3$. Insol. dil. alkalis.

Benzoyl: yellow needles. M.p. 113°.

Liebermann, Kostanecki, *Ber.*, 1884, **17**, 131.
Noelting, Kohn, *Ber.*, 1884, **17**, 352.
Puxeddu, Maccioni, *Gazz. chim. ital.*, 1907, **37**, 82.
Noelting, Werner, *Ber.*, 1890, **23**, 3262.

4′-Hydroxy-3-methylazobenzene (m-*Tolueneazo*-p-*phenol*).

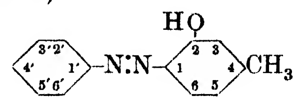
Dark yellow prisms from C_6H_6–ligroin. M.p. 144–5°.

B,HCl: m.p. 160–72°.

Et ether: *m* - tolueneazo - *p* - phenetole. $C_{15}H_{16}ON_2$. MW, 240. Orange-red prisms from EtOH. M.p. 65°. Sol. EtOH, Et_2O, C_6H_6.

Paganini, *Ber.*, 1891, **24**, 368.
Jacobson *et al.*, *Ann.*, 1895, **287**, 161.

2-Hydroxy-4-methylazobenzene (4-*Benzeneazo*-m-*cresol*)



$C_{13}H_{12}ON_2$ MW, 212

Red needles. M.p. 122°. Sol. EtOH, Me_2CO, $CHCl_3$, C_6H_6. Spar. sol. alkalis.

McPherson, Boord, *J. Am. Chem. Soc.*, 1911, **33**, 1530.

2′-Hydroxy-4-methylazobenzene (p-*Tolueneazo*-o-*phenol*).

Yellow plates from EtOH. M.p. 100°. Sol. most org. solvents. Volatile in steam.

Et ether: *p* - tolueneazo - *o* - phenetole. $C_{15}H_{16}ON_2$. MW, 240. Red prisms from ligroin. M.p. 92–3°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. pet. ether.

Bamberger, *Ber.*, 1900, **33**, 3191.
Jacobson, Huber, *Ann.*, 1909, **369**, 7.

4′-Hydroxy-4-methylazobenzene (p-*Tolueneazo*-p-*phenol*).

Orange-red prisms. M.p. 152°. Sol. EtOH, Et_2O, C_6H_6, alkalis. Spar. sol. H_2O.

B,HCl: m.p. 176° decomp.

B,2HNO₃: m.p. 54°.

Me ether: *p*-tolueneazo-*p*-anisole. $C_{14}H_{14}ON_2$. MW, 226. Red prisms from EtOH. M.p. 110–11°. Sol. most org. solvents.

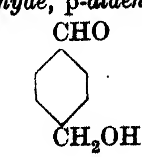
Et ether: *p* - tolueneazo - *p* - phenetole. $C_{15}H_{16}ON_2$. MW, 240. Red leaflets from EtOH. M.p. 121–2°. B.p. 251°/47 mm. Sol. EtOH, $CHCl_3$.

Acetyl: orange needles from C_6H_6. M.p. 98°.

Benzoyl: orange-red prisms from C_6H_6. M.p. 178°.

Grandmougin, Freimann, *J. prakt. Chem.*, 1908, **78**, 392.
McPherson, Stratton, *J. Am. Chem. Soc.*, 1915, **37**, 911.
Jacobson *et al.*, *Ann.*, 1895, **287**, 162.
Hantzsch, Glover, *Ber.*, 1906, **39**, 4163.

***p*-Hydroxymethyl-benzaldehyde** (ω-*Hydroxy*-p-*toluic aldehyde*, p-*aldehydobenzyl alcohol*)



$C_8H_8O_2$ MW, 136

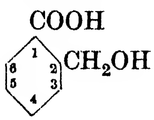
Oil. B.p. above 200°.

Me ether: $C_9H_{10}O_2$. MW, 150. B.p. 125°/16 mm. D^{25} 1·071. n_D^{25} 1·535. *Semicarbazone*: cryst. from EtOH. M.p. 182°.

Et ether: $C_{10}H_{12}O_2$. MW, 164. Oil. B.p. 133–4°/14 mm. *Phenylhydrazone*: cryst. M.p. 86°.

Allain-Le Canu, *Compt. rend.*, 1894, **118**, 535.
Quelet, *Compt. rend.*, 1931, **193**, 939; *Bull. soc. chim.*, 1933, **53**, 230.
Sabetay, *Compt. rend.*, 1931, **193**, 1194.

o-Hydroxymethyl-benzoic Acid (*ω-Hydroxy-*o*-toluic acid, benzyl alcohol 2-carboxylic acid, 2-carboxyphenylethyl alcohol*)



$C_8H_8O_3$ MW, 152

Needles. M.p. 128° (118–20°). Sol. H_2O, EtOH, Et_2O. Heat of comb. C_p 887·8 Cal. $k = 1{\cdot}51 \times 10^{-4}$ at 25°.

Me ether: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 93–4°. B.p. 121–5°/0·5 mm. *Me ester*: $C_{10}H_{12}O_3$. MW, 180. B.p. 124–5°/15 mm.

Et ether: $C_{10}H_{12}O_3$. MW, 180. *Nitrile*: $C_{10}H_{11}ON$. MW, 161. B.p. 242°.

Phenyl ether: $C_{14}H_{12}O_3$. MW, 228. Needles from EtOH. M.p. 126°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. *Me ester*: $C_{15}H_{14}O_3$. MW, 242. Needles from EtOH. M.p. 52·5°. B.p. 204°/13 mm. *Nitrile*: $C_{14}H_{11}ON$. MW, 209. Needles from ligroin. M.p. 63–5°.

Hydrazide: needles from EtOH. M.p. 128°.

Lactone: *see* Phthalide.

Cassirer, *Ber.*, 1892, **25**, 3019.
Zincke, Fries, *Ann.*, 1904, **334**, 359.
Staudinger, Mächling, *Ber.*, 1916, **49**, 1976.
v. Braun, Anton, Weissbach, *Ber.*, 1930, **63**, 2861.

m-Hydroxymethyl-benzoic Acid (*ω-Hydroxy-*m*-toluic acid, benzyl alcohol 3-carboxylic acid, 3-carboxyphenylethyl alcohol*).

Cryst. powder. M.p. 111°. B.p. 190°/11 mm.

Nitrile: 3-cyanobenzyl alcohol. C_8H_7ON. MW, 133. B.p. 165°/16 mm.

Langgruth, *Ber.*, 1905, **38**, 2063.

p-Hydroxymethyl-benzoic Acid (*ω-Hydroxy-*p*-toluic acid, benzyl alcohol 4-carboxylic acid, 4-carboxyphenylethyl alcohol*).

Plates or needles from H_2O. M.p. 181°. Sol. Et_2O. Sublimes in needles.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 161–3°/5 mm. *Benzoyl*: oil. B.p. 203–7°/3 mm. p-*Nitrobenzoyl*: yellow cryst. from EtOH. M.p. 86°. p-*Aminobenzoyl*: cryst. from C_6H_6–pet. ether. M.p. 95°. Sol. EtOH. Insol. H_2O. *Urethane*: cryst. from C_6H_6–pet. ether. M.p. 119°. Sol. EtOH. Insol. H_2O. *Phenylurethane*: cryst. from C_6H_6–pet. ether. M.p. 107°. Sol. EtOH. Insol. H_2O.

Propyl ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 164–5°/4 mm.

Butyl ester: $C_{12}H_{16}O_3$. MW, 208. B.p. 174°/3 mm.

Benzyl ester: $C_{15}H_{14}O_3$. MW, 242. Cryst. from Et_2O–pet. ether. M.p. 63°.

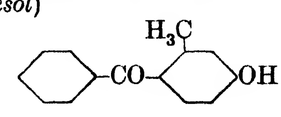
Me ether: $C_9H_{10}O_3$. MW, 166. Leaflets from H_2O. M.p. 123°. *Chloride*: $C_9H_9O_2Cl$. MW, 184·5. B.p. 136–8°/8 mm.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Plates from H_2O. M.p. 87° (78–9°). Sol. usual solvents. *Et ester*: $C_{12}H_{16}O_3$. MW, 208. B.p. 277–278·5°, 163–5°/18 mm. *Chloride*: $C_{10}H_{11}O_2Cl$. MW, 198·5. B.p. 136–8°/8 mm. *Amide*: $C_{10}H_{13}O_2N$. MW, 179. Needles from H_2O. M.p. 112°.

Nitrile: 4-cyanobenzyl alcohol. C_8H_7ON. MW, 133. Leaflets from AcOEt. M.p. 133–4°. Sol. H_2O. Insol. C_6H_6, $CHCl_3$, ligroin. *Acetyl*: m.p. 71–2°. *Benzoyl*: m.p. 123°.

Einhorn, Ladisch, *Ann.*, 1900, **310**, 203.
Friedländer, Mosczyc, *Ber.*, 1895, **28**, 1144.
Salkind, *J. Russ. Phys.-Chem. Soc.*, 1914, **46**, 509.
Case, *J. Am. Chem. Soc.*, 1925, **47**, 1144, 3004.
Quelet, *Bull. soc. chim.*, 1933, **53**, 234.

4-Hydroxy-2-methylbenzophenone (5-*Benzo-*m*-cresol*)

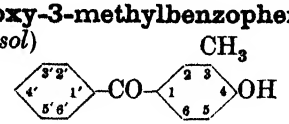


$C_{14}H_{12}O_2$ MW, 212

Colourless cryst. from C_6H_6–pet. ether. M.p. 129°. Non-volatile in steam.

Hamada, *Chem. Abstracts*, 1933, **27**, 3928.

4-Hydroxy-3-methylbenzophenone (5-*Benzo-*o*-cresol*)



$C_{14}H_{12}O_2$ MW, 212

Yellow cryst. from C_6H_6. M.p. 172–3°. Non-volatile in steam.

See above reference.

6-Hydroxy-3-methylbenzophenone (3-*Benzo*-p-*cresol*).

Yellow cryst. from EtOH. M.p. 83–4°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, to yellow sols. Colourless sol. in ligroin.

Et ether: $C_{16}H_{16}O_2$. MW, 240. Pale yellow needles from EtOH. M.p. 68°.

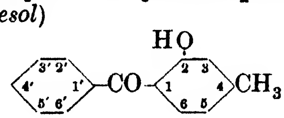
Acetyl: m.p. 102–3°.

Oxime: needles from AcOH. M.p. 126–9°.

Azine: yellow cryst. from AcOH. M.p. 260°.

Auwers, Betteridge, *Ber.*, 1903, **36**, 3891.
Auwers, Czerny, *Ber.*, 1898, **31**, 2694.

2-Hydroxy-4-methylbenzophenone (4-*Benzo*-m-*cresol*)



$C_{14}H_{12}O_2$ MW, 212

Yellow cryst. from EtOH.Aq. M.p. 60°. $FeCl_3$ ⟶ blood-red col.

Hamada, *Chem. Abstracts*, 1933, **27**, 3928.

2′-Hydroxy-4-methylbenzophenone (2-p-*Toluylphenol*).

Cryst. from EtOH.Aq. M.p. 61·5°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, ligroin. Ox. ⟶ terephthalic acid.

Oxime: m.p. 175°.

Benzoyl: cryst. from EtOH. M.p. 80°.

Phenylhydrazone: yellow cryst. from C_6H_6. M.p. 145°.

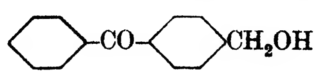
Ullmann, Goldberg, *Ber.*, 1902, **35**, 2812.

4′-Hydroxy-4-methylbenzophenone (4-p-*Toluylphenol*).

Needles from H_2O. M.p. 160°. Spar. sol. CS_2.

Limpricht, Samietz, *Ann.*, 1895, **286**, 328.

4-Hydroxymethyl-benzophenone (p-*Benzoylbenzyl alcohol, phenyl* ω-*hydroxy*-p-*tolyl ketone*)



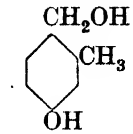
$C_{14}H_{12}O_2$ MW, 212

Leaflets from H_2O. M.p. 48·3°. Sol. EtOH, Et_2O, $CHCl_3$, Me_2CO. Spar. sol. H_2O.

Acetyl: needles from Et_2O. M.p. 36°.

Bourcet, *Bull. soc. chim.*, 1896, **15**, 947.

4-Hydroxy-2-methylbenzyl Alcohol (1-ω-*Hydroxy*-o-4-*xylenol*)

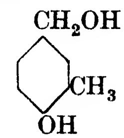


$C_8H_{10}O_2$ MW, 138

Cryst. from AcOEt. M.p. 122°. $FeCl_3$ on EtOH sol. ⟶ green col.

Bayer, D.R.P., 85,588.

4-Hydroxy-3-methylbenzyl Alcohol (1-ω-*Hydroxy*-m-4-*xylenol*)



$C_8H_{10}O_2$ MW, 138

Cryst. from $CHCl_3$. M.p. 87°.

See above reference.

2-Hydroxy-4-methylbenzyl Alcohol.
See 4-Methylsaligenin.

2-Hydroxy-5-methylbenzyl Alcohol.
See Homosaligenin.

α-Hydroxy-*N*-methylbenzylamine.
See α-Methylaminobenzyl Alcohol.

Hydroxy - methylbutenyl - α - naphtho - quinone.
See Lapachol *and* Isolapachol.

2-Hydroxy-2-methyl-*n*-butylamine (2-*Hydroxy*-1-*aminoisopentane*)

$$\begin{matrix} CH_3{\cdot}CH_2 \\ CH_3 \end{matrix}\!\!>C(OH){\cdot}CH_2NH_2$$

$C_5H_{13}ON$ MW, 103

B.p. 170°, 75–80°/30 mm. Misc. with H_2O, Et_2O.

B,HCl: leaflets from Me_2CO. M.p. 90°.

Fourneau, *J. pharm. chim.*, 1910, **2**, 56, (*Chem. Zentr.*, 1910, II, 1366).

α-Hydroxy-α-methylbutylbenzene.
See Methylethylbenzylcarbinol.

Hydroxymethyl butyl Ketone.
See 1-Hexanolone-2.

1-Hydroxy-1-methylbutyric Acid (*Methylethylglycollic acid*, 1-*ethyl-lactic acid*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}(OH){\cdot}COOH$$

$C_5H_{10}O_3$ MW, 118

Cryst. M.p. 72–3° (68°). B.p. 133–4°/16 mm. Very sol. EtOH, H_2O, Et_2O. Sublimes in needles at 90°. $CrO_3 \longrightarrow$ methyl ethyl ketone.

Me ester: $C_6H_{12}O_3$. MW, 132. B.p. 151·6–152°.

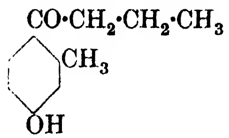
Et ester: $C_7H_{14}O_3$. MW, 146. B.p. 165·5° (162°). D^{13} 0·9768. Very sol. H_2O, EtOH, Et_2O.

Amide: $C_5H_{11}O_2N$. MW, 117. Cryst. M.p. 160°.

Nitrile: methyl ethyl ketone cyanhydrin. C_5H_9ON. MW, 99. B.p. 180°/762 mm., 91°/20·5 mm. Sol. H_2O, EtOH, Et_2O. D^{24} 0·9212 (D^{19} 0·9303). *Acetyl*: b.p. 195°/764 mm. Sol. EtOH, Et_2O. Insol. H_2O. D^{24} 0·9629.

Meerwein, *Ann.*, 1913, **396**, 255.
Henry, *Chem. Zentr.*, 1899, I, 194.
Fischer, Grävenitz, *Ann.*, 1914, **406**, 10.

4-Hydroxy-2-methylbutyrophenone (6-*Butyryl*-m-*cresol, propyl* 5-*hydroxy*-o-*tolyl ketone*)

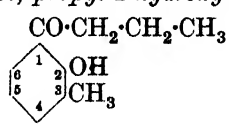


$C_{11}H_{14}O_2$ MW, 178

Plates from C_6H_6. M.p. 97–8°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

2-Hydroxy-3-methylbutyrophenone (3-*Butyryl*-o-*cresol, propyl* 2-*hydroxy*-m-*tolyl ketone*)



$C_{11}H_{14}O_2$ MW, 178

B.p. 143°/11 mm.

Oxime: needles from EtOH. M.p. 87–8°.

Phenylhydrazone: yellow needles from EtOH. M.p. 157–8°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 286.

4-Hydroxy-3-methylbutyrophenone (5-*Butyryl*-o-*cresol, propyl* 6-*hydroxy*-m-*tolyl ketone*).

Prisms from C_6H_6. M.p. 132–3°. B.p. 195–200°/15 mm.

Phenylhydrazone: yellow plates from EtOH. M.p. 110°.

See above reference.

6-Hydroxy-3-methylbutyrophenone (3-*Butyryl*-p-*cresol, propyl* 4-*hydroxy*-m-*tolyl ketone*).

Prisms from MeOH. M.p. 33–4°. B.p. 132–3°/15 mm. $D_4^{56·5}$ 1·0188. $n_\alpha^{56·2}$ 1·51778. $FeCl_3 \longrightarrow$ bluish-violet col. Na salt spar. sol. alkalis.

Oxime: needles from pet. ether. M.p. 96–7°.

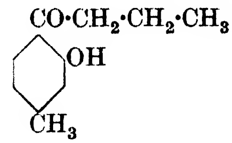
Semicarbazone: needles from EtOH. M.p. 188–9°.

Phenylhydrazone: prisms from EtOH. M.p. 141–2°.

p-*Nitrophenylhydrazone*: red prisms from EtOH. M.p. 184–6°.

Auwers, Lammerhirt, *Ber.*, 1920, **53**, 437.
Auwers, Meissner, *Ann.*, 1924, **439**, 146.
Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 287.

2-Hydroxy-4-methylbutyrophenone (4-*Butyryl*-m-*cresol, propyl* 3-*hydroxy*-p-*tolyl ketone*)



$C_{11}H_{14}O_2$ MW, 178

M.p. 17°. B.p. 142–4°/15 mm.

Oxime: needles from pet. ether. M.p. 74–5°.

Phenylhydrazone: yellowish leaflets from EtOH. M.p. 95–7°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

2-Hydroxy-2-methylcamphane.

See Homoborneol.

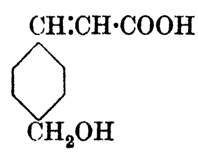
2-Hydroxy-3-methylcinchoninic Acid.

See 2-Hydroxy-3-methylquinoline-4-carboxylic Acid.

Hydroxy-methylcinnamic Acid.

See Methylcoumaric Acid *and* Methylcoumarinic Acid.

4-Hydroxymethyl-cinnamic Acid



$C_{10}H_{10}O_3$ MW, 178

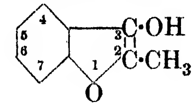
Needles from Me_2CO. M.p. 200–1°. Sol. EtOH, Me_2CO. Spar. sol. H_2O, C_6H_6, $CHCl_3$. Insol. ligroin.

Einhorn, Göttler, *Ber.*, 1909, **42**, 4845.

Hydroxymethylcoumarin.

See Homoumbelliferone *and* 4-Methylumbelliferone.

3-Hydroxy-2-methylcoumarone (*Enol form of 2-methylcoumaranone*)



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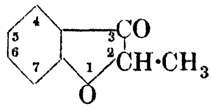
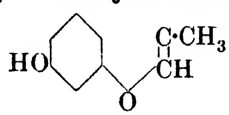


$C_9H_8O_2$ MW, 148

Oil. B.p. 163–5°/40 mm., 119°/15 mm. D_4^{20} 1·153. n_D^{20} 1·5631. Reduces Fehling's and $NH_3.AgNO_3$.

Stoermer, Atenstädt, *Ber.*, 1902, **35**, 3565.
Auwers, *Ber.*, 1919, **52**, 121.

6-Hydroxy-3-methylcoumarone



$C_9H_8O_2$ MW, 148

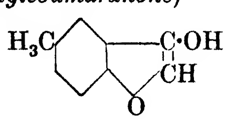
Needles from H_2O. M.p. 103° (97°). Sol. EtOH, Et_2O. Mod. sol. H_2O. Sol. alkalis with blue fluor. Alc. $FeCl_3$ ⟶ bluish-red col. Volatile in steam. Sublimes.

Me ether: $C_{10}H_{10}O_2$. MW, 162. Plates. M.p. 58°. B.p. 246°/105 mm. Volatile in steam. Conc. H_2SO_4 ⟶ violet col.

Et ether: $C_{11}H_{12}O_2$. MW, 176. Plates from EtOH.Aq. M.p. 51–2°. Volatile in steam.

Hantzch, *Ber.*, 1886, **19**, 2929.
v. Pechmann, Hanke, *Ber.*, 1901, **34**, 361.
Kostanecki, Tambor, *Ber.*, 1909, **42**, 905.

3-Hydroxy-5-methylcoumarone (*Enol form of 5-methylcoumaranone*)



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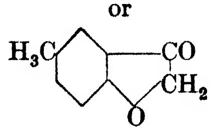


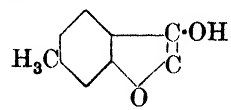
$C_9H_8O_2$ MW, 148

Needles from pet. ether. M.p. 54° (51–2°). Sol. EtOH, Et_2O, C_6H_6, AcOH. Spar. sol. pet. ether. Aq. sol. shows blue fluor. $D_4^{53.8}$ 1·1506. $n_D^{53.8}$ 1·56521. Reduces Fehling's and $NH_3.AgNO_3$.

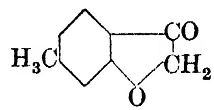
Me ether: b.p. 149°/36 mm.
Et ether: b.p. 133°/15·5 mm.
Oxime: m.p. 144°.
Semicarbazone: m.p. 231°.

Stoermer, Bartsch, *Ber.*, 1900, **33**, 3181.
Auwers, *Ber.*, 1919, **52**, 121.
Auwers, Auffenberg, *Ber.*, 1919, **52**, 94.
Higginbottom, Stephen, *J. Chem. Soc.*, 1920, **117**, 1541.

3-Hydroxy-6-methylcoumarone (*Enol form of 6-methylcoumaranone*)



or



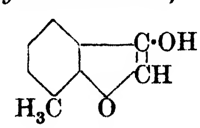
$C_9H_8O_2$ MW, 148

Yellow needles from EtOH. M.p. 85°. Sol. EtOH, AcOH. Volatile in steam.

Oxime: m.p. 156° (165°).
Semicarbazone: m.p. 208°.

Stoermer, Bartsch, *Ber.*, 1900, **33**, 3180.
Fries, Finck, *Ber.*, 1908, **41**, 4279.
Auwers, Auffenberg, *Ber.*, 1919, **52**, 94.
Higginbottom, Stephen, *J. Chem. Soc.*, 1920, **117**, 1541.

3-Hydroxy-7-methylcoumarone (*Enol form of 7-methylcoumaranone*)



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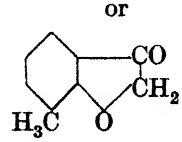


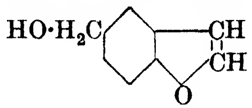
$C_9H_8O_2$ MW, 148

Yellow cryst. M.p. 88° (102°). Sol. H_2O and usual org. solvents. Volatile in steam.

Oxime: m.p. 148°.
Semicarbazone: m.p. 237°.

Stoermer, Bartsch, *Ber.*, 1900, **33**, 3179.
Auwers, Auffenberg, *Ber.*, 1919, **52**, 94.
Higginbottom, Stephen, *J. Chem. Soc.*, 1920, **117**, 1542.

5-Hydroxymethylcoumarone



$C_9H_8O_2$ MW, 148

Cryst. M.p. 26–7°. B.p. about 147–50°/12 mm.

Stoermer, Oetker, *Ber.*, 1904, **37**, 200.

Hydroxy-methylcyclohexylacetic Acid. *See* Methylcyclohexanol-acetic Acid.

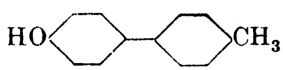
Hydroxy-methylcyclopentylacetic Acid. *See* Methylcyclopentanol-acetic Acid.

α-Hydroxymethyl-dibenzyl. *See* 3-Hydroxy-1 : 2-diphenylpropane.

α-Hydroxy-α-methyldibenzyl. *See* 2-Hydroxy-1 : 2-diphenylpropane.

β-Hydroxy-α-methyldibenzyl. *See* 1-Hydroxy-1 : 2-diphenylpropane.

4'-Hydroxy-4-methyldiphenyl (4-p-*Tolylphenol*)

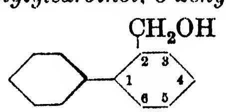


$C_{13}H_{12}O$ MW, 184

Cryst. M.p. 155°. B.p. 330°.

Hirsch, D.R.P., 58,001.

2-Hydroxymethyldiphenyl (o-*Phenylbenzyl alcohol*, o-*diphenylylcarbinol*, o-*xenylcarbinol*)



$C_{13}H_{12}O$ MW, 184

Oil. B.p. 181°/8 mm. Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O.

Acetyl: oil. B.p. 182°/20 mm. Sol. EtOH, Et_2O. Insol. H_2O.

Fanto, *Monatsh.*, 1898, **19**, 591.

3-Hydroxymethyldiphenyl (m-*Phenylbenzyl alcohol*, m-*diphenylylcarbinol*, m-*xenylcarbinol*).

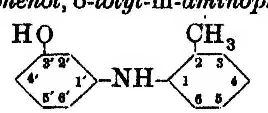
Liq. Slowly solidifies. Sol. EtOH, Et_2O, $CHCl_3$, CS_2. Spar. sol. ligroin.

Me ether: $C_{14}H_{14}O$. MW, 198. Liq. Volatile in steam.

Et ether: $C_{15}H_{16}O$. MW, 212. Liq. Sol. Et_2O. Volatile in steam.

Adam, *Ann. chim. phys.*, 1888, **15**, 243.

3'-Hydroxy-2-methyldiphenylamine (3-o-*Toluidinophenol*, o-*tolyl*-m-*aminophenol*)



$C_{13}H_{13}ON$ MW, 199

Oil. B.p. 370–5°. Sol. EtOH, Et_2O, C_6H_6, AcOH. Zn dust dist. ⟶ 2-methyldiphenylamine.

Me ether: *o*-tolyl-*m*-anisidine. $C_{14}H_{15}ON$. MW, 213. Oil.

Et ether: *o*-tolyl-*m*-phenetidine. $C_{15}H_{17}ON$. MW, 227. Oil.

Badische, D.R.Ps, 46,869, 63,260.

Philip, *J. prakt. Chem.*, 1886, **34**, 70.

4'-Hydroxy-2-methyldiphenylamine (4-o-*Toluidinophenol*, o-*tolyl*-p-*aminophenol*).

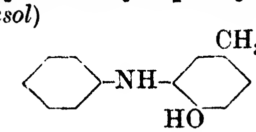
Plates from C_6H_6–pet. ether. M.p. 90°. B.p. 366–8°. Sol. EtOH, Et_2O. Spar. sol. pet. ether. Zn dust dist. ⟶ acridine. Hot HCl ⟶ *o*-toluidine + hydroquinone.

Et ether: *o*-tolyl-*p*-phenetidine. $C_{15}H_{17}ON$. MW, 227. Cryst. from ligroin. M.p. 81–2°. B.p. 354°.

Philip, *J. prakt. Chem.*, 1886, **34**, 57.

Jacobson, Henrich, *Ann.*, 1895, **287**, 175.

5-Hydroxy-3-methyldiphenylamine (3-*Anilino*-p-*cresol*)

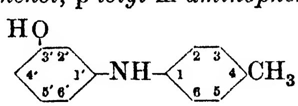


$C_{13}H_{13}ON$ MW, 199

Needles from EtOH. M.p. 79°. B.p. 345°. Sol. EtOH, Et_2O, Me_2CO, C_6H_6. Spar. sol. pet. ether. Zn dust dist. ⟶ 3-methyldiphenylamine.

Zega, Buch, *J. prakt. Chem.*, 1886, **33**, 539.

3'-Hydroxy-4-methyldiphenylamine (3-p-*Toluidinophenol*, p-*tolyl*-m-*aminophenol*)



$C_{13}H_{13}ON$ MW, 199

Needles or prisms from C_6H_6–pet. ether. M.p. 92°. B.p. 350°. Sol. EtOH, Et_2O, Me_2CO, C_6H_6. Spar. sol. hot H_2O, pet. ether. Zn dust dist. ⟶ 4-methyldiphenylamine.

N-*Acetyl*: m.p. 213°.

Me ether: *p*-tolyl-*m*-anisidine. $C_{14}H_{15}ON$. MW, 213. Cryst. from C_6H_6. B.p. about 360°.

Et ether: *p*-tolyl-*m*-phenetidine. $C_{15}H_{17}ON$. MW, 227. Cryst. M.p. about 30°. N-*Acetyl*: m.p. 61°.

Badische, D.R.Ps, 46,869, 62,539.

Hatschek, Zega, *J. prakt. Chem.*, 1886, **33**, 209.

Gnehm, Veillon, *J. prakt. Chem.*, 1902, **65**, 49.

4'-Hydroxy-4-methyldiphenylamine (4-p-*Toluidinophenol*, p-*tolyl*-p-*aminophenol*).

Plates from C_6H_6. M.p. 122°. B.p. 350–60°. Sol. EtOH, C_6H_6. Zn dust dist. ⟶ 4-methyl-diphenylamine. $FeCl_3$ ⟶ green col. ⟶ brownish red with excess $FeCl_3$.

O : N-*Diacetyl* : m.p. 101°.

O : N-*Dibenzoyl* : m.p. 169°.

Hatschek, Zega, *J. prakt. Chem.*, 1886, **33**, 224.
Bamberger, *Ann.*, 1912, **390**, 189.
Heller, *Ann.*, 1919, **418**, 264.

α-Hydroxy-methyldiphenylmethane.
See Methylbenzhydrol.

Hydroxymethylene-acetophenone.
See ω-Formylacetophenone.

Hydroxymethylene-butyrophenone.
See β-Formylbutyrophenone.

Hydroxymethylene-malonic Acid.
See Formylmalonic Acid.

β-Hydroxymethylene-propiophenone.
See β-Formylpropiophenone.

Hydroxymethylene-succinic Acid.
See Formylsuccinic Acid.

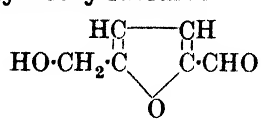
Hydroxymethyl-ethylbenzene.
See Ethylbenzyl Alcohol.

Hydroxymethylethylene oxide.
See Glycide.

2-Hydroxymethyl-1-ethylglutaric Acid.
See Homopilomalic Acid.

2-Hydroxymethylfuran.
See Furfuryl Alcohol.

5-Hydroxymethylfurfural



$C_6H_6O_3$ MW, 126

Needles. M.p. 35–35·5°. B.p. 114–16°, 72°/0·002 mm. n_D^{15} 1·5105. Sol. H_2O, EtOH, AcOEt. Spar. sol. Et_2O. Volatile in steam. Reduces Fehling's. Conc. HCl ⟶ red col. Dil. acids ⟶ levulinic + formic acids. Hydrazine ⟶ 5-methylfurfuryl alcohol.

Oxime : *syn*-, m.p. 77–8° : *anti*-, m.p. 108°.

Semicarbazone : m.p. 166–7°.

Phenylhydrazone : m.p. 140°.

p-*Nitrophenylhydrazone* : m.p. 185°.

Teunissen, *Rec. trav. chim.*, 1930, **49**, 784.
Reichstein, Zschokke, *Helv. Chim. Acta*, 1932, **15**, 250.

4-Hydroxymethyl-glyoxaline.
See 4-Iminazolylcarbinol.

6-Hydroxy-4-methylhemimellitic Acid.
See Cochenillic Acid.

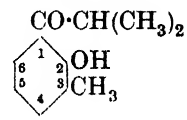
Hydroxy-methyl-hydrocinnamic Acid.
See Hydroxy-phenyl-butyric Acid *and* Hydroxy-phenyl-isobutyric Acid.

Hydroxymethyl-indene.
See Indenylcarbinol.

3-Hydroxy-2-methylindole.
See 2-Methylindoxyl.

Hydroxymethyl-indole.
See Indolylcarbinol.

2-Hydroxy-3-methylisobutyrophenone (3-*Isobutyryl*-o-*cresol*, *isopropyl* 2-*hydroxy*-m-*tolyl ketone*)



$C_{11}H_{14}O_2$ MW, 178

Greenish-yellow oil. D_4^{20} 1·047. n_{He}^{20} 1·5368. $FeCl_3$ ⟶ violet col.

Acetyl : oil. B.p. 152–4°/12 mm. D_4^{20} 1·074. n_{He}^{20} 1·5136.

Auwers, Baum, Lorenz, *J. prakt. Chem.*, 1927, **115**, 94.

4-Hydroxy-3-methylisobutyrophenone (5-*Isobutyryl*-o-*cresol*, *isopropyl* 6-*hydroxy*-m-*tolyl ketone*).

Plates from C_6H_6. M.p. 122°. B.p. 182°/12 mm. Sol. EtOH, Et_2O. Spar. sol. hot H_2O. No col. with $FeCl_3$.

See above reference.

6-Hydroxy-3-methylisobutyrophenone (3-*Isobutyryl*-p-*cresol*, *isopropyl* 4-*hydroxy*-m-*tolyl ketone*).

B.p. 250·5–251·5°/763 mm., 125–125·3°/11 mm. $D_4^{16.6}$ 1·0460. $n_D^{16.6}$ 1·538. $FeCl_3$ ⟶ violet col.

Me ether : $C_{12}H_{16}O_2$. MW, 192. B.p. 136–137·5°/10 mm., 155°/25 mm. $D_4^{14.2}$ 1·0213. $n_D^{13.7}$ 1·521.

Oxime : cryst. from MeOH.Aq. or C_6H_6. M.p. 149–50°.

Phenylhydrazone : plates from C_6H_6–pet. ether. M.p. 126·5–127·5°. Sol. EtOH, AcOH. Spar. sol. Et_2O, C_6H_6.

Semicarbazone : needles from AcOEt. M.p. 193–4°.

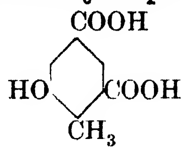
Auwers, *Ann.*, 1915, **408**, 251.
Auwers, Baum, Lorenz, *J. prakt. Chem.*, 1927, **115**, 98.

2-Hydroxy-4-methylisobutyrophenone (4-*Isobutyryl*-m-*cresol*, *isopropyl* 3-*hydroxy*-p-*tolyl ketone*).

B.p. 120–1°/11 mm. D_4^{20} 1·042. n_{He}^{20} 1·5401. $FeCl_3 \longrightarrow$ violet col.

Auwers, Koch, *Ann.*, 1924, **439**, 166.

5-Hydroxy-4-methylisophthalic Acid



$C_9H_8O_5$ MW, 196

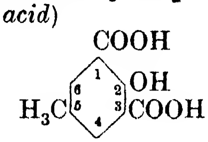
Needles from H_2O. M.p. 270° decomp. No col. with $FeCl_3$.

Jacobsen, *Ber.*, 1881, **14**, 2114.

6-Hydroxy-4-methylisophthalic Acid.

See α-Coccinic Acid.

2-Hydroxy-5-methylisophthalic Acid (*2-Hydroxyuvitic acid*)



$C_9H_8O_5$ MW, 196

Needles from H_2O. M.p. 235° decomp. Sol. EtOH, Et_2O. Mod. sol. $CHCl_3$. Spar. sol. H_2O. Insol. C_6H_6, pet. ether. $FeCl_3 \longrightarrow$ intense red col.

Me ether: $C_{10}H_{10}O_5$. MW, 210. Cryst. from C_6H_6. M.p. 180°. Sol. hot H_2O, Et_2O, EtOH, AcOH. Spar. sol. C_6H_6, ligroin. Warm $KMnO_4 \longrightarrow$ methoxytrimesic acid.

Di-Me ester: $C_{11}H_{12}O_5$. MW, 224. Needles from EtOH. M.p. 79°. Insol. H_2O. Volatile in steam.

Jacobsen, *Ann.*, 1879, **195**, 274, 285; 1881, **206**, 201.

Ullmann, Brittner, *Ber.*, 1909, **42**, 2542.

4-Hydroxy-5-methylisophthalic Acid (*4-Hydroxyuvitic acid*).

Needles from EtOH. M.p. 294–5° decomp. Sol. EtOH, Et_2O. Spar. sol. H_2O. Insol. C_6H_6, $CHCl_3$, pet. ether. $FeCl_3 \longrightarrow$ red col.

Di-Me ester: needles from MeOH. M.p. 132° (129–30°). Volatile in steam.

Di-Et ester: $C_{13}H_{16}O_5$. MW, 252. Needles from ligroin. M.p. 62°.

Dichloride: $C_9H_6O_3Cl_2$. MW, 233. Needles from C_6H_6. M.p. 67–8°.

Jacobsen, *Ann.*, 1881, **206**, 188.

Böttinger, *Ber.*, 1880, **13**, 1934.

Anschütz, Robitsek, *Ann.*, 1906, **346**, 358.

Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).

Hydroxymethylisopropylbenzene.

See Carvacrol, Thymol, *and* Isopropylcresol.

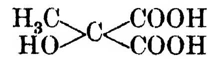
Hydroxy-1-methylisovaleric Acid.

See Hydroxy-1 : 2-dimethylbutyric Acid.

2-Hydroxymethyl-isovaleric Acid.

See 3-Hydroxy-2 : 2-dimethylbutyric Acid.

Hydroxy-methylmalonic Acid (*Isomalic acid, methyltartronic acid, α-hydroxyisosuccinic acid*)



$C_4H_6O_5$ MW, 134

Cryst. M.p. 142° decomp. Sol. H_2O, EtOH, Et_2O. Heat at 170° $\longrightarrow$ lactic acid.

Et ether: $C_6H_{10}O_5$. MW, 162. Needles from H_2O or Et_2O. M.p. 110–12°. *Di-Me ester*: b.p. 110°/16 mm.

Dinitrile: 1 : 1-dicyanoethyl alcohol. $C_4H_4ON_2$. MW, 96. *Acetate*: m.p. 69°. B.p. 210°.

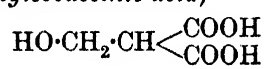
Diamide: $C_4H_8O_3N_2$. MW, 132. Cryst. M.p. 203·5°. Spar. sol. H_2O, EtOH, Et_2O. *Acetate*: m.p. 192°.

Tanatar, *Ann.*, 1893, **273**, 41.

Denis, *J. Am. Chem. Soc.*, 1908, **38**, 589.

Bardroff, *Monatsh.*, 1912, **33**, 861.

Hydroxymethyl-malonic Acid (*β-Isomalic acid, β-hydroxyisosuccinic acid*)



$C_4H_6O_5$ MW, 134

Syrup. Heat above 113° $\longrightarrow$ acrylic acid.

Cu salt: blue powder from EtOH.Aq.

Ca salt: white amorph. powder. Sol. cold H_2O. Insol. boiling H_2O, EtOH.

Me ether: $C_5H_8O_5$. MW, 148. *Di-Et ester*: $C_9H_{16}O_5$. MW, 204. Oil. B.p. 121–2°/15 mm.

Et ether: $C_6H_{10}O_5$. MW, 162. Syrup. Sol. H_2O.

Tanatar, *Ann.*, 1893, **273**, 45.

Coops, *Rec. trav. chim.*, 1904, **23**, 355.

Simonsen, *J. Chem. Soc.*, 1908, **93**, 1780.

Hydroxy-methylnaphthalene.

See Methylnaphthol.

Hydroxymethyl-naphthalene.

See Naphthylcarbinol.

3 - Hydroxy - 2 - methyl - 1 : 4 - naphthoquinone.

See Phthiocol.

3-Hydroxy-2-methyloctane.

See Isopropyl-*n*-amylcarbinol.

1-Hydroxymethyl-pelargonic Acid.

See 1-*n*-Heptylhydracrylic Acid.

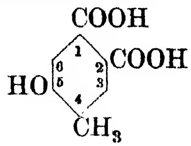
2-Hydroxymethyl-pentane-1 : 3-dicarboxylic Acid.

See Homopilomalic Acid.

5-Hydroxy-2-methyl-5-phenylpentane.
See Isoamylphenylcarbinol.

5-Hydroxy-3-methylphthalic Acid.
See β-Coccinic Acid.

5-Hydroxy-4-methylphthalic Acid (4-*Hydroxy-5-methylphthalic acid*)



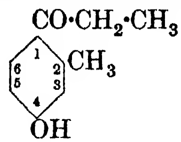
$C_9H_8O_5$ MW, 196

Cryst. from H_2O. M.p. 244–5°.
Ba salt: insol. H_2O.

Meldrum, Kapadia, *J. Indian Chem. Soc.*, 1932, **9**, 490.

6-Hydroxy-4-methylphthalic Acid (3-*Hydroxy-5-methylphthalic Acid*).
See γ-Coccinic Acid.

4-Hydroxy-2-methylpropiophenone (6-*Propionyl*-m-*cresol, ethyl 5-hydroxy*-o-*tolyl ketone*)



$C_{10}H_{12}O_2$ MW, 164

Needles from pet. ether. M.p. 114–15°. Sol. EtOH, Me_2CO, AcOH. Mod. sol. C_6H_6. Spar. sol. pet. ether. No col. with $FeCl_3$.
Me ether: $C_{11}H_{14}O_2$. MW, 178. Cryst. from EtOH. M.p. 43°. B.p. 149–50°/14 mm. *Oxime*: cryst. from EtOH.Aq. M.p. 94–5°.
Phenylhydrazone: plates from EtOH. M.p. 152·5–153·5°. Spar. sol. pet. ether.

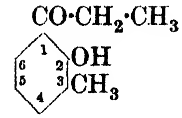
Klages, *Ber.*, 1904, **37**, 3993.
Auwers, Koch, *Ann.*, 1924, **439**, 174.
Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1684.

6-Hydroxy-2-methylpropiophenone (2-*Propionyl*-m-*cresol, ethyl 3-hydroxy*-m-*tolyl ketone*).

Prisms from Et_2O. M.p. 28·5° (25–7°). B.p. 140°/5 mm. Sol. H_2O. $FeCl_3 \longrightarrow$ brownish-violet col.
Me ether: m.p. about 8°. B.p. 137°/16 mm.
Semicarbazone: needles from C_6H_6–ligroin. M.p. 145°.
p-*Nitrophenylhydrazone*: yellowish-red needles from EtOH.Aq. M.p. 154–6°.

Simonis, *Ber.*, 1917, **50**, 782.
Auwers, Koch, *Ann.*, 1924, **439**, 167.
See also last reference above.

2-Hydroxy-3-methylpropiophenone (3-*Propionyl*-o-*cresol, ethyl 2-hydroxy*-m-*tolyl ketone*)



$C_{10}H_{12}O_2$ MW, 164

Yellow plates from pet. ether. M.p. 22–3°. B.p. 127–9°/15 mm. $FeCl_3 \longrightarrow$ violet col.
Semicarbazone: cryst. from EtOH. M.p. 202°.

Auwers, Wittig, *Ber.*, 1924, **57**, 1274.

4-Hydroxy-3-methylpropiophenone (5-*Propionyl*-o-*cresol, ethyl 6-hydroxy*-m-*tolyl ketone*).

Needles from EtOH.Aq. M.p. 83·5–84°. Sol. EtOH, AcOH. Mod. sol. C_6H_6. Spar. sol. pet. ether.
Me ether: $C_{11}H_{14}O_2$. MW, 178. Cryst. M.p. 41°. B.p. 169–71°/25 mm. *Oxime*: plates from EtOH.Aq. M.p. 99°.

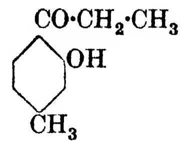
See above reference and also
Klages, *Ber.*, 1904, **37**, 3991.

6-Hydroxy-3-methylpropiophenone (3-*Propionyl*-p-*cresol, ethyl 4-hydroxy*-m-*tolyl ketone*).

Cryst. F.p. 2°. B.p. 153°/40 mm., 123–4°/11 mm. D_4^{14} 1·0841. $n_D^{13\cdot 8}$ 1·549.
Me ether: oil. B.p. 149–51°/17 mm., 133·5–6°/10 mm. $D_4^{13\cdot 9}$ 1·0514. $n_D^{13\cdot 9}$ 1·533. *Oxime*: plates. M.p. 92°.
Et ether: $C_{12}H_{16}O_2$. MW, 192. Prisms from MeOH.Aq. M.p. 50–1°.
Acetyl: needles from pet. ether. M.p. 58°. Sol. EtOH, Et_2O, C_6H_6, AcOH.
Benzoyl: prisms from EtOH. M.p. 97°. Sol. C_6H_6, AcOH, hot ligroin. Mod. sol. Et_2O.
Oxime: prisms from MeOH. M.p. 134–5°.
Semicarbazone: needles from EtOH. M.p. 211–12°.
Phenylhydrazone: needles or plates from EtOH or ligroin. M.p. 146°.
p-*Nitrophenylhydrazone*: m.p. 188–9°.

Klages, *Ber.*, 1904, **37**, 3994.
Auwers, *Ber.*, 1918, **51**, 1123.
Hill, Graf, *J. Am. Chem. Soc.*, 1916, **37**, 1844.
Auwers, Hilliger, Wulf, *Ann.*, 1922, **429**, 217.
Auwers, Lechner, Bundesmann, *Ber.*, 1925, **58**, 45.

2-Hydroxy-4-methylpropiophenone (*4-Propionyl-*m*-cresol, ethyl 3-hydroxy-*p*-tolyl ketone*)



$C_{10}H_{12}O_2$ MW, 164

Leaflets from pet. ether. M.p. 41·5–42·5°. B.p. 115–20°/10 mm. $FeCl_3 \longrightarrow$ deep violet col.

Oxime: needles from pet. ether. M.p. 103–4°.

Semicarbazone: needles from EtOH. M.p. 206–8°. Sol. hot EtOH, MeOH, AcOH. Mod. sol. Me_2CO. Insol. C_6H_6.

Phenylhydrazone: yellow plates from EtOH. M.p. 137–8°.

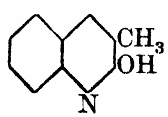
Auwers, Koch, *Ann.*, 1924, **439**, 174.
Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1688.
Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

Hydroxymethyl-pyridine.
See Pyridylcarbinol.

3-Hydroxy-2-methyl-γ-pyrone.
See Maltol.

Hydroxy-2-methylquinoline.
See Hydroxyquinaldine.

2-Hydroxy-3-methylquinoline (*3-Methyl-2-quinolinol*)

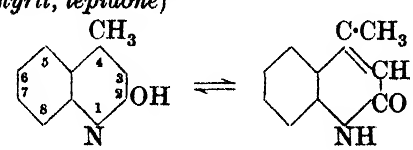


$C_{10}H_9ON$ MW, 159

Yellow needles from dil. EtOH. M.p. 234–5°. Sublimes.

Orstein, *Ber.*, 1907, **40**, 1095.

2-Hydroxy-4-methylquinoline (*2-Hydroxylepidine, 4-methyl-2-quinolinol, 4-methylcarbostyril, lepidone*)



$C_{10}H_9ON$ MW, 159

Needles from H_2O. M.p. 223·7°. B.p. 270°/17 mm. Sol. hot H_2O. Spar. sol. cold H_2O, Et_2O, $CHCl_3$, C_6H_6, ligroin. $P_2S_5 \longrightarrow$ thiolepidine. Red. $\longrightarrow$ tetrahydrolepidine.

Me ether: $C_{11}H_{11}ON$. MW, 173. B.p. 275–6°. B_2,H_2PtCl_6: decomp. at 214°.

Knorr, *Ann.*, 1886, **238**, 100.
Reissert, *Ber.*, 1891, **24**, 855.
Tröger, Dunker, *J. prakt. Chem.*, 1925, **109**, 88.

6-Hydroxy-4-methylquinoline (*6-Hydroxylepidine, 4-methyl-6-quinolinol*).

Needles from 50% EtOH. M.p. 216–18°. Sol. hot EtOH, $CHCl_3$.

Me ether: needles from dil. EtOH. M.p. 50–2°. B_2,H_2PtCl_6: m.p. 236–7°.

Königs, *Ber.*, 1890, **23**, 2673, 2684.

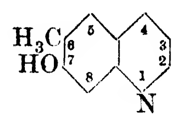
8-Hydroxy-5-methylquinoline (*5-Methyl-8-quinolinol*)

$C_{10}H_9ON$ MW, 159

Needles from dil. EtOH. M.p. 122–4°.

Nölting, Trautmann, *Ber.*, 1890, **23**, 3666.

7-Hydroxy-6-methylquinoline (*6-Methyl-7-quinolinol*)



$C_{10}H_9ON$ MW, 159

Needles from EtOH. M.p. 244°. B.p. 240°/22 mm., 210°/11 mm.

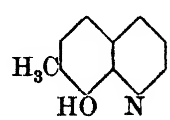
Edinger, Bühler, *Ber.*, 1909, **42**, 4316.

8-Hydroxy-6-methylquinoline (*6-Methyl-8-quinolinol*).

Needles from $CHCl_3$. M.p. 95–6°. Sublimes. Sol. EtOH, hot NaOH. Spar. sol. H_2O. Volatile in steam. $FeCl_3 \longrightarrow$ green col.

Herzfeld, *Ber.*, 1884, **17**, 1552.

8-Hydroxy-7-methylquinoline (*7-Methyl-8-quinolinol*)

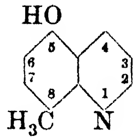


$C_{10}H_9ON$ MW, 159

Needles from dil. EtOH. M.p. 72–4°. $FeCl_3 \longrightarrow$ dark green col.

Nölting, Trautmann, *Ber.*, 1890, **23**, 3663.

5-Hydroxy-8-methylquinoline (8-*Methyl-5-quinolinol*)



$C_{10}H_9ON$ MW, 159

M.p. 262–3°. Spar. sol. $CHCl_3$. Sublimes in needles. $FeCl_3 \longrightarrow$ reddish-brown col.

Me ether: $C_{11}H_{11}ON$. MW, 173. B.p. 225–30°.

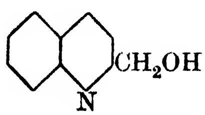
Herzfeld, *Ber.*, 1884, **17**, 905, 1551.

6-Hydroxy-8-methylquinoline (8-*Methyl-6-quinolinol*).

Needles. M.p. 200°. $FeCl_3 \longrightarrow$ brownish-red col.

Herzfeld, *Ber.*, 1884, **17**, 903.

2-Hydroxymethyl-quinoline (α-*Hydroxyquinaldine*, 2-*quinoline-carbinol*, α-*quinolylcarbinol*)

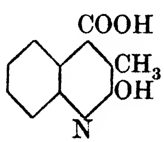


$C_{10}H_9ON$ MW, 159

Needles from ligroin or EtOH. M.p. 64°. Volatile in steam. $CrO_3 \longrightarrow$ 2-aldehydoquinoline.

Hammick, *J. Chem. Soc.*, 1926, 1303.

2-Hydroxy-3-methylquinoline-4-carboxylic Acid (2-*Hydroxy-3-methylcinchoninic acid*)



$C_{11}H_9O_3N$ MW, 203

Needles + H_2O from hot H_2O. M.p. 311–12° (315–17°).

Me ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from MeOH. M.p. 174–5°.

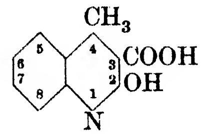
Et ester: $C_{13}H_{13}O_3N$. MW, 231. Needles from dil. EtOH. M.p. 167°.

Amide: $C_{11}H_{10}O_2N_2$. MW, 202. M.p. 353–4°.

Anilide: m.p. 314–15°.

Ornstein, *Ber.*, 1907, **40**, 1091, 1094.
Meyer, *Monatsh.*, 1905, **26**, 1322; 1907, **28**, 38.

2-Hydroxy-4-methylquinoline-3-carboxylic Acid (2-*Hydroxylepidine-3-carboxylic acid*)



$C_{11}H_9O_3N$ MW, 203

Needles from EtOH. M.p. 254–5° decomp. Spar. sol. EtOH. Insol. H_2O, Et_2O, $CHCl_3$, C_6H_6. Heat $\longrightarrow$ 2-hydroxy-4-methylquinoline. Zn $\longrightarrow$ 4-methylquinoline.

Et ester: $C_{13}H_{13}O_3N$. MW, 231. M.p. 251–2°.
Nitrile: $C_{11}H_8ON_2$. MW, 184. M.p. 320°.

Camps, *Arch. Pharm.*, 1902, **240**, 142.

2-Hydroxy-4-methylquinoline-8-carboxylic Acid (2-*Hydroxylepidine-8-carboxylic acid*).

Needles from dil. EtOH. M.p. 312° decomp. Mod. sol. EtOH, AcOH. Spar. sol. hot H_2O. Prac. insol. Et_2O, $CHCl_3$, C_6H_6, ligroin.

Reissert, *Ber.*, 1891, **24**, 853.

Hydroxymethyl-succinic Acid.
See Itamalic Acid.

1-Hydroxy-1-methylsuccinic Acid.
See Citramalic Acid.

2-Hydroxy-1-methylsuccinic Acid (2-*Hydroxypyrotartaric acid*, 2-*methylmalic acid*)

$$\begin{array}{c} CH_3{\cdot}CH{\cdot}COOH \\ HO{\cdot}CH{\cdot}COOH \end{array}$$

$C_5H_8O_5$ MW, 148

Prisms from AcOEt. M.p. 123° (119–20°).

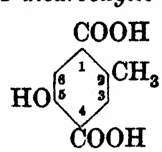
Mono-Et ester: $C_7H_{12}O_5$. MW, 176. *Na salt*: needles from EtOH. M.p. 166–7°. Sol. H_2O.

Di-Et ester: $C_9H_{16}O_5$. MW, 204. B.p. 250°/745 mm., 138°/17 mm.

Monoamide: $C_5H_9O_4N$. MW, 147. Cryst. M.p. 145–7°. Sol. H_2O. Mod. sol. EtOH.

Wislicenus, *Ber.*, 1892, **25**, 199.
Lutz, *J. Russ. Phys. Chem. Soc.*, 1909, **41**, 1534.

5-Hydroxy-2-methylterephthalic Acid (p-*Cresol-2 : 5-dicarboxylic acid*)



$C_9H_8O_5$ MW, 196

Prisms from EtOH.Aq. M.p. 285–90° decomp. Sol. EtOH, Et_2O. Spar. sol. H_2O. $FeCl_3$ ⟶ intense red col.

Jacobson, Meyer, *Ber.*, 1883, **16**, 191.

6-Hydroxy-2-methylterephthalic Acid (m-*Cresol*-2 : 5-*dicarboxylic acid*).

Needles from MeOH. M.p. 280–3°. Alc. $FeCl_3$ ⟶ intense reddish-violet col.

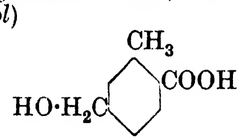
Me ether: $C_{10}H_{10}O_5$. MW, 210. Cryst. from H_2O. M.p. 267°. Spar. sol. H_2O. $FeCl_3$ ⟶ yellow ppt.

Perkin, *J. Chem. Soc.*, 1899, **75**, 194.

6-Hydroxy-2-methyltetrahydropyran.
See 4-Hydroxy-*n*-caproic Aldehyde.

8-Hydroxy-*N*-methyl-1 : 2 : 3 : 4-tetrahydroquinoline.
See Kairine.

5-Hydroxymethyl-*o*-toluic Acid (4-α-*Hydroxy*-2 : 4-*dimethylbenzoic acid*, 2-*methyl*-4-*hydroxymethylbenzoic acid*, 3-*methyl*-4-*carboxybenzyl alcohol*)

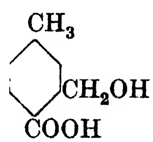


$C_9H_{10}O_3$ MW, 166

Plates from H_2O. M.p. 141–2°.

Perkin, Stone, *J. Chem. Soc.*, 1925, **127**, 2286.

3-Hydroxymethyl-*p*-toluic Acid (2-α-*Hydroxy*-2 : 4-*dimethylbenzoic acid*, 4-*methyl*-2-*hydroxymethylbenzoic acid*, 3-*methyl*-6-*carboxybenzyl alcohol*)



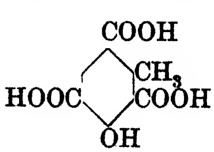
$C_9H_{10}O_3$ MW, 166

Needles from H_2O. M.p. 132–3°.

Perkin, Stone, *J. Chem. Soc.*, 1925, **127**, 2285.

Hydroxymethyl *p*-tolyl Ketone.
See p-Methylphenacyl Alcohol.

4-Hydroxy-2-methyltrimesic Acid (m-*Cresol*-2 : 4 : 6-*tricarboxylic acid*, 2 : 4 : 6-*tricarboxy*-m-*cresol*)



$C_{10}H_8O_7$ MW, 240

Needles + $2H_2O$ from H_2O. Loses H_2O at 257°. M.p. anhyd. 280°. Sol. EtOH. Spar. sol. H_2O, AcOH. Insol. Et_2O, $CHCl_3$. $FeCl_3$ ⟶ reddish-violet col.

Mono-Et ester: $C_{12}H_{12}O_7$. MW, 268. Needles + $1H_2O$ from H_2O. M.p. anhyd. 224° decomp. Sol. EtOH, Et_2O. Mod. sol. toluene. $FeCl_3$ ⟶ reddish-violet col.

Di-Et ester: $C_{14}H_{16}O_7$. MW, 296. Prisms from EtOH. M.p. 137–8°. Sol. EtOH, Et_2O. Spar. sol. ligroin. Insol. H_2O. $FeCl_3$ ⟶ reddish-violet col.

Tri-Et ester: $C_{16}H_{20}O_7$. MW, 324. Prisms from EtOH. M.p. 47°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin. Insol. H_2O.

Et ether: $C_{12}H_{12}O_7$. MW, 268. Needles from EtOH. M.p. 242–3° decomp. *Mono-Et ester*: $C_{14}H_{16}O_7$. MW, 296. Prisms from H_2O. M.p. 195°. $FeCl_3$ ⟶ brown ppt. *Tri-Et ester*: $C_{18}H_{24}O_7$. MW, 352. Oil. B.p. about 365° decomp.

Errera, *Ber.*, 1899, **32**, 2781; *Gazz. chim. ital.*, 1901, **31**, 145.

α-Hydroxymethyl-triphenylmethane.
See 2-Hydroxy-1 : 1 : 1-triphenylethane.

Hydroxymethylurea.
See Methylolurea.

1-Hydroxymyristic Acid

$CH_3\cdot[CH_2]_{11}\cdot CH(OH)\cdot COOH$

$C_{14}H_{28}O_3$ MW, 244

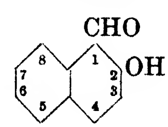
Plates from $CHCl_3$. M.p. 81–2°. Sol. EtOH, Et_2O, Me_2CO. Spar. sol. $CHCl_3$, pet. ether.

Amide: $C_{14}H_{29}O_2N$. MW, 243. Plates from EtOH. M.p. 150°. Insol. Et_2O, C_6H_6, $CHCl_3$, pet. ether.

Nitrile: $C_{14}H_{27}ON$. MW, 225. Plates from pet. ether. M.p. 44·5°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$.

Le Sueur, *J. Chem. Soc.*, 1905, **87**, 1904.

2-Hydroxy-1-naphthaldehyde (1-*Aldehydo*-2-*naphthol*)



$C_{11}H_8O_2$ MW, 172

Prisms from EtOH or needles from AcOEt. M.p. 82°. B.p. 192°/27 mm. Sol. EtOH, Et_2O, pet. ether. Insol. H_2O. Sol. aq. alkalis. Sol. conc. H_2SO_4 to yellow sol. Spar. volatile in steam. $FeCl_3$ ⟶ brown col. Reduces $NH_3.AgNO_3$ but not Fehling's. Ac_2O + $CH_3\cdot COONa$ at 180° ⟶ benzcoumarin. Malonic acid + AcOH ⟶ benzcoumarin-carboxylic acid. $CH_3COCl \longrightarrow$ anhydro-di-2-hydroxy-1-naphthaldehyde, cryst. from AcOH, m.p. 241°.

Me ether: $C_{12}H_{10}O_2$. MW, 186. Needles from EtOH. M.p. 84°. B.p. 200–1°/11 mm. Sol. C_6H_6, AcOH. Ox. $\longrightarrow$ 2-methoxy-1-naphthoic acid. *Azine*: yellow prisms from $PhNO_2$. M.p. 255–6°.

Et ether: $C_{13}H_{12}O_2$. MW, 200. Needles from EtOH. M.p. 115° (109°). *Semicarbazone*: yellow needles from EtOH. M.p. 214–15°. *Phenylhydrazone*: m.p. 91°. *Azine*: yellow cryst. from $PhNO_2$–EtOH. M.p. 184°.

2-*Acetyl*: cryst. from EtOH. M.p. 87°. Sol. most org. solvents.

Triacetyl deriv.: leaflets from EtOH. M.p. 124°. Sol. EtOH, AcOH.

Oxime: needles. M.p. 157°. Sol. alkalis. *Acetyl*: m.p. 124°.

Semicarbazone: yellow needles from MeOH. M.p. 240° decomp.

Azine: yellow needles from $PhNO_2$. M.p. above 290°. Spar. sol. most org. solvents.

Picrate: m.p. 120°.

$C_{11}H_8O_2, C_6H_3(NO_2)_3$-1 : 3 : 5 : m.p. 137°.

Gattermann, v. Horlacher, *Ber.*, 1899, **32**, 285.
Fosse, *Bull. soc. chim.*, 1901, **25**, 373.
Kauffmann, *Ber.*, 1883, **16**, 383.
Gattermann, *Ann.*, 1907, **357**, 366.
Rousset, *Bull. soc. chim.*, 1897, **17**, 312.
Torrey, Brewster, *J. Am. Chem. Soc.*, 1913, **35**, 439.

3-Hydroxy-1-naphthaldehyde (4-*Aldehydo-2-naphthol*).

Me ether: plates from pet. ether. M.p. 60°. *Semicarbazone*: needles from EtOH.Aq. M.p. 200°. *Oxime*: needles from EtOH.Aq. M.p. 102°. p-*Nitrophenylhydrazone*: red needles from AcOH. M.p. 197°.

Shoesmith, Rubli, *J. Chem. Soc.*, 1927, 3101.

4-Hydroxy-1-naphthaldehyde (4-*Aldehydo-1-naphthol*).

Yellowish needles from H_2O. M.p. 181°. Sol. EtOH, Et_2O. Insol. cold H_2O.

Me ether: white powder. M.p. 34°. B.p. 212°/40 mm., 200°/11 mm. Ox. $\longrightarrow$ 4-methoxy-1-naphthoic acid. *Phenylhydrazone*: m.p. 113°. *Azine*: yellow needles from EtOH. M.p. 185°.

Et ether: yellowish cryst. from AcOEt. M.p. 72°. *Hydrazone*: dark red needles. M.p. 160–82° decomp. *Azine*: yellow needles from $PhNO_2$. M.p. 209°.

4-*Acetyl*: m.p. 110°.

Semicarbazone: m.p. 224°.

Hydrazone: dark red ppt. M.p. 220–36°.

Azine: yellow needles from $PhNO_2$. M.p. 236°.

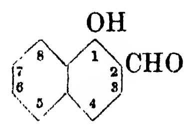
Kamm, McCluggage, Landstrom, *J. Am. Chem. Soc.*, 1917, **39**, 1247.
Gattermann, v. Horlacher, *Ber.*, 1899, **32**, 285.
Rousset, *Bull. soc. chim.*, 1897, **17**, 312.

5-Hydroxy-1-naphthaldehyde (5-*Aldehydo-1-naphthol*).

Me ether: yellow plates from pet. ether. M.p. 66°. *Semicarbazone*: needles from AcOH.Aq. M.p. 246°. *Oxime*: needles from H_2O. M.p. 104°. p-*Nitrophenylhydrazone*: red needles from AcOH.Aq. M.p. 246°.

Shoesmith, Rubli, *J. Chem. Soc.*, 1926, 3242.

1-Hydroxy-2-naphthaldehyde (2-*Aldehydo-1-naphthol*)



$C_{11}H_8O_2$ MW, 172

Greenish-yellow needles from EtOH.Aq. M.p. 59–60°. Spar. sol. cold H_2O. Yellow sols. in alkalis. Spar. volatile in steam. Reduces $NH_3.AgNO_3$. $FeCl_3 \longrightarrow$ green col.

Me ether: $C_{12}H_{10}O_2$. MW, 186. Prisms from EtOH. M.p. 47°. Sol. most org. solvents.

Oxime: needles from C_6H_6. M.p. 145°.

Bezdzik, Friedländer, *Monatsh.*, 1909, **30**, 278.
Friedländer, *Ber.*, 1908, **41**, 1037.
Weil, *Ber.*, 1911, **44**, 3058.

3-Hydroxy-2-naphthaldehyde (*Iso-β-naphthaldehyde*, 3-*aldehydo-2-naphthol*).

Yellow plates from AcOH.Aq. M.p. 99–100°.

Acetyl: cryst. from C_6H_6. M.p. 100–1°. *Anhydride*: m.p. 156°. *Semicarbazone*: m.p. 211–12°. *Oxime*: m.p. 202–3°.

Oxime: m.p. 207° decomp.

Phenylhydrazone: m.p. 246–8°.

Semicarbazone: cryst. from MeOH. M.p. above 270°.

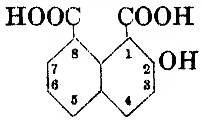
Anil: m.p. 158–9°.

Boehm, Profft, *Arch. Pharm.*, 1931, **269**, 25.

Hydroxynaphthalene.

See Naphthol.

2-Hydroxynaphthalic Acid



$C_{12}H_8O_5$ MW, 232

Free acid exists only in solution.

Anhydride: $C_{12}H_6O_4$. MW, 214. Needles. M.p. 245–6°.

Me ether: free acid not isolated. *Anhydride*: $C_{13}H_8O_4$. MW, 228. M.p. 255°.

Dziewoński, Kocwa, Geschwindówna, *Chem. Zentr.*, 1929, I, 650.

3-Hydroxynaphthalic Acid.

Free acid exists only in solution.

Anhydride: yellow needles from EtOH. M.p. 287°. Sol. EtOH, AcOH, Insol. H_2O, C_6H_6. Sol. alkalis. *Acetyl*: leaflets from AcOEt. M.p. 216°. Sol. C_6H_6. Spar. sol. EtOH. Insol. H_2O.

Me ether: free acid not isolated. *Anhydride*: yellow needles from AcOEt. M.p. 244°. Sol. AcOH, C_6H_6. Spar. sol. EtOH. Insol. H_2O.

Anselm, Zuckmayer, *Ber.*, 1899, **32**, 3288.
Dziewoński, Galitzerowna, Kocwa, *Chem. Zentr.*, 1926, II, 2816.

4-Hydroxynaphthalic Acid.

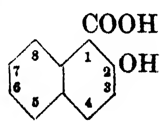
Free acid exists only in solution.

Anhydride: light yellow cryst. M.p. 350–1°. Brown sols. in alkalis. NaOH fusion ⟶ 5-hydroxy-1-naphthoic acid. Resorcinol ⟶ 4-hydroxynaphthofluorescein. *Acetyl*: m.p. 188–9°. *Benzoyl*: m.p. 235–6°.

Me ether: free acid not isolated. *Anhydride*: yellow cryst. M.p. 256–8°.

Dziewoński, Kocwa, Geschwindówna, *Chem. Zentr.*, 1929, I, 650.
See also second reference above.

2-Hydroxy-1-naphthoic Acid (2-*Naphthol-1-carboxylic acid*)



$C_{11}H_8O_3$ MW, 188

Needles from EtOH.Aq. M.p. 156–7°. Very sol. EtOH. Sol. Et_2O, $CHCl_3$, ligroin, C_6H_6. Spar. sol. H_2O. Loses CO_2 readily at m.p.

Me ester: $C_{12}H_{10}O_3$. MW, 202. M.p. 76° (80°).

Et ester: $C_{13}H_{12}O_3$. MW, 216. M.p. 55°.

Me ether: $C_{12}H_{10}O_3$. MW, 202. Prisms from EtOH. M.p. 176° decomp. Sol. Et_2O, $CHCl_3$, CS_2, Me_2CO, C_6H_6. Insol. ligroin. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. Cryst. from EtOH. M.p. 52°.

Et ether: $C_{13}H_{12}O_3$. MW, 216. Plates from EtOH.Aq. M.p. 142°. Sol. Et_2O, Me_2CO, $CHCl_3$, CS_2, C_6H_6. Insol. ligroin.

Acetyl: needles from H_2O. M.p. 130·5–131·5°. Sol. most org. solvents with exception of ligroin and CCl_4. *Chloride*: needles from $CHCl_3$. M.p. 140–1°.

Tijmstra Bz, Eggink, *Ber.*, 1906, **39**, 14.
Bodroux, *Compt. rend.*, 1904, **31**, 32.
Werner, Seybold, *Ber.*, 1904, **37**, 3661.
Zetzsche, Flütsch, Enderlin, Loosli, *Helv. Chim. Acta*, 1926, **9**, 184.

3-Hydroxy-1-naphthoic Acid (2-*Naphthol-4-carboxylic acid*).

Needles from H_2O. M.p. 248–9° (242–3°). $FeCl_3$ ⟶ reddish-brown col.

Me ester: needles from CCl_4. M.p. 91–2°.

Amide: $C_{11}H_9O_2N$. MW, 187. Prisms from H_2O. M.p. 209–11°.

Anilide: needles from MeOH. M.p. 112–13°.

Me ether: prismatic needles from AcOH.Aq. M.p. 159°.

Acetyl: needles from EtOH.Aq. M.p. 169–70° (173–4°). *Chloride*: cryst. from pet. ether. M.p. 96–7°. *Amide*: needles from MeOH. M.p. 180–1°. *Anilide*: needles from AcOH.Aq. M.p. 178–9°.

Benzoyl: cryst. from xylene. M.p. 222–3°.

Lesser, Gad, *Ber.*, 1925, **58**, 2553.

4-Hydroxy-1-naphthoic Acid (1-*Naphthol-4-carboxylic acid*).

Needles from Et_2O–ligroin. M.p. 183–4° decomp. Very sol. EtOH, Me_2CO, Et_2O. Spar. sol. $CHCl_3$, C_6H_6. Insol. ligroin.

Me ester: cryst. from MeOH. M.p. 178°.

Et ester: cryst. M.p. 134°.

Acetyl: needles from toluene. M.p. 178–9°. Very sol. EtOH, Me_2CO. Sol. $CHCl_3$, Et_2O.

Me ether: needles from EtOH. M.p. 232°. *Amide*: $C_{12}H_{11}O_2N$. MW, 201. Needles from EtOH. M.p. 234°.

Et ether: needles from EtOH. M.p. 214°. *Amide*: $C_{13}H_{13}O_2N$. MW, 215. Needles from EtOH. M.p. 244°.

Heller, *Ber.*, 1912, **45**, 675.
Gattermann, Hess, *Ann.*, 1888, **244**, 73.
Montmollin, Spielev, U.S.P., 1,474,928, (*Chem. Abstracts*, 1924, **18**, 693).

5-Hydroxy-1-naphthoic Acid (1-*Naphthol-5-carboxylic acid*).

Needles from H_2O. M.p. 235–6°. Very sol.

EtOH. Sol. Et_2O, AcOH. Spar. sol. H_2O. Sublimes. $FeCl_3 \longrightarrow$ violet ppt.

Et ester: $C_{13}H_{12}O_3$. MW, 216. M.p. 73°.

Acetyl: m.p. 202–3°.

Benzoyl: m.p. 241°.

Me ether: $C_{12}H_{10}O_3$. MW, 202. Plates from MeOH. M.p. 227–228·5°.

Fuson, *J. Am. Chem. Soc.*, 1924, **46**, 2787.
Dziewoński, Kocwa, *Chem. Abstracts*, 1929, **23**, 2435.

6-Hydroxy-1-naphthoic Acid (2-*Naphthol-5-carboxylic acid*).

Needles from H_2O. M.p. 208–9°. Sol. EtOH, Et_2O, Me_2CO, warm AcOH. Spar. sol. $CHCl_3$, C_6H_6. $FeCl_3 \longrightarrow$ dark brown col.

Acetyl: needles from AcOH.Aq. or toluene. M.p. 209–10°.

Anilide: needles from AcOH. M.p. 193–4°. Insol. most org. solvents.

Royle, Schedler, *J. Chem. Soc.*, 1923, **123**, 1645.

7-Hydroxy-1-naphthoic Acid (2-*Naphthol-8-carboxylic acid*).

Needles from H_2O. M.p. 253–4°. Very sol. EtOH. Sol. hot H_2O. Spar. sol. cold H_2O. $FeCl_3 \longrightarrow$ dark brown col.

Acetyl: needles from EtOH.Aq. M.p. 221–2°.

Benzoyl: m.p. 194°.

Anilide: needles from AcOH. M.p. 209–10°.

Me ether: colourless needles. M.p. 167–8°.

Davies, Heilbron, Irving, *J. Chem. Soc.*, 1932, 2715.
Dziewoński, Galitzevowna, Kocwa, *Chem. Abstracts*, 1928, **22**, 1154.
See also previous reference.

8-Hydroxy-1-naphthoic Acid (1-*Naphthol-8-carboxylic acid*).

Needles from Et_2O. M.p. 169°. Very sol. hot H_2O, EtOH, Et_2O. Passes readily into its lactone.

Me ether: $C_{12}H_{10}O_3$. MW, 202. Needles from C_6H_6. M.p. 162–3°. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. Plates from pet. ether. M.p. 51–2°.

Et ether: $C_{13}H_{12}O_3$. MW, 216. Needles from C_6H_6. M.p. 210–11°.

Propyl ether: $C_{14}H_{14}O_3$. MW, 230. Cryst. from C_6H_6. M.p. 176–7°.

Butyl ether: $C_{15}H_{16}O_3$. MW 244. Needles from C_6H_6. M.p. 154–5°.

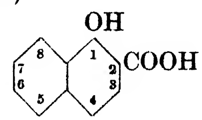
Phenyl ether: 1-phenoxynaphthalene-8-carboxylic acid. $C_{17}H_{12}O_3$. MW, 264. Needles. M.p. 139–40°.

Benzyl ether: $C_{18}H_{14}O_3$. MW, 278. Cryst. from ligroin. M.p. 125–6°.

Lactone: naphtholactone. $C_{11}H_6O_2$. MW, 170. Needles from EtOH.Aq. M.p. 108°. Very sol. EtOH, Et_2O, CS_2. Sublimes in needles.

Rule, Barnett, *J. Chem. Soc.*, 1932, 2732.
Ekstrand, *J. prakt. Chem.*, 1888, **38**, 278.

1-Hydroxy-2-naphthoic Acid (1-*Naphthol-2-carboxylic acid*)



$C_{11}H_8O_3$ MW, 188

Needles from EtOH or Et_2O. M.p. 191–2°. Very sol. EtOH, Et_2O. Sol. hot H_2O. Spar. sol. cold H_2O.

Me ester: $C_{12}H_{10}O_3$. MW, 202. Plates. M.p. 78°.

Et ester: $C_{13}H_{12}O_3$. MW, 216. Cryst. from EtOH. M.p. 49°.

Chloride: $C_{11}H_7O_2Cl$. MW, 206·5°. Needles from pet. ether. M.p. 85–6°.

Amide: $C_{11}H_9O_2N$. MW, 187. Cryst. from amyl alcohol. M.p. 202°.

Anilide: cryst. M.p. 154°.

Acetyl: m.p. 158°.

Me ether: $C_{12}H_{10}O_3$. MW, 202. Needles from EtOH.Aq. M.p. 127°. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. B.p. 193–5°/17 mm. *Et ester*: $C_{14}H_{14}O_3$. MW, 230. B.p. 184–5°/14 mm.

Schmitt, Burkard, *Ber.*, 1887, **20**, 2699.
Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1747.
Weber, Runkel, *Ann.*, 1906, **346**, 361.

3-Hydroxy-2-naphthoic Acid (2 : 3-*Hydroxynaphthoic acid*, β-*hydroxynaphthoic acid*, β-*oxynaphthoic acid*, 2-*naphthol*-3-*carboxylic acid*).

Yellow cryst. from H_2O or AcOH. M.p. 222–3°. Very sol. EtOH, Et_2O. Sol. $CHCl_3$, C_6H_6. Spar. sol. H_2O. $FeCl_3 \longrightarrow$ blue col. The arylides are widely used as coupling components for the so-called "azoic" or "ice" colours.

Me ester: $C_{12}H_{10}O_3$. MW, 202. Needles from EtOH. M.p. 75–6°.

Et ester: $C_{13}H_{12}O_3$. MW, 216. Needles from AcOH. M.p. 85°. B.p. 290–1°.

Chloride: $C_{11}H_7O_2Cl$. MW, 206·5. Needles from ligroin. M.p. 95–6°.

Amide: $C_{11}H_9O_2N$. MW, 187. Yellow needles from EtOH or AcOH. M.p. 217–18°.

Nitrile: $C_{11}H_7ON$. MW, 169. Cryst. from EtOH. M.p. 188–9°.

Anilide: plates from chlorobenzene. M.p. 243–4°. Sol. hot AcOH, $PhNO_2$. Spar. sol. EtOH, AcOEt, xylene. N-*Et*: plates from AcOEt. M.p. 153–4°.

o-*Chloroanilide*: needles from EtOH. M.p. 225–6°.

m-*Chloroanilide*: cryst. from chlorobenzene. M.p. 241–2°.

p-*Chloroanilide*: leaflets from *o*-dichlorobenzene. M.p. 258–9°.

2 : 5-*Dichloroanilide*: needles from EtOH. M.p. 246–7°.

o-*Nitroanilide*: yellow cryst. from xylene. M.p. 192–3°.

m-*Nitroanilide*: yellow cryst. from AcOH. M.p. 246–7°.

p-*Nitroanilide*: yellow cryst. from *o*-dichlorobenzene. M.p. 258–9°.

2 : 4-*Dinitroanilide*: yellow cryst. from chlorobenzene. M.p. 256–7°.

4-*Chloro*-o-*nitroanilide*: yellow leaflets from xylene. M.p. 221–2°.

o-*Hydroxyanilide*: cryst. from solvent naphtha. M.p. 214–15° decomp.

o-*Anisidide*: needles from EtOH. M.p. 167–8°.

p-*Anisidide*: leaflets from EtOH. M.p. 230°.

o-*Toluidide*: leaflets from solvent naphtha. M.p. 195–6°.

p-*Toluidide*: needles from solvent naphtha. M.p. 221–2°.

α-*Naphthalide*: cryst. from xylene. M.p. 222–3°.

β-*Naphthalide*: needles from chlorobenzene. M.p. 243–4°.

Me ether: $C_{12}H_{10}O_3$. MW, 202. Cryst. from C_6H_6. M.p. 134–5°. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. Cryst. from C_6H_6. M.p. 134–5°. *Amide*: $C_{12}H_{11}O_2N$. MW, 201. Cryst. from Me_2CO. M.p. 172–3°. *Nitrile*: $C_{12}H_9ON$. MW, 183. Plates from MeOH. M.p. 132–3°.

Et ether: $C_{13}H_{12}O_3$. MW, 216. Needles from EtOH. M.p. 124° decomp. *Et ester*: $C_{15}H_{16}O_3$. MW, 244. Plates. M.p. 60°. B.p. 300–3°/325 mm., 152°/80 mm. *Amide*: $C_{13}H_{13}O_2N$. MW, 215. Needles from EtOH. M.p. 178°.

Acetyl: needles from EtOH. M.p. 184–6°. *Me ester*: needles. M.p. 101°. *Et ester*: prisms. M.p. 82–3°. *Amide*: needles from Me_2CO. M.p. 185°. *Chloride*: cryst. from ligroin. M.p. 89°. *Nitrile*: plates from MeOH.Aq. M.p. 118°.

Lesser, Kranepuhl, Gad, *Ber.*, 1925, **58**, 2115.
D.R.P., 294,799, (*Chem. Zentr.*, 1916, II, 1095).
Griesheim, D.R.P., 293,897, (*Chem. Zentr.*, 1916, II, 617).

4-Hydroxy-2-naphthoic Acid (1-*Naphthol-3-carboxylic acid*).

Needles from H_2O. M.p. 182–3°. $FeCl_3 \longrightarrow$ golden turbidity.

Acetyl: needles from EtOH.Aq. M.p. 167–8°.

Butler, Royle, *J. Chem. Soc.*, 1923, **123**, 1653.

5-Hydroxy-2-naphthoic Acid (1-*Naphthol-6-carboxylic acid*).

Needles from H_2O or EtOH.Aq. M.p. 210–11°. $FeCl_3 \longrightarrow$ red ppt. which turns yellow then black.

Et ester: $C_{13}H_{12}O_3$. MW, 216. Needles from EtOH.Aq. or AcOH.Aq. M.p. 150–1°.

Acetyl: needles from EtOH.Aq. M.p. 214–15°.

Anilide: needles from AcOH.Aq. M.p. 163–4°.

See previous reference.

6-Hydroxy-2-naphthoic Acid (2-*Naphthol-6-carboxylic acid*).

Needles from H_2O. M.p. 240–1°. $FeCl_3 \longrightarrow$ orange col.

Et ester: needles from EtOH.Aq. M.p. 111–12°.

Acetyl: needles from H_2O. M.p. 221–3°.

Anilide: needles from AcOH.Aq. M.p. 197–8°.

Butler, Royle, *J. Chem. Soc.*, 1923, **123**, 1654.

7-Hydroxy-2-naphthoic Acid (2-*Naphthol-7-carboxylic acid*).

Needles from EtOH.Aq. M.p. 269–70°. $FeCl_3 \longrightarrow$ orange col.

Acetyl: needles from EtOH.Aq. M.p. 209–10°.

Anilide: needles from EtOH.Aq. or AcOH.Aq. M.p. 219–20°.

See previous reference.

8-Hydroxy-2-naphthoic Acid (1-*Naphthol-7-carboxylic acid*).

Needles from H_2O. M.p. 228–9° (210°). $FeCl_3 \longrightarrow$ red ppt. changing to violet then black.

Et ester: needles from EtOH.Aq. M.p. 135–7°.

Acetyl: needles from EtOH.Aq. M.p. 176–7°.

Anilide: needles from AcOH.Aq. M.p. 239–40°.

Me ether: $C_{12}H_{10}O_3$. MW, 202. Cryst. from Et_2O. M.p. 214°. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. Cryst. from EtOH.Aq. M.p. 72°.

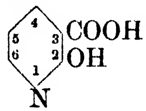
Girardet, *Helv. Chim. Acta*, 1931, **14**, 516.
Butler, Royle, *J. Chem. Soc.*, 1923, **123**, 1654.

5-Hydroxy-1 : 4-naphthoquinone.
See Juglone.

2-Hydroxy-α-naphthoquinonimine.
See 4-Amino-β-naphthoquinone.

Hydroxynaphthylamine.
See Aminonaphthol.

2-Hydroxynicotinic Acid (*2-Hydroxypyridine-3-carboxylic acid*)



$C_5H_5O_3N$ MW, 127

Needles from H_2O. M.p. 256°. Spar. sol. cold H_2O. No col. with $FeCl_3$. $FeSO_4$ ⟶ yellow col. Dist. ⟶ 2-hydroxypyridine.

Weidel, Strache, *Monatsh.*, 1886, **7**, 295.
Philips, *Ann.*, 1895, **288**, 264.
Sucharda, *Chem. Abstracts*, 1925 **19**, 72.

4-Hydroxynicotinic Acid (*4-Hydroxypyridine-3-carboxylic acid*).

Needles. M.p. 250° decomp. ⟶ 4-hydroxypyridine.

Kirpal, *Monatsh.*, 1902, **23**, 936.

6-Hydroxynicotinic Acid (*6-Hydroxypyridine-3-carboxylic acid*).

Needles from H_2O. M.p. 304° (301–2°) decomp. Insol. EtOH, Et_2O, C_6H_6, $CHCl_3$. $FeCl_3$ ⟶ yellow col. Does not combine with acids. Sublimes.

Me ester: $C_6H_{10}O_3N$. MW, 144. Leaflets from Me_2CO. M.p. 164°.

Et ester: $C_7H_{12}O_3N$. MW, 158. Cryst. from Me_2CO. Sol. EtOH, $CHCl_3$. Mod. sol. Et_2O, Me_2CO. Insol. H_2O.

Me ether: $C_6H_{10}O_3N$. MW, 144. Needles from H_2O. M.p. 237–8°. Sol. EtOH, Et_2O, AcOH. Insol. C_6H_6, $CHCl_3$. *Et ester*: $C_8H_{14}O_3N$. MW, 172. Prisms from EtOH. M.p. 71°. B.p. 135°/0·25 mm.

Et ether: $C_7H_{12}O_3N$. MW, 158. Cryst. from EtOH. M.p. 183°.

Reissert, *Ber.*, 1895, **28**, 122.
Meyer, *Monatsh.*, 1901, **22**, 440.
Ruzicka, *Helv. Chim. Acta*, 1921, **4**, 504.
Tschitschibabin, Kirssanow, *Ber.*, 1924, **57**, 1162.
Räth, Schiffmann, *Ann.*, 1931, **487**, 130.

3-Hydroxynonane.
See Ethyl-*n*-hexylcarbinol.

3-Hydroxyoctadecane.
See Ethylpentadecylcarbinol.

Hydroxyoctane.
See *n*-Octyl Alcohol, *sec.-n*-Octyl Alcohol, Ethyl-*n*-amylcarbinol, *and* Propylbutylcarbinol.

5-Hydroxyoctanone-4.
See Butyroin.

1-Hydroxypalmitic Acid

$CH_3 \cdot [CH_2]_{13} \cdot CH(OH) \cdot COOH$

$C_{16}H_{32}O_3$ MW, 272

Needles from $CHCl_3$. M.p. 86–7° (82–3°). Sol. EtOH, Et_2O. Insol. pet. ether. Ox. ⟶ pentadecylic acid. Dist. ⟶ pentadecyl aldehyde.

Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from Me_2CO. M.p. 59–60°.

Et ester: $C_{18}H_{36}O_3$. MW, 300. Cryst. from EtOH. M.p. 55·5–56·5°.

Amide: $C_{16}H_{33}O_2N$. MW, 271. Plates from EtOH. M.p. 150°. Insol. most cold org. solvents.

Nitrile: pentadecyl aldehyde cyanhydrin. $C_{16}H_{31}ON$. MW, 253. Needles from pet. ether. M.p. 52·5–53·5°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Hot HCl.Aq. ⟶ amide.

Et ether: $C_{18}H_{36}O_3$. MW, 300. M.p. 45°.

Le Sueur, *J. Chem. Soc.*, 1905, **87**, 1895.
Levene, West, *J. Biol. Chem.*, 1914, **18**, 466.

2-Hydroxypalmitic Acid

$CH_3 \cdot [CH_2]_{12} \cdot CH(OH) \cdot CH_2 \cdot COOH$

$C_{16}H_{32}O_3$ MW, 272

Leaflets from $CHCl_3$. M.p. 83–83·5°.

Acetyl: m.p. 58°.

Robinet, *Bull. soc. chim. Belg.*, 1931, **40**, 710.

10-Hydroxypalmitic Acid

$CH_3 \cdot [CH_2]_4 \cdot CH(OH) \cdot [CH_2]_9 \cdot COOH$

$C_{16}H_{32}O_3$ MW, 272

dl-.

Cryst. from AcOEt. M.p. 68–9°.

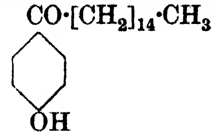
Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from pet. ether. M.p. 40·5–41·5°. B.p. 183–6°/3 mm.

d-.
See Jalapinolic Acid.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, **50**, 1753.

15-Hydroxypalmitic Acid.
See Juniperic Acid.

p-Hydroxypalmitophenone (p-*Palmitylphenol, pentadecyl* p-*hydroxyphenyl ketone*)



$C_{22}H_{36}O_2$ MW, 332

Needles from ligroin. M.p. 78°. Sol. usual org. solvents.

Me ether: *p*-palmitylanisole. $C_{23}H_{38}O_2$. MW, 346. Cryst. M.p. 70·5°. B.p. 279–80°. $D^{80.5}$ 0·8981. $n_a^{80.5}$ 1·47605. Hot. dil. HCl ⟶ anisic acid.

Et ether: *p*-palmitylphenetole. $C_{24}H_{40}O_2$. MW, 360. Plates from EtOH. M.p. 69°. B.p. 288–9°/15 mm. Spar. sol. cold EtOH. Dil. HNO_3 ⟶ *p*-ethoxybenzoic acid.

Krafft, *Ber.*, 1888, **21**, 2269.
Auwers, *Ber.*, 1903, **36**, 3891.
Eijkman, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 816.

1-Hydroxypelargonic Acid

$CH_3·[CH_2]_6·CH(OH)·COOH$

$C_9H_{18}O_3$ MW, 174

Plates. M.p. 70°.

Et ester: $C_{11}H_{22}O_3$. MW, 202. Needles. M.p. 23–4°.

Anilide: m.p. 69–70°.

Acetyl: b.p. 171–4°/10 mm.

Blaise, *Bull. soc. chim.*, 1904, **31**, 491; *Compt. rend.*, 1904, **138**, 698.

2-Hydroxypelargonic Acid

$CH_3·[CH_2]_5·CH(OH)·CH_2·COOH$

$C_9H_{18}O_3$ MW, 174

d-.

Plates from pet. ether. M.p. 47–8°. $[\alpha]_D$ 2° 26′ in EtOH. Sol. EtOH, Et_2O, hot pet. ether. Insol. H_2O.

dl-.

Needles. M.p. 61° (57–9°). Sol. EtOH, C_6H_6, AcOH, $CHCl_3$, AcOEt.

Et ester: $C_{11}H_{22}O_3$. MW, 202. B.p. 145°/13 mm.

Haller, Brochet, *Compt. rend.*, 1910, **150**, 500.
Harding, Weizmann, *J. Chem. Soc.*, 1910, **97**, 302.
Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 838.
Asano, *Journal of the Pharmaceutical Society, Japan*, 1924, **504**, 75, (*Chem. Abstracts*, 1924, **18**, 1645).

6-Hydroxypelargonic Acid

$CH_3·CH_2·CH(OH)·[CH_2]_5·COOH$

$C_9H_{18}O_3$ MW, 174

B.p. 204°/25 mm.

Et ester: $C_{11}H_{22}O_3$. MW, 202. B.p. 151–2°/18 mm.

Blaise, Koehler, *Compt. rend.*, 1909, **148**, 1773; *Bull. soc. chim.*, 1910, **7**, 415.

8-Hydroxypelargonic Acid

$HO·CH_2·[CH_2]_7·COOH$

$C_9H_{18}O_3$ MW, 174

Cryst. from AcOEt. M.p. 53–4°.

Me ester: $C_{10}H_{20}O_3$. MW, 188. B.p. 137–9°/3 mm. D^{20} 0·9588. n_D 1·4438. *Phenylurethane*: cryst. from pet. ether. M.p. 53–4°.

Acetyl: f.p. 1°. B.p. 192–3°/10 mm. D^{20} 1·025.

Lycan, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 628.
Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 467.

Hydroxypentadecenylbenzene.
See Ginkgol.

Hydroxypentadecenylbenzoic Acid.
See Ginkgolic Acid.

Hydroxypentadecylbenzene.
See Hydroginkgol.

Hydroxypentadecylbenzoic Acid.
See Hydroginkgolic Acid.

1-Hydroxypentadecylic Acid (1-*Hydroxypentadecoic acid*, 1-*hydroxytetradecane*-1-*carboxylic acid*)

$CH_3·[CH_2]_{12}·CH(OH)·COOH$

$C_{15}H_{30}O_3$ MW, 258

Needles from $CHCl_3$. M.p. 84·5°. Sol. EtOH, Et_2O. Spar. sol. C_6H_6. Heat at 275° ⟶ myristic aldehyde.

Amide: $C_{15}H_{31}O_2N$. MW, 257. Plates from EtOH. M.p. 149–50°. Insol. H_2O, $CHCl_3$, C_6H_6, pet. ether.

Nitrile: myristic aldehyde cyanhydrin. $C_{15}H_{29}ON$. MW, 239. Plates from pet. ether. M.p. 50·5°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6.

Le Sueur, *J. Chem. Soc.*, 1905, **87**, 1899.
Asahina, Asano, *Journal of the Pharmaceutical Society, Japan*, 1927, **539**, 1.

10-Hydroxypentadecylic Acid

$CH_3·[CH_2]_3·CH(OH)·[CH_2]_9·COOH$

$C_{15}H_{30}O_3$ MW, 258

Cryst. from AcOEt. M.p. 63·5–64°.

Me ester: $C_{16}H_{32}O_3$. MW, 272. M.p. 29–32°. B.p. 166°/2 mm.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, **50**, 1754.

15-Hydroxypentadecylic Acid

$HO{\cdot}CH_2{\cdot}[CH_2]_{12}{\cdot}CH_2{\cdot}COOH$

$C_{15}H_{30}O_3$ MW, 258

Obtained by saponification of musk-seed oil. Plates from Et_2O. M.p. 82–4°. Sol. EtOH, AcOEt, Me_2CO, C_6H_6. Spar. sol. pet. ether. Insol. H_2O. Ox. ⟶ tridecane-1 : 13-dicarboxylic acid.

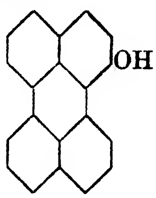
Lactone: exaltolide. $C_{15}H_{28}O_2$. MW, 240. M.p. 31–2°. B.p. 176°/15 mm. D_4^{41} 0·9383. n_D^{41} 1·4633.

Acetyl: cryst. from pet. ether. M.p. 59°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1928, **11**, 1167.
Kerschbaum, *Ber.*, 1927, **60**, 908.

Hydroxypentamethoxyisoflavone.
See under Irigenin.

Hydroxyperylene



$C_{20}H_{12}O$ MW, 268

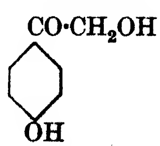
Yellow needles from EtOH.Aq. M.p. 197°. Sol. usual org. solvents. Insol. H_2O. Sols. are yellow with green fluor. Sol. alkalis. Yellow sol. in conc. H_2SO_4 ⟶ green on heating.

Me ether: $C_{21}H_{14}O$. MW, 282. Yellow needles from MeOH. M.p. 111°.

Benzoyl: m.p. 170–1°.

Weitzenböck, Seer, *Ber.*, 1913, **46**, 1997.

***p*-Hydroxyphenacyl Alcohol** (*4 : ω-Dihydroxyacetophenone*, p-*hydroxybenzoylcarbinol*, *hydroxymethyl* p-*hydroxyphenyl ketone*, p-*glycollylphenol*)



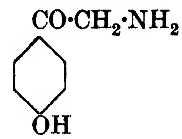
$C_8H_8O_3$ MW, 152

4-*Me ether*: *p*-methoxybenzoylcarbinol, anisoylcarbinol. $C_9H_{10}O_3$. MW, 166. Plates. M.p. 104° (100°). *Acetyl*: cryst. M.p. 59°. *Phenyl ether*: phenyl *p*-methoxyphenacyl ether. $C_{15}H_{14}O_3$. MW, 242. Cryst. M.p. 67°. B.p. 230–3°/20 mm. Ox. ⟶ anisic acid. *Oxime of phenyl ether*: needles from EtOH. M.p. 105°.

4-*Et ether*: *p*-ethoxybenzoylcarbinol. $C_{10}H_{12}O_3$. MW, 180. *Phenyl ether*: phenyl *p*-ethoxyphenacyl ether. $C_{16}H_{16}O_3$. MW, 256. Needles. M.p. 102°. B.p. 245–8°/25 mm. *Oxime of phenyl ether*: needles. M.p. 116°.

Stoermer, Atenstädt, *Ber.*, 1902, **35**, 3565.
Tiffeneau, *Compt. rend.*, 1910, **150**, 1182.
Boeseken, Hansen, Bertram, *Rec. trav. chim.*, 1916, **35**, 312.
Kondo, Nakagawa, *Journal of the Pharmaceutical Society, Japan*, 1930, **50**, 928.

***p*-Hydroxyphenacylamine** (p-*Hydroxy-ω-aminoacetophenone*)



$C_8H_9O_2N$ MW, 151

Plates from EtOH. M.p. 190–3° decomp. Spar. sol. H_2O, EtOH, AcOH. Insol. $CHCl_3$, Et_2O. Sol. acids and alkalis.

Me ether: *p*-methoxyphenacylamine. $C_9H_{11}O_2N$. MW, 165. *B,HCl*: prisms from EtOH. M.p. 204° decomp. *B_2,H_2SO_4*: m.p. 168°. *B_2,H_2PtCl_6*: yellow plates. M.p. 225–8° decomp. *Picrate*: m.p. 185° decomp. N-*Benzyl*: m.p. 118°. N-*Di-Me*: $C_{11}H_{15}O_2N$. MW, 193. Oil which slowly solidifies. M.p. about 30°.

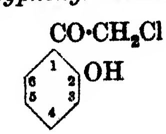
N-*Di-Me*: $C_{10}H_{13}O_2N$. MW, 179. Prisms from Et_2O–ligroin. M.p. 142°. Spar. sol. Et_2O. *B,HI*: needles. M.p. 176°.

B,HCl: prisms from EtOH. M.p. 245° decomp. Sol. H_2O. Spar. sol. EtOH.

Picrate: needles. M.p. 192°.

Tutin, *J. Chem. Soc.*, 1910, **97**, 2520.
Mannich, Hahn, *Ber.*, 1911, **44**, 1547.
Voswinckel, *Ber.*, 1912, **45**, 1005; D.R.P., 248,385.
Thiele, *Arch. Pharm.*, 1915, **253**, 193.

***o*-Hydroxyphenacyl chloride** (*ω-Chloro-2-hydroxyacetophenone*, *2-chloroacetylphenol*, *chloromethyl 2-hydroxyphenyl ketone*)



$C_8H_7O_2Cl$ **MW, 158·5**

Red needles from EtOH. M.p. 73–4° (101°). Sol. most org. solvents. Volatile in steam. CH_3·COONa.Aq. ⟶ coumaranone.

Me ether: 2-chloroacetylanisole. $C_9H_9O_2Cl$. MW, 172·5. Plates from EtOH. M.p. 68–9°. Volatile in steam. Lachrymatory. KOH fusion ⟶ salicylic acid.

Tutin, *J. Chem. Soc.*, 1910, **97**, 2504.
Auwers, *Ber.*, 1926, **59**, 2899.

p-Hydroxyphenacyl chloride (*ω-Chloro-4-hydroxyacetophenone*, *4-chloroacetylphenol*, *chloromethyl 4-hydroxyphenyl ketone*).

Yellowish-red leaflets from MeOH. M.p. 148° (102°). Sol. EtOH, MeOH.

Me ether: 4-chloroacetylanisole. $C_9H_9O_2Cl$. MW, 172·5. Needles from EtOH. M.p. 105°. Lachrymatory.

Et ether: 4-chloroacetylphenetole. $C_{10}H_{11}O_2Cl$. MW, 186·5. Red needles from EtOH. M.p. 107°. Sol. EtOH, Et_2O, $CHCl_3$.

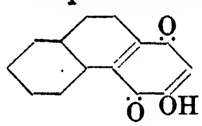
Acetyl: prisms from EtOH. M.p. 111° (90°).

Tutin, Caton, Hann, *J. Chem. Soc.*, 1909, **95**, 2117.
See also last reference above.

ω-p-Hydroxyphenacyltoluene.

See p-Hydroxy-γ-phenylpropiophenone.

3-Hydroxy-1 : 4-phenanthraquinone



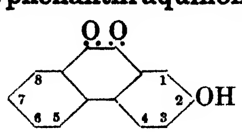
$C_{14}H_8O_3$ MW, 228

Orange-yellow needles from AcOH.Aq. Sinters at 200°, m.p. 230°. Sol. EtOH, AcOH, C_6H_6. Spar. sol. H_2O. Sol. conc. H_2SO_4 to brownish-red sol. Red sols. in alkalis.

Me ether: $C_{15}H_{10}O_3$. MW, 242. Yellow needles from C_6H_6–ligroin. M.p. 170°.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 949.

2-Hydroxyphenanthraquinone



$C_{14}H_8O_3$ MW, 228

Violet needles from AcOH. M.p. 280–3°. Sublimes. Sol. in a little KOH.Aq. ⟶ blue, in excess ⟶ deep green.

Me ether: $C_{15}H_{10}O_3$. MW, 242. Deep red needles from AcOH. M.p. 170–1°. Sol. EtOH, AcOH. Spar. sol. H_2O. Soda–lime dist. ⟶ 2-methoxyfluorene + 2-methoxyfluorenone.

Et ether: $C_{16}H_{12}O_3$. MW, 256. Red leaflets from AcOH. M.p. 160–1°. Sol. EtOH, AcOH.

Acetyl: reddish-yellow needles from AcOH. M.p. 215–16°. Sol. EtOH, Et_2O, Me_2CO.

Benzoyl: red needles from C_6H_6. M.p. 240–2°. Sol. EtOH, AcOH. Spar. sol. C_6H_6.

Semicarbazone: brown cryst. from EtOH. M.p. 263–5° decomp.

Werner, *Ann.*, 1902, **322**, 159.
Anschütz, Meyer, *Ber.*, 1885, **18**, 1943.

3-Hydroxyphenanthraquinone.

Yellowish-red needles from MeOH. M.p. 330° decomp. Sublimes.

Me ether: orange-red needles from AcOH. M.p. 205° (208°).

Et ether: orange-yellow needles from EtOH. M.p. 207–8°. *Oxime*: yellowish-green leaflets from EtOH. M.p. 174°. Sol. $CHCl_3$. Spar. sol. EtOH, Et_2O.

Acetyl: golden-yellow needles from AcOH. M.p. 199–201° (206°). *Hydrazone*: red needles from AcOH. M.p. 207–9°. Sol. most org. solvents.

Benzoyl: yellowish-red needles from AcOH. M.p. 224–6°. Sol. EtOH, AcOEt, AcOH, Me_2CO, C_6H_6. Spar. sol. Et_2O.

Hydrazone: red needles from AcOH. M.p. 237–8°. Sol. EtOH, Et_2O, AcOEt, AcOH, C_6H_6.

Werner, *Ann.*, 1902, **322**, 138.
Pschorr, *Ber.*, 1901, **34**, 4007.
Henstock, *J. Chem. Soc.*, 1906, **89**, 1530.

4-Hydroxyphenanthraquinone.

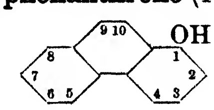
Red powder. M.p. 285°. Sol. AcOH, C_6H_6. Spar. sol. MeOH, EtOH, Et_2O. Sol. conc. H_2SO_4 to brownish-green sol. Deep green sols. in alkalis. Reductive acetylation ⟶ 1 : 3 : 4-triacetoxyphenanthrene, m.p. 138°.

Acetyl: brown cryst. M.p. 188–9°.

Semicarbazone: brown cryst. from EtOH.Aq. M.p. 258° decomp.

Schmidt, Schairer, *Ber.*, 1911, **44**, 744.

1-Hydroxyphenanthrene (*1-Phenanthrol*)



$C_{14}H_{10}O$ MW, 194

Needles from Et_2O. M.p. 156°. Red sol. in H_2SO_4.

Acetyl: needles from EtOH or C_6H_6. M.p. 135–6°.

Me ether: $C_{15}H_{12}O$. MW, 208. Needles from MeOH. M.p. 105°. *Picrate*: m.p. 154°.

Picrate: orange-red needles from MeOH. M.p. 182°.

Fieser, *J. Am. Chem. Soc.*, 1929, **51**, 2464.

2-Hydroxyphenanthrene (2-*Phenanthrol*). Plates from EtOH or ligroin. M.p. 168°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin.
Acetyl: cryst. M.p. 142–3°. Sol. EtOH, Et_2O, C_6H_6, AcOH.
Benzoyl: cryst. from EtOH. M.p. 139–40°.
Me ether: plates from EtOH or Me_2CO. M.p. 99° (100–1°). Sol. Me_2CO, Et_2O, AcOH, EtOH, ligroin. Sols. fluoresce blue. *Picrate*: orange needles from EtOH. M.p. 124°.
Et ether: $C_{16}H_{14}O$. MW, 222. Plates from AcOH. M.p. 112°. Very sol. Et_2O, $CHCl_3$, C_6H_6, pet. ether. Sol. EtOH, AcOH.
Picrate: red needles. M.p. 156°.

Werner, Rekner, *Ann.*, 1902, **321**, 306.
Pschorr, Klein, *Ber.*, 1901, **34**, 4003.
Henstock, *J. Chem. Soc.*, 1906, **89**, 1528.

3-Hydroxyphenanthrene (3-*Phenanthrol*). Needles from EtOH or ligroin. M.p. 122–3° (118–19°). Sol. EtOH, Et_2O, C_6H_6, hot ligroin.
Acetyl: cryst. from EtOH.Aq. M.p. 114–15°. Sol. EtOH, Et_2O.
Me ether: plates from MeOH. M.p. 63° (59°). Sol. EtOH, Et_2O, ligroin, C_6H_6. *Picrate*: red needles from EtOH. M.p. 124–5°.
Et ether: white cryst. from MeOH. M.p. 46°.
Benzyl ether: $C_{21}H_{16}O$. MW, 284. Plates from EtOH.Aq. M.p. 115–16°. Sol. EtOH, Et_2O.
Picrate: red needles from EtOH. M.p. 124–5°.

Pschorr, Klein, *Ber.*, 1901, **34**, 4006.
Werner, *Ann.*, 1902, **321**, 282.
Pschorr, Sumuleanu, *Ber.*, 1900, **33**, 1821.
Werner, Kunz, *Ber.*, 1902, **35**, 4423.

4-Hydroxyphenanthrene (4-*Phenanthrol*). Cryst. from pet. ether. M.p. 106–9°.
Acetyl: plates from EtOH. M.p. 58–9°.
Me ether: plates from MeOH. M.p. 68°. *Picrate*: red needles. M.p. 187–8°.

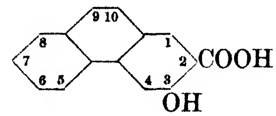
Pschorr, Jackel, *Ber.*, 1900, **33**, 1827.
Behrend, Ludwig, *Ann.*, 1911, **379**, 359.

9-Hydroxyphenanthrene (9-*Phenanthrol*). Needles from ligroin or C_6H_6. M.p. 148–9° (152–3°). Very sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Sol. ligroin. Spar. sol. H_2O. Oxidises in air.
Acetyl: needles from ligroin or EtOH.Aq. M.p. 77–8°.
Propionyl: needles from AcOH. M.p. 95°.
Me ether: needles from MeOH. M.p. 96–7°.

Picrate: red needles. M.p. 185°.

Japp, Findlay, *J. Chem. Soc.*, 1897, **71**, 1122.
Schmidt, Lumpp, *Ber.*, 1908, **41**, 4222.
Werner, Frey, *Ann.*, 1902, **321**, 299.

3-Hydroxyphenanthrene-2-carboxylic Acid (3-*Phenanthrol-2-carboxylic acid*)

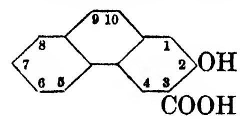


$C_{15}H_{10}O_3$ MW, 238

Yellow prisms from Me_2CO–xylene. M.p. 303° decomp. Sol. Me_2CO. Spar. sol. EtOH, xylene. Insol. ligroin.
Me ester: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from EtOH. M.p. 171°. Sol. EtOH, C_6H_6. Spar. sol. ligroin.
Acetyl: needles from EtOH or Me_2CO. M.p. 207–8°. Insol. xylene.

Werner, Kunz, *Ber.*, 1902, **35**, 4424.

2-Hydroxyphenanthrene-3-carboxylic Acid (2-*Phenanthrol-3-carboxylic acid*)

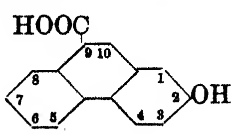


$C_{15}H_{10}O_3$ MW, 238

Yellow needles from Me_2CO–C_6H_6. M.p. 277° decomp. Sol. Me_2CO. Mod. sol. EtOH, C_6H_6. Spar. sol. hot H_2O, ligroin.
Me ester: $C_{16}H_{12}O_3$. MW, 252. Brown needles from EtOH, Et_2O, or Me_2CO. M.p. 126°. Spar. sol. ligroin.
Acetyl: brown needles from EtOH or Me_2CO. M.p. 210° decomp. Spar. sol. hot AcOH. Insol. ligroin.

Werner, Kunz, *Ber.*, 1902, **35**, 4425.

2-Hydroxyphenanthrene-9-carboxylic Acid (2-*Phenanthrol-9-carboxylic acid*)



$C_{15}H_{10}O_3$ MW, 238

Yellowish-brown cryst. from EtOH or AcOH. M.p. 278°.
Me ether: $C_{16}H_{12}O_3$. MW, 252. Prisms from EtOH. M.p. 228°. Sol. EtOH, MeOH,

AcOH, AcOEt, $PhNO_2$. Mod. sol. C_6H_6, $CHCl_3$. Spar. sol. ligroin.

Acetyl: plates from AcOH.Aq. M.p. 223°.

Pschorr, *Ber.*, 1906, **39**, 3123.

4 - Hydroxyphenanthrene - 9 - carboxylic Acid (4-*Phenanthrol*-9-*carboxylic acid*).

Me ether: needles from toluene. M.p. 224° Sol. Me_2CO. Spar. sol. EtOH, Et_2O, AcOH, toluene. Dist. in vacuo ⟶ 4-methoxyphenanthrene.

Pschorr, Jaeckel, *Ber.*, 1900, **33**, 1827.

6 - Hydroxyphenanthrene - 9 - carboxylic Acid (6-*Phenanthrol*-9-*carboxylic acid*, 3-*phenanthrol*-10-*carboxylic acid*).

Me ether: needles from EtOH. M.p. 239°. Sol. AcOH. Mod. sol. EtOH.

Et ether: $C_{17}H_{14}O_3$. MW, 266. Plates from EtOH. M.p. 206°. CrO_3 in AcOH ⟶ 3-ethoxyphenanthraquinone.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 174.

Werner, *Ann.*, 1902, **322**, 154.

8 - Hydroxyphenanthrene - 9 - carboxylic Acid (8-*Phenanthrol*-9-*carboxylic acid*, 1-*phenanthrol*-10-*carboxylic acid*).

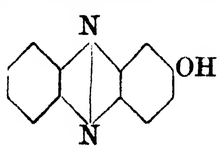
Me ether: yellow plates from EtOH. M.p. 215°. Sol. usual org. solvents. Spar. sol. pet. ether.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 169.

1-Hydroxyphenazine.

See Hemipyocyanine.

2-Hydroxyphenazine (2-*Phenazinol*)



$C_{12}H_8ON_2$ MW, 196

Dark red cryst. + $1H_2O$ from EtOH. At 110° ⟶ yellow anhyd. comp., m.p. 253–4° decomp. Yellowish-red sols. in alkalis. Conc. H_2SO_4 ⟶ dichroic sol. which is olive-green in thin, and red in thick layers: addn. of H_2O ⟶ golden-yellow col.

Me ether: $C_{13}H_{10}ON_2$. MW, 210. Yellow needles from H_2O. M.p. 126°. Spar. volatile in steam. *B_2,H_2PtCl_6*: orange plates. Decomp. above 250°.

Acetyl: yellow cryst. from EtOH or C_6H_6. M.p. 152°. Sol. AcOH. Insol. H_2O.

Kehrmann, Cherpillod, *Helv. Chim. Acta*, 1924, **7**, 974.

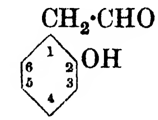
Kehrmann, Mermod, *Helv. Chim. Acta*, 1927, **10**, 65.

McCombie, Scarborough, Waters, *J. Chem. Soc.*, 1928, 356.

***o*-Hydroxyphenoxyacetophenone.**

See o-Hydroxyphenyl phenacyl Ether.

***o*-Hydroxyphenylacetaldehyde** (o-*Hydroxy*-α-*toluic aldehyde*, *homosalicylaldehyde*, ω-*aldehydo*-o-*cresol*)



$C_8H_8O_2$ MW, 136

Colourless liq. B.p. about 90° in vacuo. Yellow sol. in dil. NaOH.

Semicarbazone: cryst. from EtOH. M.p. 171°.

p-*Nitrophenylhydrazone*: cryst. from EtOH. M.p. 148°.

Me ether: *o*-methoxyphenylacetaldehyde. $C_9H_{10}O_2$. MW, 150. B.p. 115–17°/17 mm. Reduces $NH_3.AgNO_3$. Polymerises slowly in air. *Acetyl*: b.p. 238·5–9°/757 mm., 117–18°/15 mm. *Oxime*: needles. M.p. 94–5°. *Semicarbazone*: needles from EtOH. M.p. 158–9°.

Weerman, *Rec. trav. chim.*, 1917, **37**, 7.

Rinkes, *Rec. trav. chim.*, 1926, **45**, 823.

***m*-Hydroxyphenylacetaldehyde** (m-*Hydroxy*-α-*toluic aldehyde*, ω-*aldehydo*-m-*cresol*).

Me ether: *m*-methoxyphenylacetaldehyde. *Oxime*: white needles from H_2O or ligroin. M.p. 92·5° (91°).

Gulland, Virden, *J. Chem. Soc.*, 1929, 1796.

***p*-Hydroxyphenylacetaldehyde** (p-*Hydroxy*-α-*toluic aldehyde*, ω-*aldehydo*-p-*cresol*).

Cryst. Non-volatile in steam. Reduces Fehling's in the cold.

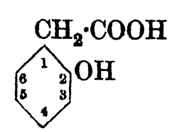
p-*Nitrophenylhydrazone*: yellow cryst. from EtOH. M.p. 158°.

Me ether: *see* Homoanisaldehyde.

Langheld, *Ber.*, 1909, **42**, 2372.

Tiffeneau, *Ann. chim.*, 1907, **10**, 350.

***o*-Hydroxyphenylacetic Acid** (2-*Hydroxy*-α-*toluic acid*)



$C_8H_8O_3$ MW, 152

Needles from Et_2O, prisms from $CHCl_3$. M.p. 145–7° (137°). B.p. 240–3° ⟶ lactone. Sol. Et_2O. Spar. sol. H_2O, $CHCl_3$. $FeCl_3$ ⟶ violet col.

Me ether: *o*-methoxyphenylacetic acid. $C_9H_{10}O_3$. MW, 166. Needles from H_2O. M.p. 123–4°. Sol. EtOH, Et_2O, Me_2CO, AcOH, $CHCl_3$, hot C_6H_6. *Nitrile*: C_9H_9ON. MW, 147. Prisms from C_6H_6–ligroin. M.p. 68°. B.p. 141–3°/15 mm.

Et ether: *o*-ethoxyphenylacetic acid. $C_{10}H_{12}O_3$. MW, 180. Needles from ligroin. M.p. 103–4°. Spar. sol. H_2O. *Nitrile*: $C_{10}H_{11}ON$. MW, 161. B.p. 135–40°/16 mm.

Lactone: *see* Isocoumaranone.

Amide: $C_8H_9O_2N$. MW, 151. Leaflets from EtOH–$CHCl_3$. M.p. 116–18°. *Benzoyl*: leaflets from EtOH. M.p. 162–4°. Sol. Et_2O, AcOH. Spar. sol. EtOH, C_6H_6, ligroin. Insol. alkalis.

Nitrile: *o*-hydroxybenzyl cyanide. C_8H_7ON. MW, 133. Needles from C_6H_6–ligroin. M.p. 117–19°. Sol. most org. solvents. *Benzoyl*: needles from ligroin. M.p. 50°.

Hydrazone: leaflets from $CHCl_3$. M.p. 154°.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, **42**, 828.
Stoermer, *Ann.*, 1900, **313**, 83.
Auwers, *Ber.*, 1907, **40**, 3512.
Pschorr, Zeidler, *Ann.*, 1910, **373**, 76.

m-Hydroxyphenylacetic Acid (*3-Hydroxy-α-toluic acid*).

Needles from C_6H_6–ligroin. M.p. 129°. Sol. H_2O, EtOH, Et_2O. $FeCl_3$ ⟶ green col.

Me ether: *m*-methoxyphenylacetic acid. $C_9H_{10}O_3$. MW, 166. Leaflets from H_2O. M.p. 67°. *Et ester*: $C_{11}H_{14}O_3$. MW, 194. B.p. 146–7°/14 mm.

Nitrile: *m*-hydroxybenzyl cyanide. C_8H_7ON. MW, 133. Plates from H_2O. M.p. 52–3°. Sol. H_2O, EtOH, Et_2O. $FeCl_3$ ⟶ violet col.

Salkowski, *Ber.*, 1884, **17**, 506.
v. Pechmann, Bauer, Obermiller, *Ber.*, 1904, **37**, 2121.
Pschorr, *Ann.*, 1912, **391**, 45.
Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, **42**, 831.

p-Hydroxyphenylacetic Acid (*4-Hydroxy-α-toluic acid*).

Occurs in human and canine urine, dandelion roots, etc. Also produced by bacteriological putrefaction. Needles from H_2O. M.p. 148–50°. Sol. EtOH, Et_2O, hot H_2O. $FeCl_3$ ⟶ weak greenish-violet col. Ba and Ca salts spar. sol. H_2O. Dry dist. ⟶ *p*-cresol.

Me ether: *see* Homoanisic Acid.

Et ether: *p*-ethoxyphenylacetic acid. $C_{10}H_{12}O_3$. MW, 180. Leaflets from H_2O. M.p. 88–9°. Spar. sol. cold H_2O. *Amide*: $C_{10}H_{13}O_2N$. MW, 179. Leaflets from H_2O. M.p. 184°. Sol. EtOH, Me_2CO, AcOH. Spar. sol. Et_2O, C_6H_6, ligroin. *Nitrile*: $C_{10}H_{11}ON$. MW, 161. Leaflets from EtOH.Aq. M.p. 47°.

Me ester: $C_9H_{10}O_3$. MW, 166. B.p. 310°. D_4^{20} 1·1786. n_D^{18} 1·5338.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 314°. $D_4^{18\cdot5}$ 1·2225. n_D^{20} 1·5183.

Amide: $C_8H_9O_2N$. MW, 151. Leaflets from H_2O. M.p. 175°. *Benzoyl*: cryst. from EtOH. M.p. 167–9°.

Nitrile: *p*-hydroxybenzyl cyanide. C_8H_7ON. MW, 133. Needles from H_2O. M.p. 69–7°. B.p. 330°. Sol. EtOH, Et_2O. Spar. sol. H_2O. $FeCl_3$ ⟶ violet col.

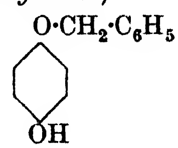
Salkowski, *Ber.*, 1889, **22**, 2137.
Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 171.
Werner, *Ann.*, 1902, **322**, 148.
Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, **103**, 1036.
Hirai, *Biochem. Z.*, 1921, **114**, 71.
See also last reference above.

α-Hydroxyphenylacetic Acid.
See Mandelic Acid.

***N*-Hydroxyphenyl-anthranilic Acid.**
See 2′-, 3′-, and 4′-Hydroxydiphenylamine-2 carboxylic Acids.

Hydroxyphenyl-benzoylethane.
See Hydroxyphenylpropiophenone.

p-Hydroxyphenyl benzyl Ether (*Hydroquinone monobenzyl ether*)



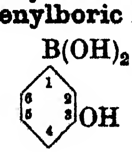
$C_{13}H_{12}O_2$ MW, 200

Plates from H_2O. M.p. 122–122·5°. Sol. EtOH, Et_2O, C_6H_6, hot H_2O. Spar. sol. cold H_2O.

Schiff, Pellizzari, *Ann.*, 1883, **221**, 370.

Hydroxyphenyl benzyl Ketone.
See Hydroxydeoxybenzoin.

3-Hydroxyphenylboric Acid



$C_6H_7O_3B$ MW, 138

Cryst. from ethylene chloride–Me_2CO. M.p. 225° decomp. Sol. H_2O, EtOH, Et_2O, Me_2CO. Spar. sol. $CHCl_3$, ethylene chloride. $FeCl_3 \longrightarrow$ bluish-violet col.

Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4421.

4-Hydroxyphenylboric Acid.

Me ether: $C_7H_9O_3B$. MW, 152. Plates from H_2O. M.p. 208·5–209·5° (207°).

König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 157.
Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4417.

4-Hydroxy-4-phenylbutylene-1.

See Allylphenylcarbinol.

1-Hydroxy-1-phenylbutyric Acid (*Propylphenylglycollic acid*)

$$CH_3{\cdot}CH_2{\cdot}\overset{C_6H_5}{C}(OH){\cdot}COOH$$

$C_{10}H_{12}O_3$ MW, 180

dl-.

Needles from H_2O. M.p. 132·5°. Sol. EtOH, hot H_2O. Insol. ligroin.

Et ester: $C_{12}H_{16}O_3$. MW, 208. B.p. 143°/20 mm.

Grignard, *Compt. rend.*, 1902, **135**, 629.
Smith, *J. prakt. Chem.*, 1911, **84**, 744.

2-Hydroxy-2-phenylbutyric Acid (*β-Hydroxy-β-methylhydrocinnamic acid*)

$$CH_3{\cdot}\overset{C_6H_5}{C}(OH){\cdot}CH_2{\cdot}COOH$$

$C_{10}H_{12}O_3$ MW, 180

Needles. M.p. 50–3°.

Me ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 135–40°/12 mm.

Et ester: $C_{12}H_{16}O_3$. MW, 208. B.p. 146–7°/15 mm.

Lindenbaum, *Ber.*, 1917, **50**, 1271.
Auwers, *Ann.*, 1917, **413**, 272.

1-Hydroxy-3-phenylbutyric Acid (*2-Benzyl-lactic acid*)

$$C_6H_5{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$$

$C_{10}H_{12}O_3$ MW, 180

d-.

Needles from C_6H_6. M.p. 114°. Sublimes. $[\alpha]_D + 12{\cdot}9°$.

l-.

M.p. 114–16°. $[\alpha]_D^{27} - 9{\cdot}9°$.

Me ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 159°/17 mm. $[\alpha]_D^{25} - 22{\cdot}3°$.

l-*Menthyl ester*: $C_{20}H_{30}O_3$. MW, 318. M.p. 88°. $[\alpha]_D^{22} - 65{\cdot}4°$.

dl-.

Plates from Et_2O–ligroin. M.p. 104·5–105°. Sol. Et_2O. Spar. sol. C_6H_6, CS_2. Insol. ligroin.

Me ester: b.p. 155°/13 mm.

Biquard, *Ann. chim.*, 1933, **20**, 143.
Knoop, Kertess, *Z. physiol. Chem.*, 1911, **71**, 256, 259.
Fittig, Petkov, *Ann.*, 1898, **299**, 32.

2-Hydroxy-3-phenylbutyric Acid (*2-Benzylhydracrylic acid*)

$$C_6H_5{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH$$

$C_{10}H_{12}O_3$ MW, 180

dl-.

Plates from Et_2O. Sol. cold H_2O, $CHCl_3$. Spar. sol. C_6H_6, ligroin, CS_2.

Fittig, Luib, *Ann.*, 1894, **283**, 297, 302, 305.

3-Hydroxy-3-phenylbutyric Acid

$$C_6H_5{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_{10}H_{12}O_3$ MW, 180

dl-.

Cryst. from EtOH or CS_2. M.p. 75°. Sol. EtOH, Et_2O, CS_2, NaOH. H_2O at 65–80° $\longrightarrow$ lactone. Ox. $\longrightarrow$ 2-benzoylpropionic acid. Red. $\longrightarrow$ 3-phenylbutyric acid.

Et ester: $C_{12}H_{16}O_3$. MW, 208. B.p. 158–160°/17 mm., 152–3°/12 mm.

Amide: $C_{10}H_{13}O_2N$. MW, 179. Prisms from EtOH. M.p. 86°. Sol. EtOH, hot H_2O, $CHCl_3$. Spar. sol. Et_2O.

Lactone: 3-phenylbutyrolactone. $C_{10}H_{10}O_2$. MW, 162. Needles from EtOH. M.p. 38°. B.p. 306°, 123°/2 mm. Sol. EtOH, Et_2O, C_6H_6, AcOH. Spar. sol. hot H_2O. $n_\alpha^{15{\cdot}4}$ 1·5418. Volatile in steam.

l-.

Occurs in urine.

Na salt: $[\alpha]_D^{18} - 13{\cdot}0$ in H_2O.

Fittig, Jayne, *Ann.*, 1883, **216**, 105.
Findlay, Hickmans, *J. Chem. Soc.*, 1909, **95**, 1009.
v. Peckmann, *Ber.*, 1882, **15**, 890.

2-Hydroxy-2-phenyl-*n*-caproic Acid (*β-Hydroxy-β-propylhydrocinnamic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{C_6H_5}{C}(OH){\cdot}CH_2{\cdot}COOH$$

$C_{12}H_{16}O_3$ MW, 208

Cryst. from 60% EtOH or C_6H_6. M.p. 121·5–122°. Decomp. at 150°. Conc. H_2SO_4 ⟶ β-propylcinnamic acid.

Schroeter, *Ber.*, 1908, **41**, 11.

3-Hydroxy-2-phenyl-*n*-caproic Acid (β-1-*Hydroxypropylhydrocinnamic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}\underset{}{\overset{C_6H_5}{\overset{|}{C}}}H{\cdot}CH_2{\cdot}COOH$$

$C_{12}H_{16}O_3$ MW, 208

M.p. 155–6°.

Ivanoff, Nicoloff, *Bull. soc. chim.*, 1932, **51**, 1325.

4-Hydroxy-2-phenyl-*n*-caproic Acid (β-2-*Hydroxypropylhydrocinnamic acid*)

$$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}\overset{C_6H_5}{\overset{|}{C}}H{\cdot}CH_2{\cdot}COOH$$

$C_{12}H_{16}O_3$ MW, 208

Lactone: 4-methyl-2-phenylbutyrolactone. $C_{12}H_{14}O_2$. MW, 190. Oil. B.p. 197–200°/19 mm. Sol. EtOH, hot H_2O.

Vorländer, Knötzsch, *Ann.*, 1897, **294**, 329.

Jacobs, Scott, *J. Biol. Chem.*, 1931, **93**, 139.

2-Hydroxy-2-phenylcaprylic Acid (β-*Hydroxy*-β-*amylhydrocinnamic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{C_6H_5}{\overset{|}{C}}(OH){\cdot}CH_2{\cdot}COOH$$

$C_{14}H_{20}O_3$ MW, 236

Needles from pet. ether, dil. EtOH, or CS_2. M.p. 79–80·5°.

Schroeter, *Ber.*, 1907, **40**, 1603.

Hydroxyphenylcarbamic Acid.
Ethyl Ester. *See* Hydroxyphenylurethane.

4-Hydroxy-2-phenylchroman.
See Flavanol.

Hydroxyphenylcinchoninic Acid.
See Isaphenic Acid.

Hydroxy-phenylcinnamic Acid.
See Hydroxystilbene-α-carboxylic Acid.

Hydroxyphenylcrotonic Acid.
See β-Methyl-*p*-coumaric Acid.

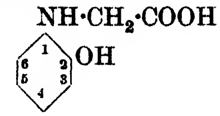
1-*p*-Hydroxyphenyl-2-dimethylamino-ethane.
See Hordenine.

Hydroxyphenylethyl Alcohol.
See Tyrosol.

Hydroxyphenylethylamine.
See Tyramine.

Hydroxyphenylethylmethylamine.
See Methyl-hydroxyphenylethyl-amine.

***o*-Hydroxyphenylglycine**



$C_8H_9O_3N$ MW, 167

Plates $+1H_2O$ from H_2O. Heat at 100–5° ⟶ anhydride.

Me ether: $C_9H_{11}O_3N$. MW, 181. Needles from C_6H_6. M.p. 153°. Sol. EtOH, Et_2O. Spar. sol. H_2O. *Amide*: $C_9H_{12}O_2N_2$. MW, 180. M.p. 153–4°. *Nitrile*: $C_9H_{10}ON_2$. MW, 162. Prisms. M.p. 68°.

Et ether: $C_{10}H_{13}O_3N$. MW, 195. Cryst. M.p. 120°. Sol. EtOH, Et_2O. Spar. sol. H_2O. *Amide*: $C_{10}H_{14}O_2N_2$. MW, 194. M.p. 161–2°.

Nitrile: $C_8H_8ON_2$. MW, 148. N-*Acetyl*: m.p. 167–8°. *Diacetyl*: m.p. 105–6°.

N-*Acetyl*: m.p. 201–2°.

Vater, *J. prakt. Chem.*, 1884, **29**, 289.

Shimo, *Bull. Chem. Soc. Japan*, 1926, **1**, 226.

***p*-Hydroxyphenylglycine.**

Plates from H_2O. Decomp. at 200° without melting. Spar. sol. H_2O, EtOH. Insol. Et_2O. $FeCl_3$ ⟶ blue col.

Me ether: cryst. M.p. 200° decomp. Sol. EtOH. Spar. sol. cold H_2O, Et_2O. *Amide*: m.p. 145–6°.

Et ether: cryst. from H_2O. M.p. 163°. *Amide*: m.p. 145–6°.

Me ester: $C_9H_{11}O_3N$. MW, 181. M.p. 97–8°.

Et ester: $C_{10}H_{13}O_3N$. MW, 195. Plates. M.p. 79°. Sol. EtOH, hot H_2O.

Amide: $C_8H_{10}O_2N_2$. MW, 166. M.p. 135–6°.

N-*Acetyl*: m.p. 203–4°.

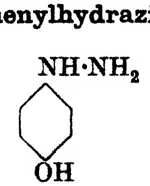
Diacetyl: m.p. 174–5°.

Meldola, Foster, Brightman, *J. Chem. Soc.*, 1917, **111**, 552.

Vater, *J. prakt. Chem.*, 1884, **29**, 294.

Bischoff, Nastvogel, *Ber.*, 1889, **22**, 1788.

***p*-Hydroxyphenylhydrazine** (p-*Hydrazinophenol*)



$C_6H_8ON_2$ MW, 124

Me ether: *p*-hydrazinoanisole. $C_7H_{10}ON_2$. MW, 138. Cryst. M.p. 65°. N-*Acetyl*: m.p. 133·5°.

Et ether: *p*-hydrazinophenetole. $C_8H_{12}ON_2$. MW, 152. Plates from C_6H_6. M.p. 74°. Sol. H_2O, EtOH. Spar. sol. Et_2O, ligroin.

Altschul, *J. prakt. Chem.*, 1898, **57**, 202; *Ber.*, 1892, **25**, 1849.

1-Hydroxy-1-phenylisobutane.
See Isopropylphenylcarbinol.

1-Hydroxy-2-phenylisobutyric Acid (1-*Benzyl-lactic acid, methylbenzylglycollic acid, α-hydroxy-α-methylhydrocinnamic acid*)

$$C_6H_5{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}(OH){\cdot}COOH$$

$C_{10}H_{12}O_3$ MW, 180

Prisms from C_6H_6. M.p. 97–9°. Sol. H_2O, C_6H_6, EtOH.

Gabriel, Michael, *Ber.*, 1879, **12**, 815.

2-Hydroxy-2-phenylisobutyric Acid (*β-Hydroxy-α-methylhydrocinnamic acid, 1-methyl-2-phenylhydracrylic acid*)

$$C_6H_5{\cdot}CH(OH){\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}COOH$$

$C_{10}H_{12}O_3$ MW, 180

Needles from C_6H_6–ligroin. M.p. 95°. Sol. EtOH, Et_2O, Me_2CO. Spar. sol. H_2O, $CHCl_3$, CS_2, ligroin. $k = 3{\cdot}47 \times 10^{-5}$ at 25°. CH_3COCl or $Ac_2O \longrightarrow$ α-methylcinnamic acid.

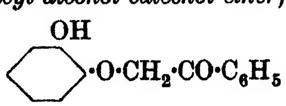
Perkin, Colman, *J. Chem. Soc.*, 1887, **49**, 159.
Perkin, Stenhouse, *J. Chem. Soc.*, 1891, **59**, 1010 (*footnote*).
Posner, *Ann.*, 1912, **389**, 75.
Dain, *J. Russ. Phys.-Chem. Soc.*, 1897, **29**, 597.

2-Hydroxy-1-phenylisopentane.
See Methylethylbenzylcarbinol.

Hydroxyphenyl-isopropyl Alcohol.
See 2-, *and* 3-, α-Hydroxyisopropylphenol.

1-Hydroxy-phenylisoquinoline.
See Phenylisocarbostyril.

o-Hydroxyphenyl phenacyl Ether (*o-Hydroxyphenoxyacetophenone, catechol phenacyl ether, phenacyl alcohol catechol ether*)



$C_{14}H_{12}O_3$ MW, 228

Needles from C_6H_6. M.p. 111°. Very sol. MeOH, EtOH, Et_2O, $CHCl_3$. Sol. C_6H_6. Spar. sol. ligroin, H_2O.

Me ether: guaiacol phenacyl ether. $C_{15}H_{14}O_3$. MW, 242. Needles from Et_2O. M.p. 101°.

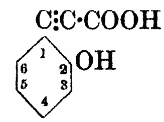
Et ether: $C_{16}H_{16}O_3$. MW, 256. Plates from EtOH. M.p. 81°.
Benzoyl: plates. M.p. 136–7°.
Oxime: needles from MeOH.Aq. M.p. 109°.
Hydrazone: yellow needles. M.p. 91°.
Semicarbazone: cryst. M.p. 145·5°.

Lazennec, *Bull. soc. chim.*, 1909, **5**, 501.

2-Hydroxy-1-phenylpropane.
See Methylbenzylcarbinol.

2-Hydroxy-2-phenylpropane.
See Dimethyl-phenylcarbinol.

2-Hydroxyphenylpropiolic Acid



$C_9H_6O_3$ MW, 162

Me ether: $C_{10}H_8O_3$. MW, 176. Needles from CS_2. M.p. 124–6° decomp. Sol. EtOH, Et_2O.
Et ether: $C_{11}H_{10}O_3$. MW, 190. Needles from H_2O. M.p. 115·5–116°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O. H_2O at 140–50° $\longrightarrow$ 2-ethoxyphenylacetylene + 2-ethoxyacetophenone.

Fittig, Claus, *Ann.*, 1892, **269**, 7.
Michael, Lamb, *Am. Chem. J.*, 1906, **36**, 565.

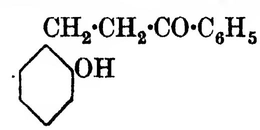
4-Hydroxyphenylpropiolic Acid.
Me ether: needles. M.p. 132–9° decomp. Mod. sol. dil. EtOH. Spar. sol. H_2O.

Reychler, *Bull. soc. chim.*, 1897, **17**, 512.

Hydroxyphenylpropionic Acid.
See Atrolactinic Acid, Tropic Acid, Hydroxyhydrocinnamic Acid, *and* Hydroxyhydratropic Acid.

o-Hydroxy-2-phenylpropionic Acid.
See Melilotic Acid.

γ-[o-Hydroxyphenyl]-propiophenone (*β-[o-Hydroxybenzyl]-acetophenone, 1-o-hydroxyphenyl-2-benzoylethane, ω-phenacyl-o-cresol*)



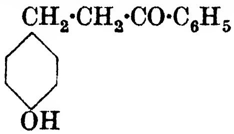
$C_{15}H_{14}O_2$ MW, 226

Leaflets. M.p. 91–2°.
Me ether: $C_{16}H_{16}O_2$. MW, 240. B.p. 223°/20 mm.
Acetyl: needles. M.p. 65–6°.

Semicarbazone : needles from C_6H_6. M.p. 174–5°.

Borsche, Geyer, *Ber.*, 1914, **47**, 1160.
Bargellini, Bini, *Gazz. chim. ital.*, 1911, **41**, 441.
Feuerstein, Musculus, *Ber.*, 1901, **34**, 410.
Feuerstein, Kostanecki, *Ber.*, 1898, **31**, 718.

γ-[**p-Hydroxyphenyl]-propiophenone** (β-[p-*Hydroxybenzyl*]-*acetophenone*, 1-p-*hydroxyphenyl-2-benzoylethane*, ω-*phenacyl*-p-*cresol*)



$C_{15}H_{14}O_2$ MW, 226

Me ether : ω-anisylacetophenone. $C_{16}H_{16}O_2$. MW, 240. Needles from EtOH.Aq. M.p. 68° (59–60°). Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O, pet. ether. *Semicarbazone* : needles from EtOH.Aq. M.p. 118–20°.

Pfeiffer, Negreau, *Ber.*, 1917, **50**, 1473.
Kohler, Conant, *J. Am. Chem. Soc.*, 1917, **39**, 1709.
Bargellini, Bini, *Gazz. chim. ital.*, 1911, **41**, 443.

β-Hydroxy-γ-phenylpropiophenone (*Benzylbenzoylcarbinol*, β-*hydroxy*-β-*benzylacetophenone*)

$C_6H_5·CO·CH(OH)·CH_2·C_6H_5$

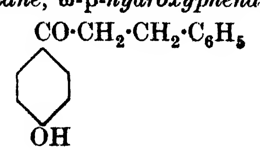
$C_{15}H_{14}O_2$ MW, 226

dl-.
Needles from H_2O. M.p. 65–6°. Reduces Fehling's.

Active form :
Prisms from pet. ether. M.p. 75·5–76·5°. Sol. usual org. solvents. Spar. sol. H_2O. $[\alpha]_D^{17·5}$ + 12·6° in Me_2CO, $[\alpha]_D^{12·1}$ − 19·3° in EtOH. Reduces Fehling's. Racemised by NaOEt.

McKenzie, Martin, Rule, *J. Chem. Soc.*, 1914, **105**, 1589.

p-Hydroxy-γ-phenylpropiophenone (p-*Hydroxy*-β-*benzylacetophenone*, 1-*phenyl*-2-p-*hydroxybenzoylethane*, ω-p-*hydroxyphenacyltoluene*)



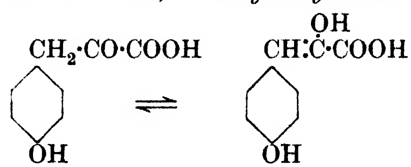
$C_{15}H_{14}O_2$ MW, 226

Me ether : $C_{16}H_{16}O_2$. MW, 240. Plates from EtOH. M.p. 97°. Sol. Et_2O, AcOH. Insol. H_2O. *Oxime* : needles from EtOH.Aq. M.p. 114°.

Jörlander, *Ber.*, 1917, **50**, 411.
Pfeiffer, Negreau, *Ber.*, 1917, **50**, 1474.

Hydroxyphenylpropyl Alcohol.
See Hydroxypropylphenol.

4-Hydroxyphenylpyruvic Acid (α-*Hydroxy*-p-*coumaric acid*, 4-α-*dihydroxycinnamic acid*)



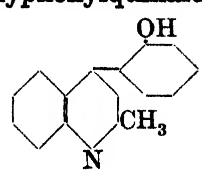
$C_9H_8O_4$ MW, 180

Plates from H_2O. M.p. 220°. Sol. EtOH, Et_2O, AcOEt. Spar. sol. H_2O, C_6H_6. Reduces Fehling's and $NH_3.AgNO_3$. $FeCl_3 \longrightarrow$ green col.

Me ether : $C_{10}H_{10}O_4$. MW, 194. Prisms from AcOEt. M.p. 186°. Sol. EtOH, C_6H_6, $CHCl_3$. Spar. sol. ligroin. *Phenylhydrazone* : m.p. 154°. *Et ester* : $C_{12}H_{14}O_4$. MW, 222. B.p. 190°/15 mm. *Semicarbazone of Et ester* : cryst. M.p. 152–3°.

Neubauer, *Chem. Zentr.*, 1909, II, 50.
Erlenmeyer, Wittenberg, *Ann.*, 1904, **337**, 299.
Cain, Simonsen, *J. Chem. Soc.*, 1913, **103**, 1036.
Neubauer, Fromherz, *Z. physiol. Chem.*, 1910, **70**, 339.

4-o-Hydroxyphenylquinaldine



$C_{16}H_{13}ON$ MW, 235

Needles from dil. EtOH. M.p. 187–8°.

Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, **27**, 3038.
M.L.B., D.R.P., 80,501.

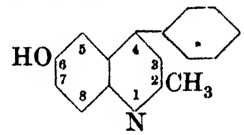
4-m-Hydroxyphenylquinaldine.
M.p. 259–60°.

See second reference above.

4-p-Hydroxyphenylquinaldine.
Cryst. from EtOH. M.p. 255°.

Besthorn, Jaeglé, *Ber.*, 1894, **27**, 912.
M.L.B., D.R.P., 80,501.

6-Hydroxy-4-phenylquinaldine



$C_{16}H_{13}ON$ MW, 235

Cryst. from EtOH. M.p. 248°.

Me ether: $C_{17}H_{15}ON$. MW, 249. Plates from C_6H_6. M.p. 76°.

Königs, Jaeglé, *Ber.*, 1895, **28**, 1048.

7-Hydroxy-4-phenylquinaldine.

Yellow needles. M.p. 262°. Sol. alkalis.

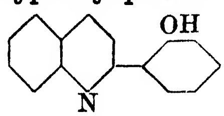
Et ether: $C_{18}H_{17}ON$. MW, 263. Needles. M.p. 91°.

B_2,H_2PtCl_6: m.p. 218–20°.

Picrate: m.p. 208°.

Bülow, Issler, *Ber.*, 1903, **36**, 2453.

2-o-Hydroxyphenylquinoline



$C_{15}H_{11}ON$ MW, 221

Yellow needles from EtOH. M.p. 115°. B.p. above 300°. Sol. acids and alkalis.

Picrate: yellow needles. M.p. 184°.

Döbner, *Ann.*, 1888, **249**, 101.

2-m-Hydroxyphenylquinoline.

Needles from dil. EtOH. M.p. 156°. Sol. EtOH, Et_2O. Zn ⟶ 2-phenylquinoline.

$B,HCl,1\frac{1}{2}H_2O$: m.p. 224°. Spar. sol. H_2O.

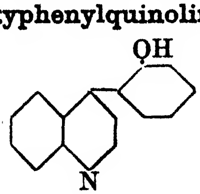
Murmann, *Monatsh.*, 1892, **13**, 67.
Miller, Kinkelin, *Ber.*, 1885, **18**, 1908.

2-p-Hydroxyphenylquinoline.

Needles. M.p. 237–8°. Sol. hot EtOH, KOH, HCl. Insol. H_2O. Zn ⟶ 2-phenylquinoline.

Murmann, *Monatsh.*, 1892, **13**, 63.
Weidel, *Monatsh.*, 1887, **8**, 127.

4-o-Hydroxyphenylquinoline



$C_{15}H_{11}ON$ MW, 221

M.p. 208°.

B,HCl: m.p. 260°.

B_2,H_2PtCl_6: m.p. 274°.

Et ether: $C_{17}H_{15}ON$. MW, 249. M.p. 80–1°.

Picrate: m.p. 201–2°.

Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, **27**, 3040.
Königs, *J. prakt. Chem.*, 1900, **61**, 40.

4-m-Hydroxyphenylquinoline.

M.p. 235°. Spar. sol. EtOH, $CHCl_3$. Prac. insol. Et_2O. CrO_3 ⟶ cinchonic acid.

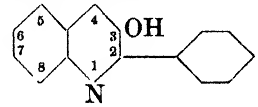
Koenigs, Nef, *Ber.*, 1887, **20**, 630.
Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, **27**, 3041.

4-p-Hydroxyphenylquinoline.

Needles or prisms from dil. EtOH. M.p. 243°. Sol. EtOH, $CHCl_3$. Prac. insol. C_6H_6, Et_2O. CrO_3 ⟶ cinchonic acid.

Koenigs, Nef, *Ber.*, 1887, **20**, 629.
Besthorn, Jaeglé, *Ber.*, 1894, **27**, 913.

3-Hydroxy-2-phenylquinoline



$C_{15}H_{11}ON$ MW, 221

M.p. 218–20° (210–12°). Sol. alkalis.

B,HCl: m.p. 261° (243–5°).

Dilthey, Thelen, *Ber.*, 1925, **58**, 1589.
Barginelli, Berlingozzi, *Gazz. chim. ital.*, 1923, **53**, 3.

4-Hydroxy-2-phenylquinoline.

Plates from EtOH. M.p. 256°. Sol. alkalis, hot EtOH. Prac. insol. H_2O. Insol. Et_2O. Zn ⟶ 2-phenylquinoline.

Me ether: $C_{16}H_{13}ON$. MW, 235. Needles from ligroin. M.p. 69–70°.

$B,HCl,\frac{1}{2}H_2O$: m.p. 234° decomp.

Just, *Ber.*, 1886, **19**, 1464.
Conrad, Limpach, *Ber.*, 1888, **21**, 521.
Niementowski, *Ber.*, 1894, **27**, 1396; *Ber.*, 1905, **38**, 2050.
Knorr, *Ann.*, 1888, **245**, 376.
Campo, *Arch. Pharm.*, 1901, **239**, 597.
Kaufmann, Pláy Janini, *Ber.*, 1911, **44**, 2677.
Dziewoński, Moszew, *Chem. Abstracts*, 1933, **27**, 3937.

6-Hydroxy-2-phenylquinoline.

Needles from dil. EtOH. M.p. 218°. Sol. EtOH, Et_2O. Insol. ligroin.

Me ether: plates from dil. EtOH. M.p. 133°.

Picrate: m.p. 205°.

Et ether: $C_{17}H_{15}ON$. MW, 249. M.p. 132°.

Picrate : needles from Et_2O. M.p. 201°.

Döbner, Fettback, *Ann.*, 1894, **281**, 14.
Schering, Chemische Fabrik auf Actien, D.R.P., 312,098, (*Chem. Zentr.*, 1919, II, 852).

7-Hydroxy-2-phenylquinoline.

Needles from dil. Me_2CO. M.p. 229–30°. Mod. sol. EtOH, Me_2CO, AcOH. Spar. sol. C_6H_6.

Borsche, *Ber.*, 1908, **41**, 3890.

8-Hydroxy-2-phenylquinoline.

Plates. M.p. 59°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6.

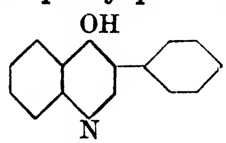
Picrate: yellow needles from dil. EtOH. M.p. 152°.

Döbner, Fettback, *Ann.*, 1894, **281**, 9.

2-Hydroxy-3-phenylquinoline.

See 3-Phenylcarbostyril.

4-Hydroxy-3-phenylquinoline



$C_{15}H_{11}ON$ MW, 221

Needles from EtOH. M.p. 255–7°.

Börner, *Chem. Zentr.*, 1900, I, 122.
Wislicenus, *Ann.*, 1917, **413**, 249.

2-Hydroxy-4-phenylquinoline.

See 4-Phenylcarbostyril.

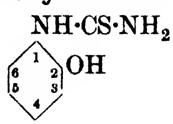
2-Hydroxy-3-phenylquinoline-4-carboxylic Acid.

See Isaphenic Acid.

Hydroxyphenyl styryl Ketone.

See 2′-, 3′-, and 4′-Hydroxychalkone.

2-Hydroxyphenylthiourea



$C_7H_8ON_2S$ MW, 168

Cryst. from H_2O. M.p. 161° decomp. Sol. EtOH, Et_2O, alkalis. Mod. sol. hot H_2O.

Me ether: $C_8H_{10}ON_2S$. MW, 182. Needles from EtOH. M.p. 152°.

Et ether: $C_9H_{12}ON_2S$. MW, 196. Plates from EtOH. M.p. 110°. Mod. sol. EtOH. Insol. H_2O.

Bendix, *Ber.*, 1878, **11**, 2263.
Muhlhäuser, *Ann.*, 1881, **207**, 246.
Berlinerblau, *J. prakt. Chem.*, 1884, **30**, 106.

3-Hydroxyphenylthiourea.

Prisms from hot H_2O. M.p. 183–4°.

Et ether: needles. M.p. 112°. Sol. hot EtOH. Spar. sol. H_2O, C_6H_6.

Meyer, Sundmacher, *Ber.*, 1899, **32**, 2115.
Pierron, *Ann. chim.*, 1908, **15**, 168.

4-Hydroxyphenylthiourea.

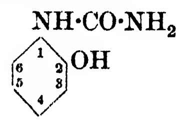
Plates from EtOH. M.p. 220–1° decomp. (214°). Mod. sol. hot H_2O, hot EtOH. Spar. sol. cold EtOH. Prac. insol. cold H_2O. Sol. alkalis and conc. acids.

Et ether: cryst. from EtOH. M.p. 172°. Sol. H_2O.

Propyl ether: $C_{10}H_{14}ON_2S$. MW, 210. Needles from dil. EtOH. M.p. 158°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O.

Kalckhoff, *Ber.*, 1883, **16**, 375, 1832.

2-Hydroxyphenylurea



$C_7H_8O_2N_2$ MW, 152

Prisms. M.p. 154° decomp. Sol. H_2O, EtOH, Et_2O. Heat ⟶ benzoxazolone. Aq. sol. resinifies.

Me ether: $C_8H_{10}O_2N_2$. MW, 166. Cryst. from EtOH. M.p. 146·5°. Sol. hot H_2O, EtOH. Spar. sol. cold H_2O.

Kalckhoff, *Ber.*, 1883, **16**, 375.
Mühlhäuser, *Ann.*, 1881, **207**, 244.

3-Hydroxyphenylurea.

Prisms from H_2O. M.p. 180–1°. Sol. hot EtOH, AcOH. Prac. insol. C_6H_6.

Meyer, Sundmacher, *Ber.*, 1899, **32**, 2114.

4-Hydroxyphenylurea.

Plates from H_2O. M.p. 168° decomp. Sol. H_2O, EtOH, alkalis and acids.

Et ether: *see* Dulcin.

Propyl ether: $C_{10}H_{14}O_2N_2$. MW, 194. Plates from H_2O. M.p. 147°. Sol. most org. solvents. Prac. insol. cold H_2O.

O-*Acetyl*: needles from EtOH. M.p. 201–202·5°. Sol. hot H_2O, EtOH. Prac. insol. hot C_6H_6.

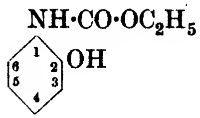
Diacetyl deriv.: needles from AcOEt. M.p. 213·5–214°. Sol. most org. solvents.

O-*Benzoyl*: yellowish-brown needles. M.p. 148°.

Dibenzoyl deriv.: cryst. M.p. 226–8°.

Kalckhoff, *Ber.*, 1883, **16**, 376.

2-Hydroxyphenylurethane (o-*Hydroxyphenylcarbamic ethyl ester*, N-*carbethoxy*-o-*aminophenol*)



$C_9H_{11}O_3N$ MW, 181

Prisms from EtOH–Et_2O. M.p. 86·5°. Sol. EtOH, Et_2O. Prac. insol. cold H_2O. KOH ⟶ *o*-aminophenol. Heat ⟶ benzoxazolone.

Me ether: $C_{10}H_{13}O_3N$. MW, 195. B.p. 180–2°/26 mm.

Benzoyl: cryst. from EtOH.Aq. M.p. 76·5°.

Ransom, *Ber.*, 1898, **31**, 1061.
Groenvik, *Bull. soc. chim.*, 1876, **25**, 177.

3-Hydroxyphenylurethane (m-*Hydroxyphenylcarbamic ethyl ester*, N-*carbethoxy*-m-*aminophenol*).

Cryst. from C_6H_6. M.p. 97°.

Benzoyl: plates from EtOH. M.p. 183–4°.

Bauer, *Ber.*, 1915, **48**, 1580.

4-Hydroxyphenylurethane (p-*Hydroxyphenylcarbamic ethyl ester*, N-*carbethoxy*-p-*aminophenol*).

Plates from EtOH–Et_2O or hot H_2O. M.p. 123° (120°). Sol. alkalis.

Me ether: needles from EtOH. M.p. 67° (63–4°).

Et ether: $C_{11}H_{15}O_3N$. MW, 209. Needles or plates from EtOH. M.p. 94°.

Groenvik, *Bull. soc. chim.*, 1876, **25**, 179.
Schönherr, *J. prakt. Chem.*, 1903, **67**, 341.

2-Hydroxy-2-phenyl-*n*-valeric Acid (2-*Ethyl-2-phenylhydracrylic acid*, β-*hydroxy*-β-*ethylhydrocinnamic acid*)

$$CH_3{\cdot}CH_2{\cdot}\underset{}{\overset{C_6H_5}{C}}(OH){\cdot}CH_2{\cdot}COOH$$

$C_{11}H_{14}O_3$ MW, 194

Needles from C_6H_6. M.p. 125° (118°). Sol. H_2O, EtOH, Et_2O. Sol. conc. H_2SO_4 ⟶ β-ethylcinnamic acid.

Et ester: $C_{13}H_{18}O_3$. MW, 222. Cryst. from EtOH.Aq. M.p. 34·5°. B.p. 143°/13 mm. Sol. most org. solvents.

Schroeter, Wülfing, *Ber.*, 1907, **40**, 1598.
Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 970.

2-Hydroxy-4-phenyl-*n*-valeric Acid

$$C_6H_5{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH$$

$C_{11}H_{14}O_3$ MW, 194

Prisms from H_2O. M.p. 131°. Sol. H_2O, Et_2O. Spar. sol. C_6H_6. Insol. ligroin. Dist. ⟶ 4-phenyl-1-butylene-1-carboxylic acid.

Et ester: $C_{13}H_{18}O_3$. MW, 222. B.p. 178–82°/12 mm.

Fittig, Hoffmann, *Ann.*, 1894, **283**, 309, 315.
Farmer, Hose, *J. Chem. Soc.*, 1933, 966.

3-Hydroxy-4-phenyl-*n*-valeric Acid

$$C_6H_5{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_{11}H_{14}O_3$ MW, 194

Needles from H_2O. M.p. 101–2° decomp. Sol. $CHCl_3$, CS_2. Spar. sol. H_2O, ligroin.

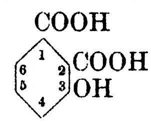
Lactone: 4-phenyl-γ-valerolactone. $C_{11}H_{12}O_2$. MW, 176. Needles from $CHCl_3$. M.p. 33°. Sol. $CHCl_3$, CS_2. Spar. sol. H_2O, ligroin.

Fittig, Stern, *Ann.*, 1892, **268**, 91, 96.

Hydroxyphenylvinylacetic Acid.

See Styrylglycollic Acid, *p*-Hydroxystyrylacetic Acid, *and* 2-Benzoylpropionic Acid.

3-Hydroxyphthalic Acid



$C_8H_6O_5$ MW, 182

Needles or prisms from H_2O. M.p. about 150° ⟶ anhydride, 161–3° (rapid heat.). Sol. H_2O, EtOH, Et_2O. Red col. with $FeCl_3$.

Me ether: 3-methoxyphthalic acid. $C_9H_8O_5$. MW, 196. Prisms from H_2O. M.p. 173–4° ⟶ anhydride. Sol. H_2O, EtOH, Et_2O. *Di-Me ester*: $C_{11}H_{12}O_5$. MW, 224. M.p. 71°. *Anhydride*: $C_9H_6O_4$. MW, 178. M.p. 160–1°.

Anhydride: $C_8H_4O_4$. MW, 164. Orange yellow cryst. from xylene. M.p. 198–9°. *Acetyl*: m.p. 113·5–115·5°. *Benzoyl*: m.p. 147·5–148°.

Bernthsen, Semper, *Ber.*, 1886, **19**, 167; 1887, **20**, 937.
Miller, *Ann.*, 1881, **208**, 247.
Pratt, Perkins, *J. Am. Chem. Soc.*, 1918, **40**, 227.
Corbellini, Rossi, *Gazz. chim. ital.*, 1931, **61**, 281.

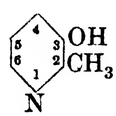
4-Hydroxyphthalic Acid.

Cryst. from H_2O. M.p. 204–5° ⟶ anhydride. Sol. EtOH, Et_2O. Spar. sol. C_6H_6, pet. ether. Reddish-yellow col. with $FeCl_3$. HCl at 180° ⟶ *m*-hydroxybenzoic acid.

1-*Me ester*: $C_9H_8O_5$. MW, 196. M.p. 159–60° decomp. Sol. H_2O, EtOH, Et_2O. Insol. C_6H_6, pet. ether. $k = 1{\cdot}54 \times 10^{-4}$ at 25°.
2-*Me ester*: needles from H_2O. M.p. 166°. Spar. sol. C_6H_6. $k = 2{\cdot}05 \times 10^{-4}$ at 25°.
Di-Me ester: $C_{10}H_{10}O_5$. MW, 210. Plates from H_2O or toluene. M.p. 107–8° (104°). Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O.
1-*Et ester*: $C_{10}H_{10}O_5$. MW, 210. M.p. 175°. $k = 7{\cdot}3 \times 10^{-4}$ at 25°.
2-*Et ester*: m.p. 152°. $k = 2{\cdot}2 \times 10^{-4}$ at 25°.
Me ether: 4-methoxyphthalic acid. M.p. 168–70° ⟶ anhydride. Sol. EtOH, Et_2O. Mod. sol. H_2O. Prac. insol. $CHCl_3$, C_6H_6. Yellow col. with $FeCl_3$. *Di-Me ester*: b.p. 195–7°/20 mm. *Anhydride*: m.p. 97° (94°, 87°). Sol. EtOH, hot C_6H_6. Sublimes.
Et ether: $C_{10}H_{10}O_5$. MW, 210. Cryst. $+H_2O$. Loses H_2O at 100°. M.p. anhyd. 163°. *Di-Me ester*: $C_{12}H_{14}O_5$. MW, 238. Plates from ligroin. M.p. 44–5°. *Anhydride*: $C_9H_8O_5$. MW, 192. M.p. 118°.
Anhydride: $C_8H_4O_4$. MW, 164. M.p. 171–3° (165–6°). Sublimes. Sol. EtOH, Et_2O, Me_2CO. Prac. insol. $CHCl_3$, C_6H_6, CS_2.
Imide: $C_8H_5O_3N$. MW, 163. M.p. 290°.

Bentley, Weizmann, *J. Chem. Soc.*, 1907, **91**, 100.
Rée, *Ann.*, 1886, **233**, 232.
Dimroth, Fick, *Ann.*, 1916, **411**, 323.

3-Hydroxy-α-picoline (3-*Hydroxy*-2-*methyl-pyridine*)



C_6H_7ON MW, 109

Cryst. M.p. 164–6°.

I.G., D.R.P., 541,681, (*Chem. Abstracts*, 1932, **26**, 2471); F.P., 685,583, (*Chem. Abstracts*, 1930, **24**, 5766).

4-Hydroxy-α-picoline (4-*Hydroxy*-2-*methyl-pyridine*).
Et ether: $C_8H_{11}ON$. MW, 137. B.p. about 220°. *B_2,H_2PtCl_6*: m.p. 207°.

Collie, Bishop, *J. Chem. Soc.*, 1925, **127**, 963.

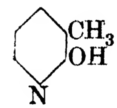
5-Hydroxy-α-picoline (5-*Hydroxy*-2-*methyl-pyridine*).
Cryst. from EtOH–Et_2O. M.p. 165–7°. Sol. H_2O, EtOH. Spar. sol. Et_2O.

Graf, *J. prakt. Chem.*, 1932, **133**, 35.

6-Hydroxy-α-picoline (6-*Hydroxy*-2-*methyl-pyridine*).
Cryst. from C_6H_6, m.p. 157°: needles $+4$–$5H_2O$ from H_2O.
B,HCl: cryst. M.p. anhyd. above 150°.

Errara, *Ber.*, 1900, **33**, 2971.

2-Hydroxy-β-picoline (2-*Hydroxy*-3-*methyl pyridine*)

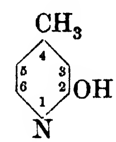


C_6H_7ON MW, 109

Needles from $CHCl_3$–ligroin. M.p. 140°. B.p. 288–90°/752 mm. Sol. H_2O, EtOH, hot C_6H_6, $CHCl_3$. Spar. sol. ligroin. $FeCl_3$ ⟶ reddish-brown col.

Seide, *Ber.*, 1924, **57**, 1805.

2-Hydroxy-γ-picoline (2-*Hydroxy*-4-*methyl-pyridine*)



C_6H_7ON MW, 109

Cryst. from C_6H_6. M.p. 130°. B.p. 307–9°. Sol. H_2O, EtOH, hot C_6H_6, $CHCl_3$. Mod. sol. Et_2O. Spar. sol. ligroin. $FeCl_3$ ⟶ reddish-brown col.

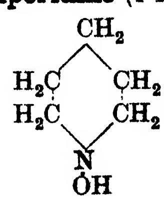
Seide, *Ber.*, 1924, **57**, 793.

3-Hydroxy-γ-picoline (3-*Hydroxy*-4-*methyl-pyridine*).
Cryst. M.p. 118–20°. B.p. 285–90°.

I.G., D.R.P., 563,373, (*Chem. Abstracts*, 1933, **27**, 1002); F.P., 685,583, (*Chem. Abstracts*, 1930, **24**, 5766).

ω-Hydroxypicoline.
See Pyridylcarbinol.

N-Hydroxypiperidine (1-*Piperidinol*)

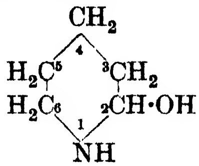


$C_5H_{11}ON$ MW, 101

Benzoyl: cryst. from pet. ether. M.p. 62°. Sol. most solvents. Reduces Fehling's.

Gambarajan, *Ber.*, 1925, **58**, 1776.

2-Hydroxypiperidine (*2-Piperidinol*)



$C_5H_{11}ON$ MW, 101

Needles from ligroin. M.p. 129°. $FeCl_3 \longrightarrow$ violet col.

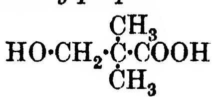
Wolffenstein, *Ber.*, 1892, **25**, 2784.

4-Hydroxypiperidine (*4-Piperidinol*).

N-*Me*: $C_6H_{13}ON$. MW, 115. Oil. F.p. 28°. B.p. 105°/18 mm. *B,HCl*: prisms from EtOH. M.p. 157–8°. Sol. H_2O, hot EtOH. *B,HBr*: needles from EtOH. M.p. 139–40°.

Mills, Parkin, Ward, *J. Chem. Soc.*, 1927, 2622.
Emmert, D.R.P., 292,846, (*Chem. Abstracts*, 1917, **11**, 1884); D.R.P., 292,456, (*Chem. Abstracts*, 1917, **11**, 1260).

Hydroxypivalic Acid (*Hydroxytrimethylacetic acid, 1 : 1-dimethylhydracrylic acid, 2-hydroxy-1 : 1-dimethylpropionic acid*)



$C_5H_{10}O_3$ MW, 118

Needles from Et_2O–pet. ether. M.p. 125° (124°). $k = 1{\cdot}39 \times 10^{-5}$ at 25°. $KMnO_4 \longrightarrow$ dimethylmalonic acid. $CrO_3 \longrightarrow$ dimethylmalonic acid + isobutyraldehyde.

K salt: cryst. M.p. 234°.

Me ester: $C_6H_{12}O_3$. MW, 132. B.p. 177–8°/740 mm. D_4^{20} 1·0365.

Et ester: $C_7H_{14}O_3$. MW, 146. B.p. 188°/750 mm., 84–6°/16 mm. D_4^{20} 0·9985.

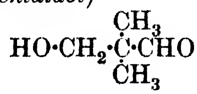
Et ether: $C_7H_{14}O_3$. MW, 146. B.p. 123°/22 mm. Insol. H_2O. *K salt*: cryst. from MeOH–Me_2CO. M.p. 255°. *Et ester*: $C_9H_{18}O_3$. MW, 174. B.p. 75°/22 mm.

Acetyl: cryst. from pet. ether. M.p. 56°. *Ca salt*: cryst. M.p. 260° decomp. *Me ester*: b.p. 191–2°/737 mm. D_4^{20} 1·0338. *Et ester*: b.p. 94°/16 mm. D_4^{20} 1·0100. *Chloride*: b.p. 84°/12 mm. *Nitrile*: b.p. 91·5°/11 mm.

Nitrile: C_5H_9ON. MW, 99. Oil. B.p. 97°/11 mm.

Wesselý, *Monatsh.*, 1900, **21**, 222; 1901, **22**, 66.
Böhm, *Monatsh.*, 1906, **27**, 949.
Blaise, *Compt. rend.*, 1902, **134**, 552.
Marcilly, *Bull. soc. chim.*, 1904, **31**, 122.

Hydroxypivalic Aldehyde (*Hydroxytrimethylacetaldehyde, 2-hydroxy-1 : 1-dimethylpropionaldehyde, pentaldol*)



$C_5H_{10}O_2$ MW, 102

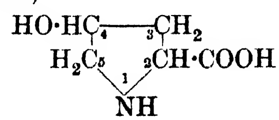
Needles from H_2O. M.p. 89–90°. B.p. 172–3°/747 mm. decomp., 67–9°/14 mm. Sol. H_2O, EtOH. Spar. sol. most other solvents.

Oxime: cryst. M.p. 29·5°. B.p. 129°/18 mm.

Azine: cryst. M.p. 151°. Very sol. EtOH, Et_2O, C_6H_6. Sol. H_2O. Spar. sol. pet. ether.

Wesselý, *Monatsh.*, 1900, **21**, 216.
König, *Monatsh.*, 1902, **23**, 469.

4-Hydroxyproline (*4-Hydroxypyrrolidine-2-carboxylic acid*)



$C_5H_9O_3N$ MW, 131

Exists in two racemic forms. Isolated from hydrolysis of gelatin. Natural 4-hydroxyproline has $[\alpha]_D^{20}$ $-81{\cdot}04°$ in H_2O. HI + P $\longrightarrow$ proline. *Picrate*: m.p. 188°.

I.

d-.

M.p. 274°. $[\alpha]_D^{21}$ 75·2° in H_2O. Insipid taste. *Phenylisocyanate*: m.p. 175°.

l-.

M.p. 274°. $[\alpha]_D^{26}$ − 74·6°. Sweet taste.

dl-.

M.p. 261°. Sol. H_2O. Spar. sol. EtOH. Sweet taste.

II.

d-.

M.p. 237–41°. $[\alpha]_D^{18}$ 58·6°. Insipid taste.

l-.

M.p. 238–41°. $[\alpha]_D^{18}$ −58·1°. Sweet taste.

dl-.

M.p. 250°. Less sol. H_2O than *dl*-I. Insipid taste.

Fischer, *Ber.*, 1902, **35**, 2660.
Klabunde, *J. Biol. Chem.*, 1931, **90**, 293.
Traube, Johow, Tepohl, *Ber.*, 1923, **56**, 1861.
Kapfhammer, Eck, *Z. physiol. Chem.*, 1927, **170**, 294.
Leuchs, Bormann, *Ber.*, 1919, **52**, 2086.
Leuchs, *Ber.*, 1905, **38**, 1937.

5-Hydroxyproline (*5-Hydroxypyrrolidine-2-carboxylic acid*).

M.p. 204·5°.

Abderhalden, Schwab, *Z. physiol. Chem.*, 1926, **153**, 88.

Hydroxypropane-tricarboxylic Acid.

See Citric Acid *and* Isocitric Acid.

Hydroxypropenylfuran.

See 3-α-Furylallyl Alcohol.

1-Hydroxypropionaldehyde (*Lactic aldehyde*)

$CH_3 \cdot CH(OH) \cdot CHO$

$C_3H_6O_2$ MW, 74

Needles from EtOH. M.p. 105° (sinters at 101°). Bimolecular. Dissociates into monomolecular form in aq. sol. Sol. AcOH. Mod. sol. H_2O, EtOH, Me_2CO. Insol. Et_2O, $CHCl_3$, C_6H_6. Reduces cold Fehling's. Yellowish-brown col. on warming with alkali. $C_6H_5NH \cdot NH_2 \longrightarrow$ lactic aldehyde phenylhydrazone + methylglyoxalosazone.

Acetyl deriv.: *see* 1-Acetoxypropionaldehyde.

Di-Et acetal: $C_7H_{16}O_3$. MW, 148. B.p. 169–70°/758 mm., 67°/12–13 mm.

Phenylhydrazone: plates from C_6H_6–pet. ether. M.p. 93°.

Phenylosazone: yellow needles from dil. EtOH. M.p. 154° (148°).

Wohl, *Ber.*, 1908, **41**, 3602.
Wohl, Lange, *ibid.*, 3608.

2-Hydroxypropionaldehyde (*Hydracrylic aldehyde*)

$HO \cdot CH_2 \cdot CH_2 \cdot CHO$

$C_3H_6O_2$ MW, 74

B.p. 90°/18 mm., 75–8°/12 mm. Sol. EtOH, Et_2O, Me_2CO. Spar. sol. H_2O. Reduces $NH_3.AgNO_3$. Does not reduce Fehling's. $KHSO_4 \longrightarrow$ acrolein. NO_2 + HCl + albumin $\longrightarrow$ green col. in concentrations up to 1 : 1000, rose col. in more dil. sol.

Di-Et acetal: $C_7H_{16}O_3$. MW, 148. B.p. 98°/20 mm. $KMnO_4 \longrightarrow$ 2 : 2-diethoxypropionic acid. $O_3 \longrightarrow$ hydracrylic aldehyde + glyoxal.

Semicarbazone: cryst. from H_2O. M.p. 114°.

Wohl, *Ber.*, 1908, **41**, 3603.
Nef, *Ann.*, 1904, **335**, 219.
Harries, *Ann.*, 1910, **374**, 320.

Hydroxypropionic Acid.

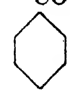
See Lactic Acid *and* Hydracrylic Acid.

1-Hydroxy-2-propionaphthone.

See Ethyl 1-hydroxy-2-naphthyl Ketone.

β-Hydroxypropiophenone (*1-Hydroxyethyl phenyl ketone, methylbenzoylcarbinol, 1-benzoylethyl alcohol*)

$CO \cdot CH(OH) \cdot CH_3$



$C_9H_{10}O_2$ MW, 150

Yellow oil. B.p. 250–2°, 125–6°/14 mm. D_4^{18} 1·1085. n_D^{23} 1·536.

Et ether: $C_{11}H_{14}O_2$. MW, 178. *p-Nitrophenylhydrazone*: m.p. 40°.

Acetyl: yellow aromatic oil. B.p. 158–60°/20 mm. D_4^{20} 1·112. n_D^{20} 1·515. Sol. EtOH, Et_2O. Insol. H_2O.

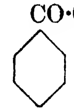
Semicarbazone: needles from EtOH. M.p. 188–9° (194°).

Phenylhydrazone: yellow needles from MeOH. M.p. 179–80°.

Auwers, *Ber.*, 1917, **50**, 1179.
Collet, *Compt. rend.*, 1897, **125**, 354.
Zincke, Zahn, *Ber.*, 1910, **43**, 855.
Kotchergine, *Bull. soc. chim.*, 1928, **43**, 573.

γ-Hydroxypropiophenone (*2-Hydroxyethyl phenyl ketone, 2-benzoylethyl alcohol, phenacylcarbinol*)

$CO \cdot CH_2 \cdot CH_2OH$



$C_9H_{10}O_2$ MW, 150

Me ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 125–6°/16 mm. D_4^{15} 1·020.

Et ether: m.p. 11–12°. B.p. 135°/18 mm.

Acetyl: m.p. 53–4°.

Kohler, *Am. Chem. J.*, 1909, **42**, 388.
Straus, Berkow, *Ann.*, 1913, **401**, 144.

2-Hydroxypropiophenone (*Ethyl o-hydroxyphenyl ketone, o-propionylphenol*)

$CO \cdot CH_2 \cdot CH_3$

OH

$C_9H_{10}O_2$ MW, 150

B.p. 150°/80 mm., 115°/15 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O. Sol. alkalis. $FeCl_3 \longrightarrow$ intense violet col. NaHg $\longrightarrow$ ethyl-*o*-hydroxyphenylcarbinol.

Me ether: *o*-propionylanisole. $C_{10}H_{12}O_2$. MW, 164. Pale yellow liq. B.p. 137°/16·5 mm. *Semicarbazone*: m.p. 154°.

Benzoyl : b.p. 158°/1 mm. *Isonitroso deriv.* : m.p. 89°.

Oxime : m.p. 93–4°.

Semicarbazone : m.p. 213° (221°).

2 : 4-*Dinitrophenylhydrazone* : scarlet cryst. M.p. 189°.

Fischer, Slimmer, *Ber.*, 1903, **36**, 2585.

Robertson, Sandrock, Hendry, *J. Chem. Soc.*, 1931, 2426.

Petschek, Simonis, *Ber.*, 1913, **46**, 2017.

Böckmühl, Ehrhart, Stein, D.R.P., 552,244, (*Chem. Abstracts*, 1932, **26**. 4343).

4-Hydroxypropiophenone (*Ethyl* p-*hydroxyphenyl ketone*, p-*propionylphenol*).

Needles or prisms from H_2O. M.p. 148°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Alk. $H_2O_2 \longrightarrow$ hydroquinone. KOH fusion $\longrightarrow$ *p*-hydroxybenzoic acid + phenol.

Me ether : *p*-propionylanisole. Needles from Et_2O. M.p. 27–9°. B.p. 273–5°, 145–7°/14 mm. D_4^{20} 1·082. n_D^{15} 1·5477 (both these values are for supercooled state). *Oxime* : needles from EtOH. M.p. 67° (74°). *Semicarbazone* : m.p. 172–3° (177°). p-*Nitrophenylhydrazone* : orange-red cryst. M.p. 149–50°.

Et ether : *p*-propionylphenetole. $C_{11}H_{14}O_2$. MW, 178. Prisms from Et_2O. M.p. 30°. B.p. 153–4°/14 mm. *Oxime* : needles from EtOH.Aq. M.p. 97°.

Isobutyl ether : $C_{13}H_{18}O_2$. MW, 206. Needles from EtOH. M.p. 52°. B.p. 172–4°/14 mm. *Oxime* : cryst. from EtOH. M.p. 49°.

Acetyl : cryst. from ligroin. M.p. 62°.

2 : 4-*Dinitrophenylhydrazone* : ruby-red cryst. M.p. 229°.

Wallach, Pond, *Ber.*, 1895, **28**, 2715.

Gattermann, Ehrhardt, Mais, *Ber.*, 1890, **23**, 1203.

Unger, *Ann.*, 1933, **504**, 280.

Klages, *Ber.*, 1902, **35**, 2262.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, **43**, 86.

Auwers, *Ann.*, 1915, **408**, 248.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1892.

Crépieux, *Bull. soc. chim.*, 1891, **6**, 160.

Hydroxypropylamine.
See Aminopropyl Alcohol *and* Aminoisopropyl Alcohol.

α-Hydroxypropylbenzene.
See Ethylphenylcarbinol.

β-Hydroxypropylbenzene.
See Methylbenzylcarbinol.

γ-Hydroxypropylbenzene.
See Hydrocinnamyl Alcohol.

2-Hydroxypropylene.
See Isopropenyl Alcohol.

3-Hydroxypropylene.
Allyl Alcohol, *q.v.*

3-Hydroxypropylene oxide.
See Glycide.

4-Hydroxy-4-propylheptene-1.
See Dipropylallylcarbinol.

β-1-Hydroxypropylhydrocinnamic Acid.
See 3-Hydroxy-2-phenyl-*n*-caproic Acid.

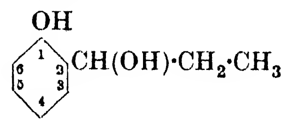
β-2-Hydroxypropylhydrocinnamic Acid.
See 4-Hydroxy-2-phenyl-*n*-caproic Acid.

β-Hydroxy-β-propylhydrocinnamic Acid.
See 2-Hydroxy-2-phenyl-*n*-caproic Acid.

2-Hydroxypropylidene chloride.
See *unsym.*-Dichloroisopropyl Alcohol.

3-ω-Hydroxypropylindole.
See 3-[3-Indolyl]-propyl Alcohol.

2-α-Hydroxypropylphenol (1-o-*Hydroxyphenylpropyl alcohol, ethyl*-o-*hydroxyphenylcarbinol*, α-2-*dihydroxypropylbenzene*)



$C_9H_{12}O_2$ MW, 152

Oil. B.p. 125–30°/0·25 mm. Spar. sol. H_2O. Reduces hot Fehling's.

2-*Me ether* : 2-α-hydroxypropylanisole. $C_{10}H_{14}O_2$. MW, 166. Oil. B.p. 251°/760 mm. 138°/22 mm. *Phenylurethane* : m.p. 102°.

2-*Et ether* : 2-α-hydroxypropylphenetole. $C_{11}H_{16}O_2$. MW, 180. Oil. B.p. 129–30°. D_4^{22} 1·0113. n_D 1·5232. *Phenylurethane* : needles. M.p. 95–6°.

Hell, Hofmann, *Ber.*, 1905, **38**, 1678.

Klages, *Ber.*, 1904, **37**, 3988.

Fischer, Stimmer, *Ber.*, 1903, **36**, 2586.

3-α-Hydroxypropylphenol (1-m-*Hydroxyphenylpropyl alcohol, ethyl*-m-*hydroxyphenylcarbinol*, α-3-*dihydroxypropylbenzene*).

Prisms from H_2O. Needles from C_6H_6. M.p. 107°. B.p. 177°/13 mm. Sol. EtOH, Et_2O, H_2O. Spar. sol. C_6H_6. $FeCl_3 \longrightarrow$ bluish-violet col.

Auwers, *Ann.*, 1917, **413**, 306.

4-α-Hydroxypropylphenol (1-p-*Hydroxyphenylpropyl alcohol, ethyl*-p-*hydroxyphenylcarbinol*, α-4-*dihydroxypropylbenzene*).

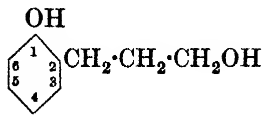
Oil. B.p. 143°/20 mm., 141–2°/16 mm. Dil. $H_2SO_4 \longrightarrow$ anethole.

4-*Me ether*: 4-α-hydroxypropylanisole. $C_{10}H_{14}O_2$. MW, 166. B.p. 252–6°. *Acetyl*: b.p. 156°/20 mm. D^{16} 1·005. *Phenylurethane*: m.p. 74°.

4-*Et ether*: 4-α-hydroxypropylphenetole. $C_{11}H_{16}O_2$. MW, 180. Oil. B.p. 144·5–145·5°/10 mm. D_4^{20} 1·1022. Spar. sol. H_2O. *Acetyl*: b.p. 161°/17 mm.

Hell, Hofmann, *Ber.*, 1905, **38**, 1678.
Klages, *ibid.*, 2221.

2-γ-Hydroxypropylphenol (3-o-*Hydroxyphenylpropyl alcohol*)



$C_9H_{12}O_2$ MW, 152

Yellow oil. B.p. 177–9°/12 mm. $D_4^{15.1}$ 1·1258. Spar. sol. H_2O. $FeCl_3 \longrightarrow$ bluish-violet col.

Auwers, *Ann.*, 1918, **415**, 152.

4-γ-Hydroxypropylphenol (3-p-*Hydroxyphenylpropyl alcohol*).

Cryst. from Et_2O–pet. ether. M.p. 55°. Sol. H_2O. $FeCl_3 \longrightarrow$ indigo blue col. Reduces $NH_3.AgNO_3$.

Dibenzoyl: m.p. 72°.

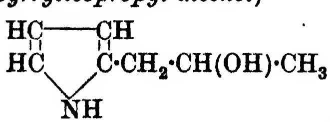
v. Braun, Deutsch, *Ber.*, 1912, **45**, 2513.

Hydroxypropyl phenyl Ketone.
See β-Hydroxybutyrophenone *and* γ-Hydroxybutyrophenone.

2-α-Hydroxypropylpiperidine.
See Conhydrine.

4-Hydroxy-2-propylpiperidine.
See ψ-Conhydrine.

2-β-Hydroxypropylpyrrole (*Pyrryl-2-propanol, 1-pyrrylisopropyl alcohol*)



$C_7H_{11}ON$ MW, 125

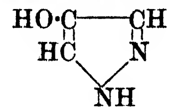
Oil. B.p. 134–9°/14–15 mm. HI + AcOH $\longrightarrow$ 2-propylpyrrole.

N-Me: $C_8H_{13}ON$. MW, 139. Oil. B.p. 116–17°/18 mm. Sol. H_2O and usual org. solvents.

Hess, *Ber.*, 1913, **46**, 3117.

6-Hydroxypurine.
See Hypoxanthine.

4-Hydroxypyrazole (4-*Pyrazolol*)



$C_3H_4ON_2$ MW, 84

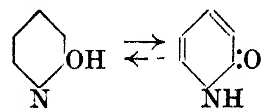
White plates from EtOH–$CHCl_3$. M.p. 118–18·5°. Very sol. H_2O, EtOH. Sol. Et_2O, hot AcOEt. Spar. sol. $CHCl_3$, C_6H_6. Reduces $NH_3.AgNO_3$. $FeCl_3 \longrightarrow$ greenish-blue col.

Dibenzoyl: needles from EtOH. M.p. 109°. Very sol. $CHCl_3$, C_6H_6. Spar. sol. Et_2O, EtOH.

Picrate: yellow needles. M.p. 128–9°.

Wolff, Lüttringhaus, *Ann.*, 1900, **313**, 8.

2-Hydroxypyridine (α-*Hydroxypyridine, α-pyridone*)



C_5H_5ON MW, 95

Needles from C_6H_6. M.p. 106–7°. B.p. 280–1°. Sol. H_2O, EtOH, $CHCl_3$. Mod. sol. Et_2O, C_6H_6. Spar. sol. ligroin. Aq. sol. reacts neutral. C_2H_5I + NaOH $\longrightarrow$ *N*-ethyl-α-pyridone. Ag salt + $C_2H_5I \longrightarrow$ 2-ethoxypyridine.

O-*Benzyl*: m.p. 42°. B.p. 183–6°/30 mm. Sol. most org. solvents.

Me ether: *$HgCl_2$ comp.*, m.p. 199–200°.

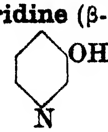
Et ether: C_7H_9ON. MW, 123. B.p. 155–6°. *$HgCl_2$ comp.*, m.p. 141–2°.

N-Me deriv.: C_6H_7ON. MW, 109. B.p. 250°. *$HgCl_2$ comp.*, m.p. 127°. Misc. with H_2O.

N-Et deriv.: C_7H_9ON. MW, 123. B.p. 249–50°. *$HgCl_2$ comp.*, m.p. 112–13°. Misc. with H_2O.

Königs, Feer, *Ber.*, 1886, **19**, 2433.
v. Pechmann, Baltzer, *Ber.*, 1891, **24**, 3145.
Weidel, Strache, *Monatsh.*, 1886, **7**, 297.
Räth A.-G., E.P., 288,628, (*Chem. Abstracts*, 1929, **23**, 607).

3-Hydroxypyridine (β-*Hydroxypyridine*)



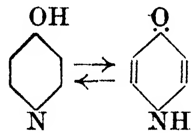
C_5H_5ON MW, 95

Needles. M.p. 129°. Sol. H_2O, EtOH. Red col. with $FeCl_3$. Zn $\longrightarrow$ pyridine. Br water $\longrightarrow$ dibromo-3-hydroxypyridine.

Et ether: $B_2H_2PtCl_6$, prisms. M.p. 192°.
Acetyl: b.p. 210°. Sol. H_2O.
Oxalate: m.p. 177°.

Weidel, Murmann, *Monatsh.*, 1895, **16**, 753.
Fischer, Renouf, *Ber.*, 1884, **17**, 763.
Fischer, Yoshioka, Hartmann, *Z. physiol. Chem.*, 1932, **212**, 146.

4-Hydroxypyridine (*γ-Hydroxypyridine, γ-pyridone*)



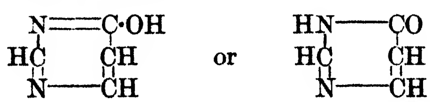
C_5H_5ON MW, 95

Needles or prisms + H_2O from H_2O. M.p. anhyd. 148·5°. B.p. above 350°. Loses H_2O of cryst. over H_2SO_4 in vacuo. Sol. 1 part H_2O at 15°. Sol. EtOH. Prac. insol. Et_2O, C_6H_6. Zn ⟶ pyridine. PCl_3 ⟶ 4-chloropyridine.
Me ether: C_6H_7ON. MW, 109. B.p. 190·5–191°/738 mm. Misc. with H_2O. Gives alkaline reaction.
N-Me deriv.: deliquescent cryst. mass.
O-*Acetyl*: m.p. 140–50°.
O-*Benzoyl*: m.p. 81°.

Lerch, *Monatsh.*, 1884, **5**, 402.
Koenigs, Greiner, *Ber.*, 1931, **64**, 1055; D.R.P., 554,702, (*Chem. Abstracts*, 1932, **26**, 5966); D.R.P., 566,693, (*Chem. Abstracts*, 1933, **27**, 2457).

4-Hydroxypyridine-2:6-dicarboxylic Acid.
See Chelidamic Acid.

6-Hydroxypyrimidine



$C_4H_4ON_2$ MW, 96

Needles from AcOEt or C_6H_6. M.p. 164–5°. Very sol. H_2O, EtOH. Sol. AcOEt, C_6H_6. Spar. sol. Et_2O. Insol. pet. ether.
B,HCl,1H₂O: m.p. 100°, anhyd. 205–10°. Readily sol. H_2O.
B_2,H_2SO_4: m.p. 218° decomp. Readily sol. H_2O.
Acetyl deriv.: needles. M.p. 180° subsequently solidifying and remelting at 215–20° decomp.

Picrate: cryst. M.p. 190°.

Wheeler, *J. Biol. Chem.*, 1907, **3**, 285.
Cherbuliez, Stavritch, *Helv. Chim. Acta*, 1922, **5**, 281.

3-Hydroxy-α-pyrone.
See Hydroxycoumalin.

6-Hydroxy-α-pyrone.
See under Glutaconic Acid.

2-Hydroxy-γ-pyrone.
See Pyromeconic Acid.

5-Hydroxy-γ-pyrone-2-carboxylic Acid.
See Comenic Acid.

3-Hydroxy-γ-pyrone-2:6-dicarboxylic Acid.
See Meconic Acid.

Hydroxypyrotartaric Acid.
See Itamalic Acid.

Hydroxypyruvic Aldehyde.
See Glycerosone.

Hydroxypyruvic Acid (*Hydroxyaldehydoacetic acid, hydroxyformylacetic acid, formylglycollic acid*)

HO·CH₂·CO·COOH
or
OHC·CH(OH)·COOH

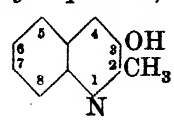
$C_3H_4O_4$ MW, 104

Cryst. from Et_2O–pet. ether. Hygroscopic. Reduces Fehling's and $NH_3.AgNO_3$. Alk. sols. give violet col. with $FeCl_3$.
Osazone: m.p. 213–15°.
p-*Nitrophenylhydrazone*: red cryst. M.p. 260°. Insol. most org. solvents.
Semicarbazone-semicarbazide: cryst. from AcOH. M.p. 221°.

Berl, Smith, *Chem. Zentr.*, 1908, II, 686.
Berl, Fodor, *Chem. Zentr.*, 1910, II, 1039.
Fenton, Wilks, *J. Chem. Soc.*, 1912, **101**, 1579.

α-Hydroxyquinaldine.
See 2-Hydroxymethylquinoline.

3-Hydroxyquinaldine (3-*Hydroxy*-2-*methylquinoline*, 2-*methyl*-3-*quinolol*)



$C_{10}H_9ON$ MW, 159

Two compounds have been described.
(i) Needles from EtOH. M.p. 203–5°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. Zn ⟶ quinaldine.

$B_2,H_2SO_4,2H_2O$: needles. M.p. 86–7°. Spar. sol. H_2O.

$B_2,H_2PtCl_6,2H_2O$: orange-red needles from EtOH. M.p. anhyd. 225–8° decomp.

Picrate: needles from EtOH. M.p. 95–6°.

Kulisch, *Monatsh.*, 1895, **16**, 355.

(ii) Turns yellow at 240°, sinters at 250°, m.p. 260°. Sol. EtOH, Me_2CO, AcOEt. Spar. sol. hot H_2O, Et_2O, C_6H_6. Non-volatile in steam. Red col. with $FeCl_3$ in dil. EtOH.

B,HCl: needles from dil. HCl. M.p. 265°.

$B_2,H_2SO_4,2H_2O$: loses H_2O at 140°. M.p. 192–3°.

$B_2,H_2PtCl_6,2H_2O$: m.p. 210° decomp.

Picrate: needles from EtOH. M.p. 245–6° decomp.

Et ether: $C_{12}H_{13}ON$. MW, 187. Needles from dil. EtOH. M.p. anhyd. 69–70°. Blue fluor. in alkaline sol. *Methiodide, $1\frac{1}{2}H_2O$*: m.p. 207°.

Methiodide: m.p. 235–40°.

Königs, Stockhausen, *Ber.*, 1902, **35**, 2556.

4-Hydroxyquinaldine (2-*Methyl*-4-*quinolol*).

Prisms from H_2O. Loses H_2O at 110°, m.p. anhyd. 232°. Sol. EtOH. 1 part sol. in 100 parts cold and 10 parts boiling H_2O. Prac. insol. Et_2O, C_6H_6, ligroin. Non-volatile in steam. Bluish-red col. with $FeCl_3$ in H_2O. Zn ⟶ quinaldine. PCl_3 ⟶ 4-chloroquinaldine. P_2S_5 ⟶ 4-mercaptoquinaldine.

Me ether: $C_{11}H_{11}ON$. MW, 173. Needles from H_2O. M.p. 82°. B.p. 294–8°.

B_2,H_2PtCl_6: yellow needles. M.p. 215° decomp. Spar. sol. cold H_2O.

Picrate: yellow needles from H_2O. M.p. 200°.

Methiodide, $1H_2O$: loses H_2O at 100°. M.p. anhyd. 201°.

Limpach, *Ber.*, 1931, **64**, 969.
Conrad, Limpach, *Ber.*, 1887, **20**, 948; D.R.P., 42,276.
Knorr, *Ber.*, 1887, **20**, 1398.
Backeberg, *J. Chem. Soc.*, 1931, 2816.

5-Hydroxyquinaldine (2-*Methyl*-5-*quinolol*).

Plates from EtOH. M.p. 246–7° (232–4°). Sol. Et_2O. Spar. sol. EtOH. Prac. insol. H_2O.

$B,HCl,2H_2O$: yellow needles. Spar. sol. cold H_2O.

Me ether: *picrate*, m.p. 217° decomp.

Et ether: b.p. 307–8°/770 mm., 290–2°/760 mm., 174–5°/11 mm. *Ethiodide*: yellow prisms. M.p. 216–18° (166°). *Picrate*: yellow needles. M.p. 213° (206–7°).

Decker, Remfry, *Ber.*, 1905, **38**, 2775.
Döbner, Miller, *Ber.*, 1884, **17**, 1709.
Chemische Fabrik auf Actien, D.R.P., 29,819.

6-Hydroxyquinaldine (2-*Methyl*-6-*quinolol*).

M.p. 213°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Non-volatile in steam.

Et ether: plates. M.p. 71°. *Ethiodide*: yellow needles. M.p. 182°. *Picrate*: yellow needles. M.p. 192°.

Döbner, Miller, *Ber.*, 1884, **17**, 1708.
Chemische Fabrik auf Actien, D.R.Ps., 24,317, 29,819.

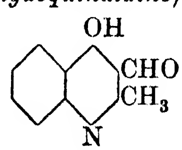
8-Hydroxyquinaldine (2-*Methyl*-8-*quinolol*).

Prisms from dil. EtOH. M.p. 74°. B.p. 266–7°. Sol. hot EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. Sublimes at 100°. Volatile in steam.

Me ether: cryst. from C_6H_6. M.p. 125°. B.p. 282°. Sol. EtOH, Et_2O, hot C_6H_6. Spar. sol. H_2O.

Döbner, Miller, *Ber.*, 1884, **17**, 1706.
Wallach, Wüsten, *Ber.*, 1883, **16**, 2010.
See also last reference above.

4-Hydroxyquinaldine-3-aldehyde (4-*Hydroxy*-3-*aldehydoquinaldine*)



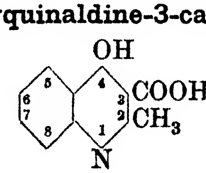
$C_{11}H_9O_2N$ MW, 187

Yellow plates from MeOH. M.p. 273° decomp. Spar. sol. H_2O, Et_2O, C_6H_6. Sol. dil. alkalis and conc. acids.

B_2,H_2PtCl_6: orange cryst. M.p. 215–20° decomp.

Conrad, Limpach, *Ber.*, 1888, **21**, 1972.

4-Hydroxyquinaldine-3-carboxylic Acid

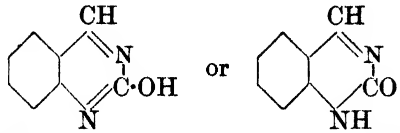


$C_{11}H_9O_3N$ MW, 203

Cryst. from EtOH. M.p. 247–8°. Prac. insol. H_2O, Et_2O, C_6H_6. Heat ⟶ 4-hydroxyquinaldine.

Conrad, Limpach, *Ber.*, 1888, **21**, 1975.
Niementowski, *Ber.*, 1894, **27**, 1400.
Camps, *Ber.*, 1901, **34**, 2717.

2-Hydroxyquinazoline (*α-Hydroxyquinazoline, α-quinazolone*)



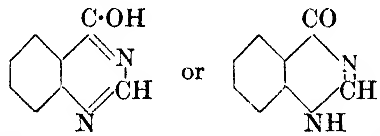
$C_8H_6ON_2$ MW, 146

White micro-cryst. powder. Insol. H_2O, EtOH.

B,HCl: yellow prisms. M.p. above 300°.

Gabriel, Stelzer, *Ber.*, 1896, **29**, 1313.

4-Hydroxyquinazoline (*γ-Hydroxyquinazoline, γ-quinazolone*)



$C_8H_6ON_2$ MW, 146

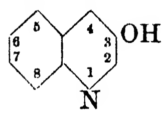
Needles from H_2O. M.p. 211–12°. Very sol. H_2O, EtOH. Spar. sol. Et_2O. Insol. ligroin.

Niementowski, *J. prakt. Chem.*, 1895, **51**, 565.
Knape, *J. prakt. Chem.*, 1891, **43**, 214.

2-Hydroxyquinoline.

See Carbostyril.

3-Hydroxyquinoline (*β-Hydroxyquinoline*)



C_9H_7ON MW, 145

Cryst. from C_6H_6. M.p. 198°. Mod. sol. hot H_2O, EtOH. Spar. sol. Et_2O, $CHCl_3$. Prac. insol. cold H_2O. Sol. acids and alkalis. Faint fluor. in acid sol. Brownish-red col. with $FeCl_3$.

$B_2,H_2SO_4,2H_2O$: m.p. 190–2° decomp. Spar. sol. H_2O.

Picrate: m.p. 240–5°.

Bargellini, Settimi, *Gazz. chim. ital.*, 1923, **53**, 601.
Mills, Watson, *J. Chem. Soc.*, 1910, **97**, 743.

4-Hydroxyquinoline (*γ-Hydroxyquinoline, Kynurine.* Keto form, *see* γ-Quinolone).

Needles + $3H_2O$. Loses H_2O at 110°. M.p. anhyd. 201°. Sublimes with difficulty. Sol. EtOH. Spar. sol. Et_2O, C_6H_6, ligroin. 100 parts H_2O dissolve 0·477 parts at 15°. Shows alkaline reaction. Red col. with $FeCl_3$. Zn ⟶ quinoline. $KMnO_4$ ⟶ kynuric acid. PCl_5 ⟶ 4-chloroquinoline. C_2H_5I + KOH ⟶ two Et ethers, b.p. 295–300° and b.p. above 360°.

$B_2,HCl,2H_2O$: loses H_2O at 110°. M.p. anhyd. 187°.

Skraup, *Monatsh.*, 1888, **9**, 821; 1889, **10**, 726.
Wenzel, *Monatsh.*, 1894, **15**, 465.
Camps, *Ber.*, 1901, **34**, 2709.

5-Hydroxyquinoline.

Plates. M.p. 224°. Spar. sol. EtOH. Prac. insol. ligroin. Non-volatile in steam. Brownish-red col. with $FeCl_3$ in dil. EtOH. Br ⟶ 6 : 8-dibromo deriv.

B,HCl: m.p. 240°.

$B_2,H_2PtCl_6,4H_2O$: m.p. 230° decomp.

Methiodide: m.p. 224°.

Riemerschmied, *Ber.*, 1883, **16**, 721.
Tellmann, *Ber.*, 1887, **20**, 2174.
Claus, Howitz, *J. prakt. Chem.*, 1893, **47**, 432.

6-Hydroxyquinoline.

Prisms from EtOH or Et_2O. M.p. 193°. B.p. above 360°. Spar. sol. EtOH. Prac. insol. cold H_2O, $CHCl_3$, C_6H_6. Sol. acids and alkalis. Yellow col. with $FeCl_3$ in dil. EtOH. Br ⟶ 5-bromo deriv.

B,HCl,H_2O: sol. H_2O. Spar. sol. hot EtOH.

Me ether: *p*-quinanisole. $C_{10}H_9ON$. MW, 159. M.p. 26·5°. B.p. 284°, 153°/12 mm. D_4^0 1·665, D_4^{20} 1·1542. Blue fluor. in acid sol. No col. with $FeCl_3$ in acid sol. *Methiodide*: m.p. 236° decomp.

Et ether: $C_{11}H_{11}ON$. MW, 173. B.p. 290–2°.

O-*Acetyl*: m.p. 36–8°. B.p. 298°. Sol. hot H_2O, EtOH, Et_2O.

O-*Benzoyl*: needles from AcOH. M.p. 230–1°. Prac. insol. H_2O, EtOH, Et_2O.

$C_9H_7ON,C_6H_3(NO_2)_3$-1 : 3 : 5 : m.p. 193–5°.

Picrate: golden needles. M.p. 235–6°.

Skraup, *Monatsh.*, 1882, **3**, 545; 1883, **4**, 696; 1885, **6**, 762; D.R.P., 14,976.
Iwamiya, *Journal of the Pharmaceutical Society, Japan*, 1929, **49**, 792.

7-Hydroxyquinoline.

Prisms from EtOH. Turns brown at 200°.

M.p. 235° decomp. (238–40°). Sol. EtOH. Spar. sol. H_2O. More sol. $CHCl_3$ than the 6-isomer. Sol. alkalis with green fluor. Sublimes on rapid heating. Brownish-red col. with $FeCl_3$ in dil. EtOH.

B,HCl,½H₂O: prisms. Sol. H_2O.

Me ether: b.p. 275°/720 mm. part. decomp. Volatile in steam.

Methiodide: needles from dil. EtOH. M.p. 251° decomp.

O-*Benzoyl*: prisms. M.p. 88–9°. Sol. EtOH.

$C_9H_7ON,C_6H_3(NO_2)_3$-1 : 3 : 5 : m.p. 199–200° decomp.

Picrate: prisms from EtOH. M.p. 244–5° decomp. Spar. sol. cold EtOH.

Fischer, *Ber.*, 1882, **15**, 1979.
Skraup, *Monatsh.*, 1882, **3**, 559.
Claus, Massau, *J. prakt. Chem.*, 1893, **48**, 176.
I.G., F.P., 727,528, (*Chem. Abstracts*, 1932, **26**, 5104).

8-Hydroxyquinoline (*Quinophenol, oxine*).

Needles from dil. EtOH. M.p. 75–6°. B.p. 266·6°/752 mm. Sol. EtOH, Me_2CO, $CHCl_3$, C_6H_6. Prac. insol. cold H_2O, Et_2O. Sol. acids and alkalis. Green col. with $FeCl_3$ in aq. sol. Sublimes. Mod. volatile in steam. $KMnO_4$ ⟶ quinolinic acid. KOH fusion ⟶ 2 : 8-dihydroxyquinoline. Reduces warm $NH_3.AgNO_3$. Br ⟶ 5-bromo and 5 : 7-dibromo derivs. Used for estimation of Mg, Zn, Al, Cu, Cd, Bi, Fe, Mn, Ni, Co, Ti, and V, and for separation of Be from Al.

B,HCl,H₂O: yellow needles. Sol. H_2O, EtOH.

B₂,H₂SO₄: quinosol, chinosol. Yellow cryst. Sol. H_2O. Antiseptic and disinfectant.

Me ether: *o*-quinanisole. M.p. 49–50° (46·5°). B.p. 282°/742 mm., 164°/14 mm. Spar. volatile in steam. *Picrate*: m.p. 143° decomp. *Methiodide*: m.p. 160° decomp.

Et ether: $C_{11}H_{11}ON$. MW, 173. Needles. B.p. 285–7°/718 mm. Spar. volatile in steam. *Methiodide*: yellow prisms from H_2O. M.p. 200°.

O-*Acetyl*: b.p. 280°. Sol. dil. HCl. Spar. sol. AcOH. Readily hyd. on standing.

O-*Benzoyl*: cryst. from EtOH. M.p. 118–20°. Sol. EtOH, Et_2O. Insol. H_2O.

O-p-*Nitrobenzoyl*: m.p. 174–5°.

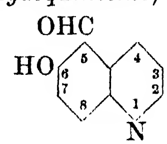
$C_9H_7ON,C_6H_3(NO_2)_3$-1 : 3 : 5 : m.p. 123·5–124°.

Picrate: yellow prisms. M.p. 203–4°. Prac. insol. cold EtOH, C_6H_6.

Methiodide, H₂O: yellow needles. M.p. 143° decomp. Spar. sol. EtOH. Insol. Et_2O.

Skraup, *Monatsh.*, 1882, **3**, 536; D.R.P., 14,976.
Weidel, Cobenzl, *Monatsh.*, 1880, **1**, 862.
Bedall, Fischer, *Ber.*, 1881, **14**, 1366.
Isiwara, Jap. P., 94,165, (*Chem. Abstracts*, 1933, **27**, 2697).
Winthrop, U.S.P., 1,903,470, (*ibid.*, 3223).
Riedel-E de Haën, E.P., 383,920, (*ibid.*, 4246).
I.G., E.P., 301,545, (*Chem. Abstracts*, 1929, **23**, 3931).

6-Hydroxyquinoline-5-aldehyde (6-*Hydroxy-5-aldehydoquinoline*)



$C_{10}H_7O_2N$ MW, 173

Cryst. from MeOH. M.p. 138·5°. Sol. EtOH, Et_2O, $CHCl_3$, Me_2CO, C_6H_6. Mod. sol. MeOH. Spar. sol. H_2O. Sublimes.

Oxime: m.p. 235°.

Phenylhydrazone: yellow needles. M.p. 232–4° decomp.

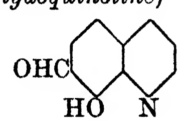
Bobrański, *J. prakt. Chem.*, 1932, **134**, 146.

8-Hydroxyquinoline-5-aldehyde (8-*Hydroxy-5-aldehydoquinoline*).

Brown cryst. powder from quinoline. M.p. above 250°. Sol. AcOH. Insol. H_2O, EtOH, Et_2O, $CHCl_3$, CCl_4, Me_2CO, C_6H_6. No col. with $FeCl_3$.

Sen, Ray, *J. Indian Chem. Soc.*, 1932, **9**, 179.

8-Hydroxyquinoline-7-aldehyde (8-*Hydroxy-7-aldehydoquinoline*)



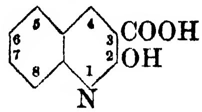
$C_{10}H_7O_2N$ MW, 173

Red cryst. powder from EtOH–$CHCl_3$. M.p. above 250°. Sol. $CHCl_3$, AcOH. Insol. H_2O, EtOH, Me_2CO, CCl_4, C_6H_6. Greenish-yellow col. with $FeCl_3$.

Sen, Ray, *J. Indian Chem. Soc.*, 1932, **9**, 178.

4-Hydroxyquinoline-2-carboxylic Acid. *See* Kynurenic Acid. Keto form *see* γ-Quinolone-2-carboxylic Acid.

2-Hydroxyquinoline-3-carboxylic Acid (*Carbostyril-3-carboxylic acid*)



$C_{10}H_7O_3N$ MW, 189

Needles from EtOH or AcOH. M.p. above 320°. Mod. sol. hot EtOH, hot AcOH. Spar. sol. hot H_2O, Et_2O. Brownish-red col. with $FeCl_3$ in H_2O. PCl_5 ⟶ 2-chloroquinoline-3-carboxylic acid.

Me ester: $C_{11}H_9O_3N$. MW, 203. M.p. 186°.

Me ether: $C_{11}H_9O_3N$. MW, 203. M.p. 182°.

Et ether: $C_{12}H_{11}O_3N$. MW, 217. Needles. M.p. 133°.

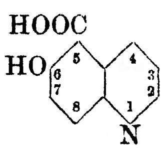
Amide: $C_{10}H_8O_2N_2$. MW, 188. Needles from hot H_2O. M.p. 290–1°.

Nitrile: $C_{10}H_6ON_2$. MW, 170. Needles from EtOH. M.p. 329–31° decomp. Sol. hot alkalis. Spar. sol. H_2O, $CHCl_3$. Insol. Et_2O.

Friedländer, Göhring, *Ber.*, 1884, **17**, 459.
Stuart, *J. Chem. Soc.*, 1888, **53**, 144.
Conrad, Reinbach, *Ber.*, 1901, **34**, 1342.
Heller, Wunderlich, *Ber.*, 1914, **47**, 1627, 2891.
Meyer, *Monatsh.*, 1907, **28**, 53.

Hydroxyquinoline-4-carboxylic Acid. *See* Hydroxycinchoninic Acid.

6-Hydroxyquinoline-5-carboxylic Acid



$C_{10}H_7O_3N$ MW, 189

Decomp. above 170° without melting (m.p. 203–4°). Prac. insol. H_2O and org. solvents. Sol. conc. acids. Heat ⟶ 6-hydroxyquinoline.

Amide: $C_{10}H_8O_2N_2$. MW, 188. M.p. 227·5°.

Nitrile: $C_{10}H_6ON_2$. MW, 170. M.p. 293°.

Bobrański, *J. prakt. Chem.*, 1932, **134**, 141.
Schmitt, Altschul, *Ber.*, 1887, **20**, 2695.

8-Hydroxyquinoline-5-carboxylic Acid. Yellow powder. M.p. 301° decomp. (273°, 280°). Spar. sol. hot H_2O, EtOH. Prac. insol. cold H_2O, Et_2O, AcOH. Insol. Me_2CO, C_6H_6, ligroin. Green col. with $FeCl_3$. Heat ⟶ 8-hydroxyquinoline. $KMnO_4$ ⟶ quinolinic acid.

B,HCl,H₂O: m.p. 260° decomp. (239°).

$B_2,H_2SO_4,2H_2O$: m.p. 240°.

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from C_6H_6. M.p. 125°.

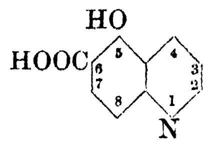
Anilide: m.p. 211–12°.

Me ether: $C_{11}H_9O_3N$. MW, 203. M.p. 225–6° decomp.

O-*Acetyl*: yellow prisms from AcOEt. M.p. 312° decomp.

Niementowski, Sucharda, *Ber.*, 1916, **49**, 14.
Lippmann, Fleissner, *Ber.*, 1886, **19**, 2467; *Monatsh.*, 1887, **8**, 311.
Matsumura, Sone, *J. Am. Chem. Soc.*, 1931, **53**, 1494.

5-Hydroxyquinoline-6-carboxylic Acid



$C_{10}H_7O_3N$ MW, 189

M.p. 211·7°. Sol. AcOH. Mod. sol. MeOH, EtOH, CS_2, C_6H_6. Insol. Et_2O, $CHCl_3$, CCl_4, Me_2CO. Sol. acids and alkalis.

Bogert, Fisher, *J. Am. Chem. Soc.*, 1912, **34**, 1575.

8-Hydroxyquinoline-6-carboxylic Acid. Granular powder. M.p. 284°. Spar. sol. EtOH, AcOH. Prac. insol. H_2O, Et_2O. Insol. Me_2CO, C_6H_6. Sol. alkalis and acids. Green col. with $FeCl_3$.

B,HCl: bronze-yellow powder. M.p. 312°.

B_2,H_2SO_4,H_2O: m.p. 307°.

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles. M.p. 147°.

Niementowski, Sucharda, *Ber.*, 1916, **49**, 20.

1-[4-Hydroxy-2-quinolyl]-2-[3:4-dimethoxyphenyl]-ethane. *See* Galipoline.

ω-Hydroxyresacetophenone. *See* Fisetol.

5-Hydroxysalicylic Acid. *See* Gentisic Acid.

α-Hydroxysantonin

$C_{15}H_{18}O_4$ MW, 262

Occurs in urine. Plates from EtOH. M.p. 286° decomp. Sol. hot EtOH. Spar. sol. H_2O, Et_2O, cold AcOEt. $[\alpha]_D$ — 115° approx. in EtOH. Dil. $HNO_3 \longrightarrow$ oxalic acid + HCN.

Acetyl: plates. M.p. 164–5°.

Phenylhydrazone: plates. M.p. 264–5°.

Lo Monaco, *Gazz. chim. ital.*, 1897, **27**, ii, 87.
Jaffé, *Z. physiol. Chem.*, 1897, **22**, 539.
Hecht, *ibid.*, 542.

β-Hydroxysantonin

$C_{15}H_{18}O_4$ MW, 262

Found in the urine of rabbits. Plates from H_2O. Cryst. from $CHCl_3$–pet. ether. M.p. 128–31°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. cold H_2O. Insol. pet. ether. Lævorotatory. Orange-red sols. in alc. alkalis.

Jaffé, *Z. physiol. Chem.*, 1897, **22**, 553.

γ-Hydroxysantonin.

See Artemisin.

1-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_{15} \cdot CH(OH) \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

Needles from AcOEt or $CHCl_3$. M.p. 93°. Sol. EtOH, Et_2O, hot C_6H_6.

Et ester: $C_{20}H_{40}O_3$. MW, 328. Needles from dil. EtOH. M.p. 62–3°. Sol. Et_2O, hot EtOH. Insol. H_2O.

Amide: $C_{18}H_{37}O_2N$. MW, 299. Plates from EtOH. M.p. 148–9°. Spar. sol. hot EtOH. Insol. Et_2O, H_2O.

Nitrile: $C_{18}H_{35}ON$. MW, 281. Plates from pet. ether. M.p. 61·5–62·5°. Sol. EtOH, Et_2O.

Acetyl: m.p. 70–70·5°.

Me ether: $C_{19}H_{38}O_3$. MW, 314. M.p. 62·5°. B.p. 190°/5 mm.

Le Suer, *J. Chem. Soc.*, 1904, **85**, 831.
Darzens, *Compt. rend.*, 1933, **196**, 348.

2-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_{14} \cdot CH(OH) \cdot CH_2 \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

Plates from $CHCl_3$. M.p. 89°. Sol. Et_2O. Spar. sol. hot EtOH, $CHCl_3$.

Ponzio, *Gazz. chim. ital.*, 1905, **35**, II, 570.

3-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_{13} \cdot CH(OH) \cdot [CH_2]_2 \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

Lactone: $C_{18}H_{34}O_2$. MW, 282. Plates from EtOH. M.p. 47–8°. Sol. EtOH, Et_2O.

Shukow, Schestakow, *Chem. Zentr.*, 1903, I, 825.

4-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_{12} \cdot CH(OH) \cdot [CH_2]_3 \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

Cryst. from EtOH. M.p. 54–5°.

Jegorow, *Chem. Zentr.*, 1915, I, 934.

5-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_{11} \cdot CH(OH) \cdot [CH_2]_4 \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

Cryst. M.p. 83°. Sol. Et_2O, $CHCl_3$, C_6H_6. Insol. pet. ether.

Acetyl: m.p. 52–3°.

Bougault, Charaux, *Compt. rend.*, 1911, **153**, 573.

9-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_7 \cdot CH(OH) \cdot [CH_2]_8 \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

M.p. 74–5° (83–4°).

Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 45–6°. B.p. 212–16°/4 mm.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 524.

10-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_6 \cdot CH(OH) \cdot [CH_2]_9 \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

Plates from EtOH. M.p. 81–2°.

Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 53–4°. B.p. 213–17°/4 mm.

Et ester: $C_{20}H_{40}O_3$. MW, 328. M.p. 44°. Sol. EtOH, Et_2O.

Phenylhydrazide: m.p. 106–7°.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 525.

11-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_5 \cdot CH(OH) \cdot [CH_2]_{10} \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

M.p. 76–7°.

Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 49–50°. B.p. 204–6°/4 mm.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 526.

12-Hydroxystearic Acid

$CH_3 \cdot [CH_2]_4 \cdot CH(OH) \cdot [CH_2]_{11} \cdot COOH$

$C_{18}H_{36}O_3$ MW, 300

M.p. 78–9° (80·5–81°). $[\alpha]_D^{18} - 0{\cdot}41°$ in Py.
Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 50–1°. B.p. 202–4°/4 mm. $[\alpha]_D^{20} - 0{\cdot}32°$ in Py.

Straus, Heinze, Salzmann, *Ber.*, 1933, **66**, 632.
Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 527.

13-Hydroxystearic Acid

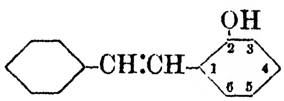
$CH_3{\cdot}[CH_2]_3{\cdot}CH(OH){\cdot}[CH_2]_{12}{\cdot}COOH$

$C_{18}H_{36}O_3$ MW, 300

M.p. 77–77·5°.
Me ester: $C_{19}H_{38}O_3$. MW, 314. M.p. 52–52·5°. B.p. 185–9°/2 mm.

See second reference above.

2-Hydroxystilbene (o-*Styrylphenol*, 1-*phenyl*-2-o-*hydroxyphenylethylene*)



$C_{14}H_{12}O$ MW, 196

Cryst. from EtOH.Aq. M.p. 147°. Sol. H_2O and alkalis with green fluor.
Acetyl: needles from EtOH.Aq. M.p. 54–5°.
Me ether: $C_{15}H_{14}O$. MW, 210. Plates from EtOH.Aq. M.p. 70°.

Funk, v. Kostanecki, *Ber.*, 1905, **38**, 940.
v. Kostanecki, Tambor, *Ber.*, 1909, **42**, 826.

3-Hydroxystilbene (m-*Styrylphenol*, 1-*phenyl*-2-m-*hydroxyphenylethylene*).

Needles from H_2O. Very sol. H_2O, EtOH, Et_2O. $FeCl_3 \longrightarrow$ dark red col.

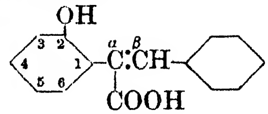
Werner, *Ber.*, 1895, **28**, 1999.

4-Hydroxystilbene (p-*Styrylphenol*, 1-*phenyl*-2-p-*hydroxyphenylethylene*).

Plates from C_6H_6 or AcOH. M.p. 189° (184·5°). Very sol. EtOH. Sol. Et_2O, AcOH, C_6H_6. Spar. sol. ligroin. Red sol. in H_2SO_4.
Acetyl: needles from EtOH. M.p. 152°. Sol. EtOH, AcOH.
Me ether: exists in two forms. (i) *Solid, stable form*: white plates from EtOH. M.p. 135–6° very sol. Et_2O, warm EtOH, Me_2CO, C_6H_6, AcOH. Passes readily into the liquid form on ultraviolet irradiation. (ii) *Liquid, labile form*: b.p. 143–5°/1·5 mm. Dist. at 15 mm. $\longrightarrow$ solid form.

Stoermer, Prigge, *Ann.*, 1915, **409**, 33.
Hewitt, Lewcock, Pope, *J. Chem. Soc.*, 1912, **101**, 606.

2-Hydroxystilbene-α-carboxylic Acid (2-*Phenyl*-1-o-*hydroxyphenylacrylic acid*, α-o-*hydroxyphenylcinnamic acid*)



$C_{15}H_{12}O_3$ MW, 240

Plates from EtOH.Aq. M.p. 155°.
Me ether: $C_{16}H_{14}O_3$. MW, 254. Needles from EtOH.Aq. M.p. 145–6°.

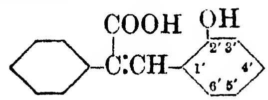
Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, **42**, 834.

4-Hydroxystilbene-α-carboxylic Acid (2-*Phenyl*-1-p-*hydroxyphenylacrylic acid*, α-p-*hydroxyphenylcinnamic acid*).

Me ether: needles from C_6H_6–ligroin. M.p. 132–3°. Sol. org. solvents. Red sol. in conc. H_2SO_4. $KMnO_4 \longrightarrow$ benzaldehyde.

Jörlander, *Ber.*, 1917, **50**, 413.

2'-Hydroxystilbene-α-carboxylic Acid (1-*Phenyl*-2-o-*hydroxyphenylacrylic acid*, 2-*hydroxy*-α-*phenylcinnamic acid*)



$C_{15}H_{12}O_3$ MW, 240

Me ether: $C_{16}H_{14}O_3$. MW, 254. Needles from EtOH. M.p. 186–7°. Dist. $\longrightarrow$ 3-phenylcoumarin.
Acetyl: needles from H_2O. Decomp. at 170–80°. Sol. EtOH, Et_2O. Spar. sol. H_2O.
Nitrile: $C_{15}H_{11}ON$. MW, 221. Yellow needles from MeOH.Aq. M.p. 104°. Acids, alkalis, or hot $H_2O \longrightarrow$ 3-phenylcoumarin.
Et ether: $C_{17}H_{15}ON$. MW, 249. Needles from EtOH.Aq. M.p. 82°. Sol. org. solvents. Insol. H_2O, ligroin.

Oglialoro, *Gazz. chim. ital.*, 1879, **9**, 428.
Funk, v. Kostanecki, *Ber.*, 1905, **38**, 940.
Borsche, Streitberger, *Ber.*, 1904, **37**, 3165.
Bistrzycki, Stelling, *Ber.*, 1901, **34**, 3087.

3'-Hydroxystilbene-α-carboxylic Acid (1-*Phenyl*-2-m-*hydroxyphenylacrylic acid*, 3-*hydroxy*-α-*phenylcinnamic acid*).

Needles from H_2O. M.p. 172–3°. Sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O. At 240° $\longrightarrow$ 3-hydroxystilbene.
Et ester: $C_{17}H_{16}O_3$. MW, 268. Cryst. from EtOH.Aq. M.p. 183°.
Me ether: needles from EtOH. M.p. 189°.

Nitrile: leaflets from AcOH.Aq. M.p. 106–7°. Sol. EtOH, hot C_6H_6, AcOH. Spar. sol. CS_2. *Et ether*: leaflets from EtOH. M.p. 72°. Sol. EtOH, C_6H_6, CS_2. *Acetyl*: needles from EtOH. M.p. 75–6°.

Werner, *Ber.*, 1895, **28**, 1998.
Bistrzycki, Stelling, *Ber.*, 1901, **34**, 3085.
Funk, v. Kostanecki, *Ber.*, 1905, **38**, 940 (*Note*).
Mayer, Balle, *Ann.*, 1914, **403**, 203.

4′-Hydroxystilbene-α-carboxylic Acid (1-*Phenyl*-2-p-*hydroxyphenylacrylic acid*, 4-*hydroxy-α-phenylcinnamic acid*).

Needles from EtOH. M.p. 223° decomp. Sol. EtOH, Et_2O, Me_2CO, AcOH. Spar. sol. C_6H_6, pet. ether.

Me ester: $C_{16}H_{14}O_3$. MW, 254. Plates from EtOH. M.p. 168–9°. Sol. EtOH, Et_2O, AcOH. *Acetyl*: needles. M.p. 108°. Sol. EtOH, Et_2O, AcOH.

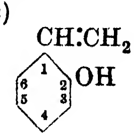
Me ether: exists in two forms. (i) Cryst. from C_6H_6. M.p. 189°. Dist. ⟶ 4-methoxystilbene. *Amide*: $C_{16}H_{15}O_2N$. MW, 253. Plates from C_6H_6–pet. ether. M.p. 131·5–132·5°. *Nitrile*: $C_{16}H_{13}ON$. MW, 235. Needles from EtOH. M.p. 93°. (ii) Cryst. from C_6H_6. M.p. 123°. *Amide*: needles from $CHCl_3$–pet. ether. M.p. 168–9°.

Acetyl: needles from C_6H_6. M.p. 174°. Sol. EtOH, Et_2O, AcOH.

Nitrile: exists in two forms. (i) Cryst. from EtOH.Aq. M.p. 190–1°. Spar. sol. cold AcOH. Insol. C_6H_6, $CHCl_3$, CS_2. *Acetyl*: plates from EtOH. M.p. 121–2°. (ii) Needles from EtOH.Aq. M.p. 192°. Sol. usual org. solvents.

Zincke, Geibel, *Ann.*, 1906, **349**, 110.
Bistrzycki, Stelling, *Ber.*, 1901, **34**, 3084.
Hewitt, Lewcock, Pope, *J. Chem. Soc.*, 1912, **101**, 606.
Stoermer, Prigge, *Ann.*, 1915, **409**, 30.
Bodroux, *Compt. rend.*, 1911, **153**, 350.

***o*-Hydroxystyrene** (o-*Vinylphenol*, o-*hydroxyphenylethylene*)



C_8H_8O MW, 120

Needles. M.p. 29–29·5°. B.p. 77°/15 mm., 56°/4 mm. Very sol. most org. solvents. Readily polymerises on standing in air. $D_4^{18\cdot2}$ 1·0609 (supercooled), $D_4^{35\cdot5}$ 1·0468. $n_D^{35\cdot7}$ 1·577.

Me ether: *o*-methoxystyrene, *o*-vinylanisole. $C_9H_{10}O$. MW, 134. B.p. 83–4°/12 mm. $D_4^{17\cdot2}$ 1·0049. $n_D^{17\cdot4}$ 1·557.

Auwers, *Ann.*, 1917, **413**, 296.
Smith, Niederl, *J. Am. Chem. Soc.*, 1931, **53**, 807.

***m*-Hydroxystyrene** (m-*Vinylphenol*, m-*hydroxyphenylethylene*).

Oil. B.p. 114–16°/16–17 mm.

Me ether: *m*-methoxystyrene, *m*-vinylanisole. B.p. 89–90°/14 mm.

Komppa, *Ber.*, 1893, **26**, (*Ref.*), 677.
Klages, Eppelsheim, *Ber.*, 1903, **36**, 3592.

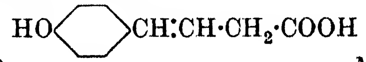
***p*-Hydroxystyrene** (p-*Vinylphenol*, p-*hydroxyphenylethylene*).

Me ether: *p*-methoxystyrene, *p*-vinylanisole. B.p. 204–5°/756 mm., 95–6°/16 mm., 90–1°/13 mm. D_4^{13} 1·0001. n_D 1·5642. Polymerises readily.

Et ether: *p*-ethoxystyrene, *p*-vinylphenetole. $C_{10}H_{12}O$. MW, 148. Cryst. B.p. 108–10°/12 mm. D_4^{18} 0·9764.

Klages, Eppelsheim, *Ber.*, 1903, **36**, 3594.
Tiffeneau, *Ann. chim.*, 1907, **10**, 349.
Mannich, Jacobsohn, *Ber.*, 1910, **43**, 195.

***p*-Hydroxystyrylacetic Acid** (3-p-*Hydroxyphenylvinylacetic acid*, 2-p-*hydroxybenzylidene-propionic acid*)



$C_{10}H_{10}O_3$ MW, 178

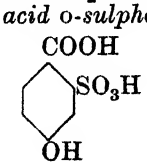
Me ether: 2-anisylidenepropionic acid, 2-*p*-methoxybenzylidenepropionic acid. Plates from H_2O. M.p. 106·5°. Very sol. EtOH, Et_2O, $CHCl_3$. Sol. CS_2.

Fittig, Politis, *Ann.*, 1889, **255**, 293.

Hydroxysuccinic Acid.

See Malic Acid.

4-Hydroxy-2-sulphobenzoic Acid (p-*Hydroxybenzoic acid* o-*sulphonic acid*)

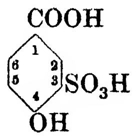


$C_7H_6O_6S$ MW, 218

Me ether: 4-methoxy-2-sulphobenzoic acid, anisic acid *o*-sulphonic acid, 2-sulphoanisic acid. $C_8H_8O_6S$. MW, 232. Cryst. + $2\frac{1}{2}H_2O$. M.p. anhyd. 104°.

Hedrick, *Am. Chem. J.*, 1887, **9**, 415.
Moale, *Am. Chem. J.*, 1898, **20**, 291.

4-Hydroxy-3-sulphobenzoic Acid (p-*Hydroxybenzoic acid* m-*sulphonic acid*)



$C_7H_6O_6S$ MW, 218

Needles or plates. Sol. H_2O, EtOH. Insol. Et_2O. $FeCl_3$ ⟶ bluish-red col. KOH fusion ⟶ protocatechuic acid.

Me ether: 4-methoxy-3-sulphobenzoic acid, anisic acid *m*-sulphonic acid, 3-sulphoanisic acid. $C_8H_8O_6S$. MW, 232. Needles + $1\frac{1}{2}H_2O$. M.p. 236° decomp. Sol. EtOH, H_2O. Insol. Et_2O. *Sulphonamide*: $C_8H_9O_5NS$. MW, 231. Needles or plates from EtOH. M.p. 276–7°. Spar. sol. H_2O.

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Prisms from EtOH. M.p. 258°. Sol. H_2O. *Et ether*: $C_9H_{11}O_5NS$. MW, 245. Needles from H_2O. M.p. 230–1° decomp.

Klepl, *J. prakt. Chem.*, 1883, **28**, 196.
Metcalf, *Am. Chem. J.*, 1893, **15**, 309.
Alleman, *Am. Chem. J.*, 1904, **31**, 41.
Pfeiffer, Negreanu, *Ber.*, 1917, **50**, 1472.

5-Hydroxy-3-sulphobenzoic Acid (m-*Hydroxybenzoic acid 5-sulphonic acid*).

Needles + $1H_2O$ from H_2O. Decomp. at 120°. Sol. EtOH, Et_2O. KOH fusion ⟶ 3 : 5-dihydroxybenzoic acid.

Hopfgartner, *Monatsh.*, 1873, **14**, 694.

6-Hydroxy-3-sulphobenzoic Acid (o-*Hydroxybenzoic acid 5-sulphonic acid, salicylic acid 5-sulphonic acid, 5-sulphosalicylic acid*).

Needles + $2H_2O$ from H_2O. M.p. anhyd. 120°. Sol. H_2O, EtOH, Et_2O. Hygroscopic. Above m.p. ⟶ salicylic acid + phenol.

Di-Et ester: $C_{11}H_{14}O_6S$. MW, 274. Cryst. from EtOH. M.p. 56°. Insol. H_2O.

Di-phenyl ester: $C_{19}H_{14}O_6S$. MW, 370. Needles from EtOH. M.p. 172–3°. Insol. H_2O. $FeCl_3$ ⟶ brown col.

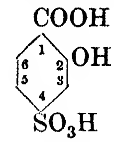
Sulphonchloride: $C_7H_5O_5ClS$. MW, 236·5. Needles from C_6H_6. M.p. 171–2° decomp. Sol. Et_2O. Spar. sol. C_6H_6. *Me ester*: $C_8H_7O_5ClS$. MW, 250·5. Cryst. from ligroin. M.p. 82–3°.

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Plates from EtOH. M.p. 253–5° decomp.

Cohn, *J. prakt. Chem.*, 1900, **61**, 545.
Hirsch, *Ber.*, 1900, **33**, 3238.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350); D.R.P., 276,331, (*Chem. Zentr.*, 1914, II, 280).

2-Hydroxy-4-sulphobenzoic Acid (o-*Hydroxybenzoic acid* p-*sulphonic acid, salicylic acid 4-sulphonic acid, 4-sulphosalicylic acid*)



$C_7H_6O_6S$ MW, 218

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Needles. M.p. 231° decomp. $FeCl_3$ ⟶ red col. *Me ether*: 2-methoxy-4-sulphobenzoic acid. $C_8H_9O_5NS$. MW, 231. Cryst. M.p. 211°.

Bromwell, *Am. Chem. J.*, 1897, **19**, 574.
Walker, *ibid.*, 578.

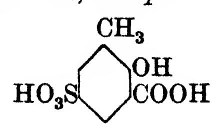
3-Hydroxy-4-sulphobenzoic Acid (m-*Hydroxybenzoic acid* p-*sulphonic acid*).

Yellowish-green needles + $2\frac{1}{2}(1\frac{1}{2})H_2O$ from H_2O. M.p. 206° (212–14°). Sol. EtOH. Insol. Et_2O. $FeCl_3$ ⟶ wine-red col.

Me ether: 3-methoxy-4-sulphobenzoic acid. $C_8H_8O_6S$. MW, 232. Plates + $2H_2O$ from H_2O. M.p. 228°. *Sulphonchloride*: $C_8H_7O_5ClS$. MW, 250·5. Plates from toluene. M.p. 214°. Spar. sol. org. solvents. *Dichloride*: $C_8H_6O_4Cl_2S$. MW, 269. Plates from CCl_4. M.p. 87°. Sol. C_6H_6, toluene. *Sulphonamide*: $C_8H_9O_5NS$. MW, 231. Plates from EtOH.Aq. M.p. 290° decomp. Sol. EtOH, MeOH, Me_2CO. Mod. sol. hot H_2O. Spar. sol. C_6H_6, toluene. *Diamide*: $C_8H_{10}O_4N_2S$. MW, 230. Needles or plates from H_2O. M.p. 255°.

Senhofer, *Ann.*, 1869, **152**, 102.
Ishihara, *Journal of the Pharmaceutical Society, Japan*, 1930, **50**, 132.
Shah, *J. Chem. Soc.*, 1930, 1295.

2-Hydroxy-5-sulpho-*m*-toluic Acid (5-*Sulpho-*o*-cresotic acid, 5-sulpho-*o*-cresotinic acid*)

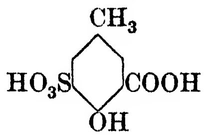


$C_8H_8O_6S$ MW, 232

Sulphonchloride: $C_8H_7O_5ClS$. MW, 250·5. Cryst. from toluene. M.p. 179–80°.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350).

4-Hydroxy-5-sulpho-*m*-toluic Acid (*5-Sulpho*-p-*cresotic acid, 5-sulpho*-p-*cresotinic acid*)

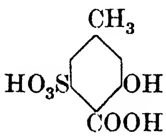


$C_8H_8O_6S$ MW, 232

Sulphonchloride: $C_8H_7O_5ClS$. MW, 250·5. Prisms from toluene. M.p. 189–90°.

See previous reference.

3-Hydroxy-5-sulpho-*p*-toluic Acid (*5-Sulpho*-m-*cresotic acid, 5-sulpho*-m-*cresotinic acid*)



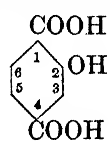
$C_8H_8O_6S$ MW, 232

Sulphonchloride: $C_8H_7O_5ClS$. MW, 250·5. Prisms from toluene. M.p. 172–3°.

See previous reference.

3-Hydroxyterephthaldehydic Acid.
See 3-Hydroxy-4-aldehydobenzoic Acid.

Hydroxyterephthalic Acid



$C_8H_6O_5$ MW, 182

Cryst. powder from H_2O. M.p. above 300°. Very sol. MeOH, EtOH. Sol. Et_2O. Spar. sol. H_2O. Part. sublimes. k (first) $= 2·5 \times 10^{-3}$: (second) $= 4·5 \times 10^{-5}$. $FeCl_3 \longrightarrow$ violet-red col. Dist. $\longrightarrow$ phenol.

1-*Me ester*: $C_9H_8O_5$. MW, 196. Needles. M.p. 206–8°. Very sol. EtOH, Et_2O. Sol. hot C_6H_6. Less sol. $CHCl_3$ than 4-Me ester. $k = 2·5 \times 10^{-4}$ at 25°.

4-*Me ester*: needles. M.p. 175–176·5°. Very sol. EtOH, Et_2O. Sol. hot C_6H_6. $k = 2·7 \times 10^{-3}$ at 25°.

Di-Me ester: $C_{10}H_{10}O_5$. MW, 210. Needles from MeOH. M.p. 94°. Very sol. EtOH, Et_2O. Sol. hot H_2O. *Acetyl*: needles from EtOH. M.p. 76°.

Me ether: methoxyterephthalic acid. $C_9H_8O_5$. MW, 196. Prisms from H_2O. M.p. 274–5° (276–9°). Very sol. EtOH. Sol. Et_2O. Spar. sol. H_2O, $CHCl_3$, C_6H_6. *Di-Me ester*: $C_{11}H_{12}O_5$. MW, 224. Needles from MeOH. M.p. 71·5°.

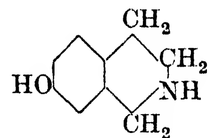
Et ether: ethoxyterephthalic acid. $C_{10}H_{10}O_5$. MW, 210. Cryst. M.p. 253–4°. Very sol. EtOH. Sol. Et_2O, C_6H_6, hot H_2O. Insol. cold H_2O.

Benzyl ether: $C_{15}H_{12}O_5$. MW, 272. Needles from EtOH. M.p. 230–40°.

Hähle, *J. prakt. Chem.*, 1891, **44**, 14.
Wegscheider, *Monatsh.*, 1902, **23**, 333, 383.
Baeyer, Tutein, *Ber.*, 1889, **22**, 2187.
Paternò, Canzoneri, *Gazz. chim. ital.*, 1879, **9**, 460.
Burkhard, *Ber.*, 1877, **10**, 147.

Hydroxytetracosane.
See Tetracosanol.

7-Hydroxy-1:2:3:4-tetrahydroisoquinoline



$C_9H_{11}ON$ MW, 149

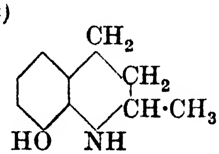
B.p. 210–20°/18 mm. Sol. EtOH with violet fluor. Spar. sol. Et_2O. Zn dust dist. $\longrightarrow$ isoquinoline.

Picrate: m.p. 198–201°.

Pictet, Spengler, *Ber.*, 1911, **44**, 2036.

Hydroxytetrahydronaphthalene.
See Tetrahydronaphthol.

8-Hydroxy-1:2:3:4-tetrahydroquinaldine (*8-Hydroxy-2-methyl-1:2:3:4-tetrahydroquinoline*)



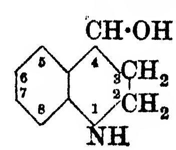
$C_{10}H_{13}ON$ MW, 163

B.p. 278–82°.

Me ether: $C_{11}H_{15}ON$. MW, 177. B.p. 270°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Döbner, Miller, *Ber.*, 1884, **17**, 1706.

4-Hydroxy-1:2:3:4-tetrahydroquinoline



$C_9H_{11}ON$ MW, 149

Prisms. M.p. 83–4°. Sol. warm H_2O and most org. solvents. Sol. cold conc. H_2SO_4 to pale red sol.

Diacetyl: prisms from ligroin. M.p. 95–6°.

Clemo, Perkin, *J. Chem. Soc.*, 1924, **125**, 1620.

5-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline.

Needles from C_6H_6. M.p. 116–17°. Sol. EtOH, Et_2O. Mod. sol. hot H_2O. Spar. sol. C_6H_6. Prac. insol. ligroin. Sublimes. Gives dark red col. with $FeCl_3$.Aq. in aq. sol.

Et ether: $C_{11}H_{15}ON$. MW, 177. Cryst. from Et_2O. M.p. 73°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, ligroin.

Riemerschmied, *Ber.*, 1883, **16**, 723.

6-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline.

M.p. 148°. Sol. acids and caustic alkalis.

Me ether: *see* Thalline.

Acetyl: needles. M.p. 82°.

Badische, D.R.P., 42,871.

8-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline.

Prisms from C_6H_6. M.p. 122·5°. Sol. EtOH, C_6H_6. Mod. sol. hot H_2O. Spar. sol. ligroin. Sublimes. Non-volatile in steam. Reddish-brown col. with $FeCl_3$.Aq. in aq. sol.

Et ether: b.p. 275–6°/716 mm.

N-*Me*: *see* Kairine.

N-*Et*: *see* Kairine A.

Bedall, Fischer, *Ber.*, 1881, **14**, 1368.

Hydroxytetralin.

See Tetrahydronaphthol.

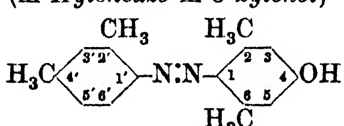
Hydroxytetramethylammonium hydroxide.

See Formocholine.

Hydroxytetramethylammonium iodide.

See under Formocholine.

4-Hydroxy-2 : 6 : 2′ : 4′-tetramethylazobenzene (m-*Xyleneazo*-m-5-*xylenol*)



$C_{16}H_{18}ON_2$ MW, 254

Orange-yellow cryst. from pet. ether. M.p. 124–5°. Sol. dil. alkalis.

Auwers, Michaelis, *Ber.*, 1914, **47**, 1292.

4-Hydroxy-1 : 2 : 3 : 5-tetramethylbenzene.

See Isodurenol.

3-Hydroxytetrolic Acid (*Hydroxymethylpropiolic acid*)

HO·CH$_2$·C:C·COOH

$C_4H_4O_3$ MW, 100

Cryst. from C_6H_6. M.p. 115–16°. Very sol. EtOH, H_2O, Me_2CO, AcOH. Sol. Et_2O. Spar. sol. $CHCl_3$, ligroin, C_6H_6.

Et ester: $C_6H_8O_3$. MW, 128. B.p. 126–7°/14 mm.

Dibromide: m.p. 137–9°.

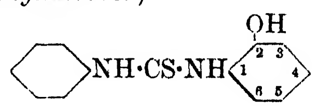
Lespieau, Viguier, *Compt. rend.*, 1908, **146**, 295.

Lespieau, *Ann. chim.*, 1912, **27**, 178.

Hydroxythioanisole.

See under Thiohydroquinone *and* Thioresorcinol.

***o*-Hydroxythiocarbanilide** (2-*Hydroxy*-sym.-*diphenylthiourea*)



$C_{13}H_{12}ON_2S$ MW, 244

Plates from 95% EtOH. M.p. 146°.

Me ether: $C_{14}H_{14}ON_2S$. MW, 258. M.p. 126°.

Otterbracher, Whitmore, *J. Am. Chem. Soc.*, 1929, **51**, 1909.

Kalckhoff, *Ber.*, 1883, **16**, 1829.

***m*-Hydroxythiocarbanilide** (3-*Hydroxy*-sym.-*diphenylthiourea*).

Plates from EtOH. M.p. 155–6°.

Meyer, Sundmacher, *Ber.*, 1899, **32**, 2116.

***p*-Hydroxythiocarbanilide** (4-*Hydroxy*-sym.-*diphenylthiourea*).

Plates from Et_2O. M.p. 162°. Sol. EtOH, alkalis. Spar. sol. Et_2O, C_6H_6, H_2O, dil. acids.

Me ether: m.p. 138°.

Acetyl: m.p. 137°.

Otterbracher, Whitmore, *J. Am. Chem. Soc.*, 1929, **51**, 1909.

Kalckhoff, *Ber.*, 1883, **16**, 1831.

3-Hydroxythionaphthene.

See Thioindoxyl.

3-Hydroxythionaphthene-2-carboxylic Acid.

See Thioindoxylic Acid.

Hydroxythionaphthol.

See Mercaptonaphthol.

Hydroxythiophenetole.

See under Thiohydroquinone.

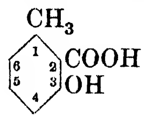
Hydroxythiophenol.
See Thiocatechol, Thiohydroquinone, *and* Thioresorcinol.

ω-Hydroxytoluene.
See Benzyl Alcohol.

Hydroxytoluene.
See Cresol.

ω-Hydroxytoluic Acid.
See Hydroxymethyl-benzoic Acid.

3-Hydroxy-*o*-toluic Acid (*6-Hydroxy-2-methylbenzoic acid, β-*m*-homosalicylic acid, *m*-cresol-2-carboxylic acid, 6-methylsalicylic acid*)



$C_8H_8O_3$ MW, 152

Needles from $CHCl_3$. M.p. 170–1° (168°). Sol. hot H_2O, EtOH, Et_2O. Mod. sol. $CHCl_3$. $k = 1{\cdot}06 \times 10^{-3}$ at 25°. $FeCl_3 \longrightarrow$ violet col. Volatile in steam. Sublimes in high vacuum.

Me ether: $C_9H_{10}O_3$. MW, 166. Prisms or needles. M.p. 139°. No col. with $FeCl_3$.

Acetyl: prisms from C_6H_6. M.p. 131°. No col. with $FeCl_3$.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 139.
Simonis, *Ber.*, 1917, **50**, 783.
Asahina, Furukawa, *Journal of the Pharmaceutical Society, Japan*, 1917, **429**, 967.
Asahina, Kondo, *Journal of the Pharmaceutical Society, Japan*, 1922, **482**, 264.
Anslow, Raistrick, *Biochem. J.*, 1931, **25**, 39.

4-Hydroxy-*o*-toluic Acid (*5-Hydroxy-2-methylbenzoic acid, *p*-cresol-2-carboxylic acid*).

Needles or prisms from H_2O. M.p. 183–4° (179°). Sol. EtOH, Et_2O. Mod. sol. H_2O. Spar. sol. $CHCl_3$. $FeCl_3 \longrightarrow$ brown ppt. Volatile in steam. Sublimes.

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 74·5–75°.

Et ester: $C_{10}H_{12}O_3$. MW, 180. Cryst. M.p. 67°.

Me ether: needles from H_2O. M.p. 146°.

Jacobsen, *Ber.*, 1884, **17**, 163.
Einhorn, Pfyl, *Ann.*, 1900, **311**, 57.
Auwers, *Z. physik. Chem.*, 1895, **18**, 611.
See also third reference above.

5-Hydroxy-*o*-toluic Acid (*4-Hydroxy-2-methylbenzoic acid, *m*-cresol-6-carboxylic acid*).

Needles + $\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 177–8°. Sol. hot H_2O, EtOH, Et_2O. Insol. $CHCl_3$. At 200° $\longrightarrow$ *m*-cresol + CO_2. No col. with $FeCl_3$.

Et ester: needles from ligroin. M.p. 98° (92°). B.p. 300°. No col. with $FeCl_3$.

Me ether: 2-methylanisic acid. Needles from H_2O. M.p. 176°. *Me ester*: $C_{10}H_{12}O_3$. MW, 180. Oil. Volatile in steam.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Needles from H_2O. M.p. 146°.

Tiemann, Schotten, *Ber.*, 1878, II, 778.
Schall, *Ber.*, 1879, **12**, 819.
Eijkmann, *Chem. Zentr.*, 1904, I, 1597.
Claisen, *Ann.*, 1897, **297**, 46.
Gomberg, Johnson, *J. Am. Chem. Soc.*, 1917, **39**, 1679.

6-Hydroxy-*o*-toluic Acid (*3-Hydroxy-2-methylbenzoic acid, o-cresol-6-carboxylic acid*).

Cryst. from H_2O. M.p. 145–6° (142°). KOH fusion $\longrightarrow$ *o*-cresol.

Me ester: cryst. M.p. 74·5–75·5°.

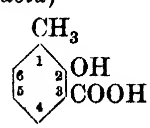
Et ester: prisms. M.p. 69°.

Nitrile: C_8H_7ON. MW, 133. Needles from H_2O. M.p. 195°.

Acetyl: needles. M.p. 144·5°.

Baudisch, Perkin, *J. Chem. Soc.*, 1909, **95**, 1885.
Einhorn, Pfyl, *Ann.*, 1900, **311**, 52.
Auwers, *Z. physik. Chem.*, 1895, **18**, 611 (*Note*).
Noelting, *Ber.*, 1904, **37**, 1027.

2-Hydroxy-*m*-toluic Acid (*o-Cresotic acid, o-cresotinic acid, o-homosalicylic acid, 2-hydroxy-3-methylbenzoic acid, o-cresol-3-carboxylic acid, 3-methylsalicylic acid*)



$C_8H_8O_3$ MW, 152

Needles from H_2O or EtOH.Aq. M.p. 163–4°. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$. $k = 1{\cdot}018 \times 10^{-3}$ at 25°. $FeCl_3 \longrightarrow$ intense violet col. Conc. HCl at 210° $\longrightarrow$ *o*-cresol + CO_2.

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 28–30°. B.p. 235°, 111°/13 mm. D^0 1·1683, $D^{16\cdot8}$ 1·529. $n_D^{16\cdot8}$ 1·5354.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 242°.

Phenyl ester: $C_{14}H_{12}O_3$. MW, 228. Needles. M.p. 48°.

p-Nitrobenzyl ester: $C_{15}H_{13}O_5N$. MW, 287. Cryst. M.p. 98·5°.

Phenacyl ester: $C_{16}H_{14}O_4$. MW, 270. Cryst. from EtOH.Aq. M.p. 138·5°.

Acetyl: needles from C_6H_6. M.p. 113°.
Chloride: $C_8H_7O_2Cl$. MW, 170·5. Cryst. M.p. 27–8°. B.p. 87–9°/16 mm. Easily decomp. *Acetyl*: cryst. M.p. 48–9°.
Amide: $C_8H_9O_2N$. MW, 151. Needles from EtOH.Aq. M.p. 112°. *Oxime*: plates from H_2O. M.p. 126·5°. Sol. hot H_2O, EtOH, C_6H_6, $CHCl_3$. Insol. ligroin.
Nitrile: C_8H_7ON. MW, 133. Plates from EtOH. M.p. 88·5°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. H_2O. Insol. ligroin.
Me ether: $C_9H_{10}O_3$. MW, 166. Needles from H_2O. M.p. 85°. *Me ester*: $C_{10}H_{12}O_3$. MW, 180. B.p. 249·5–250·5°/763 mm., 129–31°/14 mm. D^0 1·1258, $D^{17·4}$ 1·1102. $n_D^{17·4}$ 1·5166.

Paschen, *Ber.*, 1891, **24**, 3669.
Anschutz, Schroeder, Weber, Anspach, *Ann.*, 1906, **346**, 343.
Anschutz, Scholl, *Ann.*, 1911, **379**, 340.
Lyons, Reid, *J. Am. Chem. Soc.*, 1917, **39**, 1737.
Rather, Reid, *J. Am. Chem. Soc.*, 1919, **41**, 83.

4-Hydroxy-m-toluic Acid (p-*Cresotic acid*, p-*cresotinic acid*, p-*homosalicylic acid*, 6-*hydroxy*-3-*methylbenzoic acid*, p-*cresol*-3-*carboxylic acid*, 5-*methylsalicylic acid*).
Needles from H_2O or pet. ether. M.p. 153° (151°). Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$. $k = 8·41 \times 10^{-5}$ at 25°. Volatile in steam. $FeCl_3 \longrightarrow$ violet col.
Me ester: f.p. − 1°. B.p. 242°, 122–4°/14 mm. D^0 1·1673, $D^{15·8}$ 1·1534. $n_D^{15·8}$ 1·5351. Insol. H_2O.
Et ester: b.p. 251°.
Phenyl ester: needles from EtOH. M.p. 92–3°.
p-*Nitrobenzyl ester*: cryst. from EtOH.Aq. M.p. 147°.
Phenacyl ester: cryst. from EtOH.Aq. M.p. 145·5°.
Acetyl: needles or prisms from C_6H_6. M.p. 151–3°.
Propionyl: plates or needles from C_6H_6. M.p. 136–40°.
Chloride: *acetyl*, cryst. from Et_2O. M.p. 47°. B.p. 148–50°/16 mm. decomp. Sol. C_6H_6, $CHCl_3$.
Amide: needles from EtOH. M.p. 177–8°. *Et ether*: $C_{10}H_{13}O_2N$. MW, 179. Needles from EtOH.Aq. M.p. 152°. *Oxime*: needles from H_2O, plates from C_6H_6. M.p. 123–4°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. H_2O. Insol. ligroin.
Nitrile: cryst. M.p. 100–1°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. ligroin. *Acetyl*: cryst. from Et_2O. M.p. 56–7°. Sol. EtOH, Et_2O, Me_2CO, C_6H_6, $CHCl_3$, hot ligroin. Spar. sol. H_2O.
Me ether: needles from H_2O. M.p. 69°. *Me ester*: b.p. 263–5°, 143–6°/14 mm. D^0 1·1430, $D^{17·2}$ 1·1287. $n_D^{17·2}$ 1·5311. *Amide*: $C_9H_{11}O_2N$. MW, 165. Needles from EtOH.Aq. M.p. 163°. *Nitrile*: C_9H_9ON. MW, 147. Yellow oil. B.p. 270°.

Schering, D.R.P., 138,563, (*Chem. Zentr.*, 1903, I, 372).
Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).
Guillaumin, *Bull. soc. chim.*, 1910, **7**, 337.
Gattermann, *Ann.*, 1888, **244**, 66.
Auwers, *Ber.*, 1916, **49**, 821.
See also last two references above.

5-Hydroxy-m-toluic Acid (5-*Hydroxy*-3-*methylbenzoic acid*, m-*cresol*-5-*carboxylic acid*).
Needles from H_2O. M.p. 210°. Non-volatile in steam. Sublimes. No col. with $FeCl_3$.
Me ester: plates from EtOH.Aq. M.p. 92–3°. Spar. volatile in steam.
Me ether: needles from AcOH. M.p. 134°. *Me ester*: oil. B.p. 262–8°/752 mm.

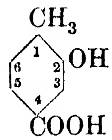
Jacobsen, *Ber.*, 1881, **14**, 2357.
Meldrum, *J. Chem. Soc.*, 1911, **99**, 1716.
Liebermann, Voswinckel, *Ber.*, 1897, **30**, 1742.

6-Hydroxy-m-toluic Acid (4-*Hydroxy*-3-*methylbenzoic acid*, o-*cresol*-5-*carboxylic acid*).
Needles + $\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 174–5°. Sol. hot H_2O, EtOH, Et_2O. Spar. sol. hot $CHCl_3$. No col. with $FeCl_3$.
Et ester: needles from C_6H_6–ligroin. M.p. 98–9°. Sol. org. solvents.
Nitrile: C_8H_7ON. MW, 133. Needles from H_2O. M.p. 93°. Sol. EtOH, C_6H_6, $CHCl_3$. Insol. ligroin.
Acetyl: plates from EtOH.Aq. M.p. 75–6°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Insol. H_2O, ligroin.
Me ether: 3-methylanisic acid. Needles from H_2O. M.p. 193°. *Me ester*: plates from EtOH.Aq. M.p. 67°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. H_2O. *Amide*: $C_9H_{11}O_2N$. MW, 165. Cryst. from EtOH.Aq. M.p. 144°.
Et ether: $C_{10}H_{12}O_3$. MW, 180. Needles from EtOH. M.p. 200–1° (198°). Volatile in steam. *Et ester*: $C_{12}H_{16}O_3$. MW, 208. B.p. 274–5°. D_4^{20} 1·057. $n_D^{15·1}$ 1·519. *Amide*:

$C_{10}H_{13}O_2N$. MW, 179. Needles from EtOH.Aq. M.p. 167°.

Schall, *Ber.*, 1879, **12**, 819.
Gattermann, Hess, *Ann.*, 1888, **244**, 65.
Gattermann, *Ann.*, 1907, **357**, 355.
Meldrum, Perkin, *J. Chem. Soc.*, 1909, **95**, 1894.
Auwers, *Ber.*, 1906, **39**, 3174; *Ann.*, 1918, **415**, 158.
Paschen, *Ber.*, 1891, **24**, 3673.

2-Hydroxy-*p*-toluic Acid (*3-Hydroxy-4-methylbenzoic acid*, o-*cresol-4-carboxylic acid*)



$C_8H_8O_3$ MW, 152

Needles or prisms from H_2O. M.p. 206–7°. Sol. hot H_2O, EtOH, Et_2O. Spar. sol. C_6H_6, pet. ether. Sublimes. Spar. volatile in steam. No col. with $FeCl_3$.

Me ether: $C_9H_{10}O_3$. MW, 166. Needles. M.p. 156°. Sol. EtOH, Et_2O. Insol. H_2O.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Cryst. M.p. 74–5°.

Acetyl: needles from C_6H_6. M.p. 162°.

Nitrile: C_8H_7ON. MW, 133. Needles from EtOH.Aq. M.p. 99·5°.

v. Gerichten, *Ber.*, 1878, **11**, 368, 1589.
Perkin, *J. Chem. Soc.*, 1898, **73**, 851.
Meldrum, Perkin, *J. Chem. Soc.*, 1908, **93**, 1420.
Borsche, Böcker, *Ber.*, 1903, **36**, 4359.

3-Hydroxy-*p*-toluic Acid (m-*Cresotic acid*, m-*cresotinic acid*, α-m-*homosalicylic acid*, *2-hydroxy-4-methylbenzoic acid*, *4-methylsalicylic acid*, m-*cresol-4-carboxylic acid*).

Needles from H_2O, plates from $CHCl_3$. M.p. 177° (173°). Sol. EtOH, $CHCl_3$. Mod. sol. H_2O. $k = 6{\cdot}84 \times 10^{-4}$ at 25°. Sublimes. $FeCl_3 \longrightarrow$ violet col.

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 27–8°. B.p. 236–7°, 242–4°/760 mm. D^0 1·1621, $D^{15 \cdot 2}$ 1·1483. $n_D^{15 \cdot 2}$ 1·5378.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 254°, 133°/11 mm. D_4^{23} 1·0950. Alc. $FeCl_3 \longrightarrow$ intense violet col.

Phenyl ester: $C_{14}H_{12}O_3$. MW, 228. Needles from EtOH. M.p. 49°.

p-*Nitrobenzyl ester*: $C_{15}H_{13}O_5N$. MW, 287. Cryst. from EtOH.Aq. M.p. 174·5–175°.

Phenacyl ester: $C_{16}H_{14}O_4$. MW, 270. Cryst. from EtOH.Aq. M.p. 116·5°.

Acetyl: needles from H_2O or C_6H_6. M.p. 139° (125–6°). Sol. EtOH, C_6H_6, AcOH. Spar. sol. cold H_2O.

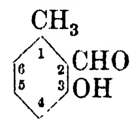
Chloride: $C_8H_7O_2Cl$. MW, 170·5. *Acetyl*: cryst. M.p. 15°. B.p. 141°/10 mm.

Me ether: plates from H_2O. M.p. 74° (69°). *Me ester*: $C_{10}H_{12}O_3$. MW, 180. Oil. B.p. 259–61°. D^0 1·1462.

Et ether: cryst. M.p. 78·5°.

Tiemann, Schotten, *Ber.*, 1878, **11**, 777.
Eijkmann, *Chem. Zentr.*, 1904, I, 1597.
Anschütz, *Ann.*, 1909, **367**, 219.
Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, **3**, 730.
Pinner, *Ber.*, 1890, **23**, 2938.
Lyons, Reid, *J. Am. Chem. Soc.*, 1917, **39**, 1737.
Rather, Reid, *J. Am. Chem. Soc.*, 1919, **41**, 83.

3-Hydroxy-*o*-toluic Aldehyde (*6-Hydroxy-2-methylbenzaldehyde*, β-m-*homosalicylaldehyde*, m-*cresol-2-aldehyde*, *6-methylsalicylaldehyde*)



$C_8H_8O_2$ MW, 136

Needles from H_2O. M.p. 31·4–31·9°. B.p. 228–9·3°/728 mm. Sol. C_6H_6. Spar. sol. pet. ether. Volatile in steam. $FeCl_3 \longrightarrow$ violet col. Forms bisulphite comp.

Oxime: needles from H_2O. M.p. 118·5–119·5°. Sol. EtOH.

Semicarbazone: plates from EtOH. M.p. 212–14° decomp.

Phenylhydrazone: cryst. M.p. 172°.

Me ether: $C_9H_{10}O_2$. MW, 150. Needles. M.p. 41·5–42°. Sol. hot pet. ether. Forms bisulphite comp.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 139.
Anselmino, *Ber.*, 1917, **50**, 395.

5-Hydroxy-*o*-toluic Aldehyde (*4-Hydroxy-2-methylbenzaldehyde*, m-*cresol-6-aldehyde*).

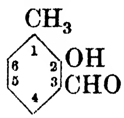
Plates from H_2O. M.p. 110°. Sol. EtOH, Et_2O. Mod. sol. $CHCl_3$. Sol. alkalis. $FeCl_3 \longrightarrow$ yellowish-red col. Non-volatile in steam. Stable to most oxidising agents. KOH fusion $\longrightarrow$ 5-hydroxy-*o*-toluic acid.

Me ether: 2-methylanisaldehyde. Cryst. from MeOH. B.p. 257°. *Oxime*: needles from ligroin. M.p. 81°.

Et ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 260–2°. *Oxime*: cryst. from $CHCl_3$–ligroin. M.p. 84°.

Gattermann, Berchelmann, *Ber.*, 1898, **31**, 1767.
Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).
Gattermann, *Ann.*, 1907, **357**, 358.

2-Hydroxy-*m*-toluic Aldehyde (2-*Hydroxy-3-methylbenzaldehyde*, o-*homosalicylaldehyde*, o-*cresol-3-aldehyde*, 3-*methylsalicylaldehyde*)



$C_8H_8O_2$ MW, 136

Cryst. M.p. 17°. B.p. 208–9°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. Volatile in steam. $FeCl_3 \longrightarrow$ blue col.

Acetyl: b.p. 267°. Forms bisulphite comp.

Oxime: needles from H_2O. M.p. 99°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Insol. cold H_2O, ligroin.

Phenylhydrazone: plates from ligroin. M.p. 97°.

p-*Bromophenylhydrazone*: plates from ligroin. M.p. 108°.

Semicarbazone: needles from AcOH. M.p. 248° (241°) decomp.

Azine: yellow needles from AcOH. M.p. 229°. Spar. sol. AcOH.

Me ether: $C_9H_{10}O_2$. MW, 150. Oil. B.p. about 120°/6 mm. Conc. $H_2SO_4 \longrightarrow$ red col. *Oxime*: needles from MeOH. M.p. 118°. *Semicarbazone*: needles from EtOH. M.p. 224°.

Tiemann, Schotten, *Ber.*, 1878, **11**, 772.
Paschen, *Ber.*, 1891, **24**, 3668.
Anselmino, *Ber.*, 1902, **35**, 4104.
Simonsen, *J. Chem. Soc.*, 1918, **113**, 777.
Bell, Henry, *J. Chem. Soc.*, 1928, 2222.

4-Hydroxy-*m*-toluic Aldehyde (6-*Hydroxy-3-methylbenzaldehyde*, p-*homosalicylaldehyde*, p-*cresol-3-aldehyde*, 5-*methylsalicylaldehyde*).

Plates from EtOH.Aq. M.p. 56°. B.p. 217–18°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. $D_4^{59\cdot2}$ 1·0913. $n_D^{59\cdot2}$ 1·547. Volatile in steam. $FeCl_3 \longrightarrow$ deep blue col.

Acetyl: needles from EtOH.Aq. M.p. 57°. Non-volatile in steam. Forms spar. sol. bisulphite comp. *Azine*: cryst. from EtOH. M.p. 163°.

Oxime: needles from H_2O. M.p. 105°.

Phenylhydrazone: yellow needles from EtOH. M.p. 149°. *Acetyl*: needles from ligroin. M.p. 126°. *Benzoyl*: yellow prisms from EtOH. M.p. 161°.

p-*Bromophenylhydrazone*: yellow plates from EtOH. Decomp. at 181°.

Semicarbazone: needles from AcOH. Decomp. at 238°.

Hydrazone: powder. M.p. 72–4°.

Me ether: b.p. 250°, 130·2°/12 mm. $D_4^{19\cdot2}$ 1·0988. $n_D^{19\cdot2}$ 1·554. *Oxime*: needles from H_2O. M.p. 144–5°.

Et ether: $C_{10}H_{12}O_2$. MW, 164. Needles from ligroin. M.p. 32–3°. B.p. 257°. *Oxime*: needles from ligroin. M.p. 87°. *Azine*: yellow prisms from EtOH–$CHCl_3$. M.p. 154–5°.

Tiemann, Schotten, *Ber.*, 1878, **11**, 773.
Schotten, *ibid.*, 785.
Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).
Goldbeck, *Ber.*, 1891, **24**, 3658.
Auwers, *Ann.*, 1915, **408**, 241.
Adams, *J. Am. Chem. Soc.*, 1919, **41**, 268.
A.G.F.A., E.P., 145,581, (*Chem. Abstracts*, 1920, **14**, 3427).
See also fourth reference above.

6-Hydroxy-*m*-toluic Aldehyde (4-*Hydroxy-3-methylbenzaldehyde*, o-*cresol-5-aldehyde*).

Prisms from H_2O. M.p. 118° (115°). Sol. hot H_2O, EtOH, Et_2O. Mod. sol. $CHCl_3$. Sol. alkalis. Non-volatile in steam. $FeCl_3 \longrightarrow$ bluish-violet col.

Acetyl: needles from EtOH.Aq. M.p. 39–40°. B.p. about 275°. Forms bisulphite comp.

Oxime: needles from H_2O. M.p. 143·5°.

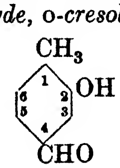
Semicarbazone: needles from AcOH. M.p. 216°.

Me ether: 3-methylanisaldehyde. Oil. B.p. 251°. *Oxime*: cryst. from C_6H_6-ligroin. M.p. 68–70°.

Et ether: needles from ligroin. M.p. 33–4°. B.p. 258–60°. *Oxime*: needles from EtOH.Aq. M.p. 92–3°.

Paschen, *Ber.*, 1891, **24**, 3672.
Gattermann, Berchelmann, *Ber.*, 1898, **31**, 1766.
Gattermann, Frenzel, *Ber.*, 1898, **31**, 1150.
Gattermann, *Ann.*, 1907, **357**, 355.
Bell, Henry, *J. Chem. Soc.*, 1928, 2222.

2-Hydroxy-*p*-toluic Aldehyde (3-*Hydroxy-4-methylbenzaldehyde*, o-*cresol-4-aldehyde*)



$C_8H_8O_2$ MW, 136

Yellow needles from H_2O. M.p. 73°.

Sidgwick, Allott, *J. Chem. Soc.*, 1923, **123**, 2820.

3-Hydroxy-p-toluic Aldehyde (*2-Hydroxy-4-methylbenzaldehyde*, *α-m-homosalicylaldehyde*, *m-cresol-4-aldehyde*, *4-methylsalicylaldehyde*).

Needles from EtOH or H_2O. M.p. 60–1°. B.p. 219–21°/726 mm. Sol. most org. solvents. Spar. sol. H_2O, cold EtOH. Volatile in steam. $FeCl_3 \longrightarrow$ violet col.

Oxime: plates from EtOH.Aq. M.p. 108·5–109°. Sol. EtOH, C_6H_6. Insol. pet. ether.

Semicarbazone: cryst. M.p. 268°.

Phenylhydrazone: cryst. M.p. 161°.

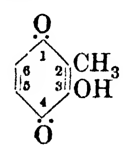
Me ether: $C_9H_{10}O_2$. MW, 150. Needles. M.p. 42–3°. B.p. 263–4°/720 mm. Sol. EtOH, C_6H_6. Spar. sol. hot H_2O. Volatile in steam. No col. with $FeCl_3$. Forms bisulphite comp.

Tiemann, Schotten, *Ber.*, 1878, **11**, 773.
Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 134.
Fries, Klostermann, *Ber.*, 1906, **39**, 872.
Anselmino, *Ber.*, 1917, **50**, 395.

ω-Hydroxy-p-toluic Aldehyde.
See p-Hydroxymethylbenzaldehyde.

Hydroxytoluquinaldine.
See 4-Hydroxy-2 : 6-dimethylquinoline *and* 4-Hydroxy-2 : 8-dimethylquinoline.

3-Hydroxytoluquinone (*3-Hydroxy-2-methyl-p-benzoquinone*)



$C_7H_6O_3$ MW, 138

Me ether: $C_8H_8O_3$. MW, 152. Oil. Slowly solidifies. H_2S.Aq. $\longrightarrow$ 3 : 6-dihydroxy-2-methoxytoluene.

Majima, Okazaki, *Ber.*, 1916, **49**, 1490.

5-Hydroxytoluquinone (*5-Hydroxy-2-methyl-p-benzoquinone*).

Yellow needles from C_6H_6. M.p. 142° decomp. Sol. H_2O. Reacts acid. Red sols in alkalis.

Acetyl: yellow prisms from ligroin. M.p. 75–6°.

Me ether: needles from EtOH. M.p. 170–2° decomp. Sol. hot H_2O, EtOH, C_6H_6. Spar. sol. Et_2O, pet. ether. Volatile in steam. $H_2S \longrightarrow$ 2 : 5-dihydroxy-4-methoxytoluene.

Et ether: $C_9H_{10}O_3$. MW, 166. Yellow cryst. from pet. ether. M.p. 101°. Sol. EtOH, C_6H_6, ligroin. Readily sublimes.

Thiele, Winter, *Ann.*, 1900, **311**, 350.
Jacobson, Jankowski, *Ann.*, 1909, **369**, 20.
Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, **97**, 1137.

6-Hydroxytoluquinone (*6-Hydroxy-2-methyl-p-benzoquinone*).

Me ether: cryst. M.p. 147°.

Henrich, Nachtigall, *Ber.*, 1903, **36**, 894.

Hydroxytolylenediamine.
See Diaminocresol.

Hydroxytoxicarol

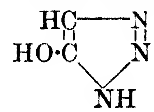
$C_{23}H_{24}O_8$ MW, 428

Yellow prisms. M.p. 226–7°. $FeCl_3 \longrightarrow$ deep green col. 5% Alc. HCl $\longrightarrow$ dehydrotoxicarol.

Acetyl: plates from AcOH. M.p. 184°.

Clark, *J. Am. Chem. Soc.*, 1934, **56**, 987.

5-Hydroxy-1 : 2 : 3-triazole



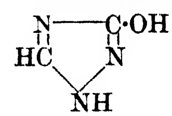
$C_2H_3ON_3$ MW, 85

Needles. M.p. 130°. Very sol. EtOH, H_2O. Sol. AcOH. Spar. sol. Et_2O. Insol. ligroin, C_6H_6. Acid to litmus.

Dibenzoyl deriv.: needles from EtOH. M.p. 104°.

Dimroth, *Ann.*, 1910, **373**, 352.
Curtius, Boekmuhl, *Ber.*, 1910, **33**, 2444.

3-Hydroxy-1 : 2 : 4-triazole



$C_2H_3ON_3$ MW, 85

Cryst. from EtOH. M.p. 234°. Very sol. H_2O, EtOH, HCl. Insol. Et_2O. Acid to litmus.

O : N-*Diacetyl*: plates from EtOH. M.p. 137°. Very sol. H_2O, EtOH.

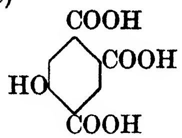
Widman, Cleve, *Ber.*, 1898, **31**, 379.
Monchat, Noll. *Ann.*, 1905, **343**, 25.

Hydroxytricarballylic Acid.
See Citric Acid *and* Isocitric Acid.

2-Hydroxy-3 : 4 : 6-triethoxybenzoylformic Acid.
See Gossypetonic Acid.

2-Hydroxytriethylamine.
See 2-Diethylaminoethyl Alcohol.

5-Hydroxytrimellitic Acid (*Phenol*-2 : 4 : 5-*tricarboxylic acid*)

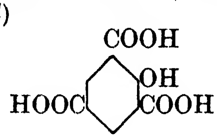


$C_9H_6O_7$ MW, 226

Prisms + $2H_2O$ from H_2O. M.p. anhyd. 240–5° decomp. Sol. EtOH. Spar. sol. H_2O. KOH fusion ⟶ phenol. HCl at 230–40° ⟶ *m*-hydroxybenzoic acid. $FeCl_3$ ⟶ brownish-red col.

Kögl, Erxleben, Jänecke, *Ann.*, 1930, **482**, 117.
Jacobsen, *Ber.*, 1883, **16**, 192.

Hydroxytrimesic Acid (*Phenol*-2 : 4 : 6-*tricarboxylic acid*)



$C_9H_6O_7$ MW, 226

Prisms + $1H_2O$ from H_2O. Spar. sol. Et_2O. Insol. $CHCl_3$, C_6H_6, ligroin. $FeCl_3$ ⟶ reddish-brown col. Heat ⟶ salicylic acid + 4-hydroxyisophthalic acid + phenol.

Tri-Et ester: $C_{15}H_{18}O_7$. MW, 310. Prisms from EtOH. M.p. 83°. Sol. Et_2O, C_6H_6, hot H_2O.

Me ether: anisole-2 : 4 : 6-tricarboxylic acid. $C_{10}H_8O_7$. MW, 240. Needles from AcOH. M.p. 248°. Sol. EtOH, Et_2O, AcOH, hot H_2O. Insol. C_6H_6. *Tri-Me ester*: $C_{13}H_{14}O_7$. MW, 282. Needles from pet. ether. M.p. 86°. Sol. EtOH, Et_2O, C_6H_6.

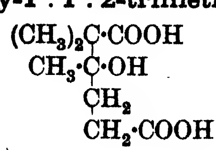
Ost, *J. prakt. Chem.*, 1877, **15**, 302.
Errera, *Ber.*, 1898, **31**, 1684.
Ullmann, Brittner, *Ber.*, 1909, **42**, 2543.

1-Hydroxy-3 : 4 : 5-trimethoxybenzene.
See Antiarol.

Hydroxytrimethylacetaldehyde.
See Hydroxypivalic Aldehyde.

Hydroxytrimethylacetic Acid.
See Hydroxypivalic Acid.

2-Hydroxy-1 : 1 : 2-trimethyladipic Acid



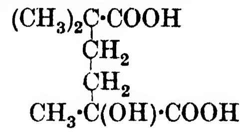
$C_9H_{16}O_5$ MW, 204

Exists only in solution. Warm H_2SO_4 ⟶ levulinic and isobutyric acids.

Lactone: $C_9H_{14}O_4$. MW, 186. Prisms from Et_2O. M.p. 108–9°. *Et ester*: $C_{11}H_{18}O_4$. MW, 214. B.p. 165–8°/18 mm.

Harding, *J. Chem. Soc.*, 1912, **101**, 1593.

4-Hydroxy-1 : 1 : 4-trimethyladipic Acid

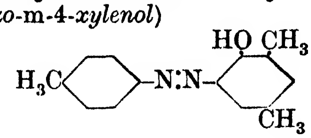


$C_9H_{16}O_5$ MW, 204

Cryst. from H_2O. M.p. 145–8°. Sol. H_2O. Insol. C_6H_6. HI ⟶ 1 : 1 : 4-trimethyladipic acid.

Auwers, Hessenland, *Ber.*, 1908, **41**, 1813.

2-Hydroxy-3 : 5 : 4′-trimethylazobenzene (*Tolueneazo*-m-4-*xylenol*)



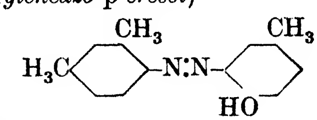
$C_{15}H_{16}ON_2$ MW, 240

Red needles from EtOH. M.p. 99°. Sol. dil. alkalis. Spar. sol. pet. ether.

Et ether: $C_{17}H_{20}ON_2$. MW, 268. Red prisms from pet. ether. M.p. 51–2°. Sol. EtOH, C_6H_6, pet. ether.

Jacobsen, *Ann.*, 1909, **369**, 24.

6-Hydroxy-3 : 2′ : 4′-trimethylazobenzene (m-*Xyleneazo*-p-*cresol*)



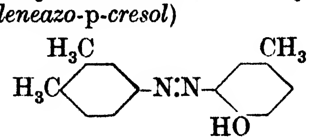
$C_{15}H_{16}ON_2$ MW, 240

Reddish-brown needles from EtOH.Aq. M.p. 85°. B.p. 230–33°/30 mm.

Et ether: red plates from ligroin. M.p. 51°. B.p. 238–42°/25 mm. Sol. EtOH, C_6H_6.

Jacobsen, *Ann.*, 1909, **369**, 31.

6-Hydroxy-3 : 3′ : 4′-trimethylazobenzene (o-*Xyleneazo*-p-*cresol*)



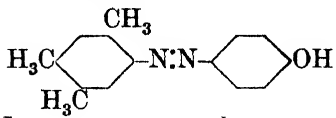
$C_{15}H_{16}ON_2$ MW, 240

Brown cryst. from AcOH.Aq. M.p. 131–2°. Sol. Et_2O, AcOH. Spar. sol. MeOH, ligroin.

Acetyl: orange-yellow leaflets from AcOH.Aq. M.p. 106°.

Auwers, *Ann.*, 1909, **365**, 292, 304.

4-Hydroxy-2′ : 4′ : 5′-trimethylazobenzene (*ψ-Cumeneazophenol*)



$C_{15}H_{16}ON_2$ MW, 240

Yellow leaflets pptd. from NH_4OH by CO_2. M.p. 94°. Sol. EtOH, C_6H_6. Spar. sol. ligroin.
B,HCl: m.p. 162°.
Acetyl: orange needles from EtOH. M.p. 105°.
Me ether: ψ-cumeneazoanisole. $C_{16}H_{18}ON_2$. MW, 254. Brown needles. M.p. 89°.

Goldschmidt, Brubacher, *Ber.*, 1891, **24**, 2312.
Farmer, Hantzsch, *Ber.*, 1899, **32**, 3097.

Hydroxytrimethylbenzaldehyde.
See Trimethylsalicylaldehyde.

6 - Hydroxy - 2 : 3 : 5 - trimethylbenzyl Alcohol.
See 3 : 5 : 6-Trimethylsaligenin.

2 - Hydroxy - 1 : 1 : 2 - trimethylbutyric Acid.
See 2-Hydroxy-1 : 1-dimethylisovaleric Acid.

2 - Hydroxy - 1 : 1 : 4 - trimethylcaproic Acid.
See 2-Hydroxy-1 : 1-dimethylisoamylacetic Acid.

2 - Hydroxy - 1 : 1 : 2 - trimethylglutaric Acid

$(CH_3)_2C{\cdot}COOH$
$CH_3{\cdot}C{\cdot}OH$
$CH_2{\cdot}COOH$

$C_8H_{14}O_5$ MW, 190

Prisms from pet. ether. M.p. 128°. Sol. H_2O, org. solvents.
Di-Et ester: $C_{12}H_{22}O_5$. MW, 246. B.p. 160–70°/30 mm.

Perkin, Thorpe, *J. Chem. Soc.*, 1897, **71**, 1179.

3 - Hydroxy - 1 : 1 : 2 - trimethylglutaric Acid

$(CH_3)_2C{\cdot}COOH$
$CH_3{\cdot}CH$
$HO{\cdot}CH{\cdot}COOH$

$C_8H_{14}O_5$ MW, 190

Lactone: $C_8H_{12}O_4$. MW, 172. Needles from toluene. M.p. 110°. Alk. $KMnO_4 \longrightarrow$ trimethylsuccinic acid.

Bardhan, *J. Chem. Soc.*, 1928, 2620.

2 - Hydroxy - 1 : 1 : 3 - trimethylglutaric Acid

$(CH_3)_2C{\cdot}COOH$
$CH{\cdot}OH$
$CH_3{\cdot}CH{\cdot}COOH$

$C_8H_{14}O_5$ MW, 190

Cis:
Cryst. from toluene. M.p. 115°. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6, $CHCl_3$.
Trans:
Cryst. from warm Et_2O. M.p. 156–7°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6, $CHCl_3$, toluene.

Perkin, Smith, *J. Chem. Soc.*, 1903, **83**, 775.
Cahn, Gibson, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 293.

3 - Hydroxy - 1 : 1 : 3 - trimethylglutaric Acid

$(CH_3)_2C{\cdot}COOH$
CH_2
$CH_3{\cdot}C(OH){\cdot}COOH$

$C_8H_{14}O_5$ MW, 190

Di-nitrile: $C_8H_{12}ON_2$. MW, 152. Needles from AcOEt-pet. ether. M.p. 165–6°. Sol. H_2O, $CHCl_3$. Spar. sol. pet. ether.

Lapworth, *J. Chem. Soc.*, 1904, **85**, 1223.

3 - Hydroxy - 1 : 2 : 2 - trimethylglutaric Acid

$CH_3{\cdot}CH{\cdot}COOH$
$CH_3{\cdot}C{\cdot}CH_3$
$HO{\cdot}CH{\cdot}COOH$

$C_8H_{14}O_5$ MW, 190

Lactone: $C_8H_{12}O_4$. MW, 172. Prisms from H_2O. M.p. 165–6°. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6, pet. ether.

Balbiano, *Ber.*, 1894, **27**, 2136.
Chandrasena, Ingold, Thorpe, *J. Chem. Soc.*, 1922, **121**, 1550.

3-Hydroxy-2 : 4 : 4-trimethylhexane.
See Isopropyl-*tert.*-amylcarbinol.

1-Hydroxy-2 : 2 : 2-trimethylpropionic Acid.
See 1-Hydroxy-2 : 2-dimethylbutyric Acid.

Hydroxytrimethylsuccinic Acid.
See Trimethylmalic Acid.

2-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid (1 : 1 : *2-Trimethyl-2-ethylhydracrylic acid*)

$$CH_3{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}C(CH_3)_2{\cdot}COOH$$

$C_8H_{16}O_3$ MW, 160

Et ester: $C_{10}H_{20}O_3$ MW, 188. B.p. 92°/11 mm.

Bardhan, *J. Chem. Soc.*, 1928, 2615.

3-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid

$$CH_3{\cdot}CH(OH){\cdot}CH(CH_3){\cdot}C(CH_3)_2{\cdot}COOH$$

$C_8H_{16}O_3$ MW, 160

Lactone: $C_8H_{14}O_2$. MW, 142. B.p. 121–3°/33 mm.

Jacobs, Scott, *J. Biol. Chem.*, 1931, **93**, 145.

2-Hydroxy-1 : 1 : 3-trimethyl-*n*-valeric Acid.

See 2-Hydroxy-1 : 1-dimethylisocaproic Acid.

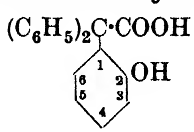
2-Hydroxy-1 : 2 : 3-trimethyl-*n*-valeric Acid.

See 2-Hydroxy-1 : 2-dimethylisocaproic Acid.

1-Hydroxy-1 : 3 : 3-trimethyl-*n*-valeric Acid.

See 1-Hydroxy-1 : 3-dimethylisocaproic Acid.

2-Hydroxytriphenylacetic Acid (*2-Hydroxytriphenylmethane-α-carboxylic acid*)



$C_{20}H_{16}O_3$ MW, 304

Cryst. from Et_2O. M.p. 149–50°. Slowly changes to lactone.

Me ether: $C_{21}H_{17}O_3$. MW, 318. Cryst. from EtOH. M.p. 234–5°. Sol. Me_2CO, AcOH, C_6H_6. Spar. sol. EtOH. Loses CO_2 at 300° ⟶ 2-methoxytriphenylmethane. Conc. H_2SO_4 ⟶ 2-methoxytriphenylcarbinol. *Me ester*: $C_{22}H_{19}O_3$. MW, 332. Prisms from EtOH. M.p. 134°. Sol. conc. H_2SO_4 to violet sol.

Et ether: $C_{22}H_{19}O_3$. MW, 332. Needles from AcOH. M.p. 264°. Sol. hot AcOH. Spar. sol. EtOH, Et_2O, Me_2CO, C_6H_6. Sol. conc. H_2SO_4 to red sol. *Et ester*: $C_{24}H_{23}O_3$. MW, 360. Cryst. from EtOH. M.p. 84°. Sol. EtOH, Me_2CO, AcOH, C_6H_6. Sol. conc. H_2SO_4 to violet sol.

Lactone: $C_{20}H_{14}O_2$. MW, 286. Leaflets from Et_2O–EtOH. M.p. 120°. Sol. Et_2O, Me_2CO, AcOEt, C_6H_6. Spar. sol. EtOH.

Liebig, Keim, *Ann.*, 1908, **360**, 207.

4-Hydroxytriphenylacetic Acid (*4-Hydroxytriphenylmethane-α-carboxylic acid*).

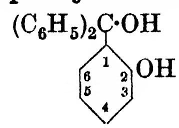
Needles from EtOH.Aq. M.p. 212° decomp. Sol. MeOH, EtOH, Et_2O, Me_2CO, AcOH, C_6H_6. Spar. sol. $CHCl_3$. Insol. ligroin. Sol. conc. H_2SO_4 to yellow sol.

Me ether: needles from 50% AcOH. M.p. 174°. *Me ester*: prisms from AcOH. M.p. 138–9°. Sol. EtOH.

Mixed anhydride with CH_3COOH: $C_{24}H_{20}O_5$. MW, 388. Needles from AcOH. M.p. 208° decomp.

Bistrzycki, Nowakowska, *Ber.*, 1901, **34**, 3063.

2-Hydroxytriphenylcarbinol



$C_{19}H_{16}O_2$ MW, 276

Prisms from Et_2O–ligroin. M.p. 140·5° (142°). Very sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. ligroin.

Me ether: $C_{20}H_{18}O_2$. MW, 290. Leaflets from EtOH. M.p. 134° (128–9°).

Phenyl ether: $C_{25}H_{20}O_2$. MW, 352. Needles from ligroin. M.p. 120°. Very sol. Et_2O, C_6H_6. Sol. boiling ligroin.

Baeyer, *Ann.*, 1907, **354**, 167.
Liebig, *Ann.*, 1908, **360**, 213.
Ullmann, Engi, *Ber.*, 1904, **37**, 2368.
Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 769.

3-Hydroxytriphenylcarbinol.

Plates from C_6H_6–ligroin. M.p. 147–8°.

Me ether: cryst. from Et_2O. M.p. 88°.

Baeyer, *Ann.*, 1907, **354**, 170.
Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 770.

4-Hydroxytriphenylcarbinol.

Exists in two forms.

(i) *High melting* (*benzenoid*) *form*.

Needles from EtOH (containing trace of NH_3). M.p. 157–9° after turning yellow at 110–20°. Sol. 150 parts C_6H_6 at ord. temp. Converted to low melting form by cryst. from solvents containing a trace of acid.

(ii) *Low melting* (*quinonoid*) *form*.
Yellow cryst. from 40–50% AcOH. M.p. 139–40°. Sol. 150 parts C_6H_6 at ord. temp.

Me ether: $C_{20}H_{18}O_2$. MW, 290. Exists in two forms. (i) M.p. 84°. (ii) M.p. 61°.

Di-Me ether: $C_{21}H_{20}O_2$. MW, 304. Cryst. M.p. 74°.

Di-Et ether: $C_{23}H_{24}O_2$. MW, 332. Plates from EtOH.Aq. M.p. 87°.

Acetyl: plates from AcOH. M.p. 136°.

Gomberg, Jickling, *J. Am. Chem. Soc.*, 1915, **37**, 2589.
Gomberg, *J. Am. Chem. Soc.*, 1913, **35**, 209.
Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 771.
Baeyer, Villiger, *Ber.*, 1902, **35**, 3027.

2-Hydroxy-1 : 1 : 1-triphenylethane (2 : 2 : 2-*Triphenylethyl alcohol*, α-*hydroxymethyltriphenylmethane*)

$$C_6H_5\cdot C(C_6H_5)_2\cdot CH_2OH$$

$C_{20}H_{18}O$ MW, 274

Cryst. from EtOH. M.p. 110·5° (107°). Sol. Et_2O, ligroin.

Acetyl: needles from EtOH. M.p. 136°.

Phenylurethane: cryst. M.p. 205–6°.

Danilow, *J. Russ. Phys.-Chem. Soc.*, 1920, **51**, 122.
Schlenk, Ochs, *Ber.*, 1916, **49**, 610.

1-Hydroxy-1 : 1 : 2-triphenylethane (*Diphenylbenzylcarbinol*, 1 : 1 : 2-*triphenylethyl alcohol*)

$$(C_6H_5)_2C(OH)\cdot CH_2\cdot C_6H_5$$

$C_{20}H_{18}O$ MW, 274

Needles from C_6H_6–pet. ether. M.p. 89–90° (88°). B.p. 222°/11 mm. Sol. EtOH, AcOH. Spar. sol. Et_2O, ligroin.

Hell, Wiegandt, *Ber.*, 1904, **37**, 1429.
Paternò, Chieffi, *Gazz. chim. ital.*, 1909, **39**, 422.

2-Hydroxy-1 : 1 : 2-triphenylethane (*Phenylbenzhydrylcarbinol*, 1 : 2 : 2-*triphenylethyl alcohol*)

$$(C_6H_5)_2CH\cdot CH(OH)\cdot C_6H_5$$

$C_{20}O_{18}O$ MW, 274

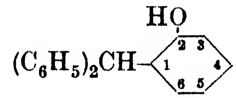
Needles from AcOH. M.p. 87°.

Gardeur, *Chem. Zentr.*, 1897, II, 661.

Hydroxytriphenylethylene.
See Diphenylbenzoylmethane.

α-Hydroxytriphenylmethane.
See Triphenylcarbinol.

2-Hydroxytriphenylmethane (*o-Benzhydrylphenol*)



$C_{19}H_{16}O$ MW, 260

Needles from C_6H_6–ligroin or EtOH. M.p. 76° (with EtOH of cryst.), 124° (EtOH free). Green sol. in conc. H_2SO_4.

Me ether: $C_{20}H_{18}O$. MW, 274. Cryst. from EtOH. M.p. 114° (116°). Very sol. Et_2O, C_6H_6, AcOH. Green sol. in conc. H_2SO_4.

Et ether: $C_{21}H_{20}O$. MW, 288. Prisms from EtOH. M.p. 63·5–64° (68°). Sol. EtOH, Et_2O, warm ligroin.

Acetyl: plates from EtOH. M.p. 81–2°.

Baeyer, *Ann.*, 1907, **354**, 169.
Liebig, Keim, *Ann.*, 1908, **360**, 216.
Salomon, *Chem. Zentr.*, 1899, I, 172.
Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 774.

3-Hydroxytriphenylmethane (*m-Benzhydrylphenol*).

Prisms from ligroin. M.p. 106°.

Me ether: plates from EtOH. M.p. 86°. Very sol. Et_2O, $CHCl_3$, C_6H_6. Sol. EtOH, AcOH. Yellow sol. in conc. H_2SO_4.

Baeyer, *Ann.*, 1907, **354**, 171.
Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 770.

4-Hydroxytriphenylmethane (*p-Benzhydrylphenol*).

Needles from EtOH.Aq. M.p. 110° (118°). Very sol. Et_2O, EtOH. Spar. sol. ligroin, 50% AcOH.

Me ether: prisms from $CHCl_3$–MeOH. M.p. 61° (64–5°).

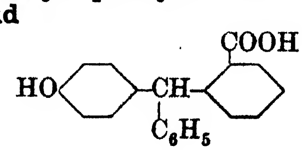
Et ether: prisms from AcOH.Aq. M.p. 70–1°. Sol. most org. solvents.

Acetyl: needles from AcOH.Aq. M.p. 84°. Very sol. most org. solvents.

Bistrzycki, Herbst, *Ber.*, 1902, **35**, 3137.
Baeyer, Villiger, *Ber.*, 1903, **36**, 2790.
Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 771.

Hydroxytriphenylmethane-α-carboxylic Acid.
See Hydroxytriphenylacetic Acid.

4′-Hydroxytriphenylmethane-2-carboxylic Acid



$C_{20}H_{16}O_3$ MW, 304

Needles from EtOH.Aq. M.p. 210–11°. Sol. EtOH, Me_2CO, AcOH, C_6H_6. Violet sols in alkalis.

Acetyl: needles from AcOH.Aq. M.p. 148°. Sol. Me_2CO. Spar. sol. EtOH, AcOH, C_6H_6.

Orndorff, Barrett, *J. Am. Chem. Soc.*, 1924, **46**, 2495.
v. Pechmann, *Ber.*, 1880, **13**, 1616.

α-Hydroxytriphenylmethane-carboxylic Acid.

See Triphenylcarbinol-carboxylic Acid.

4-Hydroxy-2 : 3 : 4-triphenyl-n-valeric Acid.

See Amaric Acid.

3-Hydroxyundecane.

See Ethyloctylcarbinol.

1-Hydroxyundecylic Acid (*1-Hydroxy-undecoic acid*)

$CH_3{\cdot}[CH_2]_8{\cdot}CH(OH){\cdot}COOH$

$C_{11}H_{22}O_3$ MW, 202

Needles from pet. ether or $CHCl_3$. M.p. 69°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O.

Et ester: $C_{13}H_{26}O_3$. MW, 230. Cryst. from $CHCl_3$. M.p. 38°.

Anilide: cryst. from AcOEt-pet. ether. M.p. 80°.

Bagard, *Bull. soc. chim.*, 1907, **1**, 310, 354.

3-Hydroxyundecylic Acid (*3-Hydroxyundecoic acid*)

$CH_3{\cdot}[CH_2]_6{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_{11}H_{22}O_3$ MW, 202

M.p. 34°. Readily forms lactone.

Lactone: $C_{11}H_{20}O_2$. MW, 184. B.p. 286°.

Shukow, Schestakow, *Chem. Zentr.*, 1908, II, 1415.

10-Hydroxyundecylic Acid (*10-Hydroxy-undecoic acid, ω-hydroxyundecylic acid*)

$HO{\cdot}CH_2{\cdot}[CH_2]_9{\cdot}COOH$

$C_{11}H_{22}O_3$ MW, 202

Needles from H_2O. M.p. 76°. Sol. EtOH. Et_2O. Spar. sol. ligroin, C_6H_6.

Me ester: $C_{12}H_{24}O_3$. MW, 216. M.p. 27–27·5°. B.p. 168–9/8 mm. Sol. EtOH, Et_2O, C_6H_6.

Nitrile: $C_{11}H_{21}ON$. MW, 183. M.p. 12–13°. B.p. 186–7°/13 mm. D^{20} 0·910.

Acetyl: m.p. 34°. B.p. 184–5°/2 mm.

Cohen, *J. Chem. Soc.*, 1932, 596.
Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 476.
See also Lycan, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 628.

5-Hydroxyuracil.

See Isobarbituric Acid.

Hydroxyurea (*Carbamylhydroxylamine*)

$$HO{\cdot}NH{\cdot}CO{\cdot}NH_2 \rightleftharpoons HO{\cdot}N{:}C(OH){\cdot}NH_2$$

$CH_4O_2N_2$ MW, 76

Needles from EtOH. M.p. 139–40° (128–30°). Sol. H_2O. Spar. sol. cold EtOH. Reduces Fehling's and warm $NH_3.AgNO_3$. $FeCl_3$ ⟶ intense bluish-violet col.

Dresler, Stein, *Ann.*, 1869, **150**, 242.
Hantzsch, *Ann.*, 1898, **299**, 99.
Francesconi, Partrozani, *Gazz. chim. ital.*, 1901, **31**, 334.

Hydroxyuvitic Acid.

See Hydroxy-5-methylisophthalic Acid.

1-Hydroxy-n-valeric Acid (*Valerolactinic acid, propylglycollic acid*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$

$C_5H_{10}O_3$ MW, 118

Hygroscopic plates. M.p. 28–9° (34°). Sublimes. Sol. H_2O, EtOH.

Et ester: $C_7H_{14}O_3$. MW, 146. B.p. 190°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Nitrile: butyraldehyde cyanhydrin. C_5H_9ON. MW, 99. B.p. 111°/20 mm. D^{15} 0·9434. n_D^{15} 1·4228. Sol. EtOH, Et_2O. Insol. H_2O. *Acetyl*: b.p. 194°. D^{24} 0·9696. Sol. EtOH, Et_2O. Insol. H_2O.

Et ether: $C_7H_{14}O_3$. MW, 146. B.p. 124°/17 mm., 114°/11 mm. *Me ester*: $C_8H_{16}O_3$. MW, 160. B.p. 70°/15 mm. *Et ester*: $C_9H_{18}O_3$. MW, 174. B.p. 84°/17 mm., 76°/12 mm. *Chloride*: $C_7H_{13}O_2Cl$. MW, 164·5. B.p. 57–58°/12 mm. *Amide*: $C_7H_{15}O_2N$. MW, 145. M.p. 91°.

Fittig, Dannenberg, *Ann.*, 1904, **331**, 132.
Levene, Haller, *J. Biol. Chem.*, 1928, **77**, 555.
Blaise, Picard, *Bull. soc. chim.*, 1912, **11**, 544.
Juslin, *Ber.*, 1884, **17**, 2504.
Henry, *Chem. Zentr.*, 1899, I, 194.

2-Hydroxy-n-valeric Acid (*2-Ethylhydracrylic acid*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH$

$C_5H_{10}O_3$ MW, 118

Not solid at −32°. $[\alpha]_D^{20}$ −10·0°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. CS_2, ligroin. Dist. ⟶ 1 : 2- and 2 : 3-pentenic acids.

Et ester: b.p. 75–7°/9 mm. $[\alpha]_D^{20}$ − 15·6° in Et_2O.
Nitrile: $[\alpha]_D^{20}$ + 10° in Et_2O.

Levene, Mori, *J. Biol. Chem.*, 1928, **78**, 5.
Fittig, Spenzer, *Ann.*, 1894, **283**, 74.

3-Hydroxy-n-valeric Acid

$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_5H_{10}O_3$ MW, 118

Very unstable, readily reverting to lactone. $k = 2{\cdot}02 \times 10^{-5}$ at 25°. $[\alpha]_D^{23}$ − 9·3° in H_2O.
Et ester: b.p. 85–6°/2 mm. D_{25}^{25} 0·9532. n_D^{25} 1·4265. Misc. with EtOH, Et_2O. Insol. H_2O. Dist. at pressures greater than 2 mm. ⟶ 3-valerolactone.
Lactone: *see* 3-Valerolactone.
Amide: $C_5H_{11}O_2N$. MW, 117. Leaflets from EtOH–Et_2O. M.p. 56°. Sol. H_2O. Spar. sol. Et_2O, $CHCl_3$. Insol. C_6H_6, ligroin. Heat ⟶ 3-valerolactone.
Nitrile: b.p. 110–12°/18 mm. $[\alpha]_D^{21}$ + 13° in EtOH.
Hydrazone: cryst. M.p. 61–2°. Loses N_2H_4 at 200°. Spar. sol. most org. solvents.

Levene, Haller, *J. Biol. Chem.*, 1928, **76**, 415.
Lease, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 807.
Neugebauer, *Ann.*, 1885, **227**, 100.
Blaise, Luttringer, *Compt. rend.*, 1905, **140**, 792.
Barbier, Locquin, *Bull. Soc. chim.*, 1913, **13**, 226.

4-Hydroxy-n-valeric Acid (*ω-Hydroxyvaleric acid*)

$HO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_5H_{10}O_3$ MW, 118

Very unstable, readily reverting to lactone. $[\alpha]_D^{24}$ + 10·5°.
Me ether: $C_6H_{12}O_3$. MW, 132. B.p. 133–4°/15 mm. D_4^{15} 1·0387. $k = 1{\cdot}91 \times 10^{-3}$ at 25°. *Me ester*: $C_7H_{14}O_3$. MW, 146. B.p. 185°. D_4^{15} 0·9747.
Et ether: b.p. 252°. Sol. H_2O.
Lactone: *see* 4-Valerolactone.
Amide: m.p. 56°. $[\alpha]_D^{22}$ + 9·5° in EtOH.

Levene, Haller, *J. Biol. Chem.*, 1926, **69**, 169; 1928, **79**, 487.
Palomaa, *Chem. Zentr.*, 1912, II, 596.
Fittig, Beiswenger, *Ber.*, 1903, **36**, 1201.

ω-Hydroxyvalerophenone (*4-Benzoylbutyl alcohol, 4-hydroxybutyl phenyl ketone*)

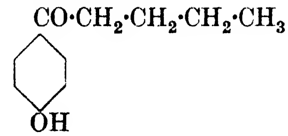
$C_6H_5{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$

$C_{11}H_{14}O_2$ MW, 178

Plates from H_2O. M.p. 40–1°. Sol. EtOH, MeOH, Et_2O, C_6H_6. Spar. sol. pet. ether.
Oxime: m.p. 56–7°.

Kipping, Perkin, *J. Chem. Soc.*, 1890, **57**, 311.

p-Hydroxyvalerophenone (*p-Valerylphenol, butyl p-hydroxyphenyl ketone*)



$C_{11}H_{14}O_2$ MW, 178

M.p. 63°. B.p. 210°/15 mm., 197·5–198·5°/10 mm.
Me ether: *p*-valerylanisole. $C_{12}H_{16}O_2$. MW, 192. Prisms. M.p. 27–8°. B.p. 196·5°/40 mm., 150·5°/6 mm. Sol. EtOH, Et_2O, pet. ether. *Phenylhydrazone*: m.p. 78°. *Semicarbazone*: m.p. 164°.
Et ether: *p*-valerylphenetole. $C_{13}H_{18}O_2$. MW, 206. Needles from EtOH. M.p. 31°. *Semicarbazone*: needles. M.p. 192°.
Benzoyl: m.p. 92°.

Sandulesco, Girard, *Bull. soc. chim.*, 1930, **47**, 1309.
Skraup, Nieten, *Ber.*, 1924, **57**, 1301.
Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1891.
Layraud, *Bull. soc. chim.*, 1907, **35**, 234.

2-Hydroxyvaline (*2-Hydroxy-1-aminoisovaleric acid, 2 : 2-dimethylserine*)

$(CH_3)_2C(OH){\cdot}CH(NH_2){\cdot}COOH$

$C_5H_{11}O_3N$ MW, 133

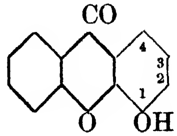
Plates from EtOH.Aq. M.p. 218° decomp. Sol. H_2O. Insol. EtOH, Et_2O, C_6H_6, AcOEt.
Phenylurethane: m.p. 162°. Sol. EtOH, Et_2O, AcOEt.
β-*Naphthalenesulphonyl deriv.*: needles from EtOH. M.p. 261°.
Me ether: $C_6H_{13}O_3N$. MW, 147. Plates. M.p. 250–60° decomp. Sol. H_2O. Insol. EtOH, Et_2O, $CHCl_3$, AcOEt.

Schrauth, Geller, *Ber.*, 1922, **55**, 2789.

1-Hydroxyvinylacetic Acid.
See Vinylglycollic Acid.

Hydroxyvinyl phenyl Ketone.
See ω-Formylacetophenone.

1-Hydroxyxanthone



$C_{13}H_8O_3$ MW, 212

Needles from EtOH.Aq. M.p. 242°. Sol. EtOH, Et_2O, AcOH. Mod. sol. hot C_6H_6. Spar. sol. H_2O, ligroin. Conc. H_2SO_4 ⟶ yellow sol. with green fluor. Sublimes.

Me ether: $C_{14}H_{10}O_3$. MW, 226. Needles from EtOH. M.p. 173°. Sol. Et_2O, C_6H_6. Mod. sol. hot EtOH, hot ligroin.

Acetyl: cryst. from EtOH.Aq. M.p. 137–8°.

Benzoyl: needles. M.p. 172°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, **25**, 1649.
Ullmann, Zlokasoff, *Ber.*, 1905, **38**, 2118.
König, v. Kostanecki, *Ber.*, 1894, **27**, 1996.

2-Hydroxyxanthone.

Needles from EtOH. M.p. 246° (242°). Sol. EtOH. Mod. sol. AcOH. Spar. sol. Et_2O, C_6H_6. Sol. alkalis. Conc. H_2SO_4 ⟶ yellow sol. with blue fluor. Zn dust dist. ⟶ xanthene.

Me ether: plates from EtOH.Aq. M.p. 129°. Sol. EtOH, C_6H_6, AcOH. Spar. sol. ligroin. Sol. conc. H_2SO_4 with blue fluor.

Acetyl: needles from EtOH.Aq. M.p. 157–8°.

Benzoyl: needles. M.p. 147°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, **25**, 1651.
Ullmann, Wagner, *Ann.*, 1907, **355**, 370.
Atkinson, Heilbron, *J. Chem. Soc.*, 1926, 2689.
See also last reference above.

3-Hydroxyxanthone.

Yellow needles from EtOH.Aq. M.p. 240° (231°). Sol. EtOH, hot C_6H_6. Insol. H_2O, ligroin. Conc. H_2SO_4 ⟶ yellow sol. with blue fluor.

Me ether: needles from EtOH. M.p. 131°. Sol. EtOH, C_6H_6, AcOH. Conc. H_2SO_4 ⟶ yellow sol. with green fluor.

Acetyl: needles from EtOH.Aq. M.p. 161°.

Benzoyl: needles from EtOH. M.p. 151°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, **25**, 1648.
König, v. Kostanecki, *Ber.*, 1894, **27**, 1996.
Ullmann, Zlokasoff, *Ber.*, 1905, **38**, 2119.
Ullmann, Denzler, *Ber.*, 1906, **39**, 4334.

4-Hydroxyxanthone.

Yellow needles from EtOH. M.p. 147°. Spar. sol. hot H_2O. Zn dust dist. ⟶ xanthene. KOH fusion ⟶ resorcinol + salicylic acid.

Me ether: yellow needles from C_6H_6–ligroin or EtOH. M.p. 138°. Sol. EtOH, C_6H_6, AcOH. Spar. sol. hot ligroin.

Acetyl: prisms from EtOH. M.p. 167–8°.

Benzoyl: needles from EtOH. M.p. 206·5°.

Michael, *Am. Chem. J.*, 1883, **5**, 91.
Graebe, *Ann.*, 1889, **254**, 290.
König, v. Kostanecki, *Ber.*, 1894, **27**, 1996.
Ullmann, Pachaud, *Ann.*, 1906, **350**, 113.
Tambor, *Ber.*, 1910, **43**, 1883.

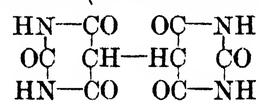
Hydroxy-xylene.

See Xylenol.

ω-Hydroxy-xylenol.

See Homosaligenin *and* Hydroxymethylbenzyl Alcohol.

Hydurilic Acid (*5-5′-Dibarbituric acid*)



$C_8H_6O_6N_4$ MW, 254

Plates + $2H_2O$ from H_2O. M.p. 320–30° decomp. Spar. sol. H_2O. Prac. insol. most org. solvents. Heat of comb. C_p = 658·5 Cal. $FeCl_3$ ⟶ green col. Sol. conc. H_2SO_4, alkalis. HNO_3 ⟶ alloxan. Ox. ⟶ 5-hydroxyhydurilic acid ⟶ oxalic acid. HCl + $KClO_3$ ⟶ dichlorohydurilic acid.

Di-Me deriv: $C_{10}H_{10}O_6N_4$. MW, 282. Cryst. from H_2O. M.p. 306–8° decomp. Sol. 4 parts H_2O. Spar. sol. most org. solvents. $FeCl_3$ ⟶ green col. Ox. ⟶ hydroxydimethylhydurilic acid.

Tetra-Me deriv.: *see* Deoxyamalic Acid.

Biltz, Hamburger, *Ber.*, 1916, **49**, 659.
Baeyer, *Ann.*, 1863, **127**, 14.
Biltz, Heyn, *Ber.*, 1919, **52**, 1302.
Conrad, *Ann.*, 1907, **356**, 29.
Murdoch, Doebner, *Ber.*, 1876, **9**, 1102.
Biltz, *Ann.*, 1914, **404**, 188.
Roeder, *Ber.*, 1913, **46**, 2563.

Hyenanchin

$C_{15}H_{18}O_7$ MW, 310

Constituent of *Hyenanche globosa*, Lamb. Needles from H_2O. M.p. 234° decomp., darkens at 200°. Spar. sol. H_2O, EtOH, Me_2CO, AcOEt. $[\alpha]_D^{15}$ + 14·7° in H_2O. Reduces Fehlings and $NH_3.AgNO_3$. Yellow ppt. with Br water. Yields no sugar on hyd. Boiled with alkalis ⟶ acetol. Gives no ketonic derivs.

Acetyl: needles from EtOH.Aq. M.p. 126°.

Henry, *J. Chem. Soc.*, 1920, **117**, 1620.

Hyenic Acid

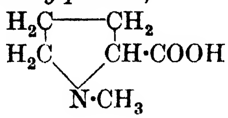
$C_{25}H_{50}O_2$ MW, 382

Occurs combined as glyceride in *Hyæna striata* and Montan wax. Needles from C_6H_6. M.p. 77–8°. Sol. Et_2O. Spar. sol. EtOH.

Ca salt: cryst. powder. M.p. 85–90°.

Carius, *Ann.*, 1864, **129**, 168.
Tropsch, Kreutzer, *Chem. Zentr.*, 1922, IV, 561.

Hygric Acid (N-*Methylpyrrolidine-2-carboxylic acid*, N-*methylproline*)



$C_6H_{11}O_2N$ MW, 129

r-.

Needles from $CHCl_3$. M.p. 169–70°. Sol. H_2O, EtOH. Spar. sol. AcOEt, $CHCl_3$. Insol. Et_2O, C_6H_6. Reduces $NH_3.AgNO_3$. Dist. ⟶ *N*-methylpyrrolidine. Hot conc. H_2SO_4 ⟶ pyridine and piperidine.

Me ester: $C_7H_{13}O_2N$. MW, 143. B.p. 69–72°/12 mm. *B,HAuCl*$_4$: golden needles from H_2O. M.p. 84–6°.

Et ester: $C_8H_{15}O_2N$. MW, 157. B.p. 75–6°/12 mm. Sol. H_2O. *B,HAuCl*$_4$: m.p. 110·5°.

Methiodide: prisms from EtOH–Et_2O. M.p. 88–9°. Sol. H_2O, EtOH. Spar. sol. AcOEt. Insol. Et_2O.

Methylamide: $C_7H_{14}ON_2$. MW, 142. Needles from pet. ether. M.p. 44–6°. Very hygroscopic. Sol. H_2O. *B,HAuCl*$_4$: yellow needles from H_2O. M.p. 149–50°. *B*$_2$*,H*$_2$*PtCl*$_6$: orange-red prisms from H_2O. M.p. 197–8°. *Picrate*: prisms from H_2O. M.p. 214–16°.

B,HCl: leaflets from EtOH–Et_2O. M.p. 187–8°. Sol. H_2O, EtOH.

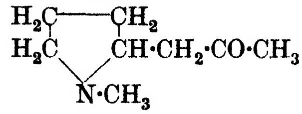
B,HAuCl$_4$: yellow needles. M.p. 190° decomp.

l-.

Needles from EtOH–Et_2O. M.p. 116–17°. $[\alpha]_D^{18}$ − 80·1° in H_2O.

Willstätter, Ettlinger, *Ann.*, 1903, **326**, 122.
Schulze, Trier, *Ber.*, 1909, **42**, 4654.
Trier, *Z. physiol. Chem.*, 1910, **67**, 328.
Karrer, Widmer, *Helv. Chim. Acta*, 1925, **8**, 368.
Hess, *Ber.*, 1913, **46**, 3114 (*Footnote*).
Hess, Eichel, Uibrig, *Ber.*, 1917, **50**, 355, 361.

Hygrine (N-*Methyl-2-acetonylpyrrolidine*)



$C_8H_{15}ON$ MW, 141

l-.

Occurs in Peruvian cusko leaves. B.p. 193–5°, 111–13°/50 mm., 92–4°/20 mm. Darkens in air. Decomp. on exposure to light. Absorbs CO_2. D_4^{17} 0·940. $[\alpha]_D$ − 1·3°. CrO_3 ⟶ hygric acid.

Oxime: needles or plates from Et_2O. M.p. 116–20°.

Picrate: yellow needles. M.p. 158°.

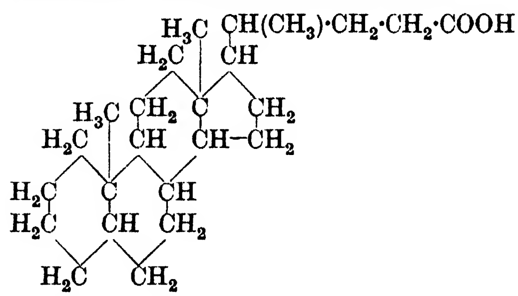
dl-.

Oxime: m.p. 125°.

Picrate: yellow needles. M.p. 176°.

Liebermann, Kühling, *Ber.*, 1891, **24**, 407.
Liebermann, Cybulski, *Ber.*, 1895, **28**, 578.
Hess, *Ber.*, 1913, **46**, 3113, 4104.

Hyocholanic Acid (*Isocholanic Acid*)



$C_{24}H_{40}O_2$ MW, 360

Cryst. from AcOH. M.p. 162°. Stereoisomeric with cholanic acid.

Me ester: $C_{25}H_{42}O_2$. MW, 374. Prisms from MeOH. M.p. 90–1°.

Et ester: $C_{26}H_{44}O_2$. MW, 388. Plates from MeOH. M.p. 84°.

Propyl ester: $C_{27}H_{46}O_2$. MW, 402. Needles from propyl alcohol. M.p. 101°.

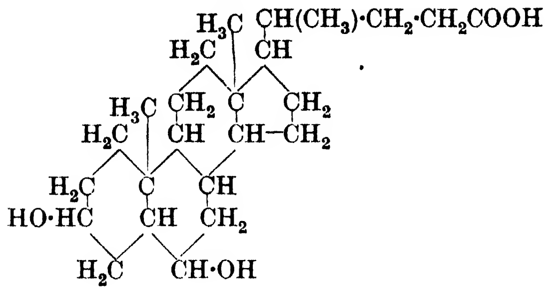
Butyl ester: $C_{28}H_{48}O_2$. MW, 416. Cryst. from Me_2CO. M.p. 87°.

Windaus, Bohne, *Ann.*, 1923, **433**, 284.
Windaus, Neukirchen, *Ber.*, 1919, **52**, 1915.

Hyocholic Acid.

See Hyodeoxycholic Acid.

Hyodeoxycholic Acid (*Hyocholic acid, 3:6-dihydroxycholanic acid*)



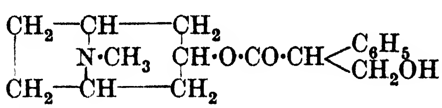
$C_{24}H_{40}O_4$ MW, 392

Occurs in bile of pig and wild boar. Cryst. from AcOEt. M.p. 196–7°. Mod. sol. EtOH, AcOH. Less sol. H_2O, Et_2O, Me_2CO, AcOEt, C_6H_6.

Diacetyl: m.p. 106°. *Me ester*: m.p. 100°.

Windaus, Bohne, *Ann.*, 1923, **433**, 278.
Windaus, *Ann.*, 1926, **447**, 233.
Windaus, *Z. angew. Chem.*, 1923, **36**, 309.
Annual Reports on Progress of Chemistry, 1928, **25**, 158; 1933, **30**, 204.

Hyoscyamine (*Tropine ester of* l-*tropic acid*)



$C_{17}H_{23}O_3N$ MW, 289

l-.

Occurs to about 1% in *Hyoscyamus muticus* (Egyptian henbane), mandragora root, henbane, etc. Needles from EtOH. M.p. 108·5°. Sol. EtOH, $CHCl_3$, C_6H_6. Less sol. H_2O, Et_2O. $[\alpha]_D^{15}$ − 22° in 50% EtOH. Resembles atropine in taste and mydriatic action but is physiologically more active. Racemises slowly in EtOH, rapidly on addition of alkali or on melting. $H_2O \longrightarrow$ *l*-tropic acid + *dl*-tropine.

B_2,H_2SO_4,$2H_2O$: needles from EtOH. M.p. anhyd. 206°. Sol. H_2O. Deliquescent.

B,HBr: prisms. M.p. 151·8°. Deliquescent.

B_2,H_2PtCl_6: orange prisms. M.p. 206°.

B,$HAuCl_4$: yellow plates from dil. HCl. M.p. 165°.

B,$HAuBr_4$: red needles. M.p. 115–20°.

B_2,$(COOH)_2$: m.p. 176°.

Methobromide: m.p. 210–12°.

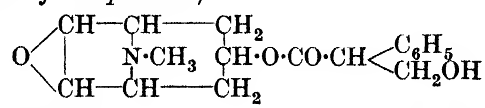
Picrate: m.p. 165°.

dl-.

See Atropine.

Ladenburg, *Ann.*, 1880, **206**, 282.
Gadamer, *Arch. Pharm.*, 1901, **239**, 294.
Sandoz, E.P., 131,283, (*Chem. Abstracts*, 1920, **14**, 95).
Carr, Reynolds, *J. Chem. Soc.*, 1910, **97**, 1329.

Hyoscine (l-*Scopolamine, scopoline* (*oscine*) *ester of* l-*tropic acid*)



$C_{17}H_{21}O_4N$ MW, 303

l-.

Occurs in plants of the *Solanaceæ* family. Syrup. Sol. H_2O and most org. solvents. Less sol. C_6H_6 and pet. ether. $[\alpha]_D^{20}$ − 18° in EtOH, − 28° in H_2O. Powerful narcotic and mydriatic. Sedative in small doses. Racemised rapidly by alkalis. Gives white ppt. with $HgCl_2$.Aq. Dil. acids or alkalis $\longrightarrow$ *l*-tropic acid + *dl*-scopoline (*dl*-oscine).

B,HCl: m.p. 200°.

B,HBr,$3H_2O$: m.p. anhyd. 193–4°. $[\alpha]_D$ − 15·72° in EtOH, − 25·9° in H_2O. Sol. H_2O, EtOH. Spar. sol. $CHCl_3$. Insol. Et_2O.

B,$HAuCl_4$: needles. M.p. 208–9° decomp. Spar. sol. H_2O.

B,$HAuBr_4$: red leaflets. M.p. 191–2°.

Picrate: yellow needles. M.p. 187–8°.

d-.

Syrup.

B,HBr,$3H_2O$: m.p. anhyd. 193–4°. $[\alpha]_D$ + 26·3 in H_2O.

B,$HAuCl_4$: needles. M.p. 204–5° decomp.

Picrate: needles. M.p. 187–8° decomp.

dl-.

Scopolamine, atroscine.

Needles + $1H_2O$, m.p. 56–7°: needles + $2H_2O$, m.p. 37–8°. Anhydrous compound is a syrup.

B,HBr,$3H_2O$: m.p. 181–2° anhyd.

B,$HAuCl_4$: needles. M.p. 214–15°.

B,$HAuBr_4$: red leaflets. M.p. 209–10°.

Picrate: needles. M.p. 173·5–174·5°.

King, *J. Chem. Soc.*, 1919, **115**, 476.
Chemnitius, *J. prakt. chem.*, 1928, **120**, 221.
Ladenburg, *Ann.*, 1880, **206**, 299.
Schmidt, *Arch. Pharm.*, 1894, **232**, 409.
Carr, Reynolds, *J. Chem. Soc.*, 1912, **101**, 950.
Jowett, *J. Chem. Soc.*, 1897, **71**, 680.

Hypaconine.
See under Hypaconitine.

Hypaconitine

$C_{33}H_{45}O_{10}N$ MW, 615

Alkaloid accompanying aconitine. Occurs abundantly in *Aconitum senanense*, Nakai. Prisms from Et_2O. M.p. 197·5–198·5°. $[\alpha]_D^{17}$ + 22·4° in $CHCl_3$. Boiling H_2O at 160–70° ⟶ acetic acid, benzoic acid, and hypaconine (*tetra-acetyl*: m.p. 182–4°). Boiling dil. H_2SO_4 ⟶ benzohypaconine (*B,HCl,3½H₂O*: m.p. 242–4°. $[\alpha]_D^{13}$ − 6·5 in H_2O). Heated in vacuo under N ⟶ pyrohypaconitine (m.p. 119–20°. $[\alpha]_D^{13}$ 18·1°). Ox. ⟶ hypoxonitine (m.p. 267–8° decomp. $[\alpha]_D^{15}$ − 63·1° in $CHCl_3$).

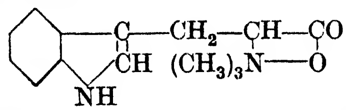
B,HBr,2½H₂O: cryst. from H_2O. M.p. 178–9°. $[\alpha]_D^{17}$ −19·7° in H_2O.

B,HAuCl₄: prisms from EtOH. M.p. 243–5°.

B,HClO₄: prisms from EtOH–Et_2O. M.p. 178–80° decomp. $[\alpha]_D^{9}$ − 11·2° in EtOH.

Majima, Morio, *Ann.*, 1929, **476**, 171, 210.

Hypaphorine



$C_{14}H_{18}O_2N_2$ MW, 246

Cryst. from H_2O. M.p. anhyd. 255° decomp. Very sol. H_2O, EtOH. Insol. most other solvents. $[\alpha]_D$ + 91–3° in H_2O.

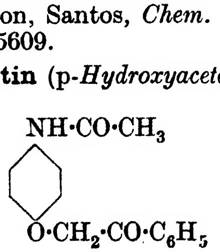
B,HCl: m.p. 227°.

B,HBr: m.p. 225°.

B,HNO₃: m.p. 215–20°. $[\alpha]_D$ + 94·7°. Spar. sol. H_2O.

Romburgh, Barger, *J. Chem. Soc.*, 1911, **99**, 2069.
Marañon, Santos, *Chem. Abstracts*, 1932, **26**, 5609.

Hypnoacetin (p-*Hydroxyacetanilide phenacyl ether*)



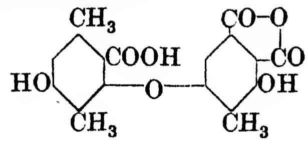
$C_{16}H_{15}O_3N$ MW, 269

Plates from EtOH. M.p. about 160° decomp. Sol. EtOH. Spar. sol. $CHCl_3$, CS_2, C_6H_6. Insol. H_2O, Et_2O. Hypnotic and antipyretic.

Vignolo, *Atti accad. Lincei*, 1895, **4**, i, 360; 1897, **6**, i, 71.

Hypnone.
See Acetophenone.

Hyposalazinic Acid



$C_{18}H_{14}O_8$ MW, 358

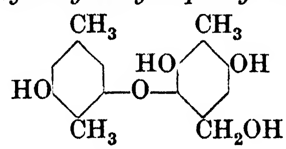
Prisms from Me_2CO. M.p. 280° decomp. Sol. EtOH, Me_2CO. Alc. $FeCl_3$ ⟶ red col. Sol. conc. H_2SO_4 to deep red sol. Sol. alkalis to yellow sols. which slowly darken. KOH fusion ⟶ 3 : 5-dihydroxy-*p*-toluic acid.

Di-Me ether: *Me ester*, $C_{21}H_{20}O_8$. MW, 400. Leaflets from Me_2CO. M.p. 165°. Sol. EtOH, Me_2CO. No col. with $FeCl_3$.

Penta-Me deriv.: $C_{23}H_{24}O_8$. MW, 428. Needles from EtOH. M.p. 146°.

Asahina, Asano, *Ber.*, 1933, **66**, 696, 1215.
Asahina, Tanase, *Ber.*, 1934, **67**, 1435.

Hyposalazinol (4 : 6 : 3′-*Trihydroxy*-5 : 2 : 5′-*trimethyl-2-hydroxymethyl-diphenyl ether*)



$C_{16}H_{18}O_5$ MW, 290

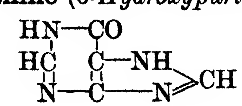
Needles from H_2O. M.p. 197°. KOH fusion ⟶ 3 : 5-dihydroxy-*p*-toluic acid + β-orcinol. H(+ Pd) ⟶ deoxyhyposalazinol.

Tri-Me ether: $C_{19}H_{24}O_5$. MW, 332. M.p. 146°.

Asahina, Asano, *Ber.*, 1933, **66**, 895.

Hypotonin.
See under Ethylenediamine.

Hypoxanthine (6-*Hydroxypurine, sarcine*)



$C_5H_4ON_4$ MW, 136

Occurs in mustard, black pepper, potato, yeast, beetroot, bone marrow, and in extracts of muscle, spleen, liver, etc. Needles. Decomp. at 150°. Spar. sol. cold H_2O, more sol. hot. Ppd. by $PdCl_2$ as co-ordinated comp. Forms cryst. salts with acids and with some bases.

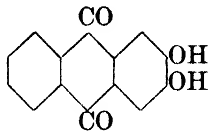
Thyminoside: *see* Inosin.

Fischer, *Ber.*, 1897, **30**, 2226.
Traube, *Ann.*, 1904, **331**, 78.
Sundwik, *Z. physiol. Chem.*, 1912, **76**, 486.

Hypoxonitine.
See under Hypaconitine.

Hyraldite.
See under Formaldehyde.

Hystazarin (2 : 3-*Dihydroxyanthraquinone, hystazine*)



$C_{14}H_8O_4$ MW, 240

Yellow needles from AcOH. M.p. above 260°. Spar. sol. most org. solvents. Insol. C_6H_6. Sol. caustic alkalis to bright blue sols. Sol. NH_3.Aq. to violet-blue sol. Violet-red sol. in conc. H_2SO_4. Green col. with $FeCl_3$ in EtOH. Zn dust dist. ⟶ anthracene. H_2SO_4 + HNO_3 ⟶ 1-nitro- and 1 : 4-dinitro derivs.

Mono-Me ether: $C_{15}H_{10}O_4$. MW, 254. Orange yellow needles from EtOH or plates from C_6H_6. M.p. 236°.

Di-Me ether: $C_{16}H_{12}O_4$. MW, 268. Yellow needles from EtOH or AcOH. M.p. 237°. Spar. sol. EtOH. Zn + NH_4OH ⟶ 2 : 3-dimethoxyanthracene.

Mono-Et ether: $C_{16}H_{12}O_4$. MW, 268. Yellow needles from EtOH. M.p. 234–40°.

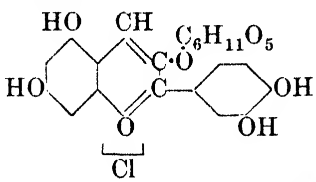
Di-Et ether: $C_{18}H_{16}O_4$. MW, 296. Yellow needles from EtOH. M.p. 160–3°.

Diacetyl: yellow needles from AcOH. M.p. 205–7°.

Bayer, D.R.P., 298,345, (*Chem. Zentr.*, 1917, II, 256).
Liebermann, *Ber.*, 1888, **21**, 2501.
Schoeller, *ibid.*, 2503.
Liebermann, Hohenemser, *Ber.*, 1902, **35**, 1778.
Lagodzinski, *Ann.*, 1905, **342**, 102.

I

Idaein chloride



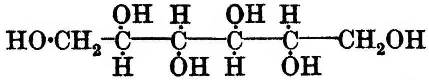
$C_{21}H_{21}O_{11}Cl$ MW, 484·5

Galactoside occurring in cranberry (*Vaccinium vitis idaea*, Linn.). Reddish-brown prisms (+ H_2O) with green reflex. M.p. 210° decomp. Sol. H_2O ⟶ dark reddish-brown sol., dilution ⟶ orange-red. NaOH ⟶ blue ⟶ green ⟶ yellow sol. Na_2CO_3 ⟶ violet sol. $FeCl_3$ in EtOH ⟶ blue col., violet on dilution.

Grove, Robinson, *J. Chem. Soc.*, 1931, 2722.

Idite.
See Iditol.

Iditol (*Idite*)



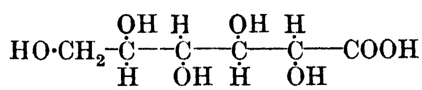
$C_6H_{14}O_6$ MW, 182

d-. Sorbierite.
Prisms from EtOH. M.p. 73–4°. $[\alpha]_D^{20}$ −3·53° in H_2O.

l-.
Prisms from EtOH. M.p. 73·5°. $[\alpha]_D^{20}$ +3·5° in H_2O. Hygroscopic.

Fischer, Fay, *Ber.*, 1895, **28**, 1979, 1982.

***l*-Idonic Acid**

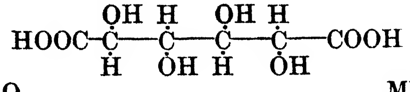


$C_6H_{12}O_7$ MW, 196

Brucine salt: m.p. 190–5°.
Quinine salt: m.p. 158°.
Strychnine salt: m.p. 120–5°.
Phenylhydrazide: m.p. 100–10°.

Nef, *Ann.*, 1914, **403**, 271.
Fischer, Fay, *Ber.*, 1895, **28**, 1975, 1981.

Idosaccharic Acid



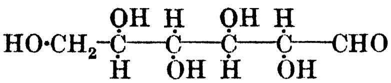
$C_6H_{10}O_8$ MW, 210

d-.
Syrup. Dextrorotatory.
Cu salt, $2H_2O$: prisms. Turns deep blue on heating.
Phenylhydrazide: m.p. 217–18° decomp.

l-.
Syrup. Sol. H_2O. Lævorotatory.

Behrend, *Ber.*, 1916, **49**, 1001.
Behrend, Heyer, *Ann.*, 1919, **418**, 314.

d-Idose



$C_6H_{12}O_6$ MW, 180

Osazone: m.p. 168°.

Ohlo, Vargha, *Ber.*, 1929, **62**, 2443.

Idryl.
See Fluoranthrene.

Ignotine.
Carnosine, *q.v.*

Ilicyl Alcohol.
See α-Amyrin.

Illipene (*Karitene*).
Hydrocarbon occurring in unsaponifiable portion of shea butter and illipé butter. Various formulæ ($C_{32}H_{56}$, $C_{64}H_{106}$, $C_{65}H_{108}$, etc.) have been given to it. M.p. 64·5° (64°). B.p. 315°/2·5 mm. Sol. $CHCl_3$. Mod. sol. Me_2CO, hot Et_2O. Spar. sol. EtOH. Vac. dist. ⟶ isoprene + dipentene. O_3 ⟶ levulinic acid + levulinic aldehyde + acetic acid.

Bauer, Umbach, *Ber.*, 1932, **65**, 859 (*Bibl.*).

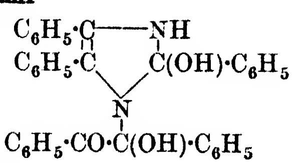
Illuric Acid

$C_{20}H_{28}O_3$ MW, 316

Occurs in copaiba balsam. Plates from EtOH. M.p. 128–9°. Sol. hot in ord. org. solvents. Spar. sol. AcOH, pet. ether. $[\alpha]_D^{18}$ − 54·89° in EtOH.

Tschirch, Keto, *Chem. Zentr.*, 1901, II, 1227.

Imabenzil



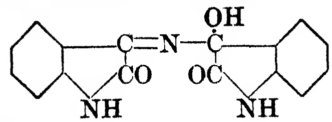
$C_{35}H_{28}O_3N_2$ MW, 524

Cryst. from MeOH. M.p. 194° (195°). Sol. AcOH with decomp. Insol. EtOH, Et_2O. CrO_3 ⟶ C_6H_5·CHO + C_6H_5·COOH + benzilimide.

Pinner, *Ber.*, 1902, **35**, 4138.

Imasatic Acid.
See Isamic Acid.

Imasatin (*Isamic acid lactam*)

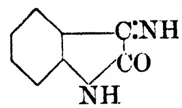


$C_{16}H_{11}O_3N$ MW, 293

Yellow cryst. M.p. 230° (sinters at 200°). Spar. sol. ord. org. solvents. Insol. H_2O.
Monobenzoyl deriv.: m.p. 240°.

Reissert, Hoppmann, *Ber.*, 1924, **57**, 980.

Imesatin (*Isatin-3-imide, 3-iminoisatin*)



$C_8H_6ON_2$ MW, 146

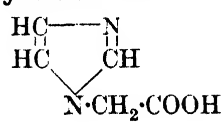
Yellow prisms. M.p. 175–6°. Sol. EtOH, hot H_2O. Spar. sol. Et_2O. Insol. C_6H_6, ligroin.

Reissert, Hoppmann, *Ber.*, 1924, **57**, 976.

Iminazole.
See Glyoxaline.

Iminazolone.
See Glyoxalone.

1-Iminazolylacetic Acid

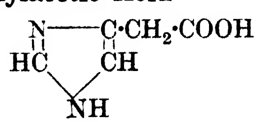


$C_5H_6O_2N_2$ MW, 126

Prisms. M.p. 268–9° decomp.
Et ester: $C_7H_{10}O_2N_2$. MW, 154. *Picrate*: m.p. 124–5°.

Easson, Pyman, *J. Chem. Soc.*, 1932, 1811.

4-Iminazolylacetic Acid



$C_5H_6O_2N_2$ MW, 126

Needles + $1H_2O$. M.p. 222° decomp.
Et ester: $C_7H_{10}O_2N_2$. MW, 154. *B,HCl*: m.p. 115–17°. *Acid oxalate*: m.p. 180° decomp.
Chloride: $C_5H_5ON_2Cl$. MW, 144·5. *B,HCl*: m.p. 127°.
Nitrile: $C_5H_5N_3$. MW, 107. M.p. 138–40°. *B,HCl*: m.p. 168–9°. *Acid oxalate*: decomp. at 194°. *Picrate*: m.p. 165–6°.
B,HCl: m.p. 225–6°.
Picrate: m.p. 212–13°.

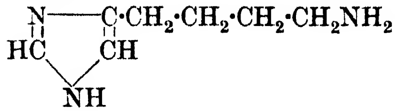
Hydrazide: m.p. 189°. *B,2HCl*: m.p. 230°.

Fargher, Pyman, *J. Chem. Soc.*, 1919, **115**, 1019.

Iminazolylacrylic Acid.
See Urocanic Acid.

Iminazolyl-α-alanine.
See Histidine.

4-[4-Iminazolyl]-*n*-butylamine (4-ω-*Aminobutylglyoxaline*)

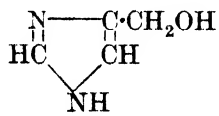


$C_7H_{13}N_3$ MW, 139

M.p. 51–3°.
B,2(COOH)₂: m.p. 168·5–170°.
Dipicrate: m.p. 197·5–198·5°.

Akabori, Kaneko, *Chem. Abstracts*, 1933, **27**, 293.

4-Iminazolylcarbinol (4-*Hydroxymethylglyoxaline*)

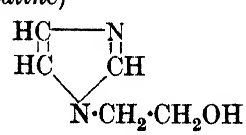


$C_4H_6ON_2$ MW, 98

Cryst. M.p. 98·5° (93–4°).
B,HCl: m.p. 93° (107–9°).
Nitrate: m.p. 84–6°.
Acid oxalate: m.p. anhyd. 134–6°.
Et ether: $C_6H_{10}ON_2$. MW, 126. M.p. 53–5°. *Acid oxalate*: m.p. 165–70°.
Picrate: m.p. 205–6° (207° decomp.).

Yabuta, Kambe, *Chem. Abstracts*, 1933, **27**, 1882.
Parrod, *Bull. soc. chim.*, 1932, **51**, 1424.

2-[1-Iminazolyl]-ethyl Alcohol (1-β-*Hydroxyethylglyoxaline*)



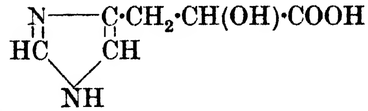
$C_5H_8ON_2$ MW, 112

M.p. 36–40°. B.p. 202–6°/20 mm. Sol. H_2O, Et_2O.
Picrate: m.p. 142–3°.

Easson, Pyman, *J. Chem. Soc.*, 1932, 1811.

2-[4-Iminazolyl]-ethylamine.
See 4-[ω-Aminoethyl]-glyoxaline.

2-[4-Iminazolyl]-lactic Acid (*Hydroxydesaminohistidine*, 1-*hydroxy-2-iminazolylpropionic acid*)

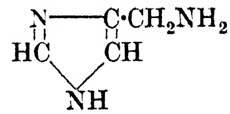


$C_6H_8O_3N_2$ MW, 156

Prisms + $1H_2O$. M.p. 222°.
Et ester: $C_8H_{12}O_3N_2$. MW, 184. Cryst. from $CHCl_3$. M.p. 118–19°. Sol. H_2O, EtOH. Insol. Et_2O.

Fargher, Pyman, *J. Chem. Soc.*, 1919, **115**, 1020.
Hirai, *Chem. Abstracts*, 1920, **14**, 1694.
Pyman, *J. Chem. Soc.*, 1911, **99**, 1400.

4-Iminazolylmethylamine (4-*Aminomethylglyoxaline*)

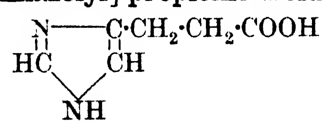


$C_4H_7N_3$ MW, 97

B,2HCl: prisms from MeOH. Softens at 236°.
B,H₂PtCl₆: blackens at 288°.
Dipicrate: m.p. 209°.
Picrolonate: m.p. 273° decomp.

Windaus, Opitz, *Ber.*, 1911, **44**, 1721.

2-[4-Iminazolyl]-propionic Acid

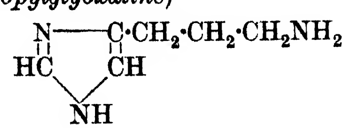


$C_6H_8O_2N_2$ MW, 140

Cryst. from butyl alcohol–H_2O. M.p. 206–8°.
Et ester: $C_8H_{12}O_2N_2$. MW, 168. B.p. 143–52°/0·05–0·07 mm. *Acid oxalate*: m.p. 159–260°.
Hydrazide: m.p. 142–3°.
Anilide: m.p. 190–1°. *Dibenzoyl deriv.*: m.p. 197°.
Platinichloride: m.p. 208–9°.

Akabori, *Ber.*, 1933, **66**, 156.
Windaus, *Ber.*, 1910, **43**, 499.

3-[4-Iminazolyl]-propylamine (4-ω-*Aminopropylglyoxaline*)

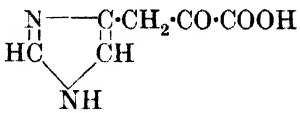


$C_6H_{11}N_3$ MW, 125

Dipicrate : m.p. 244–244·5°.

Akabori, Kaneko, *Chem. Abstracts*, 1933, **27**, 293.

4-Iminazolylpyruvic Acid



$C_6H_6O_3N_2$ MW, 154

B,HCl : froths at 108°. M.p. 241°.

Barger, Stewart, *Chem. Abstracts*, 1927, **21**, 91.

Iminoantipyrine.
See Iminopyrine.

2-Iminobutyric Acid.
See 2-Aminocrotonic Acid.

2-Iminobutyronitrile.
See Acetodinitrile.

Iminodiacetic Acid (*Diglycolamidic acid, dicarboxydimethylamine, dimethylamine-dicarboxylic acid*)

$$HN<\begin{matrix}CH_2\cdot COOH\\ CH_2\cdot COOH\end{matrix}$$

$C_4H_7O_4N$ MW, 133

M.p. 247·5° (225° decomp.). Spar. sol. H_2O. Insol. EtOH. Heat of comb. 396·3 Cal.

Di-Me ester : $C_6H_{11}O_4N$. MW, 161. B.p. 126°/33 mm. *B,HI* : decomp. at 185°. *B,HNO₃* : m.p. 198–9°. N-*Benzoyl* : m.p. 73–6°.

Mono-Et ester : $C_6H_{11}O_4N$. MW, 161. M.p. 175–6° decomp. *B,HCl* : m.p. 143°.

Di-Et ester : $C_8H_{15}O_4N$. MW, 189. B.p. 133°/11 mm., 128°/10 mm. *B,HCl* : m.p. 73–5°. *Dihydrazide* : m.p. 133°; *triacetyl deriv.* : m.p. 204–5°.

Dibutyl ester : $C_{12}H_{23}O_4N$. MW, 245. B.p. 167–8°/13 mm. D_4^{18} 1·0086. n^{18} 1·4405.

Monoamide : $C_4H_8O_3N_2$. MW, 132. N-*Benzoyl* : m.p. 190–1°.

Diamide : $C_4H_9O_2N_3$. MW, 131. Plates from H_2O. M.p. 143°. *B,HCl* : m.p. 234–6°. *B,HNO₃* : m.p. 206° decomp. N-*Benzoyl* : m.p. 225–7°.

Dinitrile : dicyanodimethylamine. $C_4H_5N_3$. MW, 95. M.p. 75° (77°). N-*Nitroso* : m.p. 43°. N-*Benzoyl*: m.p. 131–2°. *B,HNO₃* : m.p. 134–5°.

Dianilide : m.p. 140·5°.

N-*Acetyl* : see Acetyliminodiacetic Acid.

N-*Benzoyl*, $1H_2O$: m.p. 88–90°.

N-*Me* : *see* Methyliminodiacetic Acid.

B,*HCl* : m.p. 238° decomp.

B,HNO₃ : m.p. 130–5°.

Curtius, Hofmann, *J. prakt. Chem.*, 1917, **96**, 202.
Keimatsu, Kato, *Chem. Abstracts*, 1930, **24**, 70.
I.G., F.P., 746,641, (*Chem. Abstracts*, 1933, **27**, 4542).
Dubsky, Hoher, *Ber.*, 1921, **54**, 2667.

Iminodiacetophenone.
See Diphenacylamine.

2 : 2′-Iminodibutyric Acid (*Dicarboxydi-iso-propylamine, di-isopropylamine-dicarboxylic acid*)

$$\begin{matrix}CH_3\cdot CH\cdot CH_2\cdot COOH\\ NH\\ CH_3\cdot CH\cdot CH_2\cdot COOH\end{matrix}$$

$C_8H_{15}O_4N$ MW, 189

d-.
M.p. 179–80° decomp. $[\alpha]_D^{20}$ + 65·5° in H_2O.
Di-Me ester : $C_{10}H_{19}O_4N$. MW, 217. *B,HCl* : m.p. 163–4°. $[\alpha]_D^{20}$ + 42·10 in MeOH. *Chloroplatinate* : m.p. 200–1° decomp.

l-.
Plates from EtOH.Aq. M.p. 179–80° decomp. $[\alpha]_D^{20}$ − 65·3° in H_2O.
Di-Me ester : *B,HCl*, m.p. 163–4°. $[\alpha]_D^{20}$ − 42·2° in MeOH. *Chloroplatinate* : m.p. 200–1° decomp.

dl-.
M.p. 158–60°.
Di-Me ester : *B,HCl*, m.p. 142–3°. *Chloroplatinate* : m.p. 195–6° decomp.

meso-.
Cryst. from MeOH. M.p. 177–8° decomp. Sol. H_2O, hot MeOH. Spar. sol. EtOH.
Di-Me ester : b.p. 130°/10 mm. *B,HCl* : m.p. 114–15°. *Chloroplatinate* : m.p. 134–5°.
Di-Et ester : $C_{12}H_{23}O_4N$. MW, 245. B.p. 150–150·5°/15 mm.

Scheibler, Magasanik, *Ber.*, 1915, **48**, 1810.

Iminodicarboxylic Acid

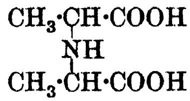
$$HN(COOH)_2$$

$C_2H_3O_4N$ MW, 105

Me-Et ester : *see* Carbomethoxyurethane.
Di-Et ester : *see* Carbethoxyurethane.

See also I.G., D.R.P., 536,446, (*Chem. Abstracts*, 1932, **26**, 996).

1 : 1′-Iminodipropionic Acid (*Diethylamine-1 : 1′-dicarboxylic acid, 1 : 1′-dicarboxydiethylamine*)



$C_6H_{11}O_4N$ MW, 161

Exists in two forms.

(I) M.p. 254–5°. Sol. H_2O. Insol. ord. org. solvents.

Di-Et ester: $C_{10}H_{19}O_4N$. MW, 217. B.p. 123–4°/15 mm.

Monoamide: $C_6H_{12}O_3N_2$. MW, 160. M.p. 232°.

Dinitrile: 1 : 1′-dicyanodiethylamine. $C_6H_9N_3$. MW, 123. M.p. 68°.

(II) Needles from H_2O. M.p. 234–5° decomp. Sol. H_2O. Insol. EtOH.

Di-Me ester: $C_8H_{15}O_4N$. MW, 189. B.p. 122–4°/30 mm.

Di-Et ester: m.p. − 5°. B.p. 121–2°/15 mm., 114–15°/10 mm. D_4^{20} 1·0152. n^{20} 1·4728.

Monoamide, $1\frac{1}{2}H_2O$: m.p. 210°.

Diamide: $C_6H_{13}O_2N_3$. MW, 159. M.p. 127°.

Imide: $C_6H_{10}O_2N_2$. MW, 142. M.p. 186°.

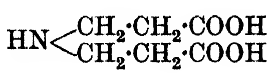
N-*Acetyl*: m.p. 174°.

Dinitrile: m.p. 68°.

B,HNO_3: decomp. at 125–40°.

Zelinsky, Annenkoff, Kulikoff, *Z. physiol. Chem.*, 1911, **73**, 463.
Dubsky, *Ber.*, 1916, **49**, 1045.
Abderhalden, Haase, *Z. physiol. Chem.*, 1931, **202**, 49.
Ciamician, Silber, *Ber.*, 1906, **39**, 3957.

2 : 2′-Iminodipropionic Acid (*Diethylamine-2 : 2′-dicarboxylic acid, 2 : 2′-dicarboxydiethylamine*)



$C_6H_{11}O_4N$ MW, 161

Syrup.

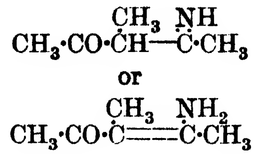
Di-Et ester: $C_{10}H_{19}O_4N$. MW, 217. B.p. 137–8°/12 mm., 112–14°/0·2 mm. D_{20}^{20} 1·0462. n_D^{25} 1·43802. *B,HCl*: m.p. 79·5–80·5°.

Kuettel, McElvain, *J. Am. Chem. Soc.*, 1931, **53**, 2694.
Ruzicka, Fornasir, *Helv. Chim. Acta*, 1920, **3**, 814.

2-Iminoglutarimide.
See Glutazine.

Iminoisatin.
See Imesatin.

2-Imino-3-methylpentanone-4 (*2-Amino-3-methylpenten-2-one-4*)



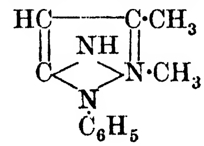
$C_6H_{11}ON$ MW, 113

Prisms from $CHCl_3$. M.p. 110° (105°). B.p. 225°. Sol. EtOH, $CHCl_3$. NaOH in sealed tube at 100° → $NH_3 + CH_3{\cdot}COOH + CH_3{\cdot}CO{\cdot}C_2H_5$. $FeCl_3$ in EtOH → dark blue col.

Claisen, *Ber.*, 1891, **24**, 3916.
Combes, *Bull. soc. chim.*, 1892, **7**, 783.

2-Imino-1-methyl-*n*-valeronitrile.
See Propiodinitrile.

Iminopyrine (*Iminoantipyrine*)

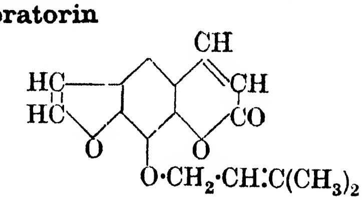


$C_{11}H_{13}N_3$ MW, 187

Needles from toluene. M.p. 116°. Sol. EtOH, Et_2O. Insol. H_2O.

Michaelis, Gunkel, *Ber.*, 1901, **34**, 726.

Imperatorin



$C_{16}H_{14}O_4$ MW, 270

Occurs in root of *Imperatoria ostruthium*, Linn. M.p. 102°. Sol. ord. org. solvents. Insol. H_2O.

Späth, Holzen, *Ber.*, 1935, **68**, 1123 (*Bibl.*).

Incarnatrin.
See under Quercitin.

Incarnatyl Alcohol

$C_{34}H_{70}O$ MW, 494

Needles from EtOH–AcOEt. M.p. 72–4°. *Benzoyl deriv.*: m.p. 58–60°.

Fargher, Probert, *Chem. Abstracts*, 1923, **17**, 1891.

Indanaldehyde.
See Hydrindene-aldehyde.

Indanamine.
See Hydrindamine.

Indane.
See Hydrindene.

Indane-carboxylic Acid.
See Hydrindenic Acid.

Indane-dicarboxylic Acid.
See Hydrindene-dicarboxylic Acid.

Indane-sulphonic Acid.
See Hydrindene-sulphonic Acid.

Indandione.
See Diketohydrindene.

Indanol.
See Hydroxyhydrindene.

1-Indanol-2-acetic Acid.
See 1-Hydroxyhydrindenyl-2-acetic Acid.

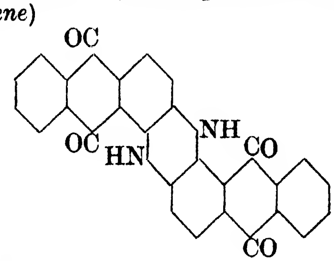
1-Indanol-2-malonic Acid.
See 1-Hydroxyhydrindenyl-2-malonic Acid.

1-Indanol-2-α-propionic Acid.
See α-1-Hydroxyhydrindenyl-2-propionic Acid.

Indanone.
See Hydrindone.

Indanthrene.
See Indanthrone.

Indanthrone (*Anthraquinone-dihydroazine, indanthrene*)

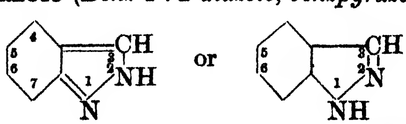


$C_{28}H_{14}O_4N_2$ MW, 442

Blue needles with metallic lustre. Decomp. at 470–500°. Greenish-blue col. in $PhNO_2$ or aniline. Blue col. in quinoline. Indanthrone and its many derivatives are widely used as vat dyestuffs, indanthrone itself (Indanthrene Blue) being the first one to be made commercially.

Terres, *Ber.*, 1913, **46**, 1634.
Schwenk, *Chem.-Ztg.*, 1928, **52**, 45.
Société pour l'industrie chimique à Bâle, F.P., 746,227, (*Chem. Abstracts*, 1933, **27**, 4547).
Maki, *Chem. Abstracts*, 1933, **27**, 2685.
Scholl, Berblinger, *Ber.*, 1903, **36**, 3427.

Indazole (*Benz*-1 : 2-*diazole, benzpyrazole*)

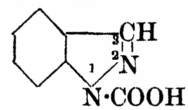


$C_7H_6N_2$ MW, 118

Needles from hot H_2O. M.p. 146·5°. B.p. 267–70°/743 mm. Sol. EtOH, Et_2O, hot H_2O.
1-*Acetyl* : m.p. 42°.
1-*Benzoyl* : m.p. 92–3°.
2-o-*Nitrobenzoyl* : stable form, m.p. 186–7°. Labile form, m.p. 141–2°.
2-m-*Nitrobenzoyl* : stable form, m.p. 134°. Labile form, m.p. 142–4°.
2-p-*Nitrobenzoyl* : stable form, m.p. 164–5°. Labile form, m.p. 137–8°.

Auwers, Frese, *Ann.*, 1926, **450**, 289.
Auwers, Allardt, *Ann.*, 1924, **438**, 19.
Meisenheimer, Diedrich, *Ber.*, 1924, **57**, 1715.
Auwers, *ibid.*, 1723.

Indazole-1-carboxylic Acid



$C_8H_6O_2N_2$ MW, 162

Me ester : $C_9H_8O_2N_2$. MW, 176. M.p. 59–60°.

Auwers, Frese, *Ann.*, 1926, **450**, 287.

Indazole-2-carboxylic Acid.
Me ester : $C_9H_8O_2N_2$. MW, 176. M.p. 60°.
Phenyl ester : $C_{14}H_{10}O_2N_2$. MW, 238. M.p. 91°.
o-*Nitrophenyl ester* : $C_{14}H_9O_4N_3$. MW, 283. M.p. 97–8°.
Chloride : $C_8H_5ON_2Cl$. MW, 180·5. M.p. 73–4°.
Amide : $C_8H_7ON_3$. MW, 161. M.p. 167°.
Anilide : stable form, m.p. 104–5°. Labile form, m.p. 105–6°.

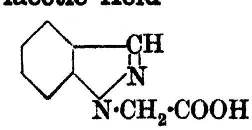
Auwers, Allardt, *Ann.*, 1924, **438**, 25.

Indazole-3-carboxylic Acid.
Cryst. M.p. 266–266·5°.
1-N-*Me* : $C_9H_8O_2N_2$. MW, 176. M.p. 213–14°.
2-N-*Me* : m.p. 225–6°.
Brucine salt : m.p. 236–236·5°. $[\alpha]_D^{15}$ − 102°.
Cinchonine salt : m.p. 233·5–234°.
Quinine salt : m.p. 245–6°.

Hayashi, *Chem. Abstracts*, 1931, **25**, 1824.

Indazolol.
See Hydroxyindazole.

1-Indazylacetic Acid

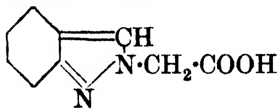


$C_9H_8O_2N_2$ **MW, 176**

Needles from H_2O. M.p. 185–6°. Sol. EtOH, AcOH.

Auwers, Allardt, *Ber.*, 1926, **59**, 96.

2-Indazylacetic Acid



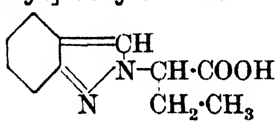
$C_9H_8O_2N_2$ MW, 176

M.p. 257° decomp.

Et ester: $C_{11}H_{12}O_2N_2$. MW, 204. M.p. 54–54·5°. B.p. 175–7°/11 mm. *Picrate*: m.p. 164·5°.

See previous reference.

1-[2-Indazyl]-butyric Acid

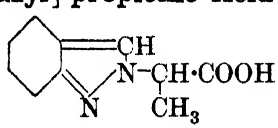


$C_{11}H_{12}O_2N_2$ MW, 204

Cryst. from C_6H_6. M.p. 143–5°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Auwers, Kleiner, *J. prakt. Chem.*, 1928, **118**, 79.

1-[2-Indazyl]-propionic Acid



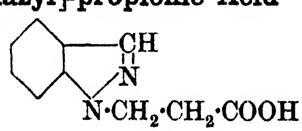
$C_{10}H_{10}O_2N_2$ MW, 190

Cryst. from H_2O. M.p. 209° decomp. Sol. AcOH. Spar. sol. Et_2O, C_6H_6.

Et ester: $C_{12}H_{14}O_2N_2$. MW, 218. B.p. 172°/11 mm. *Picrate*: m.p. 141–2°.

Auwers, Allardt, *Ber.*, 1926, **59**, 98.

2-[1-Indazyl]-propionic Acid

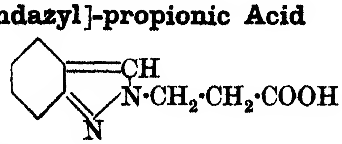


$C_{10}H_{10}O_2N_2$ MW, 190

Cryst. from C_6H_6–pet. ether. M.p. 105·5–106·5°. Sol. EtOH, Et_2O, C_6H_6. Insol. pet. ether.

Auwers, Kleiner, *J. prakt. Chem.*, 1928, **118**, 77.

2-[2-Indazyl]-propionic Acid



$C_{10}H_{10}O_2N_2$ MW, 190

Needles from H_2O. M.p. 148–9°. Sol. EtOH, Et_2O. Insol. pet. ether.

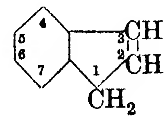
Et ester: $C_{12}H_{14}O_2N_2$. MW, 218. B.p. 206–7°/17 mm. $D_4^{15\cdot2}$ 1·1453. *Picrate*: m.p. 126·5–127°.

Picrate: m.p. 170°.

Auwers, Kleiner, *J. prakt. Chem.*, 1928, **118**, 77.

Auwers, Allardt, *Ber.*, 1926, **59**, 100.

Indene



C_9H_8 MW, 116

Constituent of crude benzole fraction of coal tar. M.p. − 2°. B.p. 182·2–182·4°/761 mm. D_4^{20} 0·9915, D_{15}^{15} 1·0002. $n_D^{18\cdot5}$ 1·5773. Sol. C_6H_6. Non-volatile in steam. Turns yellow on standing but loses this colour on exposure to sunlight. Readily polymerises to form resinous products. Conc. H_2SO_4 gives the resin *para-indene*. Na + EtOH ⟶ hydrindene. Readily oxidises. Reacts with sulphur to give complex compounds. Shows weak acid and reducing properties. The indene resins are commercial products, usually produced direct from the heavy benzole fractions of coal tar which also contain coumarone (*q.v.*). The resins are thus mixtures of indene and coumarone polymers.

Picrate: m.p. 96°.

Stobbe, Färber, *Ber.*, 1924, **57**, 1838.

Staudinger, *Helv. Chim. Acta*, 1929, **12**, 934.

Bergmann, Taubadel, *Ber.*, 1932, **65**, 463.

Ellis, Rabinovitz, *Ind. Eng. Chem.*, 1916, **8**, 797.

Courtot, Dondelinger, *Ann. chim.*, 1925, **4**, 231.

Courtot, *Chem. Abstracts*, 1924, **18**, 2699 (*Review*).

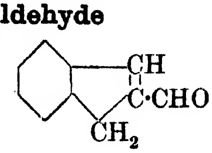
Cortese, *Rec. trav. chim.*, 1929, **48**, 564.

Staudinger, D.R.P., 504,215, (*Chem. Abstracts*), 1930, **24**, 5518).

Fazi, *Gazz. chim. ital.*, 1931, **61**, 131 (*Review*, *Bibl.*).

Jacobi, *J. prakt. Chem.*, 1931, **129**, 55 (*Review*).

Indene-2-aldehyde

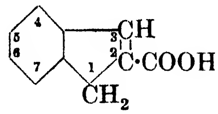


$C_{10}H_8O$ MW, 144

M.p. 50–1°.
Oxime : m.p. 125–7°.
Semicarbazone : m.p. 237°.
Anil : m.p. 99°.
p-*Toluidine-anil* : m.p. 122°.

Braun, Zobel, *Ber.*, 1923, **56**, 2139.

Indene-2-carboxylic Acid



$C_{10}H_8O_2$ MW, 160

Needles or leaflets from C_6H_6. M.p. 234°. Sol. EtOH, Et_2O. Spar. sol. H_2O, C_6H_6, $CHCl_3$. Sublimes.

Et ester : $C_{12}H_{12}O_2$. MW, 188. M.p. 50°. $D_4^{78.4}$ 1·0549. $n_D^{78.9}$ 1·548.

Liebermann, Zsuffa, *Ber.*, 1911, **44**, 206.
Auwers, *Ann.*, 1918, **415**, 167.

Indene-3-carboxylic Acid.

Yellow needles. M.p. 161° (156–7°). B.p. about 193–5°/12 mm., 140°/8 mm. Sol. EtOH. Spar. sol. Et_2O, $CHCl_3$, toluene.

Me ester : $C_{11}H_{10}O_2$. MW, 174. Oil. B.p. 153–4°/23 mm.

Et ester : $C_{12}H_{12}O_2$. MW, 188. Oil. B.p. 164°/24 mm.

Amide : $C_{10}H_9ON$. MW, 159. M.p. 180°.

Nitrile : $C_{10}H_7N$. MW, 141. B.p. 140–2°/13 mm.

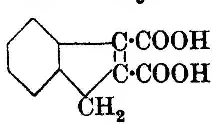
Anilide : m.p. 158°.

Hydrazide : m.p. 186°. *Benzylidene deriv.* : m.p. 272–3°. o-*Nitrobenzylidene deriv.* : m.p. 215° decomp.

Phenylhydrazide : m.p. 188°.

Wislicenus, Henrich, *Ann.*, 1924, **436**, 16.
Grignard, Bellet, Courtot, *Ann. chim.*, 1915, **4**, 55.
Weissgerber, *Ber.*, 1911, **44**, 1440, 2216.
Courtot, *Ann. chim.*, 1915, **4**, 83.

Indene-2 : 3-dicarboxylic Acid



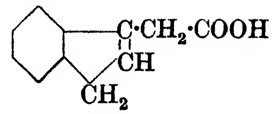
$C_{11}H_8O_4$ MW, 204

Cryst. M.p. 215° decomp. Sol. EtOH, Me_2CO. Insol. Et_2O, C_6H_6, AcOH.

Di-Et ester : $C_{15}H_{16}O_4$. MW, 260. M.p. 78°.

Bougault, *Compt. rend.*, 1914, **159**, 745.

3-Indenylacetic Acid

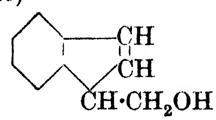


$C_{11}H_{10}O_2$ MW, 174

Nitrile : 3-cyanomethylindene. $C_{11}H_9N$. MW, 155. Needles from pet. ether. M.p. 18°.

Ingold, Thorpe, *J. Chem. Soc.*, 1919, **115**, 152.

1-Indenylcarbinol (*Benzofulvanol, 1-hydroxymethylindene*)

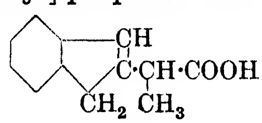


$C_{10}H_{10}O$ MW, 146

Oil with rose odour. B.p. 134–5°/10 mm. Polymerizes on standing.

Courtot, *Ann. chim.*, 1915, **4**, 93; *Compt. rend.*, 1915, **160**, 502.

1-[2-Indenyl]-propionic Acid

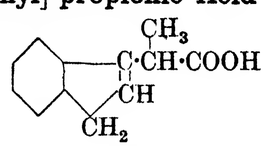


$C_{12}H_{12}O_2$ MW, 188

Nitrile : $C_{12}H_{11}N$. MW, 169. Needles from pet. ether. M.p. 92°.

Ingold, Thorpe, *J. Chem. Soc.*, 1919, **115**, 159.

1-[3-Indenyl]-propionic Acid

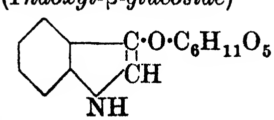


$C_{12}H_{12}O_2$ MW, 188

Nitrile : $C_{12}H_{11}N$. MW, 169. Needles from pet. ether. M.p. 118°.

Ingold, Thorpe, *J. Chem. Soc.*, 1919, **115**, 153.

Indican (*Indoxyl-β-glucoside*)



$C_{14}H_{17}O_6N$ MW, 295

Occurs in *Polygonum tinctorium*, Ait., *Isatis tinctoria*, Linn., and various *Indigofera* species. Needles + $3H_2O$ from H_2O. M.p. 57–8° (176–8° anhyd.). Hyd. by dil. HCl.

Penta-acetyl deriv. : (i) m.p. 148°; (ii) m.p. 112°.

Tetra-Me ether : $C_{18}H_{25}O_6N$. MW, 351.

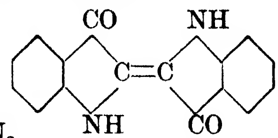
Glassy solid. Softens about 100–10°. $[\alpha]_D^{15}$ + 9·19° in Me_2CO.

Robertson, Waters, *J. Chem. Soc.*, 1933, 30 (*Bibl.*).

Indigo.

See Indigotin *and* Indigo White.

Indigotin (*Indigo, Indigo Blue,* trans-2 : 2′-*di-ψ-indoxyl, di-indogen*)



$C_{16}H_{10}O_2N_2$ MW, 262

Blue powder with coppery lustre. Sublimes. Sol. aniline, $PhNO_2$, petroleum. Insol. H_2O, ord. org. solvents. Heat of comb. C_v 1815·2 Cal. Reduced by glucose + NaOH, sodium hydrosulphite, etc. ⟶ indigo white.

Dioxime : *monoacetyl deriv.*, m.p. 167–8°.

1 : 1′-N-*Diacetyl* : red cryst. M.p. 200–20°.

1 : 1′-N-*Dibenzoyl* : violet leaflets. M.p. 254° (257°).

1 : 1′-N-*Di*-p-*nitrobenzoyl* : violet cryst. M.p. 290°.

Le Fèvre, Pearson, *J. Chem. Soc.*, 1932, 2807.

Diesbach, Lempen, *Helv. Chim. Acta*, 1933, **16**, 148.

Hope, Richter, *J. Chem. Soc.*, 1932, 2783.

Tanasescu, Georgescu, *Bull. soc. chim.*, 1932, **51**, 234.

Hinkel, Ayling, Morgan, *J. Chem. Soc.*, 1932, 985.

Spalding, U.S.P., 1,827,828, (*Chem. Abstracts*, 1932, **26**, 855).

Wait, U.S.P., 1,786,800, (*Chem. Abstracts*, 1931, **25**, 824).

Minaev, Fedorov, *Chem. Abstracts*, 1931, **25**, 4129.

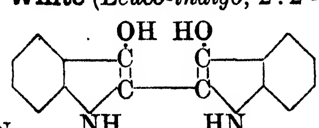
Kattwinkel, *Teer*, 1927, **25**, 585 (*Bibl.*).

Posner, *Ber.*, 1926, **59**, 1799.

Nenitzescu, *Ber.*, 1925, **58**, 1063.

Martinet, *Chimie et Industrie*, 1925, **13**, 531 (*Review*).

Indigo White (*Leuco-indigo*, 2 : 2′-*di-indoxyl*)



$C_{16}H_{12}O_2N_2$ MW, 264

Cryst. Sol. EtOH, Et_2O. Oxidises in air to indigotin.

1 : 1′ : 3 : 3′-*Tetra-acetyl* : m.p. 258°.

1 : 1′ : 3 : 3′-*Tetra-benzoyl* : m.p. 242–3°.

1 : 1′ : 3 : 3′-*Tetra*-p-*nitrobenzoyl*: (i) m.p. 269–70°; (ii) m.p. 281°.

Posner, *Ber.*, 1926, **59**, 1815.

I.C.I., E.P., 371,374, (*Chem. Abstracts*, 1933, **27**, 3086); U.S.P., 1,861,382, (*Chem. Abstracts*, 1932, **26**, 3935).

Indium trimethyl

$In(CH_3)_3$

C_3H_9In MW, 160

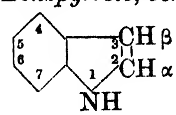
Cryst. M.p. 89–89·8°. Sol. Et_2O. D_{19}^{19} 1·568. Decomp. by H_2O, MeOH, etc. Sublimes.

Dennis, Work, Rochow, Chamot, *J. Am. Chem. Soc.*, 1934, **54**, 1047.

Indogenic Acid.

See Indoxylic Acid.

Indole (2 : 3-*Benzpyrrole, benzopyrrole*)



C_8H_7N MW, 117

Occurs in fæces, coal tar, and in several plants. Leaflets from H_2O. M.p. 52°. B.p. 253–4°. Sol. EtOH, Et_2O, C_6H_6, hot H_2O. Heat of comb. C_v 1021·8 Cal.

N-*Formyl* : C_9H_7ON. MW, 145. M.p. 52°. B.p. 136–7°/15 mm., 125–6°/8 mm. $D_4^{18 \cdot 5}$ 1·750. $n_D^{18 \cdot 5}$ 1·6200.

N-*Benzoyl* : m.p. 67–8°. B.p. 213°/16 mm.

N-*Nitroso* : m.p. 171·2° decomp.

B,$C_6H_3(NO_2)_3$-1 : 3 : 5 : m.p. 187°.

Dimeride : di-indole. $C_{16}H_{14}N_2$. MW, 234. *Acetyl deriv.* : m.p. 157–8°. N-*Mono-nitroso* : m.p. 126–8° decomp. (*benzoyl deriv.* : m.p. 150–1° decomp.). N : N′-*Dinitroso* : m.p. 160–2° decomp. *Phenylisocyanate* : m.p. 179–80°.

Trimeride : tri-indole. $C_{24}H_{21}N_3$. MW, 351. M.p. 168°. *Phenylisocyanate* : m.p. 217°.

Schmitz-Dumont, Hamann, Geller, *Ann.*, 1933, **504**, 1; *Ber.*, 1933, **66**, 76; *J. prakt. Chem.*, 1932, **132**, 39.

Levy, *Ind. Eng. Chem.*, (News Ed.), 1933, **11**, 114.

Redgrove, *Perfumery and Essential Oil Record*, 1929, **20**, 161 (*Review*).

Neber, Knöller, Herbst, Trissler, *Ann.*, 1929, **471**, 113.

Müller, D.R.P., 207,380, (*Chem. Abstracts*, 1919, **13**, 1133).

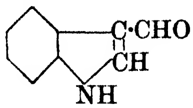
Majima, Unno, Oddo, *Ber.*, 1922, **55**, 3854.

van der Lee, *Rec. trav. chim.*, 1925, **44**, 1089.

Verley, *Bull. soc. chim.*, 1924, **35**, 1039.

Potokhin, *Chem. Abstracts*, 1928, **22**, 3409.

Indole-3-aldehyde (*3-Formylindole, 3-aldehydoindole*)

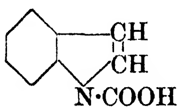


C_9H_7ON MW, 145

M.p. 194°.
N-*Acetyl*: m.p. 159–62°.
Oxime: m.p. 197–8°.
Anil: decomp. at 240–6°.
B,HNO₃: decomp. at 94°.

Majima, Kotake, *Ber.*, 1930, **63**, 2237.
Potokhin, *Chem. Abstracts*, 1928, **22**, 3409.

Indole-N-carboxylic Acid (*Indole-1-carboxylic acid*)

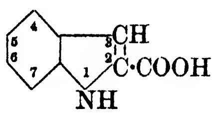


$C_9H_7O_2N$ MW, 161

Yellow cryst. M.p. 108° decomp. Hot H_2O ⟶ indole. NH_3 ⟶ indole + $(NH_4)_2CO_3$.

Oddo, Sessa, *Gazz. chim. ital.*, 1911, **41**, i, 234.

Indole-2-carboxylic Acid (*Indole-α-carboxylic acid*)



$C_9H_7O_2N$ MW, 161

M.p. 203° (201–2° decomp.).
Et ester: $C_{11}H_{11}O_2N$. MW, 189. M.p. 125–6°.
N-*Me*: $C_{10}H_9O_2N$. MW, 175. Needles from EtOH. M.p. 212°. Sol. hot EtOH, Et_2O, C_6H_6. Insol. cold H_2O.

Gabriel, Gerhard, Wolter, *Ber.*, 1923, **56**, 1027.
Maurer, Moser, *Z. physiol. Chem.*, 1926, **161**, 135.
Gränacher, Mahal, Gerö, *Helv. Chim. Acta*, 1924, **7**, 579.
Giua, *Gazz. chim. ital.*, 1924, **54**, 593.
Fischer, Hess, *Ber.*, 1884, **17**, 561.

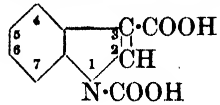
Indole-3-carboxylic Acid (*Indole-β-carboxylic acid*).
M.p. 210–18°.
Nitrile: $C_9H_6N_2$. MW, 142. Rose-coloured cryst. M.p. 178°. N-*Acetyl*: m.p. 202°.

Gavrilow, *Chem. Abstracts*, 1925, **19**, 505.
Majima, Shigematsu, *Ber.*, 1924, **57**, 1452.
Mingoia, *Gazz. chim. ital.*, 1932, **62**, 844.

Indole-6-carboxylic Acid.
Needles from AcOH. M.p. 243–4°.
Nitrile: $C_9H_6N_2$. MW, 142. M.p. 129–30°.

Kermack, *J. Chem. Soc.*, 1924, **125**, 2290.

Indole-1 : 3-dicarboxylic Acid



$C_{10}H_7O_4N$ MW, 205

Di-Et ester: $C_{14}H_{15}O_4N$. MW, 261. Cryst. from EtOH. M.p. 102–3°.

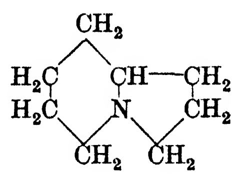
Majima, Kotake, *Ber.*, 1930, **63**, 2239.

Indole-2 : 6-dicarboxylic Acid.
Needles from AcOH. M.p. above 310°.
Di-Et ester: $C_{14}H_{15}O_4N$. MW, 261. Yellow needles from AcOH. M.p. 132°.
6-*Nitrile*: $C_{10}H_6O_2N_2$. MW, 186. M.p. 290–5° decomp. 2-*Et ester*: $C_{12}H_{10}O_2N_2$. MW, 214. M.p. 171°.

Kermack, *J. Chem. Soc.*, 1924, **125**, 2288.

Indoline.
See Dihydroindole.

Indolizidine (*Octahydropyrrocoline, octahydropyrindole*)

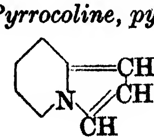


$C_8H_{15}N$ MW, 125

B.p. 75°/43 mm., 65–7°/18 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O. $D_4^{10.5}$ 0·9074. n_D 1·4748.
B,HBr: plates from AcOEt. M.p. 196°.
B,H₂PtCl₆: m.p. 215° decomp.
B,HAuCl₄: m.p. 200° decomp.
B,HgCl₂: m.p. 237° decomp.
Picrate: (i) needles from EtOH. M.p. 135–6°. (ii) M.p. 226° decomp. (228·5°).

Ochiai, Tsuda, *Ber.*, 1934, **67**, 1013.
Clemo, Ramage, *J. Chem. Soc.*, 1932, 2969.

Indolizine (*Pyrrocoline, pyrindole*)



C_8H_7N MW, 117

Plates. M.p. 75°. B.p. 205°/760 mm. Volatile in steam. Decomp. by acids.

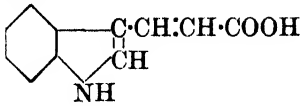
Picrate: m.p. 101°.

Diels, Alder, *Ann.*, 1932, **498**, 44.
Scholtz, *Ber.*, 1912, **45**, 1724.

Indolol.
See Hydroxyindole.

3-Indolylacetic Acid.
See Heteroauxine.

2-[3-Indolyl]-acrylic Acid



$C_{11}H_9O_2N$ MW, 187

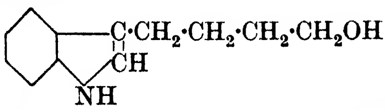
Reddish-brown plates from hot H_2O. M.p. 195–6°. Sol. EtOH, Et_2O, hot H_2O. Insol. pet. ether.

Bauguess, Berg, *J. Biol. Chem.*, 1934, **104**, 676.

2-[3-Indolyl]-α-alanine.
See Tryptophane.

Indolylamine.
See Aminoindole.

4-[3-Indolyl]-*n*-butyl Alcohol (3-ω-*Hydroxybutylindole*)

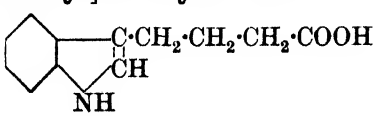


$C_{12}H_{15}ON$ MW, 189

M.p. 32–3°.
Picrate: m.p. 102°.
Phenylurethane: m.p. 88°.

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5034.

3-[3-Indolyl]-*n*-butyric Acid

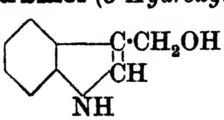


$C_{12}H_{13}O_2N$ MW, 203

Plates from C_6H_6–pet. ether. M.p. 124°.
Me ester: $C_{13}H_{15}O_2N$. MW, 217. M.p. 73–4°. B.p. 230°/6 mm.
Hydrazide: m.p. 112°.

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5032.

3-Indolylcarbinol (3-*Hydroxymethylindole*)



C_9H_9ON MW, 147

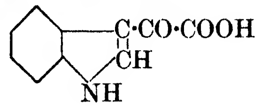
M.p. 158°.
O : N-*Diacetyl*: m.p. 95°.

Mingoia, *Gazz. chim. ital.*, 1932, **62**, 844.

2-[3-Indolyl]-ethyl Alcohol.
See Tryptophol.

Indolylethylamine.
See Aminoethyl-indole.

3-Indolylglyoxylic Acid

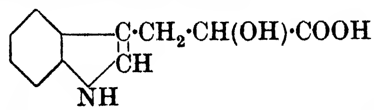


$C_{10}H_7O_3N$ MW, 189

Yellow cryst. M.p. 215° decomp.
Et ester: $C_{12}H_{11}O_3N$. MW, 217. M.p. 186°.
Chloride: $C_{10}H_6O_2NCl$. MW, 207·5. M.p. 138–9°.
Amide: $C_{10}H_8O_2N_2$. MW, 188. M.p. 248°.

Majima, Shigematsu, *Ber.*, 1924, **57**, 1451.
Oddo, Albanese, *Gazz. chim. ital.*, 1927, **57**, 827.

2-[3-Indolyl]-lactic Acid



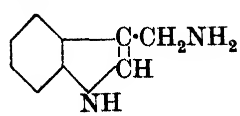
$C_{11}H_{11}O_3N$ MW, 205

l-.
Needles from Et_2O–pet. ether. M.p. 100–101° (99°). $[\alpha]_D^{20}$ − 5·36° in H_2O.

dl-.
M.p. 144–5°.

Ehrlich, Jacobsen, *Ber.*, 1911, **44**, 896.
Bauguess, Berg, *J. Biol. Chem.*, 1934, **104**, 679.

3-Indolylmethylamine (3-ω-*Aminomethylindole*)

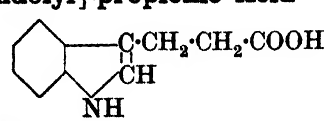


$C_9H_{10}N_2$ MW, 146

M.p. 84°.

Putokhin, *Ber.*, 1926, **59**, 1997.

2-[3-Indolyl]-propionic Acid

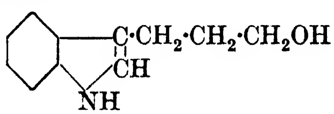


$C_{11}H_{11}O_2N$ MW, 189

M.p. 134° (132–3°).
Me ester: $C_{12}H_{13}O_2N$. MW, 203. M.p. 79–80°.
Nitrile: $C_{11}H_{10}N_2$. MW, 170. M.p. 67–8°.
Picrate: m.p. 123·5–124·5°.
Hydrazide: m.p. 129–30°.
Picrate: m.p. 141–3°.

Majima, Hoshino, *Ber.*, 1925, **58**, 2045.
Kalb, Schweizer, Schimpf, *Ber.*, 1926, **59**, 1858.
Maurer, Moser, *Z. physiol. Chem.*, 1926, **161**, 140.
Keimatsu, Sugasawa, *Chem. Abstracts*, 1929, **23**, 834.
Bauguess, Berg., *J. Biol. Chem.*, 1934, **104**, 678.
Manske, Robinson, *J. Chem. Soc.*, 1927, 241.

3-[3-Indolyl]-propyl Alcohol (3-ω-*Hydroxypropylindole*)

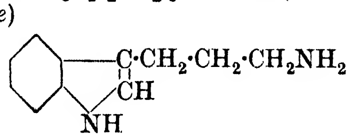


$C_{11}H_{13}ON$ MW, 175

Oil. F.p. 0°.
Picrate: m.p. 101°.
Phenylurethane: m.p. 94°.

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5034.

3-[3-Indolyl]-propylamine (3-ω-*Aminopropylindole*)

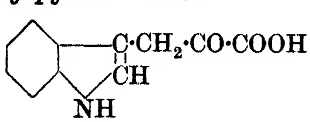


$C_{11}H_{14}N_2$ MW, 174

M.p. 60–4°. Hygroscopic.
B,HCl: m.p. 170°.
Picrate: m.p. 146–9° (155–6° anhyd.).

Jackson, Manske, *J. Am. Chem. Soc.*, 1930, **52**, 5033.

3-Indolylpyruvic Acid



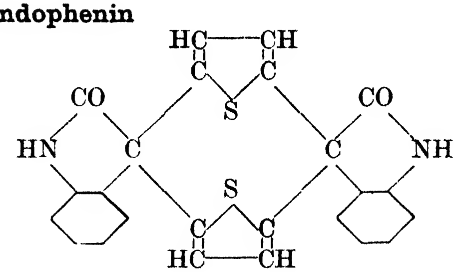
$C_{11}H_9O_3N$ MW, 203

Grey cryst. + $1CH_3{\cdot}COOH$ from AcOH. M.p. 211°.
Oxime: m.p. about 175°.

p-*Nitrophenylhydrazone*: m.p. 153–4°.

Bauguess, Berg, *J. Biol. Chem.*, 1934, **104**, 679.
Gränacher, Gerö, Schelling, *Helv. Chim. Acta*, 1924, **7**, 577.

Indophenin

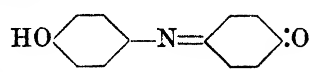


$C_{24}H_{14}O_2N_2S_2$ MW, 426

Blue needles with coppery lustre from PhOH–EtOH. Decomp. on heating. Spar. sol. EtOH, Et_2O, $CHCl_3$, AcOH. Zn + AcOH ⟶ colourless sol. which re-oxidises in air to indophenin.

Heller, *Chem.-Ztg.*, 1933, **57**, 74.
Steinkopf, Roch, *Ann.*, 1930, **482**, 251 (*Bibl.*).

Indophenol

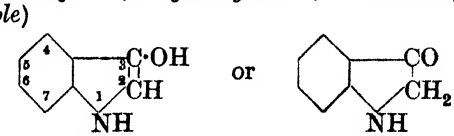


$C_{12}H_9O_2N$ MW, 199

Plates from Me_2CO–pet. ether. M.p. 160°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6.
B,HCl: m.p. 310°.
Acetyl: needles from pet. ether. M.p. 115–16°.

Kehrmann, Decker, Schmajewski, *Ber.*, 1921, **54**, 2437.
Heller, *Ann.*, 1912, **392**, 26.
Meyer, Elbers, *Ber.*, 1921, **54**, 342.
A.G.F.A., D.R.P., 157,288, (*Chem. Zentr.*, 1905, I, 315).

Indoxyl (3-*Hydroxyindole*, 3-*ketodihydroindole*)



Indoxyl or ψ-Indoxyl

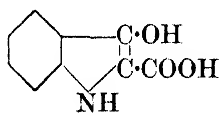
Occurs in human and animal urine. Oil. Ox. ⟶ indigotin.
N-*Acetyl*: m.p. 139°. *Oxime hydrochloride*: m.p. 139°. *Phenylhydrazone*: m.p. 154°.
3-*Acetyl*: m.p. 127·5°.
1 : 3-*Diacetyl*: m.p. 82°.

N-*Nitroso*: *Et ether*, $C_{10}H_{10}O_2N_2$. MW, 190. M.p. 84–5°.
Glucoside: *see* Indican.

Spencer, *J. Soc. Chem. Ind.*, 1931, **50**, 64T.
Wait, U.S.P., 1,820,684, (*Chem. Abstracts*, 1931, **25**, 5678).
Dow, U.S.P., 1,564,218, (*Chem. Abstracts*, 1926, **20**, 423).
Feuchter, *Chem.-Ztg.*, 1914, **38**, 273.

ψ-Indoxyl.
See Indoxyl.

Indoxylic Acid (*3-Hydroxyindole-2-carboxylic acid, indogenic acid*)



$C_9H_7O_3N$ MW, 177

Cryst. Sublimes with decomp. at 122–3°. Spar. sol. H_2O. Ox. ⟶ indigotin. Heat ⟶ indoxyl.

Me ester: $C_{10}H_9O_3N$. MW, 191. Needles from MeOH. M.p. 157–8°. 3-*Acetyl*: m.p. 145°. 3-*Tetra-acetyl-β-glucoside*: m.p. 229–30°.

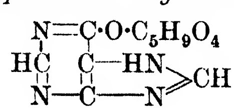
Et ester: $C_{11}H_{11}O_3N$. MW, 205. M.p. 116–17° (120–1°).

3-*Et ether*: $C_{11}H_{11}O_3N$. MW, 205. M.p. 160°. *Et ester*: $C_{13}H_{15}O_3N$. MW, 233. M.p. 98°.

N-*Acetyl*: purple, yellow, or green cryst. Turns blue at 150°. M.p. 179° decomp.

Robertson, *J. Chem. Soc.*, 1927, 1939.
Spencer, *J. Soc. Chem. Ind.*, 1931, **50**, 63T.
Ruggli, Bolliger, *Helv. Chim. Acta*, 1921, **4**, 643.

Inosin (*Hypoxanthine thyminoside*)



$C_{10}H_{12}O_5N_4$ MW, 268

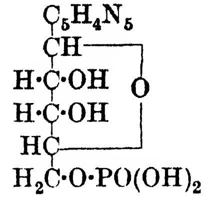
Cryst. + $2H_2O$. M.p. 215°. Hyd. ⟶ hypoxanthine + thyminose.

Triacetyl deriv.: m.p. 236°.

Triphenylmethyl ether: $C_{29}H_{26}O_5N_4$. MW, 510. M.p. 253–4°.

Haiser, Wenzel, *Chem. Zentr.*, 1908, II, 235.
Bielschowsky, Klein, *Z. physiol. Chem.*, 1932, **207**, 202; **210**, 134.
Bredereck, *Ber.*, 1933, **66**, 198.

Inosinic Acid (*Inosic acid*)

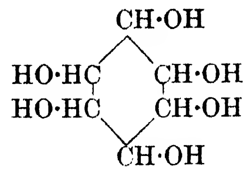


$C_{10}H_{14}O_7N_5P$ MW, 347

Occurs in muscle. Syrup. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O.

Klimek, Parnas, *Biochem. Z.*, 1932, **252**, 392.
Kiessling, *Biochem. Z.*, 1934, **273**, 103.
Ostern, *Biochem. Z.*, 1932, **254**, 65.
Embden, *Z. physiol. Chem.*, 1932, **210**, 194.

Inositol (*Cyclohexane-hexol, hexahydroxycyclohexane*)



$C_6H_{12}O_6$ MW, 180

d-. Matezodambose.

Occurs in *Pinus Lambertiana*, Dougl., and *Ceratonia Siliqua*, Linn. M.p. 247–8° (235°). Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O. $[\alpha]_D$ + 68°.

Mono-Me ether: methylinositol, pinitol, pinite, sennite, matezite. $C_7H_{14}O_6$. MW, 194. Occurs in Madagascar rubber latex. Prisms from MeOH. M.p. 186°. *Penta-acetyl*: m.p. 98°. $[\alpha]_D^{20}$ − 9·67°. *Penta-benzoyl*: m.p. 97°. $[\alpha]_D^{20}$ + 32·3°.

l-.

Needles + $2H_2O$ from H_2O. M.p. 247° (236–8°). Spar. sol. EtOH. Insol. Et_2O. $[\alpha]_D^{28}$ − 64·1° in H_2O. D^{20} 1·598.

Mono-Me ether: methylinositol, quebrachitol, bornesitol, bornesite. Occurs in Hevea and Borneo rubber latex. $C_7H_{14}O_6$. MW, 194. M.p. 191°. Mod. sol. hot EtOH. Insol. Et_2O. $[\alpha]_D^{20}$ − 80·3° in H_2O. D^0 1·54.

dl-.

Occurs in tobacco, blackberry, etc. M.p. 253° (220°/225°?).

Hexa-acetyl: m.p. 111°.

Hexa-carbethoxyl: m.p. 131–5°.

Meso-. Dambose, nucitol.

Occurs in various plants. Cryst. from EtOH.Aq. M.p. 218–19°.

Me ether: $C_7H_{14}O_6$. MW, 194. M.p. 204°.
Penta-acetyl: m.p. 96° (141° anhyd.).
Di-Me ether: dambonite. $C_8H_{16}O_6$. MW, 208. M.p. 206°. *Tetra-acetyl*: m.p. 223° (195°).
Hexa-acetyl: (i) m.p. 200°. (ii) M.p. 216°. B.p. 234°/2·5 mm.
Hexa-benzoyl: m.p. 258°.
Hexa-m-nitrobenzoyl: m.p. 217°.

Bruni, E.P., 216,982, (*Chem. Abstracts*, 1925, **19**, 300).
Whitby, Dolid, Yorston, *J. Chem. Soc.*, 1926, 1451.
Lindenfeld, *Biochem. Z.*, 1934, **272**, 284.
Philipson, *Z. physiol. Chem.*, 1930, **193**, 15.
Moldawski, *Chem. Zentr.*, 1926, I, 640.
Boeseken, Julius, *Rec. trav. chim.*, 1926, **45**, 489.
Müller, *J. Chem. Soc.*, 1912, **101**, 2383.
Posternak, *Helv. Chim. Acta*, 1929, **12**, 1165.
Girard, *Compt. rend.*, 1873, **77**, 995.
Griffin, Nelson, *J. Am. Chem. Soc.*, 1915, **37**, 1552.
Sherrard, Kurth, *Ind. Eng. Chem.*, 1928, **20**, 722.
Rhodes, Wiltshire, *Chem. Abstracts*, 1932, **26**, 4502.

Insulin.

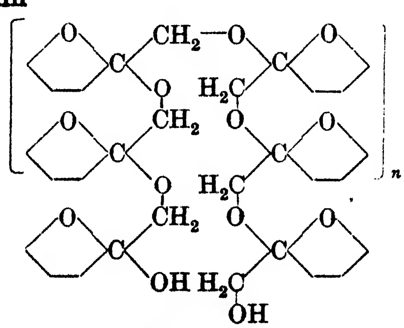
Antidiabetic present in the pancreas (Islets of Langerhans). Cryst. M.p. 233° after turning brown at 215°. Lævorotatory. Chemical properties are those of a typical protein. Isoelectric point, p_H 5·3–5·35.

Jensen, Evans, *Physiological Reviews*, 1934, **14**, 188.
Jensen, *Science*, 1932, **75**, 614.
Abel, *Proceedings of the National Academy of Sciences*, 1926, **12**, 132.

Intramine.

See 2 : 2′-Diaminodiphenyl disulphide.

Inulin

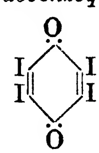


Unit of structure

Polysaccharide from various plants. MW, about 500. $[\alpha]_D^{21}$ − 38·3°. Hyd. ⟶ fructose.
Tri-Me ether: m.p. 140°. $[\alpha]_D^{20}$ − 55° in $CHCl_3$.
Triacetyl deriv.: m.p. 150–60°. $[\alpha]_D^{20}$ − 45·5° in AcOH.
Hexa-acetyl deriv.: m.p. 135°. $[\alpha]_D^{20}$ − 39·5° in AcOH.
Tripalmityl deriv.: m.p. 52·5°.
Tristearyl deriv.: m.p. 60·3°.

Haworth, Hirst, Percival, *J. Chem. Soc.*, 1932, 2384.
Hagenbuch, *Helv. Chim. Acta*, 1932, **15**, 616.
Bergmann, Knehe, *Ann.*, 1926, **449**, 302.
Arsem, U.S.Ps., 1,616,164, 1,616,167, (*Chem. Abstracts*, 1927, **21**, 1026).
Karrer, *Z. angew. Chem.*, 1922, **35**, 89 (*Bibl., Review*).
Ohlmeyer, Pringsheim, *Ber.*, 1933, **66**, 1292.
Irvine, Montgomery, *J. Am. Chem. Soc.*, 1933, **55**, 1988.
Berner, *Ber.*, 1933, **66**, 397.

Iodanil (*Tetra-iodobenzoquinone*)

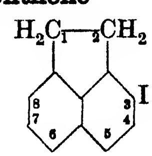


$C_6O_2I_4$ MW, 612

Brown needles from AcOH. M.p. 282–4° decomp. (265° decomp.). Mod. sol. hot AcOEt. Spar. sol. C_6H_6, AcOH, Me_2CO. Insol. EtOH, Et_2O.

Jackson, Bolton, *J. Am. Chem. Soc.*, 1914, **36**, 305.

3-Iodoacenaphthene



$C_{12}H_9I$ MW, 280

Yellow needles from EtOH. M.p. 88–90°. Sol. ord. org. solvents.

Morgan, Harrison, *J. Soc. Chem. Ind.*, 1930, **49**, 418T.

5-Iodoacenaphthene.

Needles from EtOH. F.p. 62°. M.p. 65° (63–63·5°). D_4^{62} 1·6738. $n_D^{65·5}$ 1·6909.

Picrate: m.p. 102·5°.

Sachs, Mosebach, *Ber.*, 1910, **43**, 2475.
Crompton, Walker, *J. Chem. Soc.*, 1912, **101**, 963.

Iodoacetal.
See under Iodoacetaldehyde.

Iodoacetaldehyde

$CH_2I{\cdot}CHO$

C_2H_3OI MW, 170

Liq. at − 20°. Decomp. at 80°. Sol. EtOH, Et_2O, $CHCl_3$, CS_2. Insol. H_2O. D^{20} 2·14. KOH ⟶ CHI_3.

Di-Et acetal: iodoacetal. $C_6H_{13}O_2I$. MW, 244. B.p. 132°/90 mm., 115°/50 mm., 100°/10 mm. (82°/13 mm.).

Dawson, Marshall, *J. Chem. Soc.*, 1914, **105**, 388.
Losanitsch, *Ber.*, 1909, **42**, 4046.

Iodoacetamide

$CH_2I{\cdot}CO{\cdot}NH_2$

C_2H_4ONI MW, 185

Cryst. from H_2O. M.p. 95°.

Braun, *Ber.*, 1908, **41**, 2144.
Jacobs, Heidelberger, *J. Am. Chem. Soc.*, 1919, **41**, 2093.

***N*-Iodoacetamide** (*Acetiodoamide*)

$CH_3{\cdot}CO{\cdot}NHI$

C_2H_4ONI MW, 185

M.p. about 143° decomp. Sol. EtOH, AcOEt, Me_2CO. Spar. sol. Et_2O. Insol. C_6H_6, $CHCl_3$, ligroin.

Boismenu, *Compt. rend.*, 1911, **153**, 949.

Iodoacetanilide.
See under Iodoacetic Acid *and* Iodoaniline.

Iodo-acetanisidide.
See under Iodoaminophenol.

Iodoacetic Acid

$CH_2I{\cdot}COOH$

$C_2H_3O_2I$ MW, 186

Plates from pet. ether. M.p. 83° (82°).

Me ester: $C_3H_5O_2I$. MW, 200. B.p. 169–71°.

Et ester: $C_4H_7O_2I$. MW, 214. Oil. B.p. 178–80°, 142·5–143·5°/250 mm., 85–6°/25 mm., 73°/16 mm. $D_4^{13\cdot7}$ 1·8173. $n_D^{13\cdot7}$ 1·50789.

Propyl ester: $C_5H_9O_2I$. MW, 228. B.p. 198°.

Catechol ester: $C_{10}H_8O_4I_2$. MW, 446. M.p. 48–9°.

Resorcinol ester: m.p. 59–60°.

Hydroquinone ester: m.p. 112–13°.

Amide: *see* Iodoacetamide.

Chloride: C_2H_2OClI. MW, 204·5. Oil. B.p. 49–52°/15 mm. D^{25} 2·25.

Anhydride: $C_4H_4O_3I_2$. MW, 354. M.p. 46°.

Nitrile: C_2H_2NI. MW, 167. Oil. B.p. 182–4° decomp./720 mm., 76–7°/12 mm.

Anilide: iodoacetanilide. M.p. 143–4°.

Braun, *Ber.*, 1908, **41**, 2134.
Abderhalden, Guggenheim, *Ber.*, 1908, **41**, 2853.
Lukner, *Chem. Abstracts*, 1931, **25**, 1814.
Heritage, *Chem. Abstracts*, 1919, **13**, 3288.
Knoll, D.R.P., 230,172, (*Chem. Zentr.*, 1911, I, 359).

1-Iodoacetoacetic Acid

$CH_3{\cdot}CO{\cdot}CHI{\cdot}COOH$

$C_4H_5O_3I$ MW, 228

Et ester: iodoacetoacetic ester. $C_6H_9O_3I$. MW, 256. Liq. Decomp. on dist. in vacuo. D^{14} 1·7053. Sol. Et_2O. $FeCl_3$ ⟶ bluish-red col.

Brühl, *Ber.*, 1903, **36**, 1731.

Iodoacetone

$CH_3{\cdot}CO{\cdot}CH_2I$

C_3H_5OI MW, 184

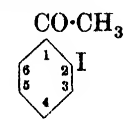
Yellow liq. B.p. 58·4°/11 mm. D^{15} 2·17.

Oxime: m.p. 64·5°.

Scholl, Matthaiopoulos, *Ber.*, 1896, **29**, 1557.

ω-Iodoacetophenone.
See Phenacyl iodide.

***o*-Iodoacetophenone**



C_8H_7OI MW, 246

Yellow oil. B.p. 139–40°/12 mm. D_4^{20} 1·746.

Oxime: m.p. 130–2°.

Auwers, Lechner, Bundesmann, *Ber.*, 1925, **58**, 50.

***p*-Iodoacetophenone.**
Plates from Et_2O. M.p. 85°. B.p. 153°/18 mm. Sol. EtOH, C_6H_6, AcOH, CS_2. Spar. sol. Et_2O, ligroin.

Kimura, *Ber.*, 1934, **67**, 395.

Iodoacetphenetidide.
See 2-Iodophenacetin.

Iodoacetylene

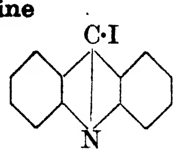
$CH{\vdots}CI$

C_2HI MW, 152

B.p. 32°.

Grignard, Tehéoufaki, *Compt. rend.*, 1929, **188**, 357.

5-Iodoacridine



$C_{13}H_8NI$ MW, 305

Brownish-yellow needles. M.p. 171° (169°). Sol. $CHCl_3$. Mod. sol. EtOH.

Picrate: m.p. 204°.

Edinger, *Ber.*, 1900, **33**, 3770.
Kalle, D.R.P., 126,795, (*Chem. Zentr.*, 1902, I, 80).

1-Iodoacrolein

CH_2:CI·CHO

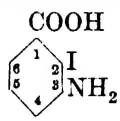
C_2H_3OI MW, 170

Reddish coloured, unstable liq. B.p. 37°/8–9 mm. Lachrymatory.

Berlande, *Bull. soc. chim.*, 1925, **37**, 1393.

Iodo-*o*-aminobenzoic Acid.
See Iodoanthranilic Acid.

2-Iodo-*m*-aminobenzoic Acid



$C_7H_6O_2NI$ MW, 263

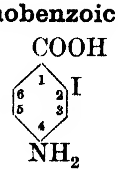
B,HCl: m.p. 262–3°.
N-*Acetyl*: m.p. 199°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 454.
Christie, James, Kenner, *J. Chem. Soc.*, 1923, **123**, 1949.

5-Iodo-*m*-aminobenzoic Acid.
Cryst. from EtOH.Aq. M.p. 197°. Sol. AcOH.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 504.

2-Iodo-*p*-aminobenzoic Acid



$C_7H_6O_2NI$ MW, 263

Needles from EtOH.Aq. Decomp. at 180° (m.p. 188° decomp.). Sol. EtOH, Et_2O, $CHCl_3$, hot H_2O.

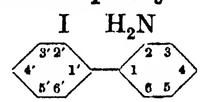
B,HCl: decomp. above 210°.
Me ester: $C_8H_8O_2NI$. MW, 277. M.p. 112°.
N-*Acetyl*: m.p. 213–14°.

Wheeler, Johns, *Am. Chem. J.*, 1910, **44**, 446.
Brenans, Prost, *Compt. rend.*, 1924, **178**, 1555.

3-Iodo-*p*-aminobenzoic Acid.
Yellow prisms. M.p. 201–2°.
N-*Acetyl*: needles from H_2O. M.p. 230°.
N-*Di-Me*: $C_9H_{10}O_2NI$. MW, 291. Needles from EtOH. M.p. 190–1° decomp.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 454.
Reverdin, *Ber.*, 1907, **40**, 3689.

2′-Iodo-2-aminodiphenyl



$C_{12}H_{10}NI$ MW, 295

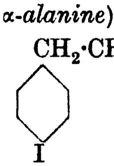
Prisms. M.p. 129–30°.

Mascarelli, Gatti, *Atti accad. Lincei*, 1931, **13**, 891, (*Chem. Abstracts*, 1932, **26**, 1272).

4′-Iodo-4-aminodiphenyl (4′-*Iodoxenylamine*).
Yellow leaflets from EtOH. M.p. 166–7° (159°).
B,HCl: m.p. 295° decomp.
N-*Benzylidene*: m.p. 208·5–209·5°.
N-p-*Dimethylaminobenzylidene*: m.p. 204°.
N-*Piperonylidene*: m.p. 150–1°.

Guglialmelli, Franco, *Chem. Abstracts*, 1932, **26**, 4327.
Kawai, *Chem. Zentr.*, 1930, II, 1969.

4-Iodo-α-aminohydrocinnamic Acid (4-*Iodophenyl-α-alanine*)

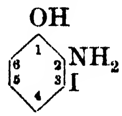


$C_9H_{10}O_2NI$ MW, 291

Thin scales from AcOH. M.p. 276° (270°) decomp. Spar. sol. EtOH. Very spar. sol. hot H_2O.
Hydrochloride: plates. Decomp. at 248°.
Et ester: $C_{11}H_{14}O_2NI$. MW, 319. Oil. B.p. 223–6°/25 mm. *Picrate*: m.p. 200–203°.

Wheeler, Clapp, *Am. Chem. J.*, 1908, **40**, 463.
Abderhalden, Brossa, *Ber.*, 1909, **42**, 3414.

3-Iodo-*o*-aminophenol



C_6H_6ONI MW, 235

Needles. M.p. 137° decomp.

Hodgson, Kershaw, *J. Chem. Soc.*, 1928, 2704.

4-Iodo-*o*-aminophenol.

Needles. M.p. 139°.

Me ether: 4-iodo-*o*-anisidine. C_7H_8ONI. MW, 249. M.p. 87°.

Robinson, *J. Chem. Soc.*, 1916, **109**, 1084.
Hunter, Barnes, *J. Chem. Soc.*, 1928, 2057.

5-Iodo-*o*-aminophenol.

Needles. M.p. 141°.

Me ether: 5-iodo-*o*-anisidine. C_7H_8ONI. MW, 249. N-*Acetyl*: 5-iodo-*o*-acetanisidide. M.p. 175–6°.

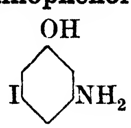
Hodgson, Kershaw, *J. Chem. Soc.*, 1928, 2705.

6-Iodo-*o*-aminophenol.

Me ether: 6-iodo-*o*-anisidine. C_7H_8ONI. MW, 249. Cryst. from EtOH.Aq. M.p. 49°. N-*Acetyl*: 6-iodo-*o*-acetanisidide. M.p. 176°.

Dains, Magers, *J. Am. Chem. Soc.*, 1930, 52, 1573.

5-Iodo-*m*-aminophenol



C_6H_6ONI MW, 235

Me ether: 5-iodo-*m*-anisidine. C_7H_8ONI. MW, 249. M.p. 86·5°.

Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2078.

2-Iodo-*p*-aminophenol

C_6H_6ONI MW, 235

Me ether: 2-iodo-*p*-anisidine. C_7H_8ONI. MW, 249. Needles from H_2O. M.p. 74–5°. Volatile in steam. *Picrate*: decomp. at 207°. N-*Acetyl*: 2-iodo-*p*-acetanisidide. M.p. 152–3°.

Et ether: 2-iodo-*p*-phenetidine. $C_8H_{10}ONI$. MW, 263. *Picrate*: decomp. at 180°. N-*Acetyl*: *see* 2-Iodophenacetin.

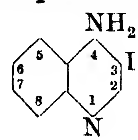
Reverdin, *Ber.*, 1896, **29**, 998.

3-Iodo-*p*-aminophenol.

Plates. M.p. 145·5°.

Hodgson, Kershaw, *J. Chem. Soc.*, 1928, 2704.

3-Iodo-4-aminoquinoline



$C_9H_7N_2I$ MW, 270

Needles from hot H_2O. M.p. 197°.

Claus, Frobenius, *J. prakt. Chem.*, 1897, **56**, 193.

6-Iodo-5-aminoquinoline.

Yellow needles from EtOH. M.p. 176°.

N-*Acetyl*: m.p. 197°.

Howitz, Fraenkel, Schroeder, *Ann.*, 1913, **396**, 73.

8-Iodo-5-aminoquinoline.

Brown needles + $1H_2O$. from EtOH.Aq., m.p. 148°: prisms from C_6H_6, m.p. 155°.

N-*Benzoyl*: m.p. 218°.

Howitz, Fraenkel, Schroeder, *Ann.*, 1913, **396**, 60.

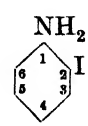
5-Iodo-8-aminoquinoline.

Yellowish-brown needles from EtOH.Aq. M.p. 122°.

N-*Benzoyl*: m.p. 161°.

Howitz, Fraenkel, Schroeder, *Ann.*, 1913, **396**, 70.

***o*-Iodoaniline**



C_6H_6NI MW, 219

Needles. M.p. 60–1° (56·5°). Sol. ord. org. solvents. Spar. sol. H_2O. Volatile in steam.

B,HCl: m.p. 153–4°.

N-*Acetyl*: *o*-iodoacetanilide. C_8H_8ONI. MW, 261. M.p. 109–10°.

Baeyer, *Ber.*, 1905, **38**, 2760.
Ries, *Zeitschrift für Kristallographie*, 1923, **58**, 340.

m-Iodoaniline.

Leaflets. M.p. 33° (25°). B.p. 145–6°/15 mm.

B,HCl: m.p. 260°.

N-*Acetyl*: *m*-iodoacetanilide. M.p. 119·5°.

N-*Chloroacetyl*: m.p. 121·5–122·5°.

N-*Benzoyl*: *m*-iodobenzanilide. $C_{13}H_{10}ONI$. MW, 323. M.p. 156–7°.

N-p-*Toluenesulphonyl*: m.p. 128°.

McCombie, Ward, *J. Chem. Soc.*, 1913, **103**, 1999.
Körner, Wender, *Gazz. chim. ital.*, 1887, **17**, 489.

p-Iodoaniline.

M.p. 67–8° (62°). Sol. EtOH. Mod. sol. Et_2O. Spar. sol. pet. ether. Volatile in steam.

N-*Formyl*: *p*-iodoformanilide. C_7H_6ONI. MW, 247. M.p. 08–9°.

N-*Acetyl*: *p*-iodoacetanilide. M.p. 184°.

N-*Chloroacetyl*: m.p. 191–4°.

N-*Diacetyl*: m.p. 108·5°.

N : N′-*Malonyl*: m.p. 267°.

N-*Benzoyl*: *p*-iodobenzanilide. M.p. 222°.

N-p-*Iodobenzoyl*: m.p. 287°.

N-o-*Nitrobenzoyl*: m.p. 208°.

N-m-*Nitrobenzoyl*: m.p. 202°.

N-p-*Nitrobenzoyl*: m.p. 269°.

N-*Cinnamoyl*: m.p. 204°.

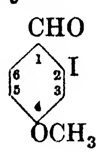
N-*Phenylacetyl*: m.p. 200°.

N-*Benzylidene*: m.p. 85·5°.

N-*Anisylidene*: m.p. 151°.

Brewster, *Organic Syntheses*, 1931, XI, 62 (*Bibl.*).

2-Iodoanisaldehyde



$C_8H_7O_2I$ MW, 262

Colourless needles from EtOH. M.p. 115°. Volatile in steam.

Oxime: m.p. 101°.

Semicarbazone: m.p. 211°.

p-*Nitrophenylhydrazone*: m.p. 247° decomp.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.

3-Iodoanisaldehyde.

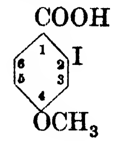
Prisms or plates from Et_2O. M.p. 107°. Very sol. EtOH. Sol. C_6H_6. Mod. sol. Et_2O. Spar. sol. ligroin.

Oxime: m.p. 130°.

Phenylhydrazone: cryst. from EtOH. M.p. 106·5–107°.

Seidel, *J. prakt. Chem.*, 1899, **59**, 141; 1898, **57**, 206.

2-Iodoanisic Acid



$C_8H_7O_3I$ MW, 278

M.p. 184°.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3044.

3-Iodoanisic Acid.

Needles from EtOH. M.p. 234·5°. Sublimes in leaflets. Sol. 165 parts cold Et_2O. Very spar. sol. hot H_2O.

Me ester: $C_9H_9O_3I$. MW, 292. Cryst. from pet. ether. M.p. 94–5°.

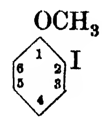
Et ester: $C_{10}H_{11}O_3I$. MW, 306. Cryst. from pet. ether. M.p. 64·75–65·75°.

Willgerodt, Burkhard, *Ann.*, 1912, **389**, 294.
Seidl, *J. prakt. Chem.*, 1899, **59**, 147.

Iodoanisidine.

See under Iodoaminophenol.

o-Iodoanisole



C_7H_7OI MW, 234

Oil. B.p. 239–40°/730 mm. (238°). Sol. EtOH, Et_2O, AcOH, $CHCl_3$, C_6H_6, ligroin. D^{20} 1·8.

Jannasch, Hinterskirch, *Ber.*, 1898, **31**, 1710.
Reverdin, *Ber.*, 1896, **29**, 997.

m-Iodoanisole.

Oil. B.p. 244–5°, 123°/14 mm., 110–110·5°/11 mm. Sol. EtOH, Et_2O.

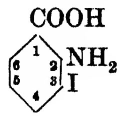
Buchan, McCombie, *J. Chem. Soc.*, 1932, 2859.

p-Iodoanisole.

Needles from MeOH.Aq. M.p. 51–2°. B.p. 237°/726 mm.

Matheson, McCombie, *J. Chem. Soc.*, 1931, 1106.
Blicke, Smith, *J. Am. Chem. Soc.*, 1928, **50**, 1229.

3-Iodoanthranilic Acid.



$C_7H_6O_2NI$ MW, 263

M.p. 137°. Sol. H_2O.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 500.

4-Iodoanthranilic Acid.

Prisms from EtOH.Aq. Decomp. at 208°. Sol. EtOH, Et_2O. Spar. sol. H_2O, C_6H_6.

N-*Me*: $C_8H_8O_2NI$. MW, 277. M.p. 197°.

N-*Et*: $C_9H_{10}O_2NI$. MW, 291. M.p. 188° decomp.

Wheeler, Johns, *Am. Chem. J.*, 1910, **44**, 449.

5-Iodoanthranilic Acid.

Prisms from EtOH. M.p. 210°. Sol. ord. org. solvents.

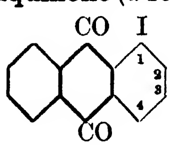
N-*Acetyl*: needles from 50% EtOH. M.p. 235°.

N-*Et*: $C_9H_{10}O_2NI$. MW, 291. Cryst. from EtOH. M.p. 162° decomp.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 500.

Wheeler, Johns, *Am. Chem. J.*, 1910, **43**, 403.

1-Iodoanthraquinone (α-*Iodoanthraquinone*)



$C_{14}H_7O_2I$ MW, 334

Cryst. from AcOH. M.p. 177°.

Laubé, *Ber.*, 1907, **40**, 3566.

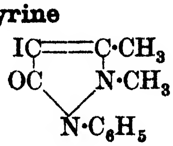
2-Iodoanthraquinone (β-*Iodoanthraquinone*).

Yellow needles from EtOH. M.p. 175–6°. Sol. C_6H_6, toluene, $CHCl_3$, hot AcOH. Spar. sol. Et_2O, MeOH.

Scholl, Neovius, *Ber.*, 1911, **44**, 1088.

Kaufler, *Ber.*, 1904, **37**, 60.

4-Iodoantipyrine



$C_{11}H_{11}ON_2I$ MW, 314

Needles. M.p. 160–1°.

Emery, Palkin, *J. Am. Chem. Soc.*, 1916, **38**, 2166.

Bougault, Robin, *Compt. rend.*, 1921, **172**, 452.

Bougault, *Chem. Abstracts*, 1920, **14**, 177.

Iodoaspirin.

See under Iodosalicylic Acid.

12-(or 13-)Iodobehenic Acid

$CH_3\cdot[CH_2]_8\cdot CHI\cdot[CH_2]_{11}\cdot COOH$

or

$CH_3\cdot[CH_2]_7\cdot CHI\cdot[CH_2]_{12}\cdot COOH$

$C_{22}H_{43}O_2I$ MW, 466

Solid. Sn + HCl ⟶ behenic acid.

Ca salt: saiodin. Powder. Insol. H_2O, EtOH.

Et ester: $C_{24}H_{47}O_2I$. MW, 494. M.p. 29°.

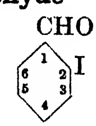
Amide: $C_{22}H_{44}ONI$. MW, 465. Cryst. from EtOH.Aq. M.p. 78°.

Bayer, D.R.Ps., 248,993, (*Chem. Zentr.*, 1912, II, 395), 180,622, (*Chem. Zentr.*, 1907, I, 773); 186,214, (*Chem. Zentr.*, 1907, II, 956).

Epifanow, *Chem. Zentr.*, 1908, I, 2019.

See also Abderhalden, Hirsch, *Z. physiol. Chem.*, 1911, **75**, 45.

***o*-Iodobenzaldehyde**



C_7H_5OI MW, 232

M.p. 37°. Volatile in steam.

Oxime: m.p. 107–8°.

Semicarbazone: m.p. 206°.

Phenylhydrazone: m.p. 79°.

Weitzenböck, *Monatsh.*, 1913, **34**, 206.

***m*-Iodobenzaldehyde.**

Prisms from EtOH. M.p. 57°.

Oxime: m.p. 62–3°.

Semicarbazone: m.p. 225–6°.

Phenylhydrazone: m.p. 155°.

p-*Nitrophenylhydrazone*: m.p. 212–13° (208°).

Patterson, *J. Chem. Soc.*, 1896, **69**, 1002.

Shoppee, *J. Chem. Soc.*, 1932, 700.

Hodgson, Beard, *J. Soc. Chem. Ind.*, 1926, **45**, 91T.

***p*-Iodobenzaldehyde.**

Needles from EtOH.Aq. M.p. 77–8°. B.p. 264·5°/725 mm.

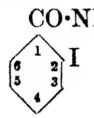
syn-*Oxime*: m.p. 160° (150°). *Acetyl deriv.*: m.p. 127°.

anti-*Oxime*: m.p. 122° (111°).

Semicarbazone: m.p. 224–5°.
Phenylhydrazone: m.p. 121°.
p-*Nitrophenylhydrazone*: m.p. 201°.

Willgerodt, Ucke, *J. prakt. Chem.*, 1912, **86**, 276.
Shoppee, *J. Chem. Soc.*, 1931, 1232.

o-Iodobenzamide



C_7H_6ONI MW, 247

Needles. M.p. 183·6°.

Remsen, Reid, *Am. Chem. J.*, 1899, **21**, 289.

m-Iodobenzamide.
M.p. 186·5°.

See previous reference.

p-Iodobenzamide.
M.p. 217·6°.

See previous reference.

Iodobenzanilide.
See under Iodoaniline.

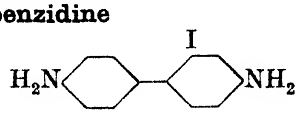
Iodobenzene

C_6H_5I MW, 204

F.p. − 31·35°. M.p. − 30·5° (− 28·5°). B.p. 188·45°, 75°/10 mm. D_4^{15} 1·83829. $n_D^{17·8}$ 1·6213. Heat of comb. C_p 770·7 Cal., C_v 770·0 Cal. Sol. most org. solvents. Insol. H_2O.

Dains, Brewster, *Organic Syntheses*, 1929, IX, 46 (*Bibl.*).
Kimura, *Ber.*, 1934, **67**, 394.

2-Iodobenzidine



$C_{12}H_{11}N_2I$ MW, 310

B,2HCl: reddish-yellow cryst.
N : N′-*Diacetyl*: m.p. 310–11°.

Sako, *Bull. Chem. Soc. Japan*, 1934, **9**, 153.

o-Iodobenzoic Acid

$C_7H_5O_2I$ MW, 248

Needles from H_2O. M.p. 162°. Sol. EtOH Et_2O. Spar. sol. H_2O. $k = 1·4 \times 10^{-3}$ at 25°. Heat of comb. C_v 769·4 Cal. D^{20} 2·249.
Me ester: $C_8H_7O_2I$. MW, 262. B.p. 277–8°/729 mm., 167°/25 mm., 145–6°/16 mm.
Et ester: $C_9H_9O_2I$. MW, 276. B.p. 275°, 163–5°/23 mm., 148°/15 mm.
p-*Nitrobenzyl ester*: m.p. 110·8°.
Phenacyl ester: m.p. 71°.
p-*Bromophenacyl ester*: m.p. 110·2°
l-*Menthyl ester*: $C_{17}H_{23}O_2I$. MW, 386. D_4^{19} 1·375. $[\alpha]_D^{19}$ − 61·35°.
Chloride: C_7H_4OClI. MW, 266·5. M.p. 35–40° (30–1°). B.p. 159°/27 mm., 135°/19 mm.
Amide: *see* o-Iodobenzamide.
Nitrile: C_7H_4NI. MW, 229. M.p. 54–5°.

Cattelain, *Bull. soc. chim.*, 1927, **41**, 1547.
Hannon, Kenner, *J. Chem. Soc.*, 1934, 138.
Kelly, Segura, *J. Am. Chem. Soc.*, 1934, **56**, 2497.
Cohen, Raper, *J. Chem. Soc.*, 1904, **85**, 1272.

m-Iodobenzoic Acid.
Cryst. from Me_2CO. M.p. 187–8° (186·5°). Sol. EtOH. Spar. sol. H_2O. Sublimes. $k = 1·63 \times 10^{-4}$ at 25°.
Me ester: m.p. 54–5° (50°). B.p. 276–7°/739 mm., 149–50°/18 mm.
Et ester: b.p. 165–6°/24 mm., 150·5°/15 mm.
p-*Nitrobenzyl ester*: m.p. 121°.
Phenacyl ester: m.p. 115–16°.
p-*Bromophenacyl ester*: m.p. 127–8°.
l-*Menthyl ester*: D_4^{19} 1·376. $[\alpha]_D$ − 58·4° in Py.
Chloride: b.p. 159–60°/23 mm.
Anhydride: $C_{14}H_8O_3I_2$. MW, 478. M.p. 134°.
Amide: *see* m-Iodobenzamide.

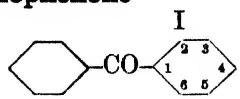
Cattelain, *Bull. soc. chim.*, 1927, **41**, 1546.
Varma, Panicker, *J. Indian Chem. Soc.*, 1930, **7**, 503.
Frankland, Carter, Adams, *J. Chem. Soc.*, 1912, **101**, 2482.
See also last two references above.

p-Iodobenzoic Acid.
Cryst. from EtOH.Aq. M.p. 270° (267°). D^{20} 2·184. Sublimes.
Me ester: m.p. 114°.
Et ester: b.p. 153·5°/14 mm.
p-*Nitrobenzyl ester*: m.p. 140·6°.
Phenacyl ester: m.p. 101° decomp.
p-*Bromophenacyl ester*: m.p. 146·4°.
l-*Menthyl ester*: D_4^{19} 1·312. $[\alpha]_D$ − 69·7° in C_6H_6.
Chloride: m.p. 83° (77–8°). B.p. 163–4°/32 mm.

Anhydride : m.p. 228°.
Amide : *see* p-Iodobenzamide.

Whitmore, Woodward, *Organic Syntheses*, 1927, VII, 58 (*Bibl.*).
Kelly, Segura, *J. Am. Chem. Soc.*, 1934, **56**, 2497.

2-Iodobenzophenone



$C_{13}H_9OI$ MW, 308

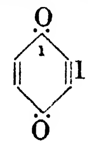
Cryst. M.p. 32°. B.p. 210–11°/13 mm.
Oxime : m.p. 152°.

Koopal, *Rec. trav. chim.*, 1915, **34**, 156.

4-Iodobenzophenone.
Cryst. from MeOH. M.p. 100–1° (102–3°).
Oxime : (α) m.p. 178°; (β) m.p. 132–4°.

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1932, **135**, 258.

Iodobenzoquinone (*Iodoquinone*)

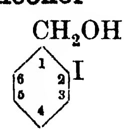


$C_6H_3O_2I$ MW, 234

1-*Oxime* : *syn*-, m.p. 185–95° : *anti*-, decomp. about 185°.

Hodgson, Moore, *J. Chem. Soc.*, 1925, 2260.
Hodgson, Kershaw, *J. Chem. Soc.*, 1930, 1970.

o-Iodobenzyl Alcohol



C_7H_7OI MW, 234

Needles from H_2O. M.p. 89·5–90°.

Olivier, *Rec. trav. chim.*, 1923, **42**, 516.

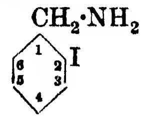
m-Iodobenzyl Alcohol.
B.p. 165°/16 mm.
Cinnamate : m.p. 35°.

See previous reference and also
Clarke, Moore, McArthur, *Brit. Chem. Abstracts*, 1935, 210.

p-Iodobenzyl Alcohol.
Cryst. from CS_2. M.p. 71·75°. Sol. EtOH, Et_2O, C_6H_6, CS_2. Spar. sol. H_2O.

Jackson, Mabery, *Ber.*, 1878, **11**, 56.

o-Iodobenzylamine



C_7H_8NI MW, 233

Liq.
N-*Benzoyl* : m.p. 154°.

Mabery, Robinson, *Am. Chem. J.*, 1882, **4**, 103.

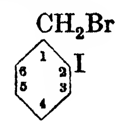
m-Iodobenzylamine.
B.p. 132°/8 mm.
N-*Acetyl* : needles from ligroin. M.p. 114·5°.
N-*Benzoyl* : plates from $CHCl_3$–ligroin. M.p. 132°.
Picrate : needles from EtOH. M.p. 210° (decomp.).

Shoppee, *J. Chem. Soc.*, 1932, 702.

p-Iodobenzylamine.
M.p. 45°.
B,HCl : m.p. 240°.
Carbonate : m.p. 113°.
N-*Acetyl* : needles. M.p. 132°.
N-*Benzylidene* : needles from MeOH. M.p. 58·8°.
Picrate : m.p. 231° decomp.

Shoppee, *J. Chem. Soc.*, 1931, 1235.
Jackson, Mabery, *Am. Chem. J.*, 1880, **2**, 257.

o-Iodobenzyl bromide



C_7H_6BrI MW, 297

Prisms. M.p. 52–3°. Sol. C_6H_6, CS_2, $CHCl_3$, hot EtOH. Spar. sol. ligroin.

Mabery, Robinson, *Am. Chem. J.*, 1882, **4**, 101.

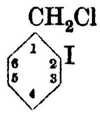
m-Iodobenzyl bromide.
Prisms from ligroin. M.p. 50–50·5° (49–49·5°).

Shoppee, *J. Chem. Soc.*, 1932, 702.
Olivier, *Rec. trav. chim.*, 1923, **42**, 516.

p-Iodobenzyl bromide.
Needles from EtOH. M.p. 78·75°. Sol. Et_2O, C_6H_6, CS_2. Spar. sol. EtOH, AcOH.

Wheeler, Clapp, *Am. Chem. J.*, 1908, **40**, 460.

o-Iodobenzyl chloride



C_7H_6ClI MW, 252·5

M.p. 28·5–29·5°.

Olivier, *Rec. trav. chim.*, 1923, **42**, 516.

m-Iodobenzyl chloride.

M.p. 26·5–27·5°.

See previous reference.

p-Iodobenzyl chloride.

Yellow liq. Volatile in steam. $CrO_3 \longrightarrow$ *p*-iodobenzoic acid.

Caldwell, Werner, *J. Chem. Soc.*, 1907, **91**, 248.

p-Iodobenzyl cyanide.

See under p-Iodophenylacetic Acid.

Iodobutane.

See n-Butyl iodide *and sec.-n*-Butyl iodide.

1-Iodo-1-butylene

$CH_3{\cdot}CH_2{\cdot}CH{:}CHI$

C_4H_7I MW, 182

Cis:

B.p. 168°.

Trans:

Yellow oil. B.p. 127–8°, 57°/30 mm. Sol. Et_2O, EtOH, C_6H_6. Insol. H_2O.

Kaufmann, Schweitzer, *Ber.*, 1922, **55**, 260.

1-Iodo-2-butylene (*Crotonyl iodide*)

$CH_3{\cdot}CH{:}CH{\cdot}CH_2I$

C_4H_7I MW, 182

B.p. 132–3° decomp. (131–3°), 61–2°/50 mm. D^0 1·6823.

Charon, *Ann. chim.*, 1899, **17**, 240.

1-Iodobutyric Acid

$CH_3{\cdot}CH_2{\cdot}CHI{\cdot}COOH$

$C_4H_7O_2I$ MW, 214

Needles from pet. ether. M.p. 41–2°. Sol. EtOH, Et_2O, pet. ether, Me_2CO. Spar. sol. H_2O.

Et ester: $C_6H_{11}O_2I$. MW, 242. B.p. 190–2° decomp., 100–1°/21 mm. D^{17} 1·570.

Hell, *Ber.*, 1873, **6**, 30.
Sernow, *Chem. Zentr.*, 1901, I, 665.
Bodroux, Taboury, *Compt. rend.*, 1907, **144**, 1217.

3-Iodobutyric Acid

$CH_2I{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

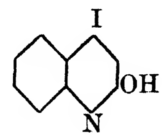
$C_4H_7O_2I$ MW, 214

Cryst. M.p. 40–1°. Spar. sol. H_2O.

Me ester: $C_5H_9O_2I$. B.p. 198–200°. D^5 1·666.

Henry, *Compt. rend.*, 1886, **102**, 369.

4-Iodocarbostyril (*4-Iodo-2-hydroxyquinoline*)

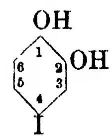


C_9H_6ONI MW, 271

M.p. 276°. Sublimes.

Baeyer, Bloem, *Ber.*, 1882, **15**, 2149.

4-Iodocatechol



$C_6H_5O_2I$ MW, 236

Leaflets from CCl_4. M.p. 92° (about 50°). Sol. EtOH, Et_2O, Me_2CO. Mod. sol. H_2O, C_6H_6, $CHCl_3$. Spar. sol. CCl_4, pet. ether. Sublimes. $FeCl_3 \longrightarrow$ green col.

1 : 2-*Diacetyl*: b.p. 148–50°/0·8 mm.
1-*Me ether*: *see* 4-Iodoguaiacol.
2-*Me ether*: *see* Guaiadol.
Di-Me ether: *see* 4-Iodoveratrol.

Fourneau, Druey, *Compt. rend.*, 1934, **199**, 870.

α-Iodocinnamic Acid

$C_6H_5{\cdot}CH{:}CI{\cdot}COOH$

$C_9H_7O_2I$ MW, 274

?-*Cis*:

(i) Cryst. from C_6H_6. M.p. 130° decomp. $k = 5{\cdot}8 \times 10^{-3}$ at 25°. (ii) Yellow cryst. M.p. 110–11°.

Me ester: $C_{10}H_9O_2I$. MW, 288. B.p. 114–15/0·4 mm.

?-*Trans*:

Needles from C_6H_6. M.p. 162–3°. Sol. ord. org. solvents. Spar. sol. H_2O, pet. ether. $k = 5 \times 10^{-4}$ at 25°.

Me ester: b.p. 132–3°/0·35 mm. $D_4^{20{\cdot}5}$ 1·6679. $n_D^{20{\cdot}5}$ 1·633.

$C_9H_7O_2I, C_6H_5{\cdot}NH_2$: m.p. 108°.

Stoermer, Kirchner, *Ber.*, 1920, **53**, 1291.
James, *J. Chem. Soc.*, 1913, **103**, 1369.

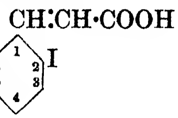
β-Iodocinnamic Acid

$C_6H_5 \cdot CI:CH \cdot COOH$

$C_9H_7O_2I$ MW, 274

Cis:
M.p. 187–8°. $k = 2{\cdot}31 \times 10^{-4}$ at 25°.
Trans:
M.p. 127–8°. $k = 4 \times 10^{-4}$ at 25°.
See second reference above.

***o*-Iodocinnamic Acid**



$C_9H_7O_2I$ MW, 274

Cryst. from MeOH. M.p. 216–17°.
Me ester: $C_{10}H_9O_2I$. MW, 288. B.p. 300–10° decomp.
Et ester: $C_{11}H_{11}O_2I$. MW, 302. B.p. 192°/22 mm.
m-*Tolyl ester*: $C_{16}H_{13}O_2I$. MW, 364. M.p. 74°.
Chloride: C_9H_6OClI. MW, 292·5. M.p. 63–4°.
Amide: C_9H_8ONI. MW, 273. Plates from MeOH. M.p. 204–5°.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 295.
Willstaedt, *Ber.*, 1931, **64**, 2691 (*Footnote*).
Kindler, *Ann.*, 1928, **464**, 291.
Weitzenböck, *Monatsh.*, 1913, **34**, 211.
Kalle, D.R.P., 105,242, (*Chem. Zentr.*, 1900, I, 704).

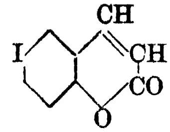
***m*-Iodocinnamic Acid.**
M.p. 191–2° decomp. Sol. C_6H_6, ligroin, hot EtOH. Spar. sol. H_2O.
Et ester: m.p. 36–7°.
m-*Tolyl ester*: m.p. 40–1°.
Benzyl ester: m.p. 50°.
Chloride: m.p. 35·3°.

Gabriel, Herzberg, *Ber.*, 1883, **16**, 2039.
Clarke, Moore, McArthur, *Brit. Chem. Abstracts*, 1935, 210.
See also last reference above.

***p*-Iodocinnamic Acid.**
Cryst. from AcOH. M.p. 225° (255°).
Et ester: $C_{11}H_{11}O_2I$. MW, 302. M.p. 37°. B.p. 210°/20 mm.
m-*Tolyl ester*: m.p. 85–6°.

Kindler, *Ann.*, 1928, **464**, 291.
Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 295.
Kalle, D.R.P., 105,242, (*Chem. Zentr.*, 1900, I, 704).

6-Iodocoumarin

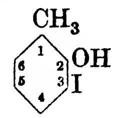


$C_9H_5O_2I$ MW, 272

Needles. M.p. 165°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Seidel, *J. prakt. Chem.*, 1899, **59**, 123.
Dey, Row, *J. Chem. Soc.*, 1924, **125**, 560.

3-Iodo-*o*-cresol



C_7H_7OI MW, 234

Me ether: C_8H_9OI. MW, 248. Oil. B.p. 200°/19 mm.

Robinson, *J. Chem. Soc.*, 1916, **109**, 1084.

4-Iodo-*o*-cresol.
M.p. 65°.

Hodgson, Moore, *J. Chem. Soc.*, 1926, 2037.

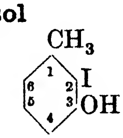
5-Iodo-*o*-cresol.
Me ether: plates from AcOH. M.p. 79–80°.

Robinson, *J. Chem. Soc.*, 1916, **109**, 1085.

6-Iodo-*o*-cresol.
Needles from H_2O. M.p. 90°.

Noelting, *Ber.*, 1904, **37**, 1024.

2-Iodo-*m*-cresol



C_7H_7OI MW, 234

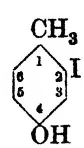
Me ether: C_8H_9OI. MW, 248. M.p. 49°. B.p. 99°/1 mm.

Sugii, Shindo, *Chem. Zentr.*, 1935, I, 698.

4-Iodo-*m*-cresol.
Me ether: oil. B.p. 101°/1·5 mm.

See previous reference.

2-Iodo-*p*-cresol



C_7H_7OI MW, 234

Needles from H_2O. M.p. 63–4°. Sol. ord. org. solvents, hot H_2O.
Benzoyl: m.p. 53°.

Pummerer, Puttfarchin, Schlopflucher, *Ber.*, 1925, **58**, 1818.

3-Iodo-p-cresol.
Needles from pet. ether. M.p. 35°. B.p. 117°/12 mm. Sol. ord. org. solvents. Insol. H_2O. Volatile in steam.
Me ether: C_8H_9OI. MW, 248. B.p. 237–8°.

Dimroth, *Ber.*, 1902, **35**, 2859.
Schall, Drale, *Ber.*, 1884, **17**, 2533.

1-Iodocrotonic Acid

$CH_3·CH:CI·COOH$

$C_4H_5O_2I$ MW, 212

Colourless needles from H_2O. M.p. 113°.

Ingold, Smith, *J. Chem. Soc.*, 1931, 2745.

3-Iodocrotonic Acid

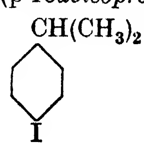
$CH_2I·CH:CH·COOH$

$C_4H_5O_2I$ MW, 212

Yellow cryst. from ligroin. M.p. 108°.
Et ester: $C_6H_9O_2I$. MW, 240. B.p. 90–2°/2 mm. slight decomp. Sol. ord. org. solvents. Spar. sol. ligroin. Lachrymatory and vesicant.

Braun, *J. Am. Chem. Soc.*, 1930, **52**, 3174.

p-Iodocumene (p-*Iodoisopropylbenzene*)

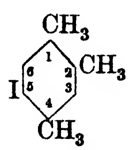


$C_9H_{11}I$ MW, 246

B.p. 236–8°.
Dichloride: p-isopropylphenyl iodide-chloride. $C_9H_{11}ICl_2$. Yellow powder. Decomp. at 110°.

Boedtker, *Bull. soc. chim.*, 1929, **45**, 645.
Schreiner, *J. prakt. Chem.*, 1910, **81**, 562.

5-Iodo-ψ-cumene (5-*Iodo*-1 : 2 : 4-*trimethylbenzene*)



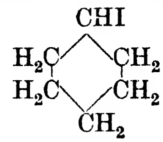
$C_9H_{11}I$ MW, 246

Colourless flakes from EtOH. M.p. 37°. B.p. 256–8°. Heat with Cu at 260° → hexamethyldiphenyl.

Dichloride (*iodide-chloride*): yellow cryst. Decomp. at 66°.

Morgan, Coulson, *J. Chem. Soc.*, 1929, 2553.
Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913, **88**, 93.
Willgerodt, Meyer, *Ann.*, 1911, **385**, 341.
Wallach, Heusler, *Ann.*, 1888, **243**, 233.

Iodocyclohexane (*Cyclohexyl iodide*)

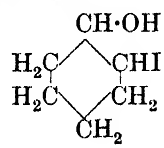


$C_6H_{11}I$ MW, 210

B.p. 180° slight decomp., 114°/80 mm., 100–1°/45 mm., 69°/10 mm. D_{15}^{15} 1·626. Zn + HCl or AcOH ⟶ cyclohexane.

Rosanow, *Chem. Zentr.*, 1924, I, 2425.
Zelinsky, *Ber.*, 1901, **34**, 2801.

2-Iodocyclohexanol

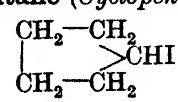


$C_6H_{11}OI$ MW, 226

Colourless prisms. M.p. 42°. Decomp. above 100°. Sublimes in vacuo. Volatile in steam with slight decomp. Insol. H_2O. Easily sol. most org. solvents. Hot KOH.Aq. ⟶ *cis*-cyclohexandiol-1 : 2. KOH or Ag_2O in Et_2O ⟶ cyclohexene oxide.
Me ether: $C_7H_{13}OI$. MW, 240. B.p. 114°/49 mm. D^{14} 1·565.
Et ether: $C_8H_{15}OI$. MW, 254. B.p. 118°/47 mm. D^{15} 1·484.

Tiffeneau, *Compt. rend.*, 1914, **159**, 772.
Brunel, *Compt. rend.*, 1902, **135**, 1056; *Ann. chim.*, 1905, **6**, 219.

Iodocyclopentane (*Cyclopentyl iodide*)

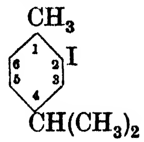


C_5H_9I MW, 196

Oil. B.p. 166–7°, 78–9°/46 mm. D_4^{20} 1·7096. n_D^{20} 1·5447. Hot alc. KOH ⟶ cyclopentene. Zn + HCl or AcOH ⟶ cyclopentane.

Rosanow, *Chem. Zentr.*, 1916, I, 925.
Wislicenus, Hentzschel, *Ann.*, 1893, **275**, 324.

2-Iodo-*p*-cymene



$C_{10}H_{13}I$ MW, 260

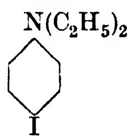
B.p. 139°/23 mm., 125°/14 mm. D^{14} 1·46.
Dichloride: $C_{10}H_{13}ICl_2$. Yellow cryst. M.p. 92·5° decomp.

Klages, *Ber.*, 1907, **40**, 2368.
Klages, Storp, *J. prakt. Chem.*, 1902, **65**, 572.

3-Iodo-*p*-cymene.
B.p. 122–4°/13 mm., 80°/5 mm. D^{13} 1·52. Rapidly darkens in air.
Dichloride: $C_{10}H_{13}ICl_2$. M.p. 87°.

Klages, Storp, *J. prakt. Chem.*, 1902, **65**, 573.
Edinger, Goldberg, *Ber.*, 1900, **33**, 2882.

p-Iododiethylaniline



$C_{10}H_{14}NI$ MW, 275

Colourless prisms from EtOH. M.p. 32°.

Samtleben, *Ber.*, 1898, **31**, 1144.

2-Iododiethyl Ether

$CH_3{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_2I$

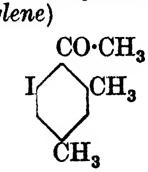
C_4H_9OI MW, 200

Pungent oil with mustard odour. B.p. 155°. D_4^{20} 1·667. n_D^{20} 1·4979.

Schmidt, *Ann.*, 1904, **337**, 60.
Karvonen, *Chem. Zentr.*, 1912, II, 1270.

Iododihydroxy-*p*-xylene.
See Iodo-β-orcinol.

6-Iodo-2 : 4-dimethylacetophenone (5-*Iodo*-4-*aceto*-m-*xylene*)

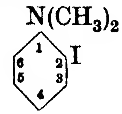


$C_{10}H_{11}OI$ MW, 274

B.p. 295–8° decomp., 171°/25 mm.

Noyes, *Am. Chem. J.*, 1898, **20**, 803.

***o*-Iododimethylaniline**



$C_8H_{10}NI$ MW, 247

B.p. 116°/11 mm.

Baeyer, *Ber.*, 1905, **38**, 2761.

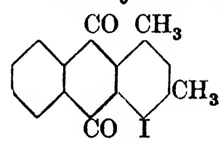
***m*-Iododimethylaniline.**
Cryst. M.p. 38–9°. B.p. 142–3°/12 mm.

See previous reference.

***p*-Iododimethylaniline.**
Leaflets from EtOH. M.p. 82° (79·5°).

Aitken, Reade, *J. Chem. Soc.*, 1926, 1896.
Baeyer, *Ber.*, 1905, **38**, 2762.

4-Iodo-1 : 3-dimethylanthraquinone

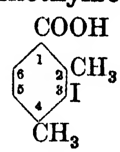


$C_{16}H_{11}O_2I$ MW, 362

Cryst. from AcOH. M.p. 118–19°.

Scholl, *Ber.*, 1910, **43**, 354.

3-Iodo-2 : 4-dimethylbenzoic Acid



$C_9H_9O_2I$ MW, 276

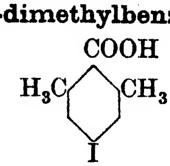
Prisms from EtOH.Aq. M.p. 167°. Sol. EtOH, C_6H_6.

Wheeler, Hoffmann, *Am. Chem. J.*, 1911, **45**, 443.

6-Iodo-2 : 4-dimethylbenzoic Acid.
Cryst. from EtOH. M.p. 196–7°. Very spar. sol. H_2O.
Nitrile: C_9H_8NI. MW, 257. Yellow needles from ligroin. M.p. 135°. Sol. EtOH, Et_2O. Insol. H_2O.

Noyes, *Am. Chem. J.*, 1898, **20**, 805.
Kerschbaum, *Ber.*, 1895, **28**, 2800.

4-Iodo-2 : 6-dimethylbenzoic Acid



$C_9H_9O_2I$ MW, 276

Yellow cryst. from MeOH. M.p. 199°. Sol. hot EtOH, hot AcOH, C_6H_6, toluene.

Lock, Schmidt, *J. prakt. Chem.*, 1934, **140**, 230.
Cf. Hufferd, Noyes, *J. Am. Chem. Soc.*, 1921, **43**, 929.

Iododimethyl Ether

$CH_3 \cdot O \cdot CH_2I$

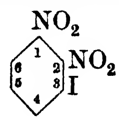
C_2H_5OI MW, 172

B.p. 122° decomp., 39°/20 mm., 25°/13 mm. D_4^{20} 2·030. n_D^{20} 1·5472. Gradually turns brown.

Karvonen, *Chem. Zentr.*, 1912, II, 1268; *Chem. Abstracts*, 1920, **14**, 2176.
Ewins, *Biochem. J.*, 1914, **8**, 371.

Iododinitroanisole.
See under Iododinitrophenol.

3-Iodo-1 : 2-dinitrobenzene



$C_6H_3O_4N_2I$ MW, 294

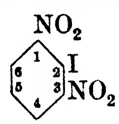
Yellow needles from EtOH. M.p. 138°. Distils undecomp. Sol. EtOH.

Wender, *Gazz. chim. ital.*, 1889, **19**, 231.

4-Iodo-1 : 2-dinitrobenzene.
Yellow plates from EtOH. M.p. 74·5°. Very sol. cold EtOH. Sol. Et_2O, $CHCl_3$. Heat with Cu at 230° ⟶ tetranitrodiphenyl. Hot alc. NH_3 ⟶ 5-iodo-2-nitroaniline.

Jacobson, Fertsch, Heubach, *Ann.*, 1898, **303**, 339.
Ullmann, Bielecki, *Ber.*, 1901, **34**, 2179.

2-Iodo-1 : 3-dinitrobenzene



$C_6H_3O_4N_2I$ MW, 294

Orange plates from EtOH. M.p. 114°. Very sol. EtOH, Et_2O. Aniline ⟶ 2 : 4-dinitrodiphenylamine.

Körner, Contardi, *Atti accad. Lincei*, 1914, **23**, II, 470.

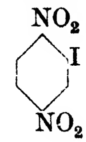
4-Iodo-1 : 3-dinitrobenzene.
Yellow leaflets from EtOH, prisms or plates from Et_2O–EtOH. M.p. 88°. Spar. sol. cold EtOH. Sol. hot EtOH. Hot alc. NH_3 ⟶ 2 : 4-dinitroaniline. Hot dil. alkalis ⟶ 2 : 4-dinitrophenol.

Körner, *Gazz. chim. ital.*, 1874, **4**, 323.

5-Iodo-1 : 3-dinitrobenzene.
Golden plates from 60% EtOH. M.p. 99°.

Nicolet, *J. Am. Chem. Soc.*, 1927, **49**, 1813.

Iodo-1 : 4-dinitrobenzene

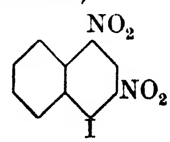


$C_6H_3O_4N_2I$ MW, 294

Yellow prisms from Et_2O–EtOH, colourless needles from EtOH. M.p. 117°. Sol. 8½ parts warm EtOH.

Körner, Contardi, *Atti accad. Lincei*, 1914, **23**, I, 286.

4-Iodo-1 : 3-dinitronaphthalene (1-*Iodo-2 : 4-dinitronaphthalene*)

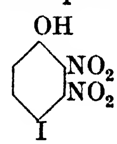


$C_{10}H_5O_4N_2I$ MW, 344

Pale straw-coloured micro-prisms from glycol ethyl ether. M.p. 183°.

Hodgson, Walker, *J. Chem. Soc.*, 1933, 1621.

4-Iodo-2 : 3-dinitrophenol

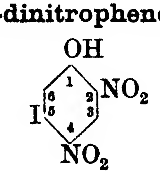


$C_6H_3O_5N_2I$ MW, 310

Yellowish-brown scales from EtOH.Aq. M.p. 140°.

Meldola, Hay, *J. Chem. Soc.*, 1907, **91**, 1483.

5-Iodo-2 : 4-dinitrophenol



$C_6H_3O_5N_2I$ MW, 310

Pale yellow needles from pet. ether. M.p. 98°. Volatile in steam.

Ag salt: golden-yellow needles from H_2O.
Me ether: 5-iodo-2 : 4-dinitroanisole.

$C_7H_5O_5N_2I$. MW, 324. Scales from EtOH. M.p. 119°.

Hodgson, Moore, *J. Chem. Soc.*, 1927, 634.
Meldola, Stephens, *J. Chem. Soc.*, 1906, **89**, 928.

6-Iodo-2 : 4-dinitrophenol.

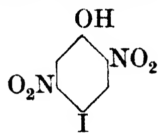
Citron-yellow needles from H_2O, prisms from EtOH. M.p. 106–7°. Sol. EtOH, Et_2O. Very spar. sol. H_2O. Volatile in steam.

Acetyl: m.p. 113°.

p-*Toluenesulphonyl*: m.p. 149°.

Sane, Joshi, *J. Indian Chem. Soc.*, 1932, **9**, 59.
Kempf, Moehrke, *Ber.*, 1914, **47**, 2622.

4-Iodo-2 : 5-dinitrophenol

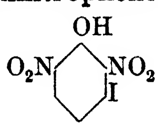


$C_6H_3O_5N_2I$ MW, 310

Citron-yellow needles from H_2O or EtOH.Aq, orange-yellow leaflets from ligroin. M.p. 114–15°. Sol. cold EtOH, C_6H_6, $CHCl_3$, Me_2CO, hot ligroin.

Girard, *Bull. soc. chim.*, 1924, **35**, 776.
Reverdin, *Ber.*, 1907, **40**, 2857.

3-Iodo-2 : 6-dinitrophenol



$C_6H_3O_5N_2I$ MW, 310

Colourless needles from H_2O or pet. ether. M.p. 151–2°. Volatile in steam.

Ag salt: bright orange-red needles.

Hodgson, Moore, *J. Chem. Soc.*, 1927, 634.

4-Iodo-2 : 6-dinitrophenol.

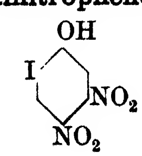
Chrome-yellow needles from H_2O. M.p. 113°. Spar. sol. EtOH.

Benzoyl: m.p. 175°.

p-*Toluenesulphonyl*: m.p. 138°.

Sane, Joshi, *J. Indian Chem. Soc.*, 1932, **9**, 59.
Körner, *Gazz. chim. ital.*, 1874, **4**, 397.

6-Iodo-3 : 4-dinitrophenol

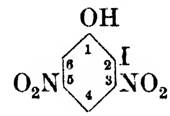


$C_6H_3O_5N_2I$ MW, 310

Me ether: 6-iodo-3 : 4-dinitroanisole. $C_7H_5O_5N_2I$. MW, 324. Yellow scales from EtOH. M.p. 146–7°.

Meldola, Stephens, *J. Chem. Soc.*, 1905, **87**, 1202.

2-Iodo-3 : 5-dinitrophenol



$C_6H_3O_5N_2I$ MW, 310

Me ether: 2-iodo-3 : 5-dinitroanisole. $C_7H_5O_5N_2I$. MW, 324. Yellowish-brown needles from EtOH. M.p. 141·5°.

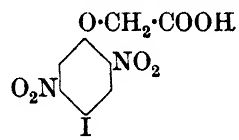
Meldola, Hay, *J. Chem. Soc.*, 1907, **91**, 1478.

4-Iodo-3 : 5-dinitrophenol.

Me ether: 4-iodo-3 : 5-dinitroanisole. Yellowish-brown prisms from EtOH. M.p. 161–2°.

See previous reference.

4-Iodo-2 : 5-dinitrophenoxyacetic Acid

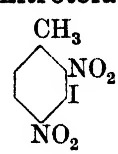


$C_8H_5O_7N_2I$ MW, 368

Pale yellow needles from dil. AcOH. M.p. 201–2°. Sol. Me_2CO, hot EtOH. Spar. sol. C_6H_6, $CHCl_3$.

Reverdin, *Ber.*, 1907, **40**, 2857; 1906, **39**, 2684.

3-Iodo-2 : 4-dinitrotoluene

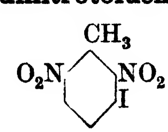


$C_7H_5O_4N_2I$ MW, 308

Yellow leaflets from EtOH. M.p. 117°.

Brady, Bowman, *J. Chem. Soc.*, 1921, **119**, 897.

3-Iodo-2 : 6-dinitrotoluene

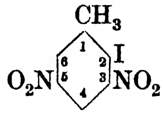


$C_7H_5O_4N_2I$ MW, 308

Plates or prisms from EtOH. M.p. 90°. Mod. sol. warm EtOH. Volatile in steam.

Körner, Contardi, *Gazz. chim. ital.*, 1917, **47**, I, 238.

2-Iodo-3 : 5-dinitrotoluene



$C_7H_5O_4N_2I$ MW, 308

Lemon-yellow plates or prisms from EtOH–Et_2O. M.p. 119·5°.

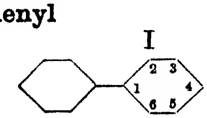
Körner, Contardi, *Atti accad. Lincei*, 1915, **24**, I, 896.

4-Iodo-3 : 5-dinitrotoluene.

Lemon-yellow needles from EtOH. M.p. 158°. Alc. NH_3 at 130° ⟶ 3 : 5-dinitro-*p*-toluidine.

Körner, Contardi, *Atti accad. Lincei*, 1914, **23**, II, 464.

2-Iododiphenyl



$C_{12}H_9I$ MW, 280

B.p. 189–92°/36 mm., 158°/6 mm., 140°/3–4 mm. D^{25}_{25} 1·6038.

Gilman, Kirby, Kinney, *J. Am. Chem. Soc.*, 1929, **51**, 2261.
Cook, *J. Chem. Soc.*, 1930, 1090.
Bowden, *J. Chem. Soc.*, 1931, 1112.

3-Iododiphenyl.

B.p. 188–9°/16 mm.

See last reference above.

4-Iododiphenyl.

Cryst. from EtOH or AcOH. M.p. 113–14°. B.p. 320° slight decomp., 222°/40 mm., 183° (198°)/11 mm.

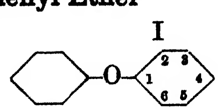
Dichloride: $C_6H_5 \cdot C_6H_4ICl_2$. Yellow needles from $CHCl_3$. M.p. 102° decomp.

Rupe, Iselin, *Ber.*, 1916, **49**, 45.
Pfeiffer, Schmitz, Inoue, *J. prakt. Chem.*, 1929, **121**, 73.

Iododiphenyl-carbimide.

See 4′-Iododiphenyl-4-isocyanate.

2-Iododiphenyl Ether



$C_{12}H_9OI$ MW, 296

Cryst. from ligroin. M.p. 55–6°. B.p. 198–202°/32 mm., 180–5°/15 mm.

Dichloride: $C_6H_5 \cdot O \cdot C_6H_4ICl_2$. M.p. 81–2°. Unstable.

Brewster, Strain, *J. Am. Chem. Soc.*, 1934, **56**, 117.
Lesslie, Turner, *J. Chem. Soc.*, 1932, 282.
Buchan, McCombie, *J. Chem. Soc.*, 1931, 142.
Clarkson, Gomberg, *J. Am. Chem. Soc.*, 1930, **52**, 2885.

3-Iododiphenyl Ether.

B.p. 185°/14 mm.

Dichloride: m.p. 58°. Unstable.

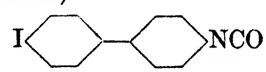
Buchan, McCombie, *J. Chem. Soc.*, 1932, 2859.
See also first reference above.

4-Iododiphenyl Ether.

Plates from MeOH.Aq. M.p. 48°.

Brewster, Strain, *J. Am. Chem. Soc.*, 1934, **56**, 117.
Scarborough, *J. Chem. Soc.*, 1929, 2367.

4′-Iododiphenyl-4-isocyanate (4′-*Iododiphenyl*-4-*carbimide*)



$C_{13}H_8ONI$ MW, 321

Pale yellow cryst. from toluene. M.p. 100–1°. Sol. ord. org. solvents. Forms highly cryst. urethanes with alcohols.

Kawai, Tamura, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1930, **13**, 266, 270; *J. Chem. Soc. Abstracts*, A, 1930, 1159.

Iodoethane.

See Ethyl iodide.

2-Iodoethyl Alcohol.

See Ethylene iodohydrin.

2-Iodoethylamine (2-*Iodo*-1-*aminoethane*, 2-*aminoethyl iodide*)

$$CH_2I \cdot CH_2NH_2$$

C_2H_6NI MW, 171

B,HI: colourless cryst. from EtOH. M.p. 192–4° (with sintering and browning).

Picrate: m.p. 129–31°.

Gabriel, *Ber.*, 1888, **21**, 1055.

Iodoethylene.

See Vinyl iodide.

2-Iodoethyl phenyl Ether (β-*Iodophenetole*)

$$C_6H_5 \cdot O \cdot CH_2 \cdot CH_2I$$

C_8H_9OI MW, 248

Cryst. from EtOH.Aq. M.p. 31–2°. Sol. ord. org. solvents.

Braun, *Ber.*, 1913, **46**, 1788.

Iodoform (*Tri-iodomethane*)

CHI_3

CHI_3 MW, 394

Yellow hexagonal plates from Me_2CO. M.p. 119°. Sol. EtOH, Et_2O, AcOH, $CHCl_3$. Prac. insol. H_2O, C_6H_6. Heat of comb. C_p 161·9 Cal. Decomp. slowly in light. Volatile in steam. Hot KOH.Aq. ⟶ KI + H·COOK. Powerful antiseptic.

Glasstone, *Industrial Chemist*, 1931, **7**, 315.
Vyskočil, *Chem. Abstracts*, 1929, **23**, 4896.
Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 453.
Otto, D.R.P., 109,013, (*Chem. Zentr.*, 1900, II, 304).

Iodoformanilide.
See under p-Iodoaniline.

Iodofumaric Acid

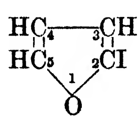
IC·COOH
HOOC·CH

$C_4H_3O_4I$ MW, 242

Yellow prisms from Et_2O. M.p. 193–4° (182–4°) decomp. Very sol. H_2O, EtOH, Et_2O. Rapidly attacked by $KMnO_4$ in Na_2CO_3.Aq.
Di-Me ester: $C_6H_7O_4I$. MW, 270. Yellow prisms from pet. ether. M.p. 52·5°. Sol. ord. org. solvents.

Thiele, Peter, *Ann.*, 1909, **369**, 122.

2-Iodofuran



C_4H_3OI MW, 194

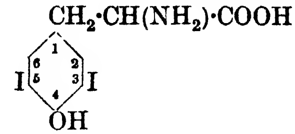
B.p. 43–5°/15 mm. D_4^{20} 2·024. n_D^{20} 1·5661. Decomp. on standing. More stable in Et_2O sol. Readily forms Grignard reagent.

Gilman, Wright, *J. Am. Chem. Soc.*, 1933, **55**, 3307.

3-Iodofuran.
B.p. 132°/732 mm., 37–8°/22 mm. D_4^{20} 2·045. n_D^{20} 1·5610. Stable. Does not form Grignard reagent.

See previous reference.

Iodogorgoic Acid (3 : 5-*Di-iodotyrosine*, 4-*hydroxy*-3 : 5-*di-iodo-β-phenyl-α-aminopropionic acid*)



$C_9H_9O_3NI_2$ MW, 433

Occurs in the skeletal proteins of corals, sponges, and other marine organisms, also in thyroid gland.

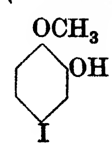
d-.
Thin yellowish-white plates. M.p. 213° (194°) decomp.
Anhydride: decomp. at 204°. Sol. MeOH, EtOH, AcOEt. Insol. H_2O.

l-.
Needles from H_2O or 70% EtOH. M.p. 213°. Sol. 347 parts H_2O at 15°. $[\alpha]_D$ +2·89° in 4% HCl.
Me ester: $C_{10}H_{11}O_3NI_2$. MW, 447. Plates from EtOH. M.p. 192° decomp. (browns at 187°). Sol. AcOH. Very spar. sol. hot H_2O, hot EtOH. Insol. Et_2O, C_6H_6. *B,HCl*: needles from EtOH–Et_2O. Decomp. at 211°.
N-Chloroacetyl: m.p. 149°.
N-*Chloroacetyl*: prismatic needles from EtOH.Aq. Decomp. at 221°. Sol. EtOH, Me_2CO. Spar. sol. hot H_2O.

dl-.
Cryst. from 70% EtOH, rectangular plates from H_2O. M.p. 200° (not sharp) decomp. Sol. 2164 parts H_2O at 15°.

Harington, Randall, *Biochem. J.*, 1931, **25**, 1032.
Sugimoto, *J. Biol. Chem.*, 1928, **76**, 723.
Abderhalden, Haas, *Z. physiol. Chem.*, 1927, **166**, 78.
Wheeler, Johns, *Am. Chem. J.*, 1910, **43**, 11.
Abderhalden, Guggenheim, *Ber.*, 1908, **41**, 1238, 1991.
Henze, *Z. physiol. Chem.*, 1907, **51**, 64.

4-Iodoguaiacol (4-*Iodocatechol* 1-*methyl ether*)



$C_7H_7O_2I$ MW, 250

Cryst. from EtOH. M.p. 87–8°. Spar. sol.

cold H_2O. Mod. sol. hot H_2O. Sol. ord. org. solvents. Volatile in steam.

Mameli, *Gazz. chim. ital.*, 1907, **37**, II, 372.
Tassily, Leroide, *Bull. soc. chim.*, 1908, **3**, 125.

5-Iodoguaiacol.
See Guaiadol.

1-Iodoheptadecane.
See *n*-Heptadecyl iodide.

1-Iodoheptane (n-*Heptyl iodide*)

$CH_3{\cdot}[CH_2]_5{\cdot}CH_2I$

$C_7H_{15}I$ MW, 226

B.p. 204°, 97°/26 mm., 91°/17 mm. D_4^{15} 1·3870.

Sherrill, *J. Am. Chem. Soc.*, 1930, **52**, 1985.

2-Iodoheptane (sec.-n-*Heptyl iodide*)

$CH_3{\cdot}[CH_2]_4{\cdot}CHI{\cdot}CH_3$

$C_7H_{15}I$ MW, 226

B.p. 98°/50 mm. D^{20} 1·304. n_D^{20} 1·4826. Decomp. on exposure to light.

Henry, *Rec. trav. chim.*, 1909, **28**, 447.
Venable, *Ber.*, 1880, **13**, 1650.

3-Iodoheptane

$CH_3{\cdot}[CH_2]_3{\cdot}CHI{\cdot}CH_2{\cdot}CH_3$

$C_7H_{15}I$ MW, 226

B.p. 89°/30 mm., 64·5°/9 mm. D_4^{15} 1·3735.

Sherrill, *J. Am. Chem. Soc.*, 1930, **52**, 1985.

4-Iodoheptane

$CH_3{\cdot}[CH_2]_2{\cdot}CHI{\cdot}[CH_2]_2{\cdot}CH_3$

$C_7H_{15}I$ MW, 226

B.p. 185° part decomp., 65–7°/9 mm. very slight decomp.

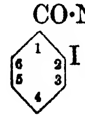
Piccard, Brewster, *J. Am. Chem. Soc.*, 1921, **43**, 2628.

Iodohexacosane.
See Hexacosyl iodide.

Iodohexane.
See Hexyl iodide.

o-Iodohippuric Acid (o-*Iodobenzoylglycine*)

$CO{\cdot}NH{\cdot}CH_2{\cdot}COOH$



$C_9H_8O_3NI$ MW, 305

Colourless slender needles from H_2O. M.p. 170° (167°). Sol. hot H_2O, Et_2O, EtOH, AcOEt, $CHCl_3$. Very spar. sol. cold H_2O, C_6H_6. HCl at 110° ⟶ *o*-iodobenzoic acid + glycine.

Et ester: $C_{11}H_{12}O_3NI$. MW, 333. Prisms from ligroin. M.p. 79–80° (softens at 70°). Very sol. EtOH, C_6H_6.

Nitrile: $C_9H_7ON_2I$. MW, 286. Prisms from EtOH. M.p. 158°.

Novello, Miriam, Sherwin, *J. Biol. Chem.*, 1926, **67**, 563.
Johnson, Meade, *Am. Chem. J.*, 1906, **36**, 296.

***m*-Iodohippuric Acid.**

Thin plates from H_2O. M.p. 155–6° (167–9°). Mod. sol. hot H_2O, EtOH, Et_2O. Insol. Me_2CO, $CHCl_3$, CCl_4, C_6H_6.

See first reference above.

***p*-Iodohippuric Acid.**

Leaflets from H_2O. M.p. 193° (188–9°). Sol. EtOH, AcOEt. Very spar. sol. cold H_2O. Insol. Me_2CO, Et_2O, CCl_4.

Et ester: plates from EtOH. M.p. 128–9°.

Nitrile: prisms from EtOH. M.p. 191–2°.

See references under *o*-Iodohippuric Acid, *supra*.

β-Iodohydrocinnamic Acid

$C_6H_5{\cdot}CHI{\cdot}CH_2{\cdot}COOH$

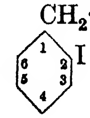
$C_9H_9O_2I$ MW, 276

Colourless cryst. from CS_2. M.p. 119–20° decomp. Hot H_2O ⟶ HI + cinnamic acid. Hot Na_2CO_3.Aq. ⟶ HI + CO_2 + styrene.

Fittig, Binder, *Ann.*, 1879, **195**, 133.

***o*-Iodohydrocinnamic Acid**

$CH_2{\cdot}CH_2{\cdot}COOH$



$C_9H_9O_2I$ MW, 276

Leaflets from H_2O. M.p. 102–3°.

Gabriel, Herzberg, *Ber.*, 1883, **16**, 2037.

***m*-Iodohydrocinnamic Acid.**

Colourless leaflets. M.p. 65–6°.

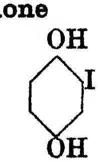
See previous reference.

***p*-Iodohydrocinnamic Acid.**

Colourless prisms from H_2O. M.p. 140–1°. Conc. H_2SO_4 ⟶ 6-iodohydrindone.

Miersch, *Ber.*, 1892, **25**, 2113.
See also previous reference.

Iodohydroquinone



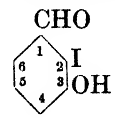
$C_6H_5O_2I$ **MW, 236**

Di-Me ether: $C_8H_9O_2I$. MW, 264. M.p. 23°. B.p. 285° (slight decomp.)/728 mm., 157°/10 mm. Turns dark green col. on standing.

Kaufmann, Fritz, *Ber.*, 1908, **41**, 4416.
Ullmann, Löwenthal, *Ann.*, 1904, **332**, 69.

Iodo-o-hydroxybenzaldehyde.
See Iodosalicylaldehyde.

2-Iodo-*m*-hydroxybenzaldehyde



$C_7H_5O_2I$ MW, 248

Me ether: $C_8H_7O_2I$. MW, 262. Yellow needles from MeOH. M.p. 86–7°. Volatile in steam.

Mayer, *Ber.*, 1912, **45**, 1109.

6-Iodo-*m*-hydroxybenzaldehyde.
Me ether: needles from C_6H_6–ligroin. M.p. 114–15°.

Mayer, *Ber.*, 1914, **47**, 410.

2-Iodo-*p*-hydroxybenzaldehyde

$C_7H_5O_2I$ MW, 248

Very pale yellow needles from EtOH. M.p. 163°.
Benzoyl: m.p. 112°.
Oxime: m.p. 155°.
Semicarbazone: m.p. 232°.
p-*Nitrophenylhydrazone*: m.p. 265° decomp.
Me ether: *see* 2-Iodoanisaldehyde.

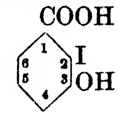
Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.

3-Iodo-*p*-hydroxybenzaldehyde.
Leaflets from hot H_2O. M.p. 108°. Sol. ord. org. solvents. Volatile in steam. Hot NaOH.Aq. at 150–80° ⟶ protocatechuic aldehyde.
Me ether: *see* 3-Iodoanisaldehyde.

Paal, *Ber.*, 1895, **28**, 2413.
Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Iodo-o-hydroxybenzoic Acid.
See Iodosalicylic Acid.

2-Iodo-*m*-hydroxybenzoic Acid



$C_7H_5O_3I$ MW, 264

Needles from $CHCl_3$. M.p. 158–9°.
Me ether: $C_8H_7O_3I$. MW, 278. Yellow needles from EtOH.Aq. M.p. 150–1°. *Me ester*: $C_9H_9O_3I$. MW, 292. Prisms from C_6H_6–pet. ether. M.p. 57°.
Acetyl: needles from C_6H_6. M.p. 179–80°.

Kenner, Turner, *J. Chem. Soc.*, 1928, 2341.
Henry, Sharp, *J. Chem. Soc.*, 1935, 856.

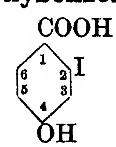
4-Iodo-*m*-hydroxybenzoic Acid.
Needles. M.p. 226° decomp. Spar. sol. cold H_2O.
Acetyl: m.p. 203°.

Brenans, Prost, *Compt. rend.*, 1924, **178**, 1285.

6-Iodo-*m*-hydroxybenzoic Acid.
Needles from H_2O. Begins to sublime at 160°, sinters at 196°, m.p. 198°.
Acetyl: m.p. 157°.

Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 448.
See also previous reference.

2-Iodo-*p*-hydroxybenzoic Acid



$C_7H_5O_3I$ MW, 264

Needles from H_2O. M.p. 179° (215°) decomp. No col. with $FeCl_3$.
Acetyl: m.p. 146°.
Me ether: *see* 2-Iodoanisic Acid.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.
Brenans, Prost, *Compt. rend.*, 1924, **178**, 1555.

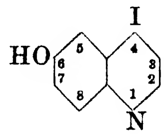
3-Iodo-*p*-hydroxybenzoic Acid.
Needles from SO_2.Aq. M.p. 174°. Sublimes. Very sol. EtOH, Et_2O. Mod. sol. AcOH, hot H_2O. Spar. sol. hot C_6H_6, $CHCl_3$. Insol. ligroin. $FeCl_3$ ⟶ brownish ppt.
Acetyl: m.p. 172°.
Me ester: $C_8H_7O_3I$. MW, 278. Glittering needles from ligroin. M.p. 155–6°.
Et ester: $C_9H_9O_3I$. MW, 292. M.p. 117°.
Me ether: *see* 3-Iodoanisic Acid.

Et ether: $C_9H_9O_3I$. MW, 292. Pearly scales (by sublimation). M.p. 215°.

Auwers, *Ber.*, 1897, **30**, 1475.
Willgerodt, Burkhard, *Ann.*, 1912, **389**, 299.
Brenans, Prost, *Compt. rend.*, 1923, **177**, 768.

4-Iodo-2-hydroxyquinoline.
See 4-Iodocarbostyril.

4-Iodo-6-hydroxyquinoline



C_9H_6ONI MW, 271

Pale yellow cryst. from Et_2O. M.p. 283°. Sol. ord. org. solvents. Spar. sol. $CHCl_3$.
Me ether: $C_{10}H_8ONI$. MW, 285. M.p. 85°.

John, Andraschko, *J. prakt. Chem.*, 1930, **128**, 215.

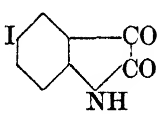
5-Iodo-6-hydroxyquinoline.
Cryst. M.p. 195°.

Claus, D.R.P., 78,880.

5-Iodo-8-hydroxyquinoline.
M.p. 127–8°.

Matsumura, *J. Am. Chem. Soc.*, 1927, **49**, 815.

5-Iodoisatin



$C_8H_4O_2NI$ MW, 273

Red plates from EtOH. M.p. 264–5°. Spar. sol. EtOH, AcOH.
Hydrazone: m.p. about 170°.
2-Anil: m.p. 223–4°.

Borsche, Weussmann, Fritsche, *Ber.*, 1924, **57**, 1770.
Hicks, *J. Chem. Soc.*, 1925, 773.
Musajo, *Chem. Abstracts*, 1933, **27**, 92.

Iodoisobutane.
See Isobutyl iodide *and tert.*-Butyl iodide.

1-Iodoisobutyric Acid

$(CH_3)_2CI{\cdot}COOH$

$C_4H_7O_2I$ MW, 214

Prisms. M.p. 73·5°. Sol. H_2O, EtOH, Et_2O.

Sernow, *Chem. Zentr.*, 1901, I, 665; 1900, I, 960.

2-Iodoisobutyric Acid

$ICH_2 \rangle CH{\cdot}COOH$ (with CH_3)

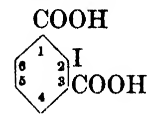
$C_4H_7O_2I$ MW, 214

Plates from CS_2. M.p. 36°. Spar. sol. H_2O.

Johansson, *Chem. Zentr.*, 1916, II, 558.
Fittig, Paul, *Ann.*, 1877, **188**, 58.

Iodoisopentane.
See active-Amyl iodide, *tert.*-Amyl iodide, *and* Isoamyl iodide.

2-Iodoisophthalic Acid



$C_8H_5O_4I$ MW, 292

Cryst. from H_2O. M.p. 236–8° (impure).
Me ester: $C_{10}H_9O_4I$. MW, 320. M.p. 50°.

James, Kenner, Stubbings, *J. Chem. Soc.*, 1920, **117**, 774.

4-Iodoisophthalic Acid.
M.p. 285–6°. Sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O.

Grahl, *Ber.*, 1895, **28**, 89.

5-Iodoisophthalic Acid.
Needles from hot AcOH. M.p. 288–9°. Sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O.
Di-Me ester: $C_{10}H_9O_4I$. MW, 320. M.p. 104–5°.
Di-Et ester: $C_{12}H_{13}O_4I$. MW, 348. M.p. 76°.

Burton, Kenner, *J. Chem. Soc.*, 1923, **123**, 1044.

1-Iodoisopropyl Alcohol (1-*Propylene iodohydrin*)

$CH_3{\cdot}CH(OH){\cdot}CH_2I$

C_3H_7OI MW, 186

B.p. 105°/60 mm.

Markownikow, *Z. Chem.*, 1870, 423.

1-Iodoisovaleric Acid

$(CH_3)_2CH{\cdot}CHI{\cdot}COOH$

$C_5H_9O_2I$ MW, 228

Prisms from pet. ether. M.p. 52°. Sol. ord. org. solvents. Insol. H_2O.
Guaiacol ester: m.p. 76–9°.

Sernow, *Chem. Zentr.*, 1901, I, 665.
Berendes, U.S.P., 994,494, (*Chem. Abstracts*, 1911, **5**, 2531).

2-Iodoisovaleric Acid

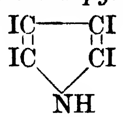
$(CH_3)_2CI·CH_2·COOH$

$C_5H_9O_2I$ MW, 228

M.p. 79–80°.

Schirokow, *J. prakt. Chem.*, 1881, **23**, 285.

Iodol (*Iodole, tetra-iodopyrrole*)



C_4HNI_4 MW, 571

Yellow needles from EtOH.Aq. Decomp. at 140–50°. Sol. Et_2O, AcOH, hot EtOH. Insol. H_2O. Heat of comb. C_v 503·3 Cal. Antiseptic.

Ciamician, Silber, *Ber.*, 1885, **18**, 1766.
Michelman, *Chem. Abstracts*, 1925, **19**, 2388.

2-Iodolactic Acid

$CH_2I·CH(OH)·COOH$

$C_3H_5O_3I$ MW, 216

Prisms. M.p. 84–5° (100–1°). Sol. H_2O, EtOH, Et_2O.

Glinsky, *Ber.*, 1873, **6**, 1257.
Melikow, *Ber.*, 1881, **14**, 937.

Iodomaleic Acid

IC·COOH
HC·COOH

$C_4H_3O_4I$ MW, 242

Prisms from Et_2O. M.p. 153–4°.

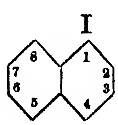
Thiele, Peter, *Ann.*, 1909, **369**, 123.

Iodomenthane.
See Menthyl iodide.

Iodomethane.
See Methyl iodide.

4-Iodo-2-methoxybenzoic Acid.
See under 4-Iodosalicylic Acid.

1-Iodonaphthalene (*α-Iodonaphthalene, α-naphthyl iodide*)



$C_{10}H_7I$ MW, 254

Oil. B.p. 302° (305°). Sol. EtOH, Et_2O, C_6H_6, CS_2. D^{15} 1·7344.
Picrate: m.p. 127°.

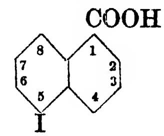
Birckenbach, Goubeau, *Ber.*, 1932, **65**, 398.

2-Iodonaphthalene (*β-Iodonaphthalene, β-naphthyl iodide*).

Leaflets. M.p. 54·5° (53–4°). B.p. 308–10°, 175°/25 mm., 172°/21 mm. Sol. EtOH, Et_2O, AcOH. Volatile in steam.

Schmidlin, Huber, *Ber.*, 1910, **43**, 2829.

5-Iodo-1-naphthoic Acid



$C_{11}H_7O_2I$ MW, 298

Needles from AcOH. M.p. 253–4°. Sublimes.
Me ester: $C_{12}H_9O_2I$. MW, 312. M.p. 81–2°.

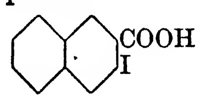
Seer, Scholl, *Ann.*, 1913, **398**, 92.

8-Iodo-1-naphthoic Acid.

Brown prisms from hot H_2O. M.p. 164·5°. Sol. EtOH, Et_2O, AcOH, C_6H_6.
Me ester: m.p. 59°.
Et ester: $C_{13}H_{11}O_2I$. MW, 326. M.p. 64·5°.
Anilide: m.p. 171·5°.

Goldstein, Francey, *Helv. Chim. Acta*, 1932, **15**, 1362.

3-Iodo-2-naphthoic Acid

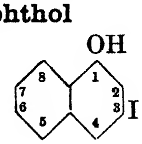


$C_{11}H_7O_2I$ MW, 298

Needles from AcOH.Aq. M.p. 214°. Sol. EtOH, Et_2O, AcOH, C_6H_6, $CHCl_3$. Spar. sol. H_2O.
Me ester: $C_{12}H_9O_2I$. MW, 312. M.p. 55°.
Et ester: $C_{13}H_{11}O_2I$. MW, 326. M.p. 78°.
Amide: $C_{11}H_8ONI$. MW, 297. M.p. 241°.
Anilide: m.p. 205°.

Goldstein, Cornamusaz, *Helv. Chim. Acta*, 1931, **14**, 200.

3-Iodo-1-naphthol



$C_{10}H_7OI$ MW, 270

Yellow needles from EtOH. M.p. 119°.

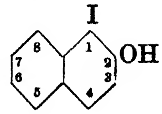
Hodgson, Elliott, *J. Chem. Soc.*, 1934, 1707.

5-Iodo-1-naphthol.

Needles from hot H_2O. M.p. 131–2°.
Me ether: $C_{11}H_9OI$. MW, 284. M.p. 78–9°.

Scholl, *Monatsh.*, 1921, **42**, 406.

1-Iodo-2-naphthol



$C_{10}H_7OI$ MW, 270

Needles from EtOH.Aq. M.p. 94·5° (90°). Spar. sol. H_2O.

Carbonate: m.p. 188–9°.

Krynski, *Chem. Abstracts*, 1928, **22**, 4120.
Marsh, *J. Chem. Soc.*, 1927, 3164.

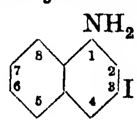
3-Iodo-2-naphthol.

Needles from EtOH. M.p. 104°. Sol. EtOH, Et_2O, AcOH, C_6H_6, $CHCl_3$, hot H_2O.

Me ether: $C_{11}H_9OI$. MW, 284. M.p. 65°.

Goldstein, Cornamusaz, *Helv. Chim. Acta*, 1932, **15**, 938.

3-Iodo-1-naphthylamine



$C_{10}H_8NI$ MW, 269

Needles from EtOH. M.p. 84°.

B,HCl: needles from EtOH. M.p. 238°.

N-*Acetyl*: prisms from AcOH. M.p. 207°.

N-*Benzoyl*: needles. M.p. 174°.

Hodgson, Elliott, *J. Chem. Soc.*, 1934, 1707.

4-Iodo-1-naphthylamine.

M.p. 82–4° decomp.

Morgan, Godden, *J. Chem. Soc.*, 1910, **97**, 1717.

5-Iodo-1-naphthylamine.

Needles from MeOH. M.p. 75–75·5°.

B,HCl: m.p. 205–15°.

Scholl, *Monatsh.*, 1921, **42**, 406.

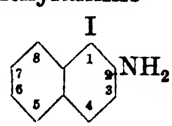
8-Iodo-1-naphthylamine.

Cryst. from MeOH. M.p. 82°.

B,HCl: m.p. 186–9° decomp.

Scholl, Seer, Weitzenböck, *Ber.*, 1910, **43**, 2207.

1-Iodo-2-naphthylamine



$C_{10}H_8NI$ MW, 269

Leaflets from H_2O. M.p. 108°.

N-*Acetyl*: decomp. at 167°.

Willstaedt, Scheiber, *Ber.*, 1934, **67**, 474.

3-Iodo-2-naphthylamine.

Cryst. from EtOH. M.p. 137°. Sol. EtOH, AcOH, $CHCl_3$. Mod. sol. C_6H_6.

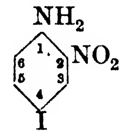
N-*Acetyl*: m.p. 198°.

Goldstein, Cornamusaz, *Helv. Chim. Acta*, 1932, **15**, 937.

Iodonitroacetanilide.

See under Iodonitroaniline.

4-Iodo-o-nitroaniline



$C_6H_5O_2N_2I$ MW, 264

Orange-yellow needles from EtOH. M.p. 123°. Sol. EtOH, AcOH.

N-*Acetyl*: 4-iodo-2-nitroacetanilide. $C_8H_7O_3N_2I$. MW, 306. M.p. 112°.

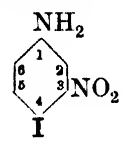
Brenans, *Compt. rend.*, 1914, **158**, 717, 1158.

5-Iodo-o-nitroaniline.

Brown needles from EtOH. M.p. 174°.

Wender, *Gazz. chim. ital.*, 1889, **19**, 234.

4-Iodo-m-nitroaniline



$C_6H_5O_2N_2I$ MW, 264

Orange needles from EtOH. M.p. 142°.

N-*Acetyl*: 4-iodo-3-nitroacetanilide. $C_8H_7O_3N_2I$. MW, 306. M.p. 136·5°.

Körner, Belasio, *Atti accad. Lincei*, 1908, **17**, i, 680.

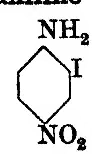
6-Iodo-m-nitroaniline.

Orange-yellow needles from EtOH. M.p. 160·5°.

N-*Acetyl*: 6-iodo-3-nitroacetanilide. M.p. 199°.

Brenans, *Compt. rend.*, 1904, **138**, 1503.

2-Iodo-p-nitroaniline



$C_6H_5O_2N_2I$ MW, 264

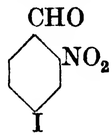
(i) Stable form. Yellowish-red cryst. M.p. 115° (105°). (ii) Labile form. Yellow plates.

N - *Acetyl* : 2 - iodo - 4 - nitroacetanilide. $C_8H_7O_3N_2I$. MW, 306. M.p. 139° (128–30°).

Körner, Contardi, *Atti accad. Lincei*, 1913, **22**, i, 824.
Bigiavi, Albanese, Poggi, *Gazz. chim. ital.*, 1931, **61**, 396.

Iodonitroanisole.
See under Iodonitrophenol.

4-Iodo-*o*-nitrobenzaldehyde

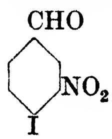


$C_7H_4O_3NI$ MW, 277

Cryst. from EtOH. M.p. 112°.
Semicarbazone : m.p. 284° decomp.

Sachs, D.R.P., 149,749, (*Chem. Zentr.*, 1904, I, 909).
Kantorowicz, *Ber.*, 1906, **39**, 2757.

4-Iodo-*m*-nitrobenzaldehyde



$C_7H_4O_3NI$ MW, 277

Yellow needles from hot EtOH. M.p. 141°.
Oxime : m.p. 157°.
p-*Nitrophenylhydrazone* : m.p. 277–8°.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 25.

***o*-Iodonitrobenzene**

$C_6H_4O_2NI$ MW, 249

Yellow needles. M.p. 54° (49·4°). B.p. 288–9°/729 mm., 162·5°/18 mm. Sol. EtOH, Et_2O. D^{75} 1·9186. Sublimes.

Holleman, *Rec. trav. chim.*, 1913, **32**, 136.
Ullmann, *Ber.*, 1896, **29**, 1880.

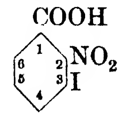
***m*-Iodonitrobenzene.**
(i) Stable form. M.p. 38·5° (36–7°). B.p. 153°/14 mm. D_4^{50} 1·9477. (ii) Labile form. M.p. 9·9°.

Brenans, *Bull. soc. chim.*, 1914, **15**, 381.
van Arkel, *Rec. trav. chim.*, 1932, **51**, 1107.
Hasselblatt, *Z. physik. Chem.*, 1913, **83**, 13.

***p*-Iodonitrobenzene.**
Yellow needles from EtOH. M.p. 174° (170–1°). B.p. 289°/772 mm.

Montagne, *Ber.*, 1918, **51**, 1489.
Datta, Varma, *J. Am. Chem. Soc.*, 1919, **41**, 2047.

3-Iodo-*o*-nitrobenzoic Acid



$C_7H_4O_4NI$ MW, 293

M.p. 235°. Spar. sol. H_2O.
Et ester : $C_9H_8O_4NI$. MW, 321. M.p. 84°.

Grothe, *J. prakt. Chem.*, 1878, **18**, 325.
Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 500.

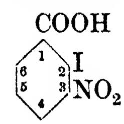
4-Iodo-*o*-nitrobenzoic Acid.
Prisms from dil. EtOH. M.p. 192°. Sol. EtOH, Et_2O, hot C_6H_6. Insol. H_2O.

Wheeler, Jones, *Am. Chem. J.*, 1910, **44**, 448.

5-Iodo-*o*-nitrobenzoic Acid.
M.p. 174°. Sol. H_2O.
Et ester : $C_9H_8O_4NI$. MW, 321. M.p. 64°.

Grothe, *J. prakt. Chem.*, 1878, **18**, 326.
Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 500.

2-Iodo-*m*-nitrobenzoic Acid



$C_7H_4O_4NI$ MW, 293

M.p. 206° (204–205·5°).

Culhane, *Organic Syntheses*, 1927, VII, 12.
Whitmore, Culhane, *J. Am. Chem. Soc.*, 1929, **51**, 604.

4-Iodo-*m*-nitrobenzoic Acid.
Yellow prisms from EtOH. M.p. 213° (210°). Sol. EtOH. Spar. sol. H_2O.
Et ester : $C_9H_8O_4NI$. MW, 321. M.p. 88–89·5°.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 25.

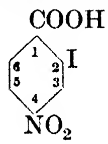
5-Iodo-*m*-nitrobenzoic Acid.
Prisms from pet. ether. M.p. 166–7°.
Et ester : m.p. 59–60°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 503.
McAlister, Kenner, *J. Chem. Soc.*, 1928, 1914.

6-Iodo-*m*-nitrobenzoic Acid.
Needles from hot H_2O. M.p. 194° (197–8°).
Me ester: $C_8H_6O_4NI$. MW, 307. M.p. 123°.
Et ester: $C_9H_8O_4NI$. MW, 321. M.p. 98°.
Chloride: $C_7H_3O_3NClI$. MW, 311·5. M.p. 83°.
Amide: $C_7H_5O_3N_2I$. MW, 292. M.p. 231°.
Anilide: m.p. 203°.

Goldstein, Grampoloff, *Helv. Chim. Acta*, 1930, **13**, 310.
Joszt, Lesnianski, *Chem. Abstracts*, 1931, **25**, 500.

2-Iodo-*p*-nitrobenzoic Acid



$C_7H_4O_4NI$ MW, 293

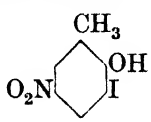
Yellow prisms from H_2O. M.p. 143°. Sol. EtOH, Et_2O. Spar. sol. ligroin, CCl_4, hot H_2O.
Me ester: $C_8H_6O_4NI$. MW, 307. M.p. 89°.
Et ester: $C_9H_8O_4NI$. MW, 321. M.p. 44°.
Chloride: $C_7H_3O_3NClI$. MW, 311·5. B.p. 196°/18 mm.
Amide: $C_7H_5O_3N_2I$. MW, 292. M.p. 205°.

Wheeler, Johns, *Am. Chem. J.*, 1910, **44**, 445.

3-Iodo-*p*-nitrobenzoic Acid.
Yellow cryst. M.p. 192°. Sol. H_2O.

Grothe, *J. prakt. Chem.*, 1878, **18**, 326.
Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 500.

3-Iodo-5-nitro-*o*-cresol

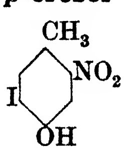


$C_7H_6O_3NI$ MW, 279

Me ether: $C_8H_8O_3NI$. MW, 293. Cryst. from MeOH.Aq. M.p. 83°. Sol. ord. org. solvents.

Robinson, *J. Chem. Soc.*, 1916, **109**, 1085.

5-Iodo-2-nitro-*p*-cresol

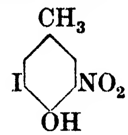


$C_7H_6O_3NI$ MW, 279

Me ether: $C_8H_8O_3NI$. MW, 293. Needles from MeOH. M.p. 118°.

Robinson, *J. Chem. Soc.*, 1916, **109**, 1088.

5-Iodo-3-nitro-*p*-cresol

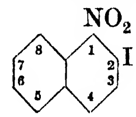


$C_7H_6O_3NI$ MW, 279

Yellow needles from AcOH. M.p. 83·5°.
NH_4 salt: m.p. 195–200°.

Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 446.

2-Iodo-1-nitronaphthalene



$C_{10}H_6O_2NI$ MW, 299

Yellow needles from EtOH. M.p. 88·5° (81°). B.p. 172·5°/10 mm.

Meldola, *J. Chem. Soc.*, 1885, **47**, 521.
Willstaedt, Scheiber, *Ber.*, 1934, **67**, 471.

3-Iodo-1-nitronaphthalene.
Yellow needles from EtOH. M.p. 108°.

Cumming, Howe, *J. Chem. Soc.*, 1931, 3178.

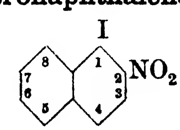
4-Iodo-1-nitronaphthalene.
Needles from EtOH. M.p. 123°.

Meldola, *J. Chem. Soc.*, 1885, **47**, 519.

5-Iodo-1-nitronaphthalene.
Yellow needles from AcOH. M.p. 164°. Sol. C_6H_6, $CHCl_3$. Spar. sol. EtOH, AcOH.

Scholl, *Monatsh.*, 1921, **42**, 405.

1-Iodo-2-nitronaphthalene



$C_{10}H_6O_2NI$ MW, 299

Yellow plates from EtOH. M.p. 111° (108·5°).

Hodgson, Kilner, *J. Chem. Soc.*, 1926, 9.
Meldola, *J. Chem. Soc.*, 1885, **47**, 519.

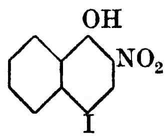
3-Iodo-2-nitronaphthalene.
Greenish-yellow prisms from EtOH. M.p. 89–89·5°.

Cumming, Howie, *J. Chem. Soc.*, 1931, 3178.

4-Iodo-2-nitronaphthalene.
Orange-yellow needles. M.p. 147°.

See previous reference.

4-Iodo-2-nitro-1-naphthol

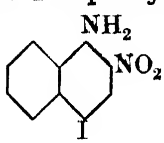


$C_{10}H_6O_3NI$ MW, 315

Yellow needles from EtOH. M.p. 150° (145–6°). Sol. EtOH. Spar. sol. hot C_6H_6.
Et ether: $C_{12}H_{10}O_3NI$. MW, 343. M.p. 104–5°.

Krynshi, *Chem. Abstracts*, 1928, **22**, 4120.
Meldola, Streatfeild, *J. Chem. Soc.*, 1895, **67**, 913.

4-Iodo-2-nitro-1-naphthylamine

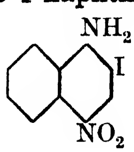


$C_{10}H_7O_2N_2I$ MW, 314

Orange needles. M.p. 192–3°.

Cumming, Howie, *J. Chem. Soc.*, 1931, 3177.

2-Iodo-4-nitro-1-naphthylamine



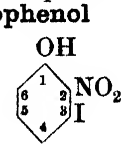
$C_{10}H_7O_2N_2I$ MW, 314

Yellowish-brown prisms from EtOH. M.p. 234°.

See previous reference.

Iodonitrophenetole.
See under Iodonitrophenol.

3-Iodo-*o*-nitrophenol



$C_6H_4O_3NI$ MW, 265

Greenish-yellow prisms from H_2O. M.p. 73·5°.
Me ether: 3-iodo-*o*-nitroanisole. $C_7H_6O_3NI$. MW, 279. M.p. 82–3°.
Acetyl: m.p. 102·5°.

Hodgson, Moore, *J. Chem. Soc.*, 1927, 633.

4-Iodo-*o*-nitrophenol.
Yellow needles from EtOH. M.p. 80–1°. Volatile in steam.
Me ether: 4-iodo-*o*-nitroanisole. M.p. 98°.
Et ether: 4-iodo-*o*-nitrophenetole. $C_8H_8O_3NI$. MW, 293. M.p. 80°.
Benzoyl: m.p. 102–3°.

Roberts, *J. Chem. Soc.*, 1923, **123**, 2711.
Robinson, *J. Chem. Soc.*, 1916, **109**, 1083.

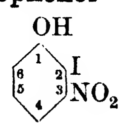
5-Iodo-*o*-nitrophenol.
Yellow needles from pet. ether. M.p. 96°.
Me ether: 5-iodo-*o*-nitroanisole. M.p. 92°.
Et ether: 5-iodo-*o*-nitrophenetole. M.p. 86–7°.
Acetyl: m.p. 95°.
Benzoyl: m.p. 122°.

Apostolo, *Gazz. chim. ital.*, 1921, **51**, ii, 396.
Hodgson, Moore, *J. Chem. Soc.*, 1927, 632.

6-Iodo-*o*-nitrophenol.
M.p. 109–10° (110–11°). Sol. EtOH, Et_2O, hot H_2O. Volatile in steam.
Me ether: 6-iodo-*o*-nitroanisole. M.p. 60–1°.
Acetyl: m.p. 96–7°.

Hodgson, Moore, *J. Chem. Soc.*, 1925, 2263.
Keimatsu, *Chem. Abstracts*, 1924, **18**, 2504.

2-Iodo-*m*-nitrophenol



$C_6H_4O_3NI$ MW, 265

Yellow needles from AcOH. M.p. 134°.
NH_4 salt: m.p. 165–70°.
Me ether: 2-iodo-*m*-nitroanisole. $C_7H_6O_3NI$. MW, 279. M.p. 121–2°.

Schlieper, *Ber.*, 1893, **26**, 2467.
Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 445.

4-Iodo-*m*-nitrophenol.
Yellow needles from H_2O. M.p. 156°.
Me ether: 4-iodo-*m*-nitroanisole. M.p. 62°.
Et ether: 4-iodo-*m*-nitrophenetole. $C_8H_8O_3NI$. MW, 293. M.p. 63·5°.
Acetyl: m.p. 107·5°.

Reverdin, *Ber.*, 1896, **29**, 2595.
Hähle, *J. prakt. Chem.*, 1891, **43**, 72.

5-Iodo-*m*-nitrophenol.
Needles from H_2O. M.p. 136°.
Me ether: 5-iodo-*m*-nitroanisole. M.p. 84°.

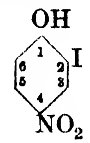
Acetyl: m.p. 110°.
Benzoyl: m.p. 100·5°.

Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2077.

6-Iodo-*m*-nitrophenol.
Yellow needles from EtOH. M.p. 146–7°.
Me ether: 6-iodo-*m*-nitroanisole. M.p. 127–8°.

Meldola, Eyre, *Chem. Zentr.*, 1901, II, 97.

2-Iodo-*p*-nitrophenol



$C_6H_4O_3NI$ MW, 265

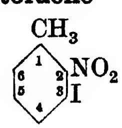
M.p. 94° (86–7°).
Me ether: 2-iodo-*p*-nitroanisole. $C_7H_6O_3NI$. MW, 279. M.p. 97°.
Et ether: 2-iodo-*p*-nitrophenetole. $C_8H_8O_3NI$. MW, 293. M.p. 96°.
Acetyl: m.p. 68°.

Hodgson, Moore, *J. Chem. Soc.*, 1925, 2264.
Keimatsu, *Chem. Abstracts*, 1924, **18**, 2504.
Robinson, *J. Chem. Soc.*, 1916, **109**, 1083.

3-Iodo-*p*-nitrophenol.
Yellow needles from pet. ether. M.p. 124°.
Me ether: 3-iodo-*p*-nitroanisole. M.p. 69–70°.
Acetyl: m.p. 73–7°.
Benzoyl: m.p. 119°.

Hodgson, Moore, *J. Chem. Soc.*, 1927, 632.

3-Iodo-*o*-nitrotoluene



$C_7H_6O_2NI$ MW, 263

Plates from pet. ether. M.p. 65°.

Wheeler, *Am. Chem. J.*, 1910, **44**, 138.

4-Iodo-*o*-nitrotoluene.
Yellow cryst. from EtOH. M.p. 60·5–61°. B.p. 286° decomp. Sol. Et_2O, CS_2.

Reverdin, Kacer, *Ber.*, 1897, **30**, 3001.
Beilstein, Kuhlberg, Heynemann, *Ann.*, 1871, **158**, 337.

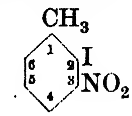
5-Iodo-*o*-nitrotoluene.
Yellow prisms from EtOH. M.p. 77° (84°). Sol. EtOH, Et_2O, C_6H_6. Spar. sol. hot H_2O.

Artmann, *Monatsh.*, 1905, **26**, 1096.
Wheeler, *Am. Chem. J.*, 1910, **44**, 144.

6-Iodo-*o*-nitrotoluene.
Yellowish cryst. M.p. 35·5° (34–6°).

Noelting, *Ber.*, 1904, **37**, 1024.
Cohen, Miller, *J. Chem. Soc.*, 1904, **85**, 1627.

2-Iodo-*m*-nitrotoluene



$C_7H_6O_2NI$ MW, 263

Yellow plates from EtOH. M.p. 67–8°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 451.

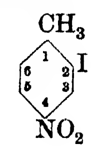
4-Iodo-*m*-nitrotoluene.
Needles from EtOH. M.p. 55–6°. Sol. hot EtOH.

Beilstein, Kuhlberg, *Ann.*, 1871, **158**, 344.
Wheeler, *Am. Chem. J.*, 1910, **44**, 139.

6-Iodo-*m*-nitrotoluene.
Needles. M.p. 103–4°. Sol. hot EtOH.

Reverdin, Kacer, *Ber.*, 1897, **30**, 3000.
Wheeler, *Am. Chem. J.*, 1910, **44**, 130.
Datta, Varma, *J. Am. Chem. Soc.*, 1919, **41**, 2047.

2-Iodo-*p*-nitrotoluene



$C_7H_6O_2NI$ MW, 263

M.p. 58° (54°). Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, AcOH. Spar. sol. ligroin.

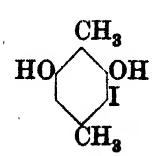
Blanksma, *Chem. Zentr.*, 1910, I, 261.
Willgerodt, Kok, *Ber.*, 1908, **41**, 2077.
See also second reference above.

3-Iodo-*p*-nitrotoluene.
Orange-yellow needles. M.p. 95–7° (103–5° after resolidification).

Elson, Gibson, Johnson, *J. Chem. Soc.*, 1929, 2740.

Iodo-octane.
See Octyl iodide.

Iodo-β-orcinol (3-*Iodo*-2 : 6-*dihydroxy*-p-*xylene*)



$C_8H_9O_2I$ MW, 264

Cryst. from ligroin. M.p. 93°. Very sol. CS_2, Et_2O, C_6H_6.

Stenhouse, Groves, *Ann.*, 1880, **203**, 298.

1-Iodopalmitic Acid

$CH_3 \cdot [CH_2]_{13} \cdot CHI \cdot COOH$

$C_{16}H_{31}O_2I$ MW, 382

Glistening scales from pet. ether. M.p. 60–1°. Sol. warm EtOH, ligroin, $CHCl_3$.

Amide: $C_{16}H_{32}ONI$. MW, 381. Leaflets from EtOH. M.p. 108°. Sol. hot EtOH, C_6H_6, $CHCl_3$.

Jones, *J. Am. Chem. Soc.*, 1915, **37**, 589.
Ponzio, *Gazz. chim. ital.*, 1911, **41**, I, 784.

2-Iodopalmitic Acid

$CH_3 \cdot [CH_2]_{12} \cdot CHI \cdot CH_2 \cdot COOH$

$C_{16}H_{31}O_2I$ MW, 382

M.p. 50·5° (48–9°).

Robinet, *Bull. soc. chim. Belg.*, 1931, **40**, 710.

15-Iodopalmitic Acid

$ICH_2 \cdot [CH_2]_{14} \cdot COOH$

$C_{16}H_{31}O_2I$ MW, 382

Cryst. M.p. 76°. Sol. hot EtOH.

Bougault, *Compt. rend.*, 1910, **150**, 876.

1-Iodo-*n*-pentane.

See n-Amyl iodide.

2-Iodo-*n*-pentane

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CHI \cdot CH_3$

$C_5H_{11}I$ MW, 198

d-.

B.p. 39°/20 mm. $[\alpha]_D^{17}$ +29·2° in Me_2CO.

l-.

B.p. 143°. D_D^{17} 1·5067. $[\alpha]_D^{17}$ −37·15°.

Bergmann, Polanyi, Szabo, *Z. physik. Chem.*, 1933, **B**, **20**, 170.

3-Iodo-*n*-pentane (*sec.-n-Amyl iodide*)

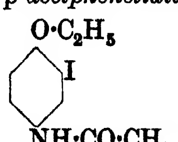
$CH_3 \cdot CH_2 \cdot CHI \cdot CH_2 \cdot CH_3$

$C_5H_{11}I$ MW, 198

B.p. 144°/738 mm., 68°/50 mm. D_4^{20} 1·5176. n_D^{20} 1·4968.

Wagner, Sayzeff, *Ann.*, 1875, **179**, 317.
Rosanow, *Chem. Zentr.*, 1923, I, 1491.

2-Iodophenacetin (*2-Iodo-4-acetylamino-phenetole, 2-iodo-p-acetphenetidide*)

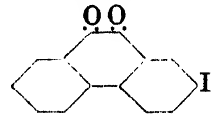


$C_{10}H_{12}O_2NI$ MW, 305

Leaflets from EtOH.Aq. M.p. 146°. Sol. EtOH, $CHCl_3$, AcOH. Very spar. sol. H_2O. Insol. pet. ether.

Reverdin, *Ber.*, 1896, **29**, 2596.
Cohn, *Chem. Zentr.*, 1912, I, 996.

2-Iodophenanthraquinone



$C_{14}H_7O_2I$ MW, 334

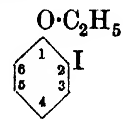
Orange cryst. from AcOH. M.p. 223–4°. Mod. sol. EtOH, C_6H_6, toluene.

McMaster, Wobus, *J. Am. Chem. Soc.*, 1934, **56**, 164.

Iodophenetidine.

See under Iodoaminophenol.

o-Iodophenetole



C_8H_9OI MW, 248

Heavy oil. B.p. 245°/736 mm. Sol. ord. org. solvents. Volatile in steam. Cl in $CHCl_3$ ⟶ dichloride $C_2H_5O \cdot C_6H_4ICl_2$, decomp. at 68°.

Reverdin, *Ber.*, 1896, **29**, 2596.
Jannasch, Naphtali, *Ber.*, 1898, **31**, 1714.

***m*-Iodophenetole.**

B.p. 133–4°/15 mm.

Dichloride: m.p. 64° decomp. Unstable.

Buchan, McCombie, *J. Chem. Soc.*, 1932, 2857.

***p*-Iodophenetole.**

Cryst. from MeOH.Aq. M.p. 29°. B.p. 249–50°/729 mm. Very sol. Et_2O, $CHCl_3$. Heat + Cu at 230–40° ⟶ 4 : 4′-diethoxydiphenyl. Cl or HOCl ⟶ golden-yellow cryst. dichloride, m.p. 73° (decomp. ⟶ 2-chloro-4-iodophenetole).

Reverdin, *Ber.*, 1896, **29**, 2596.
Matheson, McCombie, *J. Chem. Soc.*, 1931, 1106.

β-Iodophenetole.

See 2-Iodoethyl phenyl Ether.

***o*-Iodophenol**

C_6H_5OI MW, 220

Needles. M.p. 43°. B.p. 186–7°/160 mm. Decomp. on dist. in air. D^{80} 1·8757. Very sol. EtOH, Et_2O, CS_2. Mod. sol. hot H_2O. Volatile in steam. Cold conc. H_2SO_4 ⟶ 2 : 4-di-iodophenol. With 1 mol. cineole forms cryst. comp., m.p. 89°.

Acetyl-dichloride : m.p. 92–3° decomp. Unstable.

Benzoyl : needles from pet. ether. M.p. 34°. *Dichloride* : m.p. 98–101°. Unstable.

Phenylcarbamate : m.p. 122°.

Me ether : *see* o-Iodoanisole.

Et ether : *see* o-Iodophenetole.

Chi, *Chem. Abstracts*, 1932, **26**, 5552.
Buchan, McCombie, *J. Chem. Soc.*, 1931, 139.
Whitmore, Hanson, *Organic Syntheses*, Collective Vol. I, 319.
Hollemann, Rinkes, *Chem. Zentr.*, 1910, II, 304.

m-Iodophenol.

Needles from ligroin. M.p. 40°. Volatile in steam.

Acetyl : colourless plates from pet. ether. M.p. 38°. *Dichloride* : m.p. 91–2° decomp.

Benzoyl : prisms from pet. ether. M.p. 72–3°. *Dichloride* : m.p. 106° decomp. Stable.

p-*Toluenesulphonyl* : m.p. 60–1°. *Dichloride* : m.p. 97–9° decomp. Stable.

Dichloride : m.p. 91–2° decomp. Unstable.

Me ether : *see* m-Iodoanisole.

Et ether : *see* m-Iodophenetole.

Phenylurethane : m.p. 138°.

Buchan, McCombie, *J. Chem. Soc.*, 1932, 2858.
Ullmann, Loewenthal, *Ann.*, 1904, **332**, 66.

p-Iodophenol.

Flat needles from H_2O or by sublimation. M.p. 93–4°. Decomp. on dist. in air. D^{112} 1·8573. Sol. EtOH, Et_2O. Spar. sol. H_2O. Volatile in steam. Cold conc. H_2SO_4 ⟶ 2 : 4-di-iodophenol.

Carbonate : cryst. from CCl_4. M.p. 193°.

Phenylcarbamate: cryst. from C_6H_6. M.p. 148°.

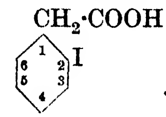
p-*Toluenesulphonyl* : cryst. from MeOH. M.p. 99°. *Dichloride* : m.p. 115° decomp. Stable.

Me ether : *see* p-Iodoanisole.

Et ether : *see* p-Iodophenetole.

Birckenbach, Goubeau, *Ber.*, 1932, **65**, 399.
Chi, *Chem. Abstracts*, 1932, **26**, 5552.
Matheson, McCombie, *J. Chem. Soc.*, 1931, 1103.
Hollemann, Rinkes, *Chem. Zentr.*, 1910, II, 304.

o-Iodophenylacetic Acid



$C_8H_7O_2I$ MW, 262

Needles from H_2O. M.p. 110°. Sol. hot H_2O, EtOH, Et_2O, CS_2, ligroin. Spar. sol. cold H_2O.

Raum, *Ber.*, 1894, **27**, 3233.

p-Iodophenylacetic Acid.

Plates from H_2O. M.p. 135°. Sol. hot H_2O, EtOH, Et_2O, C_6H_6, CS_2, AcOH. Mod. sol. cold H_2O.

Nitrile : p-iodobenzyl cyanide. C_8H_6NI. MW, 243. Plates from EtOH. M.p. 50·5°. Sol. EtOH, Et_2O, CS_2, C_6H_6, AcOH. Insol. H_2O.

Mabery, Jackson, *Ber.*, 1878, **11**, 56 ; *Am. Chem. J.*, 1880, **2**, 253.
Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 295.

ω-Iodophenylacetylene

$C_6H_5·C⋮CI$

C_8H_5I MW, 228

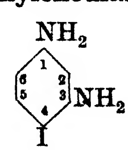
Colourless sweet-smelling oil. B.p. 134–8°/22 mm. slight decomp., 119°/20 mm., 115–17°/16 mm. D^{23} 1·75. Part. polymerizes on heating. Resinifies in sunlight. Dist. in vac. ⟶ tri-iodostyrene, $C_6H_5·CI⁚CI_2$. HI in cold AcOH ⟶ phenylacetylene di-iodide $C_6H_5·CI⁚CHI$. With 1 mol. aniline forms cryst. add. comp., m.p. 44°.

Peratoner, *Gazz. chim. ital.*, 1892, **22**, II, 81, 94.
Dehn, *Am. Chem. J.*, 1911, **33**, 1600.
Manchot, *Ann.*, 1912, **387**, 292.
Truchet, *Ann. chim.*, 1931, **16**, 373.

Iodophenyl-α-alanine.

See 4-Iodo-α-aminohydrocinnamic Acid.

4-Iodo-m-phenylenediamine



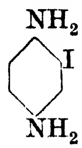
N : N′-*Diacetyl* : cryst. from C_6H_6 or $CHCl_3$. Decomp. at 175–8°.

Nicolet, Sampey, *J. Am. Chem. Soc.*, 1927, **49**, 1799.

5-Iodo-*m*-phenylenediamine.
N : N'-*Diacetyl* : m.p. 291°.

Nicolet, *J. Am. Chem. Soc.*, 1927, **49**, 1813.

Iodo-*p*-phenylenediamine

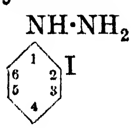


$C_6H_7N_2I$ MW, 234

Needles from H_2O. M.p. 110·5°.
N : N'-*Diacetyl* : cryst. from AcOH. M.p. 211·5°.
N : N'-*Dibenzoyl* : cryst. from $PhNO_2$. M.p. 254°.

Nicolet, Ray, *J. Am. Chem. Soc.*, 1927, **49**, 1804.

***o*-Iodophenylhydrazine**



$C_6H_7N_2I$ MW, 234

Needles from pet. ether. M.p. 29–30°. Unstable. Condenses with benzaldehyde ⟶ cryst. comp., m.p. 66°.

Votoček, Ettel, Koppova, *Bull. soc. chim.*, 1926, **39**, 281.
Busch, Meussdörffer, *J. prakt. Chem.*, 1907, **75**, 139.

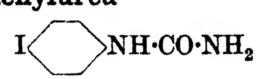
***m*-Iodophenylhydrazine.**
Yellow oil. Decomp. on dist. Condenses with benzaldehyde ⟶ cryst. comp., m.p. 146–7°.

See first reference above.

***p*-Iodophenylhydrazine.**
Silky needles from H_2O. M.p. 103°. Sol. ord. org. solvents. Condenses with benzaldehyde ⟶ cryst. comp., m.p. 118°.

Neufeld, *Ann.*, 1888, **248**, 98.
Votoček, Ettel, Koppova, *Bull. soc. chim.*, 1926, **39**, 281.

***p*-Iodophenylurea**

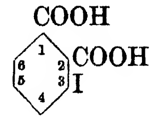


$C_7H_7ON_2I$ MW, 262

Colourless plates from hot EtOH. Does not melt below 300°.

Chattaway, Constable, *J. Chem. Soc.*, 1914, **105**, 131.

3-Iodophthalic Acid



$C_8H_5O_4I$ MW, 292

Cryst. + $3H_2O$ from H_2O. M.p. 206°.
Di-Me ester : $C_{10}H_9O_4I$. MW, 320. Prisms from pet. ether. M.p. 89°. Heat + Cu at 240–60° ⟶ tetramethyldiphenyl-2 : 3 : 2' : 3'-tetracarboxylic acid.
Di-Et ester : $C_{12}H_{13}O_4I$. MW, 348. Leaflets. M.p. 70°.
Anhydride : $C_8H_3O_3I$. MW, 274. Cryst. from Ac_2O. M.p. 159–61°.
Imide : $C_8H_4O_2NI$. MW, 273. M.p. 238°. Sublimes in needles.

Blicke, Smith, *J. Am. Chem. Soc.*, 1929, **51**, 1871.
Kenner, Mathews, *J. Chem. Soc.*, 1914, **105**, 2477.

4-Iodophthalic Acid.
Cryst. + $1\frac{1}{2}H_2O$ from H_2O. M.p. 182° (185–6° sealed tube). Sublimes ⟶ anhydride.
Di-Me ester : b.p. 219°. Heat + Cu at 240–60° ⟶ tetramethyldiphenyl-3 : 4 : 3' : 4'-tetracarboxylic acid.
Di-Et ester : b.p. 235–8°. Very easily hyd. by alkalis.
Anhydride : cryst. from Ac_2O. M.p. 125–6°.
Imide : m.p. 222–4°.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, **41**, 294.
Willgerodt, *Ber.*, 1896, **29**, 1575.
See also previous references.

Iodopropane.
See Propyl iodide *and* Isopropyl iodide.

Iodopropiolic Acid (*Iodopropargylic acid, iodopropinic acid*).

IC⋮C·COOH

C_3HO_2I MW, 196

Prisms from Et_2O or C_6H_6. M.p. 142° (140°). Decomp. above m.p. or on standing.
Et ester : $C_5H_5O_2I$. MW, 224. Prisms from Et_2O. M.p. 68°.

Baeyer, *Ber.*, 1885, **18**, 2274.
Nef, *Ann.*, 1899, **308**, 325.

1-Iodopropionaldehyde

$CH_3·CHI·CHO$

C_3H_5OI MW, 184

Lachrymatory oil with strong odour. B.p. 83–4°/17 mm. (40°/15 mm.). Insol. H_2O.

Nef, *Ann.*, 1904, **335**, 266.
Dawson, Marshall, *J. Chem. Soc.*, 1914, **105**, 387.

2-Iodopropionaldehyde

$CH_2I{\cdot}CH_2{\cdot}CHO$

C_3H_5OI MW, 184

Di-Me acetal: $C_5H_{11}O_2I$. MW, 230. B.p. 85°/60 mm. Stable.

Wohl, *Ber.*, 1908, **41**, 3604.

1-Iodopropionic Acid

$CH_3{\cdot}CHI{\cdot}COOH$

$C_3H_5O_2I$ MW, 200

d-.

B.p. 75–100°/12–22 mm. $[\alpha]_D^{17}$ + 50·7° in Et_2O.

Me ester: $C_4H_7O_2I$. MW, 214. $[\alpha]_{578}$ +87·5° in hexane.

Chloride: C_3H_4OClI. MW, 218·5. B.p. 44–5°/12 mm. $[\alpha]_{578}$ + 54·3°.

Amide: C_3H_6ONI. MW, 199. Cryst. from Me_2CO–C_6H_6. M.p. 155·5–157° decomp. $[\alpha]_D$ +20·4° in EtOH.

l-.

$[\alpha]_D^{17}$ − 49·9° in Et_2O.

Anilide: plates from EtOH. M.p. 134–6°. $[\alpha]_D$ −143° in EtOH.

dl-.

Needles from pet. ether. M.p. 45°. Decomp. in light. $k = 6{\cdot}19 \times 10^{-4}$ at 25°.

Et ester: $C_5H_9O_2I$. MW, 228. B.p. 85°/38 mm. D^{17} 1·662.

Chloride: b.p. 51–3°/13 mm. D^{25} 1·989.

Amide: C_3H_6ONI. MW, 199. Needles from toluene. M.p. 160° (156–7°, sinters at 153°). Spar. sol. C_6H_6, cold H_2O.

Anilide: needles from EtOH. M.p. 131–2°.

Freudenberg, Kuhn, Bumann, *Ber.*, 1930, **63**, 2388.
Backer, Mels, *Rec. trav. chim.*, 1930, **49**, 181.
Jacobs, Heidelberger, *J. Biol. Chem.*, 1915, **21**, 146.
Hannerz, *Ber.*, 1926, **59**, 1367.

2-Iodopropionic Acid

$CH_2I{\cdot}CH_2{\cdot}COOH$

$C_3H_5O_2I$ MW, 200

Glittering leaflets from H_2O. M.p. 85° (82°). Very sol. EtOH, Et_2O. Sol. hot H_2O. Very spar. sol. cold H_2O. $k = 9 \times 10^{-5}$ at 25°.

Me ester: $C_4H_7O_2I$. MW, 214. B.p. 188°/756 mm. D^7 1·8408.

Et ester: $C_5H_9O_2I$. MW, 228. B.p. 202° slight decomp., 136°/100 mm., 85°/13 mm., 80°/9 mm.

Isoamyl ester: $C_8H_{10}O_2I$. MW, 265. B.p. 183°/140 mm. slight decomp.

Chloride: C_3H_4OClI. MW, 218·5. B.p. 81°/15 mm.

Amide: C_3H_6ONI. MW, 199. Plates from C_6H_6. M.p. 142° (100–1°). Mod. sol. cold H_2O. Spar. sol. C_6H_6.

King, L'Ecuyer, *J. Chem. Soc.*, 1934, 1903.
Silberrad, *J. Chem. Soc.*, 1904, **85**, 611.
Perkin, *ibid.*, 422 (*Footnote*).
Wöhlk, *J. prakt. Chem.*, 1900, **61**, 210.
Meyer, *Ber.*, 1888, **21**, 24.
See also last two references above.

3-Iodopropyl Alcohol (*Trimethylene iodohydrin*)

$CH_2I{\cdot}CH_2{\cdot}CH_2OH$

C_3H_7OI MW, 186

Viscous liq. Decomp. in light. B.p. 115°/38 mm., 88°/4 mm. D_4^{20} 1·9976. n_D^{20} 1·55854.

Me ether: methyl 3-iodopropyl ether. C_4H_9OI. MW, 200. B.p. 158°. D_4^{20} 1·6788.

Et ether: ethyl 3-iodopropyl ether. $C_5H_{11}OI$. MW, 214. B.p. 172·5°/779 mm. D_4^{20} 1·5464. n_D^{20} 1·49123.

Karvonen, *Chem. Abstracts*, 1920, **14**, 2176; *Chem. Zentr.*, 1912, II, 1271.

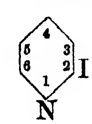
Iodopropylene.

See Allyl iodide *and* Isopropenyl iodide.

3-Iodopropylene Glycol.

See under Glycerol.

2-Iodopyridine (*α-Iodopyridine*)



C_5H_4NI MW, 205

B.p. 93°/13 mm. D_0^{20} 1·9735. n_D^{20} 1·6366.

B_2,H_2PtCl_6: red needles. M.p. 210° decomp.

Methiodide: needles from H_2O. M.p. 207° decomp.

Picrate: m.p. 119–20°.

Tschitschibabin, Rjazancev, *J. Russ. Phys. Chem. Soc.*, 1915, **46**, 1571 (*J. Chem. Soc. Abstracts*, 1916, **110**, I, 224).
Fischer, *Ber.*, 1899, **32**, 1300.

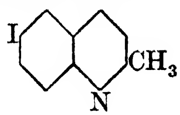
3-Iodopyridine (β-*Iodopyridine*).
Cryst. from EtOH.Aq. M.p. 53·5° (50°). Very volatile at room temp. Sol. ord. org. solvents. Spar. sol. H_2O. Cl in ice-cold $CHCl_3$ ⟶ *chloride*: yellow needles, m.p. 128–30°.
B_2,H_2PtCl_6: m.p. 211° decomp.

Baumgarten, *Ber.*, 1925, **58**, 2023.
Binz, Räth, *Ann.*, 1931, **486**, 101; E.Ps., 259,997, 251,578, (*Chem. Abstracts*, 1927, **21**, 3370, 1332).
Cf. Schering-Kahlbaum, D.R.Ps., 511,451, 468,302, (*Chem. Abstracts*, 1931, **25**, 523; 1929, **23**, 612).

4-Iodopyridine (γ-*Iodopyridine*).
Granular cryst. M.p. 100° decomp. Volatile in steam.

Haitinger, Lieben, *Monatsh.*, 1885, **6**, 319.

6-Iodoquinaldine (6-*Iodo-2-methylquinoline*)

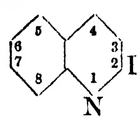


$C_{10}H_8NI$ MW, 269

Needles from EtOH.Aq. M.p. 107–8°.
Picrate: yellow leaflets from EtOH. M.p. 194–5°.

Borsche, Weussmann, Fritzsche, *Ber.*, 1924, **57**, 1772.

2-Iodoquinoline



C_9H_6NI MW, 255

Needles from EtOH.Aq. M.p. 52–3°. Decomp. on dist. Sol. ord. org. solvents. Spar. sol. H_2O.
Methiodide: yellow needles. M.p. 211–12°.
Ethiodide: brown needles. M.p. 220°.

Friedländer, Weinberg, *Ber.*, 1885, **18**, 1531.
Roser, *Ann.*, 1894, **282**, 376.

4-Iodoquinoline.
Needles. M.p. 97°. Sol. EtOH, Et_2O. Insol. cold H_2O. Volatile in steam.
B_2,H_2PtCl_6: orange needles from HCl.Aq. Decomp. at 185°.
Methiodide: reddish-yellow needles from H_2O. M.p. 251° decomp. Very spar. sol. cold H_2O.

Claus, Frobenius, *J. prakt. Chem.*, 1897, **56**, 193.

5-Iodoquinoline.
Small glittering needles from EtOH or Et_2O. M.p. 100°. Sol. ord. org. solvents. Spar. sol. hot H_2O. Sublimes. Volatile in steam.
B,HCl: m.p. 235° (darkens).
B_2,H_2CrO_4: m.p. 165° decomp.
B_2,H_2PtCl_6: bright yellow cryst. M.p. 263° decomp.
Methiodide: golden-yellow needles. M.p. 245° decomp.

Claus, Grau, *J. prakt. Chem.*, 1893, **48**, 167.

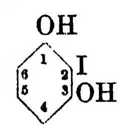
6-Iodoquinoline.
Pearly leaflets from H_2O. M.p. 91° (88°). Sol. hot H_2O, ord. org. solvents. Sublimes. Volatile in steam.
B,HCl: m.p. 210°.
B_2,H_2PtCl_6: reddish-yellow needles. M.p. 265° decomp.
Methiodide: golden-yellow rods from H_2O. M.p. above 300°.

See previous reference.

8-Iodoquinoline.
Long needles from EtOH. M.p. 36°. Very sol. ord. org. solvents. Mod. sol. ligroin.
B_2,H_2PtCl_6: fine needles + $2H_2O$ from alc. HCl. M.p. 251°.
Methiodide: small yellow needles from hot H_2O. M.p. 200°.

Howitz, Fraenkel, Schroeder, *Ann.*, 1913, **396**, 57.

2-Iodoresorcinol



$C_6H_5O_2I$ MW, 236

Di-Me ether: $C_8H_9O_2I$. MW, 264. Needles from EtOH. M.p. 103°.

Baeyer, *Ann.*, 1910, **372**, 127.
Kauffmann, Franck, *Ber.*, 1907, **40**, 4014.

4-Iodoresorcinol.
Prisms from hot H_2O. M.p 67°. Decomp. above m.p.
Di-Me ether: cryst. from ligroin. M.p. 40°. B.p. 163°/14 mm.

Nicolet, Sampey, *J. Am. Chem. Soc.*, 1927, **49**, 1798.
Kauffmann, Kieser, *Ber.*, 1912, **45**, 2334.

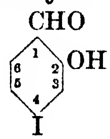
5-Iodoresorcinol.
Needles + $1H_2O$ from C_6H_6. M.p. 92·3°.

Sublimes in vacuo ⟶ needles, m.p. 105–13° (?hydrated).

1-*Me ether*: 5-iodo-3-hydroxyanisole. $C_7H_7O_2I$. MW, 250. Sublimes in colourless needles. M.p. 90°.

Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2826.

4-Iodosalicylaldehyde



$C_7H_5O_2I$ MW, 248

Long needles from EtOH or dil. AcOH. M.p. 87°. Volatile in steam. HNO_3 ⟶ 5-nitro deriv.

Benzoyl: m.p. 62°.

Me ether: 4-iodo-2-methoxybenzaldehyde. Needles from EtOH. M.p. 85°. *Oxime*: m.p. 138°. *Semicarbazone*: m.p. 228°. p-*Nitrophenylhydrazone*: m.p. 238° decomp.

Oxime: m.p. 171°.

Semicarbazone: m.p. 252°.

p-*Nitrophenylhydrazone*: m.p. 242° decomp.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3043.

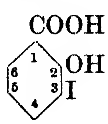
5-Iodosalicylaldehyde.

Pale yellow needles from EtOH. M.p. 102°. $FeCl_3$ on EtOH sol. ⟶ blue col.

Oxime: needles from EtOH. M.p. 135°.

Visser, *Arch. Pharm.*, 1897, **235**, 558, (*J. Chem. Soc. Abstracts*, 1898, **74**, I, 202).

3-Iodosalicylic Acid



$C_7H_5O_3I$ MW, 264

Long fine needles from H_2O. M.p. 199°. $FeCl_3$ ⟶ violet col.

Brenans, Prost, *Compt. rend.*, 1924, **178**, 1824; 1923, **176**, 1626.

Dimroth, *Ber.*, 1902, **35**, 2873.

4-Iodosalicylic Acid.

M.p. 230° decomp. $FeCl_3$ ⟶ reddish-violet col.

Acetyl: 4-iodoaspirin. $C_9H_7O_4I$. MW, 306. M.p. 156°.

Et ester: $C_9H_9O_3I$. MW, 292. M.p. 21°. Volatile in steam.

Me ether: 4-iodo-2-methoxybenzoic acid. $C_8H_7O_3I$. MW, 278. M.p. 150°. Decomp. above m.p. Sublimes at 120–30°.

Hodgson, Jenkinson, *J. Chem. Soc.*, 1927, 3041.

Brenans, Prost, *Compt. rend.*, 1924, **178**, 1010.

5-Iodosalicylic Acid.

Needles from H_2O. M.p. 197° (193·5°). Sol. EtOH. Spar. sol. H_2O. Heat of comb. C_v 706·5 Cal. $FeCl_3$ ⟶ violet col. Rapid heat ⟶ *p*-iodophenol. KOH fusion ⟶ 2:5-dihydroxybenzoic acid.

Acetyl: 5-iodoaspirin. M.p. 166°. *Nitrile*: $C_9H_6O_2NI$. MW, 287. Plates. M.p. 79°.

Et ester: needles. M.p. 70–1°. Decomp. on dist.

Glycerol α-mono-ester: m.p. 105°.

p-*Nitrobenzyl ester*: m.p. 141°.

Miller, *Ann.*, 1883, **220**, 123.

Visser, *Arch. Pharm.*, 1897, **235**, 559 (*J. Chem. Soc. Abstracts*, 1898, **74**, I, 203).

Haase, D.R.P., 224,536, (*Chem. Abstracts*, 1911, **5**, 155).

Brenans, Prost, *Compt. rend.*, 1923, **176**, 1626; 1924, **178**, 1824.

Iodosobenzene

$C_6H_5{\cdot}IO$

C_6H_5OI MW, 220

Yellow amorphous powder. Explodes at 210°. Mod. sol. hot H_2O, EtOH. Insol. Et_2O, Me_2CO, C_6H_6, pet. ether. Decomp. slowly on standing, rapidly at 90–100° ⟶ C_6H_5I + $C_6H_5IO_2$.

Diacetate: $C_6H_5I(O{\cdot}CO{\cdot}CH_3)_2$. M.p. 160·5° (157°).

Dipropionate: $C_6H_5I(O{\cdot}CO{\cdot}C_2H_5)_2$. Cryst. from ligroin. M.p. 67–70°.

Dibenzoate: $C_6H_5I(O{\cdot}CO{\cdot}C_6H_5)_2$. M.p. 159–60°.

Sidgwick, Barkworth, *J. Chem. Soc.*, 1931, 808.

Arbuzov, *J. prakt. Chem.*, 1931, **131**, 357.

Ortoleva, *Gazz. chim. ital.*, 1900, **30**, II, 3.

Iodosol.

See 6-Iodothymol.

1-Iodostearic Acid

$CH_3{\cdot}[CH_2]_{15}{\cdot}CHI{\cdot}COOH$

$C_{18}H_{35}O_2I$ MW, 410

Leaflets. M.p. 66°. Sol. warm EtOH, warm pet. ether.

Amide: $C_{18}H_{36}ONI$. MW, 409. Leaflets from EtOH. M.p. 112°.

Ponzio, *Gazz. chim. ital.*, 1911, **41**, I, 786; 1904, **34**, II, 80.

2-Iodostearic Acid

$CH_3{\cdot}[CH_2]_{14}{\cdot}CHI{\cdot}CH_2{\cdot}COOH$

$C_{18}H_{35}O_2I$ MW, 410

Needles from AcOH. M.p. 60–1°. Sol. EtOH, $CHCl_3$, C_6H_6. Spar. sol. Et_2O, pet. ether.

Me ester: $C_{19}H_{37}O_2I$. MW, 424. Needles. M.p. 44° (41°).

Eckert, Halla, *Monatsh.*, 1913, **34**, 1817.

3-Iodostearic Acid

$CH_3{\cdot}[CH_2]_{13}{\cdot}CHI{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_{18}H_{35}O_2I$ MW, 410

Needles from AcOH. M.p. 58·5°. Easily hyd. by alkalis with elimination of iodine.

See previous reference.

9-Iodostearic Acid

$CH_3{\cdot}[CH_2]_7{\cdot}CHI{\cdot}[CH_2]_8{\cdot}COOH$

$C_{18}H_{35}O_2I$ MW, 410

Thick oil. Alc. KOH ⟶ oleic + isoleic acids

Siazew, *J. prakt. Chem.*, 1887, **35**, 378; 1886, **33**, 308.

10-Iodostearic Acid

$CH_3{\cdot}[CH_2]_6{\cdot}CHI{\cdot}[CH_2]_9{\cdot}COOH$

$C_{18}H_{35}O_2I$ MW, 410

Thick oil. Alc. KOH ⟶ only isoleic acid (m.p. 44°).

Siazew, *J. prakt. Chem.*, 1888, **37**, 276.

Iodosuccinic Acid

$CHI{\cdot}COOH\alpha$
$CH_2{\cdot}COOH\beta$

$C_4H_5O_4I$ MW, 244

l-.

Cryst. from AcOEt–CCl_4. M.p. 150–2° decomp. $[\alpha]_D^{19}$ − 89·8° in AcOEt. Quickly racemised by NaI in H_2O or Me_2CO.

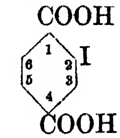
dl-.

Cryst. from AcOEt–C_6H_6. M.p. 135–40° decomp. Very sol. H_2O, EtOH, Et_2O, AcOEt. Spar. sol. C_6H_6. The freshly prepared H_2O sol. + $AgNO_3$ ⟶ AgI after short time.

β-*Monoamide*: iodosuccinamic acid. $C_4H_6O_3NI$. MW, 243. Prisms. M.p. 118–20° decomp. Sol. H_2O, EtOH, Me_2CO, AcOEt. Spar. sol. Et_2O. Insol. C_6H_6, $CHCl_3$.

Holmberg, *Arkiv. Kemi, Mineral. Geol.*, 1917, **6**, 23; *J. prakt. Chem.*, 1913, **88**, 576.
Kallenberg, *Ber.*, 1917, **50**, 94.
Westerlund, *Ber.*, 1915, **48**, 1179.

Iodoterephthalic Acid



$C_8H_5O_4I$ MW, 292

Yellow needles from hot EtOH.Aq. M.p. 274–6°. Sublimes undecomp.

4-*Me ester*: $C_9H_7O_4I$. MW, 306. M.p. 186°.

Di-Me ester: $C_{10}H_9O_4I$. MW, 320. Yellow needles from H_2O. M.p. 80°. Heat (+ Cu) ⟶ tetramethyldiphenyl-2 : 5 : 2′ : 5′-tetracarboxylic acid, m.p. 156°.

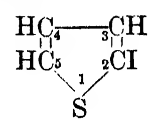
Abbes, *Ber.*, 1893, **26**, 2951.
Kenner, Witham, *J. Chem. Soc.*, 1913, **103**, 237.

Iodotetracosane.
See Tetracosyl iodide.

Iodothioanisole.
See under Iodothiophenol.

Iodothione.
1 : 3-Di-iodoisopropyl Alcohol, *q.v.*

2-Iodothiophene



C_4H_3IS MW, 210

B.p. 90–4°/34–8 mm., 80–1°/20 mm., 73°/15 mm. $HgCl_2$.Aq + AcONa in EtOH ⟶ after 3 weeks felt-like cryst., $IC_4H_2S{\cdot}HgCl$, m.p. 225° (sinters at 215°).

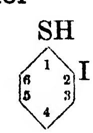
Minnis, *Organic Syntheses*, 1932, XII, 44.
Steinkopf, Bauermeister, *Ann.*, 1914, **403**, 68.

3-Iodothiophene.
B.p. 77°/11 mm.

Rinkes, *Rec. trav. chim.*, 1934, **53**, 644, 648.

Iodothiophenetole.
See under Iodothiophenol.

o-Iodothiophenol



C_6H_5IS MW, 236

Me ether: *o*-iodothioanisole. C_7H_7IS. MW, 250. Yellow oil. B.p. 173°/20 mm. Volatile in steam. Sol. ord. org. solvents.

Zincke, Siebert, *Ber.*, 1915, **48** 1247.

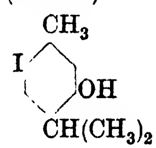
_m_-Iodothiophenol.
Me ether: *m*-iodothioanisole. Colourless oil. B.p. 157°/16 mm. Volatile in steam. Sol. ord. org. solvents.

Zincke, Müller, *Ber.*, 1913, **46**, 783.

_p_-Iodothiophenol.
Needles from EtOH. M.p. 85–6°. Sol. EtOH, Et_2O, $CHCl_3$.
Me ether: *p*-iodothioanisole. Leaflets from MeOH. M.p. 45° (38°). Insol. H_2O.
Et ether: *p*-iodothiophenetole. C_8H_9IS. MW, 264. Yellow oil. B.p. 146–7°/11 mm. CrO_3 in AcOH ⟶ sulphone, m.p. 83°.

Monier-Williams, *J. Chem. Soc.*, 1906, **89**, 278.
Zincke, Jörg, *Ber.*, 1910, **43**, 3448.
Gattermann, *Ann.*, 1912, **393**, 232.
Willgerodt, Klinger, *J. prakt. Chem.*, 1912, **85**, 189.

6-Iodothymol (*Iodosol*)

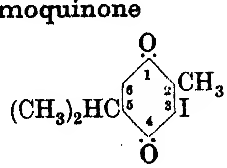


$C_{10}H_{13}OI$ MW, 276

Needles from EtOH. M.p. 68–9°. Sol. ord. org. solvents. Spar. sol. warm H_2O. Insol. cold H_2O. $MnO_2 + H_2SO_4$ or $FeCl_3$.Aq. ⟶ thymoquinone.
Acetyl: needles from AcOH. M.p. 71°. Sol. ord. org. solvents.
Et ether: $C_{12}H_{17}OI$. MW, 304. M.p. 52°. Sol. Et_2O, $CHCl_3$, AcOH, ligroin. Mod. sol. hot H_2O, hot EtOH.
Picryl ether: cryst. from AcOH. M.p. 155°.

Datta, Prasad, *J. Am. Chem. Soc.*, 1917, **39**, 444.
Kalle, D.R.P., 107,509, (*Chem. Zentr.*, 1900, I, 1087).

3-Iodothymoquinone



$C_{10}H_{11}O_2I$ MW, 290

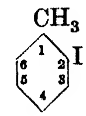
Yellowish-red prisms from 95% EtOH or ligroin. M.p. 61–2°. Difficultly volatile in steam. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Very spar. sol. hot H_2O.
Oxime: golden-yellow prisms or needles from EtOH.Aq. M.p. 130° decomp. (rapid heat.). Sol. EtOH, Et_2O. *Acetyl*: m.p. 67–8°.

Kehrmann, Krüger, *Ann.*, 1900, **310**, 100.

6-Iodothymoquinone.
Reddish plates from EtOH or ligroin. M.p. 64–5°. Mod. volatile in steam. Sol. EtOH, Et_2O, AcOH, ligroin, C_6H_6. Insol. H_2O.
Oxime: golden-yellow plates from EtOH. Decomp. 141–2°. *Acetyl*: m.p. 99–100°.

Kehrmann, Krüger, *Ann.*, 1900, **310**, 93.

_o_-Iodotoluene



C_7H_7I MW, 218

B.p. 211° (204°), 207°/726 mm. D^{20} 1·698. Dil. HNO_3 ⟶ *o*-iodobenzoic acid.

Shoesmith, Slater, *J. Chem. Soc.*, 1924, **125**, 2282.
Birckenbach, Goubeau, *Ber.*, 1932, **65**, 399.
Datta, *J. Am. Chem. Soc.*, 1919, **41**, 290.
Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913, **88**, 92.
Ullmann, Meyer, *Ann.*, 1904, **332**, 42.

_m_-Iodotoluene.
B.p. 213° (204°). D^{20} 1·698.

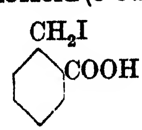
Beilstein, Kuhlberg, *Ann.*, 1871, **158**, 347.
Datta, *J. Am. Chem. Soc.*, 1919, **41**, 290.
See also first reference above.

_p_-Iodotoluene.
Leaflets. M.p. 36–7° (35°). B.p. 211° (213·5°/733 mm.). Sublimes. Volatile in steam. Sol. EtOH, Et_2O, CS_2. Dil. HNO_3 ⟶ *p*-iodobenzoic acid.

Bodroux, *Compt. rend.*, 1902, **135**, 1351.
Edinger, Goldberg, *Ber.*, 1900, **33**, 2877.
Gattermann, *Ber.*, 1890, **23**, 1223.
Datta, *J. Am. Chem. Soc.*, 1919, **41**, 290.
Ullmann, Meyer, *Ann.*, 1904, **332**, 42.
See also first two references above.

ω-Iodotoluene.
See Benzyl iodide.

ω-Iodo-_o_-toluic Acid (o-*Carboxybenzyl iodide*)

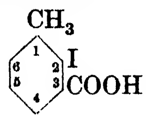


$C_8H_7O_2I$ MW, 262

Et ester: $C_{10}H_{11}O_2I$. MW, 290. Minute needles. M.p. 32·5°. Sol. ord. org. solvents. Decomp. slowly on keeping.

Davies, Perkin, *J. Chem. Soc.*, 1922, **121**, 2208.

2-Iodo-*m*-toluic Acid



$C_8H_7O_2I$ MW, 262

Needles from C_6H_6 or MeOH. M.p. 145–6° (softens at 135°).

Me ester: $C_9H_9O_2I$. MW, 276. B.p. 280–90°.

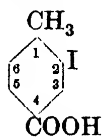
Mayer, *Ber.*, 1911, **44**, 2303.

4-Iodo-*m*-toluic Acid.

Cryst. from dil. AcOH. M.p. 214–15°. $KMnO_4 \longrightarrow$ 4-iodoisophthalic acid.

Willgerodt, Jahn, *Ann.*, 1911, **385**, 328.
Edinger, Goldberg, *Ber.*, 1900, **33**, 2879.

2-Iodo-*p*-toluic Acid



$C_8H_7O_2I$ MW, 262

Cryst. from EtOH. M.p. 205–6°.

Me ester: cryst. M.p. 28°. B.p. 194°/52 mm.

Et ester: $C_{10}H_{11}O_2I$. MW, 290. B.p. 242°/175 mm.

Amide: C_8H_8ONI. MW, 261. Leaflets from EtOH. M.p. 167°.

Dichloride: $CH_3{\cdot}C_6H_3ICl_2{\cdot}COOH$. M.p. 193–5°.

Nitrile: C_8H_6NI. MW, 243. Cryst. from AcOEt. M.p. 57·5°.

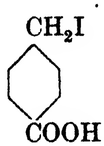
Kenner, Witham, *J. Chem. Soc.*, 1913, **103**, 235.

3-Iodo-*p*-toluic Acid.

Needles from H_2O. M.p. 127°. Very sol. $CHCl_3$.

Klöppel, *Ber.*, 1893, **26**, 1737.

ω-Iodo-*p*-toluic Acid (p-*Carboxybenzyl iodide*)

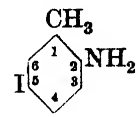


$C_8H_7O_2I$ MW, 262

Nitrile: *p*-cyanobenzyl iodide. C_8H_6NI. MW, 243. Needles from EtOH. M.p. 143–4°.

Freund, Reitz, *Ber.*, 1906, **39**, 2235.

5-Iodo-*o*-toluidine



C_7H_8NI MW, 233

Needles from 50% EtOH. M.p. 87·2° (92°, 85°). Volatile in steam. Sol. EtOH, Et_2O, AcOH, C_6H_6, ligroin, hot H_2O.

B,4HF: m.p. 105°.
B,HCl: m.p. 214°.
B,HBr: m.p. 196°.
B,HI: m.p. 190°.
B,HClO₄: m.p. 209°.
B₂,(COOH)₂: m.p. 158°.

N-*Acetyl*: 5-iodoacet-*o*-toluidide. Needles from dil. EtOH. M.p. 170·5° (161–2°).

N-*Benzoyl*: needles from EtOH. M.p. 184°.
N-*Benzylidene*: needles. M.p. 55°.
B₂,HgCl₂: m.p. 134·5°.
Phenylurethane: m.p. 232°.
Picrate: m.p. 188·5°.
Picrolonate: m.p. 189·5°.

Hahn, Berliner, *J. Am. Chem. Soc.*, 1925, **47**, 1709.
Schrauth, Schoeller, *Ber.*, 1912, **45**, 2818.

6-Iodo-*o*-toluidine.

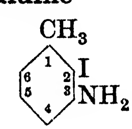
Oil. Volatile in steam.

B,HCl: plates. M.p. 254° decomp.

N-*Acetyl*: 6-iodoacet-*o*-toluidide. Needles. M.p. 166°.

Cohen, Miller, *J. Chem. Soc.*, 1904, **85**, 1627.
Noelting, *Ber.*, 1904, **37**, 1024.

2-Iodo-*m*-toluidine



C_7H_8NI MW, 233

Prisms. M.p. 41–2°. Sol. EtOH, Et_2O. Insol. H_2O.

N-*Acetyl*: 2-iodoacet-*m*-toluidide. Needles from H_2O. M.p. 135°. Sublimes. Sol. EtOH.

Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 452.

4-Iodo-*m*-toluidine.

Cryst. from dil. EtOH. M.p. 48° (38·5°). Discolours in light. Decomp. on steam dist.

B,HCl : decomp. at 155°.
$B_2,(COOH)_2$: needles. M.p. 113°.
N-*Formyl* : needles. M.p. 129°.
N-*Acetyl* : 4-iodoacet-*m*-toluidide. Prisms from EtOH. M.p. 151° (145–6°). Hyd. with difficulty.

Willgerodt, Simonis, *Ber.*, 1906, **39**, 273.
Wheeler, *Am. Chem. J.*, 1910, **44**, 139.

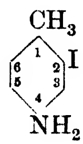
5-Iodo-*m*-toluidine.
Needles from pet. ether. M.p. 78·5°.
N-*Acetyl* : 5-iodoacet-*m*-toluidide. Plates from EtOH. M.p. 183°.

Wheeler, *Am. Chem. J.*, 1910, **44**, 145.

6-Iodo-*m*-toluidine.
Plates from EtOH. M.p. 46° (42°). Very sol. AcOH, C_6H_6, ligroin. Sol. EtOH, Et_2O. Spar. sol. hot H_2O. Resinifies in air.
N-*Acetyl* : 6-iodoacet-*m*-toluidide. Needles from EtOH. M.p. 147–8° (132–4°).

Hollemann, Linden, *Rec. trav. chim.*, 1912, **31**, 270.
Wheeler, *Am. Chem. J.*, 1910, **44**, 128.

2-Iodo-*p*-toluidine



C_7H_8NI MW, 233

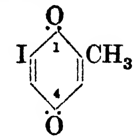
Needles from dil. EtOH or pet. ether. M.p. 37–8°. Sol. ord. org. solvents. Stable to light. Salts decomp. by cold H_2O.
N-*Acetyl* : 2-iodoacet-*p*-toluidide. Needles from dil. EtOH, M.p. 130°. *Dichloride* : $CH_3{\cdot}C_6H_3ICl_2{\cdot}NH_2$. Yellow needles. Decomp. at 100°.
Oxalate : m.p. 103° decomp.

Willgerodt, Gartner, *Ber.*, 1908, **41**, 2813.
Blanksma, *Chem. Zentr.*, 1910, I, 261.

3-Iodo-*p*-toluidine.
Prisms. M.p. 40°. Decomp. on dist. in vacuo. Very sol. ord. org. solvents. Salts decomp. by H_2O.
B,HCl : m.p. 188°.
$B_2,(COOH)_2$: m.p. 119–20°.
N-*Acetyl* : 3-iodoacet-*p*-toluidide. Needles from H_2O. M.p. 133°.
N-*Benzoyl* : needles from EtOH. M.p. 161°.

Elbs, Volk, *J. prakt. Chem.*, 1919, **99**, 270.
Wheeler, Liddle, *Am. Chem. J.*, 1909, **42**, 445.

6-Iodotoluquinone

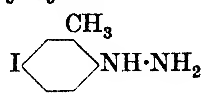


$C_7H_5O_2I$ MW, 248

Red needles. M.p. 116–17°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, CS_2. Sublimes.
4-*Oxime* : 3-iodo-5-nitroso-*o*-cresol. M.p. 156° decomp.

Kehrmann, *J. prakt. Chem.*, 1888, **37**, 340; 1889, **39**, 398.

4-Iodo-*o*-tolylhydrazine



$C_7H_9N_2I$ MW, 248

Plates from pet. ether. M.p. 98°.
N-*Benzylidene* : m.p. 102–3°.

Fichter, *J. prakt. Chem.*, 1906, **74**, 313.

2-Iodotrimethylene Glycol.
See under Glycerol.

Iodotrinitrobenzene.
See Picryl iodide.

α-Iodotriphenylmethane.
See Triphenylmethyl iodide.

3-Iodo-*n*-valeric Acid

$CH_3{\cdot}CHI{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_5H_9O_2I$ MW, 228

M.p. 18°. Unstable.
Et ester : $C_7H_{13}O_2I$. MW, 256. B.p. 102·5°/10·5 mm.

Wohlgemuth, *Compt. rend.*, 1914, **158**, 1577.

4-Iodo-*n*-valeric Acid

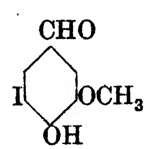
$CH_2I{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_5H_9O_2I$ MW, 228

Needles from pet. ether. M.p. 56–7° (54–6°).
Et ester : $C_7H_{13}O_2I$. MW, 256. B.p. 108–18°/20 mm.

Carter, *J. Am. Chem. Soc.*, 1928, **50**, 1968.

5-Iodovanillin

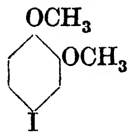


$C_8H_7O_3I$ MW, 278

M.p. 180°. Spar. sol. EtOH, Et_2O.

Hann, *J. Am. Chem. Soc.*, 1925, **47**, 2000.
See also Bougault, Robin, *Compt. rend.*, 1921, **172**, 452.

4-Iodoveratrol (4-*Iodocatechol dimethyl ether*)

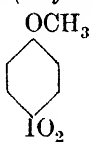


$C_8H_9O_2I$ MW, 264

Needles from MeOH. Aq. M.p. 35°.

Seer, Karl, *Monatsh.*, 1913, **34**, 647.
Tassilly, Leroide, *Compt. rend.*, 1907, **144**, 758.

***p*-Iodoxyanisole** (*Isoform*)



$C_7H_7O_3I$ MW, 266

Leaflets from formic or acetic acid. Explodes above 225°. Sol. hot H_2O. Insol. EtOH, Et_2O. Antiseptic.

Liebrecht, D.R.P., 161,725, (*Chem. Zentr.*, 1905, II, 183.
See also *Chem. Zentr.*, 1904, II, 1249.

Iodoxybenzene

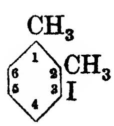
$C_6H_5{\cdot}IO_2$

$C_6H_5O_2I$ MW, 236

Needles from hot H_2O. Explodes at 236–7° (227–8°, 211°). Sol. hot H_2O, hot AcOH. Spar. sol. pet. ether. Insol. EtOH, $CHCl_3$, C_6H_6, Me_2CO.

Böeseken, Schneider, *Chem. Abstracts*, 1933, **27**, 1331.
Erlenmeyer, *Helv. Chim. Acta*, 1926, **9**, 819.
Datta, Choudhury, *J. Am. Chem. Soc.*, 1916, **38**, 1085.

3-Iodo-*o*-xylene



C_8H_9I MW, 232

B.p. 123°/23 mm., (125–6°/15 mm., 115°/17 mm.). D^{20} 1·589.

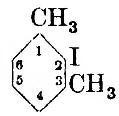
Auwers, *Ann.*, 1919, **419**, 116.

4-Iodo-*o*-xylene.

B.p. 225° (228–32° decomp.). Volatile in steam.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1917, **39**, 437.
Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913, **88**, 93.
Crossley, Hampshire, *J. Chem. Soc.*, 1911, **99**, 726.

2-Iodo-*m*-xylene



C_8H_9I MW, 232

Oil. B.p. 228–30°. Volatile in steam.

Klages, Liecke, *J. prakt. Chem.*, 1900, **61**, 324.

4-Iodo-*m*-xylene.

B.p. 232° (220°). D^{13} 1·6609.

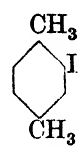
Datta, Chatterjee, *J. Am. Chem. Soc.*, 1917, **39**, 438.
Elbs, Jaroslawzew, *J. prakt. Chem.*, 1913, **88**, 93.

5-Iodo-*m*-xylene.

Oil. B.p. 228°. Volatile in steam.

Klages, Liecke, *J. prakt. Chem.*, 1900, **61**, 324.

Iodo-*p*-xylene

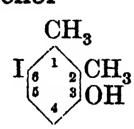


C_8H_9I MW, 232

B.p. 230°/722 mm. (229°, 217°). D^{17} 1·5988.

See above references.

6-Iodo-*o*-3-xylenol



C_8H_9OI MW, 248

Needles from EtOH. M.p. 84°.

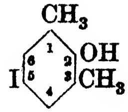
Lockemann, Kunzmann, *Angew. Chem.*, 1933, **46**, 297.

5-Iodo-*o*-4-xylenol.

Brown needles. M.p. 71°.

See previous reference.

5-Iodo-*m*-2-xylenol



C_8H_9OI MW, 248

Brown needles. M.p. 68°.

See previous reference.

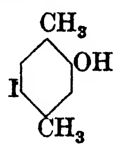
5-Iodo-*m*-4-xylenol.
Yellow liq. B.p. 108°.

Lockemann, Kunzmann, *Angew. Chem.*, 1933, **46**, 298.

2-Iodo-*m*-5-xylenol.
Brown needles. M.p. 74°.

See previous reference.

5-Iodo-*p*-2-xylenol

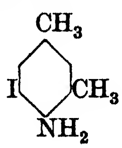


C_8H_9OI MW, 248

Needles. M.p. 79°.

See previous reference.

5-Iodo-*m*-4-xylidine

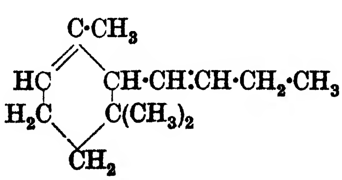


$C_8H_{10}NI$ MW, 247

Needles from EtOH. M.p. 65°. Sol. EtOH, Et_2O, ligroin.
N-Acetyl: m.p. 85°.

Kerschbaum, *Ber.*, 1895, **28**, 2799.

Ionane (1 : 5 : 5-*Trimethyl*-6-α-*butenylcyclohexene*)



$C_{13}H_{22}$ MW, 178

B.p. 220–1°/747 mm. D_0^{20} 0·853. n_D 1·4784.

Kizhner, *Chem. Abstracts*, 1912, **6**, 735.

ψ-Ionane

$CH_3·CH_2·CH:CH·CH:C(CH_3)·[CH_2]_2·CH:C(CH_3)_2$

or

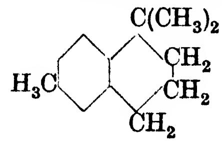
$CH_3·CH_2·CH:CH·CH:C(CH_3)·[CH_2]_3·C(CH_3):CH_2$

$C_{13}H_{22}$ MW, 178

B.p. 224–5°/751 mm. D_0^{20} 0·8151. n_D 1·4725.

Kizhner, *Chem. Abstracts*, 1912, **6**, 736.

Ionene (1 : 1 : 6-*Trimethyltetralin*, 1 : 1 : 6-*trimethyl*-1 : 2 : 3 : 4-*tetrahydronaphthalene*)

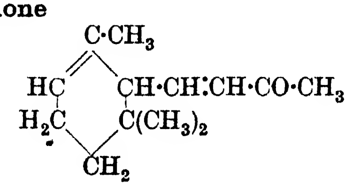


$C_{13}H_{18}$ MW, 174

Oil. B.p. 112–15°/14 mm., 106–7°/10 mm., 88–91°/4 mm. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. D_4^{25} 0·9320 (0·9299). n_D^{25} 1·52167 (1·52163).

Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, **56**, 959 (*Bibl.*).
Tiemann, Krüger, *Ber.*, 1893, **26**, 2693.

α-Ionone

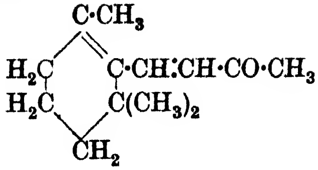


$C_{13}H_{20}O$ MW, 192

Oil. B.p. 146·5–147·5°/28 mm., 136°/17 mm., 134·3°/16 mm., 131·1°/13 mm., 127·6°/12 mm., 123–4°/11 mm. Mod. sol. H_2O. $D_4^{21·2}$ 0·9298. $n_D^{23·3}$ 1·4984 (n_D^{20} 1·5041). Heat of comb. C_p 1837·6 Cal., C_v 1835 Cal.
Oxime: m.p. 89–90°.
Semicarbazone: (i) m.p. 107–8°. (ii) M.p. 137–8°.
Thiosemicarbazone: m.p. 121°.
p-*Bromophenylhydrazone*: m.p. 142–3°.
p-*Nitrophenylhydrazone*: m.p. 113°.
2 : 4-*Dinitrophenylhydrazone*: m.p. 125–8°.

Brady, *J. Chem. Soc.*, 1931, 758.
Bogert, Fourman, *J. Am. Chem. Soc.*, 1933, **55**, 4674.
Ito, *Chem. Abstracts*, 1926, **20**, 2847.
Ballesteros, *Chem. Abstracts*, 1932, **26**, 5088.
Pummerer, Rebmann, *Ber.*, 1933, **67**, 801.
Hernandez, Jauma, Verderau, *Chem. Zentr.*, 1928, I, 1954.
Tiemann, *Ber.*, 1898, **31**, 879, 1736.

β-Ionone



$C_{13}H_{20}O$ MW, 192

Occurs in essential oil of *Boronia megastigma*, Nees. Oil. B.p. 150–1°/24 mm., 140°/18 mm., 140·4°/16 mm., 134·5–135·5°/14·5 mm., 127–128·5°/10 mm. $D_4^{19.6}$ 0·9445. Heat of comb. C_p 1842·1 Cal. n_D 1·521.

Semicarbazone: m.p. 149°.

Thiosemicarbazone: m.p. 158°.

p-*Bromophenylhydrazone*: m.p. 120°.

p-*Nitrophenylhydrazone*: m.p. 173°.

Sabetay, *Compt. rend.*, 1929, **189**, 808.
See also last five references above.

ψ-Ionone (*Citrylideneacetone*)

$CH_3\cdot CO\cdot CH{:}CH\cdot CH{:}C(CH_3)\cdot[CH_2]_2\cdot CH{:}C(CH_3)_2$

or

$CH_3\cdot CO\cdot CH{:}CH\cdot CH{:}C(CH_3)\cdot[CH_2]_3\cdot C(CH_3){:}CH_2$

$C_{13}H_{20}O$ MW, 192

B.p. 167–8°/23 mm., 143–5°/12 mm. D_4^{20} 0·8973. $n_D^{18.8}$ 1·53116. Heat of comb. C_v 1851 Cal.

Hydrate: m.p. 80°. B.p. 166·8–169·8°/10·5 mm. n_D^{21} 1·50647. *Semicarbazone*: m.p. 228° decomp.

Semicarbazone: (i) m.p. 142°. (ii) M.p. 116°.

p-*Bromophenylhydrazone*: m.p. 102–4°.

Hernández, Jaumá, Verderau, *Chem. Zentr.*, 1928, I, 1954.
Ito, *Chem. Abstracts*, 1926, **20**, 2847.
Tiemann, *Ber.*, 1898, **31**, 840.

Ipecacuanhic Acid (*Ipecacuanhin*)

$C_{14}H_{18}O_7$ MW, 298

Cryst. glucosidal tannin occurring in root of *Psychotria Ipecacuanha*, Stokes. Sol. H_2O, MeOH, EtOH. Insol. Et_2O, $CHCl_3$. AcOEt, Me_2CO. $FeCl_3 \longrightarrow$ dark green col. Reduces $AgNO_3$.

Finnemore, Braithwaite, *Chem. Abstracts*, 1912, **6**, 2978.
Huerre, *Chem. Abstracts*, 1920, **14**, 2968.

Ipecacuanhin.
See Ipecacuanhic Acid.

Ipecamine

$C_{28}H_{36}O_4N_2$ MW, 464

M.p. 89–90°. Sol. Et_2O, EtOH, C_6H_6, $CHCl_3$, Me_2CO. Spar. sol. H_2O, ligroin. $[\alpha]_D^{22}$ − 22·7° in EtOH.

Monobenzoyl deriv.: m.p. 104°.

Hesse, *Ann.*, 1914, **408**, 39.

Ipurolic Acid (2 : 10-*Dihydroxymyristic acid*)

$CH_3\cdot[CH_2]_2\cdot CH(OH)\cdot[CH_2]_7\cdot CH(OH)\cdot CH_2\cdot COOH$

$C_{14}H_{28}O_4$ MW, 260

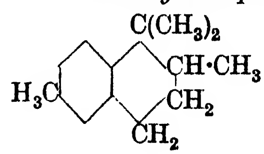
Occurs in *Ipomœa purpurea*, Roth. M.p. 100–1°.

Ag salt: m.p. 160°.

Me ester: $C_{15}H_{30}O_4$. MW, 274. M.p. 68–9°. $[\alpha]_D$ + 1·69° in EtOH. *Mono-Me ether*: $C_{16}H_{32}O_4$. MW, 288. M.p. 64–5°. *Di-phenylurethane*: m.p. 96–7°.

Asahina, Nakanishi, *Chem. Abstracts*, 1925, **19**, 3479.
Power, Rogerson, *Chem. Zentr.*, 1908, II, 887.

Irene (1:1:2:6-*Tetramethyltetralin*, 1:1:2:6-*tetramethyl*-1 : 2 : 3 : 4-*tetrahydronaphthalene*)

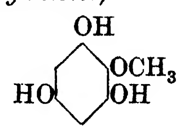


$C_{14}H_{20}$ MW, 188

B.p. 120–5°/10 mm. n_D^{20} 1·511.

Bogert, Apfelbaum, *Chem. Zentr.*, 1934, II, 2525.

Iretol (1 : 3 : 5-*Trihydroxy-2-methoxybenzene*, 2 : 4 : 6-*trihydroxyanisole*)



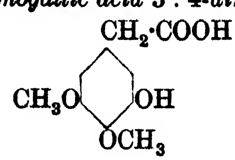
$C_7H_8O_4$ MW, 156

Needles from AcOEt–$CHCl_3$. M.p. 186°. Sol. H_2O, EtOH, AcOEt. Spar. sol. Et_2O, $CHCl_3$. Ox. $\longrightarrow$ oxalic acid.

Triacetyl: m.p. 49°. B.p. 230°/25 mm.

Kohner, *Monatsh.*, 1899, **20**, 933.
de Laire, Tiemann, *Ber.*, 1893, **26**, 2015, 2024.

Iridic Acid (3-*Hydroxy*-4 : 5-*dimethoxyphenylacetic acid, homogallic acid* 3 : 4-*dimethyl ether*)



$C_{10}H_{12}O_5$ MW, 212

Prisms from hot C_6H_6. M.p. 118°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, Me_2CO, hot C_6H_6. Insol. ligroin. Heat ⟶ iridol.

Me ester: $C_{11}H_{14}O_5$. MW, 226. Oil. B.p. above 360°.

Amide: $C_{10}H_{13}O_4N$. MW, 211. Needles from H_2O. M.p. 113°. Sol. EtOH, Me_2CO. Spar. sol. C_6H_6, Et_2O.

Acetyl: m.p. 125°.

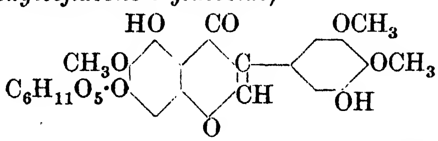
Benzoyl: m.p. 131°.

Me ether: 3 : 4 : 5-trimethoxyphenylacetic acid. $C_{11}H_{14}O_5$. MW, 226. Plates. M.p. 120°.

de Laire, Tiemann, *Ber.*, 1893, **26**, 2016.

Baker, Robinson, *J. Chem. Soc.*, 1929, 160.

Iridin (5 : 7 : 5'-*Trihydroxy*-6 : 3' : 4'-*trimethoxyisoflavone*-7-*glucoside*)

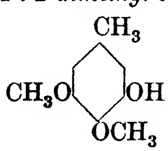


$C_{24}H_{26}O_{13}$ MW, 522

Glucoside occurring in rhizome of *Iris florentina* (Orris root). Needles from MeOH.Aq. M.p. 208°. Sol. Me_2CO, hot EtOH. Spar. sol. H_2O. Insol. Et_2O, C_6H_6, $CHCl_3$, AcOEt. Hyd. ⟶ irigenin + glucose. $FeCl_3$ ⟶ reddish-violet col.

Baker, *J. Chem. Soc.*, 1928, 1022 (*Bibl.*).

Iridol (3-*Hydroxy*-4 : 5-*dimethoxytoluene*, 5-*methylpyrogallol* 1 : 2-*dimethyl ether*)



$C_9H_{12}O_3$ MW, 168

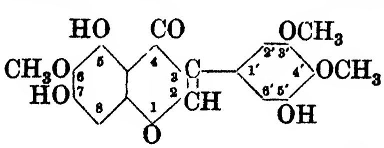
M.p. 57°. B.p. 239°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, AcOEt. Insol. H_2O.

Benzoyl: m.p. 68°.

Me ether: 3 : 4 : 5-trimethoxytoluene. $C_{10}H_{14}O_3$. MW, 182. Oil. B.p. 236–7°.

de Laire, Tiemann, *Ber.*, 1893, **26**, 2018.

Irigenin (5 : 7 : 5'-*Trihydroxy*-6 : 3' : 4'-*trimethoxyisoflavone, irigenol* 6 : 3' : 4'-*trimethyl ether*)



$C_{18}H_{16}O_8$ MW, 360

Pale yellow needles or plates from hot EtOH.Aq. M.p. 185° (186°). Sol. AcOEt, hot EtOH, hot C_6H_6, hot $CHCl_3$. Spar. sol. H_2O. Insol. Et_2O, ligroin. $FeCl_3$ ⟶ reddish-violet col. Hyd. ⟶ H·COOH + iridic acid + iretol.

5 : 5'-*Di-Me ether*: 7-hydroxy-5 : 6 : 3' : 4' : 5-pentamethoxyisoflavone. $C_{20}H_{20}O_8$. MW, 388. M.p. 218°.

7 : 5'-*Di-Me ether*: 5-hydroxy-6 : 7 : 3' : 4' : 5'-pentamethoxyisoflavone. M.p. 166–7°. *Acetyl deriv.*: m.p. 191°.

Tri-Me ether: 5 : 6 : 7 : 3' : 4' : 5'-hexamethoxyisoflavone. $C_{21}H_{22}O_8$. MW, 402. M.p. 163°.

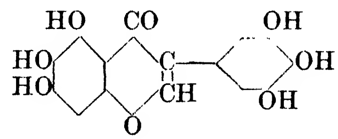
7 : 5'-*Diacetyl*: m.p. 169°.

5 : 7 : 5'-*Triacetyl*: m.p. 127–8°.

7 : 3'-*Dibenzoyl*: m.p. 155–60°.

Baker, *J. Chem. Soc.*, 1928, 1022 (*Bibl.*).

Irigenol (5 : 6 : 7 : 3' : 4' : 5'-*Hexahydroxyisoflavone*)



$C_{15}H_{10}O_8$ MW, 318

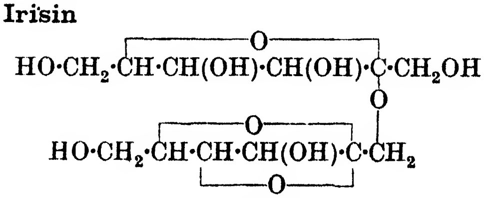
Pale yellow needles + $1H_2O$ from AcOH.Aq. M.p. 331° decomp. Sol. Me_2CO. Spar. sol. H_2O, EtOH, AcOH, C_6H_6, AcOEt. $FeCl_3$ ⟶ olive-green col.

Hexa-acetyl: m.p. 237–8°.

Me ethers: *see* Irigenin.

Baker, *J. Chem. Soc.*, 1928, 1025.

Irisin



Unit of structure

$(C_6H_{10}O_5)_n$ MW, $(162)_n$

Polysaccharide from *Iris pseudoacorus*, Linn. Powder. M.p. 210°. $[\alpha]_D^{20}$ − 53·3° in H_2O. Hyd. ⟶ fructose. Reduces Fehling's.

Me ether: m.p. 188–90°. $[\alpha]_D^{20}$ − 63·2° in $CHCl_3$.

Triacetyl deriv.: m.p. 217°. $[\alpha]_D^{20}$ − 23·1° in AcOH.

Colin, Augem, *Bull. soc. chim. biol.*, 1928, **10**, 489.

Schlubach, Knoop, Liu, *Ann.*, 1933, **504**, 34.

Iron carbonyl (*Iron pentacarbonyl*)

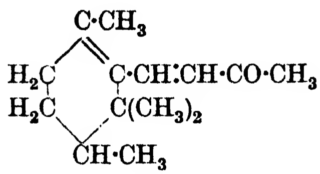
$Fe(CO)_5$

C_5H_5Fe MW, 196

Pale yellow viscous liq. F.p. − 19·5° to − 20°. B.p. 102·8°/749 mm. Decomp. at 180° ⟶ Fe + CO. D^{18}_{18} 1·4664.

Mond, Langer, *J. Chem. Soc.*, 1891, **59**, 1090.
I.G., D.R.P., 485,886, (*Chem. Abstracts*, 1930, **24**, 1187).

Irone



$C_{14}H_{22}O$ MW, 206

Occurs in essential oil of *Iris florentina*. B.p. 144°/16 mm., 93–5°/0·1 mm. D_4^{18} 0·939. n_D^{18} 1·502. $[\alpha]_D$ + 47°.
Semicarbazone : m.p. 190–5°.
Thiosemicarbazone : m.p. 110–12°.
Phenylsemicarbazone : m.p. 178–9°.
p-*Bromophenylhydrazone* : m.p. 163–9° (175° apid heat.).

Ruzicka, Seidel, Schinz, *Helv. Chim. Acta*, 1933, **16**, 1143.

Iron pentacarbonyl.
See Iron carbonyl.

Isaconitic Acid (*Isoaconitic acid propylene-1 : 3 : 3 -tricarboxylic acid*)

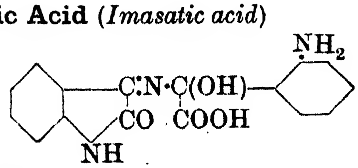
CH·COOH
CH
CH(COOH)$_2$

$C_6H_6O_6$ MW, 174

Tri-Et ester : $C_{12}H_{18}O_6$. MW, 258. Oil. B.p. 248°, 178–80°/20 mm., 176–8°/17 mm. Sol. EtOH, Et_2O. D^{20}_{15} 1·0505.

Guthzeit, Laska, *J. prakt. Chem.*, 1898, **58**, 404.
Guthzeit, Eyssen, *J. prakt. Chem.*, 1909, **80**, 41.

Isamic Acid (*Imasatic acid*)

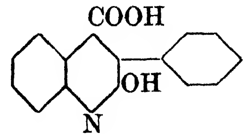


$C_{16}H_{13}O_4N_3$ MW, 311

Red prisms from EtOH. M.p. 164–5° decomp. Sol. EtOH, Py. Spar. sol. Et_2O. Insol. C_6H_6, ligroin. Min. acids ⟶ violet col.
Aniline salt : m.p. 198°.
Anilide : m.p. 168°.
Monobenzoyl deriv. : m.p. 188°.
Amide : amasatin. $C_{16}H_{14}O_3N_4$. MW, 310. Yellow cryst. from EtOH. M.p. 193°.
Lactam : *see* Imasatin.

Reissert, Hoppmann, *Ber.*, 1924, **57**, 977.

Isaphenic Acid (2-*Hydroxy*-3-*phenylquinoline*-4-*carboxylic acid*, 2-*hydroxy*-3-*phenylcinchoninic acid*)

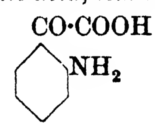


$C_{16}H_{11}O_3N$ MW, 265

Leaflets from AcOH. M.p. 294–6°. Insol. C_6H_6, $CHCl_3$.

Borsche, Jacobs, *Ber.*, 1914, **47**, 357.

Isatic Acid (o-*Aminobenzoylformic acid*, o-*aminophenylglyoxylic acid*, *isatinic acid*)

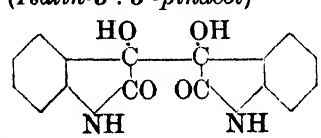


$C_8H_7O_3N$ MW, 165

Powder. Unstable. Sol. H_2O. Hot H_2O ⟶ isatin.
N-*Formyl* : m.p. 144°. *Et ester* : m.p. 67°.
N-*Acetyl* : m.p. 160°.
N-*Benzoyl* : m.p. 188° decomp. *Et ester* : m.p. 80–1°. *Amide* : m.p. 215–16°.

Schotten, *Ber.*, 1891, **24**, 773.
Erdmann, *J. prakt. Chem.*, 1841, **24**, 13.
Hantzsch, *Ber.*, 1924, **57**, 196.
Suida, *Ber.*, 1878, **11**, 586.
Heller, Lauth, *J. prakt. Chem.*, 1926, **113**, 231.

Isatide (*Isatin*-3 : 3′-*pinacol*)



$C_{16}H_{12}O_4N_2$ MW, 296

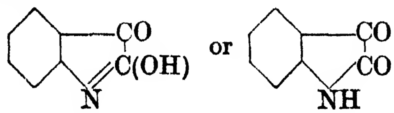
Greyish cryst. M.p. 245° (217° decomp.) Spar. sol. Et_2O, hot EtOH. Insol. H_2O. Heat of comb. C_v 1777·5 Cal.
N : N′-*Di-Me* : $C_{18}H_{16}O_4N_2$. MW, 324. M.p. 176°.

N : N′-*Diphenyl* : $C_{28}H_{20}O_4N_2$. MW, 448. M.p. 195°. *Diacetyl deriv.* : m.p. 221°. *Dibenzoyl deriv.* : m.p. 254°.

Tetra-acetyl deriv. : m.p. 223°.

Hansen, *Ann. chim.*, 1924, **1**, 120.
Stollé, Merkle, *J. prakt. Chem.*, 1933, **139**, 329.

Isatin



Isatin ψ-Isatin

$C_8H_5O_2N$ MW, 147

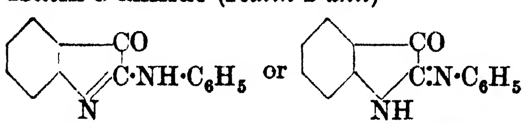
Yellowish-red prisms. M.p. 203·5°. Sol. cold dil. alkalis but hyd. on heating. Sol. MeOH, EtOH, Me_2CO, C_6H_6. Spar. sol. cold H_2O, Et_2O. Heat of comb. C_v 867·4 Cal. Sublimes. Intermediate for indigoid vat dyestuffs.

Oxime : m.p. 201–2°.
ω-*Phenylcarbohydrazide* : m.p. 281°.
ω-o-*Tolylcarbohydrazide* : m.p. 251–2°.
N-*Acetyl* : m.p. 141°.
N-*Me* : *see* *N*-Methyl-ψ-isatin.
2-*Me ether* : $C_9H_7O_2N$. MW, 161. Red prisms. M.p. 102–3°. Sol. MeOH, EtOH, C_6H_6, Me_2CO. Mod. sol. Et_2O, hot H_2O. Unstable in air and in sols. in H_2O and EtOH.

Wibaut, Geerling, *Rec. trav. chim.*, 1931, **50**, 41.
General Aniline Works, U.S.P., 1,792,170, (*Chem. Abstracts*, 1931, **25**, 1845).
Marvel, *Organic Syntheses*, 1925, V, 71.
Hartley, Dobbie, *J. Chem. Soc.*, 1899, **75**, 644.
Hantzsch, *Ber.*, 1921, **54**, 1242.

ψ-Isatin.
See Isatin.

Isatin α-anilide (*Isatin-2-anil*)



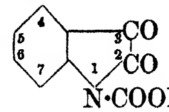
$C_{14}H_{10}ON_2$ MW, 222

Dark brownish-violet needles from C_6H_6. Orange-red leaflets from EtOH. M.p. 126°. Sol. Et_2O, C_6H_6, CS_2, hot EtOH. Sol. aq. min. and org. acids. $H_2S \longrightarrow$ indigo. Intermediate for certain indigoid vat dyestuffs.

Geigy, D.R.Ps., 113,980, 113,981, (*Chem. Zentr.*, 1900, II, 929).
Stephan, U.S.P., 1,427,863, (*Chem. Abstracts*, 1922, **16**, 3762).

See also Pummerer, Göttler, *Ber.*, 1910, **43**, 1376, and Sandmeyer, *Zeitschrift für Farben-und Textil-Chemie*, 1903, **2**, 129.

Isatin-*N*-carboxylic Acid



$C_9H_5O_4N$ MW, 191

Me ester : $C_{10}H_7O_4N$. MW, 205. M.p. 170° decomp.
Et ester : $C_{11}H_9O_4N$. MW, 219. Yellow prisms from pet. ether. M.p. 115° (117°). *Dioxime* : m.p. 145° decomp.

Heller, *Ber.*, 1918, **51**, 431.
Putochin, *Ber.*, 1927, **60**, 1638.

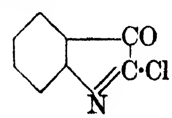
Isatin-4-carboxylic Acid.
Decomp. about 200°.
Et ester : $C_{11}H_9O_4N$. MW, 219. M.p. 140°.
3-*Phenylhydrazone* : decomp. about 200°.

Braun, Hahn, *Ber.*, 1923, **56**, 2343.

Isatin-7-carboxylic Acid.
Brownish-yellow cryst. M.p. 235°.

Sandmeyer, *Helv. Chim. Acta*, 1919, **2**, 241.
Geigy, D.R.P., 320,647, (*Chem. Zentr.*, 1920, IV, 223).

Isatin α-chloride

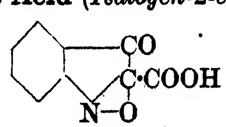


C_8H_4ONCl MW, 165·5

Brown needles. M.p. 180° decomp. Sol. EtOH, AcOH, hot C_6H_6, Et_2O. Et_2O sol. blue. Decomp. in moist air. KOH $\longrightarrow$ isatin. Intermediate for indigoid vat dyestuffs.

Baeyer, *Ber.*, 1879, **12**, 456.

Isatinic Acid.
See Isatic Acid.
Isatinimide.
See Imesatin.
Isatin pinacol.
See Isatide.
Isatogenic Acid (*Isatogen-2-carboxylic acid*)

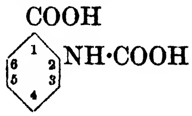


$C_9H_5O_4N$ MW, 191

Unstable. Sol. in $H_2SO_4 \longrightarrow$ isatin on addn. of H_2O.
Et ester: $C_{11}H_9O_4N$. MW, 219. M.p. 112° (115°).

Ruggli, Bolliger, *Helv. Chim. Acta*, 1921, **4**, 626.
Baeyer, *Ber.*, 1882, **15**, 780.

Isatoic Acid (N-*Carboxyanthranilic acid*, o-*carboxyphenylcarbamic acid*)

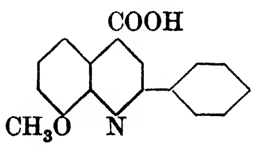


$C_8H_7O_4N$ MW, 181

2-*Me ester*: $C_9H_9O_4N$. MW, 195. M.p. 181°.
Di-Me ester: $C_{10}H_{11}O_4N$. MW, 209. M.p. 61°. B.p. 165–6°/12 mm.
2-*Et ester*: $C_{10}H_{11}O_4N$. MW, 209. M.p. 126–7°. *Amide*: $C_{10}H_{12}O_3N_2$. MW, 208. M.p. 152–3°.
Di-Et ester: $C_{12}H_{15}O_4N$. MW, 237. M.p. 43–4°. B.p. 174°/10 mm.
Anhydride: $C_8H_5O_3N$. MW, 163. M.p. 240° decomp. N-*Me*: $C_9H_7O_3N$. MW, 177. M.p. 177°.

Asahina, Ohta, *Ber.*, 1928, **61**, 320.
Putuchin, *Ber.*, 1927, **60**, 1639.
I.G., D.R.P., 500,916, (*Chem. Abstracts*, 1930, **24**, 4793).

Isatophan (8-*Methoxy-2-phenylquinoline-4-carboxylic acid*, 8-*methoxy-2-phenylcinchoninic acid*)

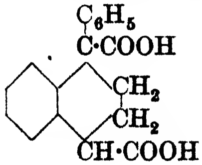


$C_{17}H_{13}O_3N$ MW, 279

Yellow needles from EtOH. M.p. 216°. Insol. H_2O, Et_2O.

Döbner, *Ann.*, 1888, **249**, 107.
See also Zuckmayer, D.R.P., 342,048, (*Chem. Zentr.*, 1921, IV, 1225).

α-**Isatropic Acid** (1-*Phenyltetralin*-1 : 4-*dicarboxylic acid*, 1-*phenyl*-1 : 2 : 3 : 4-*tetrahydronaphthalene*-1 : 4-*dicarboxylic acid*)

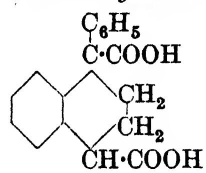


$C_{18}H_{16}O_4$ MW, 296

d-.
Sinters at 234°, m.p. 239° decomp. $[\alpha]_D$ + 7·25° in EtOH.
l-.
$[\alpha]_D$ − 7·26° in EtOH.
dl-.
M.p. 238·5–239°. Mod. sol. EtOH, AcOH. Spar. sol. hot H_2O. Insol. Et_2O, C_6H_6, ligroin, CS_2.
Mono-Et ester: $C_{20}H_{20}O_4$. MW, 324. M.p. 186°.
Di-Et ester: $C_{22}H_{24}O_4$. MW, 352. M.p. 78–9°.
Di-p-*toluidide*: m.p. 252°.

Smith, *Chem. Zentr.*, 1919, I, 835.
See also Staudinger, Ruzicka, *Ann.*, 1911, **380**, 296.

β-**Isatropic Acid** (1-*Phenyltetralin*-1 : 4-*dicarboxylic acid*, 1-*phenyl*-1 : 2 : 3 : 4-*tetrahydronaphthalene*-1 : 4-*dicarboxylic acid*)



$C_{18}H_{16}O_4$ MW, 296

d-.
M.p. 196·5–197·5°. $[\alpha]_D$ + 8·95° in EtOH.
l-.
M.p. 196·5–197°. $[\alpha]_D$ − 8·8° in EtOH.
dl-.
Plates from H_2O. M.p. 208·5–209°. Sol. EtOH, AcOH, hot H_2O. Heat to 220–5° $\longrightarrow$ α-isomer.
Mono-Et ester: $C_{20}H_{20}O_4$. MW, 324. M.p. 116°.

See first reference above.

Isethionic Acid (2-*Hydroxyethane*-1-*sulphonic acid*, 2-*sulphoethyl alcohol*)

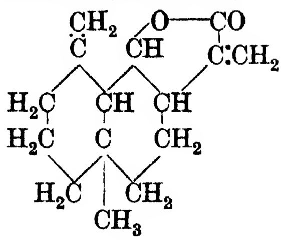
$HO{\cdot}CH_2{\cdot}CH_2{\cdot}SO_3H$

$C_2H_6O_4S$ MW, 126

Syrup. Sol. H_2O.
NH_4 salt: m.p. 130°.
K salt: m.p. 190°.
Et ether: $C_4H_{10}O_4S$. MW, 154. Syrup. D^{21} 1·359.
Chloride: *acetyl deriv.*, b.p. 130–2°/14 mm.
Sulphate: *see* Ethionic Acid.

Hübner, *Ann.*, 1884, **223**, 211.
Anschütz, *Ann.*, 1918, **415**, 97.
I.G., E.P., 378,895, (*Brit. Chem. Abstracts*, 1932, B, 1072).

Isidic Acid.
See Physodylic Acid.
Isoacetonitrile.
See Methyl isocyanide.
Isoacetophorone.
See Isophorone.
Isoaconitic Acid.
See Isaconitic Acid.
Isoalantolactone (*Isohelenin*)



$C_{15}H_{20}O_2$ MW, 232

Occurs in essential oil of *Inula Helenium*. Prisms from EtOH.Aq. M.p. 112° (115°). Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. ligroin. Insol. H_2O.

Hansen, *J. prakt. Chem.*, 1933, **136**, 185 (*Bibl.*).

Isoallylene.
See Allene.
Isoamylacetamide.
See under 4-Amino-2-methyl-*n*-butane.
Isoamyl acetate

$CH_3{\cdot}CO{\cdot}OCH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_7H_{14}O_2$ MW, 130

B.p. 142°, 138°/744 mm. D_4^{15} 0·8762. n_D^{21} 1·3999. Sol. to 0·25% in H_2O at 15°. 6 Mols. + 1 mol. MgI_2 in $Et_2O \longrightarrow$ mol. comp., cryst., m.p. 60°.

Kakutani, Ishii, *Chem. Abstracts*, 1927, **21**, 2119.
Gay, Mion, Aumeras, *Bull. soc. chim.*, 1927, **41**, 1027.
Aschan, *Chem. Zentr.*, 1918, II, 939.
Höchst, D.R.P., 282,266, (*Chem. Zentr.*, 1915, I, 516).
Buchsweiler, D.R.P., 232,818, (*Chem. Zentr.*, 1911, I, 1090).

Isoamylacetic Acid (*Isoheptoic acid, isoheptylic acid, 4-methyl-*n*-caproic acid, 5-methylhexoic acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_7H_{14}O_2$ MW, 130

B.p. 216°, 205–7°/683 mm. D^{19} 0·9155. n_D^{19} 1·4209. O_3 in $CHCl_3 \longrightarrow$ succinic acid. H_2O_2 in weak acid sol. $\longrightarrow$ acetone.

Et ester: $C_9H_{18}O_2$. MW, 158. B.p. 183°/750 mm.
Amide: $C_7H_{15}ON$. MW, 129. M.p. 104°.
Nitrile: $C_7H_{13}N$. MW, 111. B.p. 178–80°.
Anilide: m.p. 75°.

Bhide, Sudborough, *J. Indian Inst. Sci.*, 1925, **8A**, 97.
Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 442.
Wallach, *Ann.*, 1915, **408**, 190.

Isoamylacetone (*Acetylisoamylmethane, methyl isohexyl ketone, 2-methylheptanone-6*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_8H_{16}O$ MW, 128

B.p. 170–1° (165°). D^{20} 0·8151. n_D^{19} 1·4144. Misc. with most org. solvents. Forms bisulphite comp. NaOBr $\longrightarrow$ isoamylacetic acid + bromoform.

Semicarbazone: m.p. 155°.

Wallach, *Ann.*, 1915, **408**, 185.
Buelens, *Chem. Zentr.*, 1909, I, 832.

Isoamyl acetonyl Ether.
See under Hydroxyacetone.
Isoamylacetylene (5-*Methyl*-1-*hexine*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}C{\vdots}CH$

C_7H_{12} MW, 96

B.p. 92–3°. D^{17} 0·7365. n_D^{17} 1·4075.

Picon, *Compt. rend.*, 1919, **168**, 894.
André, *Ann. chim.*, 1913, **29**, 554.

2-Isoamylacrylic Acid.
See 5-Methyl-1-heptenic Acid.
Isoamyl Alcohol (*Isobutylcarbinol, 3-methylbutanol-1*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2OH$

$C_5H_{12}O$ MW, 88

B.p. 132°, 128·5°/750 mm. D_4^{15} 0·8129. n_D^{20} 1·4075, n_D^{15} 1·4085. Sol. to 2·6% in H_2O at 20°.

Phenylurethane: m.p. 57° (82·5°).
1-*Naphthylurethane*: m.p. 76° (67–8°).
p-*Nitrophenylurethane*: m.p. 97·5°.
Acid nitrophthalate: m.p. 165–6°.

Timmermans, Hennaut-Roland, *Chem. Abstracts*, 1930, **24**, 54.
Kirkpatrick, *Chem. Met. Eng.*, 1927, **34**, 276.
Martin, *Chem. Abstracts*, 1920, **14**, 3642.
Aschan, *Chem. Zentr.*, 1918, II, 939.
Michael, Zeidler, *Ann.*, 1911, **385**, 278.
Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 443.
Braun, Manz, *Ber.*, 1934, **67**, 1710.

sec.-Isoamyl Alcohol.
See Methylisopropylcarbinol.

Isoamylallylamine

$CH_2:CH \cdot CH_2 \cdot NH \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_8H_{17}N$ MW, 127

B.p. 148–53°. D_{18}^{18} 0·7777. Insol. H_2O.

Liebermann, Paal, *Ber.*, 1883, **16**, 525, 531.

Isoamyl allyl Ether

$CH_2:CH \cdot CH_2 \cdot O \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

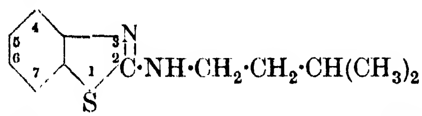
$C_8H_{16}O$ MW, 128

B.p. 120°.

Berthelot, Luca, *Ann. chim.*, 1856, **48**, 292.

Isoamylamine.
See 4-Amino-2-methyl-*n*-butane.

2-Isoamylaminobenzthiazole (1-*Isoamylaminobenzthiazole*. See Note under 2-Aminobenzthiazole)



$C_{12}H_{16}N_2S$ MW, 220

Needles from EtOH. M.p. 69–71°.

Hunter, *J. Chem. Soc.*, 1926, 2957.

2-Isoamylaminoethyl Alcohol (N-2-*Hydroxyethylisoamylamine, isoamylethanolamine*)

$(CH_3)_2CH \cdot CH_2 \cdot CH_2 \cdot NH \cdot CH_2 \cdot CH_2OH$

$C_7H_{17}ON$ MW, 131

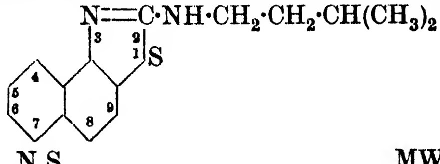
Oil. B.p. 209–10°/751 mm. D_4^{20} 0·8822. n_D^{20} 1·4447. Sol. H_2O, EtOH, Et_2O.

Picrate: yellow prisms from EtOH.Aq. M.p. 94–5°.

Picrolonate: yellowish-brown prisms from EtOH.Aq. M.p. 220° decomp.

Matthes, *Ann.*, 1901, **315**, 120.

2-Isoamylamino-β-naphthathiazole



$C_{16}H_{18}N_2S$ MW, 270

Cryst. from MeOH. M.p. 90°.

Dyson, Hunter, Morris, *J. Chem. Soc.*, 1932, 2283.

Isoamylaniline (N-*Phenylisoamylamine*, 4-*anilinoisopentane*)

$C_6H_5 \cdot NH \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_{11}H_{17}N$ MW, 163

B.p. 254·5° (242–4°), 126–7°/14 mm. D_4^{15} 0·928.

B,HCl: m.p. 151°.

B,HBr: m.p. 148–51°.

m-*Nitrobenzenesulphonyl deriv.*: m.p. 104–5°.

p-*Toluenesulphonyl deriv.*: m.p. 81°.

Hickinbottom, *J. Chem. Soc.*, 1932, 2398.
Voss, Blanke, *Ann.*, 1931, **485**, 280.
Mailhe, *Bull. soc. chim.*, 1919, **25**, 324.
Nef, *Ann.*, 1901, **318**, 141.

Isoamylanisole.
See under *p*-Isoamylphenol.

Isoamylbenzene (4-*Phenylisopentane*, 2-*methyl*-4-*phenylbutane*)

$C_6H_5 \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_{11}H_{16}$ MW, 148

Liq. with odour of oranges. B.p. 193° (189–91°). D_4^{20} 0·856. n_D^{16} 1·4867.

Gilman, Beaber, *J. Am. Chem. Soc.*, 1925, **47**, 523.
Gleditsch, *Bull. soc. chim.*, 1906, **35**, 1095.
Schramm, *Ann.*, 1883, **218**, 390.

Isoamylbenzylamine

$C_6H_5 \cdot CH_2 \cdot NH \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_{12}H_{19}N$ MW, 177

B.p. 240°.

B,HCl: needles. M.p. 253°. Spar. sol. H_2O.

B,HAuCl$_3$: leaflets from H_2O. M.p. 190°.

B$_2$,H$_2$PtCl$_6$: m.p. 203°.

Ishizaka, *Ber.*, 1914, **47**, 2456.
Einhorn, Pfeiffer, *Ann.*, 1900, **310**, 221.

Isoamyl benzyl Ether

$C_6H_5 \cdot CH_2 \cdot O \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_{12}H_{18}O$ MW, 178

B.p. 235°/744 mm. D_4^{10} 0·920.

Senderens, *Compt. rend.*, 1924, **178**, 1412.

Isoamyl benzyl Ketone

$C_6H_5 \cdot CH_2 \cdot CO \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_{13}H_{18}O$ MW, 190

B.p. 267°.

Semicarbazone: m.p. 133°.

Blaise, *Compt. rend.*, 1901, **133**, 1218.
Mailhe, *Compt. rend.*, 1913, **157**, 221.

Isoamyl bromide (1-*Bromo*-3-*methylbutane*, 4-*bromoisopentane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2Br$

$C_5H_{11}Br$ MW, 151

F.p. −112°. B.p. 121·5° (120·6°), 119·2°/737 mm. D_4^{15} 1·2095. n_D^{15} 1·4433.

Timmermans, Hennaut-Roland, *Chem. Abstracts*, 1930, **24**, 54.
Kamm, Marvel, *Organic Syntheses*, 1921, I, 4.
Michael, Zeidler, *Ann.*, 1911, **385**, 277.

Isoamyl butyrate

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}OCH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_9H_{18}O_2$ MW, 158

Liq. with odour of pears. B.p. 179°. D_{15}^{19} 0·8657.

Dietz, *Z. physiol. Chem.*, 1907, **52**, 279.
Szameitat, *Ullmann's Enzyklopädie der technischen Chemie*, 1916, III, 150.

Isoamylcarbinol.
See Isohexyl Alcohol.

Isoamyl chloride (1-*Chloro*-3-*methylbutane*, 4-*chloroisopentane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2Cl$

$C_5H_{11}Cl$ MW, 106·5

B.p. 99°/734 mm. D^0 0·8928.

Underwood, Gale, *J. Am. Chem. Soc.*, 1934, **56**, 2117.
Aschan, *Chem. Zentr.*, 1918, II, 939.
Darzens, *Compt. rend.*, 1911, **152**, 1316.
Ssolonina, *Chem. Zentr.*, 1898, II, 888.

Isoamyl cyanide.
See under Isocaproic Acid.

Isoamyl 2 : 4-dihydroxyphenyl Ketone.
See 4-Isocaproylresorcinol.

α-Isoamylene.
See 3-Methylbutylene-1.

β-Isoamylene.
See 2-Methylbutylene-2.

Isoamylethylene.
See 5-Methyl-1-hexene.

Isoamyl fluoride (1-*Fluoro*-3-*methylbutane*, 4-*fluoroisopentane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2F$

$C_5H_{11}F$ MW, 90

B.p. 53·5°. D_4^{20} 0·6945.

Tronov, Krüger, *Chem. Abstracts*, 1927, **12**, 3887.
Swarts, *Bull. soc. chim. Belg.*, 1921, **30**, 302.

Isoamyl formate

$H{\cdot}CO{\cdot}OCH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_6H_{12}O_2$ MW, 116

B.p. 124·2° (123·5°). D^{20} 0·8773. Sol. 325 parts H_2O at 22°.

Sucharda, Mazonski, *Chem. Abstracts*, 1933, **27**, 5954.
Mathews, Faville, *J. Phys. Chem.*, 1918, **22**, 1.
Stähler, *Ber.*, 1914, **47**, 590.
Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 1045.
Engelskirchen, D.R.P., 255,441, (*Chem. Zentr.*, 1913, I, 349).

Isoamylfumaric Acid (*Isobutylmesaconic acid*, 5-*methyl*-1-*hexene*-1 : 2-*dicarboxylic acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}C{\cdot}COOH$
$HOOC{\cdot}CH$

$C_9H_{14}O_4$ MW, 186

Leaflets from H_2O. M.p. 205–6°. Very sol. boiling H_2O. Sol. EtOH, Et_2O. Insol. $CHCl_3$, C_6H_6. $KMnO_4 \longrightarrow$ isobutylpyruvic acid.

Fittig, *Ann.*, 1899, **304**, 302; **305**, 58.

Isoamylhexylcarbinol (2-*Methylundecanol*-5)

$CH_3{\cdot}[CH_2]_5{\cdot}CH(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH(CH_3){\cdot}CH_3$

$C_{12}H_{26}O$ MW, 186

Thick liq. B.p. 130–3°/20 mm. Sol. EtOH, Et_2O. Insol. H_2O. D_4^0 0·8392, D_4^{20} 0·8235.

Wanin, *J. Russ. Phys.-Chem. Soc.*, 1915, **47**, 1094.

Isoamyl iodide (1-*Iodo*-3-*methylbutane*, 4-*iodoisopentane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2I$

$C_5H_{11}I$ MW, 198

B.p. 147°. D_{15}^{18} 1·515. Heat + PbO at 240° $\longrightarrow$ trimethylethylene. With 1 mol. quinoline + HgI_2 in hot $Me_2CO \longrightarrow$ comp., m.p. 160°.

Adams, Voorhees, *J. Am. Chem. Soc.*, 1919, **41**, 798.
Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 441.
Michael, Zeidler, *Ann.*, 1911, **385**, 275.

Isoamyl isobutyrate

$(CH_3)_2CH{\cdot}CO{\cdot}OCH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_9H_{18}O_2$ MW, 158

B.p. 169°. D_4^0 0·876.

Sabatier, Mailhe, *Compt. rend.*, 1912, **154**, 176.
Mailhe, *Chem. Abstracts*, 1924, **18**, 1419.

Isoamyl isocyanide (*Isoamyl carbylamine*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}NC$

$C_6H_{11}N$ MW, 97

B.p. 139–40° (137°). Heat of comb. C_p 948·2 Cal.

Guillemard, *Ann. chim.*, 1908, **14**, 415.

Isoamyl isothiocyanate (*Isoamyl mustard oil, isoamyl thiocarbimide*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}NCS$

$C_6H_{11}NS$ MW, 129

Pungent liq. with floral odour. B.p. 183°. D^{17} 0·9419.

Dyson, Hunter, *Rec. trav. chim.*, 1926, **45**, 423.
Stieger, *Monatsh.*, 1916, **37**, 640.

Isoamyl isovalerate

$(CH_3)_2CH{\cdot}CH_2{\cdot}CO{\cdot}OCH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{20}O_2$ MW, 172

Occurs in banana fruit. B.p. 190·5° (194°), 112°/80 mm., 100·7°/40 mm., 72·8°/11 mm. D_4^{19} 0·8583. n_D^{19} 1·4130.

Kodama, *J. Biochem. Japan*, 1922, **1**, 213.
Tischtschenko, *Chem. Zentr.*, 1906, II, 1552.
Balbiano, *Gazz. chim. ital.*, 1876, **6**, 238.

Isoamylmaleic Acid (*Isobutylcitraconic acid, 5-methyl-1-hexene-1 : 2-dicarboxylic acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}C{\cdot}COOH$
$HC{\cdot}COOH$

$C_9H_{14}O_4$ MW, 186

Leaflets from $CHCl_3$–ligroin. M.p. 76–80° ⟶ anhydride (yellow oil). Very sol. H_2O, EtOH, Et_2O, $CHCl_3$.

Fittig, *Ann.*, 1899, **304**, 299; **305**, 56.

Isoamylmalonic Acid (*Isohexane-5 : 5-dicarboxylic acid, 2-methylpentane-5 : 5-dicarboxylic acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH(COOH)_2$

$C_8H_{14}O_4$ MW, 174

Needles from C_6H_6–ligroin. M.p. 93°. Sol. H_2O, EtOH, Et_2O, AcOEt, hot C_6H_6. Very spar. sol. ligroin, pet. ether.

Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 240–2° (245–50°/747 mm.), 150–2°/45 mm., 130–2°/15 mm., 102°/3 mm. n_D^{20} 1·4255.

Et ester-nitrile: $C_{10}H_{17}O_2N$. MW, 183. B.p. 241°/749 mm., 125°/12 mm. D^{21} 0·939.

Monoamide: . $C_8H_{15}O_3N$. MW, 173. M.p. 136° decomp. *Et ester*: m.p. 97°.

Mononitrile: 1-cyanoisoamylacetic acid. $C_8H_{13}O_2N$. MW, 155. M.p. 47–8°. B.p. 175–80°/16 mm.

Amide-nitrile: 1-cyanoisoamylacetamide. $C_8H_{14}ON_2$. MW, 154. Cryst. from EtOH.Aq. M.p. 142°.

Diamide: $C_8H_{16}O_2N_2$. MW, 172. Needles from EtOH. M.p. 210°.

Di-nitrile: 1-cyanoisoamylacetonitrile. $C_8H_{12}N_2$. MW, 136. B.p. 121–2°/18 mm. D^{25} 0·899.

Dianilide: needles. M.p. 185°.

Dihydrazide: needles. M.p. 149° decomp.

Shonle, Keltch, Swanson, *J. Am. Chem. Soc.*, 1930, **52**, 2440.
Curtius, Wirbatz, *J. prakt. Chem.*, 1930, **125**, 267.
Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 441.
Hessler, *J. Am. Chem. Soc.*, 1913, **35**, 992.
Paal, Hofmann, *Ber.*, 1890, **23**, 1496.

Isoamyl Mercaptan (*4-Mercaptoisopentane, isoamyl thioalcohol, thioisoamyl alcohol*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2SH$

$C_5H_{12}S$ MW, 104

B.p. 116° (120–2°). D_4^{20} 0·83475. n_D^{20} 1·44118. Heat of comb. C_p 992 Cal.

Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1219, 1569.
Nord, *Ber.*, 1919, **52**, 1207.

Isoamyl nitrate

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2O{\cdot}NO_2$

$C_5H_{11}O_3N$ MW, 133

B.p. 147–8°. D_4^{22} 0·9961. n_D^{22} 1·4122.

Bouveault, Wahl, *Bull. soc. chim.*, 1903, **29**, 957.

Isoamyl nitrite (*Ordinary amyl nitrite*)

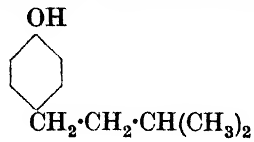
$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}NO$

$C_5H_{11}O_2N$ MW, 117

B.p. 99°. D^{15} 0·880. n_D^{21} 1·38708. Misc. with EtOH, Et_2O. Spar. sol. H_2O. Heat of comb. C_p 812·6 Cal.

Wilson, Yang, *Chem. Abstracts*, 1931, **25**, 4846.
Sugden, Reed, Wilkins, *J. Chem. Soc.*, 1925, 1537.
Neogi, *J. Chem. Soc.*, 1914, **105**, 2371.
Witt, *Ber.*, 1886, **19**, 915 (*Footnote*).

p-Isoamylphenol (p-*Hydroxyisoamylbenzene*)



$C_{11}H_{15}O$ MW, 163

B.p. 126°/14 mm.

Me ether: *p*-isoamylanisole. $C_{12}H_{17}O$. MW, 177. B.p. 121°/14 mm.

Baranger, *Bull. soc. chim.*, 1931, **49**, 1214, 1217.

Isoamylphenylcarbinol (5-*Hydroxy*-2-*methyl*-5-*phenylpentane*, α-*hydroxyisohexylbenzene*, 2-*methyl*-5-*phenylpentanol*-5)

$C_6H_5 \cdot CH(OH) \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_{12}H_{18}O$ MW, 178

B.p. 132°/8 mm. D_4^{19} 0·9536. n_D^{19} 1·5071.

Acetyl: b.p. 137–9°/9 mm.

Grignard, *Ann. chim.*, 1901, **24**, 468.

Isoamyl phenyl Ether

$C_6H_5 \cdot O \cdot CH_2 \cdot CH_2 \cdot CH(CH_3)_2$

$C_{11}H_{16}O$ MW, 164

B.p. 215° (225°). D_4^{22} 0·9198.

Voss, Blanke, *Ann.*, 1931, **485**, 279.
Sabatier, Mailhe, *Compt. rend.*, 1910, **151**, 362.
Hantzsch, Vock, *Ber.*, 1903, **36**, 2062.

Isoamyl phenyl Ketone.
See Isocaprophenone.

Isoamylpropenylcarbinol.
See 7-Methyl-2-octenol-4.

Isoamyl propionate

$CH_3 \cdot CH_2 \cdot CO \cdot OCH_2 \cdot CH_2 \cdot CH(CH_3)_2$

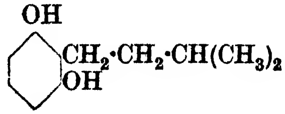
$C_8H_{16}O_2$ MW, 144

B.p. 160–1°. D_{15}^{20} 0·8580. Vapour + NH_3 passed over heated thoria ⟶ propionitrile + isoamyl alcohol.

Schumann, *Ann. phys.*, 1881, **12**, 41.
Mailhe, *Bull. soc. chim.*, 1918, **23**, 234.
Schiff, *Ann.*, 1883, **220**, 111.

Isoamylpropionic Acid.
See 2-Methylhexane-5-carboxylic Acid *and* 5-Methyl-*n*-heptylic Acid.

2-Isoamylresorcinol (2 : 6-*Dihydroxyisoamylbenzene*, *tetrahydrotubanol*)



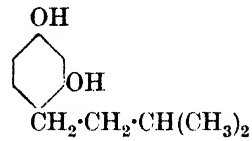
$C_{11}H_{16}O_2$ MW, 180

Cryst. from C_6H_6-pet. ether. M.p. 85° (83°).

Di-Me ether: 2 : 6-dimethoxyisoamylbenzene. $C_{13}H_{20}O_2$. MW, 208. B.p. 102°/1 mm.

Haller, *J. Am. Chem. Soc.*, 1933, **55**, 3032.

4-Isoamylresorcinol (2 : 4-*Dihydroxyisoamylbenzene*)

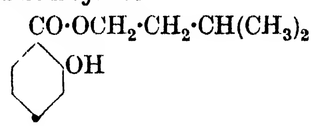


$C_{11}H_{16}O_2$ MW, 180

M.p. 68–70° (61–62·5°). B.p. 177–8°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.
Cox, *Rec. trav. chim.*, 1931, **50**, 850.
Dohme, E.P., 219,922, (*Chem. Abstracts*, 1925, **19**, 705).

Isoamyl salicylate



$C_{12}H_{16}O_3$ MW, 208

Liq. with floral odour. Used in perfumery as "orchidée," "trèfle," etc. B.p. 276–7°/743 mm., 151–2°/15 mm. D_{15}^{19} 1·0475. n_D^{20} 1·506. Sol. EtOH, Et_2O, $CHCl_3$. Sol. 0·004% in H_2O at 22°.

Acetyl: b.p 174–5°/10 mm. D^{15} 1·0835.

Tingle, *Am. Chem. J.*, 1900, **24**, 278.
Lyonnet, *Chem. Zentr.*, 1901, I, 414.
Sachse, D.R.P., 288,952, (*Chem. Zentr.*, 1916, I, 87).

Isoamylsuccinic Acid (2-*Methylhexane*-5 : 6-*dicarboxylic acid*)

$(CH_3)_2CH \cdot CH_2 \cdot CH_2 \cdot CH(COOH) \cdot CH_2 \cdot COOH$

$C_9H_{16}O_4$ MW, 188

M.p. 83–4°. Very sol. H_2O, Et_2O, $CHCl_3$, C_6H_6. Insol. ligroin.

Fittig, Schirmacher, *Ann.*, 1899, **304**, 306.
Lawrence, *Chem. Zentr.*, 1900, II, 370.

***N*-Isoamylthiourea**

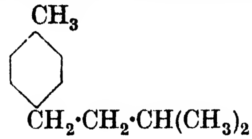
$(CH_3)_2CH \cdot CH_2 \cdot CH_2 \cdot NH \cdot CS \cdot NH_2$

$C_6H_{14}N_2S$ MW, 146

Prisms from EtOH.Aq. M.p. 90–1° (93°). Sol. EtOH. Very spar. sol. H_2O.

Dixon, *J. Chem. Soc.*, 1895, **67**, 559.

p-Isoamyltoluene (p-*Methylisoamylbenzene*)

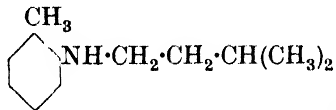


$C_{12}H_{18}$ MW, 162

B.p. 213°. D^{0} 0·8643. $CrO_3 \longrightarrow$ terephthalic acid.

Kunckell, Ulex, *J. prakt. Chem.*, 1913, **87**, 234.
Bigot, Fittig, *Ann.*, 1867, **141**, 162.

N-Isoamyl-o-toluidine (*Isoamyl-*o*-tolylamine*)



$C_{12}H_{19}N$ MW, 177

B.p. 240–5°.

Mailhe, *Bull. soc. chim.*, 1919, **25**, 324.

Isoamylurea

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CO{\cdot}NH_2$

$C_6H_{14}ON_2$ MW, 130

Plates from EtOH.Aq. M.p. 94° (150°). Spar. sol. H_2O.

Curtius, *J. prakt. Chem.*, 1930, **125**, 195.
Bougault, Leboucq, *Bull. soc. chim.*, 1930, **47**, 602.

Isoamylurethane (*Ethyl isoamylaminoformate*)

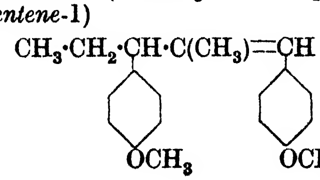
$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CO{\cdot}OC_2H_5$

$C_8H_{17}O_2N$ MW, 159

Oil. B.p. 218°, 122–3°/22 mm., 101–2°/14 mm. D_4^{20} 0·9322. n_D^{20} 1·43256.

Custer, *Ber.*, 1879, **12**, 1329.
Schmidt, *Z. physik. Chem.*, 1907, **58**, 516.

Isoanethole (2-*Methyl*-1 : 3-*di*-[p-*methoxyphenyl*]-*pentene*-1)

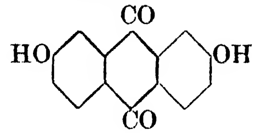


$C_{20}H_{24}O_2$ MW, 296

Pale yellow viscous oil. B.p. 205–10°/0·7 mm.

Goodall, Haworth, *J. Chem. Soc.*, 1930, 2482 (*Bibl.*).

Isoanthraflavic Acid (2:7-*Dihydroxyanthraquinone, isoanthraflavin*)



$C_{14}H_8O_4$ MW, 240

Cryst. + $1H_2O$ from EtOH.Aq. Does not melt below 330°. Sublimes. Sol. EtOH. Mod. sol. AcOH. Very spar. sol. Et_2O, $CHCl_3$, C_6H_6. Red sols. in alkalis. Bluish-red sol. in conc. H_2SO_4. KOH fusion $\longrightarrow$ anthrapurpurin.

Di-Me ether: $C_{16}H_{12}O_4$. MW, 268. Yellow needles from AcOH. M.p. 215° (209°).

Di-Et ether: $C_{18}H_{16}O_4$. MW, 296. Yellow needles from EtOH. M.p. 193–4°.

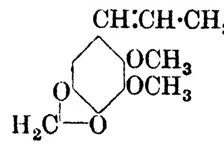
Diacetyl: prac. colourless plates from EtOH. M.p. 191°.

Noelting, Wortmann, *Ber.*, 1906, **39**, 641.
Wedekind, D.R.P., 140,129, (*Chem. Zentr.*, 1903, I, 904).
Schunk, Roemer, *Ber.*, 1876, **9**, 381.

Isoantipyrine.

See 2 : 5-Dimethyl-1-phenylpyrazolone-3.

Isoapiol (2 : 3-*Dimethoxy*-4 : 5-*methylenedioxy*-1-*propenylbenzene*)



$C_{12}H_{14}O_4$ MW, 222

Occurs in *Crithmum maritimum*. Leaflets or needles from EtOH. F.p. 46°. M.p. 55–6°. B.p. 303–4°, 189°/33 mm. Sol. Et_2O, C_6H_6, AcOEt, Me_2CO, hot EtOH, hot AcOH. Insol. H_2O.

$C_{12}H_{14}O_4,C_6H_3(NO_2)_3$-1 : 3 : 5 : m.p. 66–7°.

Picrate: m.p. 89–90° (83°).

Delépine, Longuet, *Bull. soc. chim.*, 1926, **39**, 1019.
Ciamician, Silber, *Ber.*, 1896, **29**, 1801.
Bruni, Tornani, *Gazz. chim. ital.*, 1905, **35**, 307.

Isoapoquinidine

$C_{19}H_{22}O_2N_2$ MW, 310

Prisms from EtOH. M.p. 245°. $[\alpha]_D^{21} - 12{\cdot}6°$ in EtOH.

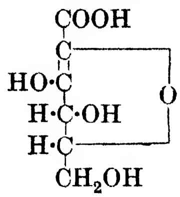
B,HCl: needles from EtOH. M.p. 255°. $[\alpha]_D^{15} - 40{\cdot}2°$.

B,HBr: needles from EtOH. M.p. 252°. $[\alpha]_D^{15} - 35{\cdot}8°$.

B,2HBr: prisms from EtOH. M.p. 280°. $[\alpha]_D^{15} + 18{\cdot}6°$.
B,H_2SO_4: cryst. from EtOH. M.p. 235–40° decomp. $[\alpha]_D^{15} + 17{\cdot}6°$.

Henry, Solomon, *J. Chem. Soc.*, 1934, 1929.

Isoascorbic Acid (*Isovitamin C*)

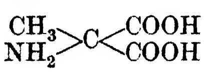


$C_6H_8O_6$ MW, 176

M.p. 168°. Sol. H_2O, EtOH, Py. Mod. sol. Me_2CO. $[\alpha]_D - 16{\cdot}3°$ in H_2O.
K salt: m.p. 181°. $[\alpha]_D + 91{\cdot}8°$.

Bachstez, Cavallini, *Z. physiol. Chem.*, 1934, **228**, 25.
Maurer, Schiedt, *Ber.*, 1934, **67**, 1239.

Isoasparagine.
See under Isoaspartic Acid.
Isoasparaginic Acid.
See Isoaspartic Acid.
Isoaspartic Acid (*Isoasparaginic acid*, 1-*amino*-1-*methylmalonic acid*, 1-*aminoisosuccinic acid*)

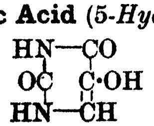


$C_4H_7O_4N$ MW, 133

Prisms. Explodes at about 250°. Sol. H_2O. Insol. EtOH. Heat. to 100° ⟶ α-alanine + CO_2.
Mono-Me ester: $C_5H_9O_4N$. MW, 147. Needles from MeOH. Insol. Et_2O.
Monoamide: isoasparagine. $C_4H_8O_3N_2$. MW, 132. Cryst. from H_2O. Spar. sol. H_2O. $[\alpha]_D^{18} + 15{\cdot}5°$ in aq. HCl.
Diamide: $C_4H_9O_2N_3$. MW, 131. Plates from H_2O. Decomp. at 200–1°. Sol. hot H_2O. Spar. sol. EtOH.

Körner, Menozzi, *Gazz. chim. ital.*, 1887, **17**, 426, 440.
Lutz, *Chem. Zentr.*, 1910, I, 907.
See also Bergmann, Zervas, *Ber.*, 1932, **65**, 1192.

Isobarbituric Acid (5-*Hydroxyuracil*)



$C_4H_4O_3N_2$ MW, 128

Decomp. on heating. Reduces $AgNO_3$ in cold. Br ⟶ isodialuric acid.
Monoacetyl deriv.: decomp. at 260°.
Diacetyl deriv.: m.p. 161°.

Biltz, Paetzold, *Ann.*, 1927, **452**, 87.

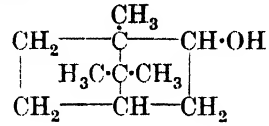
Isobebeerin.
See Isochondodendrin.
Isobixin (β-*Bixin*)

$C_{25}H_{30}O_4$ MW, 394

Yellow plates from Me_2CO. M.p. 216–17° decomp.
Me ester: $C_{26}H_{32}O_4$. MW, 408. M.p. 200–1°.

van Hasselt, *Rec. trav. chim.*, 1911, **30**, 1.
Karrer, Helfenstein, Widmer, Itallie, *Helv. Chim. Acta*, 1929, **12**, 753.

Isoborneol



$C_{10}H_{18}O$ MW, 154

d-.

Cryst. from pet. ether. M.p. 212° (sealed tube). Sol. EtOH, Et_2O, C_6H_6, pet. ether, toluene. $[\alpha]_D^{20} - 32{\cdot}30°$ in MeOH.
Formyl: $C_{11}H_{18}O_2$. MW, 182. B.p. 94°/15 mm. D_4^{20} 1·0136.
Acetyl: $C_{12}H_{20}O_2$. MW, 196. B.p. 112°/17 mm.
Propionyl: $C_{13}H_{22}O_2$. MW, 210. B.p. 150°/13 mm. (119°/16 mm.). D_4^{20} 0·9798.
Butyryl: $C_{14}H_{24}O_2$. MW, 224. B.p. 123°/11 mm.
Isobutyryl: b.p. 120°/14 mm.
n-*Valeryl*: $C_{15}H_{26}O_2$. MW, 238. B.p. 136°/12 mm. (138°/14 mm.).
Lauryl: $C_{22}H_{40}O_2$. MW, 336. B.p. 202°/30 mm.
Acid phthalate: m.p. 167°.

l-.

Cryst. from pet. ether. M.p. 214° (218°). $[\alpha]_D + 33{\cdot}89°$ in EtOH.
Acetyl: b.p. 123–7°/35 mm., 97–105°/12 mm. D_0^0 1·002.
Butyryl: b.p. 125°/14 mm.
Isovaleryl: b.p. 143·5–145·5°/18 mm. D_4^{18} 0·9525. n_D^{18} 1·462.
Acid succinyl: $C_{14}H_{22}O_4$. MW, 254. M.p. 63·5–64·5°.
Benzoyl: $C_{17}H_{22}O_2$. MW, 258. B.p. 185°/11 mm. D_4^{16} 1·057. n_D^{18} 1·529.
Acid phthalate: $C_{18}H_{22}O_4$. MW, 302. M.p. about 167° decomp.

Et ether: $C_{12}H_{22}O$. MW, 182. B.p. 205–8°, 115–20°/50 mm. D_0^0 0·9495. $[\alpha]_D$ + 26° 31′.

dl-.

Plates from pet. ether. M.p. 212° (sealed tube). Sol. EtOH, Et_2O, $CHCl_3$. Insol. H_2O.

Formyl: b.p. 106°/19 mm., 100°/14 mm. D_4^{20} 1·010. n_D^{20} 1·47164.

Acetyl: b.p. 106–7°/15 mm. (107°/13 mm.), 102°/12 mm. D_4^{20} 0·9841.

Isobutyryl: b.p. 132–3°/19 mm. D_4^{20} 0·9611.

Isovaleryl: b.p. 132–3°/13 mm. D_4^{20} 0·9506.

Oxalyl: $C_{22}H_{34}O_4$. MW, 362. M.p. 113–14°.

Succinyl: $C_{24}H_{38}O_4$. MW, 390. M.p. 37°.

p-*Nitrobenzoyl*: $C_{17}H_{21}O_4N$. MW, 303. M.p. 129°.

Me ether: $C_{11}H_{20}O$. MW, 168. B.p. 192–3°, 77°/15 mm. D_4^{16} 0·9235. n_D^{16} 1·46643.

Et ether: b.p. 203–4°. D^{15} 0·907.

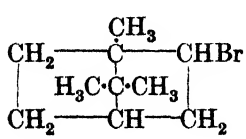
Isobornyl ether: di-isobornyl ether. $C_{20}H_{34}O$. MW, 290. M.p. 90–1°. B.p. 322°.

Asahina, Ishidate, *Ber.*, 1935, **68**, 555.
Gandini, *Gazz. chim. ital.*, 1934, **64**, 302.
Yamada, Yamada, *J. Chem. Soc. Japan*, 1932, **53**, 807.
Kuwata, Tategai, *Chem. Abstracts*, 1932, **26**, 5552.
Lipp, *Ann.*, 1930, **480**, 298.
Puxeddu, *Gazz. chim. ital.*, 1929, **59**, 59.
Fujita, *Chem. Abstracts*, 1928, **22**, 3406.
Peignier, *Parfums de France*, 1926, **4**, 196.
Vavon, Peignier, *Bull. soc. chim.*, 1926, **39**, 924.
Kenyon, Priston, *J. Chem. Soc.*, 1925, 1472.
Kahlbaum, D.R.Ps., 573,797, (*Chem. Abstracts*, 1933, **27**, 4243), 576,254, (*ibid.*, 3953.)
Stephan, Ulffers, U.S.Ps., 1,735,750, 1,755,752, (*Chem. Abstracts*, 1930, **24**, 2756).

Isobornylane.

See α-Fenchane.

Isobornyl bromide ("*Camphene hydrobromide*")

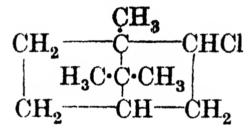


$C_{10}H_{17}Br$ MW, 217

Cryst. from EtOH. M.p. 133°. B.p. 94°/12 mm.

Semmler, *Ber.*, 1900, **33**, 3428.
Pariselle, *Ann. chim.*, 1923, **19**, 119.

Isobornyl chloride (2-*Chlorocamphane*, "*camphene hydrochloride*." Note: often wrongly called "bornyl chloride" and "pinene hydrochloride" in the literature)

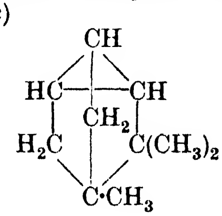


$C_{10}H_{17}Cl$ MW, 172·5

Cryst. from amyl alcohol. M.p. 161·5° (149–51°). Sol. Et_2O, pet. ether. Spar. sol. EtOH.

Gandini, *Gazz. chim. ital.*, 1934, **64**, 302.
Meerwein, van Emster, *Ber.*, 1922, **55**, 2526.

Isobornylene (β-*Bornylene, isocyclene*, β-*pericyclocamphane*)



$C_{10}H_{16}$ MW, 136

M.p. 117–18°. B.p. 150–2° (150–1°/743 mm.).

Bredt, Holz, *J. prakt. Chem.*, 1917, **95**, 151.

Iso-2-bromo-1-methylacrylic Acid.

See under 2-Bromo-1-methylacrylic Acid.

Isobutane (*Trimethylmethane*)

$(CH_3)(CH_3)>CH{\cdot}CH_3$

C_4H_{10} MW, 58

M.p. − 145°. B.p. − 10·2°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. H_2O. Heat of comb. C_p 687·19 Cal.

Coffin, Maass, *J. Am. Chem. Soc.*, 1920, **50**, 1427.

Isobutane-1 : 3-dialdehyde.

See 2-Methylglutaraldehyde.

Isobutane-1 : 1-dicarboxylic Acid.

See Isopropylmalonic Acid.

Isobutane-1 : 3-dicarboxylic Acid.

See 2-Methylglutaric Acid.

Isobutane-tricarboxylic Acid.

See 2-Methyltricarballylic Acid *and* Methanetriacetic Acid.

Isobutylacetaldehyde.

See Isocaproic Aldehyde.

***N*-Isobutylacetamide** (*Acetylisobutylamine*)

$CH_3{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_6H_{13}ON$ MW, 115

B.p. 227°. Sol. H_2O.
B,HCl : m.p. 107°.

Titherley, *J. Chem. Soc.*, 1901, **79**, 402.
Naegeli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, **12**, 249.

p-Isobutylacetanilide.
See under p-Isobutylaniline.

Isobutyl acetate

$CH_3{\cdot}CO{\cdot}OCH_2{\cdot}CH(CH_3)_2$

$C_6H_{12}O_2$ MW, 116

F.p. − 98·85°. B.p. 118°. D_4^{20} 0·8712. $n_D^{18\cdot75}$ 1·39066.

Hückel, Ackermann, *J. prakt. Chem.*, 1933, **136**, 23.

Isobutylacetic Acid.
See Isocaproic Acid.

Isobutylacetone.
See Methyl isoamyl Ketone.

Isobutyl acetonyl Ether.
See under Hydroxyacetone.

Isobutylacetylene (4-*Methylpentine*-1)

$CH_3{\cdot}CH(CH_3){\cdot}CH_2{\cdot}C{:}CH$

C_6H_{10} MW, 82

M.p. − 105·1°. B.p. 61·1–61·2°. D_4^{15} 0·7092. n_α^{15} 1·3936.

van Riesseghem, *Bull. soc. chim. Belg.*, 1933, **42**, 229.

2-Isobutylacrylic Acid.
See 1-Isoheptenic Acid.

Isobutyl Alcohol (*Isopropylcarbinol, 1-hydroxyisobutane*)

$(CH_3)_2CH{\cdot}CH_2OH$

$C_4H_{10}O$ MW, 74

B.p. 108·1°, 106·6°/737 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O. D^{15} 0·80576. n_D^{15} 1·39768. Forms add. comp. with $CaCl_2$, ($CaCl_2$, $3C_4H_{10}O$).
Acid phthalate : m.p. 68°.
Phenylurethane : m.p. 86°.
2-*Naphthylurethane* : m.p. 103–5°.
Me ether : *see* Methyl isobutyl Ether.
Et ether : *see* Ethyl isobutyl Ether.
Propyl ether : *see* Propyl isobutyl Ether.
Butyl ether : $C_8H_{18}O$. MW, 130. B.p. 131·5–132°, 43°/26·3 mm. (25·4°/9·5 mm.). $n_D^{17\cdot5}$ 1·3968.
Isobutyl ether : *see* Di-isobutyl Ether.
Phenyl ether : *see* Isobutyl phenyl Ether.

I.G., E.P., 324,897, (*Chem. Abstracts*, 1930, **24**, 3802).
Hückel, Ackermann, *J. prakt. Chem.*, 1933, **136**, 22.

Isobutylallene.
See 5-Methyl-1 : 2-hexadiene.

3-Isobutylallyl Alcohol.
See 5-Methyl-2-hexenol-1.

Isobutylallylamine

$CH_2{:}CH{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_7H_{15}N$ MW, 113

B.p. 123°. Sol. H_2O.
B,HCl : m.p. 216°.
B,HBr : m.p. 222°.
B,HAuCl₄ : m.p. 140°.
B₂,H₂PtCl₆ : m.p. 182°.
B,(COOH)₂ : m.p. 221°.

Paal. Heupel, *Ber.*, 1891, **24**, 3043.

Isobutylallylcarbinol (6-*Methyl*-1-*heptenol*-4)

$CH_2{:}CH{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_8H_{16}O$ MW, 128

B.p. 162°. D_0^{21} 0·834.
Acetyl : b.p. 179°. D_0^{20} 0·871.

Wagner, *Ber.*, 1894, **27**, 2435.

Isobutyl allyl Ether

$CH_2{:}CH{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_7H_{14}O$ MW, 114

B.p. 108–10°.

Maihle, Godon, *Bull. soc. chim.*, 1920, **27**, 329.

Isobutylamine (1-*Aminoisobutane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}NH_2$

$C_4H_{11}N$ MW, 73

B.p. 68·9°. Sol. H_2O. D_4^{25} 0·724. n_D^{17} 1·39878. Heat of comb. C_p (liq.) 714·1 Cal., C_v (liq.) 712·8 Cal.
B,HCl : m.p. 177–8° (164°).
B,HBr : m.p. 138°.
B,HAuBr₄ : m.p. 154°.
B₂,H₂PtCl₆ : decomp. at 225° (230–2°).
Hydrate : $C_4H_{11}N,H_2O$. MW, 91. M.p. 74°. Sublimes.
N-*Formyl* : b.p. 111°/12 mm. D_4^{20} 0·9105. n_D^{20} 1·43786.
N-*Acetyl* : *see* Isobutylacetamide.
N-*Phenyl* : *see* Isobutylaniline.

Taipale, *Chem. Abstracts*, 1925, **19**, 3478.
Naegeli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, **12**, 248.

2-Isobutylaminobenzthiazole (1-*Isobutylaminobenzthiazole*. See Note under 2-Aminobenzthiazole)

$C_{11}H_{14}N_2S$ MW, 206

Needles from EtOH. M.p. 103–4°.

Hunter, *J. Chem. Soc.*, 1926, 2956.

Isobutylaminoethyl Alcohol (N-2-*Hydroxyethylisobutylamine, isobutylethanolamine*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH_2OH$

$C_6H_{15}ON$ MW, 117

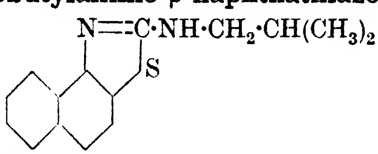
Oil. B.p. 190°/756 mm. D_4^{20} 0·8818. n_D^{20} 1·4402. Sol. H_2O, EtOH, Et_2O.

Picrate: cryst. from H_2O. M.p. 115–17°. Sol. EtOH.

Picrolonate: leaflets from EtOH.Aq. M.p. 232° decomp.

Matthes, *Ann.*, 1901, **315**, 119.

2-Isobutylamino-β-naphthathiazole



$C_{15}H_{16}N_2S$ MW, 256

Cryst. from MeOH. M.p. 71°.

Dyson, Hunter, Morris, *J. Chem. Soc.*, 1932, 2283.

Isobutyl-*n*-amylcarbinol (2-*Methylnonanol*-4)

$CH_3{\cdot}[CH_2]_4{\cdot}CH(OH){\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{22}O$ MW, 158

d-.

B.p. 117°/40 mm. n_D^{25} 1·4302. $[\alpha]_D^{30}$ + 7·22°.

Acid phthalate: $[\alpha]_D^{30}$ + 11·9°.

Levene, Marker, *J. Biol. Chem.*, 1931, **90**, 669.

Isobutyl-*active*amylcarbinol (2 : 6-*Dimethyloctanol*-4, 4-*hydroxy*-2 : 6-*dimethyloctane*)

$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{22}O$ MW, 158

B.p. 195°. $D^{15\cdot8}$ 0·8230. n_D^{20} 1·4270.

Jones, Smith, *J. Chem. Soc.*, 1925, 2535.

Isobutyl *active*-amyl Ether

$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_9H_{20}O$ MW, 144

B.p. 145–7°/729·5 mm. D_4^{22} 0·773. $n_D^{20\cdot2}$ 1·4008. $[\alpha]_D^{22}$ + 0·96°.

Guye, Chavanne, *Bull. soc. chim.*, 1896, **15**, 304.

Isobutyl *n*-amyl Ketone (4-*Keto-2-methylnonane, 2-methylnonanone*-4)

$CH_3{\cdot}[CH_2]_4{\cdot}CO{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{20}O$ MW, 156

B.p. 206–9°. D_4^{20} 0·8185.

Lowry, *J. Chem. Soc.*, 1914, **105**, 92.

Isobutyl *sec.*-*n*-amyl Ketone (2-*Methyl*-5-*ethylheptanone*-4, 4-*keto*-2-*methyl*-5-*ethylheptane*)

$\begin{matrix}CH_3{\cdot}CH_2\\CH_3{\cdot}CH_2\end{matrix}>CH{\cdot}CO{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{20}O$ MW, 156

B.p. 188–92°.

Kanao, Yaguchi, *Chem. Abstracts*, 1928, **22**, 3407.

Isobutyl *active*-amyl Ketone (2 : 6-*Dimethyloctanone*-4, 4-*keto*-2 : 6-*dimethyloctane*)

$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{20}O$ MW, 156

B.p. 187°. $D^{15\cdot5}$ 0·8190. n_D^{20} 1·4190.

Semicarbazone: m.p. 91·5°.

Jones, *J. Chem. Soc.*, 1926, 2769.

***N*-Isobutylaniline** (N-*Phenylisobutylamine*)

$C_6H_5{\cdot}NH{\cdot}CH_2{\cdot}CH(CH_3)_2$

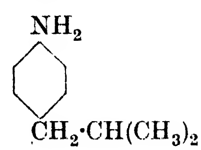
$C_{10}H_{15}N$ MW, 149

B.p. 225–7°, 109–10°/13 mm. D_4^{18} 0·940.

N-p-*Toluenesulphonyl*: m.p. 122–3°.

Hickinbottom, *J. Chem. Soc.*, 1930, 994.
Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, **46**, 741.

***p*-Isobutylaniline** (3-p-*Aminophenylisobutane*)



$C_{10}H_{15}N$ MW, 149

Pale yellow liq. B.p. 235–6°/762 mm. Sol. ord. org. solvents. Insol. H_2O.

N-*Acetyl*: *p*-isobutylacetanilide. $C_{12}H_{17}ON$. MW, 191. M.p. 127–8°.

N-p-*Toluenesulphonyl*: m.p. 136–7°.

Hickinbottom, Preston, *J. Chem. Soc.*, 1930, 1569.

Isobutylbenzene (1-*Phenylisobutane*)

$C_6H_5{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{14}$ MW, 134

B.p. 167° (169·5°). D_4^{20} 0·86726. $n_D^{14\cdot5}$ 1·4957. $CrO_3 \longrightarrow$ benzoic acid.

Späth, *Monatsh.*, 1913, **34**, 1988.

Isobutylbenzylamine

$C_6H_5{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{11}H_{17}N$ MW, 163

B.p. 217–20°/741 mm.

B,HCl: m.p. 175°.

B,HI: m.p. 165–6°.

Zaunschirm, *Ann.*, 1888, **245**, 283.
Jones, *J. Chem. Soc.*, 1903, **83**, 1414.

Isobutyl benzyl Ether

$C_6H_5{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{11}H_{16}O$ MW, 164

B.p. 212·5°/744 mm. D_4^{10} 0·9250.

Claus, Trainer, *Ber.*, 1886, **19**, 3006.
Senderens, *Compt. rend.*, 1924, **178**, 1415.

Isobutyl benzyl Ketone (2-*Methyl*-5-*phenylpentanone*-4, *isopropylphenylacetone*)

$C_6H_5{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{12}H_{16}O$ MW, 176

Yellow liq. B.p. 250·5°, 122°/15 mm. D_0^4 0·969.

Semicarbazone: m.p. 80°.

Phenylhydrazone: m.p. 67°.

Senderens, *Compt. rend.*, 1910, **150**, 1338.
Ogata, *Chem. Abstracts*, 1918, **12**, 41.
Ivanoff, Nicoloff, *Bull. soc. chim.*, 1932, **51**, 1334.

Isobutyl bromide (1-*Bromoisobutane*)

$(CH_3)_2CH{\cdot}CH_2Br$

C_4H_9Br MW, 137

B.p. 90·5–91°/766 mm., 41–3°/135 mm. D^{15} 1·27197. n_D^{15} 1·43914.

Longinov, Lerman, *Chem. Abstracts*, 1933, **27**, 3443.
Hückel, Ackermann, *J. prakt. Chem.*, 1933, **136**, 24.
Noller, Dinsmore, *Organic Syntheses*, 1933, XIII, 20.

1-Isobutyl-1 : 3-butadiene.

See 6-Methyl-1 : 3-heptadiene.

Isobutyl γ-butenyl Ketone.

See 7-Methyl-1-octenone-5.

Isobutylbutyric Acid.

See 2-Methylhexane-4-carboxylic Acid *and* 5-Methyl-*n*-heptylic Acid.

Isobutylcarbinol.

See Isoamyl Alcohol.

Isobutyl chloride (1-*Chloroisobutane*)

$(CH_3)_2CH{\cdot}CH_2Cl$

C_4H_9Cl MW, 92·5

B.p. 68·8°. D^{15} 0·8829. n_D^{15} 1·40096. Heat of comb. C_p 650·1 Cal.

Underwood, Gale, *J. Am. Chem. Soc.*, 1934, **56**, 2119.
Michael, Zeidler, *Ann.*, 1912, **393**, 110.

Isobutyl cyanide.

See under Isovaleric Acid.

Isobutylcyanoacetic Ester.

See under Isobutylmalonic Acid.

Isobutyl 2 : 4-dihydroxyphenyl Ketone.

See 4-Isovalerylresorcinol.

Isobutylene (1 : 1-*Dimethylethylene*, *γ-butylene*, 2-*methylpropylene*)

$(CH_3)_2C{:}CH_2$

C_4H_8 MW, 56

Gas at ord. temps. Liquefies in freezing mixture. B.p. −6·6°.

Coffin, Maass, *J. Am. Chem. Soc.*, 1928, **50**, 1427.
Krestinsky, *Ber.*, 1922, **55**, 2755.

Isobutylenediamine (2-*Methylpropylenediamine*, 1 : 2-*diaminoisobutane*)

$$CH_3{\cdot}\overset{CH_3}{\overset{|}{C}}(NH_2){\cdot}CH_2{\cdot}NH_2$$

$C_4H_{12}N_2$ MW, 88

Hydrochloride: plates from EtOH.Aq. M.p. 303°.

B,H_2SO_4: prisms. M.p. above 300°.

Diacetyl: needles from AcOEt. M.p. 100°.

Dibenzoyl: cryst. from 80% EtOH. M.p. 182·5° (sinters at 180°). Very sol. Py. Spar. sol. H_2O.

Di-m-*nitrobenzoyl*: cryst. from EtOH. M.p. 174°.

$B,2AuCl_3$: m.p. 228°.

$B,2HAuCl_4,2\frac{1}{2}H_2O$: m.p. 135°, anhyd. 233°.

Chloroplatinate: m.p. 270°.

$HgCl_2$ double salt: m.p. 151–2°.

Picrate: m.p. anhyd. 241°.

Picrolonate: sinters at 256°, decomp. at 260–2°.

Drew, Head, *J. Chem. Soc.*, 1934, 49.
Strack, Schwaneberg, *Ber.*, 1933, **66**, 1333.

Isobutylene dibromide.
See 1 : 2-Dibromoisobutane.
Isobutylene-1 : 3-dicarboxylic Acid.
See β-Methylglutaconic Acid.
Isobutylene dichloride.
See 1 : 2-Dichloroisobutane.
Isobutylene Glycol (1 : 2-*Dihydroxyisobutane*, 1 : 1-*dimethylethylene glycol*)

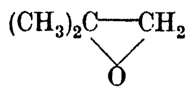
$(CH_3)_2C(OH)\cdot CH_2OH$

$C_4H_{10}O_2$ MW, 90

B.p. 177°. D^{20} 1·003. Heat + H_2O at 180–200° ⟶ isobutyraldehyde.
1 : 2-*Diacetyl*: $C_8H_{14}O_4$. MW, 174. B.p. 190–1°.
1-*Et ether*: $C_6H_{14}O_2$. MW, 118. B.p. 129°. D_4^{15} 0·8786. n_D^{15} 1·40624. Mod. sol. H_2O.

Dolgorukova-Dobryanska, *Chem. Abstracts*, 1926, **20**, 2311.
Henry, *Compt. rend.*, 1907, **144**, 1405.
Béhal, Sommelet, *Bull. soc. chim.*, 1904, **31**, 302.
Wagner, *Ber.*, 1888, **21**, 1232.

Isobutylene oxide



C_4H_8O MW, 72

B.p. 52°. D^0 0·865. Heat above 210° + Al_2O_3 or $PbCl_2$ ⟶ isobutyraldehyde. With H_2O + trace conc. H_2SO_4 ⟶ isobutylene glycol. With 33% NH_3.Aq. ⟶ 1-amino-2-methylpropanol-2.

Schoeller *et al.*, U.S.P., 1,967,433, (*Chem. Abstracts*, 1934, **28**, 5832).
Finkelstein, Canadian P., 285,920, (*Chem. Abstracts*, 1929, **23**, 1138).
Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 438.
Riedel, D.R.P., 199,148, (*Chem. Zentr.*, 1908, II, 121).

Isobutylethylene.
See 4-Methyl-1-pentene.
Isobutyl formate

$(CH_3)_2CH\cdot CH_2\cdot O\cdot CHO$

$C_5H_{10}O_2$ MW, 102

B.p. 98·2°, 77·1°/380 mm., 60·2°/201 mm., 32·8°/54 mm. D_4^{20} 0·88535. n_D^{20} 1·38568.

I.G., D.R.P., 490,250, (*Chem. Abstracts*, 1930, **24**, 2141).
Mathews, Faville, *J. Phys. Chem.*, 1918, **22**, 1.
Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 1045.

Isobutylfumaric Acid (*Isopropylmesaconic acid*)

$(CH_3)_2CH\cdot CH_2\cdot C\cdot COOH$
$HOOC\cdot CH$ (C=CH double bond)

$C_8H_{12}O_4$ MW, 172

Leaflets from H_2O. M.p. 185°. Very sol. EtOH, Et_2O, boiling H_2O. $k = 9{\cdot}3 \times 10^{-4}$ at 25°.
Et ester-amide: $C_{10}H_{17}O_3N$. MW, 199. Needles. M.p. 87°.
Diamide: $C_8H_{14}O_2N_2$. MW, 170. Leaflets. M.p. 250–2° decomp.

Demarçay, *Ann. chim.*, 1880, **20**, 493.
Walden, *Ber.*, 1891, **24**, 2038.

2-Isobutylglutaric Acid (2-*Isobutylpropane*-1 : 3-*dicarboxylic acid*)

$CH_2\cdot COOH$
$(CH_3)_2CH\cdot CH_2\cdot CH$
$CH_2\cdot COOH$

$C_9H_{16}O_4$ MW, 188

Needles from H_2O. M.p. 48°. B.p. 205°/12 mm. Very sol. Et_2O, EtOH, C_6H_6, AcOH, H_2O. Mod. sol. CS_2, ligroin.
Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 262–3°.

Knoevenagel, *Ber.*, 1898, **31**, 2590; D.R.Ps., 156,560, 161,171, (*Chem. Zentr.*, 1905, I, 56; II, 179).

Isobutylglyoxylic Acid.
See 1-Ketoisocaproic Acid.
Isobutyl *p*-hydroxyphenyl Ketone.
See *p*-Hydroxyisovalerophenone.
Isobutylideneacetic Acid.
See 2-Isopropylacrylic Acid.
Isobutylideneacetone (5-*Keto*-2-*methylhexene*-3, 2-*methyl*-3-*hexenone*-5, 1-*acetoisopentene*)

$CH_3\cdot CO\cdot CH{:}CH\cdot CH(CH_3)_2$

$C_7H_{12}O$ MW, 112

Cis:
B.p. 64°/18 mm. D_4^{20} 0·8558. n_D^{20} 1·4374.
Semicarbazone: m.p. 160°.

Trans :
B.p. 63–5°/20 mm. D^{20} 0·8407. n_D^{22} 1·4395.
Semicarbazone : m.p. 126°.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 909.
Cf. Heilmann, *Bull. soc. chim.*, 1931, **49**, 75.

3-Isobutylidenebutyric Acid.
See 5-Methyl-3-heptenic Acid.

Isobutylidene chloride.
See 1 : 1-Dichloroisobutane.

Isobutylidene-ethylene.
See 4-Methyl-1 : 2-pentadiene.

Isobutylidene-malonic Acid (3-*Methyl*-1-*butylene*-1 : 1-*dicarboxylic acid*)

$$\begin{matrix}CH_3\\CH_3\end{matrix}\!\!>CH{\cdot}CH{:}C\!<\!\!\begin{matrix}COOH\\COOH\end{matrix}$$

$C_7H_{10}O_4$ MW, 158

Di-Et ester : $C_9H_{14}O_4$. MW, 186. B.p. 128–132°/23 mm.

Schryver, *J. Chem. Soc.*, 1893, **63**, 1344.

2-Isobutylidene-propionic Acid.
See 2-Isoheptenic Acid.

Isobutyl iodide (1-*Iodoisobutane*)

$$(CH_3)_2CH{\cdot}CH_2I$$

C_4H_9I MW, 184

B.p. 120°, 83°/250 mm. D^{20} 1·605, D^{15} 1·6139. n_D^{20} 1·49597.

Brauner, *Ann.*, 1878, **192**, 69.
Perkin, *J. prakt. Chem.*, 1885, **31**, 503.
Hirao, *J. Chem. Soc. Japan*, 1931, **52**, 269, (*Chem. Abstracts*, 1932, **26**, 5062).

Isobutylisoamylamine

$$(CH_3)_2CH{\cdot}CH_2{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$$

$C_9H_{21}N$ MW, 143

B.p. 158–60°.

Sabatier, Mailhe, *Compt. rend.*, 1909, **148**, 900.

Isobutyl isocyanate

$$(CH_3)_2CH{\cdot}CH_2{\cdot}NCO$$

C_5H_9ON MW, 99

Colourless mobile pungent liq. B.p. 101·5°.

Anschütz, *Ann.*, 1908, **359**, 213.

Isobutyl isocyanide (*Isobutyl carbylamine*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}NC$$

C_5H_9N MW, 83

B.p. 110–11° (114–17°). D^4 0·7873. Heat of comb. C_p 916·4 (795·0) Cal.

Gautier, *Ann. chim.*, 1869, **17**, 245.
Guillemard, *Ann. chim.*, 1908, **14**, 413.

Isobutyl isothiocyanate (*Isobutyl mustard oil*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}NCS$$

C_5H_9NS MW, 115

B.p. 162°. D^{14} 0·9638. n_D^{14} 1·5005.

Delépine, *Compt. rend.*, 1907, **144**, 1126; *Bull. soc. chim.*, 1908, **3**, 642; *Ann. chim.*, 1912, **25**, 560.

Isobutylisovalerylcarbinol.
See Isovaleroin.

Isobutylmaleic Acid (*Isopropylcitraconic acid*)

$$\begin{matrix}(CH_3)_2CH{\cdot}CH_2{\cdot}C{\cdot}COOH\\ \| \\ HC{\cdot}COOH\end{matrix}$$

$C_8H_{12}O_4$ MW, 172

Needles or prisms from $CHCl_3$–ligroin. M.p. 78–81° ⟶ oily anhydride. Very sol. H_2O. EtOH, Et_2O. Sol. $CHCl_3$. Insol. ligroin.

Fittig, *Ann.*, 1899, **304**, 262, 292.

Isobutylmalonic Acid (*Isopentane*-4 : 4-*dicarboxylic acid*, 3-*methylbutane*-1 : 1-*dicarboxylic acid*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH\!<\!\!\begin{matrix}COOH\\COOH\end{matrix}$$

$C_7H_{12}O_4$ MW, 160

Cryst. from C_6H_6. M.p. 108°. Decomp. at 115°. Sol. H_2O, EtOH, Et_2O. $k = 1{\cdot}01 \times 10^{-3}$ at 25°. Heat ⟶ isobutylacetic acid.

Di-Me ester : $C_9H_{16}O_4$. MW, 188. B.p. 211°/763 mm., 101°/15 mm.

Di-Et ester : $C_{11}H_{20}O_4$. MW, 216. B.p. 119–20°/16 mm.

Dichloride : $C_7H_{10}O_2Cl_2$. MW, 197. B.p. 83–5°/22 mm.

Diamide : $C_7H_{14}O_2N_2$. MW, 158. Needles from EtOH. M.p. 195–6°.

Di-nitrile : $C_7H_{10}O_2$. MW, 126. B.p. 222°.

Et ester-nitrile : isobutylcyanoacetic ester, 1-cyanoisocaproic ethyl ester. $C_9H_{15}O_2N$. MW, 169. B.p. 223–4°/755 mm., 127–32°/35–42 mm.

Marshall, *Rec. trav. chim.*, 1932, **51**, 236.
Freylon, *Ann. chim.*, 1910, **20**, 59.
Hessler, *J. Am. Chem. Soc.*, 1916, **38**, 912.

Isobutyl Mercaptan (1-*Mercaptoisobutane*, *thioisobutyl alcohol*)

$$(CH_3)_2CH{\cdot}CH_2SH$$

$C_4H_{10}S$ MW, 90

B.p. 88°. D_4^{20} 0·8357. n_D^{20} 1·4386.
Hg salt : m.p. 94–5°.

3 : 5-*Dinitrobenzoyl*: m.p. 63–4°.

Nasini, *Ber.*, 1882, **15**, 2882.
Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1219.
Mereshkowski, *Chem. Zentr.*, 1915, I, 982.

N-Isobutyl-3 : 4-methylenedioxycinnamic Amide.
See Fagaramide.

Isobutyl nitrate

$(CH_3)_2CH·CH_2·O·NO_2$

$C_4H_9O_3N$ MW, 119

B.p. 123·5–124·5°. D_4^{20} 1·0152. n_D^{20} 1·4028.

Perkin, *J. Chem. Soc.*, 1889, **55**, 683.
Löwenherz, *Ber.*, 1890, **23**, 2191.

Isobutyl nitrite

$(CH_3)_2CH·CH_2·O·NO$

$C_4H_9O_2N$ MW, 103

B.p. 67°. D_4^{22} 0·8699. n_D^{22} 1·3715.

Mailhe, Bellegarde, *Bull. soc. chim.*, 1919, **25**, 590.
Neogi, *J. Chem. Soc.*, 1914, **105**, 2375.

Isobutylphenylacetic Acid.
See 1-Phenylisocaproic Acid.

Isobutylphenylcarbinol (4-*Hydroxy*-2-*methyl*-4-*phenylbutane*, α-*hydroxyisoamylbenzene*)

$C_6H_5·CH(OH)·CH_2·CH(CH_3)_2$

$C_{11}H_{16}O$ MW, 164

Viscous oil. B.p. 235–6°/746 mm., 126°/21 mm., 122°/9 mm. D_4^{18} 0·9597. n_D^{18} 1·50798.
Acetyl: $C_{13}H_{18}O_2$. MW, 206. B.p. 125–6°/9 mm.

Grignard, *Ann. chim.*, 1901, **24**, 467.
Klages, *Ber.*, 1904, **37**, 2316.
Schorigen, *Ber.*, 1907, **40**, 3117.
Tiffeneau, *Ann. chim.*, 1907, **10**, 354.

Isobutyl phenyl Ether

$C_6H_5·O·CH_2·CH(CH_3)_2$

$C_{10}H_{14}O$ MW, 150

B.p. 196° (200°). D_{15}^{24} 0·9240. n_D^{24} 1·4932. Decomp. at 380–400° ⟶ phenol + an unsaturated hydrocarbon.

Smith, *J. Am. Chem. Soc.*, 1934, **56**, 717.
Bamberger, *Ber.*, 1886, **19**, 1820.

Isobutyl phenyl Ketone.
See Isovalerophenone.

Isobutylpropenylcarbinol.
See 6-Methyl-2-heptenol-4.

Isobutyl propionate

$CH_3·CH_2·CO·OCH_2·CH(CH_3)_2$

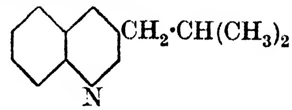
$C_7H_{14}O_2$ MW, 130

B.p. 137°. D_4^0 0·8876. Vapour passed over thoria at 470–80° ⟶ propionitrile.

Pierre, Puchot, *Ann.*, 1872, **163**, 283.
Mailhe, *Bull. soc. chim.*, 1918, **23**, 234.

1-Isobutylpropylene.
See 5-Methyl-2-hexene.

3-Isobutylquinoline

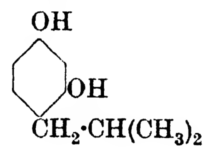


$C_{12}H_{15}N$ MW, 173

B.p. 114°/2 mm.
Picrate: m.p. 160°.

Darzens, Meyer, *Compt. rend.*, 1934, **198**, 1428.

4-Isobutylresorcinol (2 : 4-*Dihydroxyisobutylbenzene*)



$C_{10}H_{14}O_2$ MW, 166

M.p. 62–63·5°. B.p. 166–8°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.
Dohme, E.P., 219,922, (*Chem. Abstracts*, 1925, **19**, 705).
Cox, *Rec. trav. chim.*, 1931, **50**, 850.

β-Isobutylstyrene.
See 4-Methyl-1-phenyl-1-pentene.

Isobutyltartronic Acid (*Isobutylhydroxymalonic acid*)

$$(CH_3)_2CH·CH_2·C(OH)<\begin{matrix}COOH\\COOH\end{matrix}$$

$C_7H_{12}O_5$ MW, 176

Deliquescent plates. M.p. 110–14° (107°) decomp. Sol. H_2O, Et_2O, EtOH. Spar. sol. C_6H_6, pet. ether. Heat at 180° ⟶ 1-hydroxyisocaproic acid.

Plattner, *Monatsh.*, 1915, **36**, 903.
Guthzeit, *Ann.*, 1881, **209**, 237.

Isobutyl thiocyanate

$(CH_3)_2CH·CH_2·SCN$

C_5H_9NS MW, 115

B.p. 174–6°.

Hofmann, Reimer, *Ber.*, 1870, **3**, 757.

Isobutylthiourea

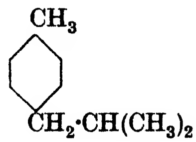
$(CH_3)_2CH{\cdot}CH_2{\cdot}NH{\cdot}CS{\cdot}NH_2$

$C_5H_{12}N_2S$ MW, 132

Cryst. M.p. 93·5°.

Hofmann, *Ber.*, 1874, **7**, 511.

***p*-Isobutyltoluene** (1-*Methyl*-4-*isobutylbenzene*)

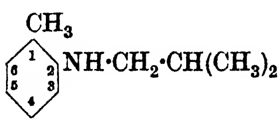


$C_{11}H_{16}$ MW, 148

B.p. 196–7°. D^{19} 0·864. n_D^{19} 1·4917.

Wallach, Berthold, *Chem. Zentr.*, 1915, II, 825.

***N*-Isobutyl-*o*-toluidine** (o-*Tolylisobutylamine*)



$C_{11}H_{17}N$ MW, 163

B.p. 230–5°/758 mm.

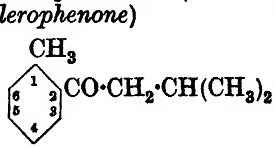
Bischoff, *Ber.*, 1897, **30**, 2466.

***N*-Isobutyl-*p*-toluidine** (p-*Tolylisobutylamine*).

B.p. 135°/19 mm.

Wedekind, Bruch, *Ann.*, 1929, **471**, 100.
Cf. Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, **46**, 741.

Isobutyl-*o*-tolyl Ketone (2-*Isovaleryltoluene*, o-*methylisovalerophenone*)



$C_{12}H_{16}O$ MW, 176

B.p. 247·5°/758 mm. D_4^0 0·9744.
Semicarbazone: m.p. 166°.

Senderens, *Ann. chim.*, 1913, **28**, 333; *Bull. soc. chim.*, 1911, **9**, 950.

Isobutyl *m*-tolyl Ketone (3-*Isovaleryltoluene*, m-*methylisovalerophenone*).

B.p. 254°/758 mm. D_4^0 0·9712.
Semicarbazone: m.p. 172°.

See previous references.

Isobutyl *p*-tolyl Ketone (4-*Isovaleryltoluene*, p-*methylisovalerophenone*).

B.p. 259°/758 mm. D_4^0 0·9707.
Semicarbazone: m.p. 212°.
Oxime: cryst. from EtOH. M.p. 65°.

Willgerodt, Hambrecht, *J. prakt. Chem.*, 1910, **81**, 83.
See also previous references.

Isobutylurea

$(CH_3)_2CH{\cdot}CH_2{\cdot}NH{\cdot}CO{\cdot}NH_2$

$C_5H_{12}ON_2$ MW, 116

Needles from Me_2CO. M.p. 141°. Spar. sol. Me_2CO, C_6H_6.
Nitrate: cryst. from EtOH. M.p. 94–8°.
N-*Acetyl*: leaflets. M.p. 109–114°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O.

Odenwald, *Ann.*, 1919, **418**, 331.
Dixon, *J. Chem. Soc.*, 1895, **67**, 559.

Isobutylurethane (*Ethyl isobutylaminoformate*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}NH{\cdot}CO{\cdot}OC_2H_5$

$C_7H_{15}O_2N$ MW, 145

Liq. with apple-like odour. B.p. 96°/17 mm. D_4^{20} 0·9432. n_D^{20} 1·4288. Upon ingestion causes headache and vomiting.

van Erp, *Rec. trav. chim.*, 1895, **14**, 20.
Curtius, Hille, *J. prakt. Chem.*, 1901, **64**, 416.

Isobutylvinylcarbinol.
See 5-Methyl-1-hexenol-3.

Isobutyl vinyl Ketone.
See 5-Methyl-1-hexenone-3.

Isobutyraldehyde (*Isobutyric aldehyde*)

$(CH_3)_2CH{\cdot}CHO$

C_4H_8O MW, 72

Pungent liq. B.p. 63–4°/757 mm. D_4^{20} 0·7938. n_D^{20} 1·3730. Heat of comb. C_p 599·9 Cal. Sol. 9 vols. H_2O at 20°. Oxidises in air, rapidly in presence of Pt black ⟶ isobutyric acid. NaHg in aq. sol. ⟶ isobutyl alcohol. Vapour + NH_3 passed over thoria at 420–40° ⟶ isobutyronitrile. Forms spar. sol. bisulphite comp.
Di-Et acetal: $C_8H_{18}O_2$. MW, 146. B.p. 134–6°. D^{12} 0·9957.
Oxime: liq. B.p. 140°.
Semicarbazone: m.p. 125–6° (121°).
Phenylsemicarbazone: m.p. 133–4°.
Phenylhydrazone: liq. B.p. 145°/20 mm.
p-*Nitrophenylhydrazone*: m.p. 130°.
2 : 4-*Dinitrophenylhydrazone*: m.p. 187°.
3-*Nitrobenzoylhydrazone*: rectangular plates. M.p. 141–2°.
4-*Chlorobenzoylhydrazone*: prismatic needles. M.p. 153–4°.

Cyanhydrin: *see under* 1-Hydroxyisovaleric Acid.

Lipp, *Ann.*, 1880, **205**, 2.
Fossek, *Monatsh.*, 1883, **4**, 660.
Sabatier, Mailhe, *Ann. chim.*, 1910, **20**, 303; *Compt. rend.*, 1912, **154**, 563.
Tiffeneau, *Compt. rend.*, 1910, **150**, 1183.
Harries, Oppenheim, *Chem. Zentr.*, 1916, II, 992.
I.G., E.P., 354,388, (*Chem. Abstracts*, 1932, **26**, 5310).
Sah *et al.*, *Chem. Zentr.*, 1935, I, 56; *Chem. Abstracts*, 1934, **28**, 3713.

Isobutyric Acid

$(CH_3)_2CH \cdot COOH$

$C_4H_8O_2$ MW, 88

The free acid or its esters occur in many plants. M.p. − 47°. B.p. 154·3°. D_4^{20} 0·9504. n_D^{20} 1·3930. $k = 1 \cdot 4\ (1 \cdot 62) \times 10^{-5}$ at 25°. Vapour passed over thoria at 400–30° ⟶ di-isopropyl ketone. Alk. $KMnO_4$ ⟶ 1-hydroxyisobutyric acid. H_2O_2 on Na salt in aq. sol. ⟶ acetone. Hot HNO_3 ⟶ 2 : 2-dinitropropane. The salts are more sol. H_2O than those of the *n*-acid.

Me ester: *see* Methyl isobutyrate.
Et ester: *see* Ethyl isobutyrate.
Propyl ester: $C_7H_{14}O_2$. MW, 130. B.p. 134°. D_4^0 0·8843.
Isopropyl ester: b.p. 120·8°. D_4^0 0·8687.
Isobutyl ester: $C_8H_{16}O_2$. MW, 144. B.p. 147°. D_4^0 0·8749.
Amyl ester: *see active*Amyl isobutyrate *and tert.*-Amyl isobutyrate.
Isoamyl ester: *see* Isoamyl isobutyrate.
Allyl ester: $C_7H_{12}O_2$. MW, 128. B.p. 133·5°/766 mm.
Benzyl ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 229°. D^{23} 1·0058.
Glycerol esters: *see* Mono-isobutyrin, Di-isobutyrin, *and* Tri-isobutyrin.
p-*Bromophenacyl ester*: m.p. 76·8°.
Anhydride: $C_8H_{14}O_3$. MW, 158. B.p. 181·5°/734 mm., 73–5°/18 mm. D_{15}^{20} 0·9540.
Chloride: C_4H_7OCl. MW, 106·5. B.p. 92°. D_4^{20} 1·0174. n_D^{20} 1·4079.
Amide: C_4H_9ON. MW, 87. M.p. 128°.
Nitrile: isobutyronitrile, isopropyl cyanide. C_4H_7N. MW, 69. B.p. 103·5° (107–8°).
Anilide: $C_{10}H_{13}ON$. MW, 163. M.p. 104·5°.

Fournier, *Bull. soc. chim.*, 1909, **5**, 921; 1910, **7**, 839.
Sabatier, Mailhe, *Compt. rend.*, 1911, **152**, 1046.
Hara, Komatsu, *Mem. Coll. Sci., Kyoto Imp. Univ.*, 1925, **8A**, 241 (*Chem. Abstracts*, 1925, **19**, 3248).
Récsei, *Chem.-Ztg.*, 1928, **52**, 22 (*Chem. Abstracts*, 1928, **22**, 1572).

Isobutyroin (*3-Hydroxy-4-keto-2 : 5-dimethylhexane, 2 : 5-dimethyl-3-hexanolone-4, isopropylisobutyrylcarbinol*)

$(CH_3)_2CH \cdot CH(OH) \cdot CO \cdot CH(CH_3)_2$

$C_8H_{16}O_2$ MW, 144

Oil with camphor-like odour. B.p. 152–4°, 83°/26 mm., 55–7°/3 mm. $D_4^{26 \cdot 5}$ 0·8990. $n_D^{26 \cdot 5}$ 1·4159.

Oxime: cryst. from EtOH–pet. ether. M.p. 110–11°. B.p. 137°/14 mm.

Bouveault, Locquin, *Bull. soc. chim.*, 1906, **35**, 631, 642, 653.
Gauthier, *Compt. rend.*, 1911, **152**, 1102.
Corson, Benson, Goodwin, *J. Am. Chem. Soc.*, 1930, **52**, 3988.

Isobutyrone.
See Di-isopropyl Ketone.

Isobutyrophenone (*Isopropyl phenyl ketone, isobutyrylbenzene*)

$C_6H_5 \cdot CO \cdot CH(CH_3)_2$

$C_{10}H_{12}O$ MW, 148

B.p. 220°/746 mm., 125·5°/32 mm., 95–8° (92°)/10 mm. D_4^{16} 0·9871. n_D^{16} 1·5196. Ox. ⟶ benzoic + acetic acids. CH_3I + KOH at 100° ⟶ *tert.*-butyl phenyl ketone.

Oxime: plates from ligroin. M.p. 94° (61°). B.p. 135–6°/11 mm.
Semicarbazone: needles from EtOH. M.p. 181° (167°).
Hydrazone: m.p. 71°.

Claus, *J. prakt. Chem.*, 1892, **46**, 480 (*Footnote*).
Nef, *Ann.*, 1900, **310**, 318.
Lapworth, Steele, *J. Chem. Soc.*, 1911, **99**, 1884.
Sabatier, Mailhe, *Compt. rend.*, 1914, **158**, 833.
Favorski, Tchilingaren, *Compt. rend.*, 1926, **182**, 223.
Oumnoff, *Bull. soc. chim.*, 1928, **43**, 568.

Isobutyrylacetic Acid.
See 2-Ketoisocaproic Acid.

Isobutyrylacetone (*Acetylisobutyrylmethane, 2-methylhexandione-3 : 5, 3 : 5-diketoisoheptane*)

$CH_3 \cdot CO \cdot CH_2 \cdot CO \cdot CH(CH_3)_2$

$C_7H_{12}O_2$ MW, 128

Oil. B.p. 168° (160–70°).
$(C_7H_{11}O_2)_2Cu$: m.p. 171°.

Powell, Seymour, *J. Am. Chem. Soc.*, 1931, **53**, 1049.

Isobutyrylbenzene.
See Isobutyrophenone.

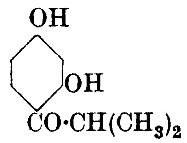
Isobutyrylcresol.
See Hydroxy-methyl-isobutyrophenone.

Isobutyrylcyclohexane.
See Hexahydroisobutyrophenone.

Isobutyrylformic Acid.
See 1-Ketoisovaleric Acid.

Isobutyrylnaphthalene.
See Isopropyl naphthyl Ketone.

4-Isobutyrylresorcinol (*Isopropyl 2 : 4-dihydroxyphenyl ketone, 2 : 4-dihydroxyisobutyrophenone*)



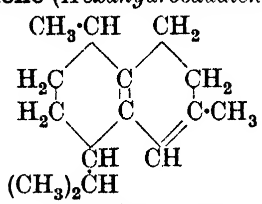
$C_{10}H_{12}O_3$ MW, 180

M.p. 67–68·5°. B.p. 173–5°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.

Isobutyryltoluene.
See Isopropyl tolyl Ketone.

Isocadinene (*Hexahydrocadalene*)



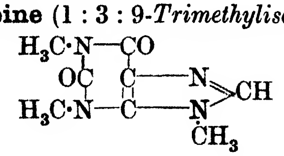
Probable structure

$C_{15}H_{24}$ MW, 204

B.p. 124–6°/11–12 mm. D_4^{20} 0·9154. n_D^{20} 1·5158.

Henderson, Robertson, *J. Chem. Soc.*, 1926, 2811.

Isocaffeine (1 : 3 : 9-*Trimethylisoxanthine*)

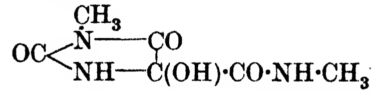


$C_8H_{10}O_2N_4$ MW, 194

M.p. 285–7°. Sol. H_2O. Spar. sol. EtOH. Sublimes.

Gulland, Hobday, *Chem. Abstracts*, 1934, **28**, 1926.
Biltz, Strufe, *Ann.*, 1921, **423**, 223.

Isocaffuric Acid (1-*Methyl-4-hydroxyhydantoyl-methylamide*)

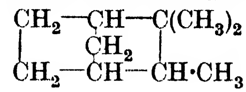


$C_6H_9O_4N_3$ MW, 187

M.p. 194°.

Gatewood, *J. Am. Chem. Soc.*, 1925, **47**, 2188.

Isocamphane (*Dihydrocamphene*)



$C_{10}H_{18}$ MW, 138

Exists in several modifications.

(I) Liquid.

$[\alpha]_D^{19}$ + 1° 15′ in MeOH.Aq. D_4^{20} 0·8524. n_D^{20} 1·45733.

(II) Solid.

d-.

Cryst. from MeOH. M.p. 62–3°. B.p. 166–166·5°/750 mm. $[\alpha]_D^{20}$ + 8·68° in C_6H_6.

l-.

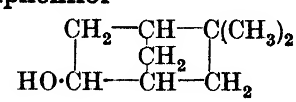
Cryst. from EtOH. M.p. about 64°. B.p. 164–5°/757 mm. $[\alpha]_D$ − 8·50° in EtOH.

dl-.

Cryst. from MeOH. M.p. 65–7°. B.p. 164°/713 mm. Sol. EtOH, C_6H_6, Me_2CO, AcOEt. Mod. sol. MeOH. D_4^{67} 0·82757. n_D^{67} 1·44186.

Lipp, *Ann.*, 1911, **382**, 280.
Komatsu, *Chem. Abstracts*, 1923, **17**, 1455.
Nakai, *ibid.*, 1456.

Isocamphenilol



$C_9H_{16}O$ MW, 140

M.p. 78°. B.p. 196°/740 mm.

Acetyl: b.p. 195°/750 mm. D_4^{20} 0·9988. n_D^{20} 1·4624.

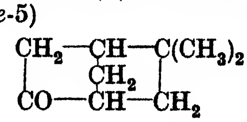
Benzoyl: m.p. 79°.

Acid phthalate: m.p. 118–19°.

Phenylurethane: m.p. 65°.

Hintikka, Komppa, *Ann.*, 1912, **387**, 309.

Isocamphenilone (2:2-*Dimethylbicyclo*-[1, 2, 2,]-*heptanone*-5)



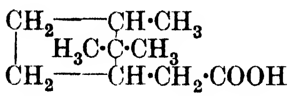
$C_9H_{14}O$ MW, 138

(α). Fenchocamphorone.
M.p. 63–5°. B.p. 196·1–196·5°.
Semicarbazone: m.p. 192–3°.

(β). M.p. 55–7°. Sublimes.
Semicarbazone: m.p. 225–6°.

Nametkin, *Chem. Abstracts*, 1925, **19**, 2946.
Nametkin, Khukhrikova, *Ann.*, 1924, **438**, 197.

Isocampholic Acid (2 : 2 : 3-*Trimethylcyclopentylacetic acid*)



$C_{10}H_{18}O_2$ MW, 170

dl-.
Oil. B.p. 140–2°/11 mm. (141°/9 mm.). D_4^{20} 0·9789.
Et ester: $C_{12}H_{22}O_2$. MW, 198. B.p. 103°/12 mm. D_4^{20} 0·9426.
Chloride: $C_{10}H_{17}OCl$. MW, 188·5. B.p. 103°/11 mm.
Amide: $C_{10}H_{19}ON$. MW, 169. M.p. 109–10°. (112°). B.p. 192–3°/14 mm. N-*Et*: b.p. 175–6°/12 mm.
Anilide: m.p. 137–9° (119·5°). B.p. 188°/10 mm.
p-*Toluidide*: m.p. 133–4°.

Lipp, Reinmartz, *Helv. Chim. Acta*, 1927, **10**, 611.
Lipp, *Ber.*, 1922, **55**, 1883.
Braun, Heymons, *Ber.*, 1928, **61**, 2276.

Isocamphoramidic Acid.
See under Isocamphoric Acid.

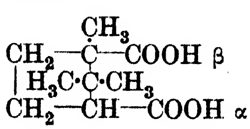
α-Isocamphorene

$C_{20}H_{32}$ MW, 272

B.p. 193–7°/19 mm. D^{21} 0·9029.

Semmler, Jonas, *Ber.*, 1914, **47**, 2077.

Isocamphoric Acid



$C_{10}H_{16}O_4$ MW, 200

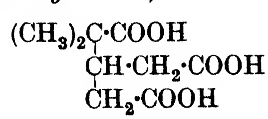
d-.
M.p. 171–2°. Sol. EtOH, AcOH. Spar. sol. H_2O. $k = 1{\cdot}74 \times 10^{-5}$ at 25°. $[\alpha]_D - 47{\cdot}6°$ in EtOH.Aq.

l-.
M.p. 173° (171·5–172·5°). Sol. EtOH. $k = 1{\cdot}6\ (1{\cdot}74) \times 10^{-5}$ at 25°.
α-Me ester: $C_{11}H_{18}O_4$. MW, 214. M.p. 89·5–90°. $[\alpha]_D - 58{\cdot}4°$ in EtOH.Aq. *Amide*: m.p. 157°.
β-Me ester: oil. $[\alpha]_D - 53{\cdot}1°$ in EtOH.Aq. *Amide*: m.p. 127–8°.
Di-Me ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 146°/22 mm., 130°/8 mm. D^{20} 1·073. $[\alpha]_D^{22} - 66{\cdot}5°$ in EtOH.
α-Et ester: $C_{12}H_{20}O_4$. MW, 228. M.p. 75° (73·5°). B.p. 195–7°/18–20 mm. $[\alpha]_D - 46{\cdot}28°$ in EtOH.Aq. $k = 6{\cdot}5 \times 10^{-6}$ at 25°.
β-Et ester: b.p. 176°/12 mm. D^{16} 1·092. $[\alpha]_D - 22{\cdot}9°$ in EtOH.Aq.
Di-Et ester: $C_{14}H_{24}O_4$. MW, 256. B.p. 165°/25–28 mm. D_4^{22} 1·0282. $n_D^{21\cdot 6}$ 1·4545. $[\alpha]_D^{16} - 50{\cdot}4°$ in EtOH.Aq.
Dichloride: $C_{10}H_{14}O_2Cl_2$. MW, 237. B.p. 153–4°/24 mm. $D_4^{20\cdot 6}$ 1·2270. $n_D^{20\cdot 7}$ 1·499.
β-Amide: isocamphoramidic acid. $C_{10}H_{17}O_3N$. MW, 199. M.p. 165–6°.
Diamide: $C_{10}H_{16}O_2N_2$. MW, 196. M.p. 132° (160° anhyd.).

dl-.
Prisms from H_2O. M.p. 191°. Spar. sol. EtOH. Insol. pet. ether. $k = 1{\cdot}74 \times 10^{-5}$ at 25°.

Bredt, *Ann.*, 1913, **395**, 57.
Noyes, Nickell, *J. Am. Chem. Soc.*, 1914, **36**, 118.
Skinner, *J. Am. Chem. Soc.*, 1917, **39**, 2698.

Isocamphoronic Acid (2 : 3-*Dimethylbutane-1 : 3 : 3′-tricarboxylic acid*)

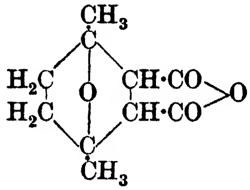


$C_9H_{14}O_6$ MW, 218

Prisms from H_2O. M.p. 166–7° (164–5°). Sol. H_2O, EtOH, Et_2O, AcOEt. Insol. pet. ether, $CHCl_3$. Sublimes.
Tri-Et ester: $C_{15}H_{26}O_6$. MW, 302. B.p. 195–200°/36 mm.
Lactone: (a) *cis*, m.p. 186°. (b) *Trans*: m.p. 256°.

Lipp, *Ber.*, 1914, **47**, 2996.
Aschan, *Ann.*, 1913, **398**, 311.
Tiemann, *Ber.*, 1896, **29**, 3020.

Isocantharidin (Note: the "isocantharidin" of Gadamer, *Chem. Abstracts*, 1918, **12**, 806, was shown to possess a different constitution)



$C_{10}H_{12}O_4$ MW, 196

Cryst. from ligroin. M.p. 121–5°.

Diels, Adler, *Ber.*, 1929, **62**, 561.

Isocapric Acid.
See 7-Methylpelargonic Acid.

Isocaproic Acid (*Isobutylacetic acid, isopentane-4-carboxylic acid, 3-methylvaleric acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_6H_{12}O_2$ MW, 116

Oil. M.p. – 33°. B.p. 199·1°/752 mm. (197°/750 mm.), 94°/15 mm. (101–2°/13 mm.), 91–2°/9 mm. D_4^{20} 0·9225. n_D^{20} 1·4144. Heat of comb. 837·8 Cal. $k = 1{\cdot}53\ (1{\cdot}57) \times 10^{-5}$ at 25°.

Et ester: $C_8H_{16}O_2$. MW, 144. B.p. 160–4°/737 mm. D^{20} 0·8705.

Isoamyl ester: $C_{11}H_{22}O_2$. MW, 186. B.p. 215–20°.

Chloride: $C_6H_{11}OCl$. MW, 134·5. B.p. 143·8–144·6°/745 mm. D_4^{20} 0·9725.

Amide: $C_6H_{13}ON$. MW, 115. M.p. 120–1° (118·8°).

Anhydride: $C_{12}H_{22}O_3$. MW, 214. B.p. 139°/19 mm., 130–1°/15 mm.

Nitrile: isoamyl cyanide. $C_6H_{11}N$. MW, 97. B.p. 156–7°/761 mm. $D_4^{14{\cdot}3}$ 0·8069. $n_D^{14{\cdot}3}$ 1·40851.

Anilide: m.p. 112° (110–110·5°).

p-*Toluidide*: m.p. 63° (61·5–62·5°).

1-*Naphthalide*: m.p. 110–11°.

Ziegler, F.P., 728,241, (*Chem. Abstracts*, 1932, **26**, 5573).
Hommelen, *Bull. soc. chim. Belg.*, 1933, **42**, 243.
Curtius, *J. prakt. Chem.*, 1930, **125**, 152.
Michael, *Ber.*, 1901, **34**, 925.
Grignard, *Ann. chim.*, 1901, **24**, 455.
Noyes, *J. Am. Chem. Soc.*, 1901, **23**, 393.
Underwood, Gale, *J. Am. Chem. Soc.*, 1934, **56**, 2117.

Isocaproic Aldehyde (*Isobutylacetaldehyde, isoamylformaldehyde, 3-methylvaleraldehyde*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CHO$

$C_6H_{12}O$ MW, 100

B.p. 121°/743 mm.

Oxime: b.p. 103°/35 mm., 90–1°/20 mm. D_0^0 0·910.

Di-Et acetal: 4 : 4-diethoxyisopentane. B.p. 180–2°.

Sabatier, Mailhe, *Compt. rend.*, 1912, **154**, 563.
Bouveault, *Compt. rend.*, 1903, **137**, 989.

Isocaprone (*Di-isoamyl ketone*, 2 : 8-*dimethylnonanone*-5, 5-*keto*-2 : 8-*dimethylnonane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{11}H_{22}O$ MW, 170

Yellow oil. B.p. 226° (224°).

Wache, *J. prakt. Chem.*, 1889, **39**, 250.
Sabatier, Mailhe, *Compt. rend.*, 1914, **158**, 832.

Isocaprophenone (*Isoamyl phenyl ketone*)

$C_6H_5{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{12}H_{16}O$ MW, 176

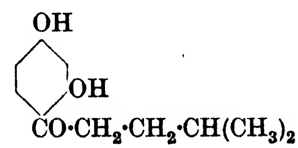
M.p. – 2°. B.p. 255–6°, 240°/720 mm., 143–8°/20 mm. D_{20}^{20} 0·971. n_D^{20} 1·533.

Oxime: m.p. 71–2°.

Semicarbazone: m.p. 150–1° (145–6°).

Shriner, Turner, *J. Am. Chem. Soc.*, 1930, **52**, 1267.

4-Isocaproylresorcinol (*Isoamyl* 2 : 4-*dihydroxyphenyl ketone*, 2 : 4-*dihydroxyisocaprophenone*)

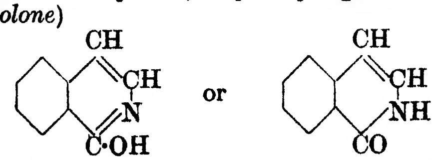


$C_{12}H_{16}O_3$ MW, 208

M.p. 76–77·5°. B.p. 192–4°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.

Isocarbostyril (1-*Hydroxyisoquinoline, isoquinolone*)



C_9H_7ON MW, 145

Needles from H_2O. M.p. 209–10°. Sublimes.

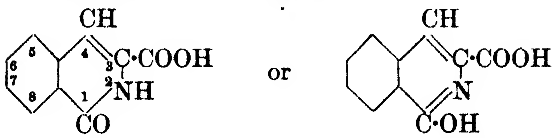
Me ether: $C_{10}H_9ON$. MW, 159. B.p. 240°, 182–6°/34 mm.

Et ether: $C_{11}H_{11}ON$. MW, 173. B.p. 182–3°/27 mm.

N-Me: $C_{10}H_9ON$. MW, 159. M.p. 40°. B.p. 314–15°/720 mm.

Bain, Perkin, Robinson, *J. Chem. Soc.*, 1914, **105**, 2397.
Tschitschibabin, Kursanova, *Chem. Abstracts*, 1931, **25**, 2727.

Isocarbostyril-3-carboxylic Acid (1-*Hydroxyisoquinoline*-3-*carboxylic acid*)



$C_{10}H_7O_3N$ MW, 189

Needles from Me_2CO. M.p. 320°. Spar. sol. EtOH, Et_2O, $CHCl_3$, AcOH, Me_2CO, C_6H_6, H_2O. Sublimes. Heat ⟶ isocarbostyril. Zn ⟶ isoquinoline. $FeCl_3$ ⟶ yellowish-red col.

N-Me: $C_{11}H_9O_3N$. MW, 203. Prisms. M.p. 238°.

N-Et: $C_{12}H_{11}O_3N$. MW, 217. Prisms. M.p. 202°.

N-Phenyl: $C_{16}H_{11}O_3N$. MW, 265. Prisms from dil. EtOH. M.p. 265°.

Picrate: m.p. 129–30°.

Bain, Perkin, Robinson, *J. Chem. Soc.*, 1914, **105**, 2397.
Bamberger, Frew, *Ber.*, 1894, **27**, 203.

Isocarbostyril-4-carboxylic Acid (1-*Hydroxyisoquinoline*-4-*carboxylic acid*).

Needles from AcOH. M.p. 290° decomp.

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from EtOH. M.p. 227°.

N-Me: needles from AcOH. M.p. 262°.

Dieckmann, Meiser, *Ber.*, 1908, **41**, 3266.

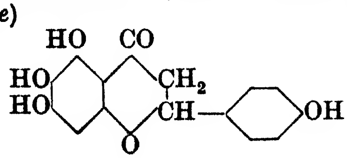
Isocarotene

$C_{40}H_{56}$ MW, 536

Needles or leaflets with steel-blue reflex. M.p. 192–3°.

Karrer, Schöpp, Morf, *Helv. Chim. Acta*, 1932, **15**, 1162.
See also Karrer, Walker, *Helv. Chim. Acta*, 1934, **17**, 43.

Isocarthamidin (5 : 6 : 7 : 4′-*Tetrahydroxyflavanone*)



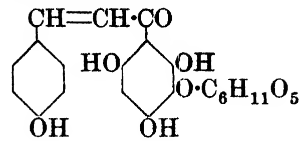
$C_{15}H_{12}O_6$ MW, 288

Yellow cryst. containing H_2O. M.p. 240°.

Tetra-acetyl: m.p. 179°.

Kuroda, *J. Chem. Soc.*, 1930, 752, 765.

Isocarthamin (*Glucoside of* 4 : 2′ : 3′ : 4′ : 6′-*pentahydroxychalkone*)



$C_{21}H_{22}O_{11}$ MW, 450

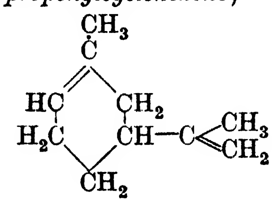
Yellow needles + $2H_2O$. M.p. 228°. Unstable, changing in air to red amorphous powder. Formed from the isomeric carthamin (*q.v.*) with cold, dilute HCl.

See previous reference.

Isocarveol.

See Pinocarveol.

Isocarvestrene ($\Delta^{6,8(9)}$-m-*Menthadiene*, 1-*methyl*-5-*isopropenylcyclohexene*)



$C_{10}H_{16}$ MW, 136

B.p. 176–7°/765 mm. D^{20}_{20} 0·8496.

Fisher, Perkin, *J. Chem. Soc.*, 1908, **93**, 1890.

Isocarvone.

See Pinocarvone.

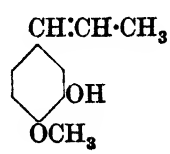
Isocaryophyllene (γ-*Caryophyllene*)

$C_{15}H_{24}$ MW, 204

B.p. 125–125·5°/14·5 mm. D^{19}_{0} 0·89941. n^{19}_{D} 1·49665. $[\alpha]^{19}_{D}$ 26·174°.

Deussen, Meyer, *J. prakt. Chem.*, 1914, **90**, 324.

Isochavibetol (2-*Methoxy*-5-*propenylphenol*, 4-*propenylguaiacol*, 3-*hydroxy*-4-*methoxy*-1-*propenylbenzene*)



$C_{10}H_{12}O_2$ MW, 164

M.p. 96° (92°). B.p. 147°/19 mm.

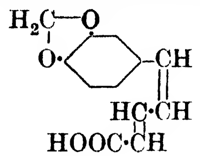
Acetyl: m.p. 101°.

Me ether: dimethoxypropenylbenzene. *See under* Isoeugenol.

Et ether: $C_{12}H_{16}O_2$. MW, 192. M.p. 49–50°.

Stockelbuch, U.S.P., 1,792,717, (*Chem. Abstracts*, 1931, **25**, 2154).
Hirao, *Chem. Abstracts*, 1933, **27**, 277, 5731.
Imoto, *Chem. Abstracts*, 1934, **28**, 3393, 4719.
Helfer, Mottier, *Chem. Zentr.*, 1935, I, 1862.

Isochavicic Acid (*Isochaviacinic acid*)



$C_{12}H_{10}O_4$ MW, 218

Stereoisomer of piperic acid occurring in black pepper. M.p. 202°.

Ott, Eichler, *Ber.*, 1922, **55**, 2661.
Lohaus, *J. prakt. Chem.*, 1928, **119**, 271.

Iso-2-chloro-1-hydroxybutyric Acid.
See 2-Chloro-1-hydroxybutyric Acid.

Isocholanic Acid.
See Hyocholanic Acid.

Isochollepidanic Acid

$C_{24}H_{34}O_{12}$ ($C_{24}H_{32}O_{12}$) MW, 514 (512)

Cryst. from hot H_2O. M.p. 302°. $[\alpha]_D^{18}$ +21·3° in EtOH.

Hexa-Me ester: $C_{30}H_{48}O_{12}$ ($C_{30}H_{46}O_{12}$). MW, 600 (598). M.p. 128°.

Wieland, Kraft, *Z. physiol. Chem.*, 1932, **211**, 209.

β-Isocholoidanic Acid

$C_{24}H_{36}O_{10}$ MW, 484

Needles from AcOH.Aq. M.p. 273° decomp.

Wieland, Honold, Pascval-Vila, *Z. physiol. Chem.*, 1923, **130**, 333.

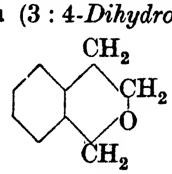
Isochondodendrin (*Isobebeerin*)

$C_{36}H_{38}O_6N_2$ MW, 594

Alkaloid from root of *Chondodendron platyphyllum*, Myers., (pareira root). M.p. 290°. $[\alpha]_D^{17}$ + 50° in Py.

Faltis, Dieterich, *Ber.*, 1934, **67**, 231.

Isochroman (3 : 4-*Dihydrobenz*-β-*pyran*)

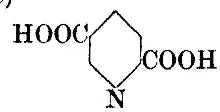


$C_9H_{10}O$ MW, 134

B.p. 90°/12 mm.

v. Braun, Zobel, *Ber.*, 1923, **56**, 2149.

Isocinchomeronic Acid (*Pyridine*-2 : 5-*dicarboxylic acid*)



$C_7H_5O_4N$ MW, 167

M.p. 254° decomp.

Me ester: *hydrazide*, m.p. 173° decomp.

Di-Me ester: $C_9H_9O_4N$. MW, 195. M.p. 164°.

Di-phenyl ester: $C_{19}H_{13}O_4N$. MW, 319. M.p. 156°.

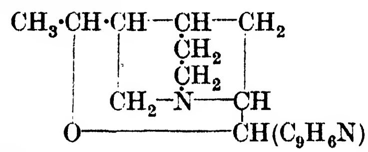
Diamide: $C_7H_7O_2N_3$. MW, 165. M.p. 310° decomp.

Dihydrazide: m.p. 268–9°.

Meyer, Staffen, *Monatsh.*, 1913, **34**, 517.
Meyer, *Rec. trav. chim.*, 1925, **44**, 327.

Isocinchonicine.
See Isocinchotoxine.

Isocinchonine



$C_{19}H_{22}ON_2$ MW, 294

α-.
Cryst. from AcOEt. M.p. 126–7°. $[\alpha]_D^{11}$ + 52·86° in EtOH.

β-. Cinchonigine.
Cryst. from ligroin. M.p. 128–30°. $[\alpha]_D^{20}$ −59° in EtOH.

B,HCl: m.p. 212°.

N-*oxide*: $C_{19}H_{22}O_2N_2$. MW, 310. M.p. 192–3°. $[\alpha]_D^{20}$ − 82° in EtOH.

Rabe, Böttcher, *Ber.*, 1917, **50**, 130.

Isocinchotoxine (*Isocinchonicine*)

$C_{19}H_{22}ON_2$ MW, 294

α-.
Cryst. from EtOH.Aq. M.p. 98–100°.

β-.
N-*Acetyl deriv.*: m.p. 121°.
N-*Nitroso deriv.*: m.p. 101–3°.
N-*Me deriv.*: m.p. 86°. *Hydriodide*: m.p. 282° decomp.
N-*Et deriv.*: m.p. 85–6°. *Hydriodide*: m.p. 232°.

Konopnicki, Ludwiczakowna, Suszko, *Chem. Zentr.*, 1934, **I**, 705.

Isocinnamic Acid.
See under Cinnamic Acid.

Isocitric Acid (1-*Hydroxypropane*-1 : 2 : 3-*tricarboxylic acid*, 1-*hydroxytricarballylic acid*)

CH(OH)·COOH
CH·COOH
CH_2·COOH

$C_6H_8O_7$ MW, 192

Occurs in *Rubus candicans*, Weihe., (blackberry). M.p. about 105°.

Tri-Et ester: $C_{12}H_{20}O_7$. MW, 276. B.p. 180–1°/10 mm.

Lactone: $C_6H_6O_6$. MW, 174. M.p. 120–30°.

Nelson, *J. Am. Chem. Soc.*, 1930, **52**, 2928 (*Bibl.*).

Isoclovene

$C_{15}H_{24}$ MW, 204

Viscous liquid. B.p. 130–1°/12 mm. D_4^{19} 0·943. n_D^{19} 1·5039. $[\alpha]_D^{14}$ − 56·6°. Resinifies in air.

Henderson, McCrone, Robertson, *J. Chem. Soc.*, 1929, 1369.

Isoclovene Alcohol

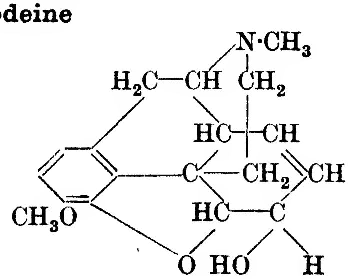
$C_{15}H_{26}O$ MW, 222

Cryst. from AcOEt. M.p. 98°. $[\alpha]_D^3$ + 227°.

Henderson, McCrone, Robertson, *J. Chem. Soc.*, 1929, 1372.

Isococaine.
See ψ-Cocaine.

Isocodeine



$C_{18}H_{21}O_3N$ MW, 299

M.p. 171–2°.

Acid tartrate: m.p. 185–6°. $[\alpha]_D^{29}$ − 98° in H_2O.

Eddy, Small, *Chem. Abstracts*, 1934, **28**, 5073.

Isoconessimine

$C_{23}H_{38}N_2$ MW, 342

Alkaloid from seeds and bark of Indian *Holarrhena*. Needles from pet. ether. M.p. 92°. $[\alpha]_D$ + 30° in EtOH.Aq. Sol. ord. org. solvents.

Di-hydrate: $C_{23}H_{38}N_2,2H_2O$. MW, 378. M.p. 88–92°.

B,2HCl: m.p. 335°.

B,2HBr: m.p. 344°.

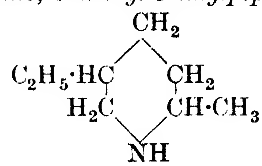
B,2HI: m.p. 316°.

B,H_2PtCl_6: m.p. 285° decomp.

Picrate: m.p. 198–200° decomp.

Siddiqui, *J. Indian Chem. Soc.*, 1934, **11**, 283.

Isocopellidine (*Copellidine-B*, *2-methyl-5-ethylpiperidine*, 6-*methyl*-3-*ethylpiperidine*)



$C_8H_{17}N$ MW, 127

d-.

B.p. 163–6°/770 mm.

l-.

B.p. 162–162·5°/776 mm.

B,HCl: m.p. 113–15°.

Acid tartrate: m.p. 61–2°.

B,$HAuCl_4$: m.p. 115°.

N-*Benzenesulphonyl*: m.p. 64°.

dl-.

B.p. 162–4°/763 mm.

N-*Benzenesulphonyl*: m.p. 66°.

Levy, Wolffenstein, *Ber.*, 1896, **29**, 1960.

Isocordine

$C_{20}H_{23}O_4N$ MW, 341

Alkaloid occurring in Korean *Corydalis* bulbs. M.p. 185°.

Benzoyl deriv.: l-*acid tartrate*: m.p. 217–18°. $[\alpha]_D^{17}$ + 69·5°.

Go, *Chem. Abstracts*, 1930, **24**, 620.

Isocoriamyrtin

$C_{15}H_{18}O_5$ MW, 278

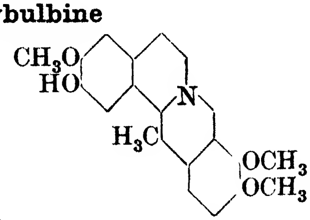
M.p. 224°.

Oxime: m.p. 265°.

Phenylhydrazone: m.p. 118–22°.

Kariyone, Sato, *Chem. Abstracts*, 1932, **26**, 1937.

Isocorybulbine



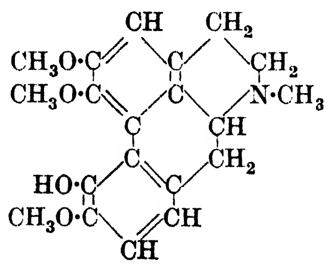
$C_{21}H_{25}O_4N$ MW, 355

Alkaloid of *Corydalis tuberosa*, D.C. Leaflets from EtOH. M.p. 187·5–188·5°. Spar. sol. EtOH. $[\alpha]_D^{15}$ + 301° in $CHCl_3$.
Methiodide : m.p. 218–21°.

Bruchhausen, Stippler, *Chem. Abstracts*, 1927, **21**, 1963.
Sawai, *Chem. Abstracts*, 1929, **23**, 3230.
Späth, Holter, *Ber.*, 1926, **59**, 2800.

Isocorydaline.
dl-Corydaline, *q.v.*

Isocorydine (*Corytuberine methyl ether*)



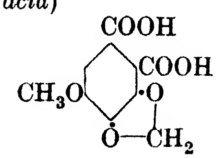
Probable structure

$C_{20}H_{23}O_4N$ MW, 341

Alkaloid occurring in *Dicentra canadensis*, and *Corydalis* species. Plates. M.p. 185°. Spar. sol. Et_2O. $[\alpha]_D^{20}$ + 195·3° in $CHCl_3$.
Methiodide : m.p. 213–14° decomp.

Gadamer, *Chem. Zentr.*, 1912, I, 149.
Späth, Berger, *Ber.*, 1931, **64**, 2038.
Gulland, Ross, Smellie, *J. Chem. Soc.*, 1931, 2885 (*Bibl.*).
Go, *Chem. Abstracts*, 1930, **24**, 620.

Isocotarnic Acid (5-*Methoxy*-3 : 4-*methylene-dioxy-phthalic acid*)

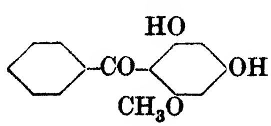


$C_{10}H_8O_7$ MW, 240

Anhydride: $C_{10}H_6O_6$. MW, 222. M.p. 196–7°.

Späth, Schmid, Sternberg, *Ber.*, 1934, **67**, 2095.

Isocotoin (2 : 4-*Dihydroxy*-6-*methoxybenzophenone*)

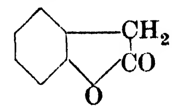


$C_{14}H_{12}O_4$ MW, 244

Yellow needles from ligroin. M.p. 162°. Sol. H_2O. Mod. sol. ligroin. $FeCl_3 \longrightarrow$ reddish-brown col.
2-p-*Toluenesulphonyl* : m.p. 146°.
4-p-*Toluenesulphonyl* : m.p. 109°.
2 : 4-*Di*-p-*toluenesulphonyl* : m.p. 137°.

Karrer, Leichenstein, *Helv. Chim. Acta*, 1928, **11**, 789.

Isocoumaranone (*Lactone of* o-*hydroxy-phenylacetic acid, 2-ketocoumaran*)

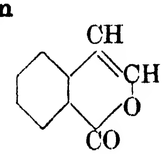


$C_8H_6O_2$ MW, 134

(i) Labile. M.p. 28° (28·5°). (ii) Stable. M.p. 49°. B.p. 245–9°. D_4^{14} 1·2236. n_D^{14} 1·555.

Auwers, *Ber.*, 1919, **52**, 129.

Isocoumarin



$C_9H_6O_2$ MW, 146

Plates from C_6H_6. M.p. 47° (46°). B.p. 285–6°/719 mm. Sol. EtOH, Et_2O, C_6H_6, CS_2. Volatile in steam.

Gabriel, *Ber.*, 1903, **36**, 573.

Isocreosol.
See under Homocatechol.

Isocrotonic Acid (2-*Methylacrylic acid, ethylideneacetic acid*, β-*crotonic acid*, 1-*propylene*-1-*carboxylic acid, allocrotonic acid*, cis-*crotonic acid*)

$$\begin{array}{l} CH{\cdot}CH_3 \\ \| \\ CH{\cdot}COOH \end{array}$$

$C_4H_6O_2$ MW, 86

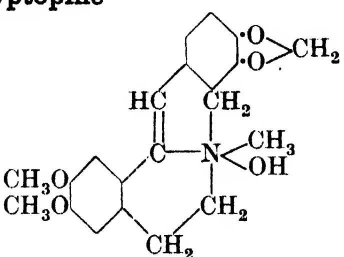
Needles or prisms from pet. ether. M.p. 15·5° (14·4–14·6°). B.p. 169°, 78·5°/20 mm., 74°/15 mm. Sol. H_2O. D_4^{15} 1·0312. n_D^{14} 1·4483. Sol. in H_2O or CS_2 in sunlight, or heat to 180° $\longrightarrow$ crotonic acid. HI $\longrightarrow$ 2-iodobutyric acid. Cl $\longrightarrow$ 1 : 2-dichlorobutyric acid. Br $\longrightarrow$ 1 : 2-dibromobutyric acid. KOH fusion $\longrightarrow$ acetic acid.
Me ester : $C_5H_8O_2$. MW, 100. B.p. 119°.
Et ester : $C_6H_{10}O_2$. MW, 114. B.p. 136°, 125·5–126°/749 mm. (129–133°/742 mm.). D_4^{20} 0·9182. n_D^{20} 1·42423.
Amide : C_4H_7ON. MW, 85. M.p. 102°.

Nitrile: C_4H_5N. MW, 67. B.p. 107·4°/757 mm. D_4^{15} 0·8289. n_D^{15} 1·42065.

Heim, *Chem. Abstracts*, 1934, **28**, 2328.
Auwers, *Ann.*, 1923, **432**, 46.
Bruylants, *Chem. Abstracts*, 1929, **23**, 4443.
Kaufler, *Monatsh.*, 1929, **53**, **54**, 119.
Heine, *Chem. Abstracts*, 1931, **25**, 5663.

Isocrotonyl bromide.
See 1-Bromoisobutylene.

Isocryptopine



$C_{21}H_{23}O_5N$ MW, 369

Only occurs in form of salts.
Chloride: decomp. at 223°.
Iodide: m.p. about 245–7° decomp.
Monosulphate: m.p. 215–20° decomp.
Disulphate: decomp. at 250°.

Perkin, *J. Chem. Soc.*, 1916, **109**, 883.

Iso-ψ-cumenol.
See 6-Hydroxy-ψ-cumene.

Isocusparine

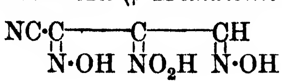
$C_{19}H_{17}O_4N$ MW, 323

M.p. 194°.

Troeger, Mueller, *Chem. Abstracts*, 1915, **9**, 2079.

Isocyanic Acid.
See Cyanic Acid.

Isocyanilic Acid (β-*Methazonic anhydride*)

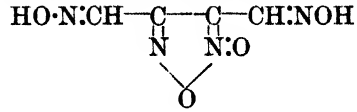


$C_4H_4O_4N_4$ MW, 172

Prisms. M.p. 170–2° (sealed tube). Sol. hot H_2O. Explosive.
Diacetyl deriv.: needles from EtOH. M.p. 134°.
Dibenzoyl deriv.: needles from EtOH. M.p. 181° decomp.

Wieland, Frank, Kitasato, *Ann.*, 1929, **475**, 45.
Wieland, *Ann.*, 1925, **444**, 19.

β-Isocyanilic Acid (α-*Methazonic anhydride*)



$C_4H_4O_4N_4$ MW, 172

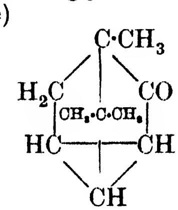
Leaflets. M.p. 119°. Spar. sol. H_2O.
Dibenzoyl deriv.: m.p. 155°.

Wieland, Frank, Kitasato, *Ann.*, 1929, **475**, 51.

Isocyanuric Acid.
See Cyanuric Acid.

Isocyclene.
See Isobornylene.

Isocyclenone (Note: this compound has previously been wrongly named "camphenone" in the literature)



$C_{10}H_{14}O$ MW, 150

Cryst. from pet. ether. M.p. 166–8° (168–70°). B.p. 205–7°. Sol. ord. org. solvents.
Oxime: m.p. 132°.
Hydrazone: m.p. about 45°.
Semicarbazone: m.p. 243–4°.

Bredt, Holz, *J. prakt. Chem.*, 1917, **95**, 149.
Nametkin, *Ber.*, 1926, **59**, 368 (*Bibl.*).

Isocysteic Acid (2-*Aminopropionic acid*-1-*sulphonic acid*, 2-*amino*-1-*sulphopropionic acid*, 1-*sulpho*-β-*alanine*)

SO_3H
$H_2N·CH_2·CH·COOH$

$C_3H_7O_5NS$ MW, 169

d-.
Decomp. at 266°. $[\alpha]_D$ − 8·66°.

dl-.
Cryst. from hot H_2O. Decomp. at 272–4°. Spar. sol. H_2O.

Gabriel, *Ber.*, 1905, **38**, 642.

Isocysteine (1-*Mercapto*-2-*aminopropionic acid*)

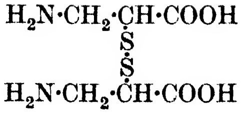
$H_2N·CH_2·CH(SH)·COOH$

$C_3H_7O_2NS$ MW, 121

B,HCl: cryst. from hot EtOH. M.p. 141°.

Gabriel, *Ber.*, 1905, **38**, 637.

Isocystine

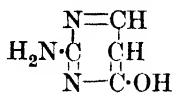


$C_6H_{12}O_4N_2S_2$ MW, 240

Cryst. M.p. 180–5° decomp.
B,HI : m.p. 189° decomp.

Gabriel, *Ber.*, 1905, **38**, 640.

Isocytosine (4-*Hydroxy*-2-*aminopyrimidine*)



$C_4H_5ON_3$ MW, 111

Prisms from H_2O. M.p. 280° decomp.
Me ether: $C_5H_7ON_3$. MW, 125. Prisms from H_2O. M.p. 125°.
d-*Glucoside* : m.p. 166° decomp. $[\alpha]_D^{24}$ — 72·6°. *Tetra-acetyl deriv.* : m.p. 131–2°. $[\alpha]_D^{13}$ — 17·7° in MeOH.

Hilbert, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 1156.
Hahn, Laves, Schäfer, *Zeitschrift für Biologie*, 1926, **84**, 411.

Isodecylenic Acid (2-*Nonene*-9-*carboxylic acid*)

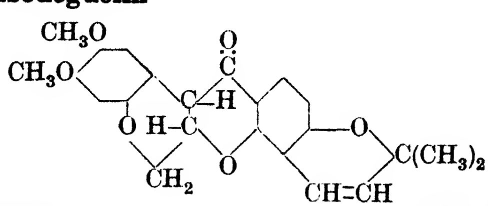
$CH_3·CH:CH·[CH_2]_6·COOH$

$C_{10}H_{18}O_2$ MW, 170

B.p. 155–7°/14 mm. D^{15} 0·930.
Me ester: $C_{11}H_{20}O_2$. MW, 184. B.p. 121–3°/20 mm. D^{15} 0·896.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 187.

Isodeguelin

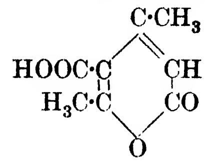


$C_{23}H_{22}O_6$ MW, 394

Occurs in seeds of *Tephrosia Vogelii*, Hook. Needles or plates. M.p. 168°.
Oxime : m.p. 233–4°.

Merz, Schmidt, *Chem. Zentr.*, 1935, I, 2027.

Isodehydracetic Acid (4 : 6 - *Dimethyl - coumalic acid, carbacetoacetic acid*)

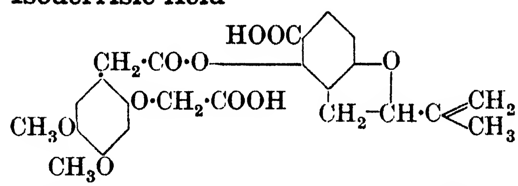


$C_8H_8O_4$ MW, 168

Needles or plates from H_2O, prisms from EtOH. M.p. 155°. Sol. EtOH, Et_2O, hot H_2O. Sublimes. $k = 5·2 \times 10^{-3}$ at 25°.
Me ester : $C_9H_{10}O_4$. MW, 182. Needles from EtOH.Aq. or Et_2O. M.p. 67–67·5°. B.p. 188°/30 mm., 167°/14 mm.
Et ester: $C_{10}H_{12}O_4$. MW, 196. M.p. 17–18°. (17·5–18·5°, 24–5°). B.p. 285° decomp. (290–5°), 191°/35 mm., 185°/25 mm., 177°/16 mm., 166°/12 mm. D_4^{20} 1·1673.

Buchner, Schröder, *Ber.*, 1902, **35**, 790.
Nieme, Pechmann, *Ann.*, 1891, **261**, 202.
Anschütz, Bendix, Kerp, *Ann.*, 1890, **259**, 155.

Isoderrisic Acid



$C_{23}H_{24}O_8$ MW, 428

Cryst. from EtOH.Aq. M.p. 156°.
Et ester : $C_{25}H_{28}O_8$. MW, 456. Cryst. from EtOH.Aq. M.p. 128°.

Laforge, Haller, Smith, *J. Am. Chem. Soc.*, 1931, **53**, 4407.

Isoderritol

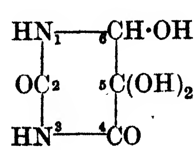
$C_{21}H_{22}O_6$ MW, 370

Yellow leaflets. M.p. 148°. $FeCl_3 \longrightarrow$ bluish-green col.

Takai, Miyajima, Ono, *Ber.*, 1932, **65**, 287.

Isodiallyl.
Dipropenyl, *q.v.*

Isodialuric Acid (5 : 5 : 6-*Trihydroxy*-5 : 6-*dihydrouracil*)



$C_4H_6O_5N_2$ (+ H_2O) MW, 162 (180)

Sol. H_2O, Me_2CO. Spar. sol. EtOH, Et_2O. Insol. ligroin.

Diacetyl deriv.: decomp. at 118°.

5-Me ether: $C_5H_8O_5N_2$. MW, 176. Decomp. at 215°.

Di-Me ether: $C_6H_{10}O_5N_2$. MW, 190. Decomp. at 215°.

5-Et ether: $C_6H_{10}O_5N_2$. MW, 190. Decomp. at 210° (160° anhyd.).

Di-Et ether: $C_8H_{14}O_5N_2$. MW, 218. Decomp. at 210°.

Biltz, Paetzold, *Ann.*, 1927, **452**, 75.

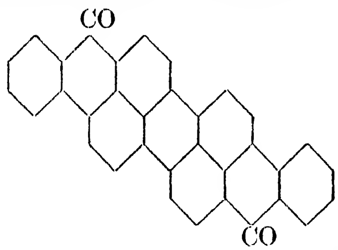
Isodianthranyl

$C_{28}H_{18}$ MW, 354

Pale yellow cryst. from AcOH. M.p. 312°.

Barnett, Goodway, *J. Chem. Soc.*, 1929, 814 (*Bibl.*).

Isodibenzanthrone (*Isoviolanthrone*)



$C_{34}H_{16}O_2$ MW, 456

Dark violet powder. Sol. $PhNO_2$ ⟶ reddish-violet sol. with brown fluor. Spar. sol. ord. org. solvents. H_2SO_4 ⟶ green col.

Sharvin, Soborovskii, *Chem. Abstracts*, 1929, **23**, 4695.

Lüttringhaus, Neresheimer, *Ann.*, 1929, **473**, 259.

Isodibromosuccinic Acid.
See under 1 : 2-Dibromosuccinic Acid.

Isodibutylene.
See Trimethylpentene.

Isodichlorosuccinic Acid.
See under 1 : 2-Dichlorosuccinic Acid.

Isodidesyl.
See under Didesyl.

Iso-dill-apiol.
See Dill-apiol.

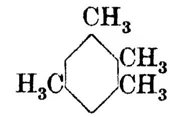
Isodiphenic Acid.
See Diphenyl-2 : 3′-dicarboxylic Acid.

Isodiphenylbenzene.
See 1 : 3-Diphenylbenzene.

Isodiphenyloxyethylamine.
See under α-Hydroxy-β-aminodibenzyl.

Isodiprene.
See *d*-Δ^3-Carene.

Isodurene (1 : 2 : 3 : 5-*Tetramethylbenzene, isodurol*)



$C_{10}H_{14}$ MW, 134

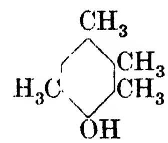
F.p. − 24·1°. B.p. 195–7°, 84·6–84·7°/17 mm. D_4^{20} 0·8906. n_D^{20} 1·5134. Heat of comb. C_v 10,358 cal./gm. Sulphonated completely in 30 seconds by 2 vols. conc. H_2SO_4 ⟶ *mono-sulphonic acid*: cryst. + $2H_2O$. M.p. 79°. Hyd. by 20% HCl at 60°.

Smith, Cass, *J. Am. Chem. Soc.*, 1932, **54**, 1609.

Smith, *Organic Syntheses*, 1931, XI, 66.

Eisenlohr, *Fortschritte der Chemie, Physik und physikalische Chemie*, 1925, **18**, 521.

Isodurenol (4-*Hydroxy*-1 : 2 : 3 : 5-*tetramethylbenzene, hydroxyisodurene,* 2 : 3 : 4 : 6-*tetramethylphenol*)



$C_{10}H_{14}O$ MW, 150

M.p. 79–81°. B.p. 230–50°. Br in AcOH ⟶ monobromo deriv., m.p. 135° (*acetyl*: m.p. 98°).

Et ether: $C_{12}H_{18}O$. MW, 178. B.p. 236–7°.

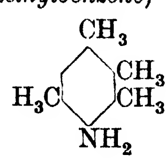
Benzoyl: m.p. 71–2°.

Phenylurethane: m.p. 178–9°.

Hey, *J. Chem. Soc.*, 1931, 1590.

Noelting, Baumann, *Ber.*, 1885, **18**, 1150.

Isoduridine (4-*Aminoisodurene,* 4-*amino*-1 : 2 : 3 : 5-*tetramethylbenzene*)



$C_{10}H_{15}N$ MW, 149

M.p. 23–4°. B.p. 255°.

N-*Acetyl*: 2 : 3 : 4 : 6-tetramethylacetanilide. $C_{12}H_{17}ON$. MW, 191. White needles. M.p. 217·5° (215°, 210–11°).

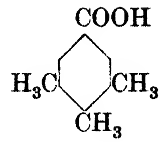
Picrate: m.p. 199–200° decomp.

See previous references.

Isodurol.
See Isodurene.

Isoduryl Aldehyde.
See 2 : 4 : 6-Trimethylbenzaldehyde.

α-Isodurylic Acid (3 : 4 : 5-*Trimethylbenzoic acid*)

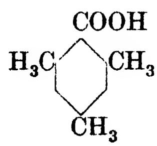


$C_{10}H_{12}O_2$ MW, 164

Needles from H_2O. M.p. 215–16°. Sol. EtOH, Et_2O. Spar. sol. boiling H_2O. Insol. cold H_2O. Volatile in steam.

Jacobsen, *Ber.*, 1882, **15**, 1855.
Jannasch, Weiler, *Ber.*, 1894, **27**, 3444.
Cf. Bielefeldt, *Ann.*, 1879, **198**, 380.

β-Isodurylic Acid (2 : 4 : 6-*Trimethylbenzoic acid*)



$C_{10}H_{12}O_2$ MW, 164

Prisms from ligroin. M.p. 155° (152–3°). Distils undecomp. Sol. EtOH, Et_2O, $CHCl_3$, Me_2CO. $k = 3{\cdot}75 \times 10^{-5}$ at 25°. Difficult to esterify by MeOH + HCl gas. Hot H_2SO_4, hot H_3PO_4, or HI at 140° ⟶ mesitylene.

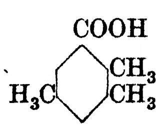
Me ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 241–2°/718 mm.

Amide: $C_{10}H_{13}ON$. MW, 163. Cryst. from C_6H_6. M.p. 187–8°.

Nitrile: 2 : 4 : 6-trimethylbenzonitrile. $C_{10}H_{11}N$. MW, 145. Plates from C_6H_6. M.p. 55°. B.p. 225–30°, 122–5°/16 mm. Stable to alkalis.

Fuson, Matuszeski, Gray, *J. Am. Chem. Soc.*, 1934, **56**, 2099.
Houben, Fischer, *Ber.*, 1933, **66**, 348; 1930, **63**, 2467.
Grignard, Bellet, Courtot, *Ann. chim.*, 1915, **4**, 46.
Bamford, Simonsen, *J. Chem. Soc.*, 1910, **97**, 1906.
Hantzsch, Lucas, *Ber.*, 1895, **28**, 748.

γ-Isodurylic Acid (2 : 3 : 5-*Trimethylbenzoic acid*)



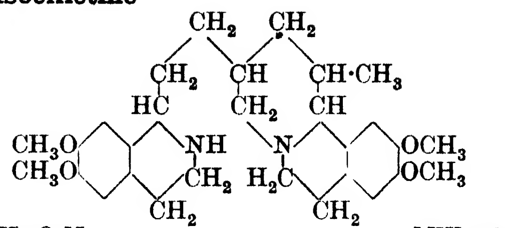
$C_{10}H_{12}O_2$ MW, 164

Plates from ligroin. M.p. 127°. Volatile in steam.

Jannasch, Weiler, *Ber.*, 1894, **27**, 3444.
Cf. Bielefeldt, *Ann.*, 1879, **198**, 380.

Isoelemicin.
See Elemicin.

Isoemetine



$C_{29}H_{40}O_4N_2$ MW, 480

Stereoisomer of emetine, from ipecacuanha. Needles + $1H_2O$ from Et_2O or AcOEt. M.p. 97–8° (softens at 92°). Sol. ord. org. solvents. Insol. pet. ether, H_2O. $[\alpha]_D$ − 47·4° in $CHCl_3$.

B,2HCl: needles from EtOH. M.p. 310° decomp.

B,2HBr: prisms + $4H_2O$ from H_2O. M.p. 215–20°.

B,2(COOH)₂: prisms + $5H_2O$ from H_2O. M.p. 92–5°.

N-*Benzoyl*: prisms from Me_2CO. M.p. 207–8°. $[\alpha]_D$ + 48·9° in $CHCl_3$.

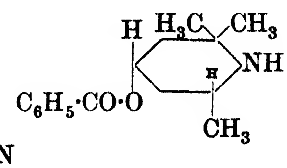
N-*Me*: plates from Et_2O. M.p. 152–3°. $[\alpha]_D$ − 50° in $CHCl_3$. *Methiodide*. Prisms. M.p. 290–2°. $[\alpha]_D$ + 92·6° in H_2O.

Pyman *et al.*, *J. Chem. Soc.*, 1927, 1068; 1918, **113**, 226; 1917, **111**, 439.
Cf. Karrer, *Ber.*, 1917, **50**, 582.

Isoephedrine.
See ψ-Ephedrine.

Isoerucic Acid.
See Brassidic Acid.

Iso-β-eucaine (O-*Benzoyl*-β-*vinyldiacetonalkamine*)



$C_{15}H_{21}O_2N$ MW, 247

The enantiomorphic and racemic forms of the free base are all uncrystallizable syrups.

d-.

B,HCl: needles from H_2O. M.p. 271–3°. $[\alpha]_{5461}$ + 17·0° in H_2O.

l-.

B,HCl: glistening needles. M.p. 271–3°. $[\alpha]_{5461}$ − 16·3° in H_2O.

dl-.

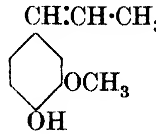
B,HCl: silky needles or plates from hot H_2O. M.p. 269–71°.

Picrate: rectangular leaflets from dil. EtOH. M.p. 256–8°.

N-*Benzoyl*: *ON*-dibenzoyl-β-vinyldiacetonalkamine. Flat prisms from Et_2O. M.p. 114–15°.

King, *J. Chem. Soc.*, 1924, **125**, 45.

Isoeugenol (4-*Hydroxy*-3-*methoxy*-1-*propenylbenzene*, 5-*propenylguaiacol*, 2-*methoxy*-4-*propenylphenol*)



$C_{10}H_{12}O_2$ MW, 164

Occurs in ylang-ylang and other essential oils. The technical product (obtained from eugenol) is a liq. mixture of *cis*- and *trans*-forms. B.p. 266°, 147·2°/20 mm., 140–2°/16 mm., 131·8°/10 mm., 118°/5 mm. D_4^{25} 1·080. n_D^{19} 1·5739. Sol. EtOH, Et_2O. Spar. sol. H_2O. Heat of comb. C_p 1278·1 Cal. 1 : 3 : 5-Trinitrobenzene ⟶ comp., red needles, m.p. 70°. With acid reagents on standing ⟶ di-isoeugenol, $C_{20}H_{24}O_4$, needles, m.p. 181° (*di-acetate*, m.p. 150–1°; *dibenzoate*, m.p. 161°; *di-Me ether*, m.p. 106°; *di-Et ether*, m.p. 130°). Ox. by various reagents ⟶ vanillin.

Hirao, *Chem. Abstracts*, 1933, **27**, 2944, 5731.

Haraszti, Széki, *Ann.*, 1933, **504**, 298.

Riedel, de Häen A.G., D.R.Ps., 545,913, 547,026, 548,282, (*Chem. Abstracts*, 1932, **26**, 3522).

Stockelbach, U.S.P., 1,792,716, (*Chem. Abstracts*, 1931, **25**, 2154).

Priester, *Chem. Abstracts*, 1931, **25**, 1632.

Cis:

B.p. 134–5°/13 mm., 115°/5 mm., 98°/1–2 mm. D_4^{20} 1·0851. n_D^{20} 1·5726. $FeCl_3$ ⟶ olive-green col.

4-*Me ether*: 3 : 4-dimethoxy-1-propenylbenzene, 4-propenylveratrol. $C_{11}H_{14}O_2$. MW, 178. B.p. 138–40°/12 mm. D_4^{20} 1·0521. n_D^{20} 1·5616.

Formyl: $C_{11}H_{12}O_3$. MW, 192. B.p. 155–60°/20 mm., 117–18°/1·5 mm. D^{15} 1·208. n_D^{20} 1·5552.

Acetyl: $C_{12}H_{14}O_3$. MW, 206. B.p. 160–2°/13 mm., 132°/5 mm. n_D^{20} 1·5418. *Dibromide*: m.p. 78–9°.

Benzoyl: m.p. 68° (59–61°).

Phenylurethane: m.p. 118°.

Trans:

M.p. 33–4°. B.p. 141–2°/13 mm. D_4^{20} 1·0852. n_D^{20} 1·5782. Stable in absence of air. $FeCl_3$ ⟶ greenish-yellow col.

4-*Me ether*: m.p. 16–17°. B.p. 143–4°/11 mm. D_4^{20} 1·0528. n_D^{20} 1·5692.

4-*Et ether*: 3-methoxy-4-ethoxy-1-propenylbenzene. $C_{12}H_{16}O_2$. MW, 192. Needles from EtOH.Aq. M.p. 64°.

4-*Benzyl ether*: $C_{17}H_{18}O_2$. MW, 254. Needles from EtOH. M.p. 58–9°.

4-[2 : 4-*Dinitrophenyl*] *ether*: m.p. 129–30°.

Acetyl: m.p. 79°. *Dibromide*: m.p. 132–3°.

Propionyl: $C_{13}H_{16}O_3$. MW, 220. B.p. 288–92°, 181–5°/40 mm.

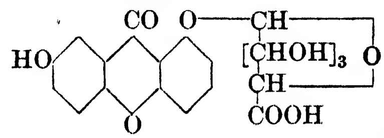
Benzoyl: m.p. 102–3° (106°).

p-*Nitrobenzoyl*: m.p. 123–4°.

Junge, *Chem. Abstracts*, 1933, **27**, 4530.

Boedecker, Volk, *Ber.*, 1931, **64**, 61.

Isoeuxanthic Acid

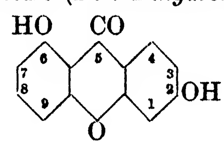


$C_{19}H_{16}O_{10}$ MW, 404

Yellow needles from MeOH. M.p. 157–9°. $[\alpha]_D$ − 87·4° in 70% EtOH. Hyd. by emulsin.

Neuberg, Neimann, *Z. physiol. Chem.*, 1905, **44**, 120.

Isoeuxanthone (2 : 6-*Dihydroxyxanthone*)



$C_{13}H_8O_4$ MW, 228

Yellow needles from EtOH.Aq. M.p. 245–6°. Sol. EtOH, Et_2O. Insol. H_2O. EtOH sol. + $FeCl_3$ ⟶ greyish-green col.

Diacetyl: m.p. 124–30°.

2-*Me ether*: $C_{14}H_{10}O_4$. MW, 242. Yellow leaflets. M.p. 143–4°. 6-*Acetyl*: m.p. 150°.

Di-Et ether: $C_{17}H_{16}O_4$. MW, 284. M.p. 185°.

Graebe, *Ann.*, 1889, **254**, 302.

Kostanecki, *Ber.*, 1894, **27**, 1991.

Meyer, Conzetti, *Ber.*, 1897, **30**, 971.

β-Isoeuxanthone (3 : 7-*Dihydroxyxanthone*).

Yellow needles from EtOH or Et_2O. M.p. above 330°. Sublimes. Sol. EtOH, Et_2O, alkalis.

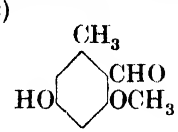
Diacetyl: needles from EtOH. M.p. 175°.

Di-Me ether: $C_{15}H_{12}O_4$. MW, 256. Needles from C_6H_6. M.p. 180°.

Baeyer, *Ann.*, 1910, **372**, 139.

Graebe, *Ann.*, 1889, **254**, 302.

Isoeverninaldehyde (*5-Hydroxy-3-methoxy-o-toluic aldehyde*)



$C_9H_{10}O_3$ MW, 166

Cryst. from 50% MeOH. M.p. 196°.

O-Acetyl: $C_{11}H_{12}O_4$. MW, 208. Prisms from pet. ether. M.p. 85°. Phototropic (colourless in dark, deep yellow in light).

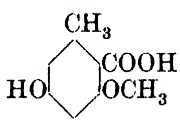
O-Carbomethoxyl: cryst. from pet. ether. M.p. 81°.

Me ether: 2-methoxy-6-methylanisaldehyde. $C_{10}H_{12}O_3$. MW, 180. Needles from ligroin. M.p. 62°.

Oxime: needles from ligroin. M.p. 127°.

Canter, Robertson, Waters, *J. Chem. Soc.*, 1933, 495.
Gattermann, *Ann.*, 1907, **357**, 346.

Isoeverninic Acid (*5-Hydroxy-3-methoxy-o-toluic acid, orsellinic acid 3-methyl ether*)



$C_9H_{10}O_4$ MW, 182

Prisms from AcOEt–ligroin. M.p. 175° decomp. Sol. EtOH, Me_2CO, AcOEt. Spar. sol. Et_2O, C_6H_6, ligroin. $FeCl_3$ ⟶ reddish-yellow col.

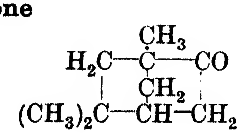
O-Carbomethoxyl: $C_{11}H_{12}O_6$. MW, 240. Needles from AcOEt–ligroin. M.p. 145°.

Me ester: $C_{10}H_{12}O_4$. MW, 196. Needles from C_6H_6. M.p. 112°. *O-Carbomethoxyl*: cryst. from pet. ether. M.p. 87°. *Anilide*: m.p. 149–50°.

See first reference above and also
Fischer, Hoesch, *Ann.*, 1912, **391**, 370.

Isofenchene.
See δ-Fenchene.

Isofenchone



$C_{10}H_{16}O$ MW, 152

d-.

Oil. B.p. 201°. $D^{18.5}$ 0·943. $n_D^{18.5}$ 1·4621. $[\alpha]_D$ + 90·35°.

Oxime: m.p. 82°.

Semicarbazone: m.p. 220·5°.

l-.

B.p. 200–1°. D_4^{20} 0·9427. n_D^{20} 1·4613. $[\alpha]_D$ − 6·68° in EtOH.

Oxime: m.p. 82°.

Semicarbazone: m.p. 220–1°.

dl-.

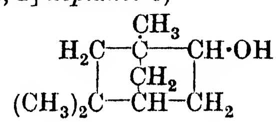
Hydrazone: m.p. 111–12°. *Acetyl deriv.*: needles. M.p. 193–4°.

Oxime: m.p. 133°.

Semicarbazone: m.p. 224–5°.

Komppa, Hasselström, *Ann.*, 1932, **496**, 167.
Komppa, Roschier, *Ann.*, 1929, **470**, 156.
Nametkin, *Chem. Zentr.*, 1916, II, 253.
Wallach, *Ann.*, 1908, **362**, 194, 200; **363**, 4.

Isofenchyl Alcohol (*1 : 3 : 3-Trimethyl-bicyclo-[1, 2, 2]-heptanol-6*)



$C_{10}H_{18}O$ MW, 154

l-.

M.p. 60·5–61°. B.p. 197–9°. $[\alpha]_D^{24}$ − 19·92° (− 27·04° in EtOH). D_4^{20} 0·8300.

Xanthogenic amide: $C_{10}H_{17}·O·CS·NH_2$. Needles from pet. ether. M.p. 69–70°. $[\alpha]_D$ − 37·8° in EtOH. Heat at 160–80° ⟶ δ-fenchene.

Acetate: b.p. 108–9°/20 mm. D_4^{20} 0·9639. n_D^{24} 1·4557. $[\alpha]_D^{24}$ − 34·95°.

Phenylurethane: m.p. 106–7°.

dl-.

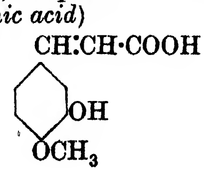
Prisms. M.p. 43°. B.p. 202–3°, 85°/10 mm. D_4^{20} 0·9543. n_D^{20} 1·4766.

Acetate: b.p. 106–8°/20 mm., 89–90°/10 mm. D_4^{20} 0·9684. n_D^{20} 1·4581.

Phenylurethane: m.p. 94–5°.

Komppa, Hasselström, *Chem. Abstracts*, 1927, **21**, 2679.
Nametkin *et al.*, *J. prakt. Chem.*, 1923, **106**, 33.
Qvist, *Ann.*, 1918, **417**, 312, 316.
Wallach, *Ann.*, 1908, **362**, 191, 200; **363**, 5.

Isoferulic Acid (*Caffeic acid 4-methyl ether, hesperetic acid, hesperetinic acid, 3-hydroxy-4-methoxycinnamic acid*)



$C_{10}H_{10}O_4$ MW, 194

Needles. M.p. 228° (222°). Very sol. EtOH, Et_2O. Spar. sol. cold H_2O, $CHCl_3$, C_6H_6. Insol. pet. ether.

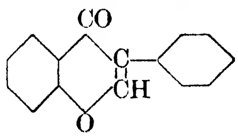
Me ester: *acetate*, $C_{13}H_{14}O_5$. MW, 250. Leaflets. M.p. 116°. *Benzoate*, $C_{18}H_{16}O_5$. MW, 312. Needles. M.p. 120°.

Acetyl: cryst. from dil. EtOH. M.p. 199°.

Carbomethoxyl: $C_{12}H_{12}O_6$. MW, 252. M.p. 223–4° decomp.

Robinson, Sugasawa, *J. Chem. Soc.*, 1931, 3169.
Pacsu, Stieber, *Ber.*, 1929, **62**, 2974.
Mauthner, *J. prakt. Chem.*, 1923, **106**, 333; 1922, **104**, 135.

Isoflavone (3-*Phenylchromone*)



$C_{15}H_{10}O_2$ MW, 222

Cryst. from pet. ether. M.p. 148°.

Joshi, Venkataraman, *J. Chem. Soc.*, 1934, 513.

Isoform.

See p-Iodoxyanisole.

Isogadoleic Acid

$C_{19}H_{37}\cdot COOH$

$C_{20}H_{38}O_2$ MW, 310

Acid of the oleic series, isomeric with gadoleic acid. Cryst. M.p. 65·5–66°. Sol. hot EtOH, Et_2O, $CHCl_3$, pet. ether. Spar. sol. Me_2CO.

K salt: amorphous powder, Spar. sol. H_2O, EtOH.

Hashimoto, *J. Am. Chem. Soc.*, 1925, **47**, 2325.

Isogalipine

$C_{18}H_{15}ON(OCH_3)_2$

$C_{20}H_{21}O_3N$ MW, 323

Isomer of the angostura alkaloid galipine. Silky needles. M.p. 165°.

B,HCl: plates + $5H_2O$. M.p. 234°.

B,HBr: prisms + $1H_2O$. M.p. 223°.

B,HI: prisms + $1H_2O$. M.p. 206°.

B_2,H_2PtCl_6: prisms + $4H_2O$. M.p. 198–9° decomp.

Troeger, Bönicke, *Arch. Pharm.*, 1920, **258**, 260 (*J. Chem. Soc.*, 1921, **120**, i, 121).

Isogentisin.

See under Gentisein.

Isogeranic Acid (2 : 6-*Dimethyl*-1 : 3-*heptadiene*-1-*carboxylic acid*)

$$CH_3\cdot\overset{CH_3}{C}H\cdot CH_2\cdot CH{:}CH\cdot\overset{CH_3}{C}{:}CH\cdot COOH$$

$C_{10}H_{16}O_2$ MW, 168

B.p. 151–4°/14 mm. D^{17} 0·959. n_D 1·49194. $KMnO_4 \longrightarrow$ isovaleric acid.

Tiemann, Tigges, *Ber.*, 1900, **33**, 564.

Isogeraniol (2 : 6-*Dimethyl*-1 : 5-*octadienol*-8 or 2-*methyl*-6-*methylene*-1-*octenol*-8)

$$H_2C{:}\overset{CH_3}{C}\cdot CH_2\cdot CH_2\cdot CH{:}\overset{CH_3}{C}\cdot CH_2\cdot CH_2OH$$

or

$$H_2C{:}\overset{CH_3}{C}\cdot CH_2\cdot CH_2\cdot CH_2\cdot\overset{CH_2}{C}\cdot CH_2\cdot CH_2OH$$

$C_{10}H_{18}O$ MW, 154

Oil with rose odour. B.p. 102–3°/9 mm. D^{20} 0·8787. n_D 1·47325.

Diphenylurethane: m.p. 73°.

Semmler, Schossberger, *Ber.*, 1911, **44**, 991.

Isogeraniolene.

See 2 : 6-Dimethylheptadiene-1 : 3.

Isogeronic Acid (3 : 3-*Dimethyl*-4-*aceto*-n-*valeric acid*)

$$CH_3\cdot CO\cdot CH_2\cdot\underset{CH_3}{\overset{CH_3}{C}}\cdot CH_2\cdot CH_2\cdot COOH$$

$C_9H_{16}O_3$ MW, 172

Oil. B.p. 162–7°/10 mm. Sol. H_2O, EtOH, Et_2O.

Semicarbazone: m.p. 198° (193–5°).

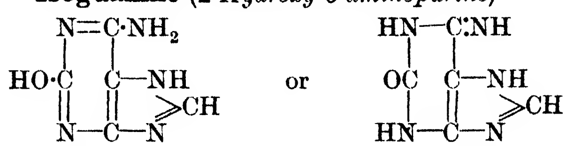
2 : 4-*Dinitrophenylhydrazone*: m.p. 140–1°.

Wallach, *Ann.*, 1902, **324**, 109.
Tiemann, *Ber.*, 1900, **33**, 3707.
Strain, *J. Biol. Chem.*, 1933, **102**, 146.

Isoglutamine.

See under Glutamic Acid.

Isoguanine (2-*Hydroxy*-6-*aminopurine*)



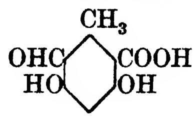
$C_5H_5ON_5$ MW, 151

The aglucone of crotonoside from *Croton tiglium*, Linn., in which it occurs with *d*-ribose. Amorphous powder. Carbonises above 250°. Does not form xanthine with HNO_3 nor guanidine with HCl + $KClO_3$. Couples with diazonium salts.

B,HCl : decomp. 250°.
B,HBr : decomp. 214°.
B_2,H_2SO_4 : prisms + $1H_2O$ from dil. H_2SO_4. Not dehydrated at 130° in vacuo. M.p. 230–50° decomp.
Picrate : micro-cryst. Decomp. above 260°.

Cherbuliez, Bernhard, *Helv. Chim. Acta*, 1932, **15**, 464.

Isohæmatommic Acid (3 : 5-*Dihydroxy*-6-*aldehydo*-o-*toluic acid*, 6-*aldehydo-orsellinic acid*)

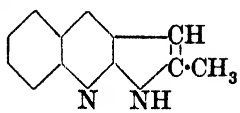


$C_9H_8O_5$ MW, 196

Needles from EtOH.Aq. M.p. 224–5° decomp.
Et ester : $C_{11}H_{12}O_5$. MW, 224. Needles from EtOH.Aq. M.p. 94°. Sublimes in vacuo. $FeCl_3$ on aq. sol. ⟶ reddish-brown col. $FeCl_3$ on EtOH sol. ⟶ purple col.

St. Pfau, *Helv. Chim. Acta*, 1933, **16**, 283.

Isoharman



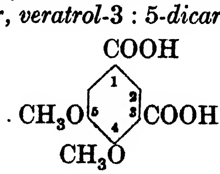
$C_{12}H_{10}N_2$ MW, 182

Leaflets from MeOH. M.p. 213–15°. Sublimes without decomp. H_2O sol. does not fluoresce. Sol. conc. H_2SO_4 with bluish-violet fluor.
Picrate : needles. M.p. 253° decomp. (darkens at 240°).

Perkin, Robinson, *J. Chem. Soc.*, 1913, **103**, 1973.

Isohelenin
See Isoalantolactone.

Isohemipinic Acid (4 : 5-*Dimethoxyisophthalic acid*, *catechol*-3 : 5-*dicarboxylic acid dimethyl ether*, *veratrol*-3 : 5-*dicarboxylic acid*)



$C_{10}H_{10}O_6$ MW, 226

Needles from H_2O. M.p. 245–6°. Sol. EtOH, Et_2O. Mod. sol. hot H_2O.
1-*Me ester* : $C_{11}H_{12}O_6$. MW, 240. Needles. M.p. 167°.

Tiemann, Mendelsohn, *Ber.*, 1877, **10**, 398.

Isoheptane (2-*Methylhexane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$

C_7H_{16} MW, 100

M.p. − 119·1°. B.p. 90°. D_4^{20} 0·6789. n_D^{20} 1·3851.

Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, **51**, 1483.
Chavanne, Simon, *Compt. rend.*, 1919, **168**, 1325.
Tafel, *Ber.*, 1909, **42**, 3146.

Isoheptanol-2.
See 2-Methylhexanol-2.

1 : 2-Isoheptene.
See 5-Methyl-1-hexene.

1-Isoheptenic Acid (2-*Isobutylacrylic acid*, 4-*methyl*-1-*hexenic acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH{:}CH{\cdot}COOH$

$C_7H_{12}O_2$ MW, 128

M.p. 16·5°. B.p. 226–7°, 123–4°/15 mm. D_4^{20} 0·942. n_D^{17} 1·4425. Volatile in steam.
Et ester : $C_9H_{16}O_2$. MW, 156. B.p. 190°. D_4^{20} 0·889.
p-*Bromophenacyl ester* : m.p. 87–8°.
Chloride : $C_7H_{11}OCl$. MW, 146·5. B.p. 64°/12 mm. D_4^{20} 0·991.
Amide : $C_7H_{13}ON$. MW, 127. M.p. 127–8°.
Nitrile : $C_7H_{11}N$. MW, 109. B.p. 65°/13 mm. D_4^{20} 0·823.

Auwers, *et al.*, *Ann.*, 1923, **432**, 46, 79.

2-Isoheptenic Acid (4-*Methyl*-2-*hexenic acid*, 4-*methylhydrosorbic acid*, 3-*isobutylidenepropionic acid*)

$(CH_3)_2CH{\cdot}CH{:}CH{\cdot}CH_2{\cdot}COOH$

$C_7H_{12}O_2$ MW, 128

B.p. 216–17°. Sol. 110 parts cold H_2O.
Nitrile : $C_7H_{11}N$. MW, 109. B.p. 175°, 80°/18 mm.

Strassmann, *Monatsh.*, 1897, **18**, 726.
Fittig, Feurer, *Ann.*, 1894, **283**, 129.
Knoevenagel, D.R.P., 156,560, (*Chem. Zentr.*, 1905, I, 56).

3-Isoheptenic Acid (4-*Methyl*-3-*hexenic acid*, 3-*isopropylidenebutyric acid*)

$(CH_3)_2C{:}CH{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_7H_{12}O_2$ MW, 128

B.p. 216–18°, 113–15°/12 mm. D_0^0 0·9864. n_D 1·45041.
Et ester : $C_9H_{16}O_2$. MW, 156. B.p. 182–5°. D^0 0·928.

Amide : $C_7H_{13}ON$. MW, 127. Cryst. M.p. 85–6°.

Komppa, Rohrmann, *Ann.*, 1934, **509**, 265.
Ssolonina, *Chem. Zentr.*, 1902, I, 629.
Léser, *Compt. rend.*, 1899, **128**, 372.

Isoheptoic Acid.
See Isoamylacetic Acid.

Isoheptyl Alcohol (*5-Methylhexanol-*1, *5-methyl-*n*-hexyl alcohol*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$

$C_7H_{16}O$ MW, 116

B.p. 170·5°/755 mm. D^{25} 0·8192. Very spar. sol. H_2O.
Phenylurethane : m.p. 82·5°.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 443.

Isoheptylic Acid.
See Isoamylacetic Acid.

Isohexacosane (*Cerane*)

$C_{26}H_{54}$ MW, 366

Scales from Et_2O. M.p. 61°. B.p. 207°/1 mm.

Levene, West, Scheer, *J. Biol. Chem.*, 1915, **20**, 532.

Isohexane (*2-Methylpentane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$

C_6H_{14} MW, 86

B.p. 62·3–63·3° (61°). D^{20} 0·6608, D_4^{20} 0·6599. n_D^{20} 1·3735.

Kishner, *Chem. Zentr.*, 1912, I, 2026.
Chavanne, Simon, *Compt. rend.*, 1919, **168**, 1324.

Isohexene.
See 4-Methyl-1-pentene, 2-Methyl-2-pentene, *and* 4-Methyl-2-pentene.

Isohexenic Acid.
See 2-Isopropylacrylic Acid.

Isohexylacetic Acid.
See 5-Methyl-*n*-heptylic Acid.

Isohexyl Alcohol (*4-Methyl-*n*-amyl alcohol, 4-methylpentanol-*1, *isoamylcarbinol*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$

$C_6H_{14}O$ MW, 102

B.p. 152–3°. D_4^{25} 0·811. n_D^{25} 1·4134.
Acetate : b.p. 159°/155 mm.
3 : 5-*Dinitrobenzoate* : m.p. 70°.
Phenylurethane : m.p. 48°.

Norris, Cortese, *J. Am. Chem. Soc.*, 1927, **49**, 2644.
Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 450.

Isohexylamine (*5-Aminoisohexane, 4-methyl-*n*-amylamine, 5-amino-2-methyl-*n*-pentane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2NH_2$

$C_6H_{15}N$ MW, 101

Strongly basic liq. B.p. 125° (122–3°). D_4^{25} 0·758. Spar. sol. H_2O. Absorbs CO_2.
B,HCl : m.p. 220°.
B_2,H_2PtCl_6 : decomp. at 200°.
$B,HgCl_2$: m.p. 185–7°.
$B_2,(COOH)_2$: needles. M.p. 166°.
Picrate : m.p. 123–5°.

Curtius, *et al.*, *J. prakt. Chem.*, 1930, **125**, 164.
Sabatier, Senderens, *Compt. rend.*, 1905, **140**, 484.

Isohexylmalonic Acid (*2-Methylhexane-6 : 6-dicarboxylic acid*)

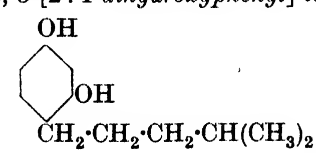
$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{<}^{COOH}_{COOH}$$

$C_9H_{16}O_4$ MW, 188

Cryst. from C_6H_6. M.p. 86·5°. Mod. sol. H_2O. Insol. pet. ether.
Di-Et ester : $C_{13}H_{24}O_4$. MW, 244. B.p. 137°/11 mm.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 451.

4-Isohexylresorcinol (*2 : 4-Dihydroxyisohexylbenzene, 5-[2 : 4-dihydroxyphenyl]-isohexane*)



$C_{12}H_{18}O_2$ MW, 194

M.p. 70–71·5°. B.p. 182–3°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.
Cox, *Rec. trav. chim.*, 1931, **50**, 848.

Isohexylsuccinic Acid (*2-Methylheptane-6 : 7-dicarboxylic acid*)

$$(CH_3)_2CH{\cdot}[CH_2]_3{\cdot}\underset{|}{C}H{\cdot}COOH \atop \qquad\qquad CH_2{\cdot}COOH$$

$C_{10}H_{18}O_4$ MW, 202

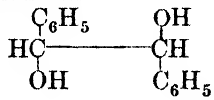
Needles from Et_2O-pet. ether. M.p. 73–4°. Sol. H_2O, EtOH, Et_2O. Insol. ligroin, pet. ether.

Longinow, *Chem. Zentr.*, 1916, I, 1054.

Isohomocatechol.
See 2 : 3-Dihydroxytoluene.

Isohomoveratrol.
See under 2 : 3-Dihydroxytoluene.

Isohydrobenzoin



$C_{14}H_{14}O_2$ MW, 214

d-.

Fine needles from H_2O. M.p. 146°. Spar. sol. boiling H_2O. $[\alpha]_D + 92°$ in EtOH.

Acetone deriv.: prisms from Et_2O. M.p. 48°. $[\alpha]_D + 65{\cdot}2°$ in EtOH.

l-.

Leaflets from C_6H_6. M.p. 146°. Very sol. MeOH, EtOH, Me_2CO, AcOEt, hot $CHCl_3$. Mod. sol. hot C_6H_6, Et_2O. $[\alpha]_D - 92°$, $[\alpha]_{5461} - 111°$, in EtOH.

Diacetyl: prisms from EtOH. M.p. 109–10°. $[\alpha]_D + 26{\cdot}9°$ in EtOH.

Mono-Et ether: $C_{16}H_{18}O_2$. MW, 242. Needles. M.p. 45–50°. $[\alpha]_D - 34{\cdot}6°$ in EtOH.

Benzylidene deriv.: needles from EtOH. M.p. 70·5°. $[\alpha]_D - 27{\cdot}6°$ in EtOH.

dl-.

M.p. 119°.

Benzylidene deriv.: m.p. 84°.

Read, Campbell, Barker, *J. Chem. Soc.*, 1929, 2305.
Read, Campbell, *J. Chem. Soc.*, 1930, 2383.

Isohydrosorbic Acid.
See 2-Propylacrylic Acid.

Isohydroxyaminodibenzyl.
See under α-Hydroxy-β-aminodibenzyl.

Isohydroxycuminic Acid.
See 2-Hydroxycuminic Acid.

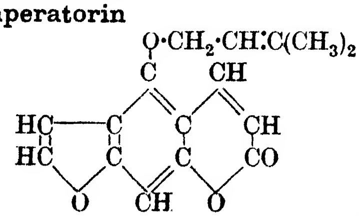
Isohyenanchin

$C_{15}H_{18}O_7$ MW, 310

Constituent of *Hyenanche globosa*, Lamb (*Toxicodendron capense*, Thunb.). Needles from H_2O. M.p. 299° decomp. (brown at 245°). Spar. sol. H_2O, EtOH, AcOEt. $[\alpha]_D^{15} - 61{\cdot}3°$ in H_2O. Reduces Fehling's and $NH_3.AgNO_3$. Non-toxic.

Henry, *J. Chem. Soc.*, 1920, **117**, 1622.

Isoimperatorin

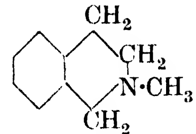


$C_{16}H_{14}O_4$ MW 270

Constituent of fish-poison plant *Imperatoria ostruthium*. Cryst. from C_6H_6. M.p. 109°. Optically inactive. $H_2O_2 + KOH$ in MeOH ⟶ furan-2 : 3-dicarboxylic acid. $CH_3{\cdot}COOH + H_2SO_4$ ⟶ a phenol, m.p. 277° decomp. which with diazomethane ⟶ bergaptene, etc.

Späth, Kahovec, *Ber.*, 1933, **66**, 1116.

Isokairoline (N-*Methyl*-1 : 2 : 3 : 4-*tetrahydro-isoquinoline*)



$C_{10}H_{13}N$ MW, 147

Oil. B.p. 212°. Odour strongly resembling NH_3. Anæsthetic.

B,HCl: m.p. 228°.

B_2,H_2PtCl_6: decomp. at 209°.

Picrate: yellow cryst. Decomp. at 148–50°.

Methiodide: cryst. from EtOH. M.p. 189°. Sol. H_2O.

Ethiodide: cryst. from EtOH. M.p. 132–3°.

Methoaurichloride: yellow plates from H_2O. M.p. 184–5°.

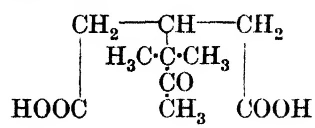
Methochloroplatinate: orange-yellow needles. M.p. 228°.

Ferranti, *Gazz. chim. ital.*, 1903, **23**, ii, 410.
Wedekind, Oechslen, *Ber.*, 1901, **34**, 3987.

Isokessyl Alcohol.
See under Kessyl Alcohol.

Isokessyl Ketone.
See under Kessyl Ketone.

Isoketocamphoric Acid



$C_{10}H_{16}O_5$ MW, 216

Prisms from H_2O, needles from $CHCl_3$–ligroin. M.p. 130°. Sol. H_2O, EtOH. Very spar. sol. Et_2O. CrO_3 ⟶ isocamphoronic acid.

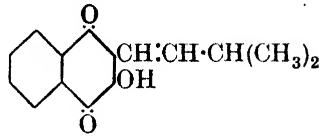
Lactone: $C_{10}H_{14}O_4$. MW, 198. Needles from AcOEt–ligroin. M.p. 180–5°.

Oxime: needles from H_2O. M.p. 185–6°.

Semicarbazone: prisms from H_2O. M.p. 187°.

Bredt-Savelsberg, Buchkremer, *Ber.*, 1931, **64**, 605.
Tiemann, *Ber.*, 1896, **29**, 3017, 3024.

Isolapachol (3 - *Hydroxy* - 2 - [γ - *methyl* - α - *butenyl*]-α-*naphthoquinone*)



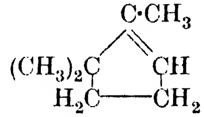
$C_{15}H_{14}O_3$ MW, 242

Brick-red needles. M.p. 120°. Very sol. ord. org. solvents. Sol. KOH.Aq. ⟶ intense purple sol.

Acetyl: yellow needles from EtOH. M.p. 74°.

Hooker, *J. Chem. Soc.*, 1896, **69**, 1362.

Isolaurolene (1 : 5 : 5-*Trimethylcyclopentene*)



C_8H_{14} MW, 110

B.p. 109°/754 mm. D_0^{20} 0·7824. n_D^{20} 1·4324. Reduces Tollens' reagent on warming.

Kondakov, Schindelmeizer, *Chem. Abstracts*, 1912, **6**, 481.
Kishner, *Chem. Zentr.*, 1911, I, 544.

Isolaurolenic Acid.
β-Campholytic Acid, *q.v.*

Isolauronolic Acid.
See β-Campholytic Acid.

Isoleucine (1-*Amino-2-methyl*-n-*valeric acid*)

$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}CH(NH_2){\cdot}COOH$

$C_6H_{13}O_2N$ MW, 131

d-.

M.p. 283–4° decomp. $[\alpha]_D^{20}$ − 10·7° in H_2O, − 41·6° in 20% HCl.

N-*Formyl*: m.p. 156°. $[\alpha]_D^{20}$ − 26·8° in EtOH.

N-*Chloroacetyl*: m.p. 72–4°. $[\alpha]_D^{20}$ − 26·1°.

N-*Benzenesulphonyl*: m.p. 153–4°. $[\alpha]_D^{20}$ + 14·3° in *N*-NaOH, − 25·5° in EtOH.

Phenylisocyanate deriv.: m.p. 119–21°. $[\alpha]_D^{20}$ − 15·0° in NaOH, − 36·3° in EtOH.

α-*Naphthylisocyanate deriv.*: m.p. 177–8°. $[\alpha]_D^{20}$ − 29·5° in EtOH.

d-" *Allo*-."

Leaflets. M.p. 274–5° decomp. Sol. 34 parts H_2O at 20°. $[\alpha]_D^{20}$ − 14·2° in H_2O, − 38·0° in 20% HCl.

N-*Formyl*: m.p. 126°. $[\alpha]_D^{20}$ − 25·2° in EtOH.

N-*Chloroacetyl*: oil.

N-*Benzenesulphonyl*: m.p. 147–8°. $[\alpha]_D^{20}$ − 30·7° in EtOH.

Phenylisocyanate deriv.: m.p. 151°. $[\alpha]_D^{20}$ − 16·8° in NaOH, − 30·6° in EtOH.

α-*Naphthylisocyanate deriv.*: m.p. 168°. $[\alpha]_D^{20}$ − 25·5° in EtOH.

l-.

Found in residues from beet sugar manufacture and as a hydrolytic product of albumen. Cryst. from 80% EtOH. M.p. 285–6° decomp. $[\alpha]_D^{20}$ + 10·7° in H_2O, + 40·8° in 20% HCl.

N-*Formyl*: m.p. 155°. $[\alpha]_D^{20}$ + 26·6° in EtOH.

N-*Chloroacetyl*: m.p. 71–3°. $[\alpha]_D^{30}$ + 26·0°.

N-*Benzenesulphonyl*: m.p. 153°. $[\alpha]_D^{20}$ −14·4° in *N*-NaOH, + 25·3° in EtOH.

Phenylisocyanate deriv.: m.p. 121°. $[\alpha]_D^{20}$ + 14·9° in NaOH, + 37·5° in EtOH.

α-*Naphthylisocyanate deriv.*: m.p. 178–9°. $[\alpha]_D^{20}$ + 30·1° in EtOH.

l-" *Allo*-."

M.p. 278° decomp. $[\alpha]_D^{20}$ + 14·0° in H_2O, + 38·1° in 20% HCl.

N-*Formyl*: m.p. 126°. $[\alpha]_D^{20}$ + 24·2° in EtOH.

N-*Chloroacetyl*: m.p. 80–6°. $[\alpha]_D^{20}$ + 19·1°.

N-*Benzenesulphonyl*: m.p. 147–8°. $[\alpha]_D^{20}$ + 30·7° in EtOH.

Phenylisocyanate deriv.: m.p. 151°. $[\alpha]_D^{20}$ + 16·9° in NaOH, + 30·8° in EtOH.

α-*Naphthylisocyanate deriv.*: m.p. 165–6°. $[\alpha]_D^{20}$ + 25·1° in EtOH.

dl-.

Cryst. from EtOH.Aq. M.p. 275° (sealed tube). Mod. sol. H_2O.

N-*Formyl*: m.p. 121°.

N-*Chloroacetyl*: m.p. 105–6°.

dl-" *Allo*-."

Et ester: $C_8H_{17}O_2N$. MW, 159. B.p. 85–8°/15 mm.

N-*Formyl*: m.p. 117–18°.

Abderhalden, *et al.*, *Ber.*, 1909, **42**, 3395; *Z. physiol. Chem.*, 1931, **195**, 121; **200**, 179; 1932, **206**, 116.

Isolinusinic Acid.
See Hexahydroxystearic Acid.

Isolongifolic Acid

$C_{14}H_{22}O_2$ MW, 222

Prismatic needles from AcOH. M.p. 136°. Mod. sol. ord. org. solvents. Insol. H_2O. $[\alpha]_{5461}$ − 12·7° in EtOH.

Me ester: $C_{15}H_{24}O_2$. MW, 236. Prisms from MeOH. M.p. 54–5°. $[\alpha]_{5461}$ + 5·94° in MeOH.

Anilide: m.p. 197°.

Bradfield, Francis, Simonsen, *J. Chem. Soc.*, 1934, 188.
Simonsen, *J. Chem. Soc.*, 1923, **123**, 2654.

Isolongifolic Aldehyde

$C_{14}H_{22}O$ MW, 206

B.p. 170°/35 mm.

Semicarbazone: needles from EtOH. M.p. 210°.

Simonsen, *J. Chem. Soc.*, 1923, **123**, 2655.

Isolongifolol

$C_{14}H_{24}O$ MW, 208

Needles from pet. ether. M.p. 112–14°.

Phenylurethane: needles from MeOH.Aq. M.p. 91–2°.

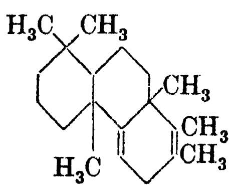
See previous reference.

Isolupetidine.
See under 2 : 6-Dimethylpiperidine.

Isomalic Acid.
See Hydroxymethyl-malonic Acid.

β-Isomalic Acid.
See Hydroxymethyl-malonic Acid.

Isomanoene

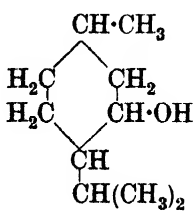


$C_{20}H_{32}$ MW, 272

Oil. B.p. 139–40°/0·2 mm. D_4^{15} 0·9519. n_D^{15} 1·5199. Se ⟶ 1 : 2 : 8-trimethylphenanthrene.

Hosking, Brandt, *Ber.*, 1935, **68**, 37.

Isomenthol (3-*Methyl*-6-*isopropylcyclohexanol*, p-*menthanol*-3)



$C_{10}H_{20}O$ MW, 156

d-.

M.p. 82·5° (85°). B.p. 218°, 96·2–96·8°/10 mm. $[\alpha]_D$ + 25·9°.

Acid phthalate: m.p. 107·5–108·5°.
p-*Nitrobenzoyl*: m.p. 54°. $[\alpha]_D$ + 24·9°.
3 : 5-*Dinitrobenzoyl*: m.p. 145°. $[\alpha]_D$ +26·5°.
Camphorsulphonate: m.p. 30–1°. $[\alpha]_D$ +35·4°.

l-.

M.p. 82·5°.
Camphorsulphonate: m.p. 33–4°.

dl-.

Needles. M.p. 53–4°. B.p. 218·5–218·6°, 97·4°/10·5 mm.

Acid phthalate: m.p. 117° (107–8°).
p-*Nitrobenzoyl*: m.p. 64·5°.
3 : 5-*Dinitrobenzoyl*: m.p. 130°.

Read, Grubb, Malcolm, *J. Chem. Soc.*, 1933, 170.
Zeitschel, Schmidt, *Ber.*, 1926, **59**, 2307.
See also Read, Grubb, *J. Chem. Soc.*, 1934, 313.

Isomenthone (3-*Methyl*-6-*isopropylcyclohexanone*)

$C_{10}H_{18}O$ MW, 154

Stereoisomer of methone.

d-.

F.p. about − 35°. B.p. 212°, 86–7°/12 mm. D_{15}^{15} 0·9057. n_D^{20} 1·45302. $[\alpha]_D^{100}$ + 95°.

Semicarbazone: m.p. 264°.

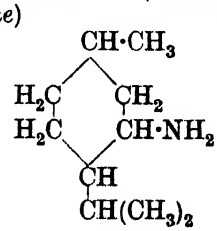
dl-.

B.p. 210°.

Oxime: (a) m.p. 99–100°. (b) M.p. 94–5°.
Semicarbazone: (a) m.p. 225°. (b) M.p. 177–8°.

Zeitschel, Schmidt, *Ber.*, 1926, **59**, 2307.
Read, Robertson, Cook, *J. Chem. Soc.*, 1927, 1281.
See also Rupe, Gassmann, *Helv. Chim. Acta*, 1934, **17**, 283.

Isomenthylamine (3-*Methyl*-6-*isopropylcyclohexylamine*)



$C_{10}H_{21}N$ MW, 155

d-.

B.p. 87°/13·5 mm. D_4^{20} 0·8632. n_D^{25} 1·4659. $[\alpha]_D^{25}$ + 28·96°.

N-*Formyl*: m.p. 45–6°.
N-*Acetyl*: m.p. 77–9°.
N-*Chloroacetyl*: m.p. 82°.
N-*Bromoacetyl*: m.p. 80°.
N-*Propionyl*: m.p. 83°.
N-*Isobutyryl*: m.p. 116°.
N-*Isovaleryl*: m.p. 82°.
N-*Benzoyl*: m.p. 97–8°.
N-2-*Naphthalenesulphonyl*: m.p. 80–1°.

l-.
N-*Benzoyl* : m.p. 121°.

Tutin, Kipping, *J. Chem. Soc.*, 1904, **85**, 74.
Read, Grubb, Malcolm, *J. Chem. Soc.*, 1933, 172.
Read, Storey, *J. Chem. Soc.*, 1930, 2761.

Isomethylgranatoline.
See under N-Methylgranatoline.
α-Isomethylheptenone.
See 6-Methyl-3-heptenone-2.
β-Isomethylheptenone.
See 2-Methyl-3-heptenone-6.
Isomethysticin.
See Methysticic Acid.
α-Isomorphine

$C_{17}H_{19}O_3N$ MW, 285

Needles from MeOH–AcOEt. M.p. 246–8°. Sol. MeOH, EtOH, hot H_2O. $[\alpha]_D^{25}$ − 164·3° in MeOH.
Methiodide : m.p. 276° decomp.

Schryver, Lees, *J. Chem. Soc.*, 1900, **77**, 1035; 1901, **79**, 567.
Emde, *Helv. Chim. Acta*, 1930, **13**, 1047.

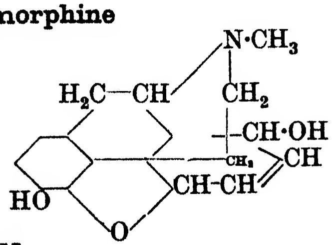
β-Isomorphine

$C_{17}H_{19}O_3N$ MW, 285

Cryst. + ½EtOH from EtOH. M.p. 182°. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O, ligroin. $[\alpha]_D^{17}$ − 216·2° in MeOH.
Methiodide : m.p. 250° decomp.

Schryver, Lees, *J. Chem. Soc.*, 1901, **79**, 569.
See also second reference above.

γ-Isomorphine



$C_{17}H_{19}O_3N$ MW, 285

M.p. 278–9° (in vacuo). $[\alpha]_D^{20}$ − 93·6° in MeOH.

Small, Lutz, *J. Am. Chem. Soc.*, 1934, **56**, 1928.
Emde, *Helv. Chim. Acta*, 1930, **13**, 1047.

Isomyristic Acid (11-*Methyltridecylic acid*)

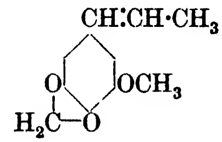
$(CH_3)_2CH{\cdot}[CH_2]_{10}{\cdot}COOH$

$C_{14}H_{28}O_2$ MW, 228

Cryst. from pet. ether. M.p. 50·5–51°.
Et ester : $C_{16}H_{32}O_2$. MW, 256. B.p. 140–2°/5 mm. n_D^{20} 1·4342.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3371.

Isomyristicin (3-*Methoxy*-4 : 5-*methylenedioxy*-1-*propenylbenzene*)

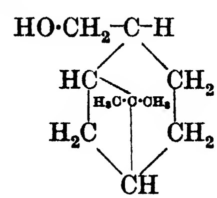


$C_{11}H_{12}O_3$ MW, 192

Needles or prisms from EtOH. M.p. 44–5°. B.p. 166°/18 mm. $n_D^{45.5}$ 1·5655.
Picrate : m.p. 86°.

Thoms, *Ber.*, 1903, **36**, 3447.
Scandola, *Atti accad. Lincei*, 1912, **21**, i, 53.

Isomyristyl Alcohol.
See 12-Methyltridecyl Alcohol.
Isomyristyl bromide.
See 12-Methyltridecyl bromide.
Isomyrtanol



$C_{10}H_{18}O$ MW, 154

d-.
B.p. 122°/20 mm., 113–113·8°/14 mm. D_0^0 0·9830. n_D^{22} 1·4896. $[\alpha]_D$ + 20·67° (+ 18·0°).
Acetyl : b.p. 132·5–133·5°/26 mm.
Acid phthalate : m.p. 124·5–125·5°.

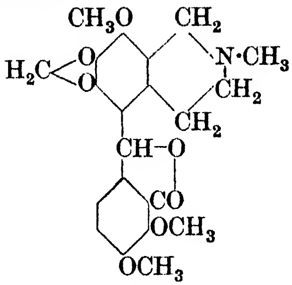
l-.
D_{20}^{20} 0·9803. n_D^{21} 1·4925. $[\alpha]_D$ − 24·48°.

dl-.
Acid phthalate : m.p. 126·5–127·5°.

Dupont, Zacharewicz, *Compt. rend.*, 1934, **199**, 365.

Isonaphthazarin.
See 2 : 3-Dihydroxy-α-naphthoquinone.

Isonarcotine

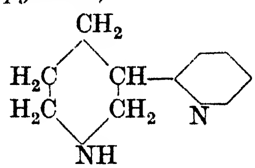


$C_{22}H_{23}O_7N$ MW, 413

M.p. 194°. Sol. EtOH, hot C_6H_6. Spar. sol. Et_2O. Insol. H_2O, ligroin.

Freund, Fleischer, *Ber.*, 1912, **45**, 1171.
Jones, Perkin, Robinson, *J. Chem. Soc.*, 1912, **101**, 257.

Isoneonicotine (3-[2-*Pyridyl*]-*piperidine*, 2-[3-*piperidyl*]-*pyridine*)

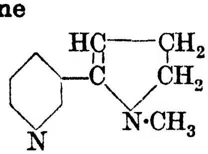


$C_{10}H_{14}N_2$ MW, 162

B.p. 282° decomp.
Picrate: m.p. 217–18°.

Smith, *J. Am. Chem. Soc.*, 1931, **53**, 281.

Isonicoteine

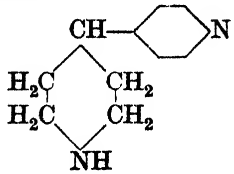


$C_{10}H_{12}N_2$ MW, 160

Occurs in Turkish tobacco. Oil. B.p. 293° decomp. D_4^{20} 1·0984. n_D^{20} 1·5749. Sol. ord. org. solvents. Spar. sol. H_2O, pet. ether.

Noga, *Chem. Zentr.*, 1915, I, 434.

Isonicotine (4-[4-*Pyridyl*]-*piperidine*, 4-[4-*piperidyl*]-*pyridine*)



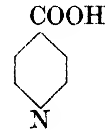
$C_{10}H_{14}N_2$ MW, 162

M.p. about 80°. B.p. 292°.

Picrate: m.p. 215–18° decomp.
N-*Nitroso*: m.p. 112°.

Smith, *J. Am. Chem. Soc.*, 1931, **53**, 282.

Isonicotinic Acid (*Pyridine*-4-*carboxylic acid*)



$C_6H_5O_2N$ MW, 123

Needles from H_2O. M.p. 315° (325–6°, sealed tube). Sublimes.

Me ester: $C_7H_7O_2N$. MW, 137. M.p. 8·5°. B.p. 207–9°, 104°/21 mm. *Methiodide*: m.p. 179°.

Et ester: $C_8H_9O_2N$. MW, 151. B.p. 219–20°, 110°/15 mm. D^{15} 1·0091.

Phenyl ester: $C_{12}H_9O_2N$. MW, 199. M.p. 70°.

Chloride: C_6H_4ONCl. MW, 141·5. M.p. 15–16°.

Amide: $C_6H_6ON_2$. MW, 122. M.p. 155·5–156°.

Anhydride: $C_{12}H_8O_3N_2$. MW, 228. M.p. 103–4° (302° decomp., sealed tube).

Nitrile: *see* 4-Cyanopyridine.

Späth, Spitzer, *Ber.*, 1926, **59**, 1477.
Meyer, Graf, *Ber.*, 1928, **61**, 2206.
Graf, *Biochem. Z.*, 1930, **229**, 164.
Meyer, *Rec. trav. chim.*, 1925, **44**, 325.
Pinner, *Ber.*, 1900, **33**, 1227.
See also Hoppe-Seyler, *Z. physiol. Chem.*, 1933, **222**, 105.

Isonipecotic Acid.
See Hexahydroisonicotinic Acid.

Isonitrosoacetic Acid (*Oximinoacetic acid*, *glyoxylic acid oxime*, *glyoximic acid*)

HO·N:CH·COOH

$C_2H_3O_3N$ MW, 89

Two forms:

(i) Needles from EtOH, prisms from Et_2O–pet. ether. M.p. 143–4° (138°), part sublimes and decomp. Heat to 180° ⟶ HCN + CO_2 + H_2O. Very sol. H_2O, EtOH. Mod. sol. Et_2O. Insol. C_6H_6, $CHCl_3$. Sol. alkalis ⟶ yellow col. $FeCl_3$ ⟶ red col. developing slowly. $k = 0·96 \times 10^{-3}$ at 25°.

Me ester: $C_3H_5O_3N$. MW, 103. Prisms from Et_2O–pet. ether. M.p. 55°. B.p. 100°/25 mm.

Et ester: $C_4H_7O_3N$. MW, 117. Needles from Et_2O–pet. ether. M.p. 35°. B.p. 110–15°/15 mm.

(ii) M.p. 100° (sinters). $FeCl_3 \longrightarrow$ instant red col.

Aymaretto, *Gazz. chim. ital.*, 1927, **57**, 650.
Houben, Kauffmann, *Ber.*, 1913, **46**, 2825.
Wieland, *Ber.*, 1910, **43**, 3363 (*footnote* 2).
Inglis, Knight, *J. Chem. Soc.*, 1908, **93**, 1596.
Bouveault, Wahl, *Bull. soc. chim.*, 1904, **31**, 677.

Isonitrosoacetoacetic Ester.
See under Diketobutyric Acid.

Isonitrosoacetone (*Pyruvaldoxime, methylglyoxal oxime*)

$CH_3·CO·CH{:}N·OH$

$C_3H_5O_2N$ MW, 87

M.p. 69°. Sol. H_2O, Et_2O. Spar. sol. C_6H_6, $CHCl_3$, CCl_4. $D^{67·5}$ 1·07437. Sublimes. Volatile in steam.
Oxime : *see* Methylglyoxime.
Hydrazone : m.p. 91°.
Semicarbazone : m.p. 218° decomp.
Me ether : $C_4H_7O_2N$. MW, 101. B.p. 115–16° decomp. *Oxime* : m.p. 73°.
Et ether : $C_5H_9O_2N$. MW, 115. B.p. 130°.

Cambi, *Atti accad. Lincei*, 1913, **22**, i, 379.
Rupe, Kessler, *Ber.*, 1909, **42**, 4718.
See also Taylor, Ewbank, *J. Chem. Soc.*, 1926, 2822.

Isonitrosoacetophenone (*Benzoylformoxime, phenylglyoxal oxime*)

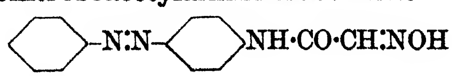
$C_6H_5·CO·CH{:}NOH$

$C_9H_7O_2N$ MW, 161

Plates from $CHCl_3$. M.p. 129° (126–8°). Sol. hot H_2O.
Oxime : (*a*) m.p. 168°. (*b*) M.p. 180°.
Hydrazone : m.p. 110°. *Benzylidene deriv.* : m.p. 154°. *Diacetyl deriv.* : m.p. 166°.
Semicarbazone : m.p. 107°, anhyd. 166°.

Cambi, *Atti accad. Lincei*, 1913, **22**, i, 380.
Dey, *J. Chem. Soc.*, 1914, **105**, 1043.
See also Gastaldi, *Gazz. chim. ital.*, 1921, **51**, i, 233.

Isonitrosoacetylaminoazobenzene



$C_{14}H_{12}O_2N_4$ MW, 268

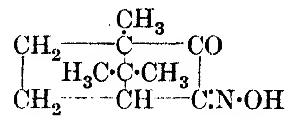
Orange needles from EtOH.Aq. M.p. 214°. Turbidity indicator.

Naegeli, Tyabji, *Helv. Chim. Acta*, 1932, **15**, 406, 778.

Isonitrosoadipic Acid.
See under 1-Ketoadipic Acid.

Isonitrosobarbituric Acid.
See Violuric Acid.

Isonitrosocamphor (*Camphorquinone*-3-*oxime*)



$C_{10}H_{15}O_2N$ MW, 181

(1) *Syn*, (β-). Yellow cryst. M.p. 114–15° (rapid heat.). $[\alpha]_D^{16}$ + 173·4°.
(2) *Anti*, (α-). Cryst. from ligroin-C_6H_6. M.p. 153°.
Benzoyl deriv. : m.p. 105–6°.
m-*Nitrobenzoyl deriv.* : (*a*) m.p. 152°. (*b*) M.p. 136–7°.
(3) *As usually prepared.* Prisms from MeOH. Aq. M.p. 151–2°. $[\alpha]_D^{24}$ + 200° in EtOH.
Phenyl ether : $C_{16}H_{19}O_2N$. MW, 257. M.p. 78°. $[\alpha]_D$ + 92°.

Meisenheimer, Theilacker, *Ann.*, 1932, **493**, 33.
Takeucki, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1933, **23**, 291.

Isonitrosocyanoacetic Acid.
See under Isonitrosomalonic Acid.

Isonitrosodiethyl Ketone.
See under Acetylpropionyl.

Isonitrosoethyl *n*-amyl Ketone.
See under Acetylcaproyl.

Isonitrosoethyl isobutyl Ketone.
See under Acetylisovaleryl.

Isonitrosoethyl isopropyl Ketone.
See under Acetylisobutyryl.

Isonitrosoisoamylacetone.
See under Acetylisocaproyl.

Isonitrosoisocaproic Acid.
See under 1-Ketoisocaproic Acid.

Isonitrosomalonic Acid (*Mesoxalic acid oxime, oximinomalonic acid*)

$$HO·N{:}C<^{COOH}_{COOH}$$

$C_3H_3O_5N$ MW, 133

Needles. M.p. 139° decomp. (decomp. at 131°).
Di-Me ester : $C_5H_7O_5N$. MW, 161. M.p. 64° (67°). B.p. 168°/16 mm. (165–9°/45 mm.).
Di-Et ester : $C_7H_{11}O_5N$. MW, 189. B.p. 172°/12 mm. *Acetyl deriv.* : b.p. 165°/15 mm.
Et ester-nitrile : $C_5H_6O_3N_2$. MW, 142. M.p. 133°. *Me ether* : $C_6H_8O_3N_2$. MW, 156. B.p.

111–12°/17 mm. *Et ether*: $C_7H_{10}O_3N_2$. MW, 170. B.p. 125–7°/23 mm.

Propyl ester-nitrile: $C_6H_8O_3N_2$. MW, 156. M.p. 106–7°.

Monoamide: $C_3H_4O_4N_2$. MW, 132. M.p. 137° decomp. *Me ether*: $C_4H_6O_4N_2$. MW, 146. M.p. 137–8° decomp.

Diamide: $C_3H_5O_3N_3$. MW, 131. M.p. 170–2° (187° decomp.). *Me ether*: $C_4H_7O_3N_3$. MW, 145. M.p. 143·5–144·5°. *Et ester*: $C_5H_9O_3N_3$. MW, 159. M.p. 150–1°. *Acetyl deriv.*: m.p. 190° decomp.

Nitrile: isonitrosocyanoacetic acid. $C_3H_2O_3N_2$. MW, 114. M.p. 103° decomp. (anhyd. 129° decomp.). *Amide*: $C_3H_3O_2N_3$. MW, 113. M.p. anhyd. 184°.

Me ether: $C_4H_5O_5N$. MW, 147. M.p. 90–1°.

Wieland, Baumann, *Ann.*, 1912, **392**, 207.
Cerchez, Colesiu, *Compt. rend.*, 1932, **194**, 1954.
Cerchez, *Bull. soc. chim.*, 1930, **47**, 1279.
See also Ulpiani, *Gazz. chim. ital.*, 1916, **46**, i, 20.

Isonitrosopropionic Acid (*Oximinopropionic acid, formylacetic acid oxime, malonaldehydic acid oxime*)

HO·N:CH·CH$_2$·COOH

$C_3H_5O_3N$ MW, 103

Syn.: *acetyl deriv.*, m.p. 145°.
Anti: m.p. 117–18° (114°).

Rinkes, *Rec. trav. chim.*, 1927, **46**, 273.
v. Pechmann, *Ann.*, 1891, **264**, 285.

Isonitrosopropiophenone.
See under Acetylbenzoyl.

Isonoragathic Acid

$C_{19}H_{30}O_2$ MW, 290

Plates from MeOH.Aq. M.p. 177–8°. B.p. 181–4°/0·2 mm. $[\alpha]_D + 2{\cdot}13°$ in EtOH.

Me ester: $C_{20}H_{32}O_2$. MW, 304. M.p. 98–9°. $[\alpha]_D + 2{\cdot}65°$ in EtOH. D_4^{102} 0·985. n_D^{102} 1·4864.

Ruzicka, Hosking, *Helv. Chim. Acta*, 1930, **13**, 1402.

Isonorbixin

$C_{24}H_{28}O_4$ MW, 380

Leaflets with bluish-red cast. Does not melt below 300°.

Me ester: $C_{25}H_{30}O_4$. MW, 394. M.p. 217°.
Di-Me ester: $C_{26}H_{32}O_4$. MW, 408. M.p. 200–1°.

Karrer, Helfenstein, Widmer, Itallie, *Helv. Chim. Acta*, 1929, **12**, 744, 752.

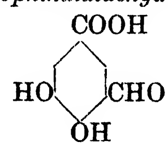
Isonorlupinene

$C_9H_{15}N$ MW, 137

B.p. 43–5°/1 mm.
Picrate: m.p. 147°.
Picrolonate: m.p. 189°.

Clemo, Ramage, Raper, *J. Chem. Soc.*, 1932, 2968.

Isonoropianic Acid (4 : 5-*Dihydroxy-3-aldehydobenzoic acid, 5-formylprotocatechuic acid, 4 : 5-dihydroxyisophthalaldehydic acid*)



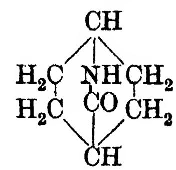
$C_8H_6O_5$ MW, 182

Yellow needles from H_2O. M.p. 240° decomp. Sol. hot H_2O, EtOH, Et_2O. Mod. sol. cold H_2O. Sol. alkalis ⟶ yellow col. which turns reddish on warming. $FeCl_3$ ⟶ dark green col. changing to violet-red on adding Na_2CO_3.

4 : 5-*Di-Me ether*: *see* Iso-opianic Acid.

Tiemann, Mendelsohn, *Ber.*, 1877, **10**, 400.

Isonortropinone (*Hexahydro-p-aminobenzolactam*)



$C_7H_{11}ON$ MW, 125

Needles from ligroin. M.p. 191–2°. Sol. H_2O, ord. org. solvents. Spar. sol. pet. ether, ligroin.

Houben, Pfau, *Ber.*, 1916, **49**, 2297.

Iso-octane.
See 2-Methylheptane.

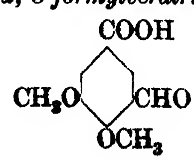
Iso-octane-3 : 6-dicarboxylic Acid.
See 1-Methyl-4-isopropyladipic Acid.

Iso-octene.
See 6-Methyl-1-heptene.

Iso-octenic Acid.
See Methylheptenic Acid.

Iso-octyl Alcohol.
See 6-Methyl-*n*-heptyl Alcohol.

Iso-opianic Acid (4 : 5-*Dimethoxy-3-aldehydobenzoic acid, 5-formylveratric acid*)



$C_{10}H_{10}O_5$ MW, 210

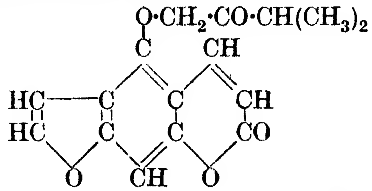
Slender needles from H_2O. M.p. 210–11°.

Me ester: $C_{11}H_{12}O_5$. MW, 224. Needles from H_2O. M.p. 98–9°.

Nitrile: $C_{10}H_9O_3N$. MW, 191. Needles from C_6H_6. M.p. 135°.

Chakravarti, Perkin, *J. Chem. Soc.*, 1929, 193.

Iso-oxypeucedanine



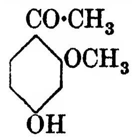
$C_{16}H_{14}O_5$ MW, 286

Isomer of the fish-poison oxypeucedanine from *Imperatoria ostruthium*. Cryst. from Et_2O. M.p. 146°.

Oxime: cryst. from EtOH.Aq. M.p. 186°.

Späth, Klager, *Ber.*, 1933, **66**, 914, 921.

Isopæonol (*Resacetophenone* 2-*methyl ether*, 4-*hydroxy*-2-*methoxyacetophenone*)



$C_9H_{10}O_3$ MW, 166

Needles from H_2O. M.p. 138° (130°).

Hoesch, *Ber.*, 1915, **48**, 1126.
Mauthner, *Chem. Abstracts*, 1934, **28**, 3392.

Isopalmitic Acid (14-*Methylpentadecylic acid*)

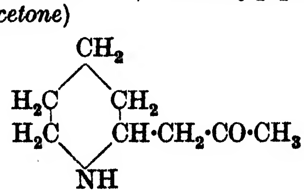
$(CH_3)_2CH{\cdot}[CH_2]_{12}{\cdot}COOH$

$C_{16}H_{32}O_2$ MW, 256

Cryst. from AcOEt. M.p. 61·8–62·4°.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3370.

Isopelletierine (2-*Acetonylpiperidine*, 2-*piperidylacetone*)



$C_8H_{15}ON$ MW, 141

B.p. 91–2°/14 mm. D_4^{20} 0·9602 (0·9624). n_D^{20} 1·46831 (1·46687).

B,HCl: m.p. 143°.
B,HBr: m.p. 135°.
Picrate: m.p. 147–9°.

N-*Me*: alkaloid occurring in *Punica granatum*, Linn. $C_9H_{17}ON$. MW, 155. B.p. 96–8°/13 mm. D_4^{20} 0·9478. n_D^{20} 1·46737. *B,HCl*: m.p. 157–8° (155–6°). *Picrate*: m.p. 154–5°. *Methiodide*: m.p. 156° (150–1°). *Semicarbazone*: m.p. 167–8°. *B,HBr*: m.p. 151–2°.

Hess, Littmann, *Ann.*, 1932, **494**, 7.

Isopentacosane (2-*Methyltetracosane*)

$(CH_3)_2CH{\cdot}[CH_2]_{21}{\cdot}CH_3$

$C_{25}H_{52}$ MW, 352

M.p. 56°.

Levene, Taylor, *J. Biol. Chem.*, 1922, **52**, 227.

Isopentacosanic Acid

$(CH_3)_2CH{\cdot}[CH_2]_{21}{\cdot}COOH$

$C_{25}H_{50}O_2$ MW, 382

M.p. 78·5°.

Et ester: $C_{27}H_{54}O_2$. MW, 410. M.p. 57°.

See previous reference.

Isopentacosyl Alcohol (ω-*Methyltetracosanol*-1)

$(CH_3)_2CH{\cdot}[CH_2]_{21}{\cdot}CH_2OH$

$C_{25}H_{52}O$ MW, 368

M.p. 75°.

See previous reference.

Isopentacosyl iodide

$(CH_3)_2CH{\cdot}[CH_2]_{21}{\cdot}CH_2I$

$C_{25}H_{51}I$ MW, 478

M.p. 51·5°.

See previous reference.

Isopentane (2-*Methylbutane*)

$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}CH_3$

C_5H_{12} MW, 72

M.p. — 160·0° (— 159·6°). B.p. 30–30·2°/747 mm. (27·95°). D_4^{20} 0·62007 (0·6194). n_D^{15} 1·35796.

Timmermans, Martin, *J. chim. phys.*, 1926, **23**, 733.
Chavanne, Simon, *Compt. rend.*, 1919, **168**, 1324.
Chablay, *Ann. chim.*, 1914, **1**, 497.

Isopentane-1 : 1-dicarboxylic Acid.
sec.-Butylmalonic Acid, *q.v.*

Isopentane-1 : 2-dicarboxylic Acid.
See 1-Methyl-1-ethylsuccinic Acid.

Isopentane-1 : 4-dicarboxylic Acid.
See 2-Methyladipic Acid.

Isopentane-3 : 3-dicarboxylic Acid.
See Methylisopropylmalonic Acid.

Isopentane-3 : 4-dicarboxylic Acid.
See Isopropylsuccinic Acid.

Isopentane-4 : 4-dicarboxylic Acid.
See Isobutylmalonic Acid.

Isopentane-1 : 1 : 2-tricarboxylic Acid (2-*Methylbutane*-1 : 1 : 2-*tricarboxylic acid*)

CH_3
CH_2
$CH_3{\cdot}C{\cdot}COOH$
$CH(COOH)_2$

$C_8H_{12}O_6$ MW, 204

1-*Mono-Et ester*: $C_{10}H_{16}O_6$. MW, 232. 1 : 2-*Di-nitrile*: $C_{10}H_{14}O_2N_2$. MW, 194. B.p. 164–6°/19·5 mm.

Inglis, *J. Chem. Soc.*, 1911, **99**, 544.

Isopentane-1 : 1 : 3-tricarboxylic Acid (2-*Methylbutane*-1 : 1 : 3-*tricarboxylic acid*)

CH_3
$CH{\cdot}COOH$
$CH{\cdot}CH_3$
$CH(COOH)_2$

$C_8H_{12}O_6$ MW, 204

Decomp. at 145°.

1-*Mono-nitrile*: $C_8H_{11}O_4N$. MW, 185. *Di-Et ester*: $C_{12}H_{19}O_4N$. MW, 241. B.p. 176°/25 mm., 172°/17 mm.

Blaise, *Compt. rend.*, 1903, **136**, 243.

Isopentane 1 : 1 : 4-tricarboxylic Acid (2-*Methylbutane*-1 : 1 : 4-*tricarboxylic acid*)

$CH_2{\cdot}COOH$
CH_2
$CH{\cdot}CH_3$
$CH(COOH)_2$

$C_8H_{12}O_6$ MW, 204

Plates from H_2O. M.p. 127–8° decomp. Heat at 200° ⟶ 2-methyladipic acid.

Tri-Et ester: $C_{14}H_{24}O_6$. MW, 288. B.p. about 135°/0·4 mm.

1-*Mono-nitrile*: $C_8H_{11}O_4N$. MW, 185. *Di-Et ester*: $C_{12}H_{19}O_4N$. MW, 241. B.p. 175–85°/20 mm.

Noyes, Cox, *J. Am. Chem. Soc.*, 1903, **25**, 1095.
Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 249.

Isopentane-1 : 2 : 3-tricarboxylic Acid (2-*Methylbutane*-1 : 2 : 3-*tricarboxylic acid*)

CH_3
$CH{\cdot}COOH$
$CH_3{\cdot}C{\cdot}COOH$
$CH_2{\cdot}COOH$

$C_8H_{12}O_6$ MW, 204

Prisms from H_2O. M.p. 196–8°.

Michael, *Ber.*, 1900, **33**, 3764.

Isopentane-1 : 2 : 4-tricarboxylic Acid (2-*Methylbutane*-1 : 2 : 4-*tricarboxylic acid*)

$CH_2{\cdot}COOH$
CH_2
$CH_3{\cdot}C{\cdot}COOH$
$CH_2{\cdot}COOH$

$C_8H_{12}O_6$ MW, 204

Tri-Et ester: $C_{14}H_{24}O_6$. MW, 288. B.p. 175–8°/12 mm.

2-*Nitrile*: $C_8H_{11}O_4N$. MW, 185. *Di-Et ester*: $C_{12}H_{19}O_4N$. MW, 241. B.p. 179–80°/13 mm.

Ruzicka, *Ber.*, 1917, **50**, 1367.

Isopentane-1 : 3 : 3-tricarboxylic Acid (2-*Methylbutane*-1 : 3 : 3-*tricarboxylic acid*)

CH_3
$C(COOH)_2$
$CH{\cdot}CH_3$
$CH_2{\cdot}COOH$

$C_8H_{12}O_6$ MW, 204

Needles from dil. HCl. M.p. 165° decomp.

Tri-Et ester: $C_{14}H_{24}O_6$. MW, 288. Oil. B.p. 160·5–161°/10 mm.

3-*Mono-nitrile*: $C_8H_{11}O_4N$. MW, 185. Needles from Et_2O–ligroin. M.p. 132–4°. *Di-Et ester*: $C_{12}H_{19}O_4N$. MW, 241. Oil. B.p. 185°/20 mm.

Thorpe, Young, *J. Chem. Soc.*, 1903, **83**, 355.
Michael, *Ber.*, 1900, **33**, 3747.

Isopentane-1 : 3 : 4-tricarboxylic Acid (2-*Methylbutane*-1 : 3 : 4-*tricarboxylic acid*)

$CH_2{\cdot}COOH$
$CH{\cdot}COOH$
$CH{\cdot}CH_3$
$CH_2{\cdot}COOH$

$C_8H_{12}O_6$ MW, 204

M.p. 154°. Sol. H_2O.

Tri-Et ester: $C_{14}H_{24}O_6$. MW, 288. B.p. 180–3°/20 mm.

Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 767.
Thorpe, *J. Chem. Soc.*, 1919, **115**, 684.

Isopentane-2 : 3 : 3-tricarboxylic Acid (2-*Methylbutane*-2 : 3 : 3-*tricarboxylic acid*)

CH_3
$C(COOH)_2$
$CH_3·C·COOH$
CH_3

$C_8H_{12}O_6$ MW, 204

3-*Et ester*: $C_{10}H_{16}O_6$. MW, 232. *Dinitrile*: $C_{10}H_{14}O_2N_2$. MW, 194. Oil. B.p. 150°/20 mm.
3-*Nitrile*: $C_8H_{11}O_4N$. MW, 185. *Di-Et ester*: $C_{12}H_{19}O_4N$. MW, 241. B.p. 203–8°/123 mm., 157–8°/20 mm. D_4^0 1·0628. n_D 1·4413.

Bone, Sprankling, *J. Chem. Soc.*, 1899, **75**, 855.
Higson, Thorpe, *J. Chem. Soc.*, 1906, **89**, 1466.

Isopentane-2 : 3 : 4-tricarboxylic Acid (2-*Methylbutane*-2 : 3 : 4-*tricarboxylic acid*, 1 : 1-*dimethyltricarballylic acid*)

$CH_2·COOH$
$CH·COOH$
$CH_3·C·COOH$
CH_3

$C_8H_{12}O_6$ MW, 204

Prisms from H_2O. M.p. 157–8° (143°). Sol. H_2O, EtOH, Et_2O, Me_2CO, AcOH. Spar. sol. $CHCl_3$. $k = 3·18 \times 10^{-4}$ at 25°. Heat ⟶ anhydride.
Tri-Me ester: $C_{11}H_{18}O_6$. MW, 246. Oil. B.p. 170–4°/33 mm. D_4^0 1·1403. n_D 1·4417.
Tri-Et ester: $C_{14}H_{24}O_6$. MW, 288. B.p. 172–4°/19 mm.
Anhydride: prisms from AcOEt. M.p. 145–6° (139–41°). B.p. about 225°.

Haller, Blanc, *Compt. rend.*, 1900, **131**, 21.
Bone, Sprankling, *J. Chem. Soc.*, 1902, **81**, 44.
Gardner, Cockburn, *J. Chem. Soc.*, 1898, **73**, 710.
Tiemann, Semmler, *Ber.*, 1895, **28**, 1349.

Isopentane-3 : 3 : 4-tricarboxylic Acid (2-*Methylbutane*-3 : 3 : 4-*tricarboxylic acid*)

$CH_2·COOH$
$C(COOH)_2$
$CH·CH_3$
CH_3

$C_8H_{12}O_6$ MW, 204

Cryst. M.p. 145° decomp.

Hjelt, *Ber.*, 1883, **16**, 2622.

Isopentane-3 : 4 : 4-tricarboxylic Acid (2-*Methylbutane*-3 : 4 : 4-*tricarboxylic acid*)

$CH(COOH)_2$
$CH·COOH$
$CH·CH_3$
CH_3

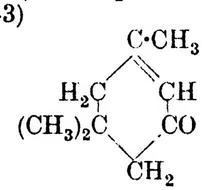
$C_8H_{12}O_6$ MW, 204

Cryst. from H_2O. M.p. 160° decomp. Sol. H_2O, EtOH, Et_2O. Less sol. $CHCl_3$, pet. ether.
Tri-Et ester: $C_{14}H_{24}O_6$. MW, 288. B.p. 276–8°, 180–2°/37 mm. Bitter taste.
4-*Mono-nitrile*: $C_8H_{11}O_4N$. MW, 185. *Di-Et ester*: $C_{12}H_{19}O_4N$. MW, 241. B.p. 165–7°/19–21 mm. D_4^0 1·0620. n_D 1·4413.

Schleicher, *Ann.*, 1892, **267**, 121.
Bentley, Perkin, Thorpe, *J. Chem. Soc.*, 1896, **69**, 273.
Bone, Sprankling, *J. Chem. Soc.*, 1900, **77**, 658.

Isopentene.
See Methylbutylene.

Isophorone (*Isoacetophorone*, 1 : 5 : 5-*trimethylcyclohexenone*-3)

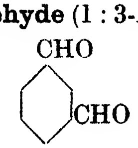


$C_9H_{14}O$ MW, 138

B.p. 214°/754 mm., 109°/32 mm., 102·5–103°/24 mm., 99°/18 mm., 98°/17 mm., 100–2°/15 mm., 89°/10 mm. Insol. H_2O. $D_4^{20·5}$ 0·9255. n_D^{18} 1·4766. Heat of comb. C_v 1259·2 Cal.
Oxime: m.p. 75–6° (78–80°). B.p. 153°/40 mm., 134°/16 mm.
Semicarbazone: m.p. 190–1°.

Treibs, *Ber.*, 1933, **66**, 1491.
Wolff, *Ann.*, 1902, **322**, 379 (*Bibl.*).
Cornubert, Borrel, *Bull. soc. chim.*, 1929, **45**, 1158.
M.L.B., D.R.P., 134,982, (*Chem. Zentr.*, 1902, II, 1164).
See also Delacre, *Bull. soc. chim.*, 1918, **23**, 219.

Isophthalaldehyde (1 : 3-*Dialdehydobenzene*)



$C_8H_6O_2$ MW, 134

Needles. M.p. 89–90°. Sol. most ord. org. solvents except Et_2O and ligroin. Spar. sol. H_2O. Volatile in steam.

Dioxime : m.p. 180°. *Di-Me ether* : m.p. 77°. *Di-Et ether* : m.p. 165°.

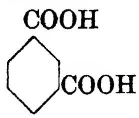
Di-phenylhydrazone : m.p. 242–4°.

Guha, Hyi, *J. Indian Chem. Soc.*, 1930, **7**, 940.
Rosenmund, Zetzsche, *Ber.*, 1921, **54**, 2890.

Isophthalaldehydic Acid.
See m-Aldehydobenzoic Acid.

Isophthalamic Acid.
See under Isophthalic Acid.

Isophthalic Acid (*Benzene*-m-*dicarboxylic acid*, m-*phthalic acid*)



$C_8H_6O_4$ MW, 166

Occurs in rhizome of *Iris versicolor*, Linn. Needles from hot H_2O or EtOH. M.p. 345–7°. Sol. AcOH. Mod. sol. EtOH. Spar. sol. H_2O. Insol. C_6H_6, ligroin. k (first) = $2{\cdot}9 \times 10^{-4}$ at 25° : (second) = $2{\cdot}5 \times 10^{-5}$ at 18°. Heat of comb. C_v 769·1 (768·8) Cal., C_p 768·8 Cal.

Mono-Me ester : $C_9H_8O_4$. MW, 180. M.p. 193°. $k = 1{\cdot}28 \times 10^{-4}$ at 25°. *Amide* : $C_9H_9O_3N$. MW, 179. M.p. 148·5°.

Di-Me ester : $C_{10}H_{10}O_4$. MW, 194. M.p. 68° (64–5°). B.p. 124°/12 mm.

Mono-Et ester : $C_{10}H_{10}O_4$. MW, 194. M.p. 115–17°.

Di-Et ester : $C_{12}H_{14}O_4$. MW, 222. M.p. 11·5°. B.p. 285°, 170–170·5°/2·4 mm. $D_4^{15\cdot7}$ 1·1239. $n_D^{17\cdot5}$ 1·508.

Di-phenyl ester : $C_{20}H_{14}O_4$. MW, 318. M.p. 120° (191°).

Dichloride : $C_8H_4O_2Cl_2$. MW, 203. M.p. 43–4°. B.p. 276°. $D_4^{17\cdot8}$ 1·3880. n_D^{47} 1·570.

Monoamide : isophthalamic acid. $C_8H_7O_3N$. MW, 165. M.p. 280°.

Diamide : $C_8H_8O_2N_2$. MW, 164. M.p. 280°.

Mononitrile : *see m*-Cyanobenzoic Acid.

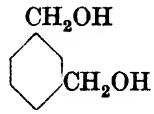
Di-nitrile : *m*-dicyanobenzene. $C_8H_4N_2$. MW, 128. M.p. 161·5–2°.

Di-hydrazide : m.p. 220°.

Baeyer, Villiger, *Ann.*, 1893, **276**, 258.
Perkin, *J. Chem. Soc.*, 1896, **69**, 1177.
Naegeli, Münzel, D.R.P., 554,700, (*Chem. Abstracts*, 1932, **26**, 5970).
Smith, *J. Am. Chem. Soc.*, 1921, **43**, 1920.
Wohl, *Ber.*, 1910, **43**, 3477.

Isophthalophenone.
See m-Dibenzoylbenzene.

Isophthalyl Alcohol (*m-Benzenedicarbinol*, α : α′-m-*xylenediol*, ωω′-*dihydroxy*-m-*xylene*, 1 : 3-*di*-[*hydroxymethyl*]-*benzene*, m-*hydroxymethylbenzyl alcohol*)



$C_8H_{10}O_2$ MW, 138

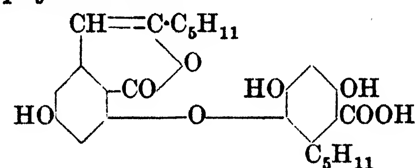
Needles from C_6H_6. M.p. 57° (46–7°). B.p. 154–9°/13 mm. Sol. H_2O, Et_2O.

Di-Et ether : $C_{12}H_{18}O_2$. MW, 194. B.p. 246–7°/712 mm.

Mettler, *Ber.*, 1906, **39**, 2940.
Gough, Thorpe, *J. Chem. Soc.*, 1919, **115**, 1162.

Isophyllodulcin.
See under Phyllodulcin.

Isophysodic Acid



$C_{26}H_{30}O_8$ MW, 470

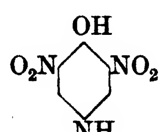
Prisms from 90% AcOH. M.p. 191–2°. $FeCl_3$ on EtOH sol. ⟶ violet col.

Me ester : $C_{27}H_{32}O_8$. MW, 484. M.p. 197°.

Tri-Me ether : $C_{30}H_{38}O_8$. MW, 526. M.p. 125°.

Asahina, Nogami, *Ber.*, 1934, **67**, 809.

Isopicramic Acid (2 : 6-*Dinitro*-4-*aminophenol*)



$C_6H_5O_5N_3$ MW, 199

Yellowish-brown needles from H_2O. M.p. 170°. Sol. EtOH. Spar. sol. H_2O, C_6H_6.

Me ether : 2 : 6-dinitro-*p*-anisidine. $C_7H_7O_5N_3$. MW, 213. M.p. 212°. N-*Acetyl* : m.p. 157°.

Et ether : 2 : 6-dinitro-*p*-phenetidine. $C_8H_9O_5N_3$. MW, 227. M.p. 172°. N-*Acetyl* : m.p. 148°.

N-*Me* : $C_7H_7O_5N_3$. MW, 213. M.p. 153–4°. N-*Acetyl* : m.p. 142–3°.

N-*Acetyl* : m.p. 182°.

N-*Benzoyl* : m.p. 263° (250°).

N-*Di-Me* : $C_8H_9O_5N_3$. MW, 227. M.p.

182°. *Me ether*: $C_9H_{11}O_5N_3$. MW, 241. M.p. 150°.

N-*Me*: N-*Et*: $C_9H_{11}O_5N_3$. MW, 241. M.p. 104–5°. *Et ether*: $C_{11}H_{15}O_5N_3$. MW, 269. M.p. 67–8°.

N-*Benzyl*: $C_{13}H_{11}O_5N_3$. MW, 289. Violet prisms. M.p. 155–6°.

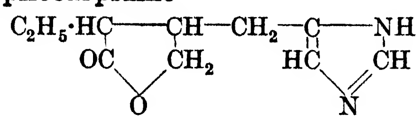
N-*Dibenzyl*: $C_{20}H_{17}O_5N_3$. MW, 379. M.p. 112–14°. *Me ether*: $C_{21}H_{19}O_5N_3$. MW, 393. M.p. 97–8°.

N-*Me*: N-*Benzyl*: $C_{14}H_{13}O_5N_3$. MW, 303. M.p. 111–12°.

N-*Et*: N-*Benzyl*: $C_{15}H_{15}O_5N_3$. MW, 317. M.p. 96–7°. *Et ether*: $C_{17}H_{19}O_5N_3$. MW, 345. M.p. 129–30°.

Egerer, *J. Biol. Chem.*, 1918, **35**, 565.
Meldola, Hollely, *J. Chem. Soc.*, 1914, **105**, 2073.

Isopilocarpidine

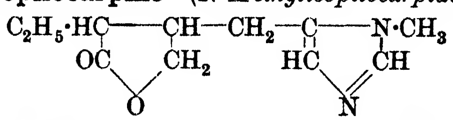


$C_{10}H_{14}O_2N_2$ MW, 194

Stereoisomer of pilocarpidine. Oil.
B,HNO₃: m.p. 109–11° (112–13°).
Aurichloride: m.p. 159°.
N-*Me*: *see* Isopilocarpine.

Preobrashenski, Wompe, Preobrashenski, *Ber.*, 1933, **66**, 1191.

Isopilocarpine (N-*Methylisopilocarpidine*)

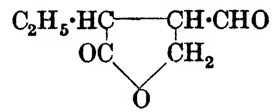


$C_{11}H_{16}O_2N_2$ MW, 208

Alkaloid from leaves of *Pilocarpus pennatifolius*, Lem., and *P. jaborandi*, Holmes. Oil. B.p. 261°/10 mm.
B,HCl,½H₂O: m.p. 127°, anhyd. 159°. $[\alpha]_D$ + 38·8°.
B,HBr: m.p. 147°. $[\alpha]_D$ +32·8°.
B,HNO₃: m.p. 159°. $[\alpha]_D$ + 35·68°.
B,HAuCl₄: m.p. 158–9°.
B₂,H₂PtCl₆: m.p. 226–7° decomp.
Picrate: m.p. 161°.
Methiodide: m.p. 114°.

Burtles, Pyman, Roylance, *J. Chem. Soc.*, 1925, 581.
Jowett, *J. Chem. Soc.*, 1905, **87**, 794; 1900, **77**, 483.
Preobrashenski, Wompe, Preobrashenski, *Ber.*, 1933, **66**, 1187.

Isopilopaldehyde (3-*Ethyl*-4-*aldehydo*-2-*ketotetrahydrofuran*, 3-*ethylparaconic aldehyde*)

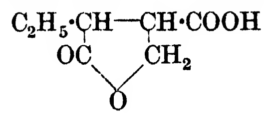


$C_7H_{10}O_3$ MW, 142

dl-.
B.p. 90°/0·05 mm.

Preobrashenski, Poljakowa, Preobrashenski, *Ber.*, 1934, **67**, 712.

Isopilopic Acid (3-*Ethylparaconic acid*, 2-*keto*-3-*ethyltetrahydrofuran*-4-*carboxylic acid*)



$C_7H_{10}O_4$ MW, 158

d-. (Jowett's "Pilopic Acid").
M.p. 105–105·5°. $[\alpha]_D^{22}$ + 58·92° in H_2O.

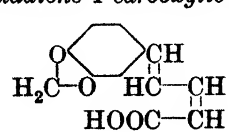
l-.
M.p. 105–105·5°. $[\alpha]_D^{23}$ − 58·06° in H_2O.

dl-.
M.p. 87·5–88°. B.p. 184–5°/7·5 mm. Sol. EtOH, AcOH, C_6H_6, Me_2CO, AcOEt, hot H_2O. Insol. pet. ether.
Et ester: $C_9H_{14}O_4$. MW, 186. B.p. 276–276·5°/751 mm. D^{20} 1·1085.
Chloride: $C_7H_9O_3Cl$. MW, 176·5. B.p. 90·2°/0·05 mm.

Tschitschibabin, Preobrashenski, *Ber.*, 1930, **63**, 467.
Preobrashenski, Poljakowa, Preobrashenski, *Ber.*, 1934, **67**, 712.

Isopinene.
See under α-Fenchene.

Isopiperic Acid (4-[3 : 4-*Methylenedioxyphenyl*]-*vinylacrylic acid*, 4-[3 : 4-*methylenedioxyphenyl*]-1 : 3-*butadiene*-1-*carboxylic acid*)



$C_{12}H_{10}O_4$ MW, 218

Cryst. from C_6H_6. M.p. 155° (145°).

Lohaus, *J. prakt. Chem.*, 1928, **119**, 254.

Isopral.
See 1 : 1 : 1-Trichloroisopropyl Alcohol.

Isoprene (2-*Methylbutadiene*-1 : 3, 2-*methylerythrene*, 2-*methyldivinyl*)

$$CH_2{:}CH{\cdot}C(CH_3){:}CH_2$$

C_5H_8 MW, 68

F.p. about − 120°. B.p. 34·5–35°/762 mm. D_4^{20} 0·6806. n_D^{20} 1·4194. Polymerizes ⟶ "synthetic" rubber. CrO_3 ⟶ CO_2 + H·COOH + CH_3·COOH. Condenses with terpenes in presence of $AlCl_3$.

Di-hydrobromide : *see* 2 : 4-Dibromoisopentane.

Kondakov, *Caoutchouc et gutta-percha*, 1921, **18**, 1097 (*Review*).
Dubosc, *Revue des produits chimiques*, 1921, **24**, 273, 307, 371 (*Review*).
Sloïn, *Revue générale de caoutchouc*, 1926, 13 (*Review*).
Waterman, Westen, *Rec. trav. chim.*, 1929, **54**, 1084.
I.G., D.R.P., 565,160, (*Chem. Abstracts*, 1933, **27**, 992).
Bogert, *Chem. Reviews*, 1932, **10**, 265 (*Review*).
Jacobs, *Chem. Abstracts*, 1932, **26**, 4731.
Jones, Williams, *J. Chem. Soc.*, 1934, 829.

Isoprene-1 : 4-dicarboxylic Acid.
See 2-Methylmuconic Acid.

Isopropenylacetylene (3-*Methylbutenine*, 3-*methylvinylacetylene*)

$$CH_2{:}C(CH_3){\cdot}C{:}CH$$

C_5H_6 MW, 66

B.p. 32–32·5°. D_4^{11} 0·6801. n_D^{20} 1·4158.

Bayer, D.R.P., 290,558, (*Chem. Zentr.*, 1916, I, 644).
Scheibler, Fischer, *Ber.*, 1922, **55**, 2903.
Favorski, Russian P., 31,015, (*Chem. Abstracts*, 1934, **28**, 3425).

Isopropenyl Alcohol (2-*Hydroxypropylene*)

$$CH_3{\cdot}C(OH){:}CH_2$$

C_3H_6O MW, 58

Me ether : 2-methoxypropylene. C_4H_8O. MW, 72. B.p. 38°.

Et ether : 2-ethoxypropylene. $C_5H_{10}O$. MW, 86. B.p. 62–3°. D^{20} 0·769.

Claisen, *Ber.*, 1898, **31**, 1021.

Isopropenylbenzene.
See α-Methylstyrene.

Isopropenyl bromide (2-*Bromopropylene*)

$$CH_3{\cdot}CBr{:}CH_2$$

C_3H_5Br MW, 121

M.p. − 126°. B.p. 48·35°. $D_4^{15\cdot75}$ 1·3965. $n_D^{15\cdot75}$ 1·44665. Alc. KOH ⟶ allylene. Refrigerating agent.

Reboul, *Ann. chim.*, 1878, **14**, 475.
See also Wyss, F.P., 751,969, (*Chem. Abstracts*, 1934, **28**, 783).

Isopropenyl chloride (2-*Chloropropylene*)

$$CH_3{\cdot}CCl{:}CH_2$$

C_3H_5Cl MW, 76·5

M.p. − 138·6°. B.p. 22·65°. $n_D^{6\cdot5}$ 1·404. Refrigerating agent.

Mailhe, *Bull. soc. chim.*, 1921, **29**, 535.
Goudet, Schenker, *Helv. Chim. Acta*, 1927, **10**, 132.
Timmermans, *Bull. soc. chim. Belg.*, 1927, **36**, 502.
See also Wyss, F.P., 751,969, (*Chem. Abstracts*, 1934, **28**, 783).

Isopropenyl iodide (2-*Iodopropylene*)

$$CH_3{\cdot}CI{:}CH_2$$

C_3H_5I MW, 168

B.p. 93–103° (82°/761·8 mm.). $D^{16\cdot4}$ 1·8028.

Ssemenow, *Z. Chem.*, 1865, 725.
Oppenheim, *ibid.*, 719.

Isopropenylsuccinic Acid.
See 2-Methyl-1-butylene-3 : 4-dicarboxylic Acid.

Isopropylacetanilide.
See under Cumidine.

Isopropyl acetate

$$CH_3{\cdot}CO{\cdot}O{\cdot}CH(CH_3)_2$$

$C_5H_{10}O_2$ MW, 102

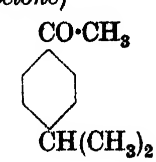
B.p. 90–3° (88–91°/734·3 mm.). D^0 0·9166.

Friedel, *Ann.*, 1862, **124**, 327.
I.C.I., F.P., 694,726, (*Chem. Abstracts*, 1931, **25**, 1843).
Buc, U.S.P., 1,808,155, (*ibid.*, 4285).

Isopropylacetone.
See Methyl isobutyl Ketone.

Isopropylacetonylcarbinol.
See 2-Methyl-3-hexanolone-5.

***p*-Isopropylacetophenone** (p-*Acetocumene*, *methyl* p-*cumyl ketone*)



$C_{11}H_{14}O$ MW, 162

B.p. 252–4°/756 mm. D^{15} 0·9753.
Oxime: m.p. 70–1°.

Allen, *Organic Syntheses*, 1934, XIV, 1.

Isopropylacetylene (3-*Methylbutine*-1)

$(CH_3)_2CH{\cdot}C{:}CH$

C_5H_8 MW, 68

B.p. 28–9°/751 mm. D^0 0·6854. $CrO_3 \longrightarrow$ acetone + acetic acid + isobutyric acid. $H_2SO_4 \longrightarrow$ methyl isopropyl ketone.

Flavitzki, Krylow, *Ber.*, 1878, **11**, 1939.
Kutscherow, *Chem. Zentr.*, 1914, I, 754.
Badische, D.R.P., 268,102, (*Chem. Zentr.*, 1914, I, 308).
Perkin, Weizmann, E.P., 277/1913, (*Chem. Abstracts*, 1913, **7**, 2095).

1-Isopropylacrylic Acid (3-*Methyl*-1-*butylene*-2-*carboxylic acid*, 1-*methylene-isovaleric acid*)

$(CH_3)_2CH$
$CH_2{=}C{\cdot}COOH$

$C_6H_{10}O_2$ MW, 114

B.p. 192·5–193° (190–1°), 100°/19 mm. D_0^0 0·9854.
Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 150° (153°).

Ssemenow, *Chem. Zentr.*, 1899, I, 1071.
Darzens, *Compt. rend.*, 1911, **152**, 445.

2-Isopropylacrylic Acid (1-*Isohexenic acid*, *isobutylidene-acetic acid*, 3-*methyl*-1-*butylene*-1-*carboxylic acid*)

$(CH_3)_2CH{\cdot}CH{:}CH{\cdot}COOH$

$C_6H_{10}O_2$ MW, 114

Present in hops. M.p. 33°. B.p. 217° (211–12°), 133°/50 mm., 115–16°/20 mm., 108°/10 mm. D_4^{21} 0·9529. n_D^{16} 1·4583. Very sol. ord. org. solvents. Br $\longrightarrow$ dibromide, m.p. 124–5°.
Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 174°/757 mm., 76–7°/25 mm. (80°/14 mm.), 55–6°/9 mm. D_4^{21} 0·9048. n_D^{21} 1·4328.
Chloride: C_6H_9OCl. MW, 132·5. B.p. 58–9°/18 mm. D_4^{20} 1·018.
Amide: $C_6H_{11}ON$. MW, 113. Leaflets. M.p. 82–6°.
Nitrile: C_6H_9N. MW, 95. B.p. 154–5°/754 mm., 43–4°/11 mm. D^{16} 0·8268.
Anilide: needles from EtOH.Aq. M.p. 142° (128°).

Linstead, *J. Chem. Soc.*, 1929, 2505.
Wieland, Schneider, Martz, *Ber.*, 1925, **58**, 102.
Auwers *et al.*, *Ann.*, 1923, **432**, 74.
Wöllmer, *Ber.*, 1916, **49**, 780.

Franke, Kohn, *Monatsh.*, 1899, **20**, 883.
Braun, *Monatsh.*, 1896, **17**, 213.
Power, Tutin, Rogerson, *J. Chem. Soc.*, 1913, **103**, 1279.
Howles, Thorpe, Udall, *J. Chem. Soc.*, 1900, **77**, 942.

1-Isopropyladipic Acid (2-*Methylhexane*-3 : 6-*dicarboxylic acid*)

$(CH_3)_2CH{\cdot}CH{\cdot}COOH$
$[CH_2]_2$
$CH_2{\cdot}COOH$

$C_9H_{16}O_4$ MW, 188

Prisms from C_6H_6–pet. ether. M.p. 66–7° (63°). B.p. 222°/12 mm. Sol. H_2O, ord. org. solvents.
Di-Me ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 132–3°/15 mm.
Mono-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 185°/15 mm.
Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 148–9°/17 mm. D^4 0·9876.

Blanc, *Bull. soc. chim.*, 1905, **33**, 907.
Bouveault, Locquin, *Bull. soc. chim.*, 1908, **3**, 445.

2-Isopropyladipic Acid

$CH_2{\cdot}COOH$
$(CH_3)_2CH{\cdot}CH$
CH_2
$CH_2{\cdot}COOH$

$C_9H_{16}O_4$ MW, 188

d-.
M.p. 72–4° (66°, 77–9°).
Na salt: $[\alpha]_D^{20}$ + 5·2°.
Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 145–50°/23 mm. D_4^{20} 0·9776. $[\alpha]_D^{20}$ − 1·534°.
Dichloride: $C_9H_{14}O_2Cl_2$. MW, 225. B.p. 145–6°/15 mm.
Diamide: $C_9H_{18}O_2N_2$. MW, 186. M.p. 169·5°. $[\alpha]_D^{20}$ + 9·5° in H_2O.

dl-.
Cryst. from H_2O, m.p. 80°. Needles from Et_2O–pet. ether, m.p. 75° (85°, 86–8°). B.p. 215–18° (222°) 12 mm.

Wallach, Woodman, *Ann.*, 1918, **414**, 287.
Braun, Werner, *Ber.*, 1929, **62**, 1054.
Cahn, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 1369.

Isopropyl Alcohol (*Isopropanol*, 2-*hydroxypropane*, *dimethylcarbinol*)

$CH_3{\cdot}CH(OH){\cdot}CH_3$

C_3H_8O MW, 60

F.p. − 89·5°. B.p. 82·40°. D_4^{20} 0·7855. n_D^{20} 1·37757. Sol. H_2O. Forms azeotropic mixture with H_2O containing 12·1% H_2O. Heat of comb. C_v 478·4 Cal., C_p 479·2 Cal.

Garlick, *Industrial Chemist*, 1927, **3**, 392 (*Review*).
Brooks, *J. Am. Chem. Soc.*, 1934, **56**, 1998.
Dalin, Gutuirya, *Chem. Abstracts*, 1934, **28**, 7489.
Distillers Co., E.P., 408,982, (*Chem. Abstracts*, 1934, **28**, 5468).
Timmermans, Delcourt, *J. chim. phys.*, 1934, **31**, 105.
Merley, U.S.P., 1,933,505, (*Chem. Abstracts*, 1934, **28**, 493).
Kirchhof, Stepanow, *Chem. Zentr.*, 1932, II, 1609.
Gilson, *J. Am. Chem. Soc.*, 1932, **54**, 1445.
Brooks, *Chem. Reviews*, 1926, **2**, 382 (*Review*).

Isopropylallylacetone.
See 7-Methyl-1-octenone-5.

3-Isopropylallyl Alcohol.
See 4-Methyl-2-pentenol-1.

Isopropylallylcarbinol (5-*Methyl*-1-*hexenol*-4, 4-*hydroxy*-5-*methylhexene*-1)

$(CH_3)_2CH·CH(OH)·CH_2·CH\colon CH_2$

$C_7H_{14}O$ MW, 114

B.p. 139–41°. D^{15} 0·846.
Acetyl: b.p. 160–2°. D^{15} 0·891.

Fournier, *Bull. soc. chim.*, 1894, **11**, 359.

Isopropyl allyl Ether

$CH_2\colon CH·CH_2·O·CH(CH_3)_2$

$C_6H_{12}O$ MW, 100

B.p. 82–3°/730 mm. D^{20} 0·7764.

Lippert, *Ann.*, 1893, **276**, 195.
Deulofeu, *Chem. Abstracts*, 1929, **23**, 1110.

Isopropylallylmalonic Acid (5-*Methyl*-1-*hexene*-4 : 4-*dicarboxylic acid*)

$$\begin{matrix} CH_2\colon CH·CH_2 \\ (CH_3)_2CH \end{matrix}>C<\begin{matrix} COOH \\ COOH \end{matrix}$$

$C_9H_{14}O_4$ MW, 186

Cryst. from C_6H_6. M.p. 112·5°.
Di-Et ester: $C_{13}H_{22}O_4$. MW, 242. B.p. 232–8°.

Hjelt, *Ber.*, 1896, **29**, 1856.

Isopropylamine (2-*Aminopropane*)

$CH_3·CH(NH_2)·CH_3$

C_3H_9N MW, 59

B.p. 32° (33–4°). D_4^{18} 0·691. $n_D^{15·4}$ 1·37698. $k = 5·3 \times 10^{-4}$ at 25°.

B,(COOH)$_2$: m.p. 160–160·5°.
B,HCl: m.p. 139·5° (153–5°).
B,HAuCl$_4$: m.p. 72–3° (140° anhyd.).
B$_2$,H$_2$AuCl$_5$: m.p. 159°.
B$_2$,H$_2$PtCl$_6$: decomp. at 214° (229–30°).
B$_2$,H$_2$PtBr$_6$: m.p. 267°.

Gabriel, Ohle, *Ber.*, 1917, **50**, 804.
Fabrique de produits de chimie organique de Laire, E.P., 282,083, (*Chem. Abstracts*, 1928, **22**, 3668).
Nyssens, *Chem. Abstracts*, 1931, **25**, 70.
Mailhe, *Compt. rend.*, 1920, **170**, 1265.

2-Isopropylaminoethyl Alcohol (N-2-*Hydroxyethylisopropylamine*, *isopropylethanolamine*)

$(CH_3)_2CH·NH·CH_2·CH_2OH$

$C_5H_{13}ON$ MW, 103

Oil. B.p. 171°/741 mm. D_4^{20} 0·8970. n_D^{20} 1·4395. Sol. H_2O, EtOH, Et_2O.
B$_2$,H$_2$PtCl$_6$: m.p. about 85°. Sol. H_2O, EtOH.
Picrate: brownish-yellow prisms from H_2O. M.p. 129°. Sol. H_2O, EtOH.
Picrolonate: yellow prisms from EtOH.Aq. M.p. 228° decomp.

Matthes, *Ann.*, 1901, **315**, 117.

Isopropyl-*n*-amylcarbinol (3-*Hydroxy*-2-*methyloctane*, 2-*methyloctanol*-3)

$CH_3·[CH_2]_4·CH(OH)·CH(CH_3)_2$

$C_9H_{20}O$ MW, 144

d-.
$[\alpha]_D^{20}$ + 22·84°. D_4^{20} 0·8270. n_D^{20} 1·4314.
Acid phthalate: oil. $[\alpha]_D$ + 13·46° in $CHCl_3$.
Strychnine salt: m.p. 181–2°. $[\alpha]_D$ − 18·18° in $CHCl_3$.

dl-.
B.p. 184°.
Phenylurethane: m.p. 64°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 629.

Isopropyl-*tert*.-amylcarbinol (3-*Hydroxy*-2 : 4 : 4-*trimethylhexane*, 2 : 4 : 4-*trimethylhexanol*-3)

$$CH_3·CH_2·\overset{\displaystyle CH_3}{\underset{\displaystyle CH_3}{C}}·CH(OH)·CH(CH_3)_2$$

$C_9H_{20}O$ MW, 144

B.p. 170–1°.
Phenylurethane: m.p. 64°.

Haller, Bauer, *Compt. rend.*, 1910, **150**, 662.

Isopropyl *n*-amyl Ketone (3-*Keto-2-methyl-octane*, 2-*methyloctanone*-3)

$CH_3\cdot[CH_2]_4\cdot CO\cdot CH(CH_3)_2$

$C_9H_{18}O$ MW, 142

B.p. 182–4°. D_4^{20} 0·8212.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 629.
Lowry, *J. Chem. Soc.*, 1914, **105**, 92.

***N*-Isopropylaniline**

$C_6H_5\cdot NH\cdot CH(CH_3)_2$

$C_9H_{13}N$ MW, 135

Oil. B.p. 206–8° (203–4°).
N-*Acetyl*: m.p. 38° (39°, 42°). B.p. 262–3°/712 mm.

Pictet, Crépieux, *Ber.*, 1888, **21**, 1109.
Hickinbottom, *J. Chem. Soc.*, 1930, 994.
Reddelien, Thurm, *Ber.*, 1932, **65**, 1520.

***o*-, *and p*-, Isopropylaniline.** *o*-, *and p*-, Cumidine, *q.v.*

Isopropylanisole.
See under Isopropylphenol.

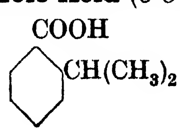
***p*-Isopropylbenzaldehyde.**
See Cuminaldehyde.

Isopropylbenzanthracene.
See Isopropylnaphthacene *and* Isopropylnaphthanthracene.

Isopropylbenzanthraquinone.
See Isopropylnaphthacenequinone *and* Isopropylnaphthanthraquinone.

Isopropylbenzene.
See Cumene.

***o*-Isopropylbenzoic Acid** (o-*Cuminic acid*)



$C_{10}H_{12}O_2$ MW, 164

Prisms from H_2O. M.p. 51°. Sol. EtOH, Et_2O, C_6H_6. Mod. sol. hot H_2O.

Kothe, *Ann.*, 1888, **248**, 62.

***p*-Isopropylbenzoic Acid.**
See Cuminic Acid.

***p*-Isopropylbenzyl Alcohol.**
See Cuminyl Alcohol.

***p*-Isopropylbenzylamine.**
See Cuminylamine.

Isopropyl benzyl Ether

$C_6H_5\cdot CH_2\cdot O\cdot CH(CH_3)_2$

$C_{10}H_{14}O$ MW, 150

B.p. 193·5°/744 mm. D_4^{10} 0·9346.

Senderens, *Compt. rend.*, 1924, **178**, 1412.

***p*-Isopropylbenzylidenemalonic Acid** (*Cuminalmalonic acid*)

$C_{13}H_{14}O_4$ MW, 234

Prisms + $1H_2O$ from hot H_2O. M.p. 89–90°, anhyd. 137°: cryst. + $1C_6H_6$ from C_6H_6, m.p. 96–7°. Sol. MeOH, EtOH, AcOH, hot H_2O, hot C_6H_6.
Di-Et ester: $C_{17}H_{22}O_4$. MW, 290. Oil. B.p. 205–8°/11·5 mm.

Knoevenagel, *Ber.*, 1898, **31**, 2616.

Isopropyl benzyl Ketone (β-*Ketoisoamylbenzene*)

$C_6H_5\cdot CH_2\cdot CO\cdot CH(CH_3)_2$

$C_{11}H_{14}O$ MW, 162

B.p. 238–40°. D_4^0 0·985.
Oxime: cryst. from ligroin. M.p. 60–1°.
Semicarbazone: m.p. 140–1° (138°).

Kon, Thorpe, *J. Chem. Soc.*, 1919, **115**, 703.
Lévy, *Bull. soc. chim.*, 1923, **33**, 1661.
Mailhe, *Compt. rend.*, 1913, **157**, 220.

Isopropyl bromide (2-*Bromopropane*)

$CH_3\cdot CHBr\cdot CH_3$

C_3H_7Br MW, 123

M.p. − 89·0°. B.p. 59·35° (60–1°). D^{15} 1·32223. n_D^{15} 1·42847.

Tseng, Hou, *Chem. Abstracts*, 1934, **28**, 3711.
Werner, *J. Soc. Chem. Ind.*, 1933, **52**, 285T.
Timmermans, Martin, *J. chim. phys.*, 1928, **25**, 423.

Isopropylbutylcarbinol (2-*Methylheptanol*-3, 3-*hydroxy-2-methylheptane*)

$CH_3\cdot[CH_2]_3\cdot CH(OH)\cdot CH(CH_3)_2$

$C_8H_{18}O$ MW, 130

d-.
B.p. 72°/17 mm. D_4^{20} 0·8235. $[\alpha]_D^{20}$ + 27·67° in EtOH.
Acid phthalate: m.p. 61–2°.

l-.
B.p. 87°/36 mm.
Acid phthalate: m.p. 61–2°.

dl-.
B.p. 167–8° (162°). D_4^{20} 0·8235. n_D^{20} 1·4265.
Acid phthalate: m.p. 47–8°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 629.

Isopropyl-*tert*.-butylcarbinol (2 : 2 : 4-*Trimethylpentanol*-3, 3-*hydroxy*-2 : 4 : 4-*trimethylpentane*)

$(CH_3)_3C{\cdot}CH(OH){\cdot}CH(CH_3)_2$

$C_8H_{18}O$ MW, 130

M.p. — 13°. B.p. 150–1° (145–8°). D_0^{20} 0·8298. n_D^{20} 1·4288.

Phenylurethane : m.p. 79°.

Favorsky, *Chem. Abstracts*, 1913, **7**, 985.
Whitmore, Houk, *J. Am. Chem. Soc.*, 1932, **54**, 3714.
Haller, Bauer, *Compt. rend.*, 1910, **150**, 582.

Isopropylbutylene.
See 5-Methyl-2-hexene *and* 2-Methyl-3-hexene.

Isopropyl butyl Ether

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH(CH_3)_2$

$C_7H_{16}O$ MW, 116

B.p. 108°/738 mm. D^{15} 0·7594. n_{5461}^{25} 1·3889.

Henstock, *J. Chem. Soc.*, 1931, 372.

Isopropyl *tert*.-butyl Ether

$(CH_3)_3C{\cdot}O{\cdot}CH(CH_3)_2$

$C_7H_{16}O$ MW, 116

B.p. 87·6°. D_4^{25} 0·7365.

Bataafsche Petroleum Maatschappij, F.P., 739,266, (*Chem. Abstracts*, 1933, **27**, 1890).
Edlund, Evans, U.S.P., 1,968,601, (*Chem. Abstracts*, 1934, 5831).
Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2096.

Isopropyl butyl Ketone (3-*Keto*-2-*methylheptane*, 2-*methylheptanone*-3)

$CH_3{\cdot}[CH_2]_3{\cdot}CO{\cdot}CH(CH_3)_2$

$C_8H_{16}O$ MW, 128

B.p. 159–60°. D_4^{20} 0·8175. n_D 1·4113.

Oxime : b.p. 135–7°/22 mm.

Semicarbazone : m.p. 111°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 628.
Wallach, Fry, *Ann.*, 1915, **408**, 197.

Isopropyl *tert*.-butyl Ketone (2 : 2 : 4-*Trimethylpentanone*-3, 3-*keto*-2 : 2 : 4-*trimethylpentane*)

$(CH_3)_3C{\cdot}CO{\cdot}CH(CH_3)_2$

$C_8H_{16}O$ MW, 128

B.p. 134–5°, 59–60°/50 mm. D_0^{20} 0·8054 (0·8065). n_D^{25} 1·40513.

Oxime : m.p. 141°.

Faworsky, Fritzmann, *J. prakt. Chem.*, 1913, **88**, 652.
Umnowa, *Chem. Zentr.*, 1913, I, 1402.

Isopropylcarbinol.
See Isobutyl Alcohol.

4-Isopropylcatechol.
See 3 : 4-Dihydroxycumene.

Isopropyl chloride (2-*Chloropropane*)

$CH_3{\cdot}CHCl{\cdot}CH_3$

C_3H_7Cl MW, 78·5

M.p. — 117°. B.p. 34·8° (36·5°). D^{15} 0·86797. n_D^{15} 1·3811.

Timmermans, *J. chim. phys.*, 1928, **25**, 422.
Norris, U.S.P., 1,825,814, (*Chem. Abstracts*, 1932, **26**, 480).
Underwood, Gale, *J. Am. Chem. Soc.*, 1934, **56**, 2119.
Curme, U.S.P., 1,545,742, (*Chem. Abstracts*, 1925, **19**, 2830).
Norris, Taylor, *J. Am. Chem. Soc.*, 1924, **46**, 753.

***p*-Isopropylcinnamic Acid** (*Cuminalacetic acid*)

CH:CH·COOH

$CH(CH_3)_2$

$C_{12}H_{14}O_2$ MW, 190

Prisms from C_6H_6. M.p. 165°. Sol. EtOH, hot AcOH, hot C_6H_6.

Et ester : $C_{14}H_{18}O_2$. MW, 218. B.p. 167–9°/12 mm.

Chloride : $C_{12}H_{13}OCl$. MW, 208·5. M.p. 25°.

Amide : $C_{12}H_{15}ON$. MW, 189. M.p. 185·6°.

Slotta, Heller, *Ber.*, 1930, **63**, 3038.
Ruzicka, Stoll, *Helv. Chim. Acta*, 1922, **5**, 933.

Isopropylcitraconic Acid.
See Isobutylmaleic Acid.

3-Isopropyl-*o*-cresol (2-*Methyl*-6-*isopropylphenol*, 2-*hydroxy*-m-*cymene*, 2-*hydroxy*-1-*methyl*-3-*isopropylbenzene*)

CH_3

OH
$CH(CH_3)_2$

$C_{10}H_{14}O$ MW, 150

Pale green liq. B.p. 225–6°/760 mm. Sol. ord. org. solvents. Spar. sol. H_2O. D^0 0·9986,

$D^{15\cdot2}$ 0·9865. $n_D^{15\cdot2}$ 1·5239. $FeCl_3$ ⟶ orange-yellow col. Conc. H_2SO_4 in AcOH ⟶ red col. Hot NaOH ⟶ green col.

Me ether: $C_{11}H_{16}O$. MW, 164. B.p. 210–11°/760 mm. D^0 0·9515, $D^{14\cdot6}$ 0·9397. $n_D^{14\cdot6}$ 1·5006.

Guillaumin, *Bull. soc. chim.*, 1910, **7**, 335.

5-Isopropyl-o-cresol (*2-Methyl-4-isopropylphenol, 6-hydroxy-*m*-cymene, 6-hydroxy-1-methyl-3-isopropylbenzene*).

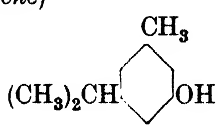
B.p. 231°, 227·5–229·5°/758 mm. Sol. H_2O. D^0 1·00122, D^{100} 0·91971. KOH fusion ⟶ 5-isopropylsalicylic acid + 4-hydroxyisophthalic acid. No col. with $FeCl_3$.

Me ether: b.p. 217°.

Et ether: $C_{12}H_{18}O$. MW, 178. B.p. 227·2–229·2° (224°). D^0 0·93866, D^{100} 0·85758.

Spica, *Gazz. chim. ital.*, 1882, **12**, 552.
Jesurun, *Ber.*, 1886, **19**, 1413.
Jordan, U.S.P., 1,782,966, (*Chem. Abstracts*, 1931, **25**, 303).

5-Isopropyl-m-cresol (*3-Methyl-5-isopropylphenol, 5-hydroxy-*m*-cymene, 5-hydroxy-1-methyl-3-isopropylbenzene*)

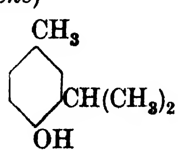


$C_{10}H_{14}O$ MW, 150

Cryst. M.p. 54°. B.p. 241°. No col. with $FeCl_3$.

Knoevenagel, *Ber.*, 1894, **27**, 2347.

3-Isopropyl-p-cresol (*4-Methyl-2-isopropylphenol, 4-hydroxy-*m*-cymene, 4-hydroxy-1-methyl-3-isopropylbenzene*)



$C_{10}H_{14}O$ MW, 150

Needles from AcOH. M.p. 36°. B.p. 228–9°/763 mm. D^0 0·9954, $D_4^{17\cdot8}$ 0·9817. $n_D^{17\cdot8}$ 1·5244. Sol. ord. org. solvents. 100 Parts H_2O dissolve 0·166 parts.

Me ether: $C_{11}H_{16}O$. MW, 164. B.p. 213–14°. D^0 0·9554, $D^{14\cdot8}$ 0·9435. $n_D^{14\cdot8}$ 1·5087.

Guillaumin, *Bull. soc. chim.*, 1910, **7**, 339.

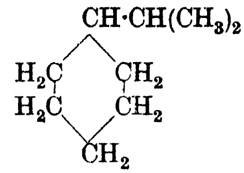
Isopropylcresotinic Acid.
See Hydroxyisopropyltoluic Acid.

Isopropyl cyanide.
See under Isobutyric Acid.

2-Isopropyl-3-cyanobutyric Ester.
See under 2-Isopropylglutaric Acid.

1-Isopropyl-1-cyanovaleric Acid.
See under Propylisopropylmalonic Acid.

Isopropylcyclohexane (*Hexahydrocumene*)

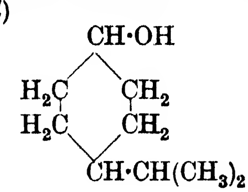


C_9H_{18} MW, 126

Oil. B.p. 154·7°. D^{20} 0·7902.

Sabatier, Senderens, *Ann. chim. phys.*, 1905, **4**, 367.
Matsubara, Perkin, *J. Chem. Soc.*, 1905, **87**, 671.

4-Isopropylcyclohexanol (*Hexahydro-*p*-isopropylphenol*)



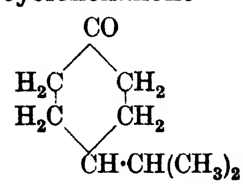
$C_9H_{18}O$ MW, 142

M.p. 8–10°. B.p. 143°/10 mm. D_{15}^{15} 0·9232. n_D^{20} 1·4661.

Phenylurethane: m.p. 75–7°.

Cahn, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 1369.

4-Isopropylcyclohexanone



$C_9H_{16}O$ MW, 140

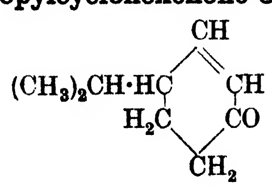
B.p. 139–40°/100 mm. D_{25}^{25} 0·9185. n_D^{25} 1·4552.

Semicarbazone: m.p. 188–9°.

p-*Nitrophenylhydrazone*: m.p. 123–4°.

See previous reference.

6-Isopropylcyclohexenone-3



$C_9H_{14}O$ MW, 138

Occurs in *Eucalyptus cneorifolia*, D.C. B.p. 98–100°/10 mm. D_{15}^{15} 0·9476. n_D^{20} 1·484. $[\alpha]_D^{18}$ − 64·5°.
Semicarbazone: m.p. 185°.
p-*Nitrophenylhydrazone*: m.p. 168–9°.
2 : 4-*Dinitrophenylhydrazone*: m.p. 137·5–138°.

Hooper, Macbeth, Price, *J. Chem. Soc.*, 1934, 1149.
Cahn, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 1368.

Isopropyl cyclohexyl Ketone.
See Hexahydroisobutyrophenone.
Isopropyldecylcarbinol.
See 2-Methyltridecanol-3.
Isopropyl decyl Ketone.
See 2-Methyltridecanone-3.
Isopropyl 2 : 4-dihydroxyphenyl Ketone.
See 4-Isobutyrylresorcinol.
Isopropylethylene.
See 3-Methylbutylene-1.

Isopropylfumaric Acid (3-*Methyl*-1-*butylene*-1 : 1-*dicarboxylic acid, dimethylmesaconic acid*)

$(CH_3)_2CH{\cdot}C{\cdot}COOH$
$HOOC{\cdot}CH$

$C_7H_{10}O_4$ MW, 158

Cryst. from H_2O. M.p. 186–7°. B.p. 205°/18 mm. Sol. EtOH, Et_2O, hot H_2O. Spar. sol. $CHCl_3$.
Di-Et ester: $C_{11}H_{18}O_4$. MW, 214. B.p. 240–1°.
Et ester-amide: $C_9H_{15}O_3N$. MW, 185. M.p. 94–5°.
Diamide: $C_7H_{12}O_2N_2$. MW, 156. M.p. 240° decomp.

Walden, *Ber.*, 1891, **24**, 2038.
Ssemenow, *Chem. Zentr.*, 1899, I, 780.

1-Isopropylglutaric Acid (2-*Methylpentane*-3 : 5-*dicarboxylic acid, isohexane*-3 : 5-*dicarboxylic acid*)

$(CH_3)_2CH{\cdot}CH{\cdot}COOH$
CH_2
$CH_2{\cdot}COOH$

$C_8H_{14}O_4$ MW, 174

d-.
Needles from hot H_2O. M.p. 95° (88–9°). $[\alpha]_D^{15}$ + 9·35° in EtOH.
Anhydride: $C_8H_{12}O_3$. MW, 156. M.p. 55–6°. $[\alpha]_D^{15}$ − 10·0° in EtOH.
Mono-anilide: m.p. 155–6°. $[\alpha]_D^{15}$ + 11·5° in EtOH.

dl-.
M.p. 95°.
Acid brucine salt: m.p. 110° decomp. $[\alpha]_D^{15}$ − 19·4° in EtOH.
Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 158–60°/45 mm.

Read, Reid, *J. Soc. Chem. Ind.*, 1928, **47**, 11T.
Treibs, *Ber.*, 1931, **64**, 2551.

2-Isopropylglutaric Acid

$CH_2{\cdot}COOH$
$(CH_3)_2CH{\cdot}CH$
$CH_2{\cdot}COOH$

$C_8H_{14}O_4$ MW, 174

Cryst. from $CHCl_3$–pet. ether. M.p. 102–102·5°. Sol. H_2O, Et_2O, C_6H_6. Spar. sol. EtOH, $CHCl_3$, CS_2, $CHCl_3$.
Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 250°.
Et ester-nitrile: 2-isopropyl-3-cyanobutyric ester. $C_{10}H_{17}O_2N$. MW, 183. B.p. 234°/755 mm.
Anhydride: $C_8H_{12}O_3$. MW, 156. Oil. B.p. 171°/30 mm.
Imide: $C_8H_{13}O_2N$. MW, 155. Plates from H_2O. M.p. 120°.
Monoanilide: plates from EtOH. M.p. 121°.

Crossley, Pratt, *J. Chem. Soc.*, 1915, **107**, 174.

N-Isopropylglycine (N-*Isopropylaminoacetic acid*)

$(CH_3)_2CH{\cdot}NH{\cdot}CH_2{\cdot}COOH$

$C_5H_{11}O_2N$ MW, 117

Cryst. from EtOH. M.p. 192–3° decomp.
B,HCl: m.p. 203–204·5°.

Scheibler, Baumgarten, *Ber.*, 1922, **55**, 1379.

Isopropylglyoxylic Acid.
See 1-Ketoisovaleric Acid.

Isopropyl-n-hexylcarbinol (2-*Methylnonanol*-3)

$CH_3{\cdot}[CH_2]_5{\cdot}CH(OH){\cdot}CH(CH_3){\cdot}CH_3$

$C_{10}H_{22}O$ MW, 158

d-.
B.p. 115°/28 mm. D_4^{20} 0·8290. n_D^{20} 1·4346. $[\alpha]_D^{20}$ + 21·46°, + 24·28° in EtOH.

dl-.
B.p. 200°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 624.

Isopropyl *n*-hexyl Ketone (*3-Keto-2-methylnonane*, *2-methylnonanone-3*)

$CH_3\cdot[CH_2]_5\cdot CO\cdot CH(CH_3)_2$

$C_{10}H_{20}O$ MW, 156

B.p. 200–2°/700 mm. D^0 0·843. Forms no oxime or semicarbazone.

Nicolle, *Bull. soc. chim.*, 1926, **39**, 61.

Isopropylhydrazine

$(CH_3)_2CH\cdot NH\cdot NH_2$

$C_3H_{10}N_2$ MW, 74

B.p. 106–7°/750 mm. Sol. H_2O, EtOH, C_6H_6, AcOEt. Spar. sol. Et_2O. Reduces $AgNO_3$, Fehling's, and K_2CrO_4 in the cold.

B,HCl: m.p. 114° (122–3°).

Dibenzoyl deriv.: m.p. 164·5–165° (161·5°).

N-*Isopropylidene*: acetone isopropylhydrazone. B.p. 132–4°/750 mm.

Lochte, Noyes, Bailey, *J. Am. Chem. Soc.*, 1922, **44**, 2562.
Taipale, *Chem. Zentr.*, 1924, I, 902.

α-Isopropylhydrocinnamic Acid (*1-Isopropyl-2-phenylpropionic acid*, *isopropylbenzylacetic acid*)

$C_6H_5\cdot CH_2\cdot CH(CH(CH_3)_2)\cdot COOH$

$C_{12}H_{16}O_2$ MW, 192

Oil. B.p. 305–8°, 155–60°/6 mm.

Et ester: $C_{14}H_{20}O_2$. MW, 220. B.p. 274–6°.

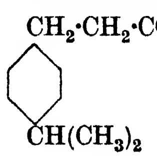
Chloride: $C_{12}H_{15}OCl$. MW, 210·5. B.p. 156–8°/22 mm.

Amide: $C_{12}H_{17}ON$. MW, 191. M.p. 94–5°.

Anilide: m.p. 126·1°.

Ishikawa, Katoh, *Chem. Abstracts*, 1934, 2698.
Guerbet, *Compt. rend.*, 1908, **146**, 1407.

***p*-Isopropylhydrocinnamic Acid** (*Cuminylacetic acid*)



$C_{12}H_{16}O_2$ MW, 192

Leaflets from ligroin. M.p. 75·5° (73°). Sol. pet. ether, hot EtOH.

Amide: $C_{12}H_{17}ON$. MW, 191. M.p. 142°.

Slotta, Heller, *Ber.*, 1930, **63**, 3038.

Isopropylhydroquinone.
See 2 : 5-Dihydroxycumene.

Isopropyl hydroxytolyl Ketone.
See Hydroxymethylisobutyrophenone.

Isopropylidene-acetone.
See Mesityl oxide.

Isopropylideneaniline.
See under Acetone.

Isopropylidene bromide.
See 2 : 2-Dibromopropane.

1-Isopropylidenebutane.
See 2-Methyl-2-hexene.

3-Isopropylidenebutyric Acid.
See 3-Isoheptenic Acid.

Isopropylidene chloride.
See 2 : 2-Dichloropropane.

Isopropylidene chlorobromide.
See 2-Chloro-2-bromopropane.

Isopropylidene-ethane.
See 2-Methylbutylene-2.

2-[Isopropylidene-ethyl]-guanidine.
See Galegine.

1 : 2-Isopropylidene-glycerol (*Acetone-glycerol*)

CH_2OH
$CH{-}O\diagdown$
$\quad\quad\quad\; > C(CH_3)_2$
$CH_2{\cdot}O\diagup$

$C_6H_{12}O_3$ MW, 132

B.p. 104–6°/31 mm., 94–6°/21 mm., 82·5–83°/13 mm. D_4^{20} 1·064. n_D 1·4383. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6.

Acetyl: b.p. 84°/9 mm. D_4^{15} 1·0770. n_D^{15} 1·42881.

1-*Bromopropionyl*: b.p. 138°/19 mm.

Caproyl: b.p. 124°/3 mm.

Lauryl: b.p. 151–2°/0·2 mm. D^{13} 0·9537. n_D^{13} 1·4454.

Palmityl: m.p. 34–5°.

Stearyl: m.p. 40–1°.

Benzoyl: m.p. 34–5°. B.p. 164–5°/9–10 mm.

p-*Bromobenzoyl*: m.p. 39–40°.

3 : 5-*Dinitrobenzoyl*: m.p. 85°.

p-*Toluenesulphonyl*: m.p. 47°.

Me ether: $C_7H_{14}O_3$. MW, 146. B.p. 154°/774 mm., 58–60°/14 mm.

Hibbert, Morazain, *Canadian Journal of Research*, 1930, **2**, 214.
Irvine, Macdonald, Soutar, *J. Chem. Soc.*, 1915, **107**, 343.
Sabalitschka, *Arch. Pharm.*, 1931, **269**, 228.

3-Isopropylidene-pentane.
See 2-Methyl-3-ethyl-pentene-2.

1-Isopropylidenepropane.
See 2-Methylpentene-2.

1-Isopropylidene-propionic Acid.
See Trimethylacrylic Acid.

2-Isopropylidene-propionic Acid.
See Pyroterebic Acid.

3-Isopropylidenepropylene.
See 4-Methyl-1 : 3-pentadiene.

Isopropylidenesuccinic Acid (*Teraconic acid*, 3 : 3-*dimethylitaconic acid*, 3-*methyl*-2-*butylene*-1 : 2-*dicarboxylic acid*)

$$(CH_3)_2C{:}C{\cdot}COOH$$
$$CH_2{\cdot}COOH$$

$C_7H_{10}O_4$ MW, 158

Cryst. from Et_2O. M.p. 160–1°. Sol. EtOH, hot H_2O. Mod. sol. Et_2O. Spar. sol. C_6H_6, $CHCl_3$. Heat of comb. 796·1 Cal. k (first) = $1{\cdot}4 \times 10^{-6}$ at 23°: (second) = $0{\cdot}46 \times 10^{-6}$ at 100°.

Mono-Et ester: $C_9H_{14}O_4$. MW, 186. M.p. 118–20°.

Di-Et ester: $C_{11}H_{18}O_4$. MW, 214. M.p. 44°. B.p. 254–5°, 197°/22 mm.

Anhydride: $C_7H_8O_3$. MW, 140. Plates from CS_2. M.p. 44°. B.p. 197°/22 mm.

Fittig, Krafft, *Ann.*, 1899, **304**, 196.
Stobbe, *Ber.*, 1903, **36**, 198.
Stollé, *J. prakt. Chem.*, 1903, **67**, 199.

Isopropyl iodide (2-*Iodopropane*)

$$CH_3{\cdot}CHI{\cdot}CH_3$$

C_3H_7I MW, 170

F.p. − 90·1°. B.p. 89·45°. D_4^{20} 1·7033. n_D^{20} 1·5026.

Knoll, D.R.P., 230,172, (*Chem. Zentr.*, 1911, I, 359).
Récsei, *Biochem. Z.*, 1927, **190**, 57.
Timmermans, Delcourt, *J. chim. phys.*, 1934, **31**, 89.

Isopropylisoamylcarbinol.
See 2 : 6-Dimethylheptanol-3.

Isopropyl isoamyl Ketone (2 : 6-*Dimethylheptanone*-3, 3-*keto*-2 : 6-*dimethylheptane*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH(CH_3)_2$$

$C_9H_{18}O$ MW, 142

B.p. 171–2°.

Blaise, *Compt. rend.*, 1901, **132**, 479.

Isopropylisobutylcarbinol.
See 2 : 5-Dimethylhexanol-3.

Isopropyl isobutyl Ketone (2 : 5-*Dimethylhexanone*-3, 3-*keto*-2 : 5-*dimethylhexane*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CO{\cdot}CH(CH_3)_2$$

$C_8H_{16}O$ MW, 128

B.p. 147–8° (146–8°). D_0^{20} 0·81223.

Oxime: b.p. 201–3°.

Semicarbazone: m.p. 142°.

Faworsky, Zacharowa, *J. prakt. Chem.*, 1913, **88**, 686.
Sernagiotto, *Atti accad. Lincei*, 1919, **28**, i, 435.
Mayberry, Aston, *J. Am. Chem. Soc.*, 1934, **56**, 2682.

Isopropylisobutyrylcarbinol.
See Isobutyroin.

Isopropyl isocyanate

$$(CH_3)_2CH{\cdot}NCO$$

C_4H_7ON MW, 85

B.p. 70–75°.

Mauguin, *Compt. rend.*, 1909, **149**, 792; *Ann. chim.*, 1911, **22**, 319.

Isopropyl isocyanide (*Isopropyl carbylamine*)

$$(CH_3)_2CH{\cdot}NC$$

C_4H_7N MW, 69

B.p. 87°. D^0 0·7596.

Gautier, *Ann.*, 1869, **149**, 156.

Isopropyl isothiocyanate (*Isopropyl mustard oil*)

$$(CH_3)_2CH{\cdot}NCS$$

C_4H_7NS MW, 101

B.p. 137–137·5°.

Jahn, *Monatsh.*, 1882, **3**, 168.

Isopropylmaleic Acid (*Dimethylcitraconic acid*, 3-*methyl*-1-*butylene*-1 : 2-*dicarboxylic acid*)

$$(CH_3)_2CH{\cdot}C{\cdot}COOH$$
$$HC{\cdot}COOH$$

$C_7H_{10}O_4$ MW, 158

Needles from Et_2O–ligroin. M.p. 91–3° decomp. Sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$. Insol. ligroin.

Anhydride: $C_7H_8O_3$. MW, 140. M.p. 5·25°. B.p. 138°/61 mm. D_0^0 1·1425.

Fittig, Krafft, *Ann.*, 1899, **304**, 196.
Ssemenow, *Chem. Zentr.*, 1899, I, 780.

Isopropylmalonic Acid (*Isobutane*-1 : 1-*dicarboxylic acid*)

$$(CH_3)_2CH{\cdot}CH{<}^{COOH}_{COOH}$$

$C_6H_{10}O_4$ MW, 146

d-.

Monoamide: $C_6H_{11}O_3N$. MW, 145. M.p. 158°. $[\alpha]_D^{18}$ + 49·81° in EtOH. *Me ester*: $C_7H_{13}O_3N$. MW, 159. M.p. 141°. $[\alpha]_D^{18}$ + 55·41° in EtOH.

l-.

B.p. 95–105° in high vacuum. D_4^{18} 1·105. $[\alpha]_D^{18}$ − 0·87°.

Mono-Me ester: $C_7H_{12}O_4$. MW, 160. B.p. 95–100° in vacuo.

Monoamide: $[\alpha]_D^{18}$ − 44·4° in EtOH.

dl-.

M.p. 87°. *k* (first) = 1·7 × 10^{-4} at 25°: (second) = 13·2 × 10^{-7} at 25°.

Mono-Me ester: b.p. 95–100°/0·3 mm. D^4 1·1055. *Amide*: $C_7H_{13}O_3N$. MW, 159. M.p. 121°.

Di-Me ester: $C_8H_{14}O_4$. MW, 174. B.p. 195°/770 mm.

Mono-Et ester: $C_8H_{14}O_4$. MW, 174. *K salt*: m.p. 92–3°. *Nitrile*: $C_8H_{13}O_2N$. MW, 155. B.p. 218–19°/745 mm., 115–16°/24–5 mm. $D^{29 \cdot 2}$ 0·952.

Di-Et ester: $C_{10}H_{18}O_4$. MW, 202. B.p. 215–17°, 188–188·5°/330 mm. D_{15}^{20} 0·997.

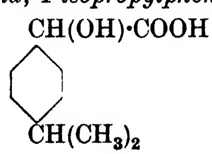
Monoamide: $C_6H_{11}O_3N$. MW, 145. M.p. 158°. *K salt*: m.p. 215°. *Nitrile*: 1-cyano-isovaleramide. $C_6H_{10}ON_2$. MW, 126. M.p. 125°. B.p. 277°/755 mm.

Mononitrile: 1-cyanoisovaleric acid. $C_6H_9O_3N$. MW, 143. B.p. 166–8°/28 mm. decomp.

Di-nitrile: $C_6H_8N_2$. MW, 108. B.p. 204–5°/752 mm. $D^{18 \cdot 6}$ 0·9228.

Lyman, Reid, *J. Am. Chem. Soc.*, 1917, **39**, 701.
Volwiler, Tabern, *J. Am. Chem. Soc.*, 1930, **52**, 1679.
Fischer, Brauns, *Ber.*, 1914, **47**, 3181.
Marshall, *Rec. trav. chim.*, 1932, **51**, 236.

4-Isopropylmandelic Acid (*α-Hydroxy-4-isopropyl-α-toluic acid, α-hydroxy-4-isopropyl-phenylacetic acid, 4-isopropylphenylglycollic acid*)



$C_{11}H_{14}O_3$ MW, 194

d-.

Leaflets from H_2O. M.p. 153–4°. Sol. EtOH. $[\alpha]_D^{17}$ 134·9° in EtOH. Boiling H_2O ⟶ *dl*-form.

l-.

Leaflets from EtOH.Aq. M.p. 153–4°. Sol. EtOH. $[\alpha]_D^{17}$ − 135° in EtOH. Boiling H_2O ⟶ *dl*-form.

dl-.

Needles from H_2O. M.p. 158° (156–7°). Sol. Et_2O. Mod. sol. EtOH. Spar. sol. H_2O.

Me ether: $C_{12}H_{16}O_3$. MW, 208. Plates from H_2O. M.p. 52–3°.

Acetyl: prisms + $1H_2O$ from pet. ether. M.p. 60–1°.

Me ester: $C_{12}H_{16}O_3$. MW, 208. Needles from pet. ether. M.p. 80°.

Et ester: $C_{13}H_{18}O_3$. MW, 222. Cryst. M.p. 40–1°.

Amide: $C_{11}H_{15}O_2N$. MW, 193. Needles from C_6H_6. M.p. 116°. Sol. EtOH, Et_2O, hot C_6H_6, $CHCl_3$. Spar. sol. H_2O. Insol. pet. ether, CS_2. *Benzoyl*: cryst. M.p. 182°.

Nitrile: cuminaldehyde cyanhydrin. $C_{11}H_{13}ON$. MW, 175. *Benzoyl*: needles from EtOH. M.p. 68–9° (65°).

Plöschl, *Ber.*, 1881, **14**, 1316.
Fileti, Amorretti, *Gazz. chim. ital.*, 1891, **21**, 42.
Fileti, *Gazz. chim. ital.*, 1892, **22**, 397.
Francis, Davis, *J. Chem. Soc.*, 1909, **95**, 1406.
Aloy, Rabaut, *Bull. soc. chim.*, 1918, **23**, 99.

Isopropyl Mercaptan (*2-Mercaptopropane, thioisopropyl alcohol*)

$CH_3 \cdot CH(SH) \cdot CH_3$

C_3H_8S MW, 76

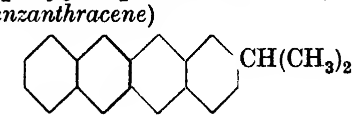
M.p. − 130·7°. B.p. 58°. D_4^{25} 0·80851. n_D^{25} 1·4223.

Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1220.
Ellis, Reid, *J. Am. Chem. Soc.*, 1932, **54**, 1677.

Isopropylmesaconic Acid.

See Isobutylfumaric Acid.

2-Isopropylnaphthacene (*2-Isopropyl-2′ : 3′-benzanthracene*)

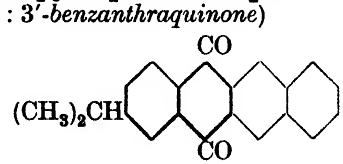


$C_{21}H_{18}$ MW, 270

Orange leaflets from xylene. M.p. 273–4°. Spar. sol. ord. org. solvents.

Cook, *J. Chem. Soc.*, 1934, 1412.

8-Isopropylnaphthacenequinone (*8-Iso-propyl-2′ : 3′-benzanthraquinone*)

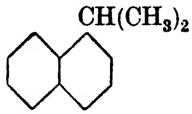


$C_{21}H_{16}O_2$ MW, 300

Yellow needles from EtOH. M.p. 131–2°.

Cook, *J. Chem. Soc.*, 1934, 1412.

1-Isopropylnaphthalene

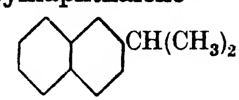


$C_{13}H_{14}$ MW, 170

B.p. 263–4°/769 mm., 132°/12 mm. n_D 1·5756.
Picrate: m.p. 85–6°.
Dimeride: $C_{26}H_{28}$. MW, 340. M.p. 198·5–199·5°.

Herzenberg, Winterfeld, Pasch, *Ber.*, 1931, **64**, 1043.
Cook, *J. Chem. Soc.*, 1932, 466.
Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 743.
Schering-Kahlbaum, E.P., 293,001, (*Chem. Abstracts*, 1929, **23**, 1421).
Roblin, Davidson, Bogert, *J. Am. Chem. Soc.*, 1935, **57**, 158.

2-Isopropylnaphthalene

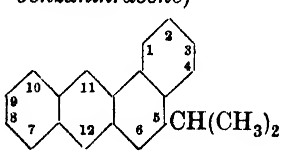


$C_{13}H_{14}$ MW, 170

B.p. 263–5°, 129–30°/14 mm. (130–5°/12 mm.).
Picrate: m.p. 93–5° (91–3°, 89–90°).

Barbot, *Bull. soc. chim.*, 1930, **47**, 1318.
Haworth, Letsky, Mavin, *J. Chem. Soc.*, 1932, 1790.
See also second reference above.

5-Isopropylnaphthanthracene (*5-Isopropyl-1′ : 2′-benzanthracene*)



$C_{21}H_{18}$ MW, 270

Cryst. from AcOH. M.p. 92°.
Picrate: m.p. 157°.

Cook, *J. Chem. Soc.*, 1932, 468.

8-Isopropylnaphthanthracene (*8-Isopropyl-1′ : 2′-benzanthracene*).
Needles from EtOH. M.p. 132–3°. Carcinogenic.
Picrate: m.p. 118°.

Cook, *J. Chem. Soc.*, 1932, 463.

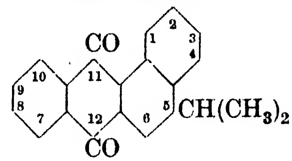
9-Isopropylnaphthanthracene (*9-Isopropyl-1′ : 2′-benzanthracene*).
Leaflets from EtOH. M.p. 125°.
Picrate: m.p. 152°.

Cook, *J. Chem. Soc.*, 1932, 464.

12-Isopropylnaphthanthracene (*12-Isopropyl-1′ : 2′-benzanthracene*).
Cryst. from AcOH. M.p. 94–5°.
Picrate: m.p. 157–8°.

Cook, *J. Chem. Soc.*, 1932, 468.

5-Isopropylnaphthanthraquinone (*5-Isopropyl-1′ : 2′-benzanthraquinone*)



$C_{21}H_{16}O_2$ MW, 300

Yellow needles from cyclohexane. M.p. 154–5°.

See previous reference.

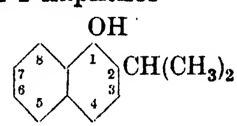
8-Isopropylnaphthanthraquinone (*8-Isopropyl-1′ : 2′-benzanthraquinone*).
Orange needles from EtOH. M.p. 94°.

Cook, *J. Chem. Soc.*, 1932, 464.

9-Isopropylnaphthanthraquinone (*9-Isopropyl-1′ : 2′-benzanthraquinone*).
Yellow needles from EtOH. M.p. 114–15°.

Cook, *J. Chem. Soc.*, 1932, 465.

2-Isopropyl-1-naphthol



$C_{13}H_{14}O$ MW, 186

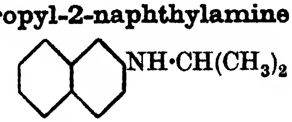
Leaflets from ligroin. M.p. 65–6°. B.p. 207–9°/30 mm.
Benzoyl: m.p. 121°.
Me ether: $C_{14}H_{16}O$. MW, 200. B.p. 217–22°/50–5 mm.

Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 744.

4-Isopropyl-1-naphthol.
Needles. M.p. 72°. B.p. 304–9°.

Schering-Kahlbaum, D.R.P., 528,150, (*Chem. Abstracts*, 1931, **25**, 4557).
Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 743.

***N*-Isopropyl-2-naphthylamine**



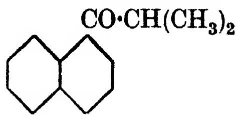
$C_{13}H_{15}N$ MW, 185

B.p. 307–10°, 160–5°/10 mm.
B,HCl: m.p. 209–10°.

N-*Benzoyl*: m.p. 96–8°.
N-p-*Toluenesulphonyl*: m.p. 119–20°.

Heap, *J. Chem. Soc.*, 1933, 495.

Isopropyl 1-naphthyl Ketone (1-*Isobutyryl-naphthalene*)

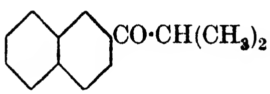


$C_{14}H_{14}O$ MW, 198

B.p. 308–10°, 172–4°/8 mm. Sol. ord. org. solvents. D^0 1·0761.
Oxime: m.p. 140°.
Picrate: m.p. 66–7°.

Rousset, *Bull. soc. chim.*, 1896, **15**, 66.
Volmar, *Compt. rend.*, 1910, **150**, 1175.

Isopropyl 2-naphthyl Ketone (2-*Isobutyryl-naphthalene*)



$C_{14}H_{14}O$ MW, 198

B.p. 312–14°, 176°/8 mm. Sol. EtOH, Et_2O, C_6H_6, CS_2. D^0 1·0617.
Oxime: m.p. 121–2°. B.p. 202–3°/12 mm.

Rousset, *Bull. soc. chim.*, 1896, **15**, 68.

Isopropyl nitrate

$(CH_3)_2CH{\cdot}O{\cdot}NO_2$

$C_3H_7O_3N$ MW, 105

B.p. 101–2°. D^{19} 1·036. n_D 1·391.

Silva, *Ann.*, 1870, **154**, 256.

Isopropyl nitrite

$(CH_3)_2CH{\cdot}O{\cdot}NO$

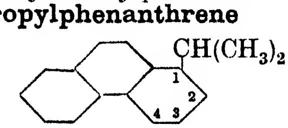
$C_3H_7O_2N$ MW, 89

B.p. 45°/762 mm., 39–39·5°/752 mm. D^0 0·856.

Silva, *Bull. soc. chim.*, 1869, **12**, 227.
Bewad, *Ber.*, 1892, **25**, 571R.

3-Isopropylpentanol-2.
See 2-Methyl-3-ethylpentanol-4.

1-Isopropylphenanthrene



$C_{17}H_{16}$ MW, 220

Prisms from EtOH. M.p. 85–6°.
Picrate: yellow needles from MeOH. M.p. 125–6°.

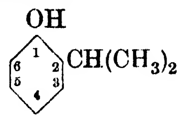
Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

2-Isopropylphenanthrene.
Prisms from EtOH. M.p. 44–5°.
Picrate: yellow needles from MeOH. M.p. 108°.

See previous reference.

Isopropylphenetole.
See under Isopropylphenol.

***o*-Isopropylphenol** (o-*Hydroxycumene*)



$C_9H_{12}O$ MW, 136

M.p. 15–16°. B.p. 212–14°. D^{20} 1·012. n_D^{20} 1·5315.
Me ether: *o*-isopropylanisole. $C_{10}H_{14}O$. MW, 150. B.p. 198–9°/751 mm. D^{16} 0·9532. n_D^{15} 1·50891.
Et ether: *o*-isopropylphenetole. $C_{11}H_{16}O$. MW, 164. B.p. 208·6–209·6°/762·2 mm. D_4^0 0·94438.
Isopropyl ether: $C_{12}H_{18}O$. MW, 178. B.p. 225–7°/745 mm. D^{25} 0·9192. n_D^{25} 1·4948.

Smith, *J. Am. Chem. Soc.*, 1934, **56**, 718.
Niederl, Storch, *J. Am. Chem. Soc.*, 1933, **55**, 293.
Sowa, Hinton, Nieuwland, *ibid.*, 3402.

***m*-Isopropylphenol** (m-*Hydroxycumene*).
M.p. 26°. B.p. 228°. Spar. sol. H_2O.
Me ether: *m*-isopropylanisole. B.p. 210–11°. D^0 0·9624.

Behal, Tiffeneau, *Bull. soc. chim.*, 1908, **3**, 317.
Jacobsen, *Ber.*, 1878, **11**, 1062.

***p*-Isopropylphenol** (p-*Hydroxycumene*).
M.p. 61°. B.p. 223–5°. D^{20} 0·990. n_D^{20} 1·5228.
Me ether: *p*-isopropylanisole. B.p. 212–13°/758 mm., 95–6°/19 mm. D_4^{17} 0·94952. n_D^{17} 1·5045.
Et ether: *p*-isopropylphenetole. B.p. 219·7–220·7°/757·7 mm.

Bert, *Compt. rend.*, 1923, **177**, 452.
Jordan, U.S.P., 1,782,966, (*Chem. Abstracts*, 1931, **25**, 303).
Smith, *J. Am. Chem. Soc.*, 1934, **56**, 718.
Schering-Kahlbaum, F.P., 684,037, (*Chem. Abstracts*, 1930, **24**, 5307).
Krauz, Remenec, *Chem. Abstracts*, 1930, **24**, 1365.

Isopropylphenylacetone.
See Isobutyl benzyl Ketone.

Isopropylphenylcarbinol (*α-Hydroxyisobutylbenzene, 1-hydroxy-3-methyl-1-phenylpropane, 1-hydroxy-1-phenylisobutane*)

$C_6H_5 \cdot CH(OH) \cdot CH(CH_3)_2$

$C_{10}H_{14}O$ MW, 150

B.p. 222–4°, 110–11°/13 mm., 97·5–98·5°/9 mm. D_{20}^{20} 0·9790. $n_D^{13\cdot7}$ 1·51932.
Acetyl: b.p. 122–5°/20 mm., 118–20°/16 mm., 106–8°/9·5 mm.

Stephens, *J. Am. Chem. Soc.*, 1928, **50**, 190.
Franke, Klein, *Monatsh.*, 1912, **33**, 1237.
Faworsky, Mandryka, *Chem. Zentr.*, 1913, I, 1010.

Isopropyl phenyl Ether

$C_6H_5 \cdot O \cdot CH(CH_3)_2$

$C_9H_{12}O$ MW, 136

B.p. 178°. D^{20} 0·978. n_D^{20} 1·4992.

Levaillant, *Compt. rend.*, 1929, **188**, 261.
Smith, *J. Am. Chem. Soc.*, 1934, **56**, 718.

Isopropyl phenylethyl Ketone (*2-Methyl-5-phenylpentanone-3*)

$C_6H_5 \cdot CH_2 \cdot CH_2 \cdot CO \cdot CH(CH_3)_2$

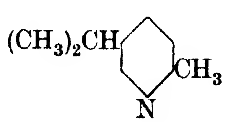
$C_{12}H_{16}O$ MW, 176

B.p. 256°, 126–7°/8 mm. D_4^0 0·9755.
Oxime: b.p. 156–8°/8 mm.
Semicarbazone: m.p. 93° (86°).

Senderens, *Compt. rend.*, 1911, **152**, 384.
Rupe, Hirschmann, *Helv. Chim. Acta*, 1931, **14**, 699.

Isopropyl phenyl Ketone.
See Isobutyrophenone.

5-Isopropyl-α-picoline (*2-Methyl-5-isopropylpyridine*)

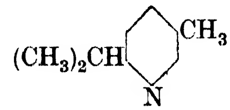


$C_9H_{13}N$ MW, 135

B.p. 190–1°, 73–4°/15 mm. D^0 0·9237, D^{15} 0·9114.
B,HAuCl₄: m.p. 93–4°.
B_2,H_2PtCl_6: reddish-yellow cryst. + H_2O. M.p. 93–4°, anhyd. 137–8° (131°).
Picrate: yellow cryst. M.p. 167·5° (166–7°).

Oparina, *Chem. Abstracts*, 1930, **24**, 4785.
Curtius, Bertho, *Ber.*, 1926, **59**, 588.

6-Isopropyl-β-picoline (*3-Methyl-6-isopropylpyridine*)

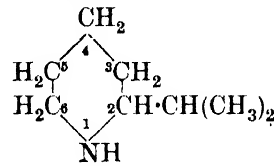


$C_9H_{13}N$ MW, 135

B_2,H_2PtCl_6: cryst. M.p. 163–4° decomp.
Picrate: prisms from EtOH. M.p. 146°.

Bertho, Curtius, Schmidt, *Ber.*, 1927, **60**, 1719.

2-Isopropylpiperidine



$C_8H_{17}N$ MW, 127

dl-.
B.p. 162°. D^0 0·8668. Spar. sol. H_2O.
B,HCl: cryst. from EtOH–Me_2CO. M.p. 216° (210°).
B,HBr: m.p. 233°.
B,HI: leaflets from C_6H_6. M.p. 243°.
B_2,H_2PtCl_6: m.p. 215–16° (193–193·5°).
Chloroaurate: m.p. 123–4°.
Picrate: cryst. from EtOH.Aq. M.p. 137–8°.
N-Me: $C_9H_{19}N$. MW, 141. B.p. 165–7°. D^0 0·8593. *$B,HAuCl_4$*: m.p. 131°. *B_2,H_2PtCl_6*: plates from H_2O. M.p. 99–100°. *Picrate*: yellow needles from H_2O. M.p. 149°.

l-.
B.p. 161·5°. D^{19} 0·8503. $[\alpha]_D$ − 13·1°.
B,HCl: needles from Me_2CO. M.p. 232°.
Chloroplatinate: m.p. 213–14°.
Acid d-tartrate: m.p. 51·5–52·5°.

Ladenburg, *Ann.*, 1888, **247**, 73.
Sobecki, *Ber.*, 1908, **41**, 4105.

4-Isopropylpiperidine.
B.p. 168–71°. Fumes in air. Mod. sol. H_2O.
B_2,H_2PtCl_6: yellow prisms. M.p. 172°.

Ladenburg, *Ann.*, 1888, **247**, 79.

Isopropylpropenylcarbinol.
See 5-Methyl-2-hexenol-4.

Isopropylpropiolic Acid (*3 : 3-Dimethyltetrolic acid, isosorbic acid*)

$(CH_3)_2CH \cdot C \vdots C \cdot COOH$

$C_6H_8O_2$ MW, 112

Cryst. M.p. 38° (36–8°). B.p. 106–7°/20 mm., 114–15°/18 mm.
Me ester: $C_7H_{10}O_2$. MW, 126. B.p. 68–9°/20 mm. D^0 0·9509.

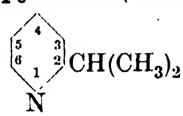
Et ester: $C_8H_{12}O_2$. MW, 140. B.p. 83°/19 mm. D^0 0·9365.
Isobutyl ester: $C_{10}H_{16}O_2$. MW, 168. B.p. 99–101°/19 mm. D^0 0·9145.

Faworsky, *J. prakt. Chem.*, 1888, **37**, 423.
Moureu, Delange, *Bull. soc. chim.*, 1903, **29**, 652.

Isopropylpropionylcarbinol.
See 2-Methyl-3-hexanolone-4.

Isopropylpropylene.
See 4-Methyl-1-pentene *and* 4-Methyl-2-pentene.

2-Isopropylpyridine (*α-Isopropylpyridine*)



$C_8H_{11}N$ MW, 121

B.p. 158·9°. Spar. sol. H_2O. D^0 0·9342.
B,HgCl₂: m.p. 93°.
$B,HAuCl_4$: m.p. 91° (91–2°).
B_2,H_2PtCl_6: m.p. 170° decomp.
Picrate: m.p. 116°.

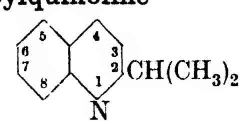
Königs, Happe, *Ber.*, 1902, **35**, 1346.

3-Isopropylpyridine (*β-Isopropylpyridine*).
B.p. 177–8°. D_{16}^{16} 0·9227.
$B,HAuCl_4$: m.p. 100°.
B_2,H_2PtCl_6: m.p. 186°.
Picrate: m.p. 136°.

Oparina, *Chem. Zentr.*, 1926, I, 3337.

Isopropylpyruvic Acid.
See 1-Ketoisocaproic Acid.

2-Isopropylquinoline



$C_{12}H_{13}N$ MW, 171

Liq. with odour resembling quinoline. B.p. 255°. Volatile in steam.
Chloroaurate: m.p. about 123°.
$B_2,H_2PtCl_6,2H_2O$: orange needles from H_2O. M.p. 195° decomp.
Picrate: cryst. from EtOH. M.p. 155–7°.
Methiodide: plates from EtOH. M.p. 182°.

Koenigs, *Ber.*, 1899, **32**, 229.
Doebner, *Ann.*, 1887, **242**, 279.

3-Isopropylquinoline.
Cryst. M.p. about 10°. B.p. 275–80°/715 mm. Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O.

Spady, *Ber.*, 1885, **18**, 3383.

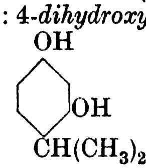
4-Isopropylquinoline.
Oil. Volatile in steam.
$B_2,H_2PtCl_6,1\frac{1}{2}H_2O$: m.p. 204° decomp.
Picrate: yellow needles from EtOH. M.p. 172–3°.
Methiodide: yellow cryst. M.p. about 173° decomp.

Koenigs, *Ber.*, 1898, **31**, 2375; 1899, **32**, 224.

7-Isopropylquinoline.
Oil. Volatile in steam.
$B_2,H_2PtCl_6,2H_2O$: yellow needles from H_2O. M.p. 219–20°.
Dichromate: red prisms. M.p. about 92°.
Picrate: yellow needles from Et_2O. M.p. 205–6°.
Methiodide: yellow needles. M.p. about 200°.

Widman, *Ber.*, 1886, **19**, 267.

4-Isopropylresorcinol (2 : 4-*Dihydroxyisopropylbenzene*, 2 : 4-*dihydroxycumene*)



$C_9H_{12}O_2$ MW, 152

Cryst. from AcOH.Aq. M.p. 105°.

Meyer, Bernhauer, *Monatsh.*, 1929, **53** & **54**, 737.

4-Isopropylsalicylic Acid.
See 2-Hydroxycuminic Acid.

Isopropylstyrene.
See Methyl-phenyl-1-butylene.

Isopropylsuccinic Acid (3-*Methylbutane*-1 : 2-*dicarboxylic acid*, *isopentane*-3 : 4-*dicarboxylic acid*)

$(CH_3)_2CH{\cdot}CH{\cdot}COOH$
$\qquad\qquad\quad CH_2{\cdot}COOH$

$C_7H_{12}O_4$ MW, 160

d-.
M.p. 87–8°. $[\alpha]_D$ + 24·01° in H_2O.
Strychnine salt: m.p. 124–31°.
Anilide: m.p. 200°.

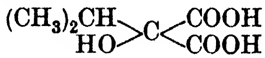
l-.
Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 119–20°.

dl-.
M.p. 120° (118°). B.p. 212°/12 mm. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. $k = 7{\cdot}5 \times 10^{-5}$ at 25°.
Di-Et ester: b.p. 236–40°.

Dichloride: $C_7H_{10}O_2Cl_2$. MW, 197. B.p. 210° decomp.
Anhydride: $C_7H_{10}O_3$. MW, 142. B.p. 255°, 164°/45 mm.

Kachler, *Ann.*, 1873, **169**, 168.
Braun, Reinhard, *Ber.*, 1929, **62**, 2586.
Henry, Paget, *J. Chem. Soc.*, 1928, 76.

Isopropyltartronic Acid (*Hydroxy-isopropylmalonic acid, 1-hydroxyisobutane-1 : 1-dicarboxylic acid*)

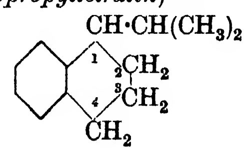


$C_6H_{10}O_5$ MW, 162

Cryst. from H_2O. M.p. 149° decomp.

Brunner, *Monatsh.*, 1894, **15**, 766.

1-Isopropyl-1 : 2 : 3 : 4-tetrahydronaphthalene (*1-Isopropyltetralin*)



$C_{13}H_{18}$ MW, 174

B.p. 247°. D_4^{25} 0·9450.

Roblin, Davidson, Bogert, *J. Am. Chem. Soc.*, 1935, **57**, 157.

2-Isopropyl-1 : 2 : 3 : 4-tetrahydronaphthalene (*2-Isopropyltetralin*).
B.p. 124–6°/13 mm.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1318.

Isopropyltetralin.
See Isopropyltetrahydronaphthalene.

Isopropyl thiocyanate

$(CH_3)_2CH{\cdot}CNS$

C_4H_7NS MW, 101

B.p. 152–3°/754 mm. D^{20} 0·963.

Henry, *Ber.*, 1869, **2**, 496.
Gerlich, *Ann.*, 1875, **178**, 83.

Isopropylthiourea

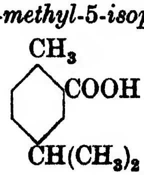
$(CH_3)_2CH{\cdot}NH{\cdot}CS{\cdot}NH_2$

$C_4H_{10}N_2S$ MW, 118

Leaflets. M.p. 157°.

Jahn, *Monatsh.*, 1882, **3**, 168.

4-Isopropyl-o-toluic Acid (*p-Cymene-2-carboxylic acid, 2-methyl-5-isopropylbenzoic acid*)

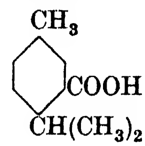


$C_{11}H_{14}O_2$ MW, 178

Cryst. from EtOH.Aq. M.p. 70°. B.p. 171–2°/20 mm. Sol. most org. solvents. Spar. sol. H_2O. Volatile in steam.
Me ester: $C_{12}H_{16}O_2$. MW, 192. B.p. 132°/16·2 mm.
Chloride: $C_{11}H_{13}OCl$. MW, 196·5. B.p. 135·5–136°/21·5 mm., 131·5–132°/17·7 mm.
Amide: $C_{11}H_{15}ON$. MW, 177. M.p. 147°.
Anilide: m.p. 143·5°.

Le Fèvre, *J. Chem. Soc.*, 1933, 983.
Bogert, Tuttle, *J. Am. Chem. Soc.*, 1916, **38**, 1349.

4-Isopropyl-m-toluic Acid (*p-Cymene-3-carboxylic acid, 3-methyl-6-isopropylbenzoic acid*

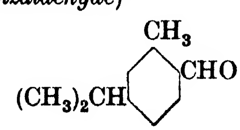


$C_{11}H_{14}O_2$ MW, 178

Needles from H_2O. M.p. 82–3° (84°). B.p. 285°. Sol. most org. solvents. Volatile in steam.
Me ester: $C_{12}H_{16}O_2$. MW, 192. B.p. 128–9°/13·5 mm.
Et ester: $C_{13}H_{18}O_2$. MW, 206. B.p. 141–2°/13·5 mm.
Phenyl ester: $C_{17}H_{18}O_2$. MW, 254. B.p. 199–208°/22·5–24·5 mm.
Chloride: $C_{11}H_{13}OCl$. MW, 196·5. B.p. 128–9°/20·1 mm., 115–16°/9·2 mm.
Amide: $C_{11}H_{15}ON$. MW, 177. M.p. 137–5°.
Anilide: m.p. 151°.

See previous references.

5-Isopropyl-o-toluic Aldehyde (*2-Methyl-4-isopropylbenzaldehyde*)

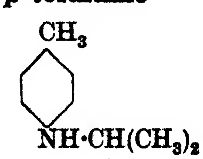


$C_{11}H_{14}O$ MW, 162

B.p. 238°, 132°/20 mm. D_0^0 0·9988.

Verley, *Bull. soc. chim.*, 1897, **17**, 913.
Bouveault, *ibid.*, 942.

N-Isopropyl-p-toluidine

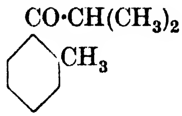


$C_{10}H_{15}N$ MW, 149

Oil. B.p. 219–21°. D^{20} 0·9226. n_D 1·5332.
B,HCl : m.p. 170–1°.
B_2,$(COOH)_2$: m.p. 129–30°.

Hori, Morley, *J. Chem. Soc.*, 1891, **59**, 34.

Isopropyl o-tolyl Ketone (o-*Isobutyryltoluene*, o-*methylisobutyrophenone*)

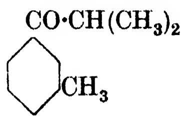


$C_{11}H_{14}O$ MW, 162

B.p. 230°/758 mm. D_4^0 0·9858.

Senderens, *Bull. soc. chim.*, 1911, **9**, 949.

Isopropyl m-tolyl Ketone (m-*Isobutyryltoluene*, m-*methylisobutyrophenone*)

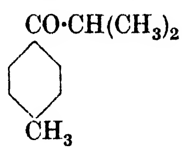


$C_{11}H_{14}O$ MW, 162

B.p. 238°/758 mm. D_4^0 0·9841.
Semicarbazone : m.p. 120°.

Senderens, *Bull. soc. chim.*, 1911, **9**, 950.

Isopropyl p-tolyl Ketone (p-*Isobutyryltoluene*, p-*methylisobutyrophenone*)



$C_{11}H_{14}O$ MW, 162

B.p. 243°/758 mm., 117–18°/13 mm. $D_4^{21\cdot2}$ 0·9681. $n_D^{21\cdot2}$ 1·519.
Semicarbazone : m.p. 101°.

See previous reference and also
Auwers, *Ann.*, 1915, **408**, 244.

Isopropylurea

$(CH_3)_2CH{\cdot}NH{\cdot}CO{\cdot}NH_2$

$C_4H_{10}ON_2$ MW, 102

Needles from AcOEt. M.p. 154°. Sol. H_2O, EtOH, $CHCl_3$, Me_2CO, hot C_6H_6. Spar. sol. Et_2O, AcOEt.
N-*Acetyl* : m.p. 68–72°.

Mauguin, *Ann. chim.*, 1911, 22, 321.

Isopropylurethane (*Ethyl isopropylaminoformate*)

$(CH_3)_2CH{\cdot}NH{\cdot}CO{\cdot}OC_2H_5$

$C_6H_{13}O_2N$ MW, 131

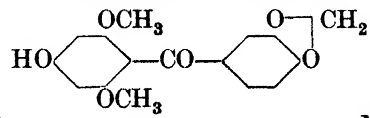
B.p. 79°/15 mm. Sol. EtOH, Et_2O. D^{15} 0·957.

Mauguin, *Ann. chim.*, 1911, **22**, 324.

Isopropylvaleric Acid.
See 2-Methylhexane-3-carboxylic Acid *and* 5-Methyl-*n*-heptylic Acid.

4-Isopropyl-o-xylene.
See 3 : 4-Dimethylcumene.

Isoprotocotoin (3 : 4 - *Methylenedioxy* - 4′ - *hydroxy*-2′ : 6′-*dimethoxybenzophenone*)

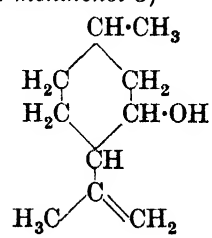


$C_{16}H_{14}O_6$ MW, 302

Needles from MeOH. M.p. 165–6°. Sol. MeOH, AcOH, $CHCl_3$, Me_2CO. Spar. sol. Et_2O, C_6H_6, hot H_2O.

Houben, Fischer, *J. prakt. Chem.*, 1929, **123**, 89, 102.

Isopulegol (5 - *Methyl* - 2 - *isopropenylcyclohexanol*, $\Delta^{8(9)}$-p-*menthenol*-3)



$C_{10}H_{18}O$ MW, 154

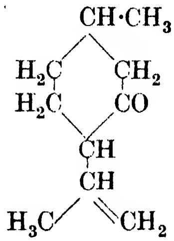
d-.
Occurs in leaves of *Leptospermum Liversidgei*, Baker & Smith. B.p. 93–4°/14 mm. D_4^{20} 0·911. n_D^{20} 1·4723.
Naphthylurethane : m.p. 112–13°.
Et ether : $C_{12}H_{22}O$. MW, 182. B.p. 85–8°/14 mm.

l-.
B.p. 94°/14 mm., 88°/10 mm. D_4^{20} 0·9110. n_D^{20} 1·4723.
Acetyl : b.p. 103°/14 mm.
Propionyl : b.p. 91°/4 mm.
Butyryl : b.p. 116°/15 mm.
Valeryl : b.p. 119°/4 mm.
Caproyl : b.p. 153°/13 mm.
Lauryl : b.p. 188°/3 mm.
Myristyl : b.p. 189°/2 mm.

Acid phthalate : m.p. 106°.
Hydrate : *see* *p*-Menthandiol-3 : 8.

Pickard, Hunter, Lewcock, de Pennington, *J. Chem. Soc.*, 1920, **117**, 1252.
Prins, *Chem. Abstracts*, 1917, **11**, 2773.
Dolvis, *Revue de chimie industrielle*, 1924, **33**, 213, 326 ; 1925, **34**, 82, 114.
Dœuvre, *Bull. soc. chim.*, 1933, **53**, 592.
Horiuchi, *Chem. Abstracts*, 1928, **22**, 3886.
Naves, *Parfums de France*, 1928, **6**, 191 (*Review*, *Bibl.*).

Isopulegone (*α - Pulegone*, $\Delta^{8(9)}$ - *p - menthenone*-3)



$C_{10}H_{16}O$ MW, 152

d-.
Occurs in oil of *Mentha pulegium*, Linn. B.p. 100°/18 mm., 95°/14 mm. D_4^{20} 0·9198. n_D^{20} 1·4675. *Enol form* : b.p. 80–1°/6 mm. D_4^{14} 0·8955. n_D^{20} 1·46732.
Oxime : m.p. 121°.
Semicarbazone : m.p. 174–5° (172–3°).

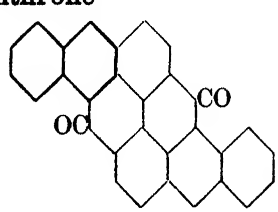
l-.
B.p. 98–100°/13 mm. $D^{19.5}$ 0·9192.
Oxime : (*a*) m.p. 120–1°. (*b*) M.p. 98°.
Semicarbazone : m.p. 173–4° decomp.

dl-.
Oxime : m.p. 138–9° (134°).
Semicarbazone : m.p. 183°.

Grignard, Savard, *Bull. soc. chim. Belg.*, 1927, **36**, 97.
Linstead, Noble, *J. Chem. Soc.*, 1934, 612.

Isopurpurin.
See Anthrapurpurin.

Isopyranthrone



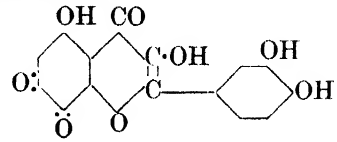
$C_{30}H_{14}O_2$ MW, 406

Dark grey or violet needles with metallic lustre from $PhNO_2$. M.p. above 360°. Sol. xylene, $PhNO_2$, aniline, quinoline, to reddish-violet sols.

Scholl, Tanzer, *Ann.*, 1923, **433**, 177.

Isopyromucic Acid.
See Hydroxycoumalin.

Isoquercetone

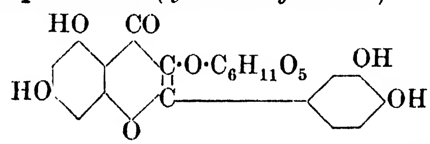


$C_{15}H_8O_8$ MW, 316

Tetra-Me ether : $C_{19}H_{16}O_8$. MW, 372. Yellow needles. M.p. 242–4°.
Tetra-acetyl : m.p. 240–2°.

Nierenstein, *J. Chem. Soc.*, 1915, **107**, 869.

Isoquercitrin (*Quercetin glucoside*)

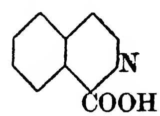


$C_{21}H_{20}O_{12}$ MW, 464

Occurs in cotton flowers and maize. Yellow needles. M.p. 220–222·5°. Sol. AcOEt. Spar. sol. H_2O. $FeCl_3 \longrightarrow$ olive-green col.

Perkin, *J. Chem. Soc.*, 1909, **95**, 2190.

Isoquinaldinic Acid (*Isoquinoline* - 1 - *carboxylic acid*)

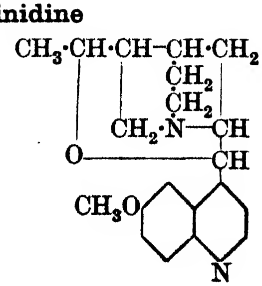


$C_{10}H_7O_2N$ MW, 173

Cryst. from C_6H_6. M.p. 161° decomp. Sol. MeOH, AcOH, $CHCl_3$, Me_2CO, hot H_2O, hot EtOH.
Nitrile : *see* 1-Cyanoisoquinoline.

Reissert, *Ber.*, 1905, **38**, 3429.

α-Isoquinidine

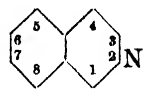


$C_{20}H_{24}O_2N_2$ MW, 324

Needles from EtOH.Aq. M.p. 142°.

Konapnicki, Suszko, *Chem. Abstracts*, 1930, **24**, 1647.
Domanski, Suszko, *Chem. Abstracts*, 1933, **27**, 3713.
Konapnicki, Ludwiczakowna, Suszko, *ibid.*, 5080.

Isoquinoline



C_9H_7N MW, 129

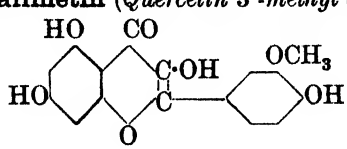
Occurs in coal tar. Hygroscopic cryst. M.p. 24·6°. B.p. 242°, 142°/40 mm. D_4^{20} 1·0986. n_D^{20} 1·6148. Heat of comb. C_p 1123·7 Cal. Alk. ox. ⟶ cinchomeronic, phthalic, and oxalic acids. Neutral ox. ⟶ phthalimide.

Methiodide: yellow needles + $1H_2O$ from H_2O. M.p. 159°.
Methiodide: m.p. 159°.
Ethiodide: m.p. 148°.
Benzyliodide: m.p. 175–6°.
Acid sulphate: m.p. 207·5°.
B,HAuCl₄: m.p. 225°.
B,H₂PtCl₆: m.p. 263° decomp.
Picrate: m.p. 222–3°.

Le Blanc, *Ber.*, 1888, **21**, 2299.
Gesellschaft für Teerverwertung, D.R.P., 285,666, (*Chem. Abstracts*, 1916, **10**, 965).
Harris, Pope, *J. Chem. Soc.*, 1922, **121**, 1030.
Tartarini, Samaja, *Chem. Abstracts*, 1933, **27**, 5741.
Forsyth, Kelly, Pyman, *J. Chem. Soc.*, 1925, 1661.
Wedekind, Oechslen, *Ber.*, 1901, **34**, 398.

Isoquinoline-1-carboxylic Acid.
See Isoquinaldinic Acid.

Isorhamnetin (*Quercetin 3′-methyl ether*)



$C_{16}H_{12}O_7$ MW, 316

Occurs in petals of wallflowers and in *Trifolium pratense*, Linn. Greenish-yellow cryst. from AcOH. M.p. 305° decomp. Spar. sol. EtOH, AcOH. Insol. C_6H_6, $CHCl_3$.

Tetra-acetyl: m.p. 205–7° (198–200°).

Power, Salway, *J. Chem. Soc.*, 1910, **97**, 245.
Fukuda, *Bull. Chem. Soc. Japan*, 1928, **3**, 53.
Heap, Robinson, *J. Chem. Soc.*, 1926, 2342.

Isorhamnonose

CHO
H·C·OH
HO·C·H
H·C·OH
CO
CH_3

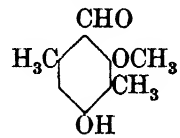
$C_6H_{10}O_5$ MW, 162

M.p. 125·5–126°. Sol. H_2O, EtOH, Py. Spar. sol. other org. solvents. $[\alpha]_D^{20}$ − 33·7°. Reduces Fehling's in the cold.

Di-p-*nitrophenylhydrazone*: m.p. 120·5° decomp.

Helferich, Himmen, *Ber.*, 1929, **62**, 2139.

Isorhizonaldehyde (4-*Hydroxy*-2-*methoxy*-3 : 6-*dimethylbenzaldehyde*)



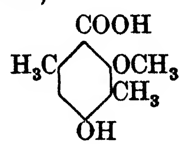
$C_{10}H_{12}O_3$ MW, 180

Needles from MeOH.Aq. M.p. 151°.

Acetyl: m.p. 67°.

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1677.

Isorhizonic Acid (4-*Hydroxy*-2-*methoxy*-3 : 6-*dimethylbenzoic acid*)



$C_{10}H_{12}O_4$ MW, 196

Needles from C_6H_6. M.p. 156–7° decomp. Sol. EtOH, Me_2CO, AcOEt. Spar. sol. ligroin.

Me ester: $C_{11}H_{14}O_4$. MW, 210. M.p. 142°.
Et ester: $C_{12}H_{16}O_4$. MW, 224. M.p. 103°.
Acetyl: m.p. 160°. *Chloride* m.p. 84°.
Anilide: m.p. 179°.

See previous reference.

Isorhodeitol

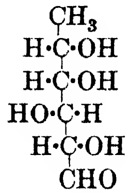
CH_3
H·C·OH
H·C·OH
HO·C·H
H·C·OH
CH_2OH

$C_6H_{14}O_5$ **MW, 166**

Syrup. $[\alpha]_D$ $-9.7°$.
Benzylidene deriv.: m.p. 158°.
Di-benzylidene deriv.: m.p. 196–7°.

Votoček, Valentin, *Bull. soc. chim.*, 1928, **43**, 219.

Isorhodeose (d-*Glucomethylose*)

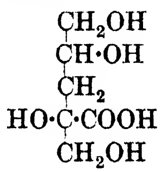


$C_6H_{12}O_5$ MW, 164

Occurs in cinchona bark. Cryst. $[\alpha]_D$ $+30.3°$.

Votoček, Rac, *Chem. Abstracts*, 1932, **26**, 4307.
See also previous reference.

Isosaccharic Acid



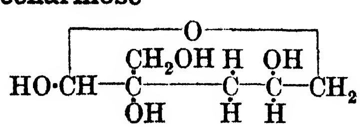
$C_6H_{12}O_6$ MW, 180

α-, *d*-.
$[\alpha]_D$ $+ 44.5°$.
Brucine salt: m.p. anhyd. 164°.
Quinine salt: m.p. 191–2° (202–4°).
Amide: $C_6H_{13}O_5N$. MW, 179. M.p. 84–9° decomp.
Lactone: *see* Isosaccharolactone.

β-, *d*-.
Brucine salt: m.p. 200–1°.

Weerman, *Rec. trav. chim.*, 1918, **37**, 41.
Nef, *Ann.*, 1910, **376**, 52.
Hintikka, *Chem. Abstracts*, 1923, **17**, 3486.
Levene, La Forge, *J. Biol. Chem.*, 1915, **21**, 358.

Isosaccharinose



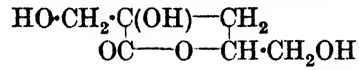
$C_6H_{12}O_5$ MW, 164

Syrup. Insol. Et_2O. $[\alpha]_D^{15}$ $- 20.66°$ in H_2O. Reduces Fehling's.
p-*Nitrophenylhydrazone*: m.p. 168–9°.

1 : 2′ : 4-*Triacetyl*: (*a*) m.p. 98°. (*b*) M.p. 85–6°.

Schorigin, Makarowa-Semljanskaja, *Ber.*, 1933, **66**, 387.

Isosaccharolactone (*Isosaccharin*)



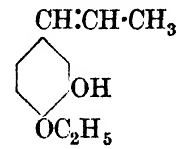
$C_6H_{10}O_5$ MW, 162

α-, *d*-.
Cryst. from AcOEt. M.p. 96°. Sol. H_2O, MeOH, EtOH, glycerol. Spar. sol. Et_2O. $[\alpha]_D^{20}$ $- 61.9°$ in H_2O. $k = 1.15 \times 10^{-6}$ at 25°.

β-, *d*-.
Not obtained pure.

Upson, *Am. Chem. J.*, 1911, **45**, 469.
Schorigin, Makarowa-Semljanskaja, *Ber.*, 1933, **66**, 387.
Nef, *Ann.*, 1910, **376**, 52, 64.

Isosafroeugenol (3-*Hydroxy*-4-*ethoxy*-1-*propenylbenzene*)

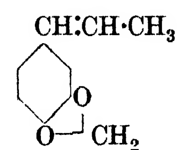


$C_{11}H_{14}O_2$ MW, 178

M.p. 85°.
Me ether: 3-methoxy-4-ethoxy-1-propenylbenzene. $C_{12}H_{16}O_2$. MW, 192. M.p. 62–63.5°.
Acetyl: m.p. 67°.
Benzoyl: m.p. 59°.
Phenylurethane: m.p. 121–3°.

Hirao, *Chem. Abstracts*, 1932, **26**, 719.
Kafuku, Ishikawa, Kato, *Chem. Abstracts*, 1929, **23**, 1890.

Isosafrol (3 : 4-*Methylenedioxy*-1-*propenylbenzene*)

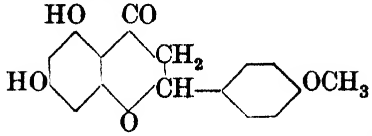


$C_{10}H_{10}O_2$ MW, 162

Trans:
F.p. 6.7–6.8°. B.p. 252.4–252.7°/768 mm., 111–12°/6 mm., 46.8° in high vacuo. Sol. EtOH, Et_2O, C_6H_6. D_4^{20} 1.122. n_D^{20} 1.5782.
Picrate: m.p. 75°.

Kafuku, *Chem. Abstracts*, 1926, **20**, 402.
Priester, *Chem. Abstracts*, 1929, **23**, 3304.
Waterman, Priester, *Rec. trav. chim.*, 1928, **47**, 1027.

Isosakuranetin (5 : 7-*Dihydroxy*-4 -*methoxy-flavanone, kikokunetin*)



$C_{16}H_{14}O_5$ MW, 286

Occurs in flowers of *Citrus trifoliata*, Linn. M.p. 193–4°.

Me ether : $C_{17}H_{16}O_5$. MW, 300. M.p. 117–18°. *Acetyl deriv.* : m.p. 158–60°.

Di-Me ether : $C_{18}H_{18}O_5$. MW, 314. M.p. 117–18°.

Et ether : $C_{18}H_{18}O_5$. MW, 314. M.p. 115°.

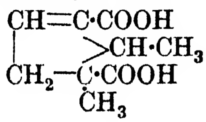
Acetyl deriv. : m.p. 114–15°.

Benzoyl deriv. : m.p. 143°.

Asahina, Inubuse, *Chem. Abstracts*, 1929, **23**, 3475.

Hattori, *Chem. Abstracts*, 1930, **24**, 1862.

Isosantenenic Acid (3 : 4-*Dimethylcyclopentene*-2 : 4-*dicarboxylic acid*)

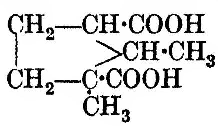


$C_9H_{12}O_4$ MW, 184

Prisms. M.p. 198–9°. Sol. H_2O, EtOH, Et_2O, AcOH. Spar. sol. C_6H_6, pet. ether.

Enkvist, *J. prakt. Chem.*, 1933, **137**, 265, 280.

Isosantenic Acid (cis-*Allosantenic acid*, 2 : 3-*dimethylcyclopentane*-1 : 3-*dicarboxylic acid*)



$C_9H_{14}O_4$ MW, 186

M.p. 121–3°.

Anhydride : $C_9H_{12}O_3$. MW, 168. M.p. 93°.

Komppa, Rohrmann, *Ber.*, 1934, **67**, 828.

Enkvist, *J. prakt. Chem.*, 1933, **137**, 285.

Isosantenone

$C_9H_{14}O$ MW, 138

Oil. B.p. 185–6°, 89–91°/25 mm.

Oxime : b.p. 155–6°/28 mm.

Semicarbazone : m.p. 175°.

Rimini, *Gazz. chim. ital.*, 1913, **43**, ii, 527.

Isosantonic Acid

$C_{25}H_{20}O_4$ MW, 264

Cryst. from EtOH. M.p. 152°. Spar. sol. H_2O. $[\alpha]_D^{25}$ − 73·92° in $CHCl_3$.

Me ester : $C_{16}H_{22}O_4$. MW, 278. M.p. 69–70°.

Et ester : $C_{17}H_{24}O_4$. MW, 292. M.p. 76°.

Francesconi, *Gazz. chim. ital.*, 1895, **25**, ii, 471.

Isoserine (1-*Hydroxy*-2-*aminopropionic acid*, 1-*hydroxy*-β-*alanine*, 2-*aminolactic acid*)

$H_2N{\cdot}CH_2{\cdot}CH(OH){\cdot}COOH$

$C_3H_7O_3N$ MW, 105

d-.

M.p. 199–201° decomp. $[\alpha]_D^{20}$ + 32·44° in H_2O.

Benzoyl deriv. : m.p. 107–9°. $[\alpha]_D$ + 29·46°.

l-.

Cryst. from H_2O. M.p. 199–201° decomp. Sol. H_2O. $[\alpha]_D^{20}$ − 32·58° in H_2O.

Benzoyl deriv. : m.p. 107–9°. $[\alpha]_D$ − 30·03°.

dl-.

Prisms. M.p. 248° decomp. Sol. hot H_2O. Heat of comb. C_v 344·5 Cal. H_2O_2 + $FeSO_4$ ⟶ aminoacetaldehyde. HNO_2 at 40–50° ⟶ glyceric acid. k (acid) = $5{\cdot}37 \times 10^{-10}$ at 25° : k (base) = $6{\cdot}03 \times 10^{-12}$ at 25°.

Et ester : $C_5H_{11}O_3N$. MW, 133. M.p. 75°.

Benzoyl deriv. : m.p. 151°.

Phenylurethane : m.p. 183–4°.

Fischer, Jacobs, *Ber.*, 1907, **40**, 1058.

Tomita, Karashima, Nakamura, Nakashima, *Z. physiol. Chem.*, 1932, **211**, 38.

Isoserine Aldehyde.

See 1-Hydroxy-2-aminopropionaldehyde.

Isosorbic Acid.

See Isopropylpropiolic Acid.

Isosparteine

$C_{15}H_{26}N_2$ MW, 234

B.p. 177·5–179°/16·5 mm.

N-*Me* : $C_{16}H_{28}N_2$. MW, 248. M.p. 24°. $[\alpha]_D$ + 23·6°. *Picrate* : m.p. 203°.

Moureu, Valeur, *Compt. rend.*, 1911, **152**, 527.

Isospinasterol

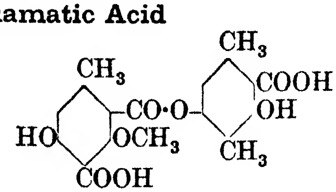
$C_{27}H_{46}O$ MW, 386

M.p. 148–50°. $[\alpha]_D^{23}$ + 5·2°.

Chloroacetyl deriv. : m.p. 155–6°.

Hart, Heyl, *J. Biol. Chem.*, 1932, **95**, 313.

Isosquamatic Acid



$C_{19}H_{18}O_9$ MW, 390

Occurs in *Sphærophorus globosus*, Wain, and *Cladonia Boryi*, Tuck. Prisms from EtOH. M.p. 227° decomp. Spar. sol. ord. org. solvents. $FeCl_3$ ⟶ violet col. in EtOH.

Asahina, Yanagita, *Ber.*, 1933, **66**, 420.

Isostearic Acid (15-*Methylheptadecylic acid*)

$(CH_3)_2CH{\cdot}[CH_2]_{14}{\cdot}COOH$

$C_{18}H_{36}O_2$ MW, 284

M.p. 67·6–68·1°.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3371.

Isostilbene.
See under Stilbene.

Isostrophanthic Acid

$C_{23}H_{32}O_8$ MW, 436

α-.
M.p. 232–4°.
Mono-Me ester: $C_{24}H_{34}O_8$. MW, 450. Cryst. + $1H_2O$. M.p. 235–7° (214°).
Di-Me ester: $C_{25}H_{36}O_8$. MW, 464. M.p. 254–5°. *Oxime*: m.p. 228° decomp.

β-.
Needles from EtOH.Aq. M.p. 280° decomp. $[\alpha]_D$ −24° in MeOH.

γ-.
M.p. 231–2°. $[\alpha]_D$ + 90° in EtOH.
Di-Me ester: m.p. 227°.

Jacobs, Gustus, *J. Biol. Chem.*, 1927, **74**, 818, 829.

Isostrophanthidic Acid

$C_{23}H_{30}O_7$ MW, 418

M.p. 175–80°. $[\alpha]_D$ − 14° in EtOH.
Me ester: $C_{24}H_{32}O_7$. MW, 432. M.p. 270–1° decomp. *Oxime*: m.p. 263°.
Semicarbazone: m.p. 305°.

Jacobs, Elderfield, Grave, Wignall, *J. Biol. Chem.*, 1931, **91**, 617.
See also previous reference.

Isostrophanthidine

$C_{23}H_{32}O_6$ MW, 404

Leaflets from MeOH. M.p. 259–61°. After relactonisation, m.p. 274–6°. $[\alpha]_D^{25}$ + 48° in Py.
Benzoyl deriv.: m.p. 270°.
Oxime: m.p. 236°.

Jacobs, Gustus, *J. Biol. Chem.*, 1927, **74**, 817.

Isostrophanthonic Acid

$C_{23}H_{30}O_8$ MW, 434

Di-Me ester: $C_{25}H_{34}O_8$. MW, 462. M.p. 250°. *Oxime*: m.p. 190°. Remelts at 215–17°.

Jacobs, Gustus, *J. Biol. Chem.*, 1931, **92**, 342.

Isostrychnic Acid

$C_{21}H_{26}O_4N_2$ MW, 370

M.p. 231° decomp. Does not form a benzoyl deriv.

Oxford, Perkin, Robinson, *J. Chem. Soc.*, 1927, 2396.

Isostrychnidine

$C_{21}H_{24}ON_2$ MW, 320

Needles + $1\frac{1}{2}H_2O$ from H_2O. M.p. 155–7° decomp., anhyd. 163–8°. Sol. MeOH, EtOH, Me_2CO, $CHCl_3$, AcOEt, hot C_6H_6. Spar. sol. pet. ether.

Oxford, Perkin, Robinson, *J. Chem. Soc.*, 1927, 2404.

Isostrychnine

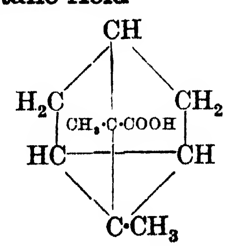
$C_{21}H_{22}O_2N_2$ MW, 334

Cryst. + $3H_2O$. M.p. 220°. Boiling NaOEt ⟶ isostrychnic acid.
Acetyl deriv.: m.p. 133–4°.

Ciusa, Scagliarini, *Gazz. chim. ital.*, 1924, **54**, 202.
Olivieri-Mandala, *Gazz. chim. ital.*, 1924, **54**, 516.
Oxford, Perkin, Robinson, *J. Chem. Soc.*, 1927, 2395.

Isosuccinic Acid.
See Methylmalonic Acid.

Isoteresantalic Acid



$C_{10}H_{14}O_2$ MW, 166

M.p. 142°. B.p. 151–2°/23 mm. $[\alpha]_D^{18}$ − 120·3°.
Me ester: $C_{11}H_{16}O_2$. MW, 180. B.p. 93·5–94·5°/10 mm.

Asahina, Ishidate, Momose, *Ber.*, 1935, **68**, 90, 562.

Isotetracosane

$C_{24}H_{50}$ MW, 338

Plates from Et_2O. M.p. 51–51·5°. B.p. 222–5°/9 mm.

Levene, West, *J. Biol. Chem.*, 1914, **18**, 480.

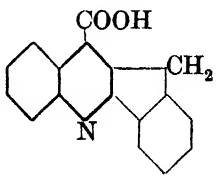
Isotetracosyl Alcohol

$C_{24}H_{50}O$ MW, 354

Cryst. from $CHCl_3$. M.p. 72°. B.p. 220°/0·8 mm.

See previous reference.

Isotetrophane

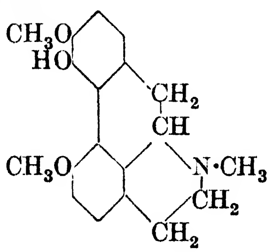


$C_{15}H_{13}O_2N$ MW, 239

M.p. 310°. Insol. ord. org. solvents.

Braun, *Ann.*, 1927, **451**, 53.

Isothebaïne

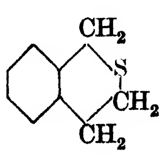


$C_{19}H_{21}O_3N$ MW, 311

Occurs in *Papaver orientale*, Linn. M.p. 203–4°. $[\alpha]_D^{18}$ + 285·1° in EtOH.
Sulphate: m.p. 120–1° decomp.
Diacetyl deriv.: m.p. 80–5°.

Callow, Gulland, Haworth, *J. Chem. Soc.*, 1929, 1444.
Klee, *Arch. Pharm.*, 1914, **252**, 211.

Isothiochroman (3 : 4-*Dihydro*-5 : 6-*benzthiopyran*-2)

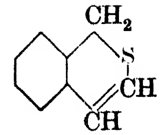


$C_9H_{10}S$ MW, 150

B.p. 128–30°/13 mm.
Methiodide: m.p. 123°.
$C_9H_{10}S,HgCl_2$: m.p. 201°.

Braun, Weissbach, *Ber.*, 1929, **62**, 2421.

Isothiochromene



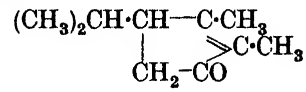
C_9H_8S MW, 148

B.p. 124°/13 mm.

Braun, Weissbach, *Ber.*, 1929, **62**, 2422.

Isothiourea.
See Thiourea.

Isothujone (1 : 2-*Dimethyl*-5-*isopropylcyclopentenone*-3)



$C_{10}H_{16}O$ MW, 152

B.p. 231–2° (230–1°). D_0^{20} 0·9282 (0·9305). n_D^{20} 1·48277.
Oxime: m.p. 119–20°.
Hydrazone: b.p. 152–3°/25 mm., 143–4°/17 mm. D_0^{20} 0·9579.
Semicarbazone: (*a*) m.p. 209°. (*b*) M.p. 184–5°.

Kishner, *Chem. Zentr.*, 1913, I, 706.
Agostinelli, *Gazz. chim. ital.*, 1914, **44**, ii, 112.
Wallach, *Ann.*, 1915, **408**, 168.

Isotrehalose (β : β-*Trehalose*)

$C_{12}H_{22}O_{11}$ MW, 342

Cryst. + $4H_2O$. M.p. anhyd. 130–5°. $[\alpha]_D^{17}$ − 41·5° in H_2O.
Octa-acetyl deriv.: m.p. 181°. $[\alpha]_D^{20}$ − 18·6° in $CHCl_3$.

Schlubach, Schetelig, *Z. physiol. Chem.*, 1932, **213**, 83.
Schlubach, Maurer, *Ber.*, 1925, **58**, 1178.
Wrede, *Biochem. Z.*, 1917, **83**, 96.

Isotriacontane (*Melissane*)

$C_{30}H_{62}$ MW, 422

Leaflets. M.p. 73–4°. B.p. 222°/0·3 mm.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 533.

Isotricosanic Acid

$C_{23}H_{46}O_2$ MW, 354

M.p. 73·5°.
Et ester: $C_{25}H_{50}O_2$. MW, 382. M.p. 55·5°.

Levene, Taylor, *J. Biol. Chem.*, 1922, **52**, 227.

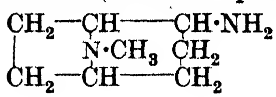
Isotricosyl Alcohol

$C_{23}H_{48}O$ MW, 340

M.p. 69°.

See previous reference.

Isotropylamine (*2-Aminotropane*)



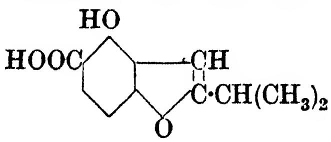
$C_8H_{16}N_2$ MW, 140

M.p. 8·5°. B.p. 206–7°. Sol. H_2O.
B,H_2PtCl_6: m.p. 261° decomp.
Picrate: m.p. 236–7° decomp.

Willstätter, Müller, *Ber.*, 1898, **31**, 2661.

Isotruxillic Acid.
See Truxinic Acid.

Isotubaic Acid (*Rotenic acid, 4-hydroxy-2-isopropylcoumarone-5-carboxylic acid*)

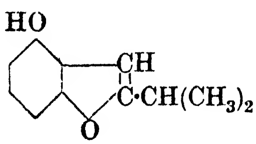


$C_{12}H_{12}O_4$ MW, 220

Needles from toluene. M.p. 183° decomp.

Reichstein, Hirt, *Helv. Chim. Acta*, 1933, **16**, 129.

Isotubanol (*Roteol, 4-hydroxy-2-isopropylcoumarone*)

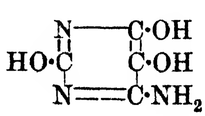


$C_{11}H_{12}O_2$ MW, 176

M.p. 37–9°. B.p. about 105°/0·2 mm. Sol. ord. org. solvents.

Reichstein, Hirt, *Helv. Chim. Acta*, 1933, **16**, 127.

Isouramil



$C_4H_5O_3N_3$ MW, 143

M.p. above 290°.
5-Acetyl: m.p. above 275°.

Davidson, Bogert, *Chem. Abstracts*, 1932, **26**, 4798.

Isourea.
See Urea.

Isouric Acid.
See Uric Acid.

Isovaleraldehyde (*Isovaleric aldehyde, 2-methylbutyraldehyde*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CHO$

$C_5H_{10}O$ MW, 86

Occurs in orange, bergamot, lemon, sandalwood, citronella, peppermint, eucalyptus, and other oils. B.p. 92·5°. D_{20}^{20} 0·7845. n_D^{20} 1·39023.
Oxime: m.p. 48·5°. B.p. 161·3°/759 mm. (164–5°).
Thiosemicarbazone: m.p. 52–3°.
p-*Nitrophenylhydrazone*: m.p. 110–11° (107–8°, 101°).
Di-Me acetal: b.p. 128°. D^{15} 0·847.
Di-Et acetal: b.p. 168·2°.
Di-isoamyl acetal: b.p. 240–55°.
Cyanhydrin: *see under* 1-Hydroxyisocaproic Acid.

Fujita, *Chem. Abstracts*, 1934, **28**, 2345.
Harries, Oppenheim, *Chem. Abstracts*, 1917, **11**, 3237.
Sabatier, Mailhe, *Compt. rend.*, 1913, **156**, 1731; 1914, **158**, 986.
Braun, Manz, *Ber.*, 1934, **67**, 1710.

Isovaleric Acid (*Isopropylacetic acid, 2-methylbutyric acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}COOH$

$C_5H_{10}O_2$ MW, 102

Occurs in tobacco, hop oil, etc. F.p. — 37·6°. B.p. 176·7°. $D_D^{17·6}$ 0·93319. $n_D^{22·4}$ 1·40178. $k = 1·68 \times 10^{-5}$ at 25°. Sol. 23 parts H_2O.
Me ester: $C_6H_{12}O_2$. MW, 116. B.p. 116–17°. D_4^{20} 0·8808.
Et ester: $C_7H_{14}O_2$. MW, 130. F.p. — 99·3°. B.p. 134·7°. D_4^{20} 0·86565. $n_D^{18·35}$ 1·39738.
Propyl ester: $C_8H_{16}O_2$. MW, 144. B.p. 155·5°, 116°/746 mm. $D_4^{17·8}$ 0·8643. $n_D^{17·8}$ 1·40413.
Isopropyl ester: b.p. 142°/756 mm. D^{17} 0·8538. n_D 1·397.
Isobutyl ester: $C_9H_{18}O_2$. MW, 158. B.p. 170·0–172°/757·5 mm., 144–3°/381 mm., 105·8°/102 mm., 92°/61 mm. D^{20} 0·8534. $n_D^{19·5}$ 1·40639.
sec.-n-*Butyl ester*: b.p. 163–4°/752 mm. D_4^{20} 0·8482.
Isoamyl ester: $C_{10}H_{20}O_2$. MW, 172. B.p. 190·3–190·6°/761 mm., 100°/40 mm. $D_4^{18·7}$ 0·8583. $n_D^{18·7}$ 1·41300.
tert.-*Amyl ester*: b.p. 173–4°. D_0^{14} 0·8608.
n-*Octyl ester*: $C_{13}H_{26}O_2$. MW, 214. B.p. 249–51°. D^{16} 0·8624.
Cetyl ester: $C_{21}H_{42}O_2$. MW, 326. M.p. 25°. B.p. 280–90°/202 mm. D^{20} 0·852.

Allyl ester: $C_8H_{14}O_2$. MW, 142. B.p. 162°, 154·5°/767·4 mm.

Phenyl ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 231°.

Chloride: C_5H_9OCl. MW, 120·5. B.p. 114·5–115·5°/771 mm. $D_4^{24·3}$ 0·9854. $n_D^{24·3}$ 1·41361.

Mono-glyceryl ester: mono-isovalerin. $C_8H_{15}O_4$. MW, 175. B.p. 145–7°/3·5 mm. D^{16} 1·059.

Di-glyceryl ester: di-isovalerin. $C_{13}H_{24}O_5$. MW, 260. B.p. 170–5°/15 mm.

Tri-glyceryl ester: *see* Tri-isovalerin.

Amide: $C_5H_{11}ON$. MW, 101. M.p. 137°.

Anhydride: $C_{10}H_{18}O_3$. MW, 186. B.p. 215·1–215·3°/762 mm., 103°/15 mm. D_4^{27} 0·9289. n_D^{26} 1·4147.

Nitrile: isobutyl cyanide. C_5H_9N. MW, 83. F.p. − 100·85°. B.p. 130·5°, 52·5–53°/50 mm. D_0^{20} 0·7884.

Anilide: m.p. 109–10°.

p-*Toluidide*: m.p. 106–7°.

1-*Naphthalide*: m.p. 125–6°.

Underwood, Gale, *J. Am. Chem. Soc.*, 1934, **56**, 2117.
Schiff, *Ann.*, 1883, **220**, 334.
Auwers, Eisenlohr, *Z. physik. Chem.*, 1913, **83**, 430.
Kirkhgof, Korzina, Astrova, *ibid.*, 3713.
Takayama, Oeda, *Chem. Abstracts*, 1932, **26**, 5017.
Okada, D.R.P., 351,329, (*Chem. Abstracts*, 1932, **26**, 975).
Mitchell, Reid, *J. Am. Chem. Soc.*, 1931, **53**, 321.
Hara, Komatsu, *Chem. Abstracts*, 1925, **19**, 3248.

Isovaleroin (2 : 7-*Dimethyl*-5-*octanolone*-4, *isobutylisovalerylcarbinol*)

$(CH_3)_2CH·CH_2·CH(OH)·CO·CH_2·CH(CH_3)_2$

$C_{10}H_{20}O_2$ MW, 172

B.p. 94–7°/12 mm. $D_4^{26·6}$ 0·8930. $n_D^{26·6}$ 1·4260.

Oxime: m.p. 128°.

Corson, Benson, Goodwin, *J. Am. Chem. Soc.*, 1930, **52**, 3993.

Isovalerone.

See Di-isobutyl Ketone.

Isovalerophenone (*Isobutyl phenyl ketone*)

$C_6H_5·CO·CH_2·CH(CH_3)_2$

$C_{11}H_{14}O$ MW, 162

B.p. 236·5°/764 mm., 137–8°/38 mm. $D_4^{16·4}$ 0·9701. $n_D^{15·3}$ 1·5139.

Oxime: m.p. 72° (64·5°).

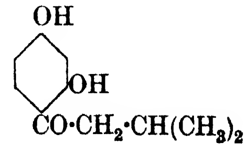
Semicarbazone: m.p. 210° (208–9°).

Senderens, *Compt. rend.*, 1910, **150**, 1337.
Tiffeneau, Levy, *Compt. rend.*, 1926, **183**, 969.

4-Isovalerylphenol.

See *p*-Hydroxyisovalerophenone.

4-Isovalerylresorcinol (*Isobutyl* 2 : 4-*dihydroxyphenyl ketone*, 2 : 4-*dihydroxyisovalerophenone*)



$C_{11}H_{14}O_3$ MW, 194

M.p. 108–10°. B.p. 183–5°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, **48**, 1692.

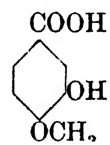
Isovaleryltoluene.

See Isobutyl tolyl Ketone.

Isovaline.

1-Amino-1-methyl-*n*-butyric Acid, *q.v.*

Isovanillic Acid (*Protocatechuic acid* 4-*methyl ether*, 3-*hydroxy*-4-*methoxybenzoic acid*, 3-*hydroxyanisic acid*)



$C_8H_8O_4$ MW, 168

Prisms or plates from H_2O. M.p. 255–7°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Sublimes.

Me ester: $C_9H_{10}O_4$. MW, 182. M.p. 83–4°. *Acetyl*: m.p. 87–8°. *Benzoyl*: m.p. 101–2°.

Et ester: $C_{10}H_{12}O_4$. MW, 196. *Et ether*: $C_{12}H_{16}O_4$. MW, 224. M.p. 62°.

Nitrile: $C_8H_7O_2N$. MW, 149. M.p. 124°. *Acetyl*: m.p. 116°.

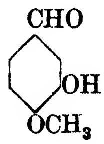
Acetyl: m.p. 206–7°.

Carbethoxyl: m.p. 185–6°.

Et ether: 4-methoxy-3-ethoxybenzoic acid. $C_{10}H_{12}O_4$. MW, 196. M.p. 165–6°. *Amide*: $C_{10}H_{13}O_3N$. MW, 195. M.p. 196–7°.

Santos, *Chem. Abstracts*, 1930, **24**, 1647.
Späth, *Monatsh.*, 1920, **41**, 297.
Fischer, Bergmann, Lipschitz, *Ber.*, 1918, **51**, 77.
Späth, Bernhauer, *Ber.*, 1925, **58**, 203.

Isovanillin (*Protocatechuic aldehyde 4-methyl ether, 3-hydroxy-4-methoxybenzaldehyde, 3-hydroxyanisaldehyde*)

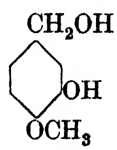


$C_8H_8O_3$ MW, 152

Cryst. from H_2O. M.p. 116–17°. B.p. 179°/15 mm. Sol. EtOH, Et_2O, AcOH, $CHCl_3$, AcOEt, hot H_2O, hot C_6H_6. Spar. sol. pet. ether, CS_2.
Oxime: m.p. 146·5°.
Acetyl: m.p. 64°.
Carbomethoxyl: m.p. 121°.
Et ether: $C_{10}H_{12}O_3$. MW, 180. M.p. 50–1°. *Oxime*: m.p. 98–9°.

Santos, *Chem. Abstracts*, 1930, **24**, 1647.
de Haen, A.G., D.R.P., 557,547, (*Chem. Abstracts*, 1933, **27**, 737).
Späth, Bernhauer, *Ber.*, 1925, **58**, 203.

Isovanillyl Alcohol (*3-Hydroxy-4-methoxybenzyl alcohol*)

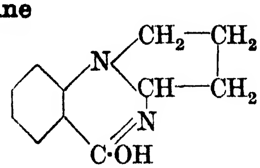


$C_8H_{10}O_3$ MW, 154

Cryst. from toluene. M.p. 132°. Sol. EtOH, Et_2O, AcOH, toluene, hot H_2O, hot $CHCl_3$, hot C_6H_6. $FeCl_3 \longrightarrow$ green col. Conc. $H_2SO_4 \longrightarrow$ red col.

Lock, *Ber.*, 1929, **62**, 1187.

Isovasicine



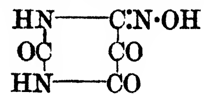
$C_{11}H_{12}ON_2$ MW, 188

Cryst. from C_6H_6–ligroin. M.p. 164° decomp.
Hydrochloride: m.p. 222°.
Methiodide: m.p. 191°.

Ghose, Krishna, Narang, Rây, *J. Chem. Soc.*, 1932, 2743.

Isoviolanthrone.
See Isodibenzanthrone.

Isovioluric Acid (*Alloxan-6-oxime*)

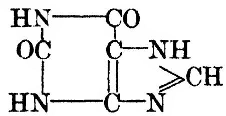


$C_4H_3O_4N_3$ MW, 157

Yellow cryst. M.p. about 250° decomp.

Davidson, Bogert, *Chem. Abstracts*, 1932, **26**, 4798.

Isoxanthine

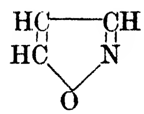


$C_5H_4O_2N_4$ MW, 152

Needles + $\frac{1}{2}H_2O$ from hot H_2O.

Behrend, *Ann.*, 1898, **245**, 223.
Gulland, Holiday, *Nature*, 1933, **132**, 782.

Isoxazole

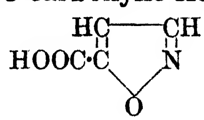


C_3H_3ON MW, 69

B.p. 95°. D_4^{20} 1·078. n_{He}^{20} 1·428.

Auwers, *Ber.*, 1924, **57**, 463.

Isoxazole-5-carboxylic Acid



$C_4H_3O_3N$ MW, 113

Pale yellow cryst. M.p. 149°. Sublimes.
Me ester: $C_5H_5O_3N$. MW, 127. Oil. B.p. 100–1°/12 mm.
Et ester: $C_6H_7O_3N$. MW, 141. Oil. B.p. 110°/1 mm.
Amide: $C_4H_4O_2N_2$. MW, 112. M.p. 141–2°.
Nitrile: $C_4H_2ON_2$. MW, 94. Oil. B.p. 168°, 75–85°/25 mm.
Anilide: m.p. 107°.

Quilico, Freri, *Gazz. chim. ital.*, 1932, **62**, 440.

Isoxylylic Acid.
See 2 : 5-Dimethylbenzoic Acid.

Isoyohimbic Acid

$C_{20}H_{24}O_3N_2$ MW, 340

Cryst. + $1H_2O$ from MeOH.Aq. M.p. 269–70°.
Me ester: *see* Isoyohimbine.

Et ester: $C_{22}H_{28}O_3N_2$. MW, 368. M.p. 202–4°. *Hydrochloride*: m.p. 299–300° decomp.

Wibaut, van Gastel, *Rec. trav. chim.*, 1935, **54**, 88.

Isoyohimbine (*Isoyohimbic acid methyl ester*)

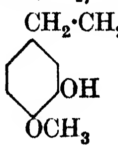
$C_{21}H_{26}O_3N_2$ MW, 354

Cryst. from MeOH.Aq. M.p. 239–40°. $[\alpha]_D^{7.5}$ + 108·8° in Py.

Hydrochloride: m.p. 298–9° (252–3°).

Wibaut, van Gastel, *Rec. trav. chim.*, 1935, **54**, 88.

Isozingerone (*Methyl* m-*hydroxy*-p-*methoxyphenylethyl ketone*, 4-[*γ-ketobutyl*]-*guaiacol*)



$C_{11}H_{14}O_3$ MW, 194

M.p. 41–2°. B.p. 159–60°/4 mm.

Oxime: m.p. 121·5–122·5°.

Benzoyl: m.p. 55·5–56·5°. B.p. 235–6°/4 mm.

Semicarbazone: m.p. 140–140·5°.

Murai, *Scientific Reports of the Imperial University, Tokyo*, 1925, **14**, 149.
Mannich, Merz, *Arch. Pharm.*, 1927, **265**, 15.

Itaconic Acid (*Methylene-succinic acid, propylene*-2 : 3-*dicarboxylic acid*)

$CH_2{:}C{\cdot}COOH$
$\quad CH_2{\cdot}COOH$

$C_5H_6O_4$ MW, 130

M.p. 162–4°. Mod. sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6, $CHCl_3$, CS_2, ligroin. k (first) = $1{\cdot}40 \times 10^{-4}$ at 25°: (second) = $3{\cdot}56 \times 10^{-6}$ at 25°. Heat of comb. C_p 475·9 Cal., C_v 477·82 Cal.

Mono-Me ester: $C_6H_8O_4$. MW, 144. M.p. 67°. B.p. 149°/12 mm.

Di-Me ester: $C_7H_{10}O_4$. MW, 158. M.p. 38°. B.p. 208°, 108°/11 mm.

Mono-Et ester: $C_7H_{10}O_4$. MW, 158. M.p. 45°. B.p. 153°/12 mm.

Di-Et ester: $C_9H_{14}O_4$. MW, 186. B.p. 228–9°, 162–3°/35 mm., 111°/13 mm. $D_4^{16.3}$ 1·0500. $n_D^{15.4}$ 1·4411.

Di-active *amyl ester*: $C_{15}H_{26}O_4$. MW, 270. B.p. 170–2°/10 mm. $[\alpha]_D^{20}$ + 4·97°.

Dichloride: $C_5H_4O_2Cl_2$. MW, 167. B.p. 89°/17 mm.

Diamide: $C_5H_8O_2N_2$. MW, 128. M.p. 192°.

Anhydride: $C_5H_4O_3$. MW, 112. M.p. 68° (64–5°). B.p. 139–40°/30 mm.

Anilide: m.p. 190°.

Shriner, Ford, Roll, *Organic Syntheses*, 1931, XI, 70 (*Bibl.*).
Malachowski, Czornodola, *Ber.*, 1935, **68**, 367.
Kinoschita, *Chem. Abstracts*, 1932, **26**, 966.
Kelly, Segura, *J. Am. Chem. Soc.*, 1934, **56**, 2497.

Itamalic Acid (*Hydroxymethylsuccinic acid*, 3-*hydroxypyrotartaric acid*)

$HO{\cdot}CH_2{\cdot}CH{\cdot}COOH$
$\quad CH_2{\cdot}COOH$

$C_5H_8O_5$ MW, 148

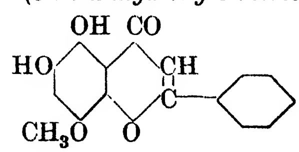
Does not exist in free state.

Di-Et ester: $C_9H_{16}O_5$. MW, 204. B.p. 150–2°/12 mm.

Me ether: $C_6H_{10}O_5$ MW, 162. Needles from Et_2O–C_6H_6. M.p. 102°. Sol. H_2O, EtOH. Spar. sol. C_6H_6, $CHCl_3$.

Fittig, Landolt, *Ann.*, 1877, **188**, 76.
Wislicenus, Böklen, Reuthe, *Ann.*, 1908, **363**, 359.
Simonsen, *J. Chem. Soc.*, 1915, **107**, 788.

Izalpinin (5 : 6-*Dihydroxy*-8-*methoxyflavone*)



$C_{16}H_{12}O_5$ MW, 284

Needles from toluene. M.p. 195°. Mod. sol. Py. Alc. $FeCl_3 \longrightarrow$ green col.

Diacetyl deriv.: m.p. 170–1°.

Dibenzoyl deriv.: m.p. 189°.

Di-Me ether: $C_{18}H_{16}O_5$. MW, 312. M.p. 193–5°.

Kimura, Hoshi, *Chem. Zentr.*, 1935, I, 1251.

J

J Acid.
See 2-Amino-5-naphthol-7-sulphonic Acid.

Jalapin (*Scammonin, orizabin*)

$C_{34}H_{56}O_{16}$ MW, 720

Glucoside present in roots of various *Convolvulaceæ*. Amorph. powder. M.p. 131°. Very sol. EtOH, amyl alcohol, $CHCl_3$, hot Et_2O, hot MeOH, hot AcOH. Sol. H_2O. Spar. sol. C_6H_6, CS_2. Strong purgative and fish poison. Dil. HCl ⟶ jalapinolic acid and sugars, among which *d*-glucose, rhodeose and a methyltetrose have been identified.

Mayer, *Ann.*, 1855, **95**, 129.
Requier, *J. pharm. chim.*, 1904, **20**, 148.

Jalapinolic Acid (α-10-*Hydroxypalmitic acid*)

$CH_3\cdot[CH_2]_4\cdot CH(OH)\cdot[CH_2]_9\cdot COOH$

$C_{16}H_{32}O_3$ MW, 272

Needles from AcOEt. M.p. 68–9° (67–8°). Very sol. EtOH, Et_2O. Insol. H_2O. $[\alpha]_D$ + 0·79° in $CHCl_3$.

Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from pet. ether. M.p. 40·5–41·5° (47–9°). B.p. 220°/20 mm., 183–6°/3 mm. $[\alpha]_D$ + 0·98° in $CHCl_3$.

Et ester: $C_{18}H_{36}O_3$. MW, 300. Needles. M.p. 47–8°. *Acetyl*: oil. B.p. 224–5°/50 mm. Very sol. EtOH. Insol. H_2O.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, **50**, 1754 (*Bibl.*).
Kromer, *J. prakt. Chem.*, 1898, **57**, 448.

Japaconine A

$C_{25}H_{41}O_9N$ MW, 499

B,HCl: prisms from Me_2CO.Aq. M.p. 173–5° decomp. Very sol. H_2O. Sol. MeOH, EtOH, amyl alcohol, AcOEt. Spar. sol. Et_2O, Me_2CO.

Tetra-acetyl deriv.: cryst. from EtOH. M.p. 235–6°. $[\alpha]_D^{18}$ − 28·9° in $CHCl_3$.

Benzoyl deriv.: *see* Japbenzaconine A.

Majima, Suginomé, Morio, *Ber.*, 1924, **57**, 1465 (*Bibl.*).

Japaconine B

$C_{25}H_{41}O_9N$ MW, 499

B,HCl: cryst. from Me_2CO.Aq. M.p. 251–2°. Very hygroscopic.

Tetra-acetyl deriv.: prisms from EtOH. M.p. 228–9°. $[\alpha]_D^{19}$ − 19·1° in EtOH.

Benzoyl deriv.: *see* Japbenzaconine B.

See previous reference.

Japaconitine A

$C_{34}H_{47}O_{11}N$ MW, 645

Constituent of the alkaloids of the Japanese aconite plant. Rhombic cryst. from EtOH. M.p. 202–3° decomp. Sol. 9 parts MeOH. $[\alpha]_D^{13}$ + 20·7° in $CHCl_3$.

B,HCl: needles + $3\frac{1}{2}H_2O$. M.p. 160–1°, 165–6° anhyd. $[\alpha]_D^{18}$ − 31·3° in H_2O.

B,HBr: cryst. + $3\frac{1}{2}H_2O$. M.p. 155–6°, 172–3° anhyd. $[\alpha]_D^{28}$ − 27·7°.

B,HI: m.p. 205–9° decomp.

Chloroaurate: needles. M.p. 159–60° decomp. Sol. 3 parts MeOH.

Perchlorate: m.p. 215–18° decomp.

Triacetyl deriv.: m.p. 191–3° decomp.

Majima, Suginomé, Morio, *Ber.*, 1924, **57**, 1462.

Japaconitine A₁

$C_{34}H_{47}O_{11}N$ MW, 645

Rhombic cryst. from MeOH. M.p. 208–9° decomp. Sol. 30 parts MeOH. $[\alpha]_D^{12}$ + 26·4° in $CHCl_3$.

B,HBr: m.p. 172–3° decomp. $[\alpha]_D^{16}$ − 22·5° in H_2O.

Chloroaurate: prisms. M.p. 223–4° decomp.

Perchlorate: m.p. 215–18° decomp.

See previous reference.

Japaconitine B

$C_{34}H_{47}O_{11}N$ MW, 645

Rhombic cryst. from MeOH. M.p. 208–9°. $[\alpha]_D^{11}$ + 26·9°. Sol. 31 parts MeOH.

B,HCl: m.p. 108–9° decomp. $[\alpha]_D^{18}$ − 24·7° in H_2O.

B,HBr: m.p. 179·5–180·5° decomp. $[\alpha]_D^{30}$ − 21·8°.

B,HI: m.p. 228–31° decomp.

Chloroaurate: prisms. M.p. 235–7° decomp. Sol. 13 parts MeOH.

Perchlorate: m.p. 215–18° decomp.

Triacetyl deriv.: m.p. 196–7° decomp.

See previous reference.

Japanic Acid (*Nonadecane*-1 : 19-*dicarboxylic acid*)

$HOOC\cdot[CH_2]_{19}\cdot COOH$

$C_{21}H_{40}O_4$ MW, 356

Cryst. from EtOH or AcOEt. M.p. 112–13°.

Di-Me ester: $C_{23}H_{44}O_4$. MW, 384. Plates from MeOH. M.p. 56–7°.

Ruzicka, Stoll, Schinz, *Helv. chim. Acta*, 1928, **11**, 680.

Japbenzaconine A (*Benzoyljapaconine A*)

$C_{32}H_{45}O_{10}N$ MW, 603

Cryst. in rosettes from Et_2O–pet. ether. M.p. 183°. $[\alpha]_D + 40 \cdot 16°$.

B,HCl: prisms from H_2O. M.p. 244–5°. $[\alpha]_D^{18} - 29 \cdot 8°$ in H_2O.

B,HAuCl₄: cryst. from EtOH. M.p. 219°.

Tetra-acetyl deriv.: cryst. from EtOH. M.p. 231–2°.

Majima, Suginomé, Morio, *Ber.*, 1924, **57**, 1464 (*Bibl.*).

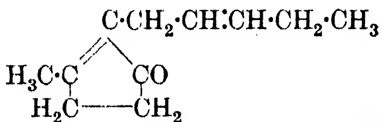
Japbenzaconine B (*Benzoyljapaconine B*)

$C_{32}H_{45}O_{10}N$ MW, 603

B,HCl: plates from H_2O. M.p. 251–2°. $[\alpha]_D^{18} - 24 \cdot 4°$.

See previous reference.

Jasmone (1-*Methyl*-2-β-*pentenylcyclopentenone*-3)



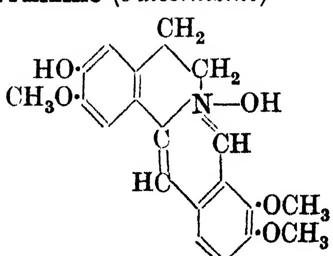
$C_{11}H_{16}O$ MW, 164

Occurs in orange and jasmin leaves. Oil. B.p. 134–5°/12 mm. D_4^{22} 0·9437. n_D^{22} 1·4979.

Semicarbazone: cryst. from MeOH or EtOH. M.p. 209·5–210°.

Ruzicka, Pfeiffer, *Helv. Chim. Acta*, 1933, **16**, 1208.

Jatrorrhizine (*Jateorhizine*)



$C_{20}H_{21}O_5N$ MW, 355

Constituent of alkaloids of columba root (*Jatrorrhiza columba*). Not known in free state.

Chloride: copper-coloured needles + $1H_2O$ from EtOH. M.p. 206°.

Iodide: reddish-yellow needles + $1H_2O$ from EtOH. M.p. 208–10°.

Nitrate: golden yellow needles from EtOH. M.p. 225° decomp.

Späth, Duschinsky, *Ber.*, 1925, **58**, 1939.
Feist, *Arch. Pharm.*, 1907, **245**, 586.
Feist, Sandstede, *Arch. Pharm.*, 1918, **256**, 1.

Jegosapogenin

$C_{35}H_{56}O_6$ MW, 572

Prisms from EtOH. M.p. 286° decomp. Sol. $CHCl_3$, AcOH. Spar. sol. MeOH, EtOH, Et_2O. Insol. H_2O. Neutral to litmus. Alk. hyd. ⟶ tiglic acid + jegosapogenol.

Triacetyl deriv.: needles from MeOH. M.p. 278°. Spar. sol. MeOH.

Tetra-acetyl deriv.: needles from MeOH. M.p. 250–4° decomp. Very sol. Et_2O, hot MeOH.

Tribenzoyl deriv.: needles from EtOH. M.p. 296–9°. Sol. Et_2O. Spar. sol. MeOH, EtOH.

Sone, *Acta Phytochimica*, 1934, **8**, 23, (*Chem. Zentr.*, 1935, I, 2539).

Jegosapogenol

$C_{30}H_{50}O_5$ MW, 490

Plates from EtOH. M.p. 329° decomp. Spar. sol. most org. solvents.

Tetra-acetyl deriv.: needles from MeOH. M.p. 205°. Very sol. most org. solvents.

Tetrabenzoyl deriv.: prisms from Me_2CO–Et_2O. M.p. 328°.

See previous reference.

Jegosaponin

$C_{55}H_{80}O_{25}$ MW, 1140

Occurs in shell of fruit of *Styrax japonica* as Ca salt. Colourless needles from MeOH. M.p. 238°. $[\alpha]_D - 39 \cdot 15°$ in 90% EtOH. Sol. MeOH, EtOH, AcOH. Insol. H_2O, Et_2O, C_6H_6, $CHCl_3$. Conc. H_2SO_4 ⟶ yellow col. changing to red. 5% H_2SO_4 ⟶ mixture of jegosapogenine, glucose, and glucuronic acid.

Asahina, Momoya, *Arch. Pharm.*, 1914, **252**, 56.

Jervasic Acid.
See Chelidonic Acid.

Jesaconitine

$C_{35}H_{49}O_{19}N$ ($C_{35}H_{51}O_{19}N$) MW, 787 (789)

Present in aconite roots. Amorph. M.p. 128–30°.

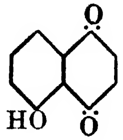
Triacetyl deriv.: m.p. 213–15°.

B,HAuCl₄: m.p. 208–9°.

B,HClO₄: m.p. 230–2°. $[\alpha]_D - 16 \cdot 7°$.

Majima, Morio, *Ann.*, 1929, **476**, 209.

Juglone (5-*Hydroxy*-1 : 4-*naphthoquinone*)



$C_{10}H_6O_3$ MW, 174

Present in leaves, etc., of *Juglans regia*, Linn., *Juglans nigra*, Linn., etc. Reddish-yellow needles from $CHCl_3$ or C_6H_6. M.p. 153–4° after sintering at 144–50°. Volatile in steam. Sublimes. Very sol. $CHCl_3$, hot AcOH. Sol. EtOH, Et_2O. Spar. sol. ligroin. Insol. H_2O. Sol. NaOH to purple sol. Conc. $H_2SO_4 \longrightarrow$ blood red col.

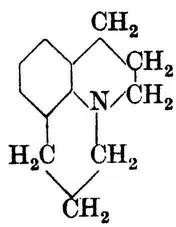
Acetyl: yellow plates from EtOH. M.p. 154–5°. Sublimes. Volatile in steam. Very sol. $CHCl_3$. Sol. C_6H_6. Spar. sol. EtOH, Et_2O, CS_2, pet. ether. Insol. H_2O.

Monoxime: red needles from EtOH.Aq. M.p. 187–187·5°. Very sol. EtOH, AcOH. Sol. Et_2O. Spar. sol. H_2O.

Dioxime: dark brown needles from AcOH. Explodes at 225°.

Bernthsen, Semper, *Ber.*, 1887, **20**, 939.
Willstätter, Wheeler, *Ber.*, 1914, **47**, 2798.

Julolidine



$C_{12}H_{15}N$ MW, 173

Cryst. M.p. 40°. B.p. 280° decomp., 155–6°/17 mm.

B,HCl: m.p. 218°.

B,HI: m.p. 219–22°.

Picrate: m.p. 165°.

Methiodide: cryst. from MeOH. M.p. 186°. Sol. H_2O, EtOH. Insol. Et_2O.

Pinkus, *Ber.*, 1892, **25**, 2798.
Braun, Heider, Wyczatkowska, *Ber.*, 1918, **51**, 1224.

Juniperic Acid (15-*Hydroxypalmitic acid*, *juniperinic acid*)

$$HO{\cdot}CH_2{\cdot}[CH_2]_{13}{\cdot}CH_2{\cdot}COOH$$

$C_{16}H_{32}O_3$ MW, 272

Constituent of wax from *Juniperus sabina*, Linn. Cryst. from C_6H_6–Et_2O. M.p. 95°. Sol. EtOH, hot Et_2O. Spar. sol. cold Et_2O. Insol. cold H_2O.

Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from pet. ether–EtOH. M.p. 55–55·5°. B.p. 194–6°/2 mm.

Acetyl: leaflets from EtOH.Aq. M.p. 63°. B.p. 215–18°/2 mm.

Lactone: dihydro-ambrettolide. Cryst. from EtOH. M.p. 33–4°. B.p. 188°/15 mm. D_4^{39} 0·9348. n_D^{39} 1·4644. Possesses odour of musk.

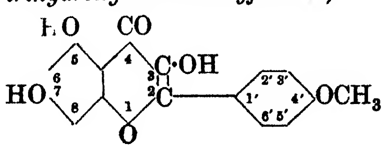
Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 484.
Ruzicka, Stoll, *Helv. Chim. Acta*, 1928, **11**, 1171.
Kerschbaum, *Ber.*, 1927, **60**, 906.

K

K Acid.

See 1-Amino-8-naphthol-4 : 6-disulphonic Acid.

Kaempferide (*Kampheride*, *campheride*, 3 : 5 : 7-*trihydroxy*-4′-*methoxyflavone*)



$C_{16}H_{12}O_6$ MW, 300

Present in rhizomes of *Alpinia officinarium*, Hance. Yellow needles + H_2O from EtOH.Aq. Dehydrates at 130–40°. M.p. 227–9°. Sol. Et_2O, AcOH. Spar. sol. EtOH, $CHCl_3$, C_6H_6. Insol. H_2O. Sol. conc. H_2SO_4 to yellow sol. Ox. $\longrightarrow$ anisic + oxalic acids. Yellow sols. in alkalis. Alc. $FeCl_3 \longrightarrow$ green col. KOH fusion $\longrightarrow$ phloroglucinol + anisic, oxalic, and formic acids.

Me ether: *see* Rhamnocitrin.

Di-Me ether: *see under* Kaempferol.

3 : 7-*Di-Et ether*: $C_{20}H_{20}O_6$. MW, 356. Yellow needles from MeOH. M.p. 137–9°. Sol. most org. solvents. Insol. H_2O.

Diacetyl deriv.: needles from EtOH. M.p. 188–9°.

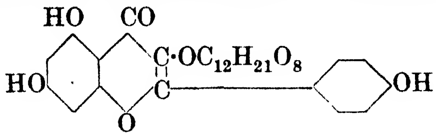
Triacetyl: needles from EtOH. M.p. 193–5°. Spar. sol. EtOH. Insol. H_2O.

Dibenzoyl deriv.: yellow needles from C_6H_6–EtOH. M.p. 185–6°.

Tribenzoyl: cryst. from AcOH. M.p. 177–8°.

Oesch, Perkin, *J. Chem. Soc.*, 1914, **105**, 2350.
Ciamician, Silber, *Ber.*, 1899, **32**, 861.
Jahns, *Ber.*, 1881, **14**, 2385.

Kaempferitrin (*Kaempferol-3-rhamnoside*)

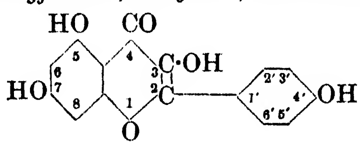


$C_{27}H_{30}O_{14}$ MW, 578

Glucoside in leaves of *Indigofera arrecta*. Needles + $3\frac{1}{2}H_2O$. M.p. 190–2°. Sol. hot EtOH. Spar. sol. H_2O. Hyd. ⟶ kaempferol + 2 mols. rhamnose.

Tasaki, *Chem. Zentr.*, 1926, I, 957.

Kaempferol (*Kampherol, campherol, 3:5:7:4′-tetrahydroxyflavone, robigenin, rhamnolutin*)



$C_{15}H_{10}O_6$ MW, 286

Present in *Ranunculaceæ*, *Leguminosæ*, etc. Yellow needles from EtOH.Aq. M.p. 276–8°. Sol. hot EtOH, Et_2O. Spar. sol. H_2O. Yellow sols. in alkalis. Alc. $FeCl_3$ ⟶ green col. Iron alum ⟶ purple col. KOH fusion ⟶ phloroglucinol + *p*-hydroxybenzoic acid + acetic acid. Sol. conc. H_2SO_4 with blue fluor. Reduces Fehling's and $NH_3.AgNO_3$. Gives coloured metallic complexes.

4′-Mono-Me ether: *see* Kaempferide.

Di-Me ether: *see* Rhamnocitrin.

Tri-Me ether: kaempferide di-Me ether. $C_{18}H_{16}O_6$. MW, 328. Yellow needles + $1H_2O$ from EtOH. M.p. 151–2°. Insol. dil. alkalis. Sol. conc. H_2SO_4 to orange yellow sol. *Acetyl*: needles from EtOH.Aq. M.p. 190–1°.

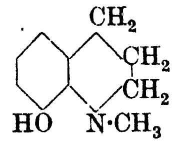
4′-Me-3:7-di-Et ether: *see under* Kaempferide.

Tetra-acetyl: prisms from EtOH. M.p. 181°. Spar. sol. EtOH. Insol. H_2O.

Glucosides: *see* Kaempferitrin, Robinin, and Multiflorin.

Kostanecki, Lampe, Tambor, *Ber.*, 1904, **37**, 2096.
Perkin, Wilkinson, *J. Chem. Soc.*, 1902, **81**, 586.
Kostanecki, Różycki, *Ber.*, 1901, **34**, 3723 (*Footnote*).
Testoni, *Gazz. chim. ital.*, 1900, **30**, 334.
Oesch, Perkin, *J. Chem. Soc.*, 1914, **105**, 2355.

Kairine (*8-Hydroxy-N-methyl-1:2:3:4-tetrahydroquinoline*)



$C_{10}H_{13}ON$ MW, 163

B.p. 278–82°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. Alc. $FeCl_3$ ⟶ violet col. Antipyretic.

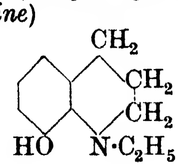
Me ether: $C_{11}H_{15}ON$. MW, 177. B.p. 270°. Sol. EtOH, Et_2O. Spar. sol. H_2O. *B,HCl*: m.p. 150°.

Benzoyl: cryst. from pet. ether. M.p. 58°. *B,HCl*: m.p. 188°.

p-*Nitrobenzoyl*: cryst. from Me_2CO. M.p. 128°.

Doebner, Miller, *Ber.*, 1884, **17**, 1707.
Pyman, *J. Chem. Soc.*, 1917, **111**, 171.

Kairine A (*8-Hydroxy-N-ethyl-1:2:3:4-tetrahydroquinoline*)



$C_{11}H_{15}ON$ MW, 177

Leaflets from Et_2O or ligroin. M.p. 76°. Sol. EtOH, Et_2O. Spar. sol. ligroin. Insol. H_2O. Alc. $FeCl_3$ ⟶ violet col. Antipyretic.

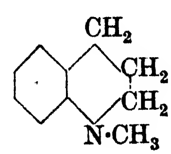
Et ether: $C_{13}H_{19}ON$. MW, 205. Leaflets from EtOH. M.p. 33°. B.p. 270°. Sol. most org. solvents.

Acetyl: prisms from EtOH. M.p. 63–4°.

Ethiodide: prisms from EtOH. M.p. 160°.

Fischer, Kohn, *Ber.*, 1886, **19**, 1046.

Kairoline (*N-Methyl-1:2:3:4-tetrahydroquinoline*)



$C_{10}H_{13}N$ MW, 147

B.p. 247–50°, 130°/77 mm., 112°/8 mm. D_4^{20} 1·022. Characteristic red col. with $NaNO_2$. $COCl_2 + AlCl_3 \longrightarrow$ blue col. Antipyretic.

B,HCl: m.p. 100°.

B,HI: m.p. 166–7°.

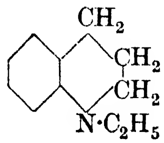
B_2,H_2PtCl_6: m.p. 177°.

Picrate: m.p. 125° (144°).

Methiodide: m.p. 172–4°.

Knorr, *Ber.*, 1899, **32**, 734 (*Footnote*).
Decker, *Ber.*, 1903, **36**, 2570.
Meisenheimer, *Ann.*, 1911, **385**, 138, 153.
Feer, Königs, *Ber.*, 1885, **18**, 2388.

Kairoline A (N-*Ethyl*-1 : 2 : 3 : 4-*tetrahydroquinoline*)



$C_{11}H_{15}N$ MW, 161

B.p. 257–8°, 135°/16 mm. Sol. EtOH, Et_2O. Insol. H_2O. Antipyretic.

B_2,H_2PtCl_6: m.p. 160°.

Picrate: m.p. 122°.

Methiodide: m.p. 179°.

v. Braun, *Ber.*, 1909, **42**, 2226.
Decker, *Ber.*, 1903, **36**, 2572.
Wagner, *Ber.*, 1880, **13**, 2400.
Kaufmann, Vonderwahl, *Ber.*, 1912, **45**, 1410.

Kalle's Acid.

See 1-Naphthylamine-2 : 7-disulphonic Acid.

Kampherol.

See Kaempferol.

Karitene.

See Illipene.

Katine.

See *d*-Nor-isoephedrine.

Kawaic Acid (2-*Methoxy*-3-*cinnamylidene*-*crotonic acid*, 2-*methoxy*-6-*phenylhexatriene*-1-*carboxylic acid*)

$$C_6H_5{\cdot}CH{:}CH{\cdot}CH{:}CH{\cdot}\overset{OCH_3}{C}{:}CH{\cdot}COOH$$

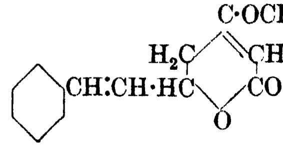
$C_{14}H_{14}O_3$ MW, 230

Prisms from Et_2O. M.p. 186° decomp. Sol MeOH, Me_2CO, $CHCl_3$, AcOEt. Spar. sol. C_6H_6 Insol. pet. ether. Alc. $FeCl_3 \longrightarrow$ brown col. Sol. conc. H_2SO_4 with purplish-red col. Dil. $H_2SO_4 \longrightarrow$ cinnamylideneacetone. Heat at 190° $\longrightarrow$ 2-methoxy-6-phenylhexatriene-1 : 3 : 5.

Me ester: $C_{15}H_{16}O_3$. MW, 244. Yellow leaflets from MeOH. M.p. 91–2°.

Borsche, Peitzsch, *Ber.*, 1929, **62**, 371.
Borsche, Blount, *Ber.*, 1930, **63**, 2419.

Kawain

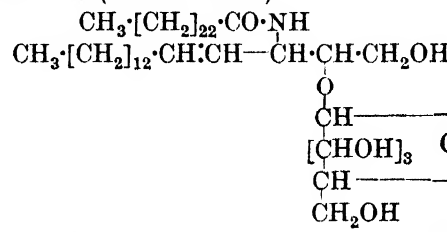


$C_{14}H_{14}O_3$ MW, 230

Occurs in the roots of *Piper methysticum*. Prisms from Et_2O–MeOH. M.p. 106°. B.p. 195–7°/0·1 mm. $[\alpha]_D^{20}$ + 105° in EtOH. Sol. MeOH, Et_2O, Me_2CO. Spar. sol. hexane, pet. ether. Sol. conc. H_2SO_4 to red sol. NaOH $\longrightarrow$ kawaic acid.

Borsche, Peitzsch, *Ber.*, 1930, **63**, 2414.

Kerasin (*Homocerebron*)



$C_{48}H_{93}O_8N$ MW, 811

One of constituents of nervous tissue. White amorph. powder. M.p. 180° decomp. Anisotropic. $[\alpha]_D$ − 9° in Py–$CHCl_3$. Sol. hot EtOH, AcOH, AcOEt, C_6H_6. Spar. sol. Py. Insol. H_2O, Et_2O, pet. ether. Sol. conc. H_2SO_4 to purple sol. Adds Br_2. Gives Molisch test. Hyd. $\longrightarrow$ lignoceric acid + sphingosin + *d*-galactose.

Penta-Me ether: $C_{53}H_{103}O_8N$. MW, 881. Amorph. powder. M.p. 73°.

Hexa-acetyl deriv.: m.p. 54–6°. $[\alpha]_D^{20}$ − 16·46°.

Klenk, Härle, *Z. physiol. Chem.*, 1930, **189**, 243.
Pryde, Humphreys, *Biochem. J.*, 1924, **18**, 661.
Levene, West, *Chem. Abstracts*, 1917, **11**, 2335.

Kessyl Alcohol

$C_{14}H_{24}O_2$ MW, 224

Exists in three modifications.

α-.

Present in *Valeriana officinalis*, Linn. Cryst. from EtOH. M.p. 85°. B.p. 300–2°, 155–6°/11 mm. $[\alpha]_D$ − 44·72° in EtOH. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, pet. ether. Insol. H_2O. Vanillin + HCl $\longrightarrow$ cherry-red col. HCl $\longrightarrow$ β-form. Ox. $\longrightarrow$ α-kessyl ketone.

Acetyl: m.p. 60–1°. B.p. 280–3°, 157–8°/6·5 mm. $[\alpha]_D$ − 62·7°.

Phenylurethane: m.p. 168°.

β-.
Needles from EtOH. M.p. 153°. $[\alpha]_D$ − 17·3°. No col. with vanillin + HCl.

Iso-.
Prisms from EtOH. M.p. 118–19°. Cherry-red col. with vanillin + HCl.
Phenylurethane: m.p. 50–2°.

Asahina, Nakanishi, *Journal of the Pharmaceutical Society, Japan*, 1932, **52**, 1; *Chem. Zentr.*, 1927, I, 429.
Asahina, Hongo, *Chem. Zentr.*, 1924, II, 673.

Kessyl Ketone

$C_{14}H_{24}O_2$ MW, 224

Exists in three modifications.

α-.
Needles from EtOH. M.p. 105°. Alc. HCl ⟶ β-form. No col. with vanillin + HCl. Yields two oximes. Red. ⟶ isokessyl alcohol.
Semicarbazone: m.p. 234–5°.
Oxime: m.p. 153–4°.
"*Iso*"*oxime*: m.p. 42°.

β-.
Needles from EtOH. M.p. 111–12°. No col. with vanillin + HCl.
Semicarbazone: m.p. 190–1°.

Iso-.
Prisms from EtOH. M.p. 56°. $[\alpha]_D$ − 133·5°.
Semicarbazone: m.p. 263–5°.

See above references.

Ketene

$CH_2{:}CO$

C_2H_2O MW, 42

M.p. − 151°. B.p. − 56° (− 41°). Readily polymerises to 1 : 3-diketocyclobutane. Stable to O. Reacts with hydroxy, amino, hydroxylamino, mercapto, etc., groups ⟶ acetyl derivs. Typical reactions are: H_2O ⟶ $CH_3{\cdot}COOH$: C_2H_5OH ⟶ $CH_3{\cdot}CO{\cdot}OC_2H_5$: NH_3 ⟶ $CH_3{\cdot}CONH_2$: aniline ⟶ acetanilide (common method of identifying ketene): Br in Et_2O ⟶ bromoacetyl bromide: H_2O_2 ⟶ peracetic acid + diacetyl peroxide: HCl ⟶ acetyl chloride: hydroxamic acids ⟶ dihydroxamic acids. Contrary to general rule reacts with *o*- and *m*-hydroxybenzoic acids (method of preparing aspirin) but not with *p*-hydroxybenzoic acid. Gives Friedel–Crafts reaction with HCl, *e.g.*, veratrole ⟶ acetoveratrone. Owing to difference in reactivity amino-acids can be acetylated in H_2O. Reacts with organomercurials ⟶ corresponding Me ketone.

Di-Et acetal: $C_6H_{12}O_2$. MW, 116. B.p. 76–7°. D_4^{20} 0·7932. n_D^{21} 1·3643.
Di-propyl acetal: $C_8H_{16}O_2$. MW, 144. B.p. 104–6°. D_4^{22} 0·7999. n_D^{21} 1·3768.
Di-isobutyl acetal: $C_{10}H_{20}O_2$. MW, 172. B.p. 110–12°. D_4^{20} 0·8145. n_D^{20} 1·3966.
Di-isoamyl acetal: $C_{12}H_{24}O_2$. MW, 200. B.p. 131–3°. D_4^{19} 0·8104. n_D^{12} 1·4021.

Hurd, *Organic Syntheses*, 1932, Collective Vol. I, 324.
Al, *Angew. Chem.*, 1932, **45**, 545.
Staudinger, Klever, *Ber.*, 1908, **41**, 595.
Deakin, Willsmore, *J. Chem. Soc.*, 1910, **97**, 1970.
Scheibler, Marhenkel, Nikolic, *Ann.*, 1927, **458**, 28.
Hurd, *J. Am. Chem. Soc.*, 1923, **45**, 3095.
van Alphen, *Rec. trav. chim.*, 1924, **43**, 823.
Ploeg, *Rec. trav. chim.*, 1926, **45**, 342.
Gilman, Whoolley, Wright, *J. Am. Chem. Soc.*, 1933, **55**, 2609.
Rice, Greenberg, Waters, Vollrath, *J. Am. Chem. Soc.*, 1934, **56**, 1760.

Ketine.

See 2 : 5-Dimethylpyrazine.

Ketipic Acid (*Oxalodiacetic acid, oxalyldiacetic acid, 2 : 3-diketoadipic acid*)

$CO{\cdot}CH_2{\cdot}COOH$
|
$CO{\cdot}CH_2{\cdot}COOH$

$C_6H_6O_6$ MW, 174

Amorph. powder. Decomp. at 150° ⟶ diacetyl. Sol. conc. HCl, AcOH. Spar. sol. Et_2O. Insol. H_2O, EtOH, $CHCl_3$, CS_2, C_6H_6, ligroin. Hot dil. min. acids ⟶ diacetyl.

Di-Et ester: $C_{10}H_{14}O_6$. MW, 230. Prisms from EtOH. M.p. 76–7° (82–3°). B.p. 220–30°/30 mm. Sol. Et_2O, $CHCl_3$. Spar. sol. EtOH. Insol. H_2O. Hot dil. min. acids ⟶ diacetyl. Alc. $FeCl_3$ ⟶ red col.

Fittig, Daimler, Keller, *Ann.*, 1888, **249**, 183, 190.
Franzen, Schmidt, *Ber.*, 1925, **58**, 224.
Wislicenus, *Ber.*, 1887, **20**, 590.

1-Ketoadipic Acid

$CH_2{\cdot}CO{\cdot}COOH$
|
$CH_2{\cdot}CH_2{\cdot}COOH$

$C_6H_8O_5$ MW, 160

Cryst. from Et_2O. M.p. 127°. Sol. H_2O, EtOH, Me_2CO. Spar. sol. Et_2O. Insol. C_6H_6, $CHCl_3$, pet. ether.

Di-Et ester: $C_{10}H_{16}O_5$. MW, 216. B.p. 157°/16 mm. *Phenylhydrazone*: m.p. 77°.

Semicarbazone: m.p. 118°. *Oxime*: needles. M.p. 52–3°. Spar. sol. H_2O, ligroin.

4-*Et ester*-1-*nitrile*: $C_8H_{12}O_3N$. MW, 170. Plates from ligroin. M.p. 74°. Spar. sol. H_2O.

Oxime: 1-oximinoadipic acid, 1-isonitrosoadipic acid. Cryst. M.p. 151–2° decomp. Sol. EtOH. Spar. sol. H_2O, Et_2O, C_6H_6. $Ac_2O \longrightarrow$ 3-cyanobutyric acid. $FeCl_3 \longrightarrow$ brown col.

Semicarbazone: m.p. 210–15°.

Phenylhydrazone: m.p. 141°.

Gault, *Compt. rend.*, 1909, **148**, 1114; *Bull. soc. chim.*, 1912, **11**, 386.

Dieckmann, *Ber.*, 1900, **33**, 586.

Fischer, Weigert, *Chem. Zentr.*, 1902, I, 985.

2-Ketoadipic Acid

$$\begin{array}{l} CO{\cdot}CH_2{\cdot}COOH \\ | \\ CH_2{\cdot}CH_2{\cdot}COOH \end{array}$$

$C_6H_8O_5$ MW, 160

Plates from $Me_2CO - CHCl_3$. M.p. 124–5°. $FeCl_3 \longrightarrow$ violet col. Semicarbazide $\longrightarrow$ levulinic acid semicarbazone.

1-*Nitrile*: $C_6H_7O_3N$. MW, 141. Cryst. from $CHCl_3$. M.p. 86–8°. Sol. most org. solvents. KOH $\longrightarrow$ succinic and acetic acids. HCl $\longrightarrow$ levulinic acid.

Kon, Nangi, *J. Chem. Soc.*, 1932, 2560.

Thiele, Landers, *Ann.*, 1909, **369**, 309.

4-Ketoazelaic Acid (*Acetone-dipropionic acid*)

$$OC\begin{array}{l} \diagup CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH \\ \diagdown CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH \end{array}$$

$C_9H_{14}O_5$ MW, 202

Exists in two forms. (i) Cryst. from H_2O. M.p. 101–2°. Sol. H_2O, EtOH. Spar. sol. $CHCl_3$. (ii) Leaflets from H_2O. M.p. 108–9°. Less sol. than (i). NaHg $\longrightarrow$ 4-hydroxyazelaic acid.

Di-Me ester: $C_{11}H_{18}O_5$. MW, 230. Leaflets from ligroin. M.p. 30–1°. Sol. EtOH. Spar. sol. H_2O, ligroin. Aq. sol. decomp. on boiling.

Phenylhydrazone: m.p. 151°.

Semicarbazone: prisms from H_2O. M.p. 180–1° decomp. Spar. sol. H_2O, EtOH, Et_2O.

v. Pechmann, Sidgwick, *Ber.*, 1904, **37**, 3817.

3-Ketobehenic Acid (3-*Ketoheneicosane*-1-*carboxylic acid*, 3-*ketodocosanic acid*)

$$CH_3{\cdot}[CH_2]_{17}{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_{22}H_{42}O_3$ MW, 354

Cryst. from AcOH. M.p. 103°.

Shukow, Schestakow, *Chem. Zentr.*, 1908, II, 1415.

9-Ketobehenic Acid (9-*Ketoheneicosane*-1-*carboxylic acid*, 9-*ketodocosanic acid*)

$$CH_3{\cdot}[CH_2]_{11}{\cdot}CO{\cdot}[CH_2]_8{\cdot}COOH$$

$C_{22}H_{42}O_3$ MW, 354

Plates from MeOH. M.p. 94°.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2207.

13-Ketobehenic Acid (13-*Ketoheneicosane* 1-*carboxylic acid*, 13-*ketodocosanic acid*)

$$CH_3{\cdot}[CH_2]_7{\cdot}CO{\cdot}[CH_2]_{12}{\cdot}COOH$$

$C_{22}H_{42}O_3$ MW, 354

Leaflets from EtOH. M.p. 83–4°. Sol. $CHCl_3$. Spar. sol. EtOH, C_6H_6. Insol. ligroin.

Me ester: $C_{23}H_{44}O_3$. MW, 368. Leaflets from EtOH.Aq. M.p. 57–8°.

Et ester: $C_{24}H_{46}O_3$. MW, 382. Leaflets from EtOH.Aq. M.p. 54°. *Oxime*: m.p. 28–9°. Sol. EtOH, AcOH, Me_2CO, $CHCl_3$. Spar. sol. H_2O.

Oxime: cryst. from EtOH. M.p. 44–5° (50°). Sol. MeOH, Et_2O, AcOH, $CHCl_3$. Spar. sol. EtOH.

Azine: cryst. from EtOH. M.p. 56°.

Holt, Baruch, *Ber.*, 1893, **26**, 838.

Baruch, *Ber.*, 1894, **27**, 176.

Fileti, *J. prakt. Chem.*, 1893, **48**, 336.

Ketobutane.

See Methyl ethyl Ketone.

3-Ketobutanol-1.

See 3-Keto-*n*-butyl Alcohol.

Ketobutenylfuran.

See Furfurylideneacetone.

3-Keto-*n*-butyl Alcohol (3-*Ketobutanol*-1, 1-*butanolone*-3, *acetoethyl alcohol*, *acetonylcarbinol*, *methyl* 2-*hydroxyethyl ketone*)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2OH$$

$C_4H_8O_2$ MW, 88

B.p. 109–10°/30 mm., 90°/11 mm. Misc. with H_2O, EtOH, Et_2O. $ZnCl_2 \longrightarrow$ methyl vinyl ketone.

Acetyl: b.p. 125–30°/30 mm. *Semicarbazone*: prisms from MeOH. M.p. 207° decomp.

Oxime: b.p. 125–30°/20 mm.

Bayer, D.R.P., 247,144, (*Chem. Zentr.*, 1912, II, 159).

Morgan, Holmes, *J. Chem. Soc.*, 1932, 2669.

3-Keto-1-butylene.
See Methyl vinyl Ketone.

Ketobutylfuran.
See Furfurylacetone.

1-Ketobutyric Acid (*2-Methylpyruvic acid, propionylformic acid*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}COOH$

$C_4H_6O_3$ MW, 102

Plates. M.p. 31–32°. B.p. 74–8°/25 mm. n_D^{20} 1·3972. NaHg ⟶ 1-hydroxybutyric acid.

Me ester: *oxime*, cryst. from Et_2O. M.p. 61°. Sol. dil. NaOH.

Et ester: $C_6H_{10}O_3$. MW, 130. B.p. 162°, 66°/16 mm. D_{20}^{20} 1·0087. Spar. sol. H_2O. *Oxime*: needles. M.p. 62–3°. B.p. 125–30°/10 mm. Sol. EtOH, Et_2O, C_6H_6, ligroin. Spar. sol. H_2O.

Amide: $C_4H_7O_2N$. MW, 101. Prisms from H_2O. M.p. 116–17°. Sol. H_2O, EtOH. Spar. sol. H_2O. *Oxime*: cryst. from ligroin. M.p. 133–5°.

Di-Et amide: $C_8H_{15}O_2N$. MW, 157. B.p. 100°/11 mm. Sol. HCl. *α-Semicarbazone*: m.p. 140–1°. *β-Semicarbazone*: m.p. 170–1°. *Phenylhydrazone*: m.p. 101–2°.

Nitrile: propionyl cyanide. C_4H_5ON. MW, 83. B.p. 108–10°. n_D^{20} 1·3225.

Oxime: cryst. from C_6H_6. M.p. 167°.

Phenylhydrazone: cryst. from C_6H_6–EtOH. M.p. 210°.

Semicarbazone: cryst. from Me_2CO. M.p. 210°.

Barré, *Compt. rend.*, 1927, **184**, 825; *Ann. chim.*, 1928, **9**, 231.
Chelinzev, Schmidt, *Ber.*, 1929, **62**, 2210.
Claisen, Moritz, *Ber.*, 1880, **13**, 2121.
Leperq, *Bull. soc. chim.*, 1894, **11**, 884.
Bouveault, Locquin, *Compt. rend.*, 1902, **135**, 181.

2-Ketobutyric Acid.
See Acetoacetic Acid.

3-Ketocapric Acid (*2-Heptylylpropionic acid*)

$CH_3{\cdot}[CH_2]_5{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_{10}H_{18}O_3$ MW, 186

M.p. 70–1°.

Lukeš, *Chem. Abstracts*, 1931, **25**, 1485.

7-Ketocapric Acid (*6-Propionyl-n-heptylic acid*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}[CH_2]_6{\cdot}COOH$

$C_{10}H_{18}O_3$ MW, 186

Leaflets. M.p. 64°. Sol. Et_2O. Spar. sol. H_2O.

Et ester: $C_{12}H_{22}O_3$. MW, 214. B.p. 157°/15 mm.

Semicarbazone: cryst. from AcOH. M.p. 184°.

Blaise, Koehler, *Bull. soc. chim.*, 1910, **7**, 225.

8-Ketocapric Acid (*7-Acetocaprylic acid*)

$CH_3{\cdot}CO{\cdot}[CH_2]_7{\cdot}COOH$

$C_{10}H_{18}O_3$ MW, 186

Et ester: $C_{12}H_{22}O_3$. MW, 214. B.p. 151–3°/11 mm. *Semicarbazone*: cryst. from EtOH. M.p. 102–3°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1927, **10**, 691.

1-Keto-*n*-caproic Acid

$CH_3{\cdot}[CH_2]_3{\cdot}CO{\cdot}COOH$

$C_6H_{10}O_3$ MW, 130

Cryst. M.p. 15°. B.p. 93–4°/14 mm.

Et ester: $C_8H_{14}O_3$. MW, 158. *Oximino deriv.*: cryst. M.p. 57° (42°). B.p. 151–2°/12 mm. *Semicarbazone*: prisms from MeOH. M.p. 149°.

Oximino deriv.: needles from H_2O. M.p. 131–2°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. $k = 6{\cdot}5 \times 10^{-3}$ at 25°. $FeCl_3$ ⟶ red col.

Oxime: cryst. from EtOH. M.p. 140°.

Phenylhydrazone: cryst. from EtOH. M.p. 89°.

Semicarbazone: cryst. from EtOH. M.p. 180°.

Kondo, *Biochem. Z.*, 1912, **38**, 409.
Hicks, *J. Chem. Soc.*, 1918, **113**, 556.
Barré, *Ann. chim.*, 1928, **9**, 235.

2-Keto-*n*-caproic Acid (*Butyrylacetic acid*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}COOH$

$C_6H_{10}O_3$ MW, 130

Me ester: $C_7H_{12}O_3$. MW, 144. B.p. 85°/14 mm. D^0 1·037.

Et ester: $C_8H_{14}O_3$. MW, 158. B.p. 104°/22 mm., 84–8°/10 mm. $D_4^{15{\cdot}65}$ 0·9862. $n_D^{15{\cdot}2}$ 1·4300.

Bouveault, Bongert, *Bull. soc. chim.*, 1902, **27**, 1088.
Wahl, *Compt. rend.*, 1911, **152**, 96.
Fischer, Goldschmidt, Nüssler, *Ann.*, 1931, **486**, 31.

3-Keto-*n*-caproic Acid (*Homolevulinic acid, 2-propionylpropionic acid, 4-methyl-levulinic acid*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_6H_{10}O_3$ MW, 130

Leaflets from Et_2O–pet. ether. M.p. 36–7°. B.p. 183°/20 mm. Sol. H_2O and most org. solvents. Spar. sol. pet. ether. Hygroscopic.

Et ester: b.p. 106°/16 mm. *Semicarbazone*: needles from AcOEt–pet. ether. M.p. 106°.
Semicarbazone: prisms from EtOH. M.p. 176° decomp.
Phenylhydrazone: cryst. M.p. 73°.

Maire, *Bull. soc. chim.*, 1908, **3**, 285.
Campbell, Thorpe, *J. Chem. Soc.*, 1910, **97**, 1315.
Müller, Feld, *Monatsh.*, 1931, **58**, 22.

4-Keto-n-caproic Acid.
3-Acetobutyric Acid, *q.v.*

1-Keto-n-caprylic Acid

$CH_3 \cdot [CH_2]_5 \cdot CO \cdot COOH$

$C_8H_{14}O_3$ MW, 158

Amide: $C_8H_{15}O_2N$. MW, 157. *Oxime*: needles from H_2O. M.p. 138–9°. Sol. EtOH, Et_2O, C_6H_6. Insol. ligroin.

v. Miller, Plöchl, *Ber.*, 1893, **26**, 1558.
See also Prileschajew, *Ber.*, 1926, **59**, 198.

2-Keto-n-caprylic Acid.
See Caproylacetic Acid.

3-Keto-n-caprylic Acid (2-n-*Valerylpropionic acid*)

$CH_3 \cdot [CH_2]_3 \cdot CO \cdot CH_2 \cdot CH_2 \cdot COOH$

$C_8H_{14}O_3$ MW, 158

Cryst. from Et_2O–pet. ether. M.p. 53°. Sol. Et_2O, AcOH. Spar. sol. H_2O.
Me ester: $C_9H_{16}O_3$. MW, 172. B.p. 111°/15 mm.
Et ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 125°/15 mm.
Semicarbazone: cryst. from EtOH. M.p. 153°.
p-*Nitrophenylhydrazone*: cryst. M.p. 152°.

Blaise, Koehler, *Compt. rend.*, 1909, **148**, 490; *Bull. soc. chim.*, 1910, **7**, 226.
Lukeš, *Chem. Abstracts*, 1929, **23**, 4469.

4-Keto-n-caprylic Acid (3-*Butyrylbutyric acid*)

$CH_3 \cdot [CH_2]_2 \cdot CO \cdot [CH_2]_3 \cdot COOH$

$C_8H_{14}O_3$ MW, 158

Cryst. M.p. 34°. B.p. 280–5°. Insol. H_2O.

Wolffenstein, *Ber.*, 1895, **28**, 1464.

5-Keto-n-caprylic Acid (4-*Propionyl*-n-*valeric acid*)

$CH_3 \cdot CH_2 \cdot CO \cdot [CH_2]_4 \cdot COOH$

$C_8H_{14}O_3$ MW, 158

Cryst. from H_2O or C_6H_6–pet. ether. M.p. 52°. B.p. 160–1°/9 mm.
Me ester: $C_9H_{16}O_3$. MW, 172. B.p. 122–3°/14 mm.
Et ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 125°/12 mm. *Semicarbazone*: cryst. from EtOH.Aq. M.p. 88·5°.
Semicarbazone: cryst. from EtOH. M.p. 190°. Insol. H_2O and most org. solvents.

Blaise, Koehler, *Compt. rend.*, 1909, **148**, 490; *Bull. soc. chim.*, 1910, **7**, 222.

6-Keto-n-caprylic Acid (5-*Acetocaproic acid*)

$CH_3 \cdot CO \cdot [CH_2]_5 \cdot COOH$

$C_8H_{14}O_3$ MW, 158

Leaflets. M.p. 29–30°. B.p. 184–5°/15 mm.
Et ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 121–2°/9 mm. D_{25}^{25} 0·9708. n_D^{25} 1·4375.
Semicarbazone: cryst. from AcOH.Aq. M.p. 113–14°.

Kipping, Perkin, *J. Chem. Soc.*, 1889, **55**, 338.
Wallach, *Ann.*, 1906, **345**, 141.
Lease, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 807.

Ketocoumaran.
See Coumaranone *and* Isocoumaranone.

Ketocyclobutane.
Cyclobutanone, *q.v.*

Ketocyclodecane.
See Cyclodecanone.

Ketocyclododecane.
See Cyclododecanone.

Ketocycloheptadecane.
Cycloheptadecanone, *q.v.*

Ketocycloheptane.
Cycloheptanone, *q.v.*

Ketocyclohexadecane.
Cyclohexadecanone, *q.v.*

Ketocyclohexane.
Cyclohexanone, *q.v.*

Ketocyclononane.
See Cyclononanone.

Ketocyclo-octadecane.
See Cyclo-octadecanone.

Ketocyclo-octene.
See Granatal.

Ketocyclopentadecane.
Cyclopentadecanone, *q.v.*

Ketocyclopentane.
Cyclopentanone, *q.v.*

Ketocyclotetradecane.
Cyclotetradecanone, *q.v.*

Ketocyclotridecane.
Cyclotridecanone, *q.v.*

Ketocycloundecane.
Cycloundecanone, *q.v.*

Ketodecane.
See Ethyl *n*-heptyl Ketone *and* Methyl octyl Ketone.

3-Ketodihydroindole.
See Indoxyl.

3-Keto-2 : 6-dimethylheptane.
See Isopropyl isoamyl Ketone.

Ketodimethylhexane.
See Ethyl *tert.*-amyl Ketone *and* Isopropyl isobutyl Ketone.

Ketodimethylhexene.
See under Homomesitones.

Ketodimethyl-n-hexoic Acid.
See Dimethylacetobutyric Acid.

5-Keto-2 : 8-dimethylnonane.
See Isocaprone.

4-Keto-2 : 6-dimethyloctane.
See Isobutyl *active*-amyl Ketone.

2-Keto-1 : 4-diphenylbutane.
See Benzyl phenylethyl Ketone.

4-Keto-1 : 4-diphenylbutane-2-carboxylic acid.
See α-Phenacylhydrocinnamic Acid.

3-Keto-1 : 5-diphenylpentane.
See Dibenzylacetone.

2-Keto-1 : 1-diphenylpropane.
See *unsym.*-Diphenylacetone.

3-Ketododecane.
See Ethyl nonyl Ketone.

Ketoeicosane.
See Ethyl heptadecyl Ketone *and* *n*-Hexyl *n*-tridecyl Ketone.

10-Ketoeicosane-1 : 20-dicarboxylic Acid

$$HOOC\cdot[CH_2]_{10}\cdot CO\cdot[CH_2]_9\cdot COOH$$

$C_{22}H_{40}O_5$ MW, 384

Di-Me ester: $C_{24}H_{44}O_5$. MW, 412. Cryst from EtOH. M.p. 68–70°. B.p. 240°/0·5 mm.

Ruzicka, Stoll, Schinz, *Helv. Chim. Acta*, 1928, **11**, 684.

2-Keto-3-ethylpentane.
See 3-Ethylpentanone-2.

Ketofluorenol.
See Hydroxyfluorenone.

1-Keto-d-gluconic Acid.
See Fructuronic Acid.

1-Ketoglutaric Acid

$$\begin{array}{l}CO\cdot COOH\\ |\\ CH_2\\ |\\ CH_2\cdot COOH\end{array}$$

$C_5H_6O_5$ MW, 146

Cryst. M.p. 115–16°. Alc. $FeCl_3 \longrightarrow$ yellowish-green col.

Di-Et ester: $C_9H_{14}O_5$. MW, 202. B.p. 160°/23 mm., 144°/13 mm. *Oxime*: needles from H_2O, Et_2O, or C_6H_6. M.p. 62–3°. *Semicarbazone*: cryst. from EtOH.Aq. M.p. 114°.

Oxime: prisms from H_2O. M.p. 152° decomp. Spar. sol. cold H_2O, Et_2O, C_6H_6, $CHCl_3$.

1-*Nitrile*: $C_5H_5O_3N$. MW, 127. *Oxime*: prisms from Et_2O–C_6H_6. M.p. 87°. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6, $CHCl_3$, CS_2.

Semicarbazone: cryst. from H_2O. M.p. 220°.

Phenylhydrazone: cryst. M.p. 152–3°.

Blaise, Gault, *Bull. soc. chim.*, 1911, **9**, 455.
Wislicenus, Waldmüller, *Ber.*, 1911, **44**, 1571.
Wislicenus, Grützner, *Ber.*, 1909, **42**, 1939.

2-Ketoglutaric Acid.
See Acetone-dicarboxylic Acid.

14-Ketoheptacosane.
See Myristone.

8-Ketoheptadecylic Acid (8-*Ketomargaric acid*)

$$CH_3\cdot[CH_2]_7\cdot CO\cdot[CH_2]_7\cdot COOH$$

$C_{17}H_{32}O_3$ MW, 284

Plates from $CHCl_3$–pet. ether. M.p. 78·5°. Sol. $CHCl_3$. Mod. sol. EtOH, Et_2O, C_6H_6, AcOEt. Insol. pet. ether.

Me ester: $C_{18}H_{34}O_3$. MW, 298. Cryst. from MeOH. M.p. 45·5°.

Et ester: $C_{19}H_{36}O_3$. MW, 312. Cryst. from EtOH.Aq. M.p. 38°. Sol. EtOH, Me_2CO, C_6H_6, $CHCl_3$.

Amide: $C_{17}H_{33}O_2N$. MW, 283. Needles from $CHCl_3$–pet. ether. M.p. 119°. Sol. hot H_2O, EtOH, Et_2O, C_6H_6, $CHCl_3$. Insol. pet. ether.

Anilide: cryst. from AcOH. M.p. 96·5°.

Semicarbazone: prisms from Me_2CO. M.p. 111°. Spar. sol. EtOH, Me_2CO, AcOEt. Insol. Et_2O, pet. ether.

Le Sueur, Withers, *J. Chem. Soc.*, 1914, **105**, 2806.

6-Ketoheptadiene-2 : 4.
See 2 : 4-Heptadienone-6.

Ketoheptane.
See Butyrone, Ethyl *n*-butyl Ketone, *and* Methyl *n*-amyl Ketone.

1-Keto-n-heptylic Acid (1-*Keto-œnanthylic acid*)

$$CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH_2\cdot CO\cdot COOH$$

$C_7H_{12}O_3$ MW, 144

M.p. 51–2°. Sol. most org. solvents.

Semicarbazone: m.p. 178·5°. Spar. sol. MeOH.

Przewalski, *J. prakt. Chem.*, 1913, **88**, 496.

2-Keto-n-heptylic Acid (*2-Keto-œnanthylic acid, n-valerylacetic acid*)

$CH_3·CH_2·CH_2·CH_2·CO·CH_2·COOH$

$C_7H_{12}O_3$ MW, 144

Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 111°/15 mm.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 1103.

3-Keto-n-heptylic Acid (*3-Keto-œnanthylic acid, 2-butyrylpropionic acid*)

$CH_3·CH_2·CH_2·CO·CH_2·CH_2·COOH$

$C_7H_{12}O_3$ MW, 144

Plates from pet. ether. M.p. 46–7°. Sol. most org. solvents.

Bouveault, Bongert, *Bull. soc. chim.*, 1902, **27**, 1093.
Lukeš, *Chem. Abstracts*, 1929, **23**, 4469.

4-Keto-n-heptylic Acid (*4-Keto-œnanthylic acid, 3-propionylbutyric acid*)

$CH_3·CH_2·CO·CH_2·CH_2·CH_2·COOH$

$C_7H_{12}O_3$ MW, 144

Cryst. from Et_2O–pet. ether. M.p. 50°. Sol. H_2O and most org. solvents. Insol. pet. ether.

Me ester: $C_8H_{14}O_3$. MW, 158. B.p. 101–2°/10 mm.

Et ester: b.p. 116°/14 mm. NaOEt ⟶ methyldihydroresorcinol.

Oxime: cryst. from H_2O. M.p. 118°.

Semicarbazone: cryst. from EtOH. M.p. 196°.

p-*Nitrophenylhydrazone*: m.p. 123°.

Blaise, Maire, *Bull. soc. chim.*, 1908, **3**, 424.

5-Keto-n-heptylic Acid.
4-Aceto-n-valeric Acid, *q.v.*

Ketohexamethylene.
See Cyclohexanone.

Ketohexane.
See Methyl n-butyl Ketone *and* Ethyl propyl Ketone.

Ketohexanol.
See Hexanolone.

Ketohexene.
See Hexenone.

Ketohydrindene.
See Hydrindone.

4-Keto-2-imino-tetrahydroglyoxaline.
See Glycocyamidine.

Ketoindane.
See Hydrindone.

β-Ketoisoamylbenzene.
See Isopropyl benzyl Ketone.

1-Ketoisocaproic Acid (*Isovalerylformic acid, isobutylglyoxylic acid, isopropylpyruvic acid*)

$(CH_3)_2CH·CH_2·CO·COOH$

$C_6H_{10}O_3$ MW, 130

M.p. − 1·5°. B.p. 84–5°/15 mm.

Et ester: $C_8H_{14}O_3$. MW, 158. B.p. 93°/25 mm., 74°/11 mm. *Oxime*: m.p. 60°. B.p. 142°/12 mm.

Amide: $C_6H_{11}O_2N$. MW, 129. Cryst. from C_6H_6. M.p. 60°. Sol. EtOH, Et_2O, $CHCl_3$. Insol. pet. ether. *Oxime*: needles from Et_2O. M.p. 146–7°. Sol. hot H_2O, EtOH, Et_2O, AcOH. Spar. sol. C_6H_6. Insol. pet. ether.

Nitrile: C_6H_9ON. MW, 111. B.p. 145–50°.

Oxime: 1-isonitrosoisocaproic acid, 1-oximinoisocaproic acid. Needles from Et_2O. M.p. 153–5°. $k = 5·6 \times 10^{-4}$ at 25°.

Phenylhydrazone: m.p. 150°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 205°.

v. Miller, Plöchl, *Ber.*, 1893, **26**, 1557.
Locquin, *Bull. soc. chim.*, 1904, **31**, 1151.
Hübner, *Ann.*, 1864, **131**, 74.
Plattner, *Monatsh.*, 1915, **36**, 907.

2-Ketoisocaproic Acid (*3 : 3-Dimethylacetoacetic acid, isobutyrylacetic acid*)

$(CH_3)_2CH·CO·CH_2·COOH$

$C_6H_{10}O_3$ MW, 130

Free acid exists as unstable syrup.

Et ester: b.p. 93–4°/16 mm., 76–8°/10 mm. D_0^0 1·002. Dil. alkalis ⟶ methyl isopropyl ketone.

Moureu, Delange, *Bull. soc. chim.*, 1903, **29**, 668.
Dieckmann, Kron, *Ber.*, 1908, **41**, 1270 (*Footnote*).

9-Ketoisomyristic Acid (*9-Keto-11-methyltridecylic acid*)

$(CH_3)_2CH·CH_2·CO·[CH_2]_8·COOH$

$C_{14}H_{26}O_2$ MW, 226

Cryst. from pet. ether. M.p. 54–5°. Red. ⟶ isomyristic acid.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3371.

9-Ketoisopalmitic Acid (*9-Keto-13-methylpentadecylic acid*)

$(CH_3)_2CH·[CH_2]_3·CO·[CH_2]_8·COOH$

$C_{16}H_{30}O_2$ MW, 254

Cryst. from AcOEt. M.p. 68–9°. Does not form semicarbazone. Red. ⟶ isopalmitic acid.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3370.

Ketoisopentane.
See Methyl isopropyl Ketone.

9-Ketoisostearic Acid (*9-Keto-15-methylheptadecylic acid*)

$(CH_3)_2CH \cdot [CH_2]_5 \cdot CO \cdot [CH_2]_8 \cdot COOH$

$C_{18}H_{34}O_2$ MW, 282

Cryst. from AcOEt. M.p. 72°. Red. ⟶ isostearic acid.

See previous reference.

1-Ketoisovaleric Acid (*Dimethylpyruvic acid, isobutyrylformic acid, isopropylglyoxylic acid*)

$(CH_3)_2CH \cdot CO \cdot COOH$

$C_5H_8O_3$ MW, 116

Cryst. M.p. 31°. B.p. 170·5°, 65–7°/10 mm. Sol. H_2O, EtOH, Et_2O. D_4^{20} 0·9968. n_D^{16} 1·3850.
Et ester: $C_7H_{12}O_3$. MW, 144. Oil. B.p. 65–9°/15 mm. D_0^0 1·031. *Oxime*: needles from Et_2O–pet. ether. M.p. 57°. *Semicarbazone*: needles from Et_2O–pet. ether. M.p. 95–6°. Sol. EtOH, Et_2O. Spar. sol. H_2O.
Amide: $C_5H_9O_2N$. MW, 115. Plates from Et_2O. M.p. 110°. Sol. Et_2O, $CHCl_3$. Spar. sol. H_2O, C_6H_6. Sublimes.
Nitrile: C_5H_7ON. MW, 97. B.p. 116–18°. D_4^{20} 0·9860.
Oxime: plates. M.p. 163–5° decomp.
Phenylhydrazone: cryst. from EtOH. M.p. 143°.

Bouveault, Wahl, *Compt. rend.*, 1901, **132**, 417.
Barger, Ewins, *J. Chem. Soc.*, 1910, **97**, 290.
Sen, *Biochem. J.*, 1923, **143**, 195.
Abderhalden, Rossner, *Z. physiol. Chem.*, 1927, **163**, 264.
Tschelizeff, Schmidt, *Ber.*, 1929, **62**, 2212.

8-Ketolauric Acid (*7-Butyrylcaprylic acid*)

$CH_3 \cdot [CH_2]_2 \cdot CO \cdot [CH_2]_7 \cdot COOH$

$C_{12}H_{22}O_3$ MW, 214

Cryst. M.p. 50°.
Semicarbazone: cryst. M.p. 131°.

Asano, *Chem. Abstracts*, 1924, **18**, 1645.

Ketomalonic Acid.
See Mesoxalic Acid.

Ketomethylcyclohexylacetic Acid.
See Methylcyclohexanone-acetic Acid.

4-Keto-2-methyl-5-ethylheptane.
See Isobutyl *sec.-n*-amyl Ketone.

Ketomethylethylheptene.
See under Homomesitones.

Ketomethylheptadecylic Acid.
See 9-Ketoisostearic Acid *and* Lichesterylic Acid.

3-Keto-2-methylheptane.
See Isopropyl butyl Ketone.

Ketomethylheptene.
See 2-Methyl-2-heptenone-6 *and under* Homomesitones.

Ketomethylhexane.
See Methyl isoamyl Ketone *and* Methyl *active*-amyl Ketone.

5-Keto-2-methylhexene-3.
See Isobutylideneacetone.

Ketomethylnonane.
See Isopropyl *n*-hexyl Ketone *and* Isobutyl *n*-amyl Ketone.

Ketomethylnonene.
See under Homomesitones.

3-Keto-2-methyloctane.
See Isopropyl *n*-amyl Ketone.

9-Keto-13-methylpentadecylic Acid.
See 9-Ketoisopalmitic Acid.

4-Keto-2-methylpentene-2.
See Mesityl oxide.

3-Keto-2-methyl-1-phenylbutylene-1.
See Methyl β-methylstyryl Ketone.

9-Keto-11-methyltridecylic Acid.
See 9-Ketoisomyristic Acid.

3-Ketomyristic Acid

$CH_3 \cdot [CH_2]_9 \cdot CO \cdot CH_2 \cdot CH_2 \cdot COOH$

$C_{14}H_{26}O_3$ MW, 242

Plates from pet. ether. M.p. 87°.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2206; 1930, 747.

12-Ketomyristic Acid

$CH_3 \cdot CO \cdot [CH_2]_{10} \cdot CH_2 \cdot COOH$

$C_{14}H_{26}O_3$ MW, 242

Et ester: $C_{16}H_{30}O_3$. MW, 270. B.p. 164–6°/1 mm. *Semicarbazone*: cryst. from EtOH. M.p. 105–6°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1927, **10**, 693.

Ketone Musk.
See 2:6-Dinitro-5-*tert*.-butyl-4-aceto-*m*-xylene.

9-Ketononadecylic Acid

$CH_3 \cdot [CH_2]_8 \cdot CO \cdot [CH_2]_8 \cdot COOH$

$C_{19}H_{36}O_3$ MW, 312

Plates from MeOH. M.p. 86–7°.

Amide: $C_{19}H_{37}O_2N$. MW, 311. Plates from MeOH. M.p. 83°.

Robinson, Robinson, *J. Chem. Soc.*, 1926, 2207.

Ketononane.

See cross references under Nonanone.

14-Keto-octacosane-1 : 28-dicarboxylic Acid

$HOOC·[CH_2]_{14}·CO·[CH_2]_{13}·COOH$

$C_{30}H_{56}O_5$ MW, 496

Cryst. from AcOEt. M.p. 101–3°.

Ruzicka, Brugger, Seidel, Schinz, *Helv. Chim. Acta*, 1928, **11**, 511.

Keto-octadecane.

See cross references under Octadecanone.

9-Keto-octadecane-1 : 18-dicarboxylic Acid

$HOOC·[CH_2]_9·CO·[CH_2]_8·COOH$

$C_{20}H_{36}O_5$ MW, 356

Di-Me ester: $C_{22}H_{40}O_5$. MW, 384. Plates from MeOH. M.p. 59–60°.

Ruzicka, Stoll, Schinz, *Helv. Chim. Acta*, 1928, **11**, 677.

Keto-octane.

See Ethyl *n*-amyl Ketone, Methyl *n*-hexyl Ketone, *and* Propyl *n*-butyl Ketone.

3-Ketopalmitic Acid

$CH_3·[CH_2]_{11}·CO·CH_2·CH_2·COOH$

$C_{16}H_{30}O_3$ MW, 270

Plates from pet. ether. M.p. 91–2°.

Oxime: needles from pet. ether. M.p. 54°. Sol. org. solvents.

Robinson, Robinson, *J. Chem. Soc.*, 1925, **127**, 180.

4-Ketopalmitic Acid

$CH_3·[CH_2]_{10}·CO·[CH_2]_3·COOH$

$C_{16}H_{30}O_3$ MW, 270

Plates from MeOH, C_6H_6, or pet. ether. M.p. 88°.

Robinson, *J. Chem. Soc.*, 1930, 748.

6-Ketopalmitic Acid

$CH_3·[CH_2]_8·CO·[CH_2]_5·COOH$

$C_{16}H_{30}O_3$ MW, 270

Plates from MeOH. M.p. 78°.

See previous reference.

7-Ketopalmitic Acid

$CH_3·[CH_2]_7·CO·[CH_2]_6·COOH$

$C_{16}H_{30}O_3$ MW, 270

Plates from MeOH. M.p. 77–8°.

Bodenstein, *Ber.*, 1894, **27**, 3400.
Robinson, *J. Chem. Soc.*, 1930, 749.

8-Ketopalmitic Acid

$CH_3·[CH_2]_6·CO·[CH_2]_7·COOH$

$C_{16}H_{30}O_3$ MW, 270

Cryst. from AcOEt. M.p. 73·5–74·5°.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, **50**, 1754.

9-Ketopalmitic Acid

$CH_3·[CH_2]_5·CO·[CH_2]_8·COOH$

$C_{16}H_{30}O_3$ MW, 270

Cryst. from AcOEt. M.p. 75–75·8°.

Semicarbazone: cryst. from EtOH. M.p. 154–5°.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3370.

10-Ketopalmitic Acid

$CH_3·[CH_2]_4·CO·[CH_2]_9·COOH$

$C_{16}H_{30}O_3$ MW, 270

Cryst. from AcOEt. M.p. 74–5°.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, **50**, 1753.

2-Ketopelargonic Acid (*2-Ketononoic acid*, n-*heptoylacetic acid*)

$CH_3·[CH_2]_5·CO·CH_2·COOH$

$C_9H_{16}O_3$ MW, 172

Cryst. mass. Decomp. at ord. temp. to methyl hexyl ketone.

Me ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 132–4°/19 mm. D_0^0 0·9820.

Et ester: $C_{11}H_{20}O_3$. MW, 200. B.p. 132–3°/13 mm. D_0^0 0·9659.

Amide: $C_9H_{17}O_2N$. MW, 171. Leaflets from H_2O. M.p. 106–7°. Alc. $FeCl_3 \longrightarrow$ red col.

Nitrile: $C_9H_{15}ON$. MW, 153. B.p. 137–41°/15 mm. Sol. alkalis. $NH_2OH \longrightarrow$ 3-hexyl-isoxazolone-imide.

Moureu, Delange, *Bull. soc. chim.*, 1903, **29**, 670.
Moureu, Lazennec, *Bull. soc. chim.*, 1907, **1**, 1065.

3-Ketopelargonic Acid (*3-Ketononoic acid*, *2-caproylpropionic acid*)

$CH_3·[CH_2]_4·CO·CH_2·CH_2·COOH$

$C_9H_{16}O_3$ MW, 172

M.p. 69–70°.

Lukeš, *Chem. Abstracts*, 1929, **23**, 4469.

6-Ketopelargonic Acid (*6-Ketononoic acid, 5-propionyl-*n*-caproic acid*)

$CH_3·CH_2·CO·[CH_2]_5·COOH$

$C_9H_{16}O_3$ MW, 172

Leaflets from Et_2O–pet. ether. M.p. 42°. Sol. Et_2O, AcOH. Spar. sol. H_2O, pet. ether.

Me ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 143°/21 mm.

Et ester: $C_{11}H_{20}O_3$. MW, 200. B.p. 153°/21 mm. *Semicarbazone*: cryst. from Et_2O. M.p. 85°. Sol. EtOH. Spar. sol. Et_2O, C_6H_6.

Semicarbazone: cryst. from EtOH. M.p. 169°. Spar. sol. EtOH.

Blaise, Koehler, *Bull. soc. chim.*, 1910, **7**, 224.

8-Ketopentadecane-1 : 15-dicarboxylic Acid

$HOOC·[CH_2]_7·CO·[CH_2]_7·COOH$

$C_{17}H_{30}O_5$ MW, 314

Cryst. from C_6H_6. M.p. 115–16°.

Di-Me ester: $C_{19}H_{34}O_5$. MW, 342. Plates. M.p. 57–9°.

Ruzicka, Brugger, Seidel, Schinz, *Helv. Chim. Acta*, 1928, **11**, 504.

10-Ketopentadecylic Acid

$CH_3·[CH_2]_3·CO·[CH_2]_9·COOH$

$C_{15}H_{28}O_3$ MW, 256

Cryst. from AcOEt. M.p. 70–1°.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, **50**, 1754.

Ketopentane.
See Diethyl Ketone *and* Methyl propyl Ketone.

2-Keto-1-phenylbutane.
See Ethyl benzyl Ketone.

1-Keto-3-phenylbutyric Acid.
See Benzylpyruvic Acid.

3-Keto-5-phenylcaproic Acid.
See 4-Benzyl-levulinic Acid.

1-Ketopimelic Acid

$H_2C<\begin{matrix}CH_2·CO·COOH\\CH_2·CH_2·COOH\end{matrix}$

$C_7H_{10}O_5$ MW, 174

Cryst. from $CHCl_3$. M.p. 93–4°. Sol. H_2O, EtOH, Et_2O, Me_2CO, AcOH, AcOEt. Spar. sol. C_6H_6, pet. ether, toluene, xylene.

Oxime: cryst. from warm H_2O. M.p. 142° decomp.

Phenylhydrazone: yellow prisms from AcOH.Aq. M.p. 143–4° decomp. Sol. EtOH, Et_2O, AcOEt.

2 : 4-*Dinitrophenylhydrazone*: yellow needles from EtOH.Aq. M.p. 190–1° decomp.

Semicarbazone: prisms from H_2O. M.p. 196–7°.

Adickes, *Ber.*, 1925, **58**, 213.

3-Ketopimelic Acid (*Acetone-diacetic acid, hydrochelidonic acid*)

$OC<\begin{matrix}CH_2·CH_2·COOH\\CH_2·CH_2·COOH\end{matrix}$

$C_7H_{10}O_5$ MW, 174

Plates or rhombohedra from H_2O. M.p. 143° (138°). Sol. EtOH. Spar. sol. Et_2O, Me_2CO. Insol. C_6H_6. Heat at m.p. ⟶ anhydride.

Di-Me ester: $C_9H_{14}O_5$. MW, 202. Needles from EtOH. M.p. 56°. B.p. 276–7° decomp. Sol. EtOH, Et_2O, AcOH, C_6H_6, $CHCl_3$, AcOEt. *Oxime*: needles from CS_2. M.p. 52°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. ligroin.

Mono-Et ester: $C_9H_{14}O_5$. MW, 202. Needles from C_6H_6–ligroin. M.p. 67–8°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, CS_2. Insol. ligroin.

Di-Et ester: $C_{11}H_{18}O_5$. MW, 230. Liq. D_{11}^{11} 1·0862. *Oxime*: needles from C_6H_6–ligroin. M.p. 38°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O, ligroin.

Monoamide: $C_7H_{11}O_4N$. MW, 173. Plates from EtOH. M.p. 127°. Sol. H_2O. Spar. sol. cold EtOH, $CHCl_3$. Insol. Et_2O, C_6H_6, ligroin.

Anhydride: $C_7H_8O_4$. MW, 156. Cryst. from EtOH–$CHCl_3$. M.p. 69° (64–5°). B.p. 200–5°/15 mm. Sol. EtOH, Et_2O, Me_2CO, C_6H_6, $CHCl_3$, AcOEt. Spar. sol. H_2O, MeOH, AcOH, CS_2.

Oxime: prisms from H_2O. M.p. 129° decomp.

Volhard, *Ann.*, 1892, **267**, 55, 104; 1889, **253**, 221.

Marckwald, *Ber.*, 1888, **21**, 1402.

Ketopiperidine.
See Piperidone.

1-Ketopropionaldehyde.
See Pyruvic Aldehyde.

1-Ketopropionic Acid.
See Pyruvic Acid.

2-Ketopropyl Alcohol.
See Hydroxyacetone.

β-Ketopropylbenzene.
See Methyl benzyl Ketone.

Ketopyrrolidine.
See Pyrrolidone.

2-Ketostearic Acid (*Palmitylacetic acid*)

$CH_3·[CH_2]_{14}·CO·CH_2·COOH$

$C_{18}H_{34}O_3$ MW, 298

Et ester: $C_{20}H_{38}O_3$. MW, 326. Cryst. from EtOH. M.p. 37–8°. Alc. $FeCl_3$ ⟶ wine-red col.

Helferich, Köster, *Ber.*, 1923, **56**, 2090.

3-Ketostearic Acid

$CH_3 \cdot [CH_2]_{13} \cdot CO \cdot CH_2 \cdot CH_2 \cdot COOH$

$C_{18}H_{34}O_3$ MW, 298

Plates. M.p. 97°. Sol. EtOH, Et_2O, AcOH, Insol. H_2O.

Oxime: cryst. M.p. 85°. Sol. EtOH, Et_2O. Insol. H_2O.

Shukow, Schestakow, *J. prakt. Chem.*, 1903, **67**, 418.

5-Ketostearic Acid.
See Lactarinic Acid.

6-Ketostearic Acid

$CH_3 \cdot [CH_2]_{10} \cdot CO \cdot [CH_2]_5 \cdot COOH$

$C_{18}H_{34}O_3$ MW, 298

Plates from EtOH. M.p. 75°. Insol. H_2O.

Arnaud, *Compt. rend.*, 1902, **134**, 548.

8-Ketostearic Acid

$CH_3 \cdot [CH_2]_8 \cdot CO \cdot [CH_2]_7 \cdot COOH$

$C_{18}H_{34}O_3$ MW, 298

Plates from EtOH. M.p. 83°. Spar. sol. pet. ether.

Amide: $C_{18}H_{35}O_2N$. MW, 297. Cryst. from C_6H_6 or MeOH. M.p. 79°.

Behrend, *Ber.*, 1896, **29**, 807.
Robinson, Robinson, *J. Chem. Soc.*, 1926, 2206.

9-Ketostearic Acid

$CH_3 \cdot [CH_2]_7 \cdot CO \cdot [CH_2]_8 \cdot COOH$

$C_{18}H_{34}O_3$ MW, 298

Plates from EtOH. M.p. 76°.

Et ester: $C_{20}H_{38}O_3$. MW, 326. Plates from EtOH. M.p. 41°.

Amide: $C_{18}H_{35}O_2N$. MW, 297. Plates from C_6H_6–pet. ether. M.p. 80°.

Baruch, *Ber.*, 1894, **27**, 174.
Shukow, Schestakow, *J. prakt. Chem.*, 1903, **67**, 415.
Robinson, Robinson, *J. Chem. Soc.*, 1926, 2207.

10-Ketostearic Acid

$CH_3 \cdot [CH_2]_6 \cdot CO \cdot [CH_2]_9 \cdot COOH$

$C_{18}H_{34}O_3$ MW, 298

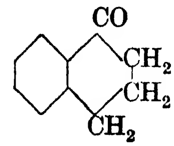
Cryst. from EtOH–AcOH. M.p. 65°. Sol. EtOH, Et_2O, AcOH.

Shukow, Schestakow, *J. prakt. Chem.*, 1903, **67**, 416.

Ketosuccinic Acid.
See Oxalacetic Acid.

2-Ketotetrahydroglyoxaline.
See Ethyleneurea.

1-Ketotetrahydronaphthalene (*α-Tetralone*)



$C_{10}H_{10}O$ MW, 146

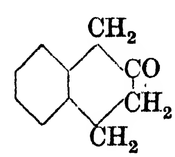
B.p. 129·4°/12 mm. $D_4^{15.6}$ 1·0988. $n_D^{15.5}$ 1·571. Does not form bisulphite comp.

Oxime: exists in two forms. (i) Needles from MeOH. M.p. 88–9°. Volatile in steam. (ii) Prisms. M.p. 102–3°. Spar. volatile in steam.

Semicarbazone: yellow needles or prisms from EtOH. M.p. 217°. Sol. EtOH, Me_2CO. Spar. sol. $CHCl_3$, AcOEt. Insol. H_2O.

Kipping, Hill, *J. Chem. Soc.*, 1899, **75**, 151.
Auwers, *Ann.*, 1918, **415**, 162.
Schroeter, *Ann.*, 1921, **426**, 88.
Strauss, Rohrbader, *Chem. Abstracts*, 1921, **15**, 1897.
Inoue, *Chem. Abstracts*, 1924, **18**, 2891.
I.G., E.P., 318,550, (*Chem. Abstracts*, 1930, **24**, 2137).

2-Ketotetrahydronaphthalene (*β-Tetralone*)



$C_{10}H_{10}O$ MW, 146

Cryst. M.p. 18°. B.p. 138°/16 mm. $D_4^{16.9}$ 1·1055.

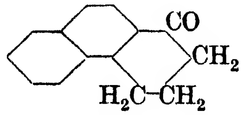
Oxime: needles from EtOH.Aq. M.p. 87·5–88°. Sol. hot EtOH, hot C_6H_6, $CHCl_3$.

Phenylhydrazone: yellow cryst. M.p. 109°.

Semicarbazone: cryst. from EtOH. M.p. 190–1°.

Bamberger, Lodter, *Ann.*, 1895, **288**, 114.
v. Braun, Braunsdorf, Kirschbaum, *Ber.*, 1922, **55**, 3659.

1-Keto-1 : 2 : 3 : 4-tetrahydrophenanthrene



$C_{14}H_{12}O$ MW, 196

Plates from $CHCl_3$–pet. ether. M.p. 95–6°. Œstrus-exciting comp.

Oxime: m.p. 165–6°.

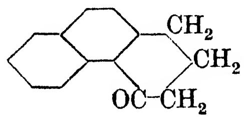
Semicarbazone: m.p. 247° decomp.

Picrate: m.p. 106–7°.

Schroeter, Müller, Huang, *Ber.*, 1929, **62**, 654.

Haworth, *J. Chem. Soc.*, 1932, 1130.

4-Keto-1 : 2 : 3 : 4-tetrahydrophenanthrene



$C_{14}H_{12}O$ MW, 196

Needles from MeOH. M.p. 69°. Œstrus-exciting comp.

Oxime: m.p. 172–3°.

Semicarbazone: m.p. 225° decomp.

Picrate: m.p. 101–2°.

See above references.

2-Ketotetrahydroquinoline.
See Hydrocarbostyril.

Ketotetramethylene.
See Cyclobutanone.

12-Ketotricosane.
See Laurone.

3-Keto-2 : 2 : 4-trimethylpentane.
See Isopropyl *tert.*-butyl Ketone.

3-Ketoundecane.
See Ethyl octyl Ketone.

8-Ketoundecylic Acid (7-*Propionylcaprylic acid*)

$CH_3·CH_2·CO·[CH_2]_7·COOH$

$C_{11}H_{20}O_3$ MW, 200

Cryst. from pet. ether. M.p. 43·5°.

Myddleton, Barrett, *J. Am. Chem. Soc.*, 1927, **49**, 2258.

9-Ketoundecylic Acid (8-*Acetopelargonic acid*)

$CH_3·CO·[CH_2]_8·COOH$

$C_{11}H_{20}O_3$ MW, 200

Needles or leaflets from pet. ether. M.p. 59·5°. B.p. 166–7°/1 mm. Sol. most org. solvents. Spar. sol. H_2O.

Et ester: $C_{13}H_{24}O_3$. MW, 228. B.p. 169–70°/12 mm.

Oxime: cryst. from EtOH. M.p. 68–9°.

Semicarbazone: cryst. from EtOH. M.p. 136·5°.

See previous reference and also

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1926, **9**, 1084.

3-Ketovaleraldehyde.
See Levulinic Aldehyde.

1-Keto-*n*-valeric Acid (*Butyrylformic acid*)

$CH_3·CH_2·CH_2·CO·COOH$

$C_5H_8O_3$ MW, 116

B.p. 179°, 79°/12 mm. Sol. Et_2O, C_6H_6, $CHCl_3$, ligroin, CS_2. Mod. sol. H_2O.

Et ester: $C_7H_{12}O_3$. MW, 144. B.p. 179–80°, 70·5°/11 mm. Sol. H_2O. *Oxime*: cryst. M.p. 48°. B.p. 144–5°/16 mm. *Semicarbazone*: needles + C_6H_6 from C_6H_6–pet. ether. M.p. 139–40°. *Phenylhydrazone*: cryst. M.p. 80–1°.

Isobutyl ester: $C_9H_{16}O_3$. MW, 172. B.p. 87–8°/11 mm. D_4^0 0·973. *Oxime*: cryst. M.p. 16°. B.p. 152°/15 mm. *Semicarbazone*: plates + C_6H_6 from C_6H_6–pet. ether. M.p. 137–8°.

Amide: $C_5H_9O_2N$. MW, 115. Cryst. from EtOH. M.p. 108°. Sublimes. *Oxime*: needles from Et_2O–ligroin. M.p. 131°. Sol. H_2O, EtOH, Et_2O. Insol. ligroin.

Nitrile: C_5H_7ON. MW, 97. B.p. 133–7°.

Oxime: needles from ligroin. M.p. 145°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, ligroin. $k = 6·85 \times 10^{-4}$ at 25°.

Semicarbazone: cryst. from EtOH. M.p. 220° decomp.

Phenylhydrazone: cryst. M.p. 101–2°.

p-*Nitrophenylhydrazone*: cryst. M.p. 205°.

Locquin, *Bull. soc. chim.*, 1904, **31**, 1073, 1149.

Blaise, *Compt. rend.*, 1913, **157**, 1443.

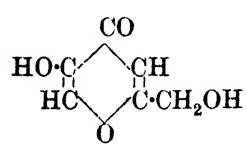
Barger, Ewins, *J. Chem. Soc.*, 1910, **97**, 292.

2-Keto-*n*-valeric Acid.
See Propionylacetic Acid.

3-Keto-*n*-valeric Acid.
See Levulinic Acid.

Koch Acid.
See 1-Naphthylamine-3 : 6 : 8-trisulphonic Acid.

Kojic Acid (5-*Hydroxy-2-hydroxymethyl-γ-pyrone*)



$C_6H_6O_4$ MW, 142

Product of action of *Aspergillus oryzae* on dextrose. Needles. M.p. 152°. Sol. H_2O, EtOH, AcOEt. Mod. sol. Et_2O, $CHCl_3$, Py. Spar. sol. other solvents. $FeCl_3 \longrightarrow$ blue col. Reduces Fehling's and $NH_3.AgNO_3$.

Di-Me ether: $C_8H_{10}O_4$. MW, 170. Cryst. M.p. 90°.

Diacetyl: cryst. M.p. 102°.

Monobenzoyl deriv.: cryst. M.p. 135°.

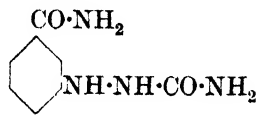
Dibenzoyl: m.p. 136°.

Di-phenylurethane: m.p. 170°.

Yabata, *J. Chem. Soc.*, 1922, **122**, 939; 1924, **125**, 575.

Verkade, *Rec. trav. chim.*, 1924, **43**, 886.

Kryogenin (*3-Semicarbazidobenzamide, m-carbamylphenylsemicarbazide*)



$C_8H_{10}O_2N_3$ MW, 180

Cryst. $KMnO_4 \longrightarrow$ brown col. Antipyretic.

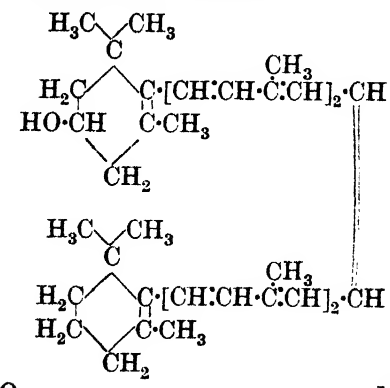
Lumière, Lumière, Chevrottier, *Compt. rend.*, 1902, **135**, 188.

Pégurier, *Chem. Zentr.*, 1905, I, 406.

Kryptopyrrole.

Cryptopyrrole, *q.v.*

Kryptoxanthin (*Caricaxanthin*)



$C_{40}H_{56}O$ MW, 552

Pigment accompanying zeaxanthin in maize, paprika, etc. Reddish-violet prisms from C_6H_6 – MeOH. M.p. 169°. Optically inactive. Absorption maxima in CS_2: 519, 483, 452 mμ. Epiphasic between 90% MeOH and pet. ether. Exhibits Vitamin A activity.

Acetyl: red plates from EtOH–C_6H_6. M.p. 117–18°. Same absorption maxima and phasic properties as kryptoxanthin.

Kuhn, Grundmann, *Ber.*, 1933, **66**, 1749.

Karrer, Schlientz, *Helv. Chim. Acta*, 1934, **17**, 55.

Kurchenine

$C_{21}H_{32}O_2N_2$ MW, 334

Alkaloid of *Holarrhena antidysenterica*. Plates from MeOH. M.p. 335–6°. Almost insol. Et_2O. $[\alpha]_D^{21}$ – 92·0° in 2N/HCl.

B,H_2SO_4: cryst. from EtOH. $[\alpha]_D$ – 78·3° in H_2O.

Bertho, v. Schuckmann, Schönberger, *Ber.*, 1933, **66**, 789.

Kurchicine

$C_{20}H_{36}ON_2$ MW, 320

Alkaloid occurring with conessine in Kurchee bark. Needles from $CHCl_3$–pet. ether. M.p. 175°. $[\alpha]_D^{32}$ – 11·44° in $CHCl_3$. Sol. conc. H_2SO_4 to yellow sol. Br in conc. $H_2SO_4 \longrightarrow$ brown ring. Gives white ppt. with Millon's reagent.

B,2HCl: $[\alpha]_D^{32}$ – 27·17° in H_2O.

B,2HBr: m.p. 260°. $[\alpha]_D^{30}$ – 22·63° in H_2O.

B,2HI: m.p. 259–60°. $[\alpha]_D^{32}$ – 22·7° in H_2O.

$B,H_2SO_4,2H_2O$: m.p. above 270°. $[\alpha]_D^{29}$ –12·72° in H_2O.

$B,(COOH)_2$: m.p. above 270°.

B,H_2PtCl_6: m.p. 210° decomp.

$B,2HAuCl_4$: m.p. 195° decomp.

Ghosh, Bose, *Arch. Pharm.*, 1932, **270**, 100.

Kurchine

$C_{23}H_{38}N_2$ MW, 342

Alkaloid occurring with conessine in Kurchee bark. Needles from EtOH. M.p. 75°. B.p. 233°/1 mm. Sol. conc. H_2SO_4 to yellow sol. Br in conc. $H_2SO_4 \longrightarrow$ purple ring. Gives white ppt. with Millon's reagent. $[\alpha]_D^{32}$ – 7·57° in $CHCl_3$.

$B,2HCl,H_2O$: m.p. above 270°. $[\alpha]_D^{32}$ – 0·88° in H_2O.

B,2HBr: $[\alpha]_D^{29}$ – 3·08° in H_2O.

B,2HI: m.p. 275° decomp. $[\alpha]_D^{29}$ – 7·55° in H_2O.

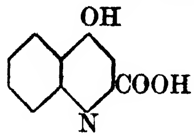
B,H_2SO_4: $[\alpha]_D^{34}$ – 13·68°.

B,H_2PtCl_6: m.p. above 240°.

$B,2HAuCl_4$: m.p. 160–6°.

See previous reference.

Kynurenic Acid (4-*Hydroxyquinoline*-2-*carboxylic acid*, 4-*hydroxyquinaldinic acid*. Keto-form, *see* γ-Quinolone-2-carboxylic Acid).

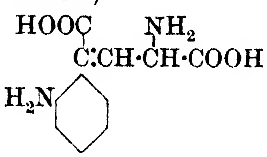


$C_{10}H_7O_3N$ MW, 189

Needles. M.p. 282–3°. Sol. hot EtOH. Insol. Et_2O. Sol. to 0·9% in boiling H_2O.
Me ester: $C_{11}H_9O_3N$. MW, 203. M.p. 224°. Forms cryst. hydrochloride.
Me ether: $C_{11}H_9O_3N$. MW, 203. Needles from H_2O. M.p. 196–7° decomp. *Me ester*: $C_{12}H_{11}O_3N$. MW, 217. M.p. 148–9°.

Späth, *Monatsh.*, 1921, **42**, 89.
Besthorn, *Ber.*, 1921, **54**, 1330.

Kynurenine (3-*Amino*-1-o-*aminophenylpropylene*-1 : 3-*dicarboxylic acid*, 3-*amino*-1-o-*aminophenylglutaconic acid*)

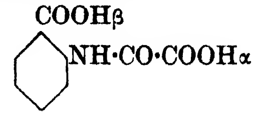


$C_{11}H_{12}O_4N_2$ MW, 236

M.p. 190° decomp. with previous sintering. $[\alpha]_D^{17} - 28{\cdot}5°$.

Kotake, Iwao, *Z. physiol. Chem.*, 1931, **195**, 139.
Toritaka, *Z. physiol. Chem.*, 1934, **226**, 29.

Kynuric Acid (*Oxanilic acid* 2-*carboxylic acid*, o-*carboxyoxanilic acid*)



$C_9H_7O_5N$ MW, 209

Needles + $1H_2O$ from H_2O. M.p. 188–90°, anhyd. 200° decomp. Sol. EtOH, Et_2O. Sol. 890 parts H_2O at 10°.
α-*Me ester*: $C_{10}H_9O_5N$. MW, 223. Cryst. from H_2O. M.p. 176·5°. Sol. EtOH, hot H_2O, C_6H_6. Spar. sol. cold H_2O. Insol. $CHCl_3$, ligroin. β-*Nitrile*: needles from MeOH. M.p. 139°.
α-*Et ester*: $C_{11}H_{11}O_5N$. MW, 237. Cryst. M.p. 184°. β-*Amide*: prisms from EtOH. M.p. 158–9°.
α-*Anilide*: oxanilide 2-carboxylic acid. Needles from EtOH.Aq. M.p. 226–7°.
β-*Nitrile*: 2-cyanoxanilic acid. $C_9H_6O_3N_2$. MW, 190. Needles. M.p. 126°. Sol. EtOH, AcOH, C_6H_6. Spar. sol. Et_2O, pet. ether. *Anilide*: 2-cyanoxanilide. Needles from AcOH. M.p. 197·5°.

Reissert, Grube, *Ber.*, 1909, **42**, 3715.
Kretschy, *Monatsh.*, 1884, **5**, 21.
Bogert, Gortner, *J. Am. Chem. Soc.*, 1910, **32**, 121.
Knape, *J. prakt. Chem.*, 1891, **43**, 228.
Suida, *Monatsh.*, 1911, **32**, 201.

Kynurine.
See 4-Hydroxyquinoline.

L

Laccainic Acid

$C_{16}H_{12}O_8$ MW, 332

Occurs in Lac-dye. Brownish-red plates. Decomp. at 180°. Sol. EtOH, Me_2CO, AcOH. Spar. sol. H_2O, Et_2O. Alkalis ⟶ red col. Reduces $NH_3.AgNO_3$, but not Fehling's. HNO_3 ⟶ picric acid.

Schmidt, *Ber.*, 1887, **20**, 1288.

Lacceran.
Dotriacontane, *q.v.*

Lacceric Acid (*Hentriacontane*-1-*carboxylic acid*)

$$CH_3{\cdot}[CH_2]_{30}{\cdot}COOH$$

$C_{32}H_{64}O_2$ MW, 480

Occurs in wax of *Tachardia lacca* as laccerol ester. Plates from C_6H_6. M.p. 95–6°.
Et ester: $C_{34}H_{68}O_2$. MW, 508. M.p. 76°. Red. ⟶ laccerol.

Gascard, *Compt. rend.*, 1914, **159**, 260.

Laccerol (*Dotriacontanol*, 1-*hydroxydotriacontane*)

$$CH_3{\cdot}[CH_2]_{30}{\cdot}CH_2OH$$

$C_{32}H_{66}O$ MW, 466

Occurs as laccerate in lac wax. Plates from C_6H_6. M.p. 89°. Sol. usual org. solvents. Red. ⟶ dotriacontane. KOH at 250° ⟶ lacceric acid.
Laccerate: cryst. from C_6H_6. M.p. 94°. Sol. $CHCl_3$, hot C_6H_6. Insol. EtOH, Et_2O, AcOH.

Gascard, *Ann. chim.*, 1921, **15**, 332; *Compt. rend.*, 1914, **159**, 258.

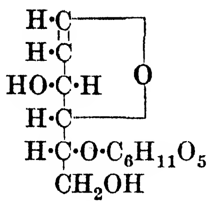
Laccol

$C_{23}H_{36}O_2$ MW, 344

Occurs in Indo-Chinese lac. Thick brown liq.
Di-Me ether: $C_{25}H_{40}O_2$. MW, 372. B.p. 206–8°/0·25 mm. D_4^{26} 0·92954.

Majima, *Ber.*, 1922, **55**, 195.

Lactal (5-*Galactosido-glucal*)



$C_{12}H_{20}O_9$ MW, 308

Needles + $1H_2O$ from 90% EtOH. M.p. 184–6° anhyd. 192–212° decomp. (165–70° decomp.). $[\alpha]_D^{16}$ + 27·66°. Ox. ⟶ 5-galactosidomannose.
Hexa-acetyl deriv.: m.p. 114°.

Bergmann, Kobel, Schotte, Rennert, Ludewig, *Ann.*, 1923, **434**, 86.
Fischer, Curme, *Ber.*, 1914, **47**, 2051.
See also Watters, Hudson, *J. Am. Chem. Soc.*, 1930, **52**, 3472.

Lactamide

$CH_3 \cdot CH(OH) \cdot CO \cdot NH_2$

$C_3H_7O_2N$ MW, 89

d-.
M.p. 49–51°. $[\alpha]_{Hg}^{18}$ + 22·2°.
p-*Toluenesulphonyl deriv.*: m.p. 105–6°.

r-.
Plates from AcOEt. M.p. 75·5°. Sol. H_2O, EtOH.
Benzoyl deriv.: m.p. 105–6°.
Et ether: $C_5H_{11}O_2N$. MW, 117. Leaves. M.p. 64°. B.p. 219°. Sol. H_2O, EtOH, Et_2O.

Freudenberg, Rhino, *Ber.*, 1924, **57**, 1547.
Freudenberg, Brauns, Siegel, *Ber.*, 1923, **56**, 193.

Lactamidine

$CH_3 \cdot CH(OH) \cdot C(:NH) \cdot NH_2$

$C_3H_8ON_2$ MW, 88

B,HCl: needles from EtOH. M.p. 171°.
B_2,H_2SO_4: m.p. 200–2°.
Nitrate: m.p. 84°.

Pinner, *Ber.*, 1890, **23**, 2947.
Rule, *J. Chem. Soc.*, 1918, **113**, 19.

Lactanilide.
See under Lactic Acid.

Lactarinic Acid (5-*Ketostearic acid*)

$CH_3 \cdot [CH_2]_{11} \cdot CO \cdot [CH_2]_4 \cdot COOH$

$C_{18}H_{34}O_3$ MW, 298

Constituent of *Lactarius rufus*, Scopol. Plates from EtOH. M.p. 87°. Sol. Et_2O, $CHCl_3$. Mod. sol. C_6H_6. Insol. H_2O.
Et ester: $C_{20}H_{38}O_3$. MW, 326. Cryst. M.p. 41°. Sol. EtOH, Et_2O.
Oxime: cryst. M.p. 59–61°.

Bougault, Charaux, *Compt. rend.*, 1911, **153**, 572, 880.
Zellner, *Monatsh.*, 1920, **41**, 443.
Robinson, Robinson, *J. Chem. Soc.*, 1925, **127**, 179.

Lacthydrazide.
See under Lactic Acid.

Lacthydroxamic Acid

$CH_3 \cdot CH(OH) \cdot CO \cdot NH \cdot OH$

$C_3H_7O_3N$ MW, 105

Oil.
Benzoyl deriv.: m.p. 124·5–126·0°.

Jones, Neuffer, *J. Am. Chem. Soc.*, 1917, **39**, 659.

Lactic Acid (1-*Hydroxypropionic acid, ethylidene-lactic acid*)

$CH_3 \cdot CH(OH) \cdot COOH$

$C_3H_6O_3$ MW, 90

d-. Sarcolactic Acid, Paralactic Acid.
Occurs in juice of muscular tissue, bile, etc. Prisms. M.p. 25–6°. $[\alpha]_D^{15}$ + 3·82° in H_2O. Vacuum dist. ⟶ *d*-lactide. H_2SO_4 ⟶ $H \cdot COOH + CH_3 \cdot CHO$. Very hygroscopic.
Me ester: $C_4H_8O_3$. MW, 104. Oil. B.p. 60–1°/35 mm., 58°/19 mm. D^{20} 1·0895. $[\alpha]_D^{20}$ − 8·25°.
Et ester: $C_5H_{10}O_3$. MW, 118. B.p. 69–70°/36 mm. D_4^{14} 1·0415. $[\alpha]_D^{14}$ − 10·33°. *Acetyl*: b.p. 76–8°/15 mm. D_4^{14} 1·0513. $[\alpha]_D^{14}$ − 49·87°.
Propyl ester: $C_6H_{12}O_3$. MW, 132. B.p. 122–3°/150 mm., 60–1°/10–11 mm. $[\alpha]_D^{19}$ − 17·06°.
Butyl ester: $C_7H_{14}O_3$. MW, 146. B.p. 70·5–73°/10–11 mm.
Isobutyl ester: b.p. 72–3°/13 mm. $[\alpha]_D^{18}$

$-$ 15·4°. *Acetyl*: b.p. 90–1°/12 mm. $[\alpha]_D^{20}$ $-$ 48·5°.

Amyl ester: $C_8H_{16}O_3$. MW, 160. *d*-. B.p. 101–2°/17 mm. D_4^{20} 0·9667. $[\alpha]_D$ $-$ 3·93°. *dl*-. B.p. 114–15°/36 mm. D_4^{20} 0·971. $[\alpha]_D$ $-$ 6·38°.

Me ether: see 1-Methoxypropionic Acid.

Et ether: *d*-1-ethoxypropionic acid. $C_5H_{10}O_3$. MW, 118. Syrup. B.p. 105–6°/16–19 mm. D_4^{20} 1·0395. $[\alpha]_D^{20}$ $-$ 66·36°. *Me ester*: $C_6H_{12}O_3$. MW, 132. B.p. 40–1°/10 mm. D_4^{20} 0·9610. $[\alpha]_D^{20}$ $-$ 81·6°. *Et ester*: $C_7H_{14}O_3$. MW, 146. B.p. 58·5–60°/16–19 mm. D_4^{20} 0·9355. $[\alpha]_D^{20}$ $-$ 79·69°.

l-.

Prismatic plates. M.p. 26–7°. Sol. H_2O, EtOH, Et_2O. $[\alpha]_D$ $-$ 2·26° in H_2O.

Me ester: b.p. 40°/13 mm. D^{15} 1·097. $[\alpha]_D^{20}$ + 7·46°. *Acetyl*: b.p. 171–2°, 68–70°/13 mm. $D^{19.8}$ 1·0885. $[\alpha]_D^{19.8}$ + 54·28°.

Et ester: b.p. 64–7°/22–25 mm. $[\alpha]_D^{19}$ + 14·52°.

Propyl ester: b.p. 61–3°/11–12 mm. $[\alpha]_D^{16}$ + 12°.

Butyl ester: $[\alpha]_D^{7}$ + 11·7°.

Me ether: see 1-Methoxypropionic Acid.

Et ether: *l*-1-ethoxypropionic acid. $[\alpha]_D^{12}$ + 56·96°.

dl-.

Widely distributed in nature. Cryst. M.p. 18°. B.p. 122°/14–15 mm. Volatile in superheated steam. Sol. H_2O, EtOH. Spar. sol. Et_2O. n_α^{20} 1·43915. $k = 1·38 \times 10^{-4}$ at 25° ($3·1 \times 10^{-4}$ at 25°). $H_2O_2 \longrightarrow$ acetaldehyde.

Me ester: b.p. 144·8°. D^{19} 1·0898.

Et ester: b.p. 154·5°. D^{19} 1·0308.

Isopropyl ester: b.p. 166–8°. Sol. H_2O.

1-*Menthyl ester*: $C_{13}H_{24}O_3$. MW, 228. Needles. M.p. 32°. B.p. 142°/15 mm. $[\alpha]_D^{20}$ $-$ 75·9° in EtOH.

1-*Bornyl ester*: $C_{13}H_{22}O_3$. MW, 226. B.p. 136°/10 mm. D_4^{20} 1·0370. $[\alpha]_D^{20}$ $-$ 39·3°.

O-*Formyl*: needles from C_6H_6. M.p. 78°. B.p. 120–1°/13 mm.

O-*Acetyl*: see 1-Acetoxypropionic Acid.

O-*Chloroacetyl*: cryst. from C_6H_6. M.p. 76°. B.p. 160–2°/15 mm. Sol. hot C_6H_6.

O-*Benzoyl*: *see O*-Benzoyl-lactic Acid.

Allophanate: needles. M.p. 190° decomp.

Me ether: see 1-Methoxypropionic Acid.

Et ether: *dl*-1-ethoxypropionic acid. B.p. 195–8° slight decomp., 131–3°/63–8 mm., 97°/11 mm. Sol. H_2O, EtOH, Et_2O. $k = 2·46 \times 10^{-4}$ at 25°. *Et ester*: b.p. 155°, 73°/42 mm. D_4^{20} 0·9446. n_D^{20} 1·40125. Sol. EtOH, Et_2O. Insol. H_2O. 1-*Menthyl ester*: $C_{15}H_{28}O_3$. MW, 256. B.p. 140°/13 mm. D_4^{20} 0·9363. $[\alpha]_D^{20}$ $-$60·3°. 1-*Bornyl ester*: $C_{15}H_{26}O_3$. MW, 254. B.p. 135°/10 mm. D_4^{20} 0·9858. $[\alpha]_D^{20}$ $-$ 33·2°.

Phenyl ether: see 1-Phenoxypropionic acid.

Nitrile: lactonitrile, acetaldehyde cyanhydrin. C_3H_5ON. MW, 71. B.p. 182–4° slight decomp., 102°/30 mm., 90°/17 mm. D_4^{20} 0·9877. $n_D^{18.4}$ 1·40582. Heat of comb. C_v 421·15 Cal. *Et ether*: C_5H_9ON. MW, 99. B.p. 131°/765 mm., 129–30°/730 mm. D_4^{16} 0·878. n_D^{16} 1·390. *Propyl ether*: $C_6H_{11}ON$. MW, 113. B.p. 150°/727 mm. D_4^{20} 0·866. n_D^{20} 1·398.

Amide: see Lactamide.

Amidine: see Lactamidine.

Amidoxime: $CH_3·CH(OH)·C(:NOH)·NH_2$. $C_3H_8O_2N_2$. MW, 104. Plates from AcOEt. M.p. 115° (111°). Sol. H_2O, EtOH. Spar. sol. Et_2O, $CHCl_3$. Insol. C_6H_6, ligroin. Sol. dil. HCl, alkalis, and NH_3. *Dibenzoyl*: m.p. 131°.

Hydrazide: lacthydrazide. Sol. H_2O, EtOH, AcOEt. Insol. Et_2O. *B,HCl*: m.p. 149°.

Anilide: lactanilide. $C_9H_{11}O_2N$. MW, 165. Plates from H_2O. M.p. 58·5–59·1°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. cold H_2O. Insol. pet. ether. *Et ether*: $C_{11}H_{15}O_2N$. MW, 193. Needles from ligroin. M.p. 62–3°. O-*Acetyl*: needles from H_2O. M.p. 121–2°. O-*Benzoyl*: *see under O*-Benzoyl-lactic Acid.

o-*Toluidide*: $C_{10}H_{13}O_2N$. MW, 179. Needles from ligroin. M.p. 75–6° (72°). B.p. 254°/44·4 mm.

p-*Toluidide*: needles from H_2O. M.p. 109° (102–3°).

N-*Methylanilide*: *N*-lactyl-*N*-methylaniline. $C_{10}H_{13}O_2N$. MW, 179. Prisms or plates from H_2O. M.p. 95–6°.

N-*Ethylanilide*: *N*-lactyl-*N*-ethylaniline. $C_{11}H_{15}O_2N$. MW, 193. Prisms from H_2O. M.p. 83·5°.

p-*Hydroxyanilide*: *p*-lactylaminophenol. $C_9H_{11}O_3N$. MW, 181. Cryst. from H_2O. M.p. 137–8°.

p-*Anisidide*: lactyl-*p*-anisidine. $C_{10}H_{13}O_3N$. MW, 195. Needles from H_2O. M.p. 106·5°.

p-*Phenetidide*: lactophenin. $C_{11}H_{15}O_3N$. MW, 209. Needles from H_2O. M.p. 118°. Antipyretic and antineuralgic.

1-*Naphthalide*: $C_{13}H_{13}O_2N$. MW, 215. Prisms from EtOH.Aq. M.p. 108°. O-*Benzoyl*: *see under O*-Benzoyl-lactic Acid.

2-*Naphthalide*: needles from EtOH.Aq. M.p. 137·5°. O-*Benzoyl*: *see under O*-Benzoyl-lactic Acid.

Guanidine salt: m.p. 161·5–162°.

Quinine salt: m.p. 165·5° decomp.

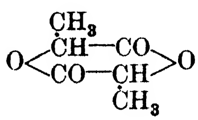
Brucine salt: cryst. from EtOH. M.p. 210°.

Bischoff, Walden, *Ann.*, 1894, **279**, 71 *et seq.*
Liebig, *Ann.*, 1847, **62**, 286, 327.
Purdie, Lander, *J. Chem. Soc.*, 1898, **73**, 863, 871.
Wassar, Guye, *Chem. Zentr.*, 1903, II, 1419.
Wislicenus, *Ann.*, 1873, **167**, 305.
Purdie, Irvine, *J. Chem. Soc.*, 1899, **75**, 483.
Irvine, *J. Chem. Soc.*, 1906, **89**, 936.
Schreiner, *Ann.*, 1879, **197**, 12.

β-Lactic Acid.
See Hydracrylic Acid.

Lactic Aldehyde.
See 1-Hydroxypropionaldehyde.

Lactide (3 : 6 - *Diketo* - 2 : 5 - *dimethyl* - 1 : 4 - *dioxan*)



$C_6H_8O_4$ MW, 144

d-.
Rhomboids from Et_2O. M.p. 95°. B.p. 150°/25 mm. Spar. sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. $[\alpha]_D^{18}$ − 298° in C_6H_6.

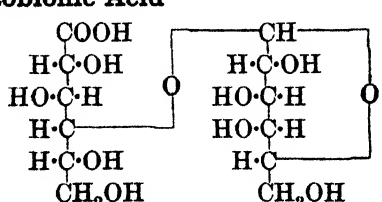
l-.
Rhomboids from Et_2O. M.p. 95°. B.p. 150°/25 mm. Spar. sol. Et_2O. $[\alpha]_D^{16}$ + 281·6° in C_6H_6.

dl-.
Needles from EtOH. M.p. 124·5°. B.p. 142°/8 mm., 255°/757 mm. Spar. sol. EtOH, Et_2O.

Jungfleisch, Godchot, *Compt. rend.*, 1905, **141**, 111.
Wyroubow, *Compt. rend.*, 1905, **141**, 111.

Lactimide.
See 3 : 6-Dimethyl-2 : 5-diketopiperazine.

Lactobionic Acid



$C_{12}H_{22}O_{12}$ MW, 358

Syrup. Sol. H_2O. Spar. sol. EtOH, AcOH. Insol. Et_2O. Dil. min. acids ⟶ galactose + gluconic acid. Hyd. by emulsin and by enzyme sols. from species of lactose-fermenting yeasts. Does not reduce Fehling's. Salts sol. H_2O.

CaA_2,5H_2O: cryst. $[\alpha]_D^{20}$ + 23·7° in H_2O.

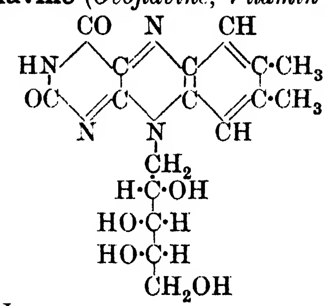
δ-Lactone: cryst. from AcOH. M.p. 195°–6° decomp. $[\alpha]_D^{20}$ + 54° ⟶ + 22°.

Me ester of octa-Me ether: b.p. 157–64°/0·05 mm. n_D^{18} 1·4632. Dil. min. acids ⟶ 2 : 3 : 4 : 6-tetramethylgalactose + 2 : 3 : 5 : 6-tetramethyl-γ-gluconolactone.

Fischer, Meyer, *Ber.*, 1889, **22**, 361.
Haworth, Long, *J. Chem. Soc.*, 1927, 546.
Isbell, *Chem. Abstracts*, 1934, **28**, 1667.

Lactobiose.
See Lactose.

Lactoflavine (*Ovoflavine, Vitamin B_2*)



$C_{17}H_{20}O_6N_4$ MW, 376

Occurs widely distributed in nature. Orange needles from dil. AcOH. M.p. 271° decomp. Sol. H_2O. Aq. sol. shows strong green fluor. $[\alpha]_D$ − 9·80 in H_2O; − 125° in *N*/20-NaOH. Absorption maxima: 445, 365, 265, 220 mμ in H_2O. Physiologically active. Irradiation in alk. sol. ⟶ lumiflavine. Irradiation in high vacuum ⟶ deuterolactoflavine. $NaHSO_3$ ⟶ leucolactoflavine.

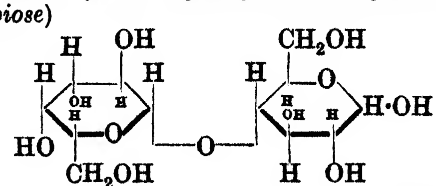
Tetracetyl deriv.: m.p. 246°.

Kuhn, Weygand, *Ber.*, 1934, **67**, 1939.
Wagner-Jauregg, *Angew. Chem.*, 1934, **47**, 318 (*Bibl.*).
Kuhn, Wagner-Jauregg, *Ber.*, 1934, **67**, 1770.

Lactonitrile.
See under Lactic Acid.

Lactophenin.
See under Lactic Acid.

Lactose (*Milk sugar, glucose-4-β-galactoside, lactobiose*)



$C_{12}H_{22}O_{11}$ **MW, 342**

Occurs in milk of mammals (human 6–7%, cow 4–5%), but not in plants. Manufactured from whey. Cryst. + H_2O. Loses H_2O at 130°, turns brown at 160°, part. decomp. at 175° with formation of lactocaramel. M.p. 203° decomp.

The anhyd. sugar is hygroscopic and exists in two stereoisomeric forms: α-, m.p. 223°, $[\alpha]_D$ + 90° in H_2O; β-, m.p. 252°, $[\alpha]_D$ + 35° in H_2O. Equilibrium mixture has $[\alpha]_D$ + 55·3° in H_2O.

Sp. gr. 1·534. Heat of comb. 3953 cal. per gm. Hydrated form sol. 5–6 parts cold H_2O or 2½ parts hot H_2O. Mod. sol. AcOH. Insol. MeOH, EtOH, Et_2O. Exhibits mutarotation. Less sweet than sucrose. Hot min. acids ⟶ glucose + galactose. More stable than sucrose to hyd. by min. acids. Hyd. by lactase, but not by maltase, invertase or diastase. Undergoes lactic and butyric fermentations. Reduces Fehling's. Br water ⟶ lactobionic acid. Dil. HNO_3 ⟶ mucic and saccharic acids. Conc. HNO_3 ⟶ oxalic acid. Dil. $KMnO_4$ ⟶ formic acid. Hot $KMnO_4$ ⟶ CO_2 + H_2O. Autooxidation in acid sol. ⟶ levulinic and formic acids. NaHg ⟶ dulcitol and sorbitol. Ac_2O + AcONa ⟶ octa-acetyl deriv. Conc. KOH ⟶ lactic acid. KOH fusion ⟶ oxalic acid.

Phenylosazone: yellow needles. M.p. 200° decomp. Sol. EtOH, hot AcOH, 80 parts hot H_2O. Insol. Et_2O, $CHCl_3$, C_6H_6. Conc. HCl or C_6H_5·CHO ⟶ lactosone.

p-*Nitrophenylosazone*: m.p. 258° decomp.

Amylphenylhydrazone: m.p. 123°. $[\alpha]_D$ − 8·6° in MeOH.

Allylphenylhydrazone: m.p. 132°. $[\alpha]_D$ − 14·8° in MeOH.

Benzylphenylhydrazone: m.p. 128°. $[\alpha]_D$ − 25·7° in MeOH.

2-*Naphthylhydrazone*: m.p. 203°. $[\alpha]_D$ 0° in MeOH, + 7° in AcOH.

Semicarbazone: cryst. + $2H_2O$. Loses $1H_2O$ at 115° and second H_2O above 120°. M.p. 185° decomp. $[\alpha]_D$ + 10·6° in H_2O. Sol. H_2O.

Octa-acetyl deriv.: from α-lactose. Needles. M.p. 152°. $[\alpha]^{20}_D$ + 54° in $CHCl_3$, + 28·6° in C_6H_6, + 59·9° in AcOH. More sol. EtOH, Et_2O than β-form. From β-lactose: cryst. from EtOH. M.p. 90°. $[\alpha]^{20}_D$ − 4·4° in $CHCl_3$, − 23·5° in C_6H_6, 0° in AcOH.

Octanitrate: m.p. 145–6°. $[\alpha]^{20}_D$ + 74·2° in MeOH.

Octaphenylurethane: m.p. 275–80°.

Hepta-acetyl chlorolactose: (*a*) probably α-form. Prisms. M.p. 57–9°. $[\alpha]^{20}_D$ 76·2° in C_6H_6. Sol. ligroin. (*b*) Probably β-form. Prisms. M.p. 118–20°. $[\alpha]^{20}_D$ 73·5° in C_6H_6. Insol. ligroin.

Hepta-acetylbromolactose: prisms from EtOH. M.p. 143–4°. $[\alpha]^{22}_D$ + 104·9° in $CHCl_3$. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O. Insol. pet. ether.

Me-lactoside: needles. M.p. 171°. *Hepta-Me ether*: cryst. from pet. ether. M.p. 81–2°. n_D 1·4675. $[\alpha]_D$ + 5·19° in H_2O, − 16·87° in EtOH, − 13·04° in MeOH, − 13·64° in Me_2CO. *Hepta-acetyl*: m.p. 66–7°. $[\alpha]^{19}_D$ − 5·91° in $CHCl_3$.

Haworth, Long, *J. Chem. Soc.*, 1927, **544**.
Haworth, Leitch, *J. Chem. Soc.*, 1918, **113**, 188.
Pictet, Vogel, *Helv. Chim. Acta*, 1928, **11**, 209.
Gillis, *Rec. trav. chim.*, 1920, **39**, 88.
Whittier, *Chemical Reviews*, 1926, **2**, 85 (*Bibl.*).

Lactucerol

$C_{30}H_{50}O$ MW, 426

Occurs in sap of *Lactuca virosa*. Exists in two forms.

α-.

Needles from EtOH. M.p. 203° (166–81°). Sol. Et_2O, $CHCl_3$, ligroin. Spar. sol. Me_2CO, AcOH, cold EtOH. $[\alpha]_D$ + 76·2° in $CHCl_3$.

Acetyl deriv.: m.p. 202–7°.

Propionyl deriv.: m.p. 152°.

Benzoyl deriv.: m.p. 156°.

β-.

Needles from Et_2O or $CHCl_3$. M.p. 165°. $[\alpha]_D$ + 53·8°.

Acetyl deriv.: plates. M.p. 230°.

Benzoyl deriv.: m.p. 260°.

Hesse, *Ann.*, 1886, **234**, 243; 1888, **244**, 270.
Bauer, Schub, *Arch. Pharm.*, 1929, **267**, 413.

Lactucol

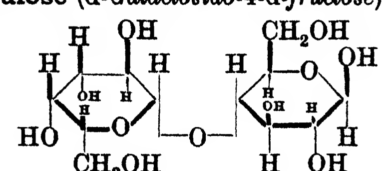
$C_{13}H_{20}O$ MW, 192

Occurs in *Lactuca sativa* and *L. altissima*. Needles. M.p. 160–2°.

Acetate: m.p. 198–200°.

Kassner, *Ann.*, 1887, **238**, 224.

Lactulose (d-*Galactosido*-4-d-*fructose*)



$C_{12}H_{22}O_{11}$ MW, 342

Plates from MeOH. M.p. 158°. Sol. H_2O. $[\alpha]_D^{22}$ − 23·8°. Exhibits mutarotation. Dil. H_2SO_4 ⟶ *d*-galactose + *d*-fructose. Reduces Fehling's.

Anhydro-osazone: m.p. 226° decomp. $[\alpha]_D^{20}$ − 174°.

Montgomery, Hudson, *J. Am. Chem. Soc.*, 1930, **52**, 2101.

Ladaniol

$C_{17}H_{30}O$ MW, 250

Constituent of *Cistrus creticus* (Ladanum). Prisms from EtOH. M.p. 89°. Sol. Et_2O, Me_2CO, $CHCl_3$. Spar. sol. EtOH, H_2O. Sol. conc. H_2SO_4 to reddish-brown sol.

Emmanuel, *Arch. Pharm.*, 1912, **250**, 111.

Lævoglucosan.
See β-Glucosan.

Laminarin (*Laminariose*)

$(C_6H_{10}O_5)_{6\text{ or }7}$ MW, 972 or 1134

Sugar occurring in the brown algæ, especially the *Laminaria* sub-group. White powder. Darkens slowly at 265°, rapidly at 300°. $[\alpha]_D$ − 11·5°. Sol. H_2O. Insol. EtOH, Et_2O, C_6H_6, pet. ether. Sol. alkalis. Ppts. with Ba, Ca, Sr sols. Hyd. by H_2SO_4 ⟶ glucose. Hyd. by snail-juice but not by amylose or emulsin.

Colin, Ricard, *Bull. soc. chim. biol.*, 1930, **12**, 88.
Kylin, *Z. physiol. Chem.*, 1915, **94**, 337.

Laminariose.
See Laminarin.

Lanoceric Acid

$C_{30}H_{60}O_4$ MW, 484

Occurs combined in wool-fat. Leaflets from EtOH. M.p. 104–5°. Boiling dil. HCl ⟶ anhydride. Spar. sol. Et_2O, C_6H_6. Existence denied by Rohmänn.

Anhydride: $C_{30}H_{58}O_3$. MW, 466. M.p. 86–7°. Sol. C_6H_6. Spar. sol. EtOH.

Darmstädter, Lipschültz, *Ber.*, 1896, **29**, 1474.
Rohmänn, *Biochem. Z.*, 1916, **77**, 298, 321.

Lanolic Acid

$C_{12}H_{22}O_3$ MW, 214

Cryst. powder. M.p. 75–7°. Insol. H_2O, ligroin.

Marchetti, *Gazz. chim. ital.*, 1895, **25**, 43.

Lanolin Alcohol

$C_{12}H_{24}O$ MW, 184

Occurs combined in wool fat. Powder from $CHCl_3$. M.p. 102–4°. Spar. sol. EtOH, $CHCl_3$, C_6H_6. Ox. ⟶ lanolinic acid.

See previous reference.

Lanopalminic Acid

$C_{16}H_{32}O_3$ MW, 272

Occurs combined in wool fat. Cryst. from EtOH.Aq. M.p. 87–8°. Sol. most org. solvents. Insol. H_2O, dil. alkalis. After melting, emulsifies with H_2O. Existence denied by Röhmann.

Darmstädter, Lipschültz, *Ber.*, 1896, **29**, 2891.
Röhmann, *Biochem. Z.*, 1916, **77**, 298, 321.

Lanosterol

$C_{30}H_{50}O$ MW, 426

Occurs in wool fat. Cryst. from MeOH–Me_2CO. M.p. 140–1°. $[\alpha]_D^{17}$ + 58·0° in $CHCl_3$. Sol. $CHCl_3$. Spar. sol. Me_2CO, AcOEt, ligroin, cold EtOH. Very spar. sol. MeOH. Not pptd. by digitonin.

Acetyl deriv.: needles. M.p. 113–14°.

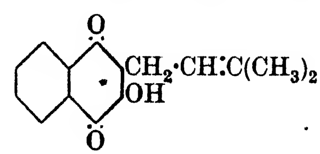
Benzoyl deriv.: needles. M.p. 191·5°. $[\alpha]_D^{17}$ + 72·2°.

Bromoacetyl deriv.: needles. M.p. 99–101°.

Windaus, Tschesche, *Z. physiol. Chem.*, 1930, **190**, 58.
Dorée, Garratt, *J. Soc. Chem. Ind.*, 1933, **52**, 141, 355.

Lantanuric Acid.
See Allanturic Acid.

Lapachol (*3-Hydroxy-2-[γ-methyl-β-butenyl]-α naphthoquinone, tecomin, taiguic acid*)



$C_{15}H_{14}O_3$ MW, 242

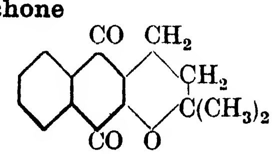
Occurs in lapacho heartwood and various *Bignoniaceæ*. Yellow prisms from EtOH or Et_2O. M.p. 139–40°. Sol. EtOH, AcOH, $CHCl_3$, C_6H_6. Spar. sol. Et_2O, hot H_2O. Sol. alkalis to red sols. HNO_3 ⟶ phthalic acid. Conc. HNO_3 ⟶ naphthalene + isobutylene. HCl + AcOH ⟶ α-lapachone.

Oxime: yellow needles from EtOH. M.p. 180° decomp. Sol. EtOH.

Acetyl: yellow prisms from EtOH. M.p. 82–3°. Sol. Et_2O, hot EtOH. Hyd. by NH_3.

Fieser, *J. Am. Chem. Soc.*, 1927, **49**, 857.
Hooker, *J. Chem. Soc.*, 1896, **69**, 1356.
Paternò, *Gazz. chim. ital.*, 1882, **12**, 343.
Oesterle, *Arch. Pharm.*, 1913, **251**, 301.

α-Lapachone



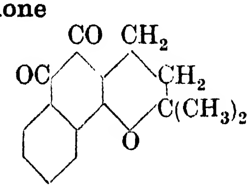
$C_{15}H_{14}O_3$ MW, 242

Yellow needles from EtOH. M.p. 117°. Sol. most org. solvents. Spar. sol. H_2O. Insol. alkalis. Spar. volatile in steam. Sol. conc. $H_2SO_4 \longrightarrow$ β-lapachone.

Monoxime: plates from EtOH. M.p. 204° decomp. Sol. conc. $H_2SO_4 \longrightarrow$ β-lapachone monoxime. Sol. 1% NaOH.

Hooker, *J. Chem. Soc.*, 1896, **69**, 1359.
Paternò, *Gazz. chim. ital.*, 1882, **12**, 343.

β-Lapachone



$C_{15}H_{14}O_3$ MW, 242

Orange-red needles from EtOH. M.p. 155–6°. Sol. C_6H_6, hot EtOH. Spar. sol. Et_2O. Insol. H_2O, dil. alkalis. $HNO_3 \longrightarrow$ phthalic acid.

Monoxime: orange prisms from EtOH. M.p. 169°. Insol. 1% NaOH.

Phenylhydrazone: orange needles. M.p. 188–9°. Spar. sol. EtOH, Et_2O, AcOH.

Paternò, Minunni, *Gazz. chim. ital.*, 1889, **19**, 614.
See also above references.

Lapathinic Acid

$C_{20}H_{18}O_{14}$ MW, 482

Constituent of the root of *Rumex obtusifolius*. Prisms from Et_2O. M.p. 228–9° decomp. Sol. H_2O, EtOH, Et_2O. AcOH. Insol. $CHCl_3$, pet. ether. Yellow sols in alkalis. Sol. conc. H_2SO_4 to colourless sol. Reduces $NH_3.AgNO_3$. $FeCl_3 \longrightarrow$ green col.

Tschirch, Weil, *Arch. Pharm.*, 1912, **250**, 30.

Lapodin

$C_{18}H_{16}O_5$ MW, 312

Constituent of the root of *Rumex obtusifolius*. Yellow leaflets from EtOH. M.p. 206° decomp. Spar. sol. EtOH. Insol. H_2O. Yellow sols in alkalis. Alc. $FeCl_3 \longrightarrow$ brown col.

Hesse, *Ann.*, 1899, **309**, 51.

Lappaconine

$C_{23}H_{37}O_6N$ MW, 423

Cryst. + $1\frac{1}{2}$ H_2O from H_2O. M.p. 96°. $[\alpha]_D^{25}$ + 16·3° in EtOH. Sol. EtOH, $CHCl_3$, C_6H_6. Spar. sol. Et_2O, pet. ether.

B,HCl: m.p. 246–7°.

B,HAuCl₄,H₂O: m.p. 126–7°.

Weidemann, *Chem. Zentr.*, 1923, I, 603.
Schulze, Ulfert, *Arch. Pharm.*, 1922, **260**, 230.

Lappaconitic Acid.

Acetylanthranilic Acid, *q.v.*

Lappaconitine

$C_{32}H_{44}O_9N_2$ MW, 600

Alkaloid from *Aconitum septrentrionale*. Plates from EtOH. M.p. 223° (214°). $[\alpha]_D^{18}$ + 27° in $CHCl_3$. Sol. $CHCl_3$. Spar. sol. H_2O, EtOH, Et_2O, C_6H_6. Forms no cryst. salts. Acid hyd. $\longrightarrow$ lappaconine + anthranilic acid + $CH_3{\cdot}COOH$. Alk. hyd. $\longrightarrow$ lappaconitic acid. Paralyses the heart and stops respiration.

See references under Lappaconine, above.

Laricin.

See Maltol.

Laricinic Acid.

See Maltol.

Laricinoleic Acid

$C_{20}H_{30}O_2$ MW, 302

Acid occurring combined in larch turpentine. Leaflets from EtOH. M.p. 135–6°. Sol. EtOH, Et_2O, Me_2CO, AcOH, pet. ether. Gives Liebermann and Salkowski tests.

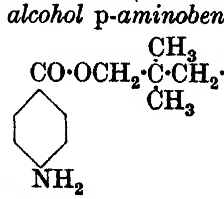
Tschirch, Weigel, *Arch. Pharm.*, 1900, **238**, 399.

Larixinic Acid.

See Maltol.

Larocaine

(2 : 2-*Dimethyl-3-diethylamino-propyl alcohol* p-*aminobenzoate hydrochloride*)



$C_{16}H_{27}O_2N_2Cl$ MW, 314·5

Cryst. M.p. 196°. Sol. H_2O. Spar. sol. cold EtOH. Cryst. ppts. with Reinecke's salt, picric acid, trinitroresorcinol, KBr, KI. Local anæsthetic. Twice as active and less toxic than cocaine.

Mannich, Lesser, Silten, *Ber.*, 1932, **65**, 378.
Rosenthaler, *Chem. Abstracts*, 1932, **26**, 4910.

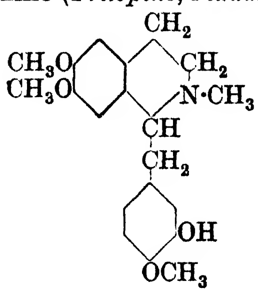
Lasiocarpin

$C_{21}H_{33}O_7N$ MW, 411

Alkaloid from *Heliotropium lasiocarpum*. Leaflets from pet. ether. M.p. 95°. Sol. EtOH, C_6H_6. Spar. sol. H_2O. $[\alpha]_D^{20} - 4°$.

Menschikoff, *Ber.*, 1932, **65**, 974.

Laudanidine (*Tritopine*, l-*laudanine*)



$C_{20}H_{25}O_4N$ MW, 343

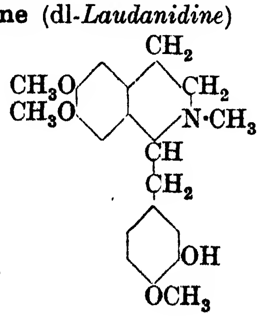
One of the opium alkaloids. Cryst. from EtOH. M.p. 184–5° (177°). $[\alpha]_D^{18} - 100{\cdot}6°$ in EtOH. Sol. H_2O, C_6H_6. Spar. sol. EtOH, Et_2O, pet. ether. Sol. conc. H_2SO_4 to yellowish-red sol. Sol. alkalis. $FeCl_3 \longrightarrow$ green col. Strong tetanic poison.

Acetyl: needles from EtOH. M.p. 98°. Sol. EtOH, Me_2CO, $CHCl_3$. Spar. sol. H_2O, Et_2O. Sol. alkalis. $FeCl_3 \longrightarrow$ green col.

dl-: *see* Laudanine.

Späth, Bernhauer, *Ber.*, 1925, **58**, 200.
Späth, Burger, *Monatsh.*, 1926, **47**, 733.
Späth, Seka, *Ber.*, 1925, **58**, 1272.
Hesse, *Ann.*, 1894, **282**, 209.

Laudanine (dl-*Laudanidine*)



$C_{20}H_{25}O_4N$ MW, 343

One of the opium alkaloids. Prisms from EtOH. M.p. 166°. Sol. $CHCl_3$, C_6H_6. Spar. sol. H_2O, EtOH, Et_2O. Sol. alkalis. Sol. conc. H_2SO_4 to violet-red sol. $FeCl_3 \longrightarrow$ green col. Strong tetanic poison.

Acetyl: m.p. 40°. Sol. EtOH, Et_2O. Spar. sol. pet. ether.

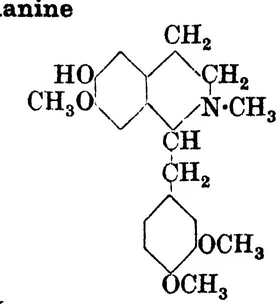
Oxalate,6H_2O: m.p. 110°.

Tartrate,3H_2O: m.p. 100°.

l-: *see* Laudanidine.

Späth, Lang, *Monatsh.*, 1921, **42**, 273.
Späth, *Monatsh.*, 1920, **41**, 297.
See also last reference above.

ψ-Laudanine



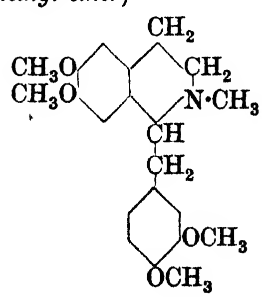
$C_{20}H_{25}O_4N$ MW, 343

Cryst. from pet. ether, m.p. 112°. Needles + EtOH from 50% EtOH, m.p. 76–80°. Sol. EtOH, C_6H_6.

Picrate: needles from EtOH. M.p. 163°.

Decker, Eichler, *Ann.*, 1913, **395**, 377.

Laudanosine (N-*Methyltetrahydropapaverine*, *laudanine methyl ether*)



$C_{21}H_{27}O_4N$ MW, 357

d-.

One of the opium alkaloids. Needles from C_6H_6. M.p. 89°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. H_2O, alkalis. $[\alpha]_D^{15} + 103{\cdot}2°$ in EtOH. Ox. $\longrightarrow$ veratric aldehyde + 4 : 5-dimethoxy-2 : β-methylaminoethylbenzaldehyde. Exhaustive methylation $\longrightarrow$ trimethylamine + tetramethoxy-*o*-vinylstilbene. Strong tetanic poison.

l-.

Cryst. from EtOH. M.p. 89°. $[\alpha]_D^{18}$ − 105·42° in EtOH.

dl-.

Needles from EtOH. M.p. 114–15°. Sol. EtOH, Me_2CO, AcOEt, $CHCl_3$, C_6H_6. Insol. pet. ether, alkalis.

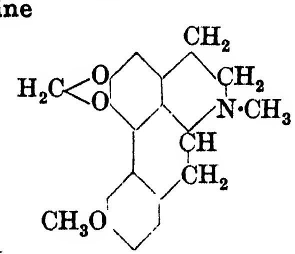
B,HCl: m.p. 123°.
B_2,H_2PtCl_6: m.p. 160°.
Picrate: m.p. 174°.
Methiodide: m.p. 215–17°.

Pictet, Athanasescu, *Ber.*, 1900, **33**, 2347.
Pictet, Finkelstein, *Ber.*, 1909, **42**, 1979.
Pyman, Reynolds, *J. Chem. Soc.*, 1910, **97**, 1324.
Kondo, Mori, *Journal of the Pharmaceutical Society, Japan*, 1931, **51**, 615.

Lauraldehyde.

See Lauric Aldehyde.

Laureline



$C_{19}H_{19}O_3N$ MW, 309

l- (*Natural*).

Alkaloid occurring in New Zealand *Laurelia*. Tablets from EtOH. M.p. 97°. $[\alpha]_D^{15}$ − 98·5° in EtOH. Sol. conc. H_2SO_4 to bluish-red sol. Readily oxidises in air. Acid ox. ⟶ mellophanic acid. Alk. ox. ⟶ 4-methoxyphthalic anhydride. Exhaustive methylation, followed by oxidation and dist. ⟶ methoxy-methylenedioxy-phenanthrene, m.p. 132°. Exerts convulsive action on nerve cells of spinal cord.

B,HCl: m.p. 280°.
B,HNO_3: m.p. 238–40°.
B_2,H_2SO_4: m.p. 105°.
Tartrate: m.p. 220°.
Methiodide: cryst. from EtOH. M.p. 223°.

l- (*Synthetic*).

Cryst. from pet. ether. M.p. 114°. $[\alpha]_D$ − 97·7° in EtOH.

d-Tartrate: m.p. 211°. $[\alpha]_D$ + 23·5° in EtOH.

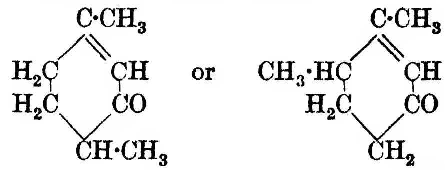
d-.

M.p. 114°. $[\alpha]_D$ + 97·6° in EtOH.

l-Tartrate: m.p. 210°. $[\alpha]_D$ + 26° in EtOH.

Barger, Girardet, *Helv. Chim. Acta*, 1931, **14**, 501.
Barger, Schlittler, *Helv. Chim. Acta*, 1932, **15**, 394.
Aston, *J. Chem. Soc.*, 1910, **97**, 1386.

Laurenone (1 : 4-*Dimethyl*-1-*cyclohexenone*-3, or 1 : 6-*dimethyl*-1-*cyclohexenone*-3)



$C_8H_{12}O$ MW, 124

B.p. 92–5°/16 mm. $D^{12.5}$ 0·9574. n_D 1·48535. Optically active.

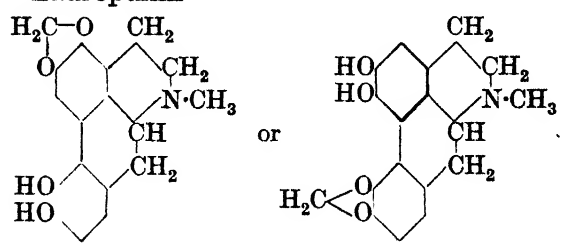
Oxime: prisms. M.p. 105–7°.
Oxaminoxime: m.p. 159°.

Lapworth, *Report of the British Association for the Advancement of Science*, 1900, 327.
Tiemann, *Ber.*, 1900, **33**, 2950.

Laurent's Acid.

See 1-Naphthylamine-5-sulphonic Acid.

Laurepukin



Suggested structures

$C_{18}H_{17}O_4N$ MW, 311

Alkaloid from New Zealand *Laurelia*. Needles from Et_2O–$CHCl_3$. M.p. 230–1°. $[\alpha]_D$ − 222° in $CHCl_3$.

Di-Me ether: $C_{20}H_{21}O_4N$. MW, 339. Prisms. M.p. 134°. B.p. 200–210°/10 mm. $[\alpha]_D$ − 314° in $CHCl_3$. *Methiodide*: m.p. 249–50°.

Girardet, *Helv. Chim. Acta*, 1931, **14**, 504.

Lauric Acid (*Dodecylic acid, undecane*-1-*carboxylic acid*)

$$CH_3{\cdot}[CH_2]_{10}{\cdot}COOH$$

$C_{12}H_{24}O_2$ MW, 200

Occurs as glyceride in the fruit of laurels, cocoanut oil, etc. Needles from EtOH. M.p. 44°. B.p. 225°/100 mm., 141–2°/0·6–0·7 mm. D_4^{50} 0·8690. Sol. pet. ether. Ox. ⟶ methyl nonyl ketone. Na + EtOH (or C_4H_9OH), or catalytic hydrogenation ⟶ dodecyl alcohol.

Me ester: $C_{13}H_{26}O_2$. MW, 214. M.p. 5°. B.p. 141°/15 mm.

Et ester: $C_{14}H_{28}O_2$. MW, 228. Solid at − 10°. B.p. 163°/25 mm. D_{19}^{19} 0·8671. $n_a^{12·9}$ 1·43269.

Glycerol esters: *see* Monolaurin, Trilaurin, *and under* Glycerol.

Dodecyl ester: $C_{25}H_{50}O_2$. MW, 382. M.p. 27°. B.p. 226°/4·5 mm.

Phenyl ester: $C_{18}H_{28}O_2$. MW, 276. Leaflets from EtOH. M.p. 24·5°. B.p. 210°/15 mm.

o-*Nitrophenyl ester*: $C_{18}H_{27}O_4N$. MW, 321. Cryst. from EtOH. M.p. 35–6°.

p-*Tolyl ester*: $C_{19}H_{30}O_2$. MW, 290. M.p. 28°. B.p. 219·5°/15 mm.

Phenacyl ester: $C_{20}H_{30}O_3$. MW, 318. Needles. M.p. 48–9°. Spar. sol. EtOH.

p-*Iodophenacyl ester*: $C_{20}H_{29}O_3I$. MW, 444. M.p. 85·8°.

Chloride: $C_{12}H_{23}OCl$. MW, 218·5. M.p. − 17°. B.p. 145°/18 mm., 135–40°/10 mm.

Nitrile: $C_{12}H_{13}N$. MW, 181. M.p. 4°. B.p. 198°/100 mm. D^{15} 0·8273. Sol. EtOH, $CHCl_3$, C_6H_6. Spar. sol. Et_2O, ligroin.

Amide: $C_{12}H_{25}ON$. MW, 199. Needles. M.p. 110° (102°). B.p. 199–200°/12·5 mm. Sol. EtOH. Insol. H_2O.

Anilide: needles from EtOH.Aq. M.p. 78° (69°).

p-*Bromoanilide*: m.p. 104°.

2 : 4 : 6-*Tribromoanilide*: m.p. 126°.

o-Toluidide: cryst. from Et_2O. M.p. 83°.

p-*Toluidide*: cryst. from EtOH. M.p. 87°.

o-*Phenetidide*: m.p. 69·7–70°.

p-*Phenetidide*: m.p. 109–10°.

1-*Naphthalide*: cryst. from EtOH. M.p. 105°.

2-*Naphthalide*: m.p. 106°.

Anhydride: $C_{24}H_{46}O_3$. MW, 382. Cryst. M.p. 41·8°. D_4^{70} 0·8533. n_4^{70} 1·4292.

Hydrazide: needles. M.p. 104·5°.

Phenylhydrazide: m.p. 105–6°.

2-*Naphthylhydrazide*: m.p. 136°.

Veselý, Haas, *Chem. Abstracts*, 1928, **22**, 58.
Holde, Gentner, *Ber.*, 1925, **58**, 1418.
Pickard, Kenyon, *J. Chem. Soc.*, 1914, **105**, 852.
Dunstan, Thole, Benson, *ibid.*, 791.
Eitner, Wetz, *Ber.*, 1893, **26**, 2840.
Krafft, Stauffer, *Ber.*, 1882, **15**, 2840.
Grün, Schacht, *Ber.*, 1907, **40**, 1787.
Grün, v. Skopnik, *Ber.*, 1909, **42**, 3755.
Robertson, *J. Chem. Soc.*, 1919, **115**, 1210.

Lauric Aldehyde (*Dodecylaldehyde, lauraldehyde*)

$CH_3·[CH_2]_9·CH_2·CHO$

$C_{12}H_{24}O$ MW, 184

Occurs in oil from *Chamæcyparis Lawsonia*. Plates. M.p. 44·5°. B.p. 184–5°/100 mm., 142–3°/22 mm.

Oxime: m.p. 73°.

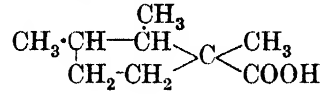
2 : 4-*Dinitrophenylhydrazone*: m.p. 106°.

Krafft, *Ber.*, 1880, **13**, 1414.
Reinboldt, Dewald, *Ann.*, 1928, **460**, 305.

Laurolan.

See 1 : 2 : 3-Trimethylcyclopentane.

Laurolanic Acid (1 : 2 : 3-*Trimethylcyclopentane*-1-*carboxylic acid*)



$C_9H_{16}O_2$ MW, 156

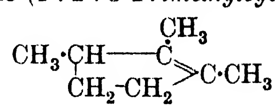
d-.

B.p. 215°/749 mm., 178°/100 mm. $D_D^{23·5}$ 0·9008. n_D 1·4579. $[\alpha]_D^{25·5}$ + 1·74°.

Amide: $C_9H_{17}ON$. MW, 155. M.p. 50–1°.

Noyes, Burke, *J. Am. Chem. Soc.*, 1912, **34**, 180.

Laurolene (1 : 2 : 3-*Trimethylcyclopentene*)



C_8H_{14} MW, 110

d-.

B.p. 122°. D_4^{4} 0·8097, D_4^{15} 0·8030. n_D 1·44376. $[\alpha]_D^{26·5}$ + 28·15°, $[\alpha]_D^{23}$ + 22·8°.

l-.

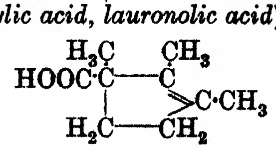
B.p. 119°. D_4^{15} 0·8043. n_D^{25} 1·4432. $[\alpha]_D^{27}$ − 18·13°, $[\alpha]_D^{35}$ − 14·7°. Oxidises in air.

dl-.

B.p. 120–1°/752 mm. (119°). D_D^{15} 0·8039. $n_D^{16·5}$ 1·4464.

Noyes, Burke, *J. Am. Chem. Soc.*, 1912, **34**, 180.
Noyes, Kyriakides, *J. Am. Chem. Soc.*, 1910, **32**, 1066.

Laurolenic Acid (1 : 2 : 3-*Trimethylcyclopentene-3-carboxylic acid, lauronolic acid*)



$C_9H_{14}O_2$ MW, 154

d-.

Cryst. M.p. 6·5–8° (13°). B.p. 230–5°, 139–40°/17 mm., 104°/0·5–1 mm. D_4^{25} 1·0133. n_D^{20} 1·47155. $[\alpha]_D^{21}$ + 195·2°. $k = 1{\cdot}36 \times 10^{-5}$. Red. ⟶ laurolanic acid.

Amide: $C_9H_{15}ON$. MW, 153. Plates from H_2O. M.p. 71–2°. Sol. H_2O. $[\alpha]_D$ + 94·61°.

dl-.

M.p. 5–8·5°. B.p. 192°/100 mm. D_4^{25} 1·0318. n_D 1·4766.

Noyes, Skinner, *J. Am. Chem. Soc.*, 1917, **39**, 2692.
Noyes, Burke, *J. Am. Chem. Soc.*, 1912, **34**, 181.
Tiemann, Tigges, *Ber.*, 1900, **33**, 2946.

Laurone (*Di-*n*-undecyl ketone, 12-ketotricosane*)

$CH_3{\cdot}[CH_2]_9{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}[CH_2]_9{\cdot}CH_3$

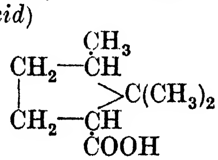
$C_{23}H_{46}O$ MW, 338

M.p. 69°. Insol. cold EtOH. $D_4^{90{\cdot}9}$ 0·7888.

Oxime: m.p. 39–40°.

Kipping, *J. Chem. Soc.*, 1890, **57**, 981.
Krafft, *Ber.*, 1882, **15**, 1712.

Lauronic Acid (*Dihydro-α-campholytic acid, camphoceanic acid, 1 : 1 : 2-trimethylcyclopentane-5-carboxylic acid*)



$C_9H_{16}O_2$ MW, 156

d-.

Oil. D^{20} 0·9915. $[\alpha]_D^{22}$ + 36·5° in pet. ether.

Amide: $C_9H_{17}ON$. MW, 155. Plates from pet. ether. M.p. 86·5°. $[\alpha]_D^{24}$ + 21·2° in pet. ether.

Noyes, Potter, *J. Am. Chem. Soc.*, 1912, **34**, 1079.

Lauronolic Acid.

See Laurolenic Acid.

Laurophenone (*Laurylbenzene, undecyl phenyl ketone*)

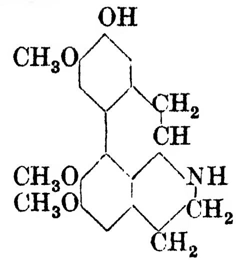
$C_6H_5{\cdot}CO{\cdot}[CH_2]_{10}{\cdot}CH_3$

$C_{18}H_{28}O$ MW, 260

Cryst. M.p. 47° (45°). B.p. 201–2°/9 mm. $D^{78{\cdot}5}$ 0·87935. $n_\alpha^{78{\cdot}5}$ 1·47001.

Kipping, Russell, *J. Chem. Soc.*, 1895, **67**, 508.
Haller, Bauer, *Compt. rend.*, 1909, **149**, 7.
Eijkman, *Chem. Zentr.*, 1904, I, 1259.

Laurotetanine



$C_{19}H_{21}O_4N$ MW, 327

Alkaloid from *Lauraceæ*. Cryst. + $1H_2O$ from Me_2CO. M.p. 125°. $[\alpha]_D^{25}$ + 98·5°. Turns yellow in air.

Phenylthiocarbamide: m.p. 211–12°.

Picrate: m.p. 148°.

Dibenzoyl deriv.: m.p. 169–70°.

Me ether: $C_{20}H_{23}O_4N$. MW, 341. Amorphous. *B,HCl*: cryst. M.p. 245°. *Oxalate*: m.p. 233°. *Thiocarbamide*: m.p. 154–5°.

O : N-*Di-Me*: *see* Glaucine.

Greshoff, *Ber.*, 1890, **23**, 3537.
Gorter, *Chem. Abstracts*, 1922, **16**, 2470.
Barger, Eisenbrand, Eisenbrand, Schlittler, *Ber.*, 1933, **66**, 450.

Lauryl Alcohol.

See Dodecyl Alcohol.

Laurylamine.

Dodecylamine, *q.v.*

Lead tetrabutyl

$Pb(C_4H_9)_4$

$C_{16}H_{36}Pb$ MW, 435

B.p. 156°/10 mm. in CO_2.

Danzer, *Monatsh.*, 1926, **46**, 241.

Lead tetra-ethyl

$Pb(C_2H_5)_4$

$C_8H_{20}Pb$ MW, 323

B.p. about 200°, 152°/290·5 mm., 83°/13–14 mm. D_4^{20} 1·6528. n_D^{20} 1·5198. Sol. Et_2O. Insol. H_2O. Volatile in steam. Conc. HCl ⟶ triethyl lead chloride. SO_2 ⟶ diethyl sulphone and lead ethyl sulphinate. Used as anti-knock in petrol.

Pfeiffer, Truskier, *Ber.*, 1904, **37**, 1127.
Grüttner, Krause, *Ber.*, 1916, **49**, 1421; *Ann.*, 1918, **415**, 356.
Jones, Werner, *J. Am. Chem. Soc.*, 1918, **40**, 1273.

Lead tetra-isoamyl

$Pb[CH_2{\cdot}CH_2{\cdot}CH(CH_3)_2]_4$

$C_{20}H_{44}Pb$ MW, 491

Cryst. in AcOEt at − 75°. D_4^{20} 1·2337. $n_D^{20\cdot5}$ 1·4946.

Grüttner, Krause, *Ber.*, 1917, **50**, 280.

Lead tetra-isobutyl

$Pb[CH_2{\cdot}CH(CH_3)_2]_4$

$C_{16}H_{36}Pb$ MW, 435

Plates. M.p. − 23°. $D_4^{20\cdot2}$ 1·3240. $n_D^{20\cdot2}$ 1·5042.

Grüttner, Krause, *Ber.*, 1917, **50**, 282.

Lead tetra-isopropyl

$Pb[CH(CH_3)_2]_4$

$C_{12}H_{28}Pb$ MW, 379

F.p. − 53·5°. B.p. 133–8°/27 mm., 120·0°/14 mm. D_4^{12} 1·4578, D_4^{20} 1·4504. n_D^{12} 1·5260, n_D^{20} 1·5223. Decomp. in air.

Grüttner, Krause, *Ber.*, 1917, **50**, 576.

Lead tetramethyl

$Pb(CH_3)_4$

$C_4H_{12}Pb$ MW, 267

F.p. − 27·5°. B.p. 110°/760 mm. Sol. EtOH, Et_2O. Insol. H_2O. D^0 2·034, D_4^{20} 1·9952. n_D^{20} 1·5120. Poisonous. Very explosive. Stabilised by small quantities of arylamides.

Grüttner, Krause, *Ber.*, 1916, **49**, 1420.
Krause, *Ber.*, 1929, **62**, 1877.
Calcott, Parmelee, U.S.P., 1,835,140, (*Chem. Abstracts*, 1932, **26**, 977).
Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 46.

Lead tetraphenyl

$Pb(C_6H_5)_4$

$C_{24}H_{20}Pb$ MW, 515

Needles or prisms from C_6H_6. M.p. 229° (224–5°). D^{20} 1·5298. Sol. diethyl sulphide, dipropylamine. Mod. sol. $CHCl_3$, C_6H_6, CS_2. Spar. sol. EtOH, Et_2O, AcOH, ligroin. Decomp. at 270°. H(+ Ni) ⟶ diphenyl.

Werner, Pfeiffer, *Z. anorg. allgem. Chem.*, 1898, **17**, 100.
Gilman, Robinson, *J. Am. Chem. Soc.*, 1927, **49**, 2315.

Lead tetrapropyl

$Pb(C_3H_7)_4$

$C_{12}H_{28}Pb$ MW, 379

B.p. 126°/13 mm. D_4^{20} 1·4419. n_D^{20} 1·5094.

Grüttner, Krause, *Ber.*, 1916, **49**, 1421.

Lead tetra-*o*-tolyl

$Pb(C_6H_4{\cdot}CH_3)_4$

$C_{28}H_{28}Pb$ MW, 571

Cryst. from Me_2CO or EtOH. M.p. 201–2°.

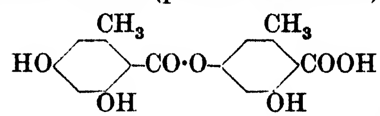
Austin, *J. Am. Chem. Soc.*, 1931, **53**, 1550.

Lead tetra-*p*-tolyl.

Needles from EtOH. M.p. 239–40°. D^{20} 1·4329. Sol. C_6H_6, $CHCl_3$, CS_2. H(+ Ni) under press. ⟶ 4 : 4′-dimethyldiphenyl.

Polis, *Ber.*, 1887, **20**, 721.

Lecanoric Acid (p-*Diorsellinic acid*)



$C_{16}H_{14}O_7$ MW, 318

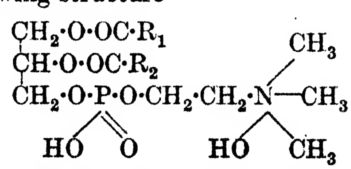
Occurs in numerous lichens. Prisms + H_2O from H_2O. M.p. 175°. Sol. Et_2O, Me_2CO, hot EtOH. Spar. sol. cold H_2O, hot C_6H_6. $FeCl_3$ ⟶ purple-red col. Reduces NH_3.$AgNO_3$. Hot KOH ⟶ orsellinic acid. Hot alcohols ⟶ orsellinic esters.

Me ether : *see* Evernic Acid.
Tri-Me ether : $C_{20}H_{22}O_7$. MW, 374. Needles or prisms from EtOH. M.p. 149·5–150°. Sol. hot EtOH, Me_2CO.
Me ester : $C_{17}H_{16}O_7$. MW, 332. Needles from EtOH. M.p. 146°. Sol. Et_2O, Me_2CO. Spar. sol. C_6H_6, cold EtOH. *Monoacetyl deriv.* : m.p. 167°. *Diacetyl deriv.* : m.p. 149–50°. *Triacetyl* : m.p. 157°.
Triacetyl : m.p. 197–8° decomp.

Asahina, Fuzikawa, *Ber.*, 1932, **65**, 983.
Koller, *Monatsh.*, 1932, **61**, 153.
Fischer, Fischer, *Ber.*, 1913, **46**, 1143.
Hesse, *J. prakt. Chem.*, 1911, **83**, 83, 87, 89, 95; 1898, **57**, 264; *Ann.*, 1866, **139**, 25.

Lecithin.

Generic name for a group of phosphatides of the following structure



Where $\cdot OC{\cdot}R_1$ and $\cdot OC{\cdot}R_2$ are fatty acid radicals, those so far detected including stearic, palmitic, oleic, linolic, linolenic and arachidonic. The lecithins are thus diglycerides in which the third $-CH_2 \cdot OH$ group is linked to the choline ester of phosphoric acid.

The lecithins are white waxy substances, rapidly turning yellow or brown on exposure to air: very hygroscopic, and form colloidal solutions very easily with H_2O: readily hyd. by acids, alkalis and enzymes: form cryst. addn. products with many inorganic salts, particularly $CdCl_2$. The lecithins from egg yolk and soya bean are the best known.

Levene, Rolf, *Physiological Reviews*, 1921, I, 327.
MacLean, MacLean, *Lecithin and Allied Substances* (1927).
Thierfelder, Klenk, *Die Chemie der Cerebroside und Phosphatide* (1930).

Ledol (*Ledum camphor*)

$C_{15}H_{26}O$ MW, 222

Occurs in leaves of *Ledum palustre*. Needles from pet. ether. M.p. 105°. B.p. 282–3°. Sublimes. Sol. EtOH, Et_2O. Spar. sol. H_2O. $[\alpha]_D$ 7·98° in EtOH. Dil. $HNO_3 \longrightarrow$ oxalic acid.

Hjelt, Collan, *Ber.*, 1882, **15**, 2501.
Rizza, *J. Chem. Soc. Abstracts*, 1888, **54**, 845.
Komppa, *Chem. Abstracts*, 1934, **28**, 4724
Hasenfratz, *Compt. rend.*, 1928, **187**, 903.

Leontamine

$C_{14}H_{26}N_2$ MW, 222

Isolated from *Leontica Eversmanii*. B.p. 118–19°/4 mm. D_4^{20} 0·9880. n_D 1·5113. $[\alpha]_D^{15}$ + 2·53°.

Platinichloride: m.p. 248° decomp.
Di-picrate: m.p. 194–5°.
Di-methiodide: m.p. 265–8°.

Orechow, Konowalowa, *Arch. Pharm.*, 1932, **270**, 329.

Leontidine.

Isolated from *Leontica Eversmanii*. Needles from pet. ether. M.p. 116–18°.

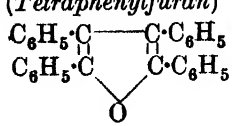
B,HCl: m.p. 293° decomp.
B_2,H_2PtCl_6: m.p. 258–9° decomp.

See above reference.

Lepargylic Acid.

Azelaic Acid, *q.v.*

Lepidene (*Tetraphenylfuran*)

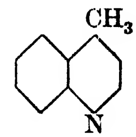


$C_{28}H_{20}O$ MW, 372

Needles and plates from EtOH–AcOH. M.p. 175°. B.p. 220°. Sol. Et_2O, C_6H_6, hot EtOH, AcOH. Insol. H_2O. Ox. $\longrightarrow$ α : β-dibenzoylstilbene.

Zinin, *J. prakt. Chem.*, 1867, **101**, 160.
Salkind, Teterin, *J. prakt. Chem.*, 1932, **133**, 195.

Lepidine (4-*Methylquinoline*, γ-*methylquinoline*)



$C_{10}H_9N$ MW, 143

B.p. 261–3° (133°/15 mm.). D^0 1·0995, D^{20} 1·0862. Sol. EtOH, Et_2O, C_6H_6, ligroin. Spar. sol. H_2O. Ox. $\longrightarrow$ cinchoninic acid. $KMnO_4 \longrightarrow$ methylpyridine-carboxylic acid and pyridine-2 : 3 : 4-tricarboxylic acid.

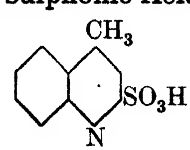
B_2,H_2PtCl_6: m.p. 226–30°.
$B,HAuCl_4$: decomp. at 188–90°.
B_2,H_2SO_4: needles. M.p. 228–9°.
Picrate: m.p. 210–11°.
Methiodide: prisms. M.p. 173–4°.
Ethiodide: prisms. M.p. 141–3°.
Me perchlorate: m.p. 153°.

König, Treichel, *J. prakt. Chem.*, 1921, **102**, 80.
Koenigs, Mengel, *Ber.*, 1904, **37**, 1328.
Knorr, *Ann.*, 1886, **236**, 94.
Weidel, *Monatsh.*, 1882, **3**, 75.
Chichibabin, D.R.P., 468,303, (*Chem. Abstracts*, 1929, **23**, 607).
Beyer, *J. prakt. Chem.*, 1886, **33**, 418.
Feo, *Bull. soc. chim.*, 1935, **2**, 94.

Lepidine-carboxylic Acid.

See 4-Methylquinoline-2-carboxylic Acid *and* 4-Methylquinoline-6-carboxylic Acid.

Lepidine-2-sulphonic Acid



$C_{10}H_9O_3NS$ MW, 223

Needles from conc. HCl. M.p. above 270°. Spar. sol. H_2O. Boiling $H_2O \longrightarrow$ 2-hydroxylepidine. Salts hyd. by boiling H_2O.

Besthorn, Geisselbrecht, *Ber.*, 1920, **53**, 1024.

Lepidone.

See 2-Hydroxy-4-methylquinoline.

Lepralin.

See Leprarin.

Lepranidin.
See Leprarin.

Lepraninin.
See Leprarin.

Lepranthin

$C_{25}H_{40}O_{10}$ MW, 500

Constituent of *Leprantha impolita*. Plates from C_6H_6–ligroin. M.p. 183°. $[\alpha]_D^{17}$ + 71°. Easily sol. EtOH, Et_2O, C_6H_6. Spar. sol. pet. ether.

Zopf, *Ann.*, 1904, **336**, 48.

Leprarin

$C_{19}H_{18}O_9$ MW, 390

Isolated from *Lepraria latebrarum*, Ach. Plates from EtOH, m.p. 155° : plates + $CHCl_3$ from $CHCl_3$–ligroin, m.p. 156°. Sol. AcOH, hot EtOH. Spar. sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Sol. acids and alkalis. Insol. H_2O. $[\alpha]_D^{17}$ + 13·4° in $CHCl_3$. $FeCl_3$ in EtOH ⟶ brownish-red col. CH_3OH + HCl ⟶ lepraninin, m.p. 135°. C_2H_5OH + HCl ⟶ lepranidin, m.p. 121–2°. C_3H_7OH + HCl ⟶ lepralin, m.p. 100°.

Zopf, *Ann.*, 1897, **295**, 290 ; 1900, **313**, 318.
Kassner, *Arch. Pharm.*, 1901, **239**, 44.

Leptospermol

$C_{14}H_{20}O_4$ MW, 252

Oil from "Leptospermum." B.p. 275–8°, 145–6°/10 mm. D_4^t 1·073. n_D^{20} 1·500. $FeCl_3$ ⟶ orange-red col. Cu salts ⟶ blue col.

Penfold, *Chem. Abstracts*, 1922, **16**, 139.

Lettocine

$C_{17}H_{25}O_2N$ MW, 275

Alkaloid of *Holarrhena Antidysenterica*. Light brown cryst. powder from $CHCl_3$-pet. ether. M.p. 350–2°. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O, pet. ether.

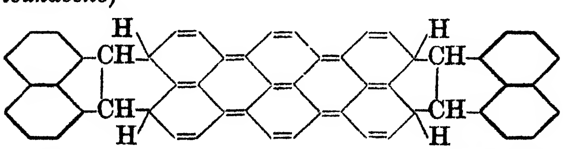
B,HI : yellowish-brown cryst. powder from EtOH.Aq. M.p. 256° decomp.

Picrate : cryst. from hot EtOH. M.p. 198°.

Methiodide : cryst. from MeOH. M.p. 235°.

Peacock, Chowdhury, *J. Chem. Soc.*, 1935, 734.

Leucacene (peri-*Diacenaphthylenerhodacene, leukacene*)

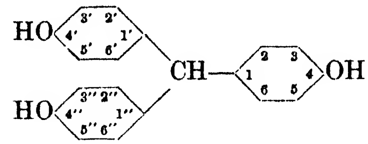


$C_{54}H_{32}$ MW, 680

Colourless plates or needles. M.p. 250°. Turns pink in air. Heat to 175° ⟶ acenaphthylene + rhodacene. CrO_3 ⟶ naphthoic acid.

Dziewoński, *Ber.*, 1920, **53**, 2173.

Leucaurine (4 : 4′ : 4″-*Trihydroxytriphenylmethane*)



$C_{19}H_{16}O_3$ MW, 292

Prisms from AcOH. Very sol. EtOH, AcOH. Spar. sol. H_2O. Alk. sol. oxidises rapidly in air.

Triacetyl : needles. M.p. 138–9°. Sol. hot EtOH, Et_2O.

Tri-Me ether : $C_{22}H_{22}O_3$. MW, 334. Needles from EtOH. M.p. 45–7°. Spar. sol. EtOH, Et_2O, ligroin.

Baeyer, Villiger, *Ber.*, 1902, **35**, 1197.
Kauffmann, Pannwitz, *Ber.*, 1912, **45**, 771.
Dale, Schorlemmer, *Ann.*, 1873, **166**, 286.
Hevzig, Smoluchowski, *Monatsh.*, 1894, **15**, 80.

Leucine (1-*Aminoisocaproic acid*, 1-*aminoisobutylacetic acid*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$

$C_6H_{13}O_2N$ MW, 131

d-.

Plates from EtOH. M.p. 293° (sealed tube). Sol. 48 parts H_2O at 20°. $[\alpha]_D^{20}$ + 10·34° in H_2O, $[\alpha]_D^{20}$ − 15·6° in 20% HCl.

N-*Formyl* : cryst. M.p. 141–4°. $[\alpha]_D^{20}$ + 19·2° in EtOH.

N-*Benzoyl* : cryst. + ½H_2O from Et_2O–ligroin. M.p. 60°, anhyd. 105–7°. $[\alpha]_D^{20}$ − 6·39° in KOH. Sol. 120 parts boiling H_2O.

Fischer, Warburg, *Ber.*, 1905, **38**, 3997.
Fischer, *Ber.*, 1900, **33**, 2370.
Ehrlich, *Biochem. Z.*, 1906, **1**, 25.
Schultze, Likiernik, *Z. physiol. Chem.*, 1893, **17**, 518.

l-.

Obtained by hyd. of most proteins. Plates from EtOH.Aq. M.p. 293–5° decomp. $[\alpha]_D^{20}$ − 10·42° in H_2O, $[\alpha]_D^{15}$ + 17·3° in 20% HCl. Sol. 46 parts H_2O at 18°.

Me ester : $C_7H_{15}O_2N$. MW, 145. B.p. 79–79·5°/12 mm. $[\alpha]_D^{17}$ + 16·52°. D^{17} 0·9533. *Hydrochloride* : α-form, m.p. 118° : β-form, m.p. 148°.

Et ester: $C_8H_{17}O_2N$. MW, 159. B.p. 196°/761 mm., 88°/18 mm., 83·5°/12 mm. $[\alpha]_D^{20}$ + 13·1°. *Hydrochloride*: prisms from AcOEt–ligroin. M.p. 134°. $[\alpha]_D$ + 18·4°.

N-*Formyl*: needles. $[\alpha]_D^{20}$ − 18·4° in EtOH.

N-*Acetyl*: m.p. 181°. $[\alpha]_D^{29}$ − 16·99°.

N-*Benzoyl*: cryst. M.p. 60° (hydrated), 105–7° (anhyd.).

Fischer, *Ber.*, 1900, **33**, 2377; 1901, **34**, 445.
Abderhalden, Spinner, *Z. physiol. Chem.*, 1919, **107**, 1.
Ehrlich, Wendel, *Biochem. Z.*, 1908, **8**, 399.
Fischer, Warburg, *Ber.*, 1905, **38**, 4002.
Cherbuliez, Plattner, Ariel, *Helv. Chim. Acta*, 1930, **13**, 1390.

dl-.

Plates from H_2O. M.p. 293–5° (sealed tube). Sol. 106 parts H_2O at 15°. Very spar. sol. EtOH.

Et ester: b.p. 196°/761 mm., 88°/18 mm., 83·5°/12 mm. Misc. with EtOH, Et_2O, C_6H_6, ligroin. N-*Acetyl*: b.p. 114°/2 mm., 101–3°/1 mm. N-*Benzoyl*: m.p. 79°.

p-*Nitrobenzyl ester*: m.p. 184–5°.

Amide: $C_6H_{14}ON_2$. MW, 130. Prisms from C_6H_6. M.p. 106–7°. Very sol. EtOH, Me_2CO. Sol. H_2O. Spar. sol. C_6H_6. N-*Benzoyl*: plates from ligroin. M.p. 171°.

N-*Benzoyl*: needles or plates. M.p. 137–41°. Sol. EtOH, Et_2O, $CHCl_3$, AcOH. Spar. sol. C_6H_6. Insol. ligroin. *Me ester*: cryst. from ligroin. M.p. 95–6°.

Abderhalden, Wybert, *Ber.*, 1916, **49**, 2455.
Bergell, Wülfing, *Z. physiol. Chem.*, 1910, **64**, 361.
Fischer, *Ber.*, 1900, **33**, 2373; 1901, **34**, 444; 1905, **38**, 615.
Koenigs, Mylo, *Ber.*, 1908, **41**, 4438.
Max, *Ann.*, 1909, **369**, 280.
Bouveault, Locquin, *Bull. soc. chim.*, 1906, **35**, 968 (*Footnote*).

Leucine-choline

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH(N(CH_3)_3{\cdot}OH){\cdot}CH_2OH$

$C_9H_{23}O_2N$ MW, 177

Hygroscopic solid.

Iodide: needles from EtOH. M.p. 141–2°. Very sol. H_2O. Sol. EtOH.

Chloride: needles from EtOH–Et_2O. M.p. 173°.

Picrate: cryst. from H_2O. M.p. 136°.

Aurichloride double salt: m.p. 98–100°.

Platinichloride double salt: m.p. 211–13°.

Karrer *et al.*, *Helv. Chim. Acta*, 1922, **5**, 469.

Leucinic Acid.
See 1-Hydroxyisocaproïc Acid.

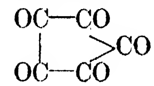
Leucinol.
2-Amino-4-methyl-*n*-amyl Alcohol, *q.v.*

Leuco-indigo.
See Indigo White.

Leucoisonaphthazarin.
See 1 : 2 : 3 : 4-Tetrahydroxynaphthalene.

Leuconaphthazarin.
See 1 : 4 : 5 : 8-Tetrahydroxynaphthalene.

Leuconic Acid (*Pentaketopentamethylene, pentaketocyclopentane, cyclopentane-pentone*)



C_5O_5 MW, 140

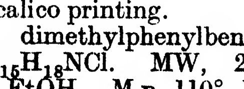
Cryst. from HNO_3 (sp. gr. 1·36). Sol. H_2O. Spar. sol. EtOH. Prac. insol. Et_2O. Sweet taste.

Tetra-oximine: cryst. from H_2O. Explodes about 160°.

Penta-oxime: yellow cryst. Decomp. at 172°. Insol. most org. solvents. Sol. NaOH. *Tetra-acetyl*: needles from C_6H_6. Decomp. about 50°. Spar. sol. $CHCl_3$, C_6H_6.

Nietzki, Benckiser, *Ber.*, 1886, **19**, 293.
Nietzki, Rosemann, *Ber.*, 1889, **22**, 918.
Homolka, *Ber.*, 1922, **55**, 1310.
Contardi, *Gazz. Chim. ital.*, 1921, **51**, 109.

Leucotrope (*Dimethylphenylbenzylammonium hydroxide*)



$C_{15}H_{19}ON$ MW, 229

Strongly alkaline syrup. Dist. ⟶ dimethylaniline + benzyl alcohol. NaHg ⟶ dimethylaniline + toluene. Used as benzylating agent. Leucotrope and its sulphonic derivatives are employed in calico printing.

Chloride: dimethylphenylbenzylammonium chloride. $C_{15}H_{18}NCl$. MW, 247·5. Plates from H_2O or EtOH. M.p. 110°, 113–16° (116°) anhyd. Very sol. H_2O, EtOH. Insol. Et_2O.

Bromide: dimethylphenylbenzylammonium bromide. $C_{15}H_{18}NBr$. MW, 292. Plates from H_2O or $CHCl_3$–Me_2CO. Decomp. at 107–8°.

Iodide: dimethylphenylbenzylammonium iodide. $C_{15}H_{18}NI$. MW, 339. Prisms from

H_2O or 50% EtOH. M.p. 164°. Sublimes undecomp. in vacuo. Sol. $CHCl_3$, Me_2CO_3, hot EtOH.

Chlorate: cryst. hygroscopic mass. M.p. 137° decomp.

Michler, Gradmann, *Ber.*, 1877, **10**, 2078.
Wedekind, Paschke, *Ber.*, 1910, **43**, 1306.
Wedekind, *Ber.*, 1906, **39**, 484.
Emde, *Arch. Pharm.*, 1911, **249**, 108.

Leucylalanine

$$(CH_3)_2CH{\cdot}CH_2{\cdot}\underset{}{\overset{NH_2}{CH}}{\cdot}CO{\cdot}NH{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_9H_{18}O_3N_2$ MW, 202

l-*Leucyl*-d-*alanine*.

Plates from EtOH. M.p. about 257°. Very sol. H_2O. Sol. MeOH. Spar. sol. EtOH. $[\alpha]_D^{20}$ + 22·9° (+ 19·84°).

Inactive leucylalanine.

Plates from H_2O. M.p. 248° ⟶ anhydride. Sol. 60 parts H_2O at ord. temp. Insol. EtOH, Et_2O, C_6H_6.

Fischer, Warburg, *Ann.*, 1905, **340**, 160.

Leucyl-β-asparagine

$$(CH_3)_2CH{\cdot}CH_2{\cdot}\overset{NH_2}{CH}{\cdot}CO{\cdot}NH{\cdot}\overset{CH_2\cdot CONH_2}{CH}{\cdot}COOH$$

$C_{10}H_{19}O_4N_3$ MW, 245

d-*Leucyl*-l-*asparagine*.

Cryst. from H_2O. M.p. 230° decomp. Very spar. sol. EtOH. $[\alpha]_D^{20}$ − 53·8 in H_2O.

l-*Leucyl*-l-*asparagine*.

Cryst. from H_2O: needles from EtOH.Aq. M.p. 228°. $[\alpha]_D^{20}$ + 17·8° in H_2O.

Fischer, Koenigs, *Ber.*, 1904, **37**, 4591; 1907, **40**, 2051.

***l*-Leucyl-*d*-glutamic Acid**

$$(CH_3)_2CH{\cdot}CH_2{\cdot}\overset{NH_2}{CH}{\cdot}CO{\cdot}NH{\cdot}\underset{\underset{CH_2\cdot COOH}{CH_2}}{CH}{\cdot}COOH$$

$C_{11}H_{20}O_5N_2$ MW, 260

Needles from H_2O. M.p. 232° decomp. Sol. H_2O, dil. HCl. Spar. sol. EtOH. $[\alpha]_D^{20}$ + 10·5° in *N*/HCl. Hyd. by pancreatic juices.

Anhydride: $C_{11}H_{18}O_4N_2$. MW, 242. Needles from MeOH. M.p. 200° decomp.

Amide: *l*-leucyl-*d*-glutamine. $C_{11}H_{21}O_4N_3$. MW, 259. Needles from EtOH.Aq. M.p. 235–6°. $[\alpha]_D^{18}$ + 12·6° in dil. HCl. Sol. H_2O, dil. acids, dil. alkalis. Insol. EtOH. Hyd. by HCl.

Fischer, *Ber.*, 1907, **40**, 3559, 3711.

Thierfelder. v. Cramm., *Z. physiol. Chem.*, 1919, **105**, 79.
Abderhalden, *Z. physiol. Chem.*, 1926, **154**, 18.

Leucylglutamine.

See under Leucylglutamic Acid.

Leucylglycine

$$(CH_3)_2CH{\cdot}CH_2{\cdot}\overset{NH_2}{CH}{\cdot}CO{\cdot}NH{\cdot}CH_2{\cdot}COOH$$

$C_8H_{16}O_3N_2$ MW, 188

l-.

Needles from EtOH.Aq. M.p. 248° after darkening at 235°. $[\alpha]_D^{20}$ + 81·5° in H_2O.

dl-.

Cryst. from H_2O. M.p. 243° (rapid heat.). Sol. 15 parts H_2O. Insol. most org. solvents.

Me ester: $C_9H_{18}O_3N_2$. MW, 202. *Hydrochloride*: m.p. 133°.

Fischer, *Ber.*, 1906, **39**, 2911.
Fischer, Brunner, *Ann.*, 1905, **340**, 144.
Schönheimer, *Z. physiol. Chem.*, 1926, **154**, 203.
Aberhalden, Kröner, *Z. physiol. Chem.*, 1928, **178**, 282.

Leucyl-leucine

$$(CH_3)_2CH{\cdot}CH_2{\cdot}\underset{NH\cdot CO\cdot \underset{NH_2}{CH}\cdot CH_2\cdot CH(CH_3)_2}{CH}{\cdot}COOH$$

$C_{12}H_{24}O_3O_2$ MW, 244

l-*Leucyl*-l-*leucine*.

Plates from H_2O or hot EtOH. M.p. 270°. $[\alpha]_D^{20}$ − 13·36° in NaOH.

Inactive leucyl-leucine A.

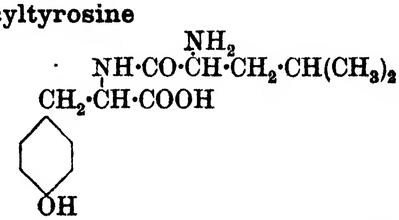
Needles + $1\frac{1}{2}H_2O$ from H_2O. M.p. 270° after sintering at 260°. Sol. 30 parts boiling H_2O. Sol. MeOH. Spar. sol. EtOH. Insol. Et_2O.

Inactive leucyl-leucine B.

Plates from EtOH. M.p. 267–8° decomp. Sol. 50 parts boiling H_2O.

Fischer, Koelker, *Ann.*, 1907, **354**, 40.
Fischer, *Ber.*, 1906, **39**, 2918.
Fischer, Aberhalden, *Z. physiol. Chem.*, 1907, **51**, 267.

Leucyltyrosine



$C_{15}H_{22}O_4N_2$ MW, 294

l-*Leucyl*-l-*tyrosine.*

Cryst. + $2H_2O$. M.p. 275–7°. $[\alpha]_D^{20}$ + 11·3°. Sol. H_2O. Spar. sol. EtOH.

d-*Leucyl*-l-*tyrosine.*

Powder + $2H_2O$ from Et_2O–EtOH. M.p. 250–60° decomp. $[\alpha]_D^{20}$ − 16°.

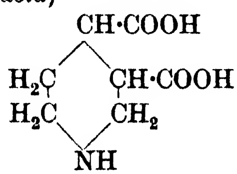
Abderhalden, Bahn, *Chem. Zentr.*, 1930, II, 2271.

For Leucyl *o*- and *m*-tyrosines *see* Abderhalden, Schairer, *Chem. Zentr.*, 1931, I, 2210.

Leukacene.

See Leucacene.

Leuponic Acid (*Loiponic acid, hexahydrocinchomeronic acid*)



$C_7H_{11}O_4N$ MW, 173

Unstable form of hexahydrocinchomeronic acid (*q.v.*), into which it is converted by KOH. Prisms from H_2O. M.p. 254–60° decomp. Sol. 20 parts boiling H_2O. Very spar. sol. EtOH. Slightly dextrorotatory in HCl.

B,HCl: prisms. M.p. 216–20°. Spar. sol. H_2O.

B,HAuCl$_4$: plates. M.p. 201–2°.

Acetyl: cryst. M.p. 204°. *Anhydride*: cryst. M.p. 161–3°.

Skraup, *Monat.*, 1896, **17**, 380.

Koenigs, *Ber.*, 1897, **30**, 1326.

Levulinic Acid (*Lævulinic acid, lævulic acid, 2-acetopropionic acid, 3-keto*-n-*valeric acid*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_5H_8O_3$ MW, 116

Cryst. M.p. 33–5°. B.p. 245–6°, 143–7°/14 mm., 137–9°/10 mm. Very sol. H_2O, EtOH, Et_2O. D_4^{15} 1·1447, D_4^{25} 1·1351, D_4^{50} 1·1140, D_4^{75} 1·0924. $n_D^{15·8}$ 1·442. $k = 2{\cdot}4 \times 10^{-5}$ at 25°.

Oxime: plates from H_2O. M.p. 95–6°. Very sol. H_2O, EtOH, Et_2O. $k = 2{\cdot}303 \times 10^{-5}$ at 25°. *Acetyl*: cryst. M.p. 75°.

Phenylsemicarbazone: needles from EtOH. M.p. 185–6°.

p-*Tolylsemicarbazone*: needles from H_2O or $CHCl_3$. M.p. 179–80°.

p-*Nitrophenylhydrazone*: needles from EtOH. M.p. 174–5°.

2 : 4-*Dinitrophenylhydrazone*: yellow cryst. from $CHCl_3$. M.p. 206·5°.

2-*Naphthylhydrazone*: yellowish-orange plates from C_6H_6. M.p. 143–4°. *Picrate*: yellowish-orange needles. M.p. 176° decomp.

3-*Nitrobenzoylhydrazone*: orange-yellow cryst. from H_2O. M.p. 185–6°.

o-*Chlorobenzoylhydrazone*: needles from EtOH. M.p. 215°.

p-*Chlorobenzoylhydrazone*: plates from H_2O. M.p. 135–7°.

Me ester: $C_6H_{10}O_3$. MW, 130. B.p. 196°. D_4^{20} 1·04745. n_D^{20} 1·42333. *Semicarbazone*: cryst. M.p. 142–3°. *Phenylhydrazone*: cryst. from EtOH. M.p. 105–6°. 2 : 4-*Dinitrophenylhydrazone*: cryst. from EtOH. M.p. 141·2°.

Et ester: $C_7H_{12}O_3$. MW, 144. B.p. 205·8°. D_4^{20} 1·01114. n_D^{20} 1·42288. *Semicarbazone*: m.p. 147–8°. *Phenylhydrazone*: cryst. M.p. 103–4°. 2 : 4-*Dinitrophenylhydrazone*: cryst. from EtOH. M.p. 101°. 2-*Naphthylhydrazone*: yellowish-orange prisms from EtOH.Aq. M.p. 138–9°. 3-*Nitrobenzoylhydrazone*: needles from EtOH.Aq. M.p. 136°. p-*Chlorobenzoylhydrazone*: plates from EtOH.Aq. M.p. 106–8°.

Propyl ester: $C_8H_{12}O_3$. MW, 158. B.p. 221·2°. D_4^{20} 0·98955. n_D^{20} 1·42576. *Semicarbazone*: cryst. M.p. 129–30°. *Phenylhydrazone*: cryst. M.p. 88–90°. 2 : 4-*Dinitrophenylhydrazone*: cryst. M.p. 63°.

Isopropyl ester: b.p. 209·3°. D_4^{20} 0·98724. n_D^{20} 1·42088. *Semicarbazone*: cryst. M.p. 141–2°. *Phenylhydrazone*: cryst. M.p. 108–9°. 2 : 4-*Dinitrophenylhydrazone*: cryst. M.p. 90·9°.

Butyl ester: $C_9H_{16}O_3$. MW, 172. B.p. 237·8°. D_4^{20} 0·97353. n_D^{20} 1·42095. *Semicarbazone*: cryst. M.p. 102–3°. *Phenylhydrazone*: cryst. M.p. 78–81°. 2 : 4-*Dinitrophenylhydrazone*: cryst. M.p. 65·8°.

sec.-n-*Butyl ester*: b.p. 225·8°. D_4^{20} 0·9669. n_D^{20} 1·42499.

Isobutyl ester: b.p. 230·9°. D_4^{20} 0·9677. n_D^{20} 1·4267. *Semicarbazone*: m.p. 112–13°. *Phenylhydrazone*: m.p. 84·6°. 2 : 4-*Dinitrophenylhydrazone*: m.p. 55·6°.

n-*Amyl ester*: $C_{10}H_{18}O_3$. MW, 186. B.p. 253·4°. D_4^{20} 0·96136. n_D^{20} 1·43192. 2 : 4-*Dinitrophenylhydrazone*: m.p. 84·2°.

Isoamyl ester: b.p. 248·8°. D_4^{20} 0·96029. n_D^{20} 1·43102. *Semicarbazone*: m.p. 91–2°. *Phenylhydrazone*: m.p. 70–2°. 2 : 4-*Dinitrophenylhydrazone*: m.p. 50·5°.

n-*Hexyl ester*: $C_{11}H_{20}O_3$. MW, 200. B.p. 266·8°. D_4^{20} 0·95332. n_D^{20} 1·4343. 2 : 4-*Dinitrophenylhydrazone*: m.p. 56·6°.

n-*Heptyl ester*: $C_{12}H_{22}O_3$. MW, 214. B.p. 283·5°. n_D^{20} 1·4360. D_4^{20} 0·94332. 2 : 4-*Dinitrophenylhydrazone*: m.p. 79·0°.

Allyl ester: $C_8H_{12}O_3$. MW, 142. B.p. 219–22° decomp., 133–6°/40 mm. D_4^{20} 1·0277. n_D^{20} 1·4413. *Semicarbazone*: cryst. from EtOH. M.p. 126–7°. *Phenylhydrazone*: cryst. from C_6H_6. M.p. 79–80°.

p-*Nitrobenzyl ester*: cryst. M.p. 60·5–61°. Sol. 162 parts cold EtOH, 32 parts boiling EtOH.

p-*Bromophenacyl ester*: cryst. M.p. 84·0°.

Anilide: m.p. 101–2°. *Anil*: cryst. from Me_2CO. M.p. 145°.

1-*Naphthalide*: cryst. from anisole. M.p. 105–6°.

2-*Naphthalide*: cryst. from C_6H_6. M.p. 107–8°.

Sah *et al.*, *Chem. Abstracts*, 1935, **29**, 465.
Cowley, Schuette, *J. Am. Chem. Soc.*, 1933, **55**, 3463 (*Bibl.*).
Lukeš, Prelog, *Chem. Abstracts*, 1930, **24**, 4762.
McKenzie, *Organic Syntheses*, Collective Vol. I, 328.

Levulinic Alcohol.

See 3-Acetopropyl Alcohol.

Levulinic Aldehyde (2-*Acetopropionaldehyde*, 3-*ketovaleraldehyde*, 1-*pentanalone*-4, 2-*pentanonal*-5)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}CHO$$

$C_5H_8O_2$ MW, 100

Oil. B.p. 186–8° slight decomp., 70°/12 mm., 66°/8·5 mm. n_D^{21} 1·42567. Misc. in all proportions with H_2O, EtOH, Et_2O. Volatile in steam. Reduces Fehling's and $NH_3.AgNO_3$.

Dioxime: prisms from Et_2O. M.p. 73–4°.

Di-semicarbazone: cryst. from MeOH. M.p. 180–2°.

Di-p-*nitrophenylhydrazone*: m.p. 284–5°.

Di-Me acetal: $C_7H_{14}O_3$. MW, 146. Oil. B.p. 87–8°/17 mm., 79–80°/13 mm. D_{18}^{18} 0·9684. Misc. with EtOH, Et_2O in all proportions. Sol. 6 parts H_2O. Reduces Fehling's on boiling.

Di-Et acetal: $C_9H_{18}O_3$. MW, 174. Oil. B.p. 92–3°/11–12 mm.

Harries, Turk, *Ann.*, 1910, **374**, 345.
Fischer, Düll, Ertel, *Ber.*, 1932, **65**, 1470.

Levulose.

See Fructose.

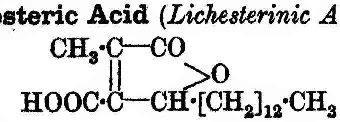
Lewisite.

See 2-Chlorovinyldichloroarsine.

Licareol.

See Linalool.

Lichesteric Acid (*Lichesterinic Acid*)



$C_{19}H_{32}O_4$ MW, 324

l-.

Isolated from Iceland Moss and other lichens. M.p. 124·5–125° (121–2°). $[\alpha]_D^{25}$ − 32·66°. Sol. AcOH, $CHCl_3$, CS_2, C_6H_6. Mod. sol. pet. ether. Insol. H_2O. KOH.Aq. ⟶ lichesterylic acid + CO_2. $KMnO_4$ ⟶ myristic acid.

NH_4 salt: m.p. 106°.

Me ester: $C_{20}H_{34}O_4$. MW, 338. Prisms. M.p. 53·4°. $[\alpha]_D^{14}$ − 28·07° in $CHCl_3$.

Asano, Kanematsu, *Ber.*, 1932, **65**, 1175.
Böhme, *Arch. Pharm.*, 1903, **241**, 1.
Sinnbold, *Arch. Pharm.*, 1898, **236**, 504.

Lichesterinic Acid.

See Lichesteric Acid.

Lichesterylic Acid (2-*Myristylisobutyric acid*, 3-*keto*-1-*methylheptadecylic acid*)

$$CH_3{\cdot}[CH_2]_{12}{\cdot}CO{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_{18}H_{34}O_3$ MW, 298

M.p. 83–4°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. H_2O.

Semicarbazone: m.p. 126°.

Asano, Kanematsu, *Journal of the Pharmaceutical Society, Japan*, 1931, **51**, 390.
Asano, Ohta, *ibid.*, 395.
Sinnhold, *Arch. Pharm.*, 1898, **236**, 515.

Lignocerane

$C_{24}H_{50}$ MW, 338

Plates from Et_2O. M.p. 51–51·5°. B.p. 222–5°/9 mm. Probably identical with *n*-tetracosane.

Levene, West, *J. Biol. Chem.*, 1913, **14**, 265; 1914, **18**, 480.

Lignoceryl Alcohol

$C_{24}H_{50}O$ MW, 354

Cryst. from EtOH or Me_2CO. M.p. 76°. CrO_3 ⟶ lignoceric acid. Probably identical with *n*-tetracosanol.

Acetyl: m.p. 56°.

Sandqvist, Gorton, Bengtsson, *Ber.*, 1931, **64**, 2172.

Lignoceric Acid

$C_{24}H_{48}O_2$ MW, 368

M.p. 83·5° (80–1°). Sol. EtOH. As obtained from beechwood tar is practically pure *n*-tetracosanic acid. As obtained from pea-nut oil is a mixture of near homologues.

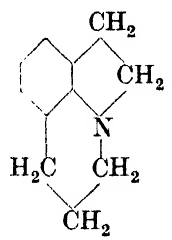
Me ester: $C_{25}H_{50}O_2$. MW, 382. Plates. M.p. 56·5–57° (57–8°, 58–59·8°).

Et ester: $C_{26}H_{52}O_2$. MW, 396. M.p. 56°. B.p. 305–10°/15–20 mm.

Chloride: $C_{24}H_{47}OCl$. MW, 386·5. Yellow plates from Et_2O. M.p. 48–50°.
Phenacyl ester: m.p. 87–8°.
p-*Chlorophenacyl ester*: m.p. 99–100°.
p-*Bromophenacyl ester*: m.p. 90–1°.
Cholesteryl ester: m.p. 87°. $[\alpha]_D^{20}$ − 18·7°.
2-*Methyl-5-isopropylanilide*: m.p. 84–5°.

Francis, Piper, Malkin, *Proc. Roy. Soc.*, 1930, **128A**, 242.
Hell, Hermanns, *Ber.*, 1880, **13**, 1713.
Kreiling, *Ber.*, 1888, **21**, 880.
Holde, Godbole, *Ber.*, 1926, **59**, 36.

Lilolidine



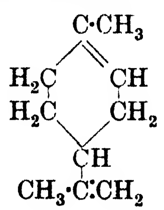
$C_{11}H_{13}N$ MW, 159

B.p. 156°/15 mm. Turns red on standing.
Picrate: cryst. from EtOH. M.p. 138°.

v. Braun, Heider, Wyczatkowska, *Ber.*, 1918, **51**, 1219.

Limene.
Bisabolene, *q.v.*
Limettin.
See Citropten, Addendum, Vol. I.

Limonene (1-*Methyl*-4-*isopropenyl*-Δ^1-*cyclohexene*, $\Delta^{1,8(9)}$-p-*menthadiene*)



$C_{10}H_{16}$ MW, 136

dl-. Dipentene, cinene.
Found in *Oleum cinæ* and pine needle oil. Formed during the distillation of rubber by polymerisation of isoprene. B.p. 178°/760 mm. (177·6°/760 mm.). $D_4^{20·84}$ 0·8402. $n_D^{19·6}$ 1·4727. Min. acids ⟶ terpinene and *p*-cymene. Dil. H_2SO_4 + AcOH ⟶ acetyl-α-terpineol. H (+ Ni or Pt) at 180° ⟶ *p*-menthane. H (+ Cu or Pt) at 180° ⟶ Δ^1-*p*-menthene. S ⟶ *p*-cymene. Hot metal filaments ⟶ isoprene. Ox. (moist air) ⟶ *dl*-carveol + *dl*-carvone. $KMnO_4$ ⟶ 1 : 2 : 8 : 9-tetrahydroxy-*p*-menthane + lactone of hydroxyterpenylic acid + terebic acid. HCl (dry) ⟶ limonene hydrochloride. HCl (moist) ⟶ limonene dihydrochloride. HBr ⟶ limonene dihydrobromide. Br ⟶ limonene tetrabromide. NOCl ⟶ limonene α- and β-nitrosochlorides. N_2O_4 ⟶ limonene nitrosate. Perbenzoic acid or peracetic acid ⟶ limonene monoxide + dioxide.
Hydrochloride: b.p. 110°/20 mm. D^0 0·9927.
Dihydrochloride: *trans*-form. M.p. 50–1°. B.p. 110–12°/10 mm. *Cis*-form. M.p. about 25°.
Dihydrobromide: *trans*-form. M.p. 64°. *Cis*-form. M.p. 38°.
Dihydriodide: *trans*-form. M.p. 81° (78–9°).
Tetrabromide: m.p. 125–6°.
Nitrosochloride: m.p. 78°. Solidifies on further heating and melts again at 104°.
Nitrosate: m.p. 84°.
Nitrolaniline: *α-form*, m.p. 126°. β-*Form*, m.p. 149°.
Nitrolpiperidine: *α-form*, m.p. 154°. β-*Form*, m.p. 152°.

d-. Carvene, citrene, hesperidene.
Chief constituent of oil of orange rind, dill oil, and oil of cumin, neroli, bergamot, carraway, and lemon. B.p. 178°/760 mm. (176–176·4°). D_4^0 0·8584, D_4^4 0·8576, D_4^{20} 0·8411, D_{25}^{25} 0·8437. n_D^{21} 1·47428. $[\alpha]_D^{20}$ + 126·84°.
Hydrochloride: b.p. 97–8°/11–12 mm. $D^{17·8}$ 0·973. $[\alpha]_D$ + 39·5°.
Tetrabromide: cryst. from AcOEt. M.p. 104–5°. $[\alpha]_D$ + 73–4° in $CHCl_3$.
Diozonide: m.p. 60–5°. $[\alpha]_D^{18}$ − 9·32° in $CHCl_3$.
Nitrosochloride: *α-form*, m.p. 103–4°. $[\alpha]_D^{9·8}$ + 313·4°. β-*Form*, m.p. 105–6°. $[\alpha]_D^{10·5}$ + 240·3°.
Nitrolaniline: *α-form*, m.p. 113°. β-*Form*, m.p. 153°.
Nitrolpiperidine: *α-form*, m.p. 93–4°. $[\alpha]_D$ + 67·5°. β-*Form*, m.p. 110–11°. $[\alpha]_D$ + 60·48°.

l-.
Found in pine needle oil. B.p. 177·6–177·8°/760 mm. (176–176·4°). D_4^{20} 0·8422. n_D^{21} 1·47468. $[\alpha]_D^{20}$ − 122·6°.
Hydrochloride: b.p. 97–8°/11–12 mm. D^{16} 0·982. $[\alpha]_D$ − 40·0°.
Tetrabromide: cryst. from AcOEt. M.p. 104–5°. $[\alpha]_D$ − 73–4° in $CHCl_3$.
Nitrosochloride: *α-form*, m.p. 103–4°. $[\alpha]_D$ − 314·8°. β-*Form*, m.p. 105–6°. $[\alpha]_D$ − 242·2°.
Nitrolaniline: *α-form*, m.p. 113°. β-*Form*, m.p. 153°.

Nitrolpiperidine: α-*form*, m.p. 93–4°. $[\alpha]_D$ − 67·6°. β-*Form*, m.p. 110–11°. $[\alpha]_D$ − 60·18°.

v. Braun, Lemke, *Ber.*, 1923, **56**, 1562.
Ginsberg, *Chem. Zentr.*, 1897, II, 417.
Godlewski, Roshanowitsch, *Chem. Zentr.*, 1889, I, 1241.
Wagner, *Ber.*, 1894, **27**, 1653, 2270.
Tiemann, Semmler, *Ber.*, 1895, **28**, 2145.
Semmler, *Ber.*, 1900, **33**, 1457.
Perkin, *J. Chem. Soc.*, 1904, **85**, 654.
Wallach, *Ber.*, 1907, **40**, 600.
Audrain, *Bulletin de l'institut du pin*, 1927, 33, 55, 91, 183 (*Bibl.*).

Linalol.
See Linalool.

Linalool (*Linalol*, 2 : 6-*dimethyl*-2 : 7-*octadienol*-6 or 2 : 6-*dimethyl*-1 : 7-*octadienol*-6)

$$(CH_3)_2{>}C{:}CH{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH{:}CH_2$$

or

$$CH_2{=}(CH_3){>}C{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH{:}CH_2$$

$C_{10}H_{18}O$ MW, 154

dl-.

B.p. 197–9°, 89–91°/15 mm. D^{15} 0·870. n_D 1·4627. Formed in isomerisation of geraniol by action of heat. CrO_3 ⟶ citral + methylheptenone. $KMnO_4$ ⟶ acetone + levulinic acid. Org. acids ⟶ geraniol. PCl_3, or HCl in toluene at 100° ⟶ geranyl chloride. Na + EtOH ⟶ dihydromyrcene. H (+ Pt or Pd) ⟶ dihydro- + tetrahydro-linalool. Dil. H_2SO_4 or Ac_2O ⟶ geraniol, nerol, α-terpineol, and terpin hydrate. H·COOH ⟶ dipentene + terpinene. S ⟶ *p*-cymene, dipentene, etc. Perbenzoic acid ⟶ linalool monoxide + dioxide. $NaHSO_3$ ⟶ $C_{10}H_{18}O,2NaHSO_3$.
Phenylurethane: m.p. 63–5°.

d-. Coriandrol.

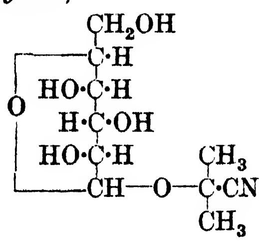
Occurs in oil of linaloe and coriander oil. B.p. 198–200°/760 mm. (194–8°), 85–90°/20 mm. D^{20} 0·8679. n_D^{20} 1·4652. $[\alpha]_D^{20}$ + 19·18°.

l-. Licareol.

Occurs in oil of linaloe, rose, bergamot, neroli, lavender, sage, and thyme. B.p. 197–200°/756 mm., 86–7°/14 mm. D^{20} 0·8622. n_D^{22} 1·4604. $[\alpha]_D$ − 19·37° (− 20·7°).
Me ether: $C_{11}H_{20}O$. MW, 168. B.p. 189–92°.
Et ether: $C_{12}H_{22}O$. MW, 182. B.p. 192°.
Allyl ether: $C_{13}H_{22}O$. MW, 194. B.p. 103–5°/15 mm. D_4^0 0·8722, D_4^{16} 0·8665.
Formyl: b.p. 100–3°/10–11 mm.
Acetyl: b.p. about 200°/762 mm., 115–16°/25 mm., 102–5°/13 mm., 96·5–97°/10 mm. D^{15} 0·913 (0·906–7), D^{20} 0·8951. n_D^{20} 1·450–1. $[\alpha]_D^{20}$ − 6·35° (− 7·7° to − 8·3°).
Propionyl: b.p. 115°/10–11 mm. (115–19°/16 mm.).
Butyryl: D^{15} 0·897. n_D^{20} 1·4518. $[\alpha]_D^{20}$ − 10·02°.
Isobutyryl: D^{15} 0·8926. n_D^{20} 1·4487. $[\alpha]_D^{20}$ − 11·89°.

Ruzicka, Fornasir, *Helv. Chim. Acta*, 1919, **2**, 182.
Tiemann, *Ber.*, 1898, **31**, 832.
Stephan, *J. prakt. Chem.*, 1899, **60**, 252.
Bertram, D.R.P., 80,711.
Verley, *Bull. soc. chim.*, 1919, **25**, 68.
Lewinsohn, *Chem. Abstracts*, 1924, **18**, 442.

Linamarin (*Phaseolunatin, glucoside of acetone cyanhydrin*)



$C_{10}H_{17}O_6N$ MW, 247

Occurs in flax and *Dimorphotheca ecklonis*. Needles. M.p. 142–3°. $[\alpha]_D^{18}$ − 29·10° in H_2O. Sol. H_2O, EtOH, hot Me_2CO. Spar. sol. Et_2O, $CHCl_3$, C_6H_6. Prac. insol. pet. ether. Dil. acids ⟶ glucose + acetone + HCN.
Tetra-acetyl: needles. M.p. 140–1°. $[\alpha]_D^{14}$ − 10·66° in Me_2CO.

Fischer, Anger, *Ber.*, 1919, **52**, 854.

Linoleic Acid (*Linolic acid*, 8 : 11-*heptadecadiene*-1-*carboxylic acid*, 9 : 12-*octadecadienic acid*)

$$CH_3{\cdot}[CH_2]_4{\cdot}CH{:}CH{\cdot}CH_2{\cdot}CH{:}CH{\cdot}[CH_2]_7{\cdot}COOH$$

$C_{18}H_{32}O_2$ MW, 280

Occurs as glyceride in linseed, cotton seed, maize, hemp, poppy-seed, and other vegetable oils. B.p. 229–30°/16 mm., 228°/14 mm., 202°/1·4 mm. D_4^{18} 0·9026 (0·9038), D_4^{20} 0·9031 (0·9025). n_D^{20} 1·4711, $n_D^{21·5}$ 1·4683. Iodine value 179·9. CNS value 91·2. Oxidised by air. $KMnO_4$ ⟶ caproic, azelaic and oxalic acids + trace of malonic acid. HI + P ⟶ stearic acid. Br ⟶ tetrabromostearic acid.
Me ester: $C_{19}H_{34}O_2$. MW, 294. B.p. 211–12°/16 mm., 207–8°/11 mm., 168–70°/1 mm. D_4^{18} 0·8886.
Et ester: $C_{20}H_{36}O_2$. MW, 308. B.p. 270–5°/180 mm. D_4^{20} 0·8865.

Cholesteryl ester: $C_{45}H_{76}O_2$. MW, 644. M.p. 49°. $[\alpha]_D^{20}$ − 24·3°.
Chloride: $C_{18}H_{31}OCl$. MW, 298·5. B.p. 167–8°/2·3 mm.
Anhydride: $C_{36}H_{62}O_3$. MW, 542. Liq. Sol. EtOH, Et_2O, $CHCl_3$, ligroin. $D_4^{23\cdot5}$ 0·901. $n_D^{21\cdot5}$ 1·4737. Iodine value 177·2–178·5.
Tetrabromide: *see* Tetrabromostearic Acid.

Waterman, van Dijk, *Chem. Zentr.*, 1931, I, 2740.
Haworth, *J. Chem. Soc.*, 1929, 1456.
Coffey, *J. Chem. Soc.*, 1921, **119**, 1411.
Rollett, *Z. physiol. Chem.*, 1909, **62**, 410.

Linolenic Acid (8 : 11 : 14-*Heptadecatriene*-1-*carboxylic acid*, 9 : 12 : 15-*octadecatrienic acid*)

$CH_3\cdot[CH_2\cdot CH\!:\!CH]_3\cdot CH_2\cdot[CH_2]_6\cdot COOH$

$C_{18}H_{30}O_2$ MW, 278

A constituent of most drying oils and certain animal fats. α, β, and γ forms found in oil from seed of *Genothera biennis*.

α-Form: natural linolenic acid.
Liq. Sol. EtOH, Et_2O. D_4^{20} 0·9046. Br ⟶ hexabromostearic acid (m.p. 180°). H (+ Ni) ⟶ stearic acid. $KMnO_4$ ⟶ hexahydroxystearic acid.

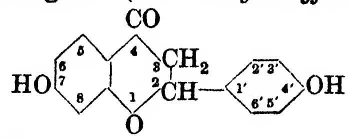
β-Form.
Liq. Br ⟶ liq. hexabromostearic acid.
Mixed α + β forms.
B.p. 230–2°/17 mm. D_4^{18} 0·9141.
Me ester: $C_{19}H_{32}O_2$. MW, 292. B.p. 207°/14 mm.
Et ester: $C_{20}H_{34}O_2$. MW, 306. B.p. 132–3°/0·001 mm. D_4^{20} 0·8919. n_D^{20} 1·46753.

γ-Form.
Liq. Br ⟶ hexabromostearic acid (m.p. 195–6°).

Erdmann, Bedford, *Ber.*, 1909, **42**, 1324; *Z. physiol. Chem.*, 1910, **69**, 78.
Erdmann, *Z. physiol. Chem.*, 1911, **74**, 179.
Coffey, *J. Chem. Soc.*, 1921, **119**, 1306, 1408.
Smith, West, *Chem. Abstracts*, 1927, **21**, 2250.
Heiduschka, Lüft, *Arch. Pharm.*, 1919, **257**, 33.

Linolic Acid.
See Linoleic Acid.
Linusic Acid.
See Hexahydroxystearic Acid.
Linusinic Acid.
See Hexahydroxystearic Acid.

Liquiritigenin (7 : 4′-*Dihydroxyflavanone*)



$C_{15}H_{12}O_4$ MW, 256

Aglucone of liquiritin. Needles + $1H_2O$ from EtOH. M.p. 207°. Mg + HCl ⟶ violet-red col. No col. with $FeCl_3$. 50% KOH at 170–80° ⟶ resacetophenone and *p*-hydroxybenzoic acid.
Diacetyl: needles from EtOH. M.p. 186°.
Oxime: yellowish cryst. from H_2O. M.p. 178°.
4′-*Glucoside*: *see* Liquiritin.

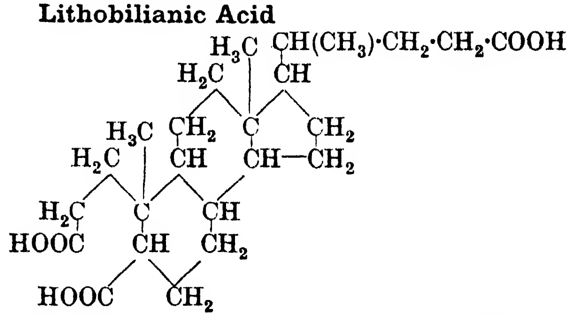
Shinoda, Ueeda, *Ber.*, 1934, **67**, 434.

Liquiritin

$C_{21}H_{22}O_9$ MW, 418

4′-Glucoside of liquiritigenin (*q.v.*). Present in *Glycyrrhiza glabra*, Linn., *var. glandilufera*, Regel et Herder. Needles + $1H_2O$ from EtOH.Aq. or H_2O. M.p. 212°. Mg + HCl in EtOH ⟶ violet-red col. No col. with alc. $FeCl_3$. Aq. alc. H_2SO_4 ⟶ glucose + liquiritigenin. 50% KOH ⟶ pæonol and *p*-hydroxybenzoic acid.
See above reference.

Lithobilianic Acid

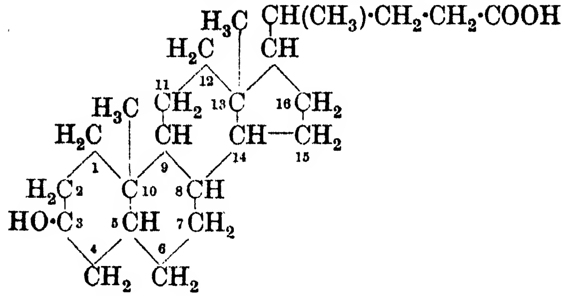


$C_{24}H_{38}O_6$ MW, 422

Prism from AcOH. M.p. 279° (275°). Heat ⟶ pyrolithobilianic acid.
Tri-Me ester: $C_{27}H_{44}O_6$. MW, 464. Needles from dil. MeOH. M.p. 112°.

Wieland, Weyland, *Z. physiol. Chem.*, 1920, **110**, 123.
Borsche, Hallwasz, *Ber.*, 1922, **55**, 3328.
Wieland, Dane, Scholz, *Z. physiol. Chem.*, 1932, **211**, 261.
Wieland, Dane, *Z. physiol. Chem.*, 1932, **212**, 48.
Windaus, *Z. physiol. Chem.*, 1932, **213**, 147.
Sobotka, *Chemical Reviews*, 1934, **15**, 311.

Lithocholic Acid (3-*Hydroxycholanic acid*)



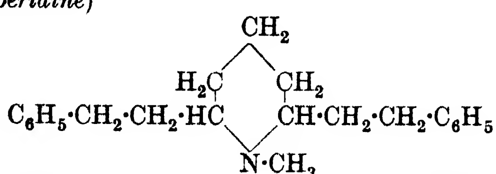
$C_{24}H_{40}O_3$ MW, 376

Occurs in human and cattle bile. Prisms from dil. EtOH. M.p. 186°. $[\alpha]_D^{20}$ + 32·14° in EtOH. Sol. EtOH, $CHCl_3$, AcOH. Spar. sol. Et_2O, AcOEt. Prac. insol. H_2O, ligroin. Insol. cold $NaHCO_3$, NaOH, but sol. in hot. CrO_3 ⟶ dehydrolithocholic acid. HNO_3 ⟶ lithobilianic acid. Red. ⟶ cholanic acid. Tasteless.

Me ester: $C_{25}H_{42}O_3$. MW, 390. Needles from dil. MeOH. M.p. 130°.

Fischer, *Z. physiol. Chem.*, 1911, **73**, 214, 234.
Wieland, Weyland, *Z. physiol. Chem.*, 1920, **110**, 123.
Borsche, Hallwasz, *Ber.*, 1922, **55**, 3326.
Windaus, *Z. physiol. Chem.*, 1932, **213**, 147.
Sobotka, *Chemical Reviews*, 1934, **15**, 311.

Lobelan (N-*Methyl*-2 : 6-*di*-[β-*phenylethyl*]-*piperidine*)

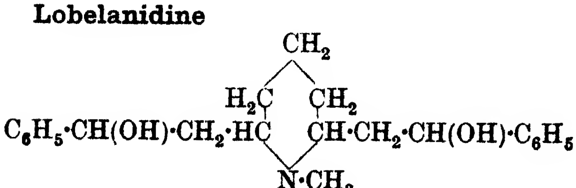


$C_{22}H_{29}N$ MW, 307

B.p. about 175° in high vacuum.
B,HCl: m.p. 194–5°.
Methiodide: m.p. 234°.

Wieland, Schopf, Hermsen, *Ann.*, 1925, **444**, 60.
Wieland, Drishaus, *Ann.*, 1929, **473**, 102.

Lobelanidine

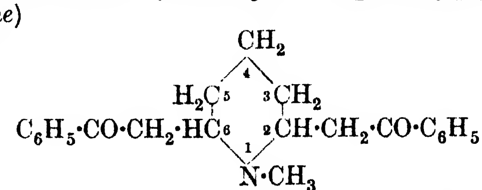


$C_{22}H_{29}O_2N$ MW, 339

M.p. 150°. CrO_3 ⟶ lobelanine. PCl_5 ⟶ dichlorolobelan.
B,HCl: m.p. 135–8°.
B,HBr: m.p. 188–90°.
Diacetyl: m.p. 214–15°. *Acetate*: m.p. 75°.
Dibenzoyl: m.p. 109–10°. *B,HCl*: m.p. 239–40° decomp.
Methiodide: m.p. 173–5°.

Wieland, Dragendorff, *Ann.*, 1929, **473**, 83.
Scheuing, Winterhalder, *Ann.*, 1929, **473**, 126.
See also first reference above.

Lobelanine (N-*Methyl*-2 : 6-*diphenacylpiperidine*)



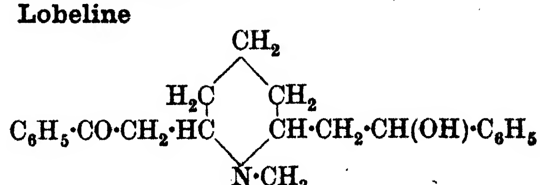
$C_{22}H_{25}O_2N$ MW, 335

M.p. 99°. Sol. Me_2CO, C_6H_6, EtOH, AcOH, $CHCl_3$, Py. Spar. sol. Et_2O, pet. ether. Insol. H_2O. CrO_3 ⟶ benzoic + scopolinic acids. $KMnO_4$ ⟶ benzoic acid (2 mols.). Stable to HNO_3 (D 1·4). Heat ⟶ acetophenone. Alkalis ⟶ methylphenylcarbinol, benzhydrol, and methylamine. NaHg ⟶ lobelanidine. H_2O_2 ⟶ lobelanine N-oxide (m.p. 84–6°).
B,HCl: cryst. from EtOH. M.p. 196° (188°).
B,HBr: m.p. 188°.
B,HI: m.p. 169–72°.
B,HClO_4: m.p. 173–4°.
B,HNO_3: m.p. 160°.
Dioxime: prisms from EtOH. M.p. 209° decomp.

Wieland, Schopf, Hermsen, *Ann.*, 1925, **444**, 49.
Wieland, Dragendorff, *Ann.*, 1929, **473**, 83.
Scheuing, Winterhalder, *Ann.*, 1929, **473**, 126.

Lobelidine.
See dl-Lobeline.

Lobeline



$C_{22}H_{27}O_2N$ **MW, 337**

l-.

Occurs in *Lobelia inflata*. Needles from EtOH, Et_2O, or C_6H_6. M.p. 130–1°. $[\alpha]_D^{15}$ − 42·85° in EtOH. Heat ⟶ acetophenone. CrO_3 ⟶ lobelanine. NaHg ⟶ lobelanidine.

B,HCl : needles from Et_2O. M.p. 182°. Sol. $CHCl_3$.

B,HNO₃ : m.p. 170–2°.

Benzoyl : m.p. 155–7° decomp.

dl-. Lobelidine.

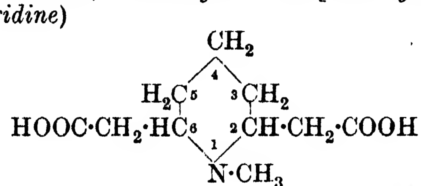
Occurs in *Lobelia inflata*. Prisms from EtOH. M.p. 110°.

B,HCl : m.p. 170°.

B,HNO₃ : m.p. 159–60° decomp.

Wieland, *Ber.*, 1921, **54**, 1784.
Wieland, Schopf, Hermsen, *Ann.*, 1925, **444**, 40.
Wieland, Dragendorff, *Ann.*, 1929, **473**, 83.
Wieland, Koschara, Dane, *ibid.*, 118.

Lobelinic Acid (N-*Methylpiperidine*-2 : 6-*diacetic acid*, N-*methyl*-2 : 6-*di*-[*carboxymethyl*]-*piperidine*)



$C_{10}H_{17}O_4N$ MW, 215

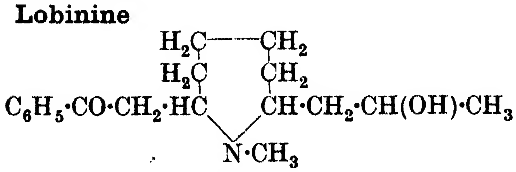
M.p. 225–8° decomp. Sol. H_2O. Spar. sol. org. solvents.

B,HAuCl₄ : m.p. 215–17° decomp.

Dianilide : m.p. 218–19°.

Wieland, Dragendorff, *Ann.*, 1929, **473**, 95.

Lobinine



Probable structure

$C_{18}H_{27}O_2N$ MW, 289

Occurs in *Lobelia inflata*. Not obtained cryst. NaHg ⟶ lobinol. CrO_3 ⟶ benzoic and acetic acids.

B,HCl : needles from EtOH–Et_2O or Et_2O–Me_2CO. M.p. 144°. $[\alpha]_D$ − 106·1° in H_2O.

B,HI : m.p. 130°.

B,HClO₄ : m.p. 146°. CrO_3 ⟶ lobinone perchlorate.

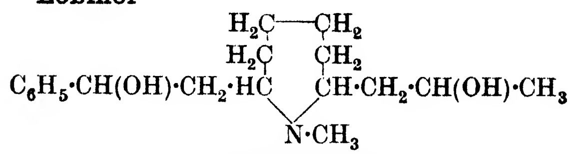
B₂,H₂PtCl₆ : decomp. at 190°.

Hydrochloride of benzoyl deriv. : m.p. 146–7°.

Oxime hydrochloride : m.p. 182°.

Wieland, Ishimasa, Koschara, *Ann.*, 1931, **491**, 14.

Lobinol



Probable structure

$C_{18}H_{29}O_2N$ MW, 291

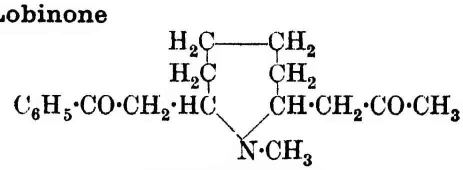
Free base not isolated.

B,HCl : cryst. from EtOH. M.p. 180°.

Methiodide : m.p. 101°.

Wieland, Ishimasa, Koschara, *Ann.*, 1931, **491**, 24.

Lobinone



Probable structure.

$C_{18}H_{25}O_2N$ MW, 287

Free base not isolated.

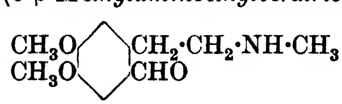
B,HCl : m.p. 94°. $[\alpha]_D$ − 18·6° in H_2O.

B,HClO₄ : cryst. from EtOH. M.p. 133°.

Methiodide : m.p. 141°.

Wieland, Ishimasa, Koschara, *Ann.*, 1931, **491**, 25.

Lodal (6-β-*Methylaminoethylveratric aldehyde*)



$C_{12}H_{17}O_3N$ MW, 223

Needles from Me_2CO. M.p. 123–4°. Sol. EtOH, $CHCl_3$. Spar. sol. H_2O. Spar. sol. other org. solvents. Strongly alkaline to litmus.

B,HCl : yellow needles + $3\frac{1}{2}H_2O$ from H_2O. M.p. 61–2°, anhyd. decomp. at 186°. Sol. H_2O, EtOH. Spar. sol. $CHCl_3$.

B,HBr : yellow needles + $2H_2O$ from Me_2CO.Aq. M.p. 87–90°, anhyd. 195°.

B,HAuCl₄ : brown needles from EtOH. M.p. 169°. Spar. sol. H_2O.

Picrate : yellow needles from EtOH. M.p. 169–70°.

Cyano deriv. : prisms from Et_2O.Aq. M.p.

127–8°. Mod. sol. EtOH. Spar. sol. Et_2O. Insol. H_2O.

Pyman, *J. Chem. Soc.*, 1909, **95**, 1270.
Buck, *J. Am. Chem. Soc.*, 1930, **52**, 4121.
Kindler, Peschke, *Arch. Pharm.*, 1932, **270**, 353.

Loiponic Acid.
See Leuponic Acid.

d-Longifolene

$C_{15}H_{24}$ MW, 204

Sesquiterpene from Indian turpentine. B.p. 254–6°/706 mm., 150–1°/36 mm. D_{30}^{30} 0·9284. n_D^{30} 1·495. $[\alpha]_D$ + 42·73°.
B,HCl: needles from MeOH. M.p. 59–60°. $[\alpha]_D$ + 7·1° in $CHCl_3$.
B,HBr: prisms from EtOH. M.p. 69–70°.
B,HI: needles from EtOH. M.p. 71°.

Simonsen, *J. Chem. Soc.*, 1920, **117**, 578; 1923, **123**, 2642.

Longifolic Acid

$C_{13}H_{21}\cdot COOH$

$C_{14}H_{22}O_2$ MW, 222

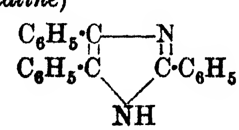
Prisms from EtOH.Aq. or pet. ether. M.p. 152–3°. B.p. about 234°/55 mm. Sol. most org. solvents. Spar. sol. formic acid. Insol. H_2O. Very stable.
Me ester: $C_{15}H_{24}O_2$. MW, 236. Oil. B.p. 170–3°/14 mm.
Amide: $C_{14}H_{23}ON$. MW, 221. Needles from pet. ether. M.p. 133°. $[\alpha]_{5461}$ − 20·5° in MeOH.
Nitrile: $C_{14}H_{21}N$. MW, 203. Yellow oil. B.p. 145–50°/2 mm.
Urethane: plates from MeOH.Aq. M.p. 76–7°. $[\alpha]_{5461}$ − 11·1° in MeOH.

Simonsen, *J. Chem. Soc.*, 1923, **123**, 2652.
Bradfield, Francis, Simonsen, *J. Chem. Soc.*, 1934, 193.

α-Longifolic Acid. $C_{14}H_{22}O_2$ MW, 222.
Exists in two forms. (i) Labile. Cryst. from ligroin. M.p. 121–2°. (ii) Needles from ligroin. M.p. 140–2°. $[\alpha]_{5461}$ − 31° in EtOH.

Bradfield, Francis, Simonsen, *J. Chem. Soc.*, 1934, 192.

Lophine (2:4:5-*Triphenyliminazole*, 2:4:5-*triphenylglyoxaline*)



$C_{21}H_{16}N_2$ MW, 296

Needles. M.p. 275°. Mod. sol. EtOH, Et_2O. Insol. H_2O. Strong base. Forms metallic derivs.
B,HCl: cryst. + ½H_2O. M.p. anhyd. 155°.
N-*Et*: $C_{23}H_{20}N_2$. MW, 324. Prisms from EtOH. M.p. 234°.

Radziszewski, *Ber.*, 1877, **10**, 70.
Kulisch, *Monatsh.*, 1896, **17**, 302.
Strain, *J. Am. Chem. Soc.*, 1927, **49**, 1996.

Lophophorine.
See under Anhalonine.

Loranthyl Alcohol

$C_{24}H_{50}O$ MW, 354

Constituent of leaves of *Loranthus europœus*, Linn. Cryst. from EtOH. M.p. 71–2°. Sol. Et_2O, Me_2CO, C_6H_6, AcOEt, pet. ether, phenol.
Acetyl: plates from EtOH. M.p. 57–8°.
Benzoyl: cryst. M.p. 56–7°.

Einleger, Fischer, Zellner, *Monatsh.*, 1923, **44**, 287.

Loroglossigenin

$C_{18}H_{22}O_8$ MW, 366

Leaflets from MeOH. M.p. 77°. Sol. H_2O, Et_2O, $CHCl_3$. Spar. sol. pet. ether. $FeCl_3$ ⟶ violet col. Does not reduce Fehling's.

Bridel, Delauney, *Compt. rend.*, 1923, **177**, 776.

Loroglossin

$C_{30}H_{42}O_{18}$ MW, 690

Glucoside found in many species of orchids. Needles from EtOH–Me_2CO. M.p. 137°. $[\alpha]_D$ − 45·65° in H_2O. Sol. H_2O. Spar. sol. Me_2CO, AcOEt. Hyd. by dil. H_2SO_4 and emulsin.

See above reference and also
Bourquelot, Bridel, *Compt. rend.*, 1919, **168**, 701.

Lotoflavin

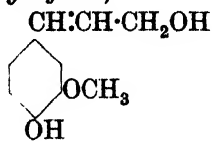
$C_{15}H_{10}O_6$ MW, 286

Obtained by hyd. of lotusin from *Lotus arabicus*. Yellow cryst. Decomp. at 270–300°. Sol. EtOH, hot AcOH. KOH fusion ⟶ phloroglucinol + β-resorcylic acid. Probably a tetrahydroxyflavone.
Tetra-acetyl deriv.: m.p. 176–8°.

Dunstan, Henry, *Proc. Roy. Soc.*, 1900, **67**, 224; 1901, **68**, 374.
Cullinane, Algar, Ryan, *Proceedings of the Royal Society, Dublin*, 1928, **19**, 77.
Robinson, Venkataraman, *J. Chem. Soc.*, 1929, 62.

Loturine.
See Aribine.

Lubanol (*4-Hydroxy-3-methoxyphenylallyl alcohol, ω-hydroxyeugenol*)



$C_{10}H_{12}O_3$ MW, 180

Benzoyl deriv.: constituent of Siamese benzoin. Cryst. from pet. ether—Et_2O. M.p. 72°. *Dibromide*: needles. M.p. 119–20°.

Dibenzoyl: needles. M.p. 79–80°. No col. with $FeCl_3$. *Dibromide*: needles. M.p. 153–4°. $FeCl_3$ ⟶ green col.

Zincke, Dzrimal, *Monatsh.*, 1921, **41**, 423.
Zincke, Hanselmayer, Ehmer, *Monatsh.*, 1922, **42**, 447.

Luciculine

$C_{22}H_{35}O_3N$ MW, 361

Cryst. + $1H_2O$ from Me_2CO. M.p. 115–17°. $[\alpha]_D^{11.5}$ — 11·4° in EtOH.

B,HCl: cryst. + $1\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 198–203° decomp. $[\alpha]_D$ — 9·4° in H_2O.

Diacetyl: *see under* Lucidusculine.

Majima, Morio, *Ber.*, 1932, **65**, 601.

Lucidusculine

$C_{24}H_{37}O_4N$ MW, 403

Alkaloid, constituent of *Aconitum luciduscullum*. Plates from MeOH. M.p. 170–1°. $[\alpha]_D$ — 95·5° in $CHCl_3$.

B,HCl: cryst. + $3\frac{1}{2}H_2O$ from H_2O. M.p. 98–115°, anhyd. decomp. at 245–65°.

B,HBr: cryst. + $1\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 248–50°. $[\alpha]_D^{26}$ — 62·7° in H_2O.

B,HClO$_4$: cryst. from EtOH. Decomp. at 260–5°. $[\alpha]_D^{15}$ — 70·3° in EtOH.

Picrate: cryst. from H_2O. M.p. 173–6°.

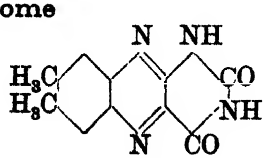
B$_2$,H$_2$PtCl$_6$: needles from H_2O. Decomp. at 225°.

Methiodide: plates from EtOH. M.p. 197°. $[\alpha]_D^{15}$ — 65·0° in EtOH.

Acetyl: diacetyl-luciculine. Plates from EtOH. M.p. 153–7°. $[\alpha]_D^{13}$ — 76·0° in $CHCl_3$. *B,HCl*: cryst. + $3H_2O$ from H_2O. M.p. 113–17°, anhyd. decomp. at 139–44°. $[\alpha]_D^{15}$ — 50·4° in H_2O.

Majima, Morio, *Ber.*, 1932, **65**, 600.

Lumichrome

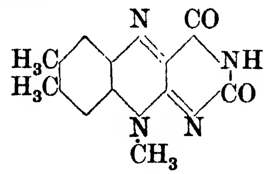


$C_{12}H_{12}O_2N_4$ MW, 244

Irradiation product of lactoflavine. Needles from $CHCl_3$ or dil. AcOH. Decomp. about 300°. Sol. hot MeOH, 90% EtOH. Spar. sol. $CHCl_3$, H_2O.

Karrer, *et al.*, *Helv. Chim. Acta*, 1934, **17**, 1010, 1165.

Lumilactoflavine



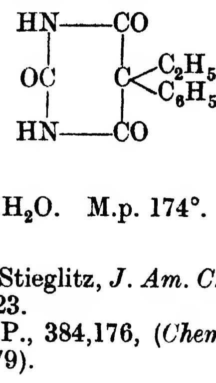
$C_{13}H_{12}O_2N_4$ MW, 256

Needles from dil. AcOH. M.p. 330° decomp. $[\alpha]_D \pm 10°$ in H_2O. Sol. H_2O, $CHCl_3$. Absorption maxima: 470, 445, 420, 360, 341, 312, 270 mμ in H_2O. NaOH ⟶ acid, ($C_{12}H_{12}O_3N_2$) + urea.

N-Me deriv.: $C_{14}H_{14}O_2N_4$. MW, 270. Cryst. from AcOH. M.p. 326°.

Wagner-Jauregg, *Angew. Chem.*, 1934, **47**, 318 (*Bibl.*).

Luminal (*Ethylphenylbarbituric acid, phenobarbital*)



$C_{12}H_{12}O_3N_2$ MW, 232

Cryst. from H_2O. M.p. 174°. Hypnotic and sedative.

Rising, Stieglitz, *J. Am. Chem. Soc.*, 1918, **40**, 723.
I.G., E.P., 384,176, (*Chem. Zentr.*, 1933, I, 1479).

Lumisterol

$C_{28}H_{44}O$ MW, 396

First product of ultraviolet irradiation of ergosterol. Further irradiation ⟶ tachysterol. Needles from Me_2CO–MeOH. M.p. 118°. $[\alpha]_{5461}^{19}$ + 235·4° in Me_2CO. Very sol. Me_2CO, Et_2O, $CHCl_3$. Sol. MeOH.

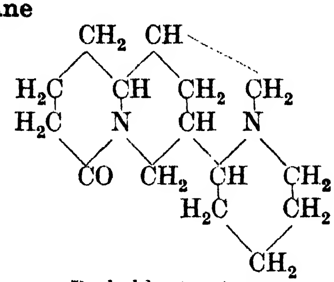
Acetyl deriv.: needles from Me_2CO–MeOH. M.p. 100°. $[\alpha]_{5461}^{19}$ + 162·8° in Me_2CO. Very sol. Me_2CO, Et_2O, $CHCl_3$.

3 : 5-*Dinitrobenzoyl deriv.*: pale yellow needles. M.p. 139–41°. $[\alpha]_{5461}^{20}$ + 24° in C_6H_6.

Allophanate: cryst. M.p. 217–18°. $[\alpha]_D^{17}$ + 75·4° in $CHCl_3$.

Dimroth, *Ber.*, 1935, **68**, 539.
Windaus, Dithmar, Fernholtz, *Ann.*, 1932, **493**, 259.
Bourdillon *et al.*, *Proc. Roy. Soc.*, 1932, **109**, 488.
Heilbron, Spring, Stewart, *J. Chem. Soc.*, 1935, 1221.

Lupanine



Probable structure

$C_{15}H_{24}ON_2$ MW, 248

d-.

Cryst. M.p. 40°. B.p. 185–6°/0·08 mm. $[\alpha]_D$ + 61·4° in Me_2CO. Hygroscopic.

B,HCl: cryst. + $2H_2O$ from H_2O. M.p. 127°. $[\alpha]_D$ + 62·0°.

B,HI: prisms + $2H_2O$ from H_2O. M.p. 189°. $[\alpha]_D$ + 45·5° in H_2O.

B,HAuCl₄: cryst. from H_2O. M.p. 188–9°.

B,HCNS: prisms from H_2O. M.p. 184°. $[\alpha]_D$ + 55·6° in H_2O.

B,HCSN: cryst. from H_2O. M.p. 189–90°. $[\alpha]_D$ + 47·1°.

d-*Camphorsulphonyl deriv.*: prisms + $2H_2O$ from Me_2CO. M.p. 112–15°. $[\alpha]_D$ + 42·5° in H_2O.

l-.

Oil. B.p. 186–8°/1 mm. $[\alpha]_D$ − 61·0° in Me_2CO.

B,HI: prisms + $2H_2O$ from H_2O. M.p. 190°. $[\alpha]_D$ − 43·6°.

B,HCNS: cryst. from H_2O. M.p. 183–5°. $[\alpha]_D$ − 55·3° in H_2O.

l-*Camphorsulphonyl deriv.*: cryst. + $2H_2O$ from Me_2CO. M.p. 110–13°. $[\alpha]_D$ − 45·3°.

dl-.

Constituent of blue lupins. Cryst. from Me_2CO. M.p. 98°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$. Insol. ligroin.

B,HCl: cryst. + $2H_2O$ from H_2O. M.p. 127–8°, anhyd. 250–2°.

B,HAuCl₄: cryst. from H_2O. M.p. 177–8°.

v. Ammon, Szombathy, E.P., 288,637, (*Chem. Abstracts*, 1929, **23**, 612).
Clemo, Raper, Tenniswood, *J. Chem. Soc.*, 1931, 429.
Clemo, Raper, *J. Chem. Soc.*, 1933, 644.
Couch, *J. Am. Chem. Soc.*, 1934, **56**, 1423.

Luparenol

$C_{15}H_{24}O$ MW, 220

One of higher boiling constituents of essential oil of hops. Odourless liq. B.p. 125–8°/3 mm. D_{20}^{20} 0·9738. n_D^{20} 1·5023. $[\alpha]_D^{20}$ − 3·7°. Adds one mol. Br.

Phenylurethane: needles from EtOH.Aq. M.p. 157°.

Chapman, *J. Chem. Soc.*, 1928, 1304.

Luparol

$C_{16}H_{26}O_2$ MW, 250

One of higher boiling constituents of essential oil of hops. Pale yellow liq. with faint odour. B.p. 122–4°/2 mm. D_{20}^{20} 0·9170. n_D^{20} 1·4942. Optically inactive. Alc. $FeCl_3$ ⟶ deep red col. 50% KOH ⟶ isovaleric acid + a phenol, ($C_{11}H_{16}O_2$, b.p. 115–17°/4 mm., D_{20}^{20} 0·9448, n_D^{20} 1·4670). Ox. ⟶ isovaleric acid.

Chapman, *J. Chem. Soc.*, 1928, 1305.

Luparone

$C_{13}H_{22}O$ MW, 194

One of higher boiling constituents of essential oil of hops. B.p. 74–6°/3 mm. D_{20}^{20} 0·8861. n_D^{20} 1·485. $[\alpha]_D^{20}$ − 0·4°.

Semicarbazone: cryst. from pet. ether. M.p. 98°.

Chapman, *J. Chem. Soc.*, 1928, 1303.

Lupeol

$C_{30}H_{50}O$ MW, 426

Constituent of several species of gutta percha. Needles from Me_2CO–MeOH.Aq. M.p. 212–13° (211°). Sol. org. solvents. $[\alpha]_D^{20}$ + 26·4° in $CHCl_3$.

Acetyl deriv.: needles from EtOH. M.p. 216° (214°). $[\alpha]_D^{20}$ + 47·5° in $CHCl_3$. $[\alpha]_D^{19}$ + 41·23° in $CHCl_3$.

Benzoyl deriv.: needles from Me_2CO. M.p. 270° (261·5°). $[\alpha]_D^{15}$ + 60·4° in $CHCl_3$.

Cinnamoyl deriv.: leaflets from EtOH. M.p. 249–50° (242°). $[\alpha]_D$ + 45·5° in $CHCl_3$. Sol. Et_2O, Me_2CO, $CHCl_3$. Spar. sol. hot EtOH. Insol. H_2O.

Phenylurethane: plates. M.p. 231°. $[\alpha]_D^{18·5}$ + 46·8° in $CHCl_3$.

Cohen, *Rec. trav. chim.*, 1909, **28**, 368.
Sugii, Sengoku, Taguchi, *Chem. Abstracts*, 1932, **26**, 975.

Lupeone

$C_{30}H_{48}O$ MW, 424

Cryst. M.p. 171–2°. $[\alpha]_D^{25} + 57{\cdot}3°$ in $CHCl_3$.

Oxime: cryst. from AcOEt. M.p. 274°. $[\alpha]_D^{26} + 12{\cdot}26°$ in $CHCl_3$.

Cyanhydrin: cryst. M.p. 194°.

See previous references.

Lupetidine.
See Dimethylpiperidine.

Lupeylene

$C_{30}H_{48}$ MW, 408

Cryst. M.p. 173–4°. B.p. 287°/10 mm.

Nögd, *Arch. Pharm.*, 1927, **265**, 1389.

α-Lupinane

$C_{10}H_{19}N$ MW, 153

Apparently exists in two forms both yielding the same picrate. (i) B.p. 75–7°/11 mm. D_4^{23} 0·93. $[\alpha]_D^{23} - 0{\cdot}65°$ ($- 0{\cdot}15°$). (ii) B.p. 84–6°/15 mm. $[\alpha]_D^{23} - 9{\cdot}4°$.

Picrate: m.p. 185°.

Karrer, Vogt, *Helv. Chim. Acta*, 1930, **13**, 1073.
Bartholomaüs, Schaumann, D.R.P., 396,508, (*Chem. Zentr.*, 1924, II, 1409).
Schöpf, Thöma, *Ann.*, 1928, **465**, 115.

β-Lupinane.

B.p. 85–6°/15 mm., 76–7°/11·5 mm.
B,HI: m.p. 261–2°.
B,HAuCl$_4$: m.p. 143–4°.
B$_2$,H$_2$PtCl$_6$: m.p. 215°.
Picrate: m.p. 164–5°.
Methiodide: m.p. 214°.

Winterfeld, Kneuer, *Ber.*, 1931, **64**, 152, 2415.
Winterfeld, Holschneider, *Ber.*, 1933, **66**, 1751.
See also last reference above.

Lupinic Acid

$C_{10}H_{17}O_2N$ MW, 183

l-.

Plates + $3H_2O$ from $CHCl_3$. M.p. 255°. Sol. H_2O, EtOH, $CHCl_3$. Insol. Et_2O, Me_2CO.

Me ester: $C_{11}H_{19}O_2N$. MW, 197. B.p. 120–2°/10 mm. $[\alpha]_D^{21} - 19{\cdot}4°$ in MeOH. *B$_2$,H$_2$PtCl$_6$*: m.p. 210–12°.

B,HCl: m.p. 275°. $[\alpha]_D^{21} - 13{\cdot}1°$ in MeOH.

B$_2$,H$_2$PtCl$_6$: red prisms from Me_2CO. M.p. 235°.

Methiodide: needles from EtOH–AcOEt. M.p. 225–6°. Sol. H_2O, EtOH, $CHCl_3$. Spar. sol. Me_2CO.

Epi-d-.

Me ester: b.p. 126°/11 mm. $[\alpha]_D^{18} + 43{\cdot}5°$ in MeOH. *Picrate*: m.p. 185°.

Amide: $C_{10}H_{18}ON_2$. MW, 182. Cryst. from MeOH. M.p. 228°. $[\alpha]_D^{18} + 41{\cdot}3°$ in MeOH.

Nitrile: $C_{10}H_{16}N_2$. MW, 164. B.p. 120°/11 mm.

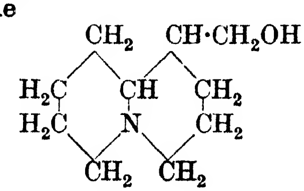
Epi-dl-.

Me ester: b.p. 130°/11 mm. *Picrate*: m.p. 208°.

Schöpf, Thomä, Schmidt, Braun, *Ann.*, 1928, **465**, 109.
Willstätter, Fourneau, *Ber.*, 1902, **35**, 1917.

Lupinidine.
See Spartein.

Lupinine



$C_{10}H_{19}ON$ MW, 169

Alkaloid present in many plants of the *Lupinus* species. Rhombic cryst. from pet. ether. M.p. 68·5–69°. B.p. 255–7° (269–70°). Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. pet. ether. $[\alpha]_D^{17} - 19{\cdot}0°$. Strong base.

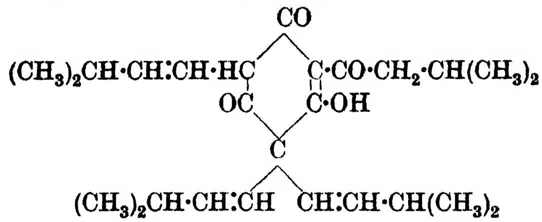
B,HCl: prisms from EtOH.Aq. M.p. 212–13°. $[\alpha]_D - 14°$ in H_2O.
B,HI: m.p. 140–1°.
Aurichloride: m.p. 211–13°.
Platinichloride: m.p. 166–166·5°.
Phenylurethane: m.p. 98–9°.
Methochloride: m.p. 212–13°.
Methiodide: m.p. 295–6°.
d-*Tartrate*: prisms from Me_2CO–EtOH. M.p. 171°.
d-*Camphorsulphonate*: m.p. 181–2°.

Willstätter, Fourneau, *Ber.*, 1902, **35**, 1914.
Karrer, Cannel, Tolmer, Widmer, *Helv. Chim. Acta*, 1928, **11**, 1062.
Winterfeldt, Kneuer, Holschneider, *Ann.*, 1932, **499**, 109.
Couch, *J. Am. Chem. Soc.*, 1934, **56**, 2434.

α-Lupulinic Acid.
See Humulone.

β-Lupulinic Acid.
See Lupulone.

Lupulone (β-*Lupulinic acid*)

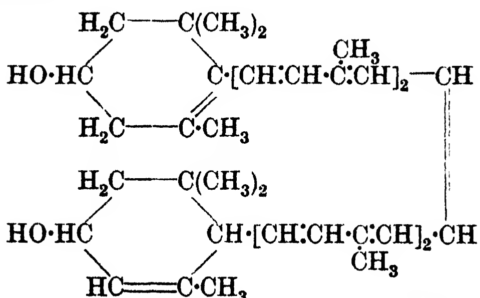


$C_{26}H_{38}O_4$ MW, 414

One of the bitter acids from hops. Cryst. from MeOH. M.p. 90·5–92°.

Wöllmer, *Ber.*, 1925, **58**, 675.
Wieland, *Ber.*, 1925, **58**, 2012.

Lutein



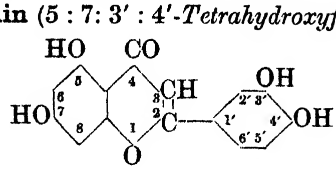
$C_{40}H_{56}O_2$ MW, 568

Carotenoid pigment present in egg yolk, and leaves. Coppery prisms from MeOH. M.p. 196°. $[\alpha]_{Cd}$ + 160° in $CHCl_3$. Absorption bands in CS_2, 511, 479 and 446 mμ.

Dipalmityl: *see* Helenien.

Kuhn, Winterstein, Lederer, *Z. physiol. Chem.*, 1931, **197**, 141.
Willstätter, Escher, *Z. physiol. Chem.*, 1912, **76**, 214.

Luteolin (5 : 7: 3′ : 4′-*Tetrahydroxyflavone*)



$C_{15}H_{10}O_6$ MW, 286

Occurs in many plants, e.g., *Leguminosæ Resedaceæ, Euphorbiaceæ, Umbelliferæ, Scrophulariaceæ.* Yellow needles + H_2O from EtOH. M.p. 328–30°. Sublimes in high vacuum. Sol. EtOH, Et_2O. Spar. sol. H_2O. Sol. alkalis to yellow sols. KOH fusion ⟶ phloroglucinol + protocatechuic acid.

7-Me ether: $C_{16}H_{12}O_6$. MW, 300. Leaflets from EtOH. M.p. 270°. Spar. sol. EtOH.

3′-Me ether: m.p. 330–1°.

4′-Me ether: *see* Diosmetin, Addendum, Vol. I.

7 : 4′-*Di-Me ether*: $C_{17}H_{14}O_6$. MW, 314. Needles. M.p. 224–5°. Alc. KOH at 160° ⟶ isovanillic acid.

7 : 3′ : 4′-*Tri-Me ether*: $C_{18}H_{16}O_6$. MW, 328. Yellow needles from EtOH. M.p. 161–3°. Spar. sol. EtOH. Insol. alkalis. *Acetyl*: prisms from EtOH. M.p. 156–8°.

5 : 7 : 3′-*Tri-Me-4′-Et ether*: $C_{20}H_{20}O_6$. MW, 356. Needles from xylene. M.p. 222°. Sol. EtOH to blue fluor. sol.

7 : 3′ : 4′-*Tri-Et ether*: $C_{21}H_{22}O_6$. MW, 370. Yellow needles from EtOH. M.p. 140–3°. Insol. cold EtOH, alkalis. *Acetyl*: needles from EtOH. M.p. 183–5°. Spar. sol. EtOH to blue fluor. sol.

Tetra-Et ether: $C_{23}H_{26}O_6$. MW, 398. Needles. M.p. 153–5°. HI ⟶ luteolin.

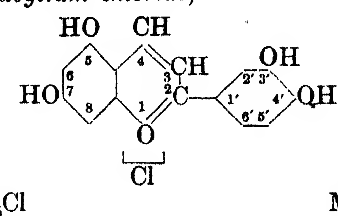
Tetra-acetyl: needles from EtOH. M.p. 222–4°. Spar. sol. EtOH.

7 : 3′ : 4′-*Tribenzoyl*: needles. M.p. 219°. Spar. sol. EtOH, C_6H_6. Insol. H_2O.

Tetrabenzoyl: needles from EtOH. M.p. 200–201°. Spar. sol. C_6H_6.

Perkin, Horsfall, *J. Chem. Soc.*, 1900, **77**, 1315.
Kostanecki, Rózcycki, Tambor, *Ber.*, 1900, **33**, 3417.
Vongerichten, *Ber.*, 1900, **33**, 2339.
Diller, Kostanecki, *Ber.*, 1901, **34**, 1452.
Perkin, *J. Chem. Soc.*, 1896, **69**, 800.
Fleischer, *Ber.*, 1899, **32**, 1186.
Lovecy, Robinson, Sugasawa, *J. Chem. Soc.*, 1930, 817.

Luteolinidin chloride (5 : 7 : 3′ : 4′-*Tetrahydroxyflavylium chloride*)



$C_{15}H_{11}O_5Cl$ MW, 306·5

Reddish-brown prisms from EtOH. Does not melt at 300°. Sol. conc. H_2SO_4 with green fluor. Alc. $FeCl_3$ ⟶ bluish-violet col.

3′-Me ether: $C_{16}H_{13}O_5Cl$. MW, 320·5. Reddish-violet needles from EtOH. Decomp. at 255°. Insol. H_2O, Et_2O. Alc. $FeCl_3$ ⟶ blue col.

Tetra-Me ether: $C_{19}H_{19}O_5Cl$. MW, 362·5. Orange-red needles. *Ferrichloride*: red needles from AcOH. M.p. 206–7°.

5-Benzoyl : crimson cryst. from EtOH. Decomp. at 182°. Alc. $FeCl_3$ ⟶ dark red col. → violet on addn. of H_2O.

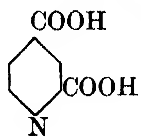
Pratt, Robinson, *J. Chem. Soc.*, 1925, **127**, 1135.
Asahina, Nakagome, Inubuse, *Ber.*, 1929, **62**, 3018.
Léon, Robinson, *J. Chem. Soc.*, 1931, 2734.

Lutidine.
See Dimethylpyridine.

Lutidine-carboxylic Acid.
See Dimethylnicotinic Acid *and* Dimethylpicolinic Acid.

Lutidine-dicarboxylic Acid.
See Dimethylcinchomeronic Acid *and* Dimethyldinicotinic Acid.

Lutidinic Acid (*Pyridine-2 : 4-dicarboxylic acid*)



$C_7H_5O_4N$ MW, 167

Leaflets + $1H_2O$ from H_2O. M.p. anhyd. 248–50° (235°). Sol. H_2O, hot EtOH. Insol. Et_2O, C_6H_6, CS_2. Alc. KOH ⟶ violet-red col.

Di-Me ester : $C_9H_9O_4N$. MW, 195. Needles from pet. ether. M.p. 58°.

Di-phenyl ester : $C_{19}H_{13}O_4N$. MW, 319. M.p. 136°.

Dichloride : $C_7H_3O_2NCl_2$. MW, 204. Needles. M.p. 54–6°. Sol. C_6H_6. Spar. sol. pet. ether.

Diamide : $C_7H_7O_2N_3$. MW, 165. Needles from H_2O. M.p. 254–5°. Sol. amyl alcohol, $PhNO_2$. Insol. EtOH, Et_2O, C_6H_6.

Dihydrazide : $C_7H_9O_2N_5$. MW, 195. Needles from EtOH.Aq. M.p. 256° decomp. (rapid heat.). Sol. H_2O. Insol. MeOH, EtOH. Reduces Fehling's and Tollen's reagents.

Diazide : $C_7H_3O_2N_7$. MW, 217. Cryst. from Et_2O. Decomp. at 98° (rapid heat.).

Meyer, Tropsch, *Monatsh.*, 1914, **35**, 189.

α-Lutidone.
See 6-Hydroxy-2 : 4-dimethylpyridine.

γ-Lutidone.
See 4-Hydroxy-2 : 6-dimethylpyridine.

ψ-Lutidostyril.
See 6-Hydroxy-2 : 4-dimethylpyridine.

Lycaconine (*Anthranoyl-lycoctinine*)

$C_{32}H_{44}O_8N_2$ MW, 584

Yellow plates from EtOH. M.p. 154–5°. Sol. $CHCl_3$. Spar. sol. EtOH, Et_2O, C_6H_6. Insol. H_2O, pet. ether. Alkalis ⟶ lycoctinine + anthranilic acid.

B,2HClO₄ : m.p. above 235°.

Schulz, Bierling, *Arch. Pharm.*, 1913, **251**, 8.

Lycaconitine

$C_{27}H_{34}O_6N_2$ MW. 482

Constituent of roots of *Aconitum lycoctonum*. Amorph. M.p. 111–14°. Sol. EtOH, C_6H_6, $CHCl_3$, CS_2. Spar. sol. H_2O, Et_2O. $[\alpha]_D + 31.5°$. H_2O at 100° ⟶ lycoctonic acid.

Dragendorff, Spohn, *Jahresber. Fortschr. Chem.*, 1884, 1394.

Lycetol.
See under 2 : 5-Dimethylpiperazine.

Lycine.
See Betaine.

Lycoctinine

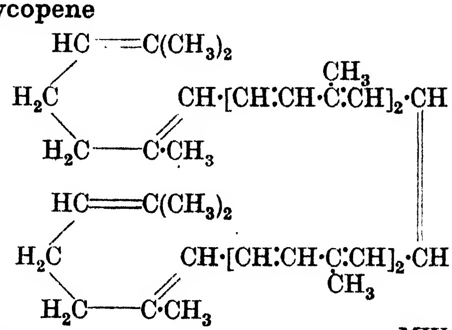
$C_{25}H_{39}O_7N$ MW, 465

Needles + $1H_2O$ from dil. EtOH. M.p. 131–3°, decomp. at 137°. Sol. EtOH, $CHCl_3$. Spar. sol. C_6H_6, Et_2O, H_2O. Insol. pet. ether. $[\alpha]_D^{20}$ + 49·64° in EtOH.

B,HCl : prisms + $1H_2O$. M.p. 75°.
B,HBr : prisms + $2H_2O$. M.p. 88–9°.
B,HClO₄ : prisms + $1\frac{1}{2}H_2O$. M.p. 68–9°.
Methiodide : needles. M.p. 178°.

Schulz, Bierling, *Arch. Pharm.*, 1913, **251**, 8.

Lycopene

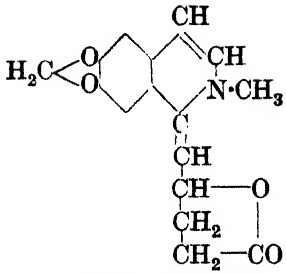


$C_{40}H_{56}$ MW, 536

Carotenoid pigment present in tomatoes (*Lycopersicum esculentum*), dog rose, many berries and fruits. Prisms from pet. ether. M.p. 175° (173°). Sol. $CHCl_3$, CS_2, hot C_6H_6. Spar. sol. EtOH, pet. ether. Absorption bands in CS_2, 548, 507·5 and 477 mμ.

Willstätter, Escher, *Z. physiol. Chem.*, 1910, **64**, 47.
Kuhn, Grundmann, *Ber.*, 1932, **65**, 1880.
Karrer, Helfenstein, Pieper, Wettstein, *Helv. Chim. Acta*, 1931, **14**, 435.
Winterstein, *Angew. Chem.*, 1934, **47**, 315.

Lycorine (*Narcissine*)



Probable structure

$C_{16}H_{17}O_4N$ MW, 287

Alkaloid found in plants of the order *Amaryllidaceæ*. Short prisms from EtOH. M.p. 280°. $[\alpha]_D^{26}$ − 120° in EtOH. Spar. sol. EtOH, Et_2O, $CHCl_3$. Insol. H_2O. Alkaline to litmus. Salts easily hyd.

B,HCl: needles + $1H_2O$ from H_2O. M.p. 206° (217°) decomp. $[\alpha]_D$ + 43°.

Picrate: yellow leaflets from H_2O. M.p. 196°.

Perchlorate: plates from H_2O. M.p. 230° decomp.

Kondo, Tomimura, *Chem. Abstracts*, 1928, **22**, 2948.
Gorter, *Chem. Zentr.*, 1920, III, 842.
Asahing, Sugii, *Arch. Pharm.*, 1913, **251**, 357.

Lygosin.

See 2 : 2′-Dihydroxydistyryl Ketone.

Lysergic Acid

$C_{16}H_{16}O_2N_2$ MW, 268

Leaflets + H_2O from H_2O. M.p. 238° decomp. $[\alpha]_D^{20}$ + 40° in Py. Sol. Py. Spar. sol. most org. solvents. Amphoteric. Gives characteristic blue Keller test of ergot alkaloids.

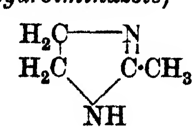
B,HCl: cryst. from MeOH. M.p. 208–10° decomp.

B_2,H_2SO_4: cryst. from H_2O. M.p. 220° decomp.

Me ester: $C_{17}H_{18}O_2N_2$. MW, 282. Leaflets from C_6H_6. M.p. 168°. Sol. EtOH, Et_2O, Me_2CO. Insol. pet. ether.

Jacobs, Craig, *J. Biol. Chem.*, 1934, **104**, 549; **106**, 396.

Lysidine (2-*Methyl*-4 : 5-*dihydroglyoxaline*, 2-*methyl*-4 : 5-*dihydroiminazole*)



$C_4H_8N_2$ MW, 84

Cryst. M.p. 105° (85°). B.p. 195–8° (221–4°). Sol. H_2O, EtOH. Prac. insol. Et_2O. Used as uric acid eliminant.

$B,HCl,2HgCl_2$: prisms from hot H_2O. M.p. 162–3°.

Ladenburg, *Ber.*, 1894, **27**, 2952; 1895, **28**, 3068.

Lysine (1 : 5-*Diamino*-n-*caproic acid*)

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$

$C_6H_{14}O_2N_2$ MW, 146

d-.

Obtained by hyd. of casein, egg albumen, fibrin, gelatin, blood corpuscles and seeds of some conifers. Found in beet molasses. Needles from H_2O or dil. EtOH. Darkens at 210°. M.p. 224–5° decomp. $[\alpha]_D^{20}$ + 14·6°. Very sol. H_2O. Prac. insol. EtOH. $k_a = 4{\cdot}9 \times 10^{-12}$ at 0°, $2{\cdot}95 \times 10^{-11}$ at 25°: $k_{b_1} = 7{\cdot}4 \times 10^{-6}$ at 0°, $0{\cdot}89 \times 10^{-5}$ at 25°: $k_{b_2} = 1{\cdot}82 \times 10^{-13}$ at 0°, $1{\cdot}52 \times 10^{-12}$ at 25°. Isoelectric point p_H 10·56° at 0°, 9·74 at 25°. $Ba(OH)_2$ at 150° or HCl at 165–70° ⟶ *dl*-lysine. Heat ⟶ pentamethylenediamine. $Ba(MnO_4)_2$ ⟶ glutaric, glutamic, oxalic, and hydrocyanic acids. KOH fusion ⟶ propionic and acetic acids.

B,HCl: m.p. 235–6°. Acid reaction.

B,2HCl: cryst. from dil. HCl. M.p. 193°. $[\alpha]_D^{20}$ + 15·3° in H_2O. Neutral reaction.

5-*Benzoyl*: m.p. 235°. $[\alpha]_D^{19}$ + 20·12° in HCl.Aq.

1 : 5-*Dibenzoyl*: *see d*-Lysuric Acid.

Benzylidene deriv.: m.p. 205–6°.

$B,H_2PtCl_6,EtOH$: yellow prisms. Decomp. at 120°.

$B_2,3HAuCl_4,HCl,2H_2O$: sinters at 120°. M.p. 152–5°.

Picrate: cryst. from H_2O. M.p. 266° decomp. Spar. sol. EtOH.

dl-.

B,HCl: m.p. 235–6°.

B,2HCl: cryst. M.p. 188–90° (183–6°). Sol. H_2O.

1-*Benzoyl*: needles. M.p. 235° (235–49°). Sol. hot H_2O. Spar. sol. EtOH. Insol. Et_2O, $CHCl_3$, C_6H_6.

5-*Benzoyl*: cryst. from H_2O. M.p. 254° (263–8°).

1 : 5-*Dibenzoyl*: *see dl*-Lysuric Acid.

1-*Benzoyl*-5-p-*toluenesulphonyl*: m.p. 140°.

5-*Benzoyl*-1-p-*toluenesulphonyl*: m.p. 199°.

1-*Me*: *B,HCl*, m.p. 244–5°. *B,HI*: m.p. 239–41°. *Picrolonate*: m.p. 243–5°.

5-*Me*: *picrate*, m.p. 227° decomp. *Picrolonate*: m.p. 228° decomp.

1-*Me*-5-*benzoyl*: m.p. 234°.

5-Me-5-benzoyl : m.p. 232°.

Me ester : $C_7H_{16}O_2N_2$. MW, 160. Syrup. Alkaline reaction. *B,HCl*, m.p. 218° decomp. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O, C_6H_6.

Picrate : yellow needles from H_2O. Decomp. at 230°.

$B,2HAuCl_4,\frac{1}{2}H_2O$: m.p. 173–6° decomp.

Eck, Marvel, *J. Biol. Chem.*, 1934, **106**, 387.
Vickery, Leavenworth, *J. Biol. Chem.*, 1928, **76**, 437.
Cox, King, Berg, *J. Biol. Chem.*, 1929, **81**, 755.
Foster, Schmidt, *J. Am. Chem. Soc.*, 1926, **48**, 1712.
van Slyke, *J. Biol. Chem.*, 1914, **16**, 531.
Fischer, Weigert, *Ber.*, 1902, **35**, 3772.
Sörensen, *Chem. Zentr.*, 1903, II, 35.
v. Braun, *Ber.*, 1909, **42**, 839.

Lysuric Acid (N : N′-*Dibenzoyl-lysine*)

$C_6H_5·CO·NH·[CH_2]_4·CH·COOH$
$NH·CO·C_6H_5$

$C_{20}H_{22}O_4N_2$ MW, 354

d-.

Cryst. M.p. 149–50° (144–5°). $[\alpha]^{20}_D + 3·06°$ in 0·1*N*/NaOH, $[\alpha]^{15}_D - 8·59°$ in MeOH. Sol. EtOH. Spar. sol. cold H_2O. Conc. HCl or $Ba(OH)_2$ ⟶ 1- and 5-benzoyl-lysine.

Me ester : $C_{21}H_{24}O_4N_2$. MW, 368. M.p. 114°. $[\alpha]^{17}_D - 18·6°$ in MeOH.

Et ester : $C_{22}H_{26}H_4N_2$. MW, 382. M.p. 101°. $[\alpha]^{19}_D - 16·2°$ in EtOH.

$NaA,C_{20}H_{22}O_4N_2,H_2O$: m.p. 108–9°.

$BaA_2,2C_{20}H_{22}O_4N_2,2H_2O$: needles. M.p. 144–8°.

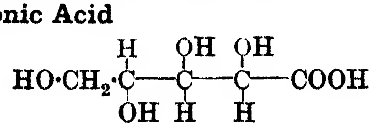
$BaA_2,1\frac{1}{2}H_2O$: m.p. 168°. Sol. H_2O, hot EtOH.

dl-.

Plates from Me_2CO. M.p. 145–6°. Sol. EtOH, Me_2CO. Spar. sol. H_2O, Et_2O, C_6H_6. Conc. HCl or $Na(OH)_2$ ⟶ 1- and 5- benzoyl-lysine.

Karrer, Escher, Widmer, *Helv. Chim. Acta*, 1926, **9**, 316.
Karrer, Ehrenstein, *Helv. Chim. Acta*, 1926, **9**, 326.
Drechsel, *Ber.*, 1895, **28**, 3190.
Fischer, Weigert, *Ber.*, 1902, **35**, 3776.
v. Braun, *Ber.*, 1909, **42**, 845.

Lyxonic Acid



$C_5H_{10}O_6$ MW, 166

d-.

M.p. 144°. $[\alpha]^{20}_D$ 6·6° + initially, 52·7° on standing. Sol. H_2O. Spar. sol. EtOH. NaHg in dil. H_2SO_4 ⟶ *d*-lyxose. Py + H_2O at 135° ⟶ *d*-xylonic acid. Evaporation of aq. sol. ⟶ lyxonolactone.

K salt, H_2O : m.p. 166°. $[\alpha]^{20}_D - 8·5°$.

γ-Lactone : m.p. 110°. $[\alpha]^{20}_D + 77·7°$ in H_2O.

Tri-Me-δ-lactone : b.p. 105°/0·02 mm. n^{18}_D 1·4620. $[\alpha]^{19}_D + 35·5°$ initially, − 9·3° on standing in H_2O.

Quinine salt : needles from EtOH. M.p. 169°. $[\alpha]^{20}_D - 109·8°$.

Brucine salt : prisms or plates from EtOH. M.p. 174–6°. Needles + H_2O from dil. EtOH. M.p. 168–70°. Sol. H_2O. $[\alpha]^{20}_D - 27·57°$.

Hydrazide : m.p. 188°. $[\alpha]^{14}_D - 3·6°$ in H_2O.

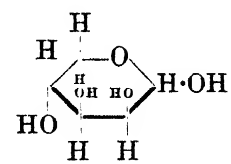
Phenylhydrazide : m.p. 164°. $[\alpha]^{20}_D - 13·72°$.

Rehorst, *Ann.*, 1933, **503**, 157.
Fischer, Bromberg, *Ber.*, 1896, **29**, 581.
Maurer, Müller, *Ber.*, 1930, **63**, 2072.

Lyxosamine.

See Lyxosimine.

Lyxose



$C_5H_{10}O_5$ MW, 150

d-.

α-Form :

Cryst. from EtOH–Et_2O. M.p. 106–7° (101°). Hygroscopic. Very sol. H_2O. Sol. 37·97 parts EtOH at 17°. Exhibits mutarotation. $[\alpha]^{20}_D$ + 5·5° initially, − 14° on standing. Br water ⟶ *d*-lyxonic acid. NaHg ⟶ *d*-arabitol. Dist. with HCl ⟶ furfural. MeOH + NH_3 ⟶ *d*-lyxosimine. HCN followed by hyd. ⟶ *d*-galactonic and *d*-talonic acids. Reduces Fehling's. Does not undergo fermentation. Gives the same phenylosazone as *d*-xylose.

Phenylosazone : m.p. 164°. Decomp. at 167°.

p-*Bromophenylhydrazone* : m.p. 161·5° (156–7°).

p-*Nitrophenylhydrazone* : m.p. 172°.

Phenyl-p-*chlorobenzylhydrazone* : m.p. 134–5°. $[\alpha]_D + 29·2°$ in MeOH.

Dibenzylhydrazone : m.p. 115–18°. $[\alpha]_D + 27·7°$ in MeOH.

Me-lyxoside : cryst. from AcOEt. M.p. 109°. $[\alpha]_D + 59°$.

2 : 3 : 4-*Tri-Me-Me-lyxoside* : b.p. about 70°/0·02 mm. n^{14}_D 1·4460. $[\alpha]^{20}_{5461} + 10°$ in H_2O.

2 : 3 : 4-*Tri-Me-lyxose*: needles from pet. ether. M.p. 79°. $[\alpha]_D^{20}$ − 22° in H_2O.

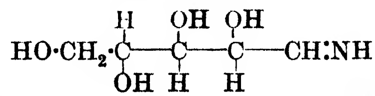
β-*Form*:
Needles from EtOH. M.p. 117–18°. $[\alpha]_D$ − 70° in H_2O initially, − 14° on standing. Very sol. H_2O. Spar. sol. EtOH. The osazone and hydrazones are identical with those of the α-form.

l-.
Cryst. M.p. 105°. Hygroscopic. $[\alpha]_D$ −5·8° initially, − 13·5° on standing.
p-*Bromophenylhydrazone*: m.p. 157°.
p-*Nitrophenylhydrazone*: m.p. 172°.

dl-.
Cryst. M.p. 95°.

Haworth, Hirst, *J. Chem. Soc.*, 1928, 1228.
Hirst, Smith, *J. Chem. Soc.*, 1928, 3147.
van Ekenstein, Blanksma, *Chem. Weekblad.*, 1914, **11**, 189.
Clark, *J. Biol. Chem.*, 1917, **31**, 605.
Weerman, *Rec. trav. chim.*, 1917–8, **37**, 31.
Ruff, Ollendorff, *Ber.*, 1900, **33**, 1799.
Wohl, List, *Ber.*, 1897, **30**, 3105.
Fischer, Bromberg, *Ber.*, 1896, **29**, 584.

Lyxosimine (*Lyxosamine*)



$C_5H_{11}O_4N$ MW, 149

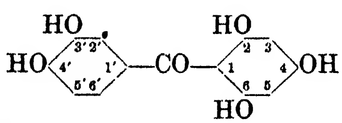
d-.
Cryst. M.p. 142–3°. $[\alpha]_D^{5}$ − 54·5° in H_2O initially, − 44·5° on standing.

Levene, La Forge, *J. Biol. Chem.*, 1915, **22**, 333.
Levene, *J. Biol. Chem.*, 1916, **24**, 62.

M

M Acid.
See 1-Amino-5-naphthol-7-sulphonic Acid.

Maclurin (2 : 4 : 6 : 3′ : 4′-*Pentahydroxybenzophenone*)



$C_{13}H_{10}O_6$ MW, 262

Yellow prisms + $1H_2O$ from H_2O. M.p. anhyd. 220–2°. Very sol. EtOH, Et_2O. Spar. sol. H_2O. Conc. H_2SO_4 ⟶ yellow col. $FeCl_3$ → dark green col.

3′-*Me ether*: $C_{14}H_{12}O_6$. MW, 276. Yellow needles + $1H_2O$ from H_2O. Decomp. above 200°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Alc. $FeCl_3$ ⟶ brown col.

2 : 4 : 6-*Tri-Me ether*: cotogenin. $C_{16}H_{16}O_6$. MW, 304. Leaflets from EtOH. M.p. 217°. Spar. sol. EtOH. Alc. $FeCl_3$ ⟶ green col. *Diacetyl*: prisms. M.p. 120°.

Penta-Me ether: $C_{18}H_{20}O_6$. MW, 332. Plates from EtOH or C_6H_6–ligroin. M.p. 157°. Sol. warm EtOH, Et_2O, AcOH.

Ciamician, Silber, *Ber.*, 1893, **26**, 783.
Hoesch, v. Zarrzechi, *Ber.*, 1917, **50**, 467.
Nierenstein, *J. Indian Chem. Soc.*, 1931, **8**. 143.

Macralstonidine

$C_{41}H_{50}O_3N_4$ MW, 646

Alkaloid of *Alstonia macrophylla*. Plates from EtOH. Decomp. about 270°. $[\alpha]_D$ + 174·5° in C_6H_6. Hygroscopic.
B,2HCl: needles from EtOH. M.p. 326° decomp. $[\alpha]_D$ + 136·5° in H_2O.

Sharp, *J. Chem. Soc.*, 1934, 1231.

Macralstonine

$C_{44}H_{54}O_5N_4$ MW, 718

Alkaloid of *Alstonia macrophylla*. Cryst. from EtOH–Py. M.p. 293° decomp. Sol. $CHCl_3$, Py. Spar. sol. Me_2CO. Insol. other org. solvents. $[\alpha]_D$ + 27·5° in $CHCl_3$.
B,H_2SO_4: prisms from MeOH. M.p. about 263° decomp. $[\alpha]_D$ − 36·8° in H_2O.

See previous reference.

α-Malamic Acid (α-*Malamidic acid, malic acid* 1-*amide*)

HO·CH·$CONH_2$
CH_2·COOH

$C_4H_7O_4N$ MW, 133

l-.
Me ester: $C_5H_9O_4N$. MW, 147. Cryst. M.p. 66–7°. $[\alpha]_D$ − 48·48° in MeOH. Insol. Et_2O.

Et ester: $C_6H_{11}O_4N$. MW, 161. Cryst. M.p. 102–3°. $[\alpha]_D$ − 42·0° in MeOH. Sol. EtOH. Insol. Et_2O.

Benzylamide: m.p. 131–2°. $[\alpha]_D$ − 42·62° in MeOH.

d-.

Benzylamide: m.p. 131°. Sol. EtOH, MeOH. Spar. sol. H_2O. Insol. Et_2O. $[\alpha]_D$ + 42·40° in MeOH.

dl-.

Me ester: prisms from EtOH. M.p. 146°. Sol. H_2O, EtOH, Et_2O. *Benzoyl*: cryst. M.p. 78–80°. Sol. Et_2O.

Et ester: *benzoyl*, cryst. from Et_2O. M.p. 96–7°. Very sol. H_2O. Sol. EtOH, Et_2O.

Lutz, *Chem. Zentr.*, 1900, II, 1013; *Ber.*, 1902, **35**, 2462; 1908, **41**, 842.
Curtius, Koch, *J. prakt. Chem.*, 1888, **38**, 479.

β-Malamic Acid (β-*Malamidic acid, malic acid 2-amide*)

HO·CH·COOH
CH₂·CONH₂ → $CH_2 \cdot CONH_2$

$C_4H_7O_4N$ MW, 133

l-.

Cryst. M.p. 149°. Sol. H_2O. $D_{4\ vac.}^{18}$ 1·576. $[\alpha]_D$ − 9·33° in H_2O. $k = 2{\cdot}86 \times 10^{-4}$ at 25°.

N-*Benzyl*: m.p. 130–1°. D_4^{18} 1·349. $[\alpha]_D^{20}$ − 13·8° in MeOH.

N-*Dibenzyl*: prisms. M.p. 170°. $[\alpha]_D$ −61·6° in EtOH.

Me ester: $C_5H_9O_4N$. MW, 147. M.p. 75–6°. $[\alpha]_D$ − 12·5° in MeOH. N-*Benzyl*: leaflets from EtOH. M.p. 105°. Insol. Et_2O. $[\alpha]_D^{20}$ − 12·8° in MeOH.

d-.

Plates from H_2O. M.p. 149°. $D_{4\ vac.}^{18}$ 1·577. $[\alpha]_D$ + 9·70° in H_2O. $k = 2{\cdot}86 \times 10^{-4}$ at 25°. Alkalis ⟶ *d*-malic acid.

Me ester: cryst. M.p. 75–6°. $[\alpha]_D$ + 12·7° in MeOH. N-*Benzyl*: m.p. 105°. Sol. EtOH. Insol. Et_2O. $[\alpha]_D^{20}$ + 12·8° in MeOH.

N-*Benzyl*: plates. M.p. 130–1° decomp. Sol. EtOH, MeOH. Insol. Et_2O. D_4^{18} 1·347. $[\alpha]_D^{20}$ + 13·6° in MeOH.

Benzylamide: m.p. 125–6°. $[\alpha]_D$ + 44·56° in MeOH.

Cinchonine salt: m.p. 165–7°.

dl-.

Cryst. M.p. 148°. Spar. sol. MeOH, EtOH. Insol. Et_2O. D_D^{18} 1·526.

Me ester: cryst. M.p. 113°. Spar. sol. MeOH.

N-*Benzyl*: m.p. 131°. D_4^{18} 1·1360. Heat at m.p. ⟶ benzylmaleimide.

See previous references.

Malamide (*Malic acid diamide*)

HO·CH·CONH₂
CH₂·CONH₂

$C_4H_8O_3N_2$ MW, 132

d-.

Cryst. M.p. 156–7°. $[\alpha]_D^{20}$ + 37·9° in H_2O.

NN′-*Dibenzyl*: plates. M.p. 157°. $[\alpha]_D^{18}$ + 36·7° in MeOH.

l-.

Prisms from H_2O. M.p. 156–8°. $[\alpha]_D^{20}$ − 38·0° in H_2O.

Me ether: *l*-methoxysuccinic diamide. $C_5H_{10}O_3N_2$. MW, 146. Prisms from MeOH. M.p. 178–9°.

NN′-*Dibenzyl*: prisms from C_6H_6. M.p. 157°. Sol. EtOH, MeOH. Spar. sol. H_2O. $[\alpha]_D^{19}$ − 36·9° in MeOH. $[\alpha]_D^{15}$ − 32·4° in Py.

dl-.

Cryst. M.p. 163–4°.

Me ether: *dl*-methoxysuccinic diamide. Cryst. M.p. 175°. Sol. H_2O, hot EtOH. Insol. Et_2O.

Lutz, *Chem. Zentr.*, 1900, II, 1013; *Ber.*, 1904, **37**, 2127.
Freudenberg, *Ber.*, 1914, **47**, 2031.

Malamidic Acid.
See Malamic Acid.

Malanil

HO·CH—CO
CH₂—CO >N·C₆H₅

$C_{10}H_9O_3N$ MW, 191

Needles from H_2O. M.p. 170°. Sol. H_2O, EtOH, Et_2O. $[\alpha]_D$ − 34°. Heat at 120° ⟶ fumaric acid + fumaranilide.

Acetyl: cryst. M.p. 157°. Sol. EtOH.

Arppe, *Ann.*, 1855, **96**, 110.
Bischoff, *Ber.*, 1891, **24**, 2007.

Malanilic Acid.
See under Malic Acid.

Malanilide (l-*Malic acid dianilide*)

HO·CH·CO·NH·C₆H₅
CH₂·CO·NH·C₆H₅

$C_{16}H_{16}O_3N$ MW, 270

Cryst. from EtOH. M.p. 198°. Spar. sol. EtOH, Et_2O. $[\alpha]_D$ − 101·1° in Py.Aq., −60·66° in AcOH.

Me ether: methoxysuccinic dianilide. $C_{17}H_{18}O_3N$. MW, 284. Needles from C_6H_6. M.p. 158–9°.

Acetyl: cryst. from MeOH. M.p. 177°.

Bischoff, Nastvogel, *Ber.*, 1890, **23**, 2040.
Freundenberg, Noë, *Ber.*, 1925, **58**, 2406.

Malealdehyde.
See Maleic Dialdehyde.

Maleamic Acid (*Maleic acid monoamide, maleinamic acid*)

CH·COOH
‖
CH·CONH$_2$

$C_4H_5O_3N$ MW, 115

Leaflets from H_2O. M.p. 172–3° (decomp. at 152–3°). Sol. H_2O, hot EtOH. Insol. Et_2O, C_6H_6, $CHCl_3$. Alc. KOH ⟶ fumaric acid.

Anilide: maleanilic acid amide. Yellow cryst. from C_6H_6. M.p. 173–5°.

N-*Benzyl*: leaflets from EtOH.Aq. M.p. 138°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Insol. C_6H_6.

N-*Diphenyl*: *see under* Maleanilic Acid.

Piutti, Giustiniani, *Gazz. chim. ital.*, 1896, **26**, 438.
Anschütz, *Ann.*, 1890, **259**, 138.
Plancher, Ravenna, *Atti accad. Lincei*, 1905, **14**, 216.

Maleamide (*Maleic acid diamide, maleinamide*)

CH·CONH$_2$
‖
CH·CONH$_2$

$C_4H_6O_2N_2$ MW, 114

Cryst. from MeOH. M.p. 266° decomp.

Rinkes, *Rec. trav. chim.*, 1927, **46**, 272.

Maleanil (*Maleinanil*, N-*phenylmaleimide*)

CH·CO
‖ >N·C$_6$H$_5$
CH·CO

$C_{10}H_7O_2N$ MW, 173

Yellow needles from C_6H_6–ligroin. M.p. 90–1°. B.p. 162·1–162·3°/12 mm. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. H_2O, ligroin, CS_2. Alkalis ⟶ fumaranilic acid.

Anschütz, Wirtz, *Ann.*, 1887, **239**, 140.
Auwers, Schleicher, *Ann.*, 1899, **309**, 346.

Maleanilic Acid (*Maleic acid monoanilide, maleinanilic acid*)

CH·CO·NH·C$_6$H$_5$
‖
CH·COOH

$C_{10}H_9O_3N$ MW, 191

Yellow prisms from EtOH. M.p. 198° (187–187·5°). Spar. sol. H_2O.

Me ester: $C_{11}H_{11}O_3N$. MW, 205. Leaflets or needles from C_6H_6. M.p. 76–78·5°. Sol. EtOH, Et_2O. Mod. sol. C_6H_6. Spar. sol. pet. ether.

Amide: *see under* Maleamic Acid.

N-*Phenyl*: *N*-diphenylmaleamic acid. Needles from EtOH. M.p. 130°.

Anschütz, *Ber.*, 1887, **20**, 3215.
Hoogewerff, v. Dorp, *Rec. trav. chim.*, 1899, **18**, 363.

Maleanilide (*Maleic acid dianilide, maleinanilide*)

CH·CO·NH·C$_6$H$_5$
‖
CH·CO·NH·C$_6$H$_5$

$C_{16}H_{14}O_2N_2$ MW, 266

Leaflets or prisms from MeOH or EtOH. M.p. 184–6°. Sol. MeOH, EtOH. Spar. sol. dry Et_2O, C_6H_6.

v. Dorp, v. Haarst, *Rec. trav. chim.*, 1900, **19**, 311.
v. Dorp, v. Dorp, *Rec. trav. chim.*, 1906, **25**, 103.

Maleic Acid (*Ethylene*-1 : 2-*dicarboxylic acid*, cis-*form*. *Cf.* Fumaric Acid)

CH·COOH
‖
CH·COOH

$C_4H_4O_4$ MW, 116

Prisms. M.p. 130–130·5°. Very sol. H_2O, EtOH. k (first) $= 1·17 \times 10^{-2}$ at 25°; (second) $= 2·6 \times 10^{-7}$ at 25°. On standing ⟶ fumaric acid. Heat at 160° ⟶ anhydride. Electrolysis in alk. sol. ⟶ succinic acid + acetylene. Ozone in H_2O ⟶ glyoxylic acid. $KMnO_4$ ⟶ mesotartaric acid.

Di-Me ester: $C_6H_8O_4$. MW, 144. B.p. 205°, 102°/17 mm. D^{14} 1·1529, D^{21} 1·15060. $n_D^{19·9}$ 1·441556. Heat with I ⟶ fumaric ester.

Mono-Et ester: $C_6H_8O_4$. MW, 144. Syrup. Very sol. H_2O. $k = 1·1 \times 10^{-3}$ at 25°.

Di-Et ester: $C_8H_{12}O_4$. MW, 172. B.p. 223°, 105–6°/14 mm. $D_4^{17·6}$ 1·07155, D_{15}^{15} 1·0735. $n_D^{19·9}$ 1·441556.

Dipropyl ester: $C_{10}H_{16}O_4$. MW, 200. $D_4^{18·4}$ 1·03049. $n_D^{18·3}$ 1·444453.

Di-isopropyl ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 232–5° slight decomp.

Di-active-*amyl ester*: $C_{14}H_{24}O_4$. MW, 256. B.p. 170°/29 mm., 160°/20 mm. D_4^{20} 0·9708. n_D 1·4472. $[\alpha]_D^{20} + 4·62°$.

Mono-l-*menthyl ester*: cryst. from pet. ether. M.p. 85°.

Di-l-*menthyl ester*: cryst. from EtOH. M.p. 98·3°.

Mono-l-*bornyl ester*: plates from pentane. M.p. 50°. $[\alpha]_D^{17} - 47·5°$ in EtOH, $[\alpha]_D^{16} - 56·9°$ in $CHCl_3$.

Di-l-*bornyl ester*: cryst. from EtOH.Aq. M.p. 81°. $[\alpha]_D^{18} - 55°$ in EtOH.

Monophenyl ester: $C_{10}H_8O_4$. MW, 192. Needles from C_6H_6-ligroin. M.p. 101°.

Diphenyl ester: $C_{16}H_{12}O_4$. MW, 268. Plates from ligroin. M.p. 73°. B.p. 226°/15 mm.

Mono-o-*toluidide*: $C_{11}H_{11}O_3N$. MW, 205. Yellow prisms from EtOH. M.p. 117·5–118°. Sol. EtOH, Me_2CO. Insol. H_2O, Et_2O, C_6H_6, ligroin, CS_2.

Mono-p-*toluidide*: yellow needles from EtOH. M.p. 201° decomp. Sol. hot EtOH, Me_2CO, Et_2O. Insol. H_2O, C_6H_6, $CHCl_3$, ligroin.

Di-p-*toluidide*: $C_{18}H_{18}O_2N_2$. MW, 294. Cryst. from Et_2O. M.p. 142°.

2-*Mononaphthalide*: yellow needles from $CHCl_3$. M.p. 200° decomp. Sol. EtOH. Insol. H_2O.

Hydrazine deriv.: needles. M.p. 144° decomp.

Anhydride: *see* Maleic Anhydride.

Monoamide: *see* Maleamic Acid.

Diamide: *see* Maleamide.

Monoanilide: *see* Maleanilic Acid.

Dianilide: *see* Maleanilide.

Imide: *see* Maleimide.

Ureide: *see* Maleuric Acid.

Knops, *Ann.*, 1888, **248**, 194.

Dunlap, Phelps, *Am. Chem. J.*, 897, **19**, 494.

Kempf, *Ber.*, 1906, **39**, 3722.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, **41**, 80.

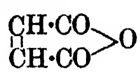
Guistiniani, *Gazz. chim. ital.*, 1893, **23**, 182.

Wassermann, *Ann.*, 1931, **488**, 223; 1932, **492**, 266.

Bischoff, v. Hedenström, *Ber.*, 1902, **35**, 4087.

I.G., F.P., 721,763, (*Chem. Abstracts*, 1932, **26**, 4067).

Maleic Anhydride



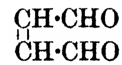
$C_4H_2O_3$ MW, 98

Needles from $CHCl_3$ or Et_2O. M.p. 60° (53°). B.p. 196°, 82°/14 mm. Sol. Me_2CO, $CHCl_3$. Spar. sol. ligroin. Readily sublimes. Forms characteristic add. comps. with compounds containing conjugated double bonds.

I.G., F.P., 721,763, (*Chem. Abstracts*, 1932, **26**, 4067).

Terry, Eichelberger, *J. Am. Chem. Soc.*, 1925, **47**, 1076.

Maleic Dialdehyde (*Malealdehyde, dialdehydoethylene*)



$C_4H_4O_2$ MW, 84

Yellow oil. B.p. 56–9°/9·5 mm. Sol. Me_2CO, AcOH, $CHCl_3$. Spar. sol. Et_2O, C_6H_6, toluene, CCl_4, CS_2. Yellow sols. in H_2O, MeOH, EtOH, and amyl alcohol become colourless on standing. Py sol. turns brown. Slowly polymerises. Reacts acid to litmus. $Ag_2CO_3 + H_2O \longrightarrow$ fumaric + maleic acids.

Dioxime: cryst. from MeOH. Decomp. at 152–5°. Sol. H_2O, amyl alcohol. Spar. sol. Et_2O, C_6H_6, $CHCl_3$, pet. ether.

Disemicarbazone: needles from H_2O. Spar. sol. all other solvents. Decomp. at 246–7°.

Diphenylhydrazone: plates from EtOH. M.p. 198–9° decomp. Sol. EtOH, hot MeOH, Me_2CO, AcOH, AcOEt, Py. Mod. sol. $CHCl_3$, C_6H_6. Spar. sol. H_2O, Et_2O, pet. ether.

Di-p-*nitrophenylhydrazone*: purple cryst. M.p. 238–40°. Sol. hot EtOH, MeOH, AcOH, Py. Insol. Et_2O, Me_2CO, C_6H_6. Conc. H_2SO_4 $\longrightarrow$ intense ruby-red sol.

Tetra-Me acetal: b.p. 198–198·5°/760 mm., 78°/10 mm. D_4^{20} 1·0047. n_D^{20} 1·42817. Mod. sol. H_2O. Misc. with most org. solvents.

Tetra-Et acetal: b.p. 112–112·5°/11 mm. D^{23} 0·926.

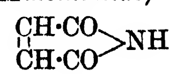
Wohl, Mylo, *Ber.*, 1912, **45**, 1746.

Wohl, Bernreuther, *Ann.*, 1930, **482**, 11, 29.

Maleic Semi-aldehyde.

See Formylacrylic Acid.

Maleimide (*Maleinimide*)



$C_4H_3O_2N$ MW, 97

Plates. M.p. 93°. Readily sublimes.

N-*Me*: $C_5H_5O_2N$. MW, 111. Prisms from Et_2O. M.p. 90–2°. Sol. EtOH. Spar. sol. C_6H_6. Easily volatile.

N-*Et*: $C_6H_7O_2N$. MW, 125. Cryst. from C_6H_6. M.p. 45·5°. Very sol. EtOH, Et_2O. Spar. sol. H_2O.

N-*Phenyl*: *see* Maleanil.

Piutti, Giustiniani, *Gazz. chim. ital.*, 1896, **26**, 438.

Plancher, Cottaderi, *Atti accad. Lincei*, 1904, **13**, 489.

Maleinamic Acid.

See Maleamic Acid.

Maleinamide.
See Maleamide.

Maleinanil.
See Maleanil.

Maleinanilic Acid.
See Maleanilic Acid.

Maleinanilide.
See Maleanilide.

Maleinimide.
See Maleimide.

Maleinuric Acid.
See Maleuric Acid.

Maleuric Acid (*Maleinuric acid*)

CH·CO·NH·CO·NH$_2$
‖
CH·COOH

$C_5H_6O_4N_2$ MW, 158

Cryst. M.p. 167·5–168° decomp. Sol. hot H_2O, Et_2O. Insol. Et_2O, $CHCl_3$.

Dunlap, Phelps, *Am. Chem. J.*, 1897, **19**, 492.

Malic Acid (*Hydroxysuccinic acid*)

HO·CH·COOH
|
CH$_2$·COOH

$C_4H_6O_5$ MW, 134

d-.

Cryst. M.p. 98–9°. Sol. H_2O, EtOH, MeOH, Me_2CO. $[\alpha]_D$ + 2·92° in MeOH, + 5·2° in Me_2CO.

Di-Na salt: $[\alpha]_D^{20}$ + 8·29° in H_2O.

Di-Me ester: $C_6H_{10}O_5$. MW, 162. $[\alpha]_D$ + 6°.

Cinnamyl ester: m.p. 105–10°.

Quinine salt: cryst. M.p. 160–70°. Spar. sol. cold H_2O.

Me ether: *see* Methoxysuccinic Acid.

Et ether: *d*-ethoxysuccinic acid. $C_6H_{10}O_5$. MW, 162. Prisms. M.p. 76–80°. $[\alpha]_D^{17}$ + 34·73° in H_2O, $[\alpha]_D^{11}$ + 60·57° in EtOH, $[\alpha]_D^{12}$ + 47·75° in $CHCl_3$, $[\alpha]_D^{18}$ + 70·52° in AcOEt. Hygroscopic. *Mono-NH_4 salt*: leaflets or prisms. $[\alpha]_D^{17}$ + 29·48°. *Di-NH_4 salt*: $[\alpha]_D^{12}$ + 18·93° in H_2O. *Mono-K salt*: prisms. $[\alpha]_D^{19}$ + 26·49° in H_2O. *Di-Me ester*: $C_8H_{14}O_5$. MW, 190. B.p. 121°/30 mm. D_4^{13} 1·1055. $[\alpha]_D^{13}$ + 59·86°. *Di-Et ester*: $C_{10}H_{18}O_5$. MW, 218. B.p. 124°/13 mm. D_4^{12} 1·0475. $[\alpha]_D^{15}$ + 55·62°. *Dipropyl ester*: $C_{12}H_{22}O_5$. MW, 246. B.p. 144°/11 mm. D_4^{15} 1·0131. $[\alpha]_D^{15}$ + 51·31°.

Propyl ether: $C_7H_{12}O_5$. MW, 176. Cryst. M.p. 63–6°. $[\alpha]_D^{12}$ + 36·04° in H_2O. Hygroscopic. *Mono-K salt*: $[\alpha]_D^{18}$ + 32·30° in H_2O. *Di-K salt*: $[\alpha]_D^{18}$ + 18·69° in H_2O. *Ca salt*: $[\alpha]_D^{12}$ + 14·18° in H_2O.

Mono-amide: *see* Malamic Acid.

Diamide: *see* Malamide.

Benzylamide: *see under* Malamic Acid.

l-.

Needles. M.p. 100°. Very sol. EtOH. Spar. sol. Et_2O. D_4^{20} 1·595. Specific rotation depends on the concentration of the sol. *k* (first) = $3·95 \times 10^{-4}$ at 25°; (second) = $8·3 \times 10^{-6}$ at 25°. Heat at 100° ⟶ malomalic acid. Electrolysis ⟶ acetaldehyde. HI at 130° ⟶ succinic acid. 20% NaOH ⟶ fumaric acid. Ag_2O ⟶ malonic acid.

Mono-NH_4 salt: m.p. 160–1°. $D^{12·5}$ 1·5500. Triboluminescent.

Di-Me ester: b.p. 242°, 122°/12 mm. D_4^{20} 1·2334, D^{100} 1·1442. n_D^{20} 1·4425. $[\alpha]_D^{20}$ − 6·85°. On long heating ⟶ fumaric ester. Easily decomp. by H_2O. *Acetyl*: *see under* Acetoxysuccinic Acid. *Chloroacetyl*: b.p. 187–8°/37 mm. D_4^{20} 1·3062. n_D^{20} 1·4530. $[\alpha]_D^{20}$ − 23·30°. *Bromoacetyl*: b.p. 194–5°/22 mm. D_4^{20} 1·5072. n_D^{20} 1·4680. $[\alpha]_D^{20}$ − 22·40°. *Propionyl*: b.p. 145–7°/10 mm. D_4^{20} 1·1609. n_D^{20} 1·4328. $[\alpha]_D^{20}$ − 22·94°. *Butyryl*: b.p. 150°/10 mm. D_4^{20} 1·1317. n_D^{20} 1·4342. $[\alpha]_D^{20}$ − 22·44°. *Isobutyryl*: b.p. 140°/8 mm. D_4^{26} 1·1255. n_D^{20} 1·4310. $[\alpha]_D^{20}$ − 22·36°. *Isovaleryl*: b.p. 158–60°/10 mm. D_4^{20} 1·1034. n_D^{20} 1·4350. $[\alpha]_D^{20}$ − 22·39°. *Benzoyl*: b.p. 210–23°/12 mm. D_4^{40} 1·1944. $[\alpha]_D^{21}$ − 5·62°. *Cinnamoyl*: m.p. 304–5°.

Di-Et ester: $C_8H_{14}O_5$. MW, 190. B.p. 253°, 128°/10 mm. D_4^{20} 1·1280, D_4^{100} 1·10366, D^{40} 1·1099. n_D^{20} 1·4362. $[\alpha]_D^{20}$ − 10·18°, $[\alpha]_D^{11}$ − 10·30°. *Formyl*: b.p. 120–1°/2 mm. *Acetyl*: *see under* Acetoxysuccinic Acid. *Bromoacetyl*: b.p. 178–82°/10 mm. D_4^{20} 1·3936. n_D^{20} 1·4610. $[\alpha]_D^{20}$ − 22·48°. *Propionyl*: b.p. 150°/9 mm., 160°/18 mm. D_4^{20} 1·0958. n_D^{20} 1·4308. $[\alpha]_D^{20}$ − 22·20°. 1-*Bromopropionyl*: b.p. 187–8°/12 mm. D_4^{20} 1·3325. n_D^{20} 1·4561. $[\alpha]_D^{20}$ − 22·48°. *Butyryl*: b.p. 162–3°/12 mm., 157°/13 mm. D_4^{11} 1·0792, D_4^{20} 1·0736. n_D^{20} 1·4315. $[\alpha]_D^{20}$ − 22·22°, $[\alpha]_D^{11}$ − 22·70°. 1-*Bromobutyryl*: b.p. 188–90°/10 mm. D_4^{20} 1·3059. n_D^{20} 1·4568. $[\alpha]_D^{20}$ − 24·76°. *Isobutyryl*: b.p. 160°/15 mm. D_4^{20} 1·0688. n_D^{20} 1·4285. $[\alpha]_D^{20}$ − 21·90°. 1-*Bromoisobutyryl*: b.p. 177–80°/12 mm. D_4^{20} 1·2850. n_D^{20} 1·4520. $[\alpha]_D^{20}$ − 22·57°. n-*Valeryl*: b.p. 176–7°/19 mm. D_4^{20} 1·0551. n_D^{20} 1·43168. $[\alpha]_D^{20}$ − 21·38°. *Isovaleryl*: b.p. 168°/10 mm. D_4^{20} 1·0605. n_D^{20} 1·4538. $[\alpha]_D^{20}$ − 22·07°. *Caproyl*: b.p. 182–182·6°/17 mm. D_4^{20} 1·0420. n_D^{20} 1·43348. $[\alpha]_D^{20}$ − 20·30°. *Heptylyl*: b.p. 191·6–192·2°/15·5 mm. D_4^{20} 1·0289. n_D^{20} 1·43499. $[\alpha]_D^{20}$ − 19·30°. *Caprylyl*: b.p. 199·4°/15 mm. D_4^{20}

1·0162. n_D^{20} 1·43639. $[\alpha]_D^{20}$ − 18·21°. *Pelargonyl*: b.p. 206·8–208·8°/14·5 mm. D_4^{20} 1·0073. n_D^{20} 1·43820. $[\alpha]_D^{20}$ − 17·24°. *Capryl*: b.p. 217·2–217·6°/13·5 mm. D_4^{20} 1·0011. n_D^{20} 1·43931. $[\alpha]_D^{20}$ − 16·61°. *Benzoyl*: b.p. 210–20°/12 mm. D_4^{40} 1·1361. $[\alpha]_D^{21}$ − 3·87°. *Cinnamoyl*: light yellow oil. B.p. 195°/2 mm. *Hydrocinnamoyl*: b.p. 185–6°/3 mm. *Ethane-sulphonyl*: b.p. 154–5°/0·5 mm. p-*Toluenesulphonyl*: b.p. 197–8°/1 mm.

Dipropyl ester: $C_{10}H_{18}O_5$. MW, 218. B.p. 152°/10 mm. D_4^{20} 1·0736. n_D^{20} 1·4380. $[\alpha]_D^{20}$ − 11·601°. *Acetyl*: b.p. 162–3°/16 mm. D_4^{20} 1·0724. n_D^{20} 1·4315. $[\alpha]_D^{20}$ − 22·85°. *Chloroacetyl*: b.p. 182–4°/15 mm. D_4^{20} 1·1566. n_D^{20} 1·4465. $[\alpha]_D^{20}$ − 23·52°. *Bromoacetyl*: b.p. 192–3°/17 mm. D_4^{20} 1·3150. n_D^{20} 1·4608. $[\alpha]_D^{20}$ − 22·24°. *Butyryl*: b.p. 174·5°/16 mm. D_4^{20} 1·0417. n_D^{20} 1·4348. $[\alpha]_D^{20}$ − 22·40°. *Isovaleryl*: b.p. 182–3°/17 mm. D_4^{20} 1·0263. n_D^{20} 1·4352. $[\alpha]_D^{20}$ − 21·68°.

Di-isopropyl ester: $C_{10}H_{18}O_5$. MW, 218. B.p. 147°/14 mm. D_4^{20} 1·1076. n_D^{20} 1·4363. $[\alpha]_D^{20}$ − 10·41°.

Dibutyl ester: $C_{12}H_{22}O_5$. MW, 246. B.p. 169·4–170·4°/12–13 mm. D_4^{20} 1·0382. $[\alpha]_D^{20}$ − 10·72°. *Acetyl*: b.p. 177·4–178·2°/12 mm. D_4^{20} 1·0430. $[\alpha]_D^{20}$ − 19·925°.

Di-isobutyl ester: $C_{12}H_{22}O_5$. MW, 246. B.p. 175°/15 mm. D_4^{20} 1·0418. n_D^{20} 1·4392. $[\alpha]_D^{20}$ − 11·14°. *Acetyl*: b.p. 179°/20 mm. D_4^{20} 1·0362. n_D^{20} 1·4330. $[\alpha]_D^{20}$ − 21·88°. *Bromoacetyl*: b.p. 195–7°/15 mm. D_4^{20} 1·2022. n_D^{20} 1·4520. $[\alpha]_D^{20}$ − 20·38°. *Butyryl*: b.p. 190–2°/14 mm. D_4^{20} 1·0146. n_D^{20} 1·4352. $[\alpha]_D^{20}$ − 21·68°. *Isovaleryl*: b.p. 195°/16 mm. D_4^{20} 1·0045. n_D^{20} 1·4353. $[\alpha]_D^{20}$ − 19·91°.

*Di-*d*-amyl ester*: $C_{14}H_{26}O_5$. MW, 274. B.p. 191–2°/20 mm. D_4^{20} 1·0176. $[\alpha]_D^{20}$ − 6·88°.

*Di-*dl*-amyl ester*: b.p. 191–2°/20 mm. D_4^{20} 1·0179. n_D^{20} 1·4438. $[\alpha]_D^{20}$ − 9·92.

Me ether: *see* Methoxysuccinic Acid.

Et ether: *l*-ethoxysuccinic acid. $C_6H_{10}O_5$. MW, 162. Cryst. M.p. 76–80°. $[\alpha]_D^{14}$ − 66·48° in Me_2CO. *Mono-NH_4 salt*: leaflets or prisms. $[\alpha]_D$ − 29·49° in H_2O. *Mono-strychnine salt*: $[\alpha]_D^{11}$ − 34·9° in H_2O. *Di-strychnine salt*: $[\alpha]_D^{17}$ − 34° in H_2O. *Di-Me ester*: $C_8H_{14}O_5$. MW, 190. B.p. 110°/12 mm. D_4^{12} 1·1080. $[\alpha]_D^{12}$ − 61·13°. *Di-Et ester*: $C_{10}H_{18}O_5$. MW, 218. B.p. 118–20°/15 mm. D_4^{6} 1·0501. $[\alpha]_D^{6}$ −54·14°. *Dipropyl ester*: $C_{12}H_{22}O_5$. MW, 246. B.p. 147°/17 mm. D_4^{7} 1·0226. $[\alpha]_D^{7}$ − 51·20°. *Dibutyl ester*: $C_{14}H_{26}O_5$. MW, 274. B.p. 158°/13 mm. D_4^{6} 1·0045. $[\alpha]_D^{6}$ − 46·43°.

Propyl ether: $C_7H_{12}O_5$. MW, 176. Cryst. M.p. 67°. $[\alpha]_D^{12}$ − 36·40° in H_2O, $[\alpha]_D^{12}$ − 64·39° in Me_2CO. Very hygroscopic. *Ca salt*: $[\alpha]_D^{12}$ − 14·49° in H_2O. *Ba salt*: cryst. $[\alpha]_D^{18}$ − 10·45° in H_2O.

Isopropyl ether: $C_7H_{12}O_5$. MW, 176. Cryst. $[\alpha]_D^{18}$ − 36·26° in H_2O. Decomp. easily. *Mono-K salt*: $[\alpha]_D^{18}$ − 31·78° in H_2O. *Di-K salt*: $[\alpha]_D^{16}$ − 19·02° in H_2O. *Ca salt*: cryst. Spar. sol. H_2O. $[\alpha]_D^{18}$ − 19·57° in H_2O. *Ba salt*: cryst. Sol. H_2O. $[\alpha]_D^{20}$ − 12·16° in H_2O. *Di-isopropyl ester*: $C_{13}H_{24}O_5$. MW, 260. B.p. 148°/25 mm. $D_4^{17·5}$ 0·9762. $[\alpha]_D^{18}$ − 58·47°.

Isobutyl ether: $C_8H_{14}O_5$. MW, 190. *Di-Na salt*: $[\alpha]_D$ − 27·8° in H_2O. *Ba salt*: $[\alpha]_D^{13}$ − 21·4° in H_2O.

Acetyl: *see* Acetoxysuccinic Acid.

Propionyl: cryst. from $CHCl_3$. Decomp. at 130°.

Nitrate: "nitromalic acid." Needles from H_2O. M.p. 115° decomp. Sol. H_2O, EtOH, Et_2O, AcOH. Insol. C_6H_6, ligroin. *Di-Me ester*: cryst. M.p. 24–5°. D_4^{20} 1·3184. n_D^{13} 1·4390. $[\alpha]_D^{20}$ − 18·80° in $CHCl_3$. *Di-Et ester*: F.p. − 70°. B.p. 148–51°/25 mm. D^{16} 1·2024. D_4^{20} 1·2090. n_D^{13} 1·4325. $[\alpha]_D^{20}$ − 31·24°. *Dipropyl ester*: liq. Decomp. on heating. D_4^{20} 1·1932. n_D^{13} 1·4363. $[\alpha]_D^{20}$ − 10·41°.

Benzoyl: cryst. from H_2O. M.p. 162°.

Cinnamoyl: m.p. 145°. *Ag salt*: $[\alpha]_D^{25}$ + 8·6°.

Monoamide: *see* Malamic Acid.

Diamide: *see* Malamide.

Monoanilide: malanilic acid. $C_{10}H_{11}O_4N$. MW, 209. Cryst. M.p. 155°. Sol. H_2O, EtOH. Spar. sol. Et_2O.

Dianilide: *see* Malanilide.

Benzylamide: *see under* Malamic Acid.

Dihydrazide: amorph. from EtOH.Aq. M.p. 177·5°. Sol. H_2O. Mod. sol. EtOH. Spar. sol. Et_2O. *B,2HCl*: needles. M.p. 189° decomp. Very sol. H_2O. *Diacetyl*: m.p. 174·5°. *Dibenzylidene*: m.p. 164°. *Cinnamylidene*: m.p. 192°. *Acetone deriv.*: m.p. 168°.

Anhydride: $C_4H_4O_4$. MW, 116. *Acetyl*: m.p. 58°. Very sol. AcOH, Ac_2O.

*Mono-*o*-toluidide*: leaflets from Et_2O. M.p. 174°. Sol. H_2O, EtOH, Et_2O.

*Di-*o*-toluidide*: $C_{18}H_{20}O_3N_2$. MW, 312. Plates from EtOH. M.p. 180·5–181·5°. Sol. EtOH, AcOH, Me_2CO. Spar. sol. Et_2O, $CHCl_3$, ligroin. $[\alpha]_D$ − 61·8° in Py.Aq., − 65·0° in AcOH.

*Di-*m*-toluidide*: cryst. M.p. 153°. $[\alpha]_D^{17}$ − 75·9° in Py.Aq.

*Mono-*p*-toluidide*: $C_{11}H_{13}O_4N$. MW, 223. Needles from EtOH. M.p. 178°.

*Di-*p*-toluidide*: needles from EtOH. M.p. 207°

(195°). Sol. hot AcOH. Mod. sol. EtOH, $CHCl_3$, ligroin. Almost insol. H_2O, Et_2O. $[\alpha]_D$ − 92·5° in Py.Aq., − 70° in AcOH.Aq.

dl-.

Cryst. M.p. 133° (125–6°). Very sol. H_2O. D_4^{20} 1·601 in vacuo. *k* (first) = $3{\cdot}99 \times 10^{-4}$ at 25°; (second) = $5{\cdot}5 \times 10^{-6}$ at 25°.

Cinchonine salt: m.p. 135–40°. $[\alpha]_D$ + 141–5° in H_2O.

Di-Et ester: $C_8H_{14}O_5$. MW, 190. B.p. 255°, 150–2°/27 mm. D_4^{21} 1·124.

*Di-*d*-amyl ester*: $C_{14}H_{26}O_5$. MW, 274. B.p. 191–2°/20 mm. D_4^{20} 1·0180. $[\alpha]_D^{20}$ + 3·50°.

Me ether: *see* Methoxysuccinic Acid.

Et ether: *dl*-ethoxysuccinic acid. $C_6H_{10}O_5$. MW, 162. Cryst. from Et_2O. M.p. 86°. Very sol. H_2O, EtOH, Et_2O. *Di-Et ester*: $C_{10}H_{18}O_5$. MW, 218. B.p. 126°/14–15 mm., 195–200°/250 mm.

Propyl ether: $C_9H_{12}O_5$. MW, 176. Cryst. M.p. 73–5°.

Isobutyl ether: $C_{10}H_{14}O_5$. MW, 190. Cryst. Easily decomp.

*Mono-*p*-nitrobenzyl ester*: m.p. 87·2°.

*Di-*p*-nitrobenzyl ester*: m.p. 124·5°.

Phenacyl ester: cryst. from EtOH. M.p. 106°.

Dichloride: $C_4H_4O_3Cl_2$. MW, 171. *Acetyl*: b.p. 118°/14 mm. D^{22} 1·377. $[\alpha]_D^{22}$ − 13·1°.

Bischoff, Nastvogel, *Ber.*, 1890, **23**, 2043.
Purdie, Williamson, *J. Chem. Soc.*, 1895, **67**, 959.
Walden, *Z. physik. Chem.*, 1895, **17**, 248; *Ber.*, 1896, **29**, 136.
Tingle, Bates, *J. Am. Chem. Soc.*, 1909, **31**, 1239.
Purdie, Young, *J. Chem. Soc.*, 1910, **97**, 1531.
Curtius, *J. prakt. Chem.*, 1917, **95**, 210.
Rather, Reid, *J. Am. Chem, Soc.*, 1919, **41**, 79.
Freudenberg, Brauns, *Ber.*, 1922, **55**, 1349.
Freudenberg, Noë, *Ber.*, 1925, **58**, 2403.
Takahashi, Yoshida, *Chem. Abstracts*, 1932, **26**, 5070.
Jones, *J. Chem. Soc.*, 1933, 795

Malol.

See Ursolic Acid.

Malolic Acid.

See Ursolic Acid.

Malomalic Acid

HOOC·CH·CH_2·COOH
O<
CO·CH_2·CH(OH)·COOH

or

HOOC·CH·CH_2·COOH
O<
CO·CH(OH)·CH_2·COOH

$C_8H_{10}O_9$ MW, 250

Solid. $[\alpha]_D$ − 16·2° in H_2O, − 21·4° in Me_2CO. Stable in cold H_2O. Hot $H_2O \longrightarrow$ *l*-malic acid.

Walden, *Ber.*, 1899, **32**, 2707.

Malonaldehydic Acid.

See Formylacetic Acid.

Malonamic Acid (*Malonic acid monoamide, malonamidic acid, carbamylacetic acid*)

$CH_2<$ COOH / $CONH_2$

$C_3H_5O_3N$ MW, 103

Et ester: $C_5H_9O_3N$. MW, 131. Needles from Me_2CO. M.p. 50°.

Hydrazide: needles from EtOH. M.p. 126–7°. Sol. H_2O. Spar. sol. EtOH, AcOH. Insol. Et_2O, C_6H_6, $CHCl_3$, ligroin.

Nitrile: *see under* Cyanoacetic Acid.

Pinner, *Ber.*, 1895, **28**, 479.
Bulow, Bozenhardt, *Ber.*, 1910, **43**, 561.

Malonamide (*Malonic acid diamide*)

$CH_2<$ $CONH_2$ / $CONH_2$

$C_3H_6O_2N_2$ MW, 110

Dimorphous. M.p. 170°. Insol. EtOH, Et_2O.

N-*Me*: $C_4H_8O_2N_2$. MW, 116. N′-*Phenyl*: methylamide-anilide. M.p. 154°. N′-p-*Tolyl*: methylamide-*p*-toluidide. M.p. 176°.

N-*Et*: $C_5H_{10}O_2N_2$. MW, 130. Plates from EtOH–C_6H_6. M.p. 123°. N′-*Phenyl*: ethylamide-anilide. M.p. 151°. N′-p-*Tolyl*: ethylamide-*p*-toluidide. Plates from H_2O. M.p. 176°.

N-*Isopropyl*: $C_6H_{12}O_2N_2$. MW, 144. Prisms from EtOH–C_6H_6. M.p. 129°. N′-p-*Tolyl*: propylamide-*p*-toluidide. Needles from EtOH. M.p. 192°.

N-*Isobutyl*: $C_7H_{14}O_2N_2$. MW, 158. Needles from C_6H_6. M.p. 83°. N′-p-*Tolyl*: isobutylamide-*p*-toluidide. Needles from EtOH. M.p. 177°.

N-*Phenyl*: amide-anilide. $C_9H_{10}O_2N_2$. MW, 178. Needles from EtOH or H_2O. M.p. 163°.

N-*Tolyl*: *see under* Malonic Acid.

N : N′-*Di-Et*: $C_7H_{14}O_2N_2$. MW, 158. Plates from EtOH–pet. ether. M.p. 149°. Sol. MeOH, EtOH, Me_2CO, $CHCl_3$, AcOH, AcOEt. Mod. sol. C_6H_6. Spar. sol. pet. ether, CCl_4. Insol. Et_2O.

N : N′-*Dipropyl*: $C_9H_{18}O_2N_2$. MW, 186. Plates from Me_2CO. M.p. 139°. Sol. EtOH, MeOH, $CHCl_3$, AcOH, AcOEt, CCl_4. Less sol. Me_2CO, H_2O, C_6H_6. Spar. sol. pet. ether.

N : N′-*Di-isopropyl* : needles from pet. ether. M.p. 114°.

N : N′-*Dibutyl* : $C_{11}H_{22}O_2N_2$. MW, 214. Plates. M.p. 132·5°. Sol. EtOH, MeOH, AcOH, AcOEt, Me_2CO, $CHCl_3$, C_6H_6, CCl_4. Spar. sol. H_2O, pet. ether.

N : N′-*Di-isobutyl* : needles from AcOEt. M.p. 126·5°. Sol. EtOH, MeOH, $CHCl_3$, AcOH. Less sol. Et_2O, Me_2CO, C_6H_6, AcOEt. Insol. H_2O, pet. ether.

N : N′-*Diphenyl* : *see* Malonanilide.

N-*Benzyl* : $C_{10}H_{12}O_2N_2$. MW, 192. N′-p-*Tolyl* : needles from EtOH. M.p. 188°.

N : N′-*Dibenzyl* : $C_{21}H_{18}O_2N_2$. MW, 330. Plates. M.p. 142°. Sol. EtOH, MeOH, $CHCl_3$, AcOH. Spar. sol. H_2O, Me_2CO, C_6H_6, AcOEt. Insol. Et_2O.

N : N′-*Ditolyl* : *see under* Malonic Acid.

West, *J. Chem. Soc.*, 1925, **127**, 750.
Backes, West, Whiteley, *J. Chem. Soc.*, 1921, **119**, 364.
Fischer, Dilthey, *Ber.*, 1902, **35**, 846.

Malonamidic Acid.
See Malonamic Acid.

Malonanil (N-*Phenylmalonimide*)

$$H_2C{<}^{CO}_{CO}{>}N{\cdot}C_6H_5$$

$C_9H_7O_2N$ MW, 161

Cryst. from toluene. M.p. 249°. Stable to conc. HCl and HNO_3. Hot conc. $H_2SO_4 \longrightarrow$ aniline + $CH_3{\cdot}COOH$ + CO_2.

Warren, Briggs, *Ber.*, 1931, **64**, 28.

Malonanilic Acid (*Malonic acid monoanilide*)

$$CH_2{<}^{CO\cdot NH\cdot C_6H_5}_{COOH}$$

$C_9H_9O_3N$ MW, 179

Cryst. from H_2O, EtOH, or Et_2O. M.p. 132°. Decomp. above m.p. $\longrightarrow$ acetanilide + CO_2. $k = 1{\cdot}96 \times 10^{-5}$ at 25°.

Me ester : $C_{10}H_{11}O_3N$. MW, 193. Needles from Et_2O–pet. ether. M.p. 42–3°.

Et ester : $C_{11}H_{13}O_3N$. MW, 207. Cryst. from Et_2O or C_6H_6. M.p. 38–9°. Sol. EtOH, C_6H_6, $CHCl_3$. Insol. H_2O, ligroin.

Amide : *see under* Malonamide.

N-*Benzoyl* : prisms from C_6H_6. M.p. 100–1° decomp.

Chattaway, Olmsted, *J. Chem. Soc.*, 1910, **97**, 939.
Rügeheimer, *Ber.*, 1884, **17**, 736.

Malonanilide (*Malonic acid dianilide*)

$$CH_2{<}^{CO\cdot NH\cdot C_6H_5}_{CO\cdot NH\cdot C_6H_5}$$

$C_{15}H_{14}O_2N_2$ MW, 254

Needles from EtOH. M.p. 225°. Sol. hot EtOH, AcOH. Insol. H_2O, Et_2O.

N : N′-*Di-Me* : $C_{17}H_{18}O_2N_2$. MW, 282. Prisms. M.p. 108–9°. Sol. EtOH. Mod. sol. H_2O.

N : N′-*Diphenyl* : prisms. M.p. 219–20° decomp.

Chattaway, Olmsted, *J. Chem. Soc.*, 1910, **97**, 939.

Malondialdehyde (*Malonic dialdehyde, dialdehydomethane*)

$$H_2C{<}^{CHO}_{CHO}$$

$C_3H_4O_2$ MW, 72

Only known in aq. sol. Reacts strongly acid. $FeCl_3 \longrightarrow$ intense red col.

Dianil : yellow leaflets. M.p. 115°. *B,HCl* : yellowish-brown needles.

Claisen, *Ber.*, 1903, **36**, 3668.

Malonhydroxamic Acid

$$H_2C{<}^{CO\cdot NH\cdot OH}_{COOH}$$

$C_3H_5O_4N$ MW, 119

NH_4 salt : m.p. 181°.

Amide : $C_3H_6O_3N_2$. MW, 118. *Oxime* : prisms from H_2O. Decomp. about 152°. Spar. sol. H_2O. Insol. EtOH, Et_2O, C_6H_6, AcOH, ligroin. $k = 6{\cdot}6 \times 10^{-8}$ at 25°.

Oxime : prisms from H_2O, plates from AcOH.Aq. M.p. 154–5° (160°). Spar. sol. EtOH. Insol. Et_2O.

Hantzsch, Schatzmann, Urbahn, *Ber.*, 1894, **27**, 804.
Modeen, *Ber.*, 1891, **24**, 3438.
See also de Paolini, Carbone, *Gazz. chim. ital.*, 1930, **60**, 261.

Malonic Acid (*Methane-dicarboxylic acid*)

$$H_2C{<}^{COOH}_{COOH}$$

$C_3H_4O_4$ MW, 104

Cryst. M.p. 135·6°. Sol. H_2O, EtOH, Et_2O. Mod. sol. Py. k (first) $= 1{\cdot}71 \times 10^{-3}$ at 25°, $1{\cdot}36 \times 10^{-3}$ at 0°; (second) $= 2{\cdot}0 \times 10^{-6}$ at 25°. Decomp. above 140° $\longrightarrow$ acetic acid. Sublimes undecomp. under 8–10 mm. press. $KMnO_4 \longrightarrow$ formic acid + CO_2.

Di-Me ester : *see* Dimethyl malonate.

Mono-Et ester: $C_5H_8O_4$. MW, 132. B.p. 147°/21 mm. D^0 1·201, D^{19}_{19} 1·1759. Sol. H_2O, Et_2O. n^{19}_D 1·4275. $k = 4{\cdot}51 \times 10^{-4}$ at 25°. Heat above 150° ⟶ diethyl malonate + $CH_3CO{\cdot}OC_2H_5$ + $CH_3{\cdot}COOH$ + CO_2. *Propyl ester*: $C_8H_{14}O_4$. MW, 174. B.p. 211°. D^0_0 1·04977. l-*Menthyl ester*: b.p. 161–4°/11 mm. $[\alpha]_D$ − 59·7° in EtOH, − 61·7° in $CHCl_3$.

Di-Et ester: *see* Diethyl malonate.

Mono-propyl ester: $C_6H_{10}O_4$. MW, 146. B.p. 118·5°/3 mm. D^{20} 1·1326. n^{20}_D 1·4301.

Dipropyl ester: $C_9H_{10}O_4$. MW, 182. B.p. 228–9°/770·3 mm., 229·2°. D^0_0 1·02705, D^{20} 1·0088. n^{20}_D 1·4206.

Mono-butyl ester: $C_7H_{12}O_4$. MW, 160. B.p. 132°/3 mm. D^{20} 1·0932. n^{20}_D 1·4328.

Dibutyl ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 251·5°, 140°/18 mm. D^0_0 1·0049, D^{20} 0·9810. n^{20}_D 1·4262.

Di-l-*menthyl ester*: needles from MeOH. M.p. 61°. $[\alpha]_D$ − 71·3° in EtOH, − 79·24° in $CHCl_3$.

Di-phenyl ester: $C_{15}H_{12}O_4$. MW, 256. Needles from EtOH. M.p. 50°. B.p. 210°/15 mm. with decomp.

Di-2-naphthyl ester: m.p. 146–7°.

p-*Nitrobenzyl ester*: m.p. 85·5°. Spar. sol. boiling EtOH.

p-*Phenylphenacyl ester*: m.p. 175°.

Anhydride: *see* Carbon suboxide.

Monoamide: *see* Malonamic Acid.

Diamide and substituted diamides: *see* Malonamide.

Amide-nitrile: *see under* Cyanoacetic Acid.

Dinitrile: *see* Malonitrile.

Mono-nitrile: *see* Cyanoacetic Acid.

Monochloride: $C_3H_3O_3Cl$. MW, 122·5. Needles from $CHCl_3$–pet. ether or CS_2. M.p. 65° decomp. Sol. Et_2O, C_6H_6, $CHCl_3$. Spar. sol. pet. ether, CS_2. *Me ester*: $C_4H_5O_3Cl$. MW, 136·5. B.p. 71°/15 mm., 63–4°/10 mm.

Dichloride: *see* Malonyl chloride.

Monoanilide: *see* Malonanilic Acid.

Dianilide: *see* Malonanilide.

Amide-anilide: *see under* Malonamide.

Mono-o-*toluidide*: *N*-*o*-tolylmalamic acid. Needles from H_2O or EtOH. M.p. 138–43° decomp. Sol. H_2O, EtOH. *Et ester*: cryst. from Et_2O–ligroin. M.p. 78° (73–4°).

Mono-m-*toluidide*: *N*-*m*-tolylmalamic acid. Plates. M.p. 99–101°.

Mono-p-*toluidide*: *N*-*p*-tolylmalamic acid. Cryst. from EtOH. M.p. 86°. *Et ester*: plates + ½H_2O from EtOH.Aq. M.p. 144°, anhyd. 163–4°.

Di-o-*toluidide*: needles from AcOH–AcOEt. M.p. 193° (184–5°). Sol. AcOH. Spar. sol. EtOH, AcOEt.

Di-p-*toluidide*: cryst. M.p. 250°. Sol. AcOH. Spar. sol. EtOH.

Dihydrazide: plates from EtOH. M.p. 154°. Very sol. H_2O, AcOH. Sol. EtOH. Spar. sol. Me_2CO, Et_2O, C_6H_6, $CHCl_3$, ligroin.

Diacetylhydrazide: cryst. from EtOH.Aq. M.p. 229°. Sol. hot H_2O. Spar. sol. EtOH. AcOH. Insol. Me_2CO, C_6H_6, $CHCl_3$, ligroin.

Ureide: *see* Malonuric Acid.

Anil: *see* Malonanil.

Freund, *Ber.*, 1884, **17**, 780.
Rügenheimer, Hoffmann, *Ber.*, 1885, **18**, 2971.
Wiens, *Ann.*, 1889, **253**, 299.
Bülow, Weidlich, *Ber.*, 1906, **39**, 3373.
Staudinger, Becker, *Ber.*, 1917, **50**, 1019.
Contzen-Crowet, *Bull. soc. chim. Belg.*, 1926, **35**, 165.
Faltis, Pirsch, Bermann, *Ber.*, 1930, **63**, 696.
Drake, Sweeny, *J. Am. Chem. Soc.*, 1932, **54**, 2059.
Fischer, *Anleitung zur Darstellung organischer Präparate*, **8** [*Braunschweig* 1908], 43.
Bischoff, v. Hedenström, *Ber.*, 1902, **35**, 3455.

Malonic Dialdehyde.

See Malondialdehyde.

Malonic Ester.

See Diethyl malonate.

Malonic Semi-aldehyde.

See Formylacetic Acid.

Malonitrile (*Cyanoacetic nitrile, methylene cyanide, dicyanomethane*)

$$CH_2{<}^{CN}_{CN}$$

$C_3H_2N_2$ MW, 66

Cryst. M.p. 29–30°. B.p. 218–19°, 109°/20 mm., 99°/11 mm. Sol. H_2O, EtOH, Et_2O, C_6H_6. Mod. sol. $CHCl_3$, AcOH. $n^{34\cdot2}_D$ 1·41463. Conc. HCl ⟶ malonic acid. Poisonous.

Hesse, *Am. Chem. J.*, 1896, **18**, 726.

Malonuric Acid (*Allophanylacetic acid*)

$$NH_2{\cdot}CO{\cdot}NH{\cdot}CO{\cdot}CH_2{\cdot}COOH$$

$C_4H_6O_4N_2$ MW, 146

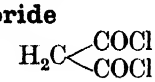
Et ester: $C_6H_{10}O_4N_2$. MW, 174. Prisms from H_2O. M.p. 128°. Sol. EtOH, AcOEt. Spar. sol. H_2O, Et_2O, C_6H_6, ligroin. NaOH ⟶ barbituric acid.

Amide: $C_4H_7O_3N_3$. MW, 145. Needles from H_2O. NaOH ⟶ barbituric acid.

Nitrile: cyanoacetylurea. $C_4H_5O_2N_3$. MW, 127. Cryst. from H_2O. M.p. 212° (209°).
N-*Formyl*: cryst. from H_2O. M.p. 189–90°. Spar. sol. hot H_2O, EtOH, AcOH.

v. Gorski, *Ber.*, 1896, **29**, 2046.
Böhringer, D.R.P., 193,447, (*Chem. Zentr.*, 1908, I, 1000).
Conrad, Schulze, *Ber.*, 1909, **42**, 741.

Malonyl chloride



$C_3H_2O_2Cl_2$ MW, 141

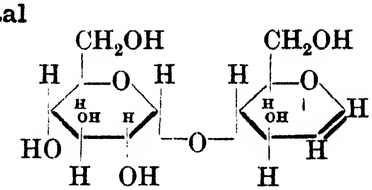
B.p. 58°/26 mm., 53–4°/19 mm. $D_4^{18.6}$ 1·4486, $D_4^{22.9}$ 1·4505. $n_D^{18.4}$ 1·45915. $n_D^{22.1}$ 1·462.

Auwers, Schmidt, *Ber.*, 1913, **46**, 477.
Staudinger, Bereza, *Ber.*, 1908, **41**, 4463.

Malonylurea.

See Barbituric Acid.

Maltal



$C_{12}H_{20}O_9$ MW, 308

Syrup. Does not reduce Fehling's. Perbenzoic acid ⟶ 4-α-glucosido-β-mannose.
Hexa-acetyl: $C_{24}H_{32}O_{15}$. MW, 560. Prisms from MeOH. M.p. 131–3°. $[\alpha]_D^{20}$ + 68° in $CHCl_3$. Sol. $CHCl_3$. Spar. sol. EtOH. Insol. pet. ether, H_2O. Does not reduce Fehling's.

Haworth, Hirst, Reynolds, *J. Chem. Soc.*, 1934, 302.

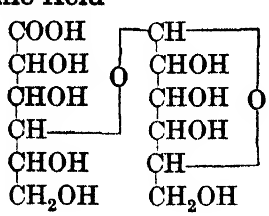
ψ-Maltal

$C_{12}H_{20}O_9$ MW, 308

Penta-acetyl: $C_{22}H_{30}O_{14}$. MW, 518. Needles from Et_2O–MeOH. M.p. 129°. $[\alpha]_D^{20}$ + 162° in $CHCl_3$. Sol. $CHCl_3$, EtOH. Spar. sol. hot H_2O. Reduces Fehling's in hot.

See previous reference.

Maltobionic Acid



$C_{12}H_{22}O_{12}$ MW, 358

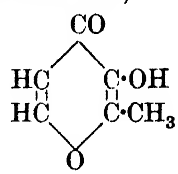
Syrup. Misc. with H_2O in all proportions. Insol. EtOH, AcOEt, boiling Et_2O. $[\alpha]_D^{20}$ +98·3° in H_2O. Dil. H_2SO_4 ⟶ gluconic acid + glucose.
Brucine salt: cryst. from H_2O–EtOH. M.p. 153°. $[\alpha]_D^{20}$ + 38·05° in H_2O.
Me ester of octa-Me ether: methyl octamethylmaltobionate. $C_{21}H_{40}O_{12}$. MW, 484. Pale yellow viscous liq. B.p. 170–3°/0·05 mm. n_D^{14} 1·4620°.

Haworth, Peat, *J. Chem. Soc.*, 1926, 3094.
Glattfeld, Hanke, *J. Am. Chem. Soc.*, 1918, **40**, 973.

Maltobiose.

See Maltose.

Maltol (3-*Hydroxy*-2-*methyl*-γ-*pyrone, laricin, laricinic acid, larixinic acid*)

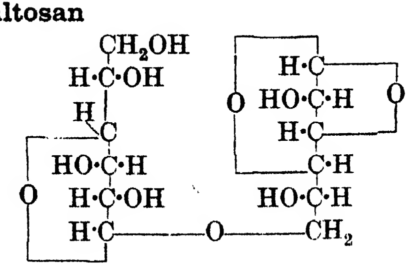


$C_6H_6O_3$ MW, 126

Occurs in larch bark and chicory. Needles from toluene. M.p. 162–4° (153°). Easily sol. hot H_2O, $CHCl_3$. Less sol. cold EtOH. Spar. sol. Et_2O, C_6H_6. Insol. pet. ether. Yellow sols. in alkalis. Sublimes in prisms at 93°. Reduces $NH_3.AgNO_3$ and warm Fehling's. $FeCl_3$ ⟶ reddish-violet col. Reacts acid to litmus.
Me ether: $C_7H_8O_3$. MW, 140. Oil. B.p. 114°/15 mm. Heat with NH_3.Aq. ⟶ 4-hydroxy-3-methoxy-α-picoline.
Benzoyl: needles from EtOH.Aq. M.p. 115–16°. Sol. EtOH. Mod. sol. H_2O.
Carbanilide: $C_{13}H_{11}O_4N$. MW, 245. Needles from AcOEt. M.p. 149–50°. Sublimes.

Stenhouse, *Ann.*, 1862, **123**, 191.
Peratoner, Lamburello, *Gazz. chim. ital.*, 1906, **36**, 37.
Feuerstein, *Ber.*, 1901, **34**, 1804.
Reichstein, Beitter, *Ber.*, 1930, **63**, 824.

Maltosan



Proposed formula

$C_{12}H_{20}O_{10}$ MW, 324

Amorphous powder. M.p. about 145–50°. Sol. H_2O, MeOH, Py, hot AcOH. Insol. other org. solvents. $[\alpha]_D^{20}$ + 75·8° in H_2O. Reduces Fehling's in hot. Decomp. on dist. at 2 mm. 90% EtOH + MeONa in cold ⟶ β-methylmaltoside.

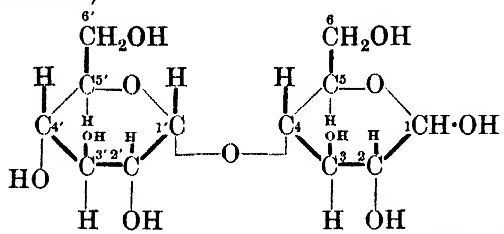
Osazone: m.p. 206°. Identical with maltose osazone.

Hydrochloride: hygroscopic solid.

Hexa-acetate: m.p. 95°.

Pictet, Marfort, *Helv. Chim. Acta*, 1923, **6**, 129.

Maltose (*Glucose-4-α-glucoside, malt sugar, maltobiose*)



$C_{12}H_{22}O_{11}$ MW, 342

Occurs in nature as decomp. product of starch. Needles + H_2O. Loses H_2O at 100°. M.p. 160–5°. $[\alpha]_D^{21}$ + 116·9° in H_2O initially, + 128·6° on standing. Very sol. H_2O. Insol. EtOH, Et_2O. Reduces Fehling's and $NH_3.AgNO_3$. Dil. min. acids or maltase ⟶ glucose. Br water ⟶ maltobionic acid. Fermented by yeast.

Phenylhydrazone: m.p. 130° decomp.

2-*Naphthylhydrazone*: m.p. 176°.

Phenylosazone: yellow needles from AcOH. M.p. 206°.

p-*Bromophenylosazone*: yellow needles from EtOH. M.p. 198°.

p-*Iodophenylosazone*: m.p. 208° decomp.

p-*Nitrophenylosazone*: red needles from Py–Et_2O. M.p. 261° decomp.

β-*Methylglucoside*: $C_{13}H_{24}O_{11}$. MW, 356. Cryst. + H_2O from dil. EtOH. M.p. 110–11°, anhyd. 155° decomp. $[\alpha]_D^{19}$ + 76·0° in H_2O. *Heptamethyl ether*: $C_{20}H_{38}O_{11}$. MW, 454. Syrup. B.p. 189–90°/0·09 mm. n_D 1·4698. $[\alpha]_D$ + 89·5° in MeOH. *Hepta-acetyl*: needles. M.p. 128–9°. $[\alpha]_D^{20}$ + 53·5° in $CHCl_3$.

β-*Ethylglucoside*: $C_{14}H_{26}O_{11}$. MW, 370. Cryst. from MeOH–AcOEt. M.p. 168–9°. $[\alpha]_D^{16·5}$ + 79·22° in H_2O. Sol. H_2O, EtOH. Prac. insol. Et_2O, $CHCl_3$, Me_2CO. *Hepta-acetyl*: prisms from EtOH. M.p. 132°. $[\alpha]_D^{14}$ + 48·93°.

Octa-acetyl: α-*form*, cryst. from EtOH. M.p. 125°. $[\alpha]_D^{20}$ + 122·77 in $CHCl_3$. β-*Form*: needles from EtOH. M.p. 160–1°. $[\alpha]_D^{20}$ + 62·59 in $CHCl_3$.

Fluorohepta-acetyl: prisms from dil. EtOH. M.p. 174–5°. $[\alpha]_D^{20}$ + 111·1°.

Chlorohepta-acetyl: prisms. M.p. 125°. $[\alpha]_D$ + 159·5° in $CHCl_3$.

Bromohepta-acetyl: prisms from ligroin. M.p. 112–13°. $[\alpha]_D^{20}$ + 180·1° in $CHCl_3$.

Irvine, Dick, *J. Chem. Soc.*, 1919, **115**, 593.
Haworth, Leitch, *ibid.*, 809.
Haworth, Peat, *J. Chem. Soc.*, 1926, 3094.
Haworth, Loach, Long, *J. Chem. Soc.*, 1927, 3146.
Pictet, Vogel, *Helv. Chim. Acta*, 1927, **10**, 588.
Brauns, *J. Am. Chem. Soc.*, 1929, **51**, 1820.
Zemplén, *Ber.*, 1927, **60**, 1555.
Josephson, *Ann.*, 1929, **472**, 230.
Herzfeld, *Ann.*, 1883, **220**, 206.
Harding, *Sugar*, 1923, **25**, 350 (*Bibl.*).

Maltosimine

$C_{12}H_{23}O_{10}N$ MW, 341

Needles from MeOH. M.p. 165° decomp. $[\alpha]_D$ + 118° in H_2O.

Lobry de Bruyn, Leent, *Rec. trav. chim.*, 1895, **14**, 138.

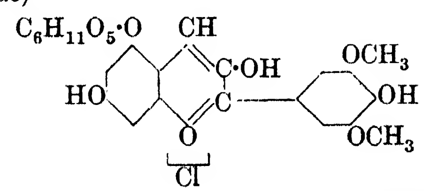
Malt sugar.

See Maltose.

Malyureidic Acid.

See 5-Hydantoinacetic Acid.

Malvenin chloride (5-β-*Glucosidomalvidin chloride*)

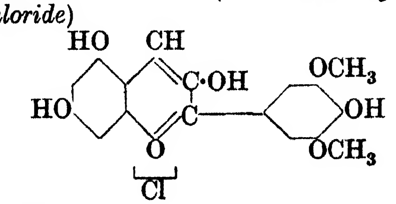


$C_{23}H_{25}O_{12}Cl$ MW, 528·5

Brownish-violet cryst. + $2H_2O$ from EtOH–HCl.Aq. Na_2CO_3 ⟶ greenish-blue sol.

Léon, Robinson, *J. Chem. Soc.*, 1932, 2221.

Malvidin chloride (3′ : 5′-*Dimethyldelphinidin chloride*)



$C_{17}H_{15}O_7Cl$ MW, 366·5

Prisms + $1H_2O$ from EtOH–HCl.Aq. Red by transmitted light, green by reflected light.

5-*Benzoyl*: prisms from MeOH–HCl.Aq. Olive-green with golden lustre. Mod. sol. MeOH. Spar. sol. EtOH. Na_2CO_3 ⟶ blue sol.

5-β-*Glucoside*: *see* Malvenin chloride.

Bradley, Robinson, *J. Chem. Soc.*, 1928, 1541.

Malvin chloride

$C_{29}H_{35}O_{17}Cl$ MW, 690·5

Diglucoside of malvidin chloride. Reddish-brown powder. Purplish-red sol. in MeOH. Mod. sol. EtOH, amyl alcohol. Orange-red sol. in conc. H_2SO_4. No col. with $FeCl_3$.

Willstätter, Mieg, *Ann.*, 1915, **408**, 122.
Robinson, Todd, *J. Chem. Soc.*, 1932, 2299.

Malvone

$C_{29}H_{36}O_{19}$ MW, 688

Cryst. + $1H_2O$ from H_2O. M.p. 220–30°. Reduces warm Fehling's. No col. with $FeCl_3$.

Phenylhydrazine deriv.: cryst. from EtOH.Aq. M.p. 204°.

Karrer *et al.*, *Helv. Chim. Acta*, 1927, **10**, 744.
Karrer, de Meuron, *Helv. Chim. Acta*, 1932, **15**, 507.

Mandelamide (*Mandelic acid amide*)

$C_6H_5{\cdot}CH(OH){\cdot}CONH_2$

$C_8H_9O_2N$ MW, 151

d-.

Plates from C_6H_6. M.p. 123–4° (122–122·5°). $[\alpha]^{22}_D$ − 66·6° in Me_2CO, $[\alpha]^{1}_D$ − 72·4° in Me_2CO.

Me ether: $C_9H_{11}O_2N$. MW, 165. Plates from pet. ether. M.p. 108–9°. $[\alpha]^{18}_D$ − 103·6° in Me_2CO.

N-*Di-Me*: $C_{10}H_{13}O_2N$. MW, 179. M.p. 151–2°. $[\alpha]^{18}_{578}$ − 162°. *Me ether*: $C_{11}H_{15}O_2N$. MW, 193. B.p. 110°/0·6 mm. $[\alpha]^{15}_{587}$ − 14·33°. Rotation varies considerably with temp.

N-*Et*: $C_{10}H_{13}O_2N$. MW, 179. Plates from $CHCl_3$–pet. ether. M.p. 65·5–66·5°. $[\alpha]^{18}_D$ − 103·6° in Me_2CO.

Acetone deriv.: m.p. 126°. $[\alpha]^{17}_{578}$ − 95° in Me_2CO, − 81° in EtOH.

l-.

Cryst. M.p. 122–122·5°. $[\alpha]^{9}_D$ + 74·7° in Me_2CO.

dl-.

Plates from C_6H_6 or EtOH. M.p. 133–4°. Spar. sol. Et_2O.

Me ether: plates from H_2O or Et_2O. M.p. 112–14°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, Et_2O.

Et ether: $C_{10}H_{13}O_2N$. MW, 179. Needles from H_2O or Et_2O. M.p. 93–4°. Very sol. EtOH, C_6H_6. Spar. sol. H_2O, pet. ether.

Allyl ether: $C_{11}H_{13}O_2N$. MW, 191. M.p. 77–8°.

Phenyl ether: $C_{14}H_{13}O_2N$. MW, 227. Needles from H_2O or EtOH. M.p. 154–5°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, Et_2O, ligroin.

O-*Acetyl*: needles from H_2O. M.p. 112–13°. N-*Benzylidene*: prisms from EtOH. M.p. 123°.

O-*Benzoyl*: needles from H_2O or EtOH.Aq. M.p. 164°. N-*Me*: needles from H_2O or EtOH.Aq. M.p. 139°.

N-*Di-Me*: m.p. 158°. *Me ether*: m.p. 41°.

N-*Et*: plates from C_6H_6–pet. ether. M.p. 53–4°. Sol. H_2O, EtOH, Me_2CO, Et_2O, C_6H_6. Spar. sol. pet. ether.

N-*Benzylidene*: prisms from EtOH or AcOH. M.p. 195°. Spar. sol. EtOH. Insol. Et_2O.

N-*Anisylidene*: cryst. from EtOH. M.p. 182°. Insol. H_2O, Et_2O, ligroin.

Prior to 1923 confusion existed between the *d*- and *l*-forms of mandelamide. *See* Freudenberg, Brauns, Siegel, *Ber.*, 1923, **56**, 196, *and* Freudenberg, Markert, *Ber.*, 1925, **58**, 1753.

McKenzie, Wren, *J. Chem. Soc.*, 1908, **93**, 311.
Wren, *J. Chem. Soc.*, 1909, **95**, 1583.
McKenzie, Martin, Rule, *J. Chem. Soc.*, 1914, **105**, 1586.
Gesellschaft für Chemische Industrie, Basel, D.R.P., 256,756, (*Chem. Zentr.*, 1913, I, 974).
Freudenberg, Todd, Seidler, *Ann.*, 1933, **501**, 210.

dl-Mandelamidine (*Mandelic acid amidine*)

$C_6H_5{\cdot}CH(OH){\cdot}C{\lesssim}^{NH}_{NH_2}$

$C_8H_{10}ON_2$ MW, 150

Needles from Et_2O. M.p. 110°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6. Reacts strongly alkaline.

B,HCl: prisms from H_2O. M.p. 219–20° (213–14°).

B,HNO_3: cryst. M.p. 154° decomp.

Mandelic acid salt: plates from EtOH. M.p. 185–7° decomp. Sol. EtOH. Spar. sol. MeOH, H_2O. Insol. Et_2O, C_6H_6, pet. ether.

N : N′-*Diacetyl*: cryst. from EtOH. M.p. 210°. Spar. sol. Et_2O, ligroin.

Rule, *J. Chem. Soc.*, 1918, **113**, 12.
Beyer, *J. prakt. Chem.*, 1885, **31**, 387.

***dl*-Mandelanilide** (*Anilide of* dl-*mandelic acid*)

$C_6H_5·CH(OH)·CO·NH·C_6H_5$

$C_{14}H_{13}O_2N$ MW, 227

Plates from H_2O or EtOH, needles from AcOH. M.p. 151–2° (146°). Sol. EtOH. Spar. sol. cold H_2O, Et_2O, $CHCl_3$, AcOH, ligroin, CS_2.

O-*Acetyl*: needles from EtOH.Aq. M.p. 117·5°.

Anschütz, Bocker, *Ann.*, 1909, **368**, 61.
Bischoff, Walden, *Ann.*, 1894, **279**, 123.

Mandelhydroxamic Acid (*Hydroxyamide of mandelic acid*)

$C_6H_5·CH(OH)·CO·NH·OH$

$C_8H_9O_3N$ MW, 167

Plates from EtOH. M.p. 147° decomp. (132°). Sol. MeOH. Mod. sol. Et_2O. Spar. sol. C_6H_6. Heat at m.p. or boil with H_2O ⟶ benzaldehyde. $FeCl_3$ ⟶ red col. Cu salt + alkali ⟶ violet col. Ni salt + alkali ⟶ reddish-yellow col.

Benzoyl deriv.: cryst. from EtOH. M.p. 101–2°. Decomp. by H_2O.

Angeli, Alessandri, *Atti accad. Lincei*, 1914, **23**, 104.
Jones, Neuffer, *J. Am. Chem. Soc.*, 1917, **39**, 666.

Mandelic Acid (*α-Hydroxyphenylacetic acid, phenylglycollic acid*)

$C_6H_5·CH(OH)·COOH$

$C_8H_8O_3$ MW, 152

d-.

Plates. M.p. 133°. $[\alpha]_D^{20}$ − 159·73° in EtOH, $[\alpha]_D^{20}$ − 187·44° in AcOH. Sol. H_2O. $k = 4·3 \times 10^{-4}$ at 25°. Slowly racemises at 160°.

Me ether: *d*-α-methoxyphenylacetic acid. $C_9H_{10}O_3$. MW, 166. Needles from pet. ether. M.p. 63–4°. $[\alpha]_D^{13}$ − 165·8° in H_2O, − 150·0° in EtOH. *K salt*: $[\alpha]_D^{15}$ − 98·2° in H_2O. *Na salt*: spar. sol. H_2O. $[\alpha]_D^{15}$ − 106·5° in H_2O. *Ca salt*: prisms. Spar. sol. H_2O. $[\alpha]_D^{15}$ − 98·4° in H_2O. *Me ester*: $C_{10}H_{12}O_3$. MW, 180. B.p. 117·5–118°/8 mm. $[\alpha]_D^{12·5}$ − 101·7° in CS_2, $[\alpha]_D^{13}$ − 96·3° in Me_2CO. *Chloride*: $C_9H_9O_2Cl$. MW, 184·5. B.p. 98°/11 mm. $[\alpha]_{625}^{18}$ − 45°, $[\alpha]_{546}^{18}$ − 72°. Easily decomp.

Et ether: *d*-α-ethoxyphenylacetic acid. $C_{10}H_{12}O_3$. MW, 180. Syrup. $[\alpha]_D^{15}$ − 90·8° in Me_2CO. *Na salt*: $[\alpha]_D^{12}$ − 82·2° in H_2O. *Ba salt*: $[\alpha]_D^{14}$ − 70·7° in H_2O. *Et ester*: $C_{12}H_{16}O_3$. MW, 208. B.p. 146–7°/17–20 mm. $D_4^{21·5}$ 1·0429. $[\alpha]_D^{21·5}$ − 32·32°.

Isopropyl ether: $C_{11}H_{14}O_3$. MW, 194. Oil. Solidifies to prisms in vacuo. $[\alpha]_D^{18}$ − 84·8° in Me_2CO. *Na salt*: $[\alpha]_D^{15}$ − 67·0° in H_2O. *K salt*: $[\alpha]_D^{15}$ − 61·9° in H_2O.

Acetyl: *d*-α-acetoxyphenylacetic acid. Needles + $1H_2O$ from H_2O. M.p. anhyd. 96·5–98°. Anhyd. sol. EtOH, Et_2O, Me_2CO, $CHCl_3$. Mod. sol. C_6H_6. Spar. sol. H_2O, CCl_4, pet. ether. $[\alpha]_D^{20}$ (anhyd.) − 156·4° in Me_2CO, $[\alpha]_D^{15}$ − 157·7° in EtOH. *Me ester*: b.p. 177°/45 mm. D_D^{20} 1·1546. $[\alpha]_D^{18}$ − 160° in C_6H_6, − 148° in $CHCl_3$, − 124·7° in MeOH.

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 55°. B.p. 135°/12 mm. D^{20} 1·1756. $[\alpha]_D^{18}$ − 214° in CS_2, − 173° in C_6H_6, − 167° in $CHCl_3$, − 143° in MeOH, − 121° in Me_2CO. *Propionyl*: b.p. 184°/45 mm. D_4^{20} 1·1261. $[\alpha]_D^{20}$ − 135·5°.

Et ester: $C_{10}H_{12}O_3$. MW, 180. M.p. 35°. B.p. 150°/21 mm. D_4^{20} 1·1270. $[\alpha]_D^{20}$ − 180° in CS_2, − 128·4° in $CHCl_3$, − 90·62° in Me_2CO. *Propionyl*: m.p. 33°. B.p. 177°/30 mm. D_4^{20} 1·0936. $[\alpha]_D^{20}$ − 131·5° in CS_2, − 109·4° in $CHCl_3$. *Butyryl*: D_4^{20} 1·071. *Valeryl*: b.p. 173–4°/18 mm. D_4^{20} 1·0544. $[\alpha]_D^{20}$ − 116·9° in CS_2.

Propyl ester: $C_{11}H_{14}O_3$. MW, 194. M.p. 24°. D^{20} 1·1005.

Butyl ester: $C_{12}H_{16}O_3$. MW, 208. M.p. 31°. D^{20} 1·0720.

Isobutyl ester: m.p. 36°. B.p. 159°/19 mm. D_4^{20} 1·0870. $[\alpha]_D^{20}$ − 146·6° in CS_2.

dl-*Amyl ester*: $C_{13}H_{18}O_3$. MW, 222. B.p. 166–7°/17 mm. D_4^{20} 1·0531. $[\alpha]_D^{20}$ − 96·46°.

l-*Menthyl ester*: needles from EtOH. M.p. 81–2°. $[\alpha]_D^{17}$ − 138·6° in EtOH ($[\alpha]_D^{20}$ − 140·92° in EtOH). *Acetyl*: needles from EtOH.Aq. M.p. 45–6°. Sol. Et_2O, EtOH, C_6H_6, $CHCl_3$, pet. ether, CCl_4, CS_2, AcOMe, heptane. Spar. sol. H_2O. $[\alpha]_D^{9·5}$ − 123·1° in EtOH. *Benzoyl*: plates. M.p. 54–5°. $[\alpha]_D^{16}$ − 119·8° in EtOH.

l-*Bornyl ester*: prisms from EtOH. M.p. 78°. Very sol. org. solvents. Insol. H_2O. $[\alpha]_D^{20·5}$ − 84·2° in EtOH.

Acetone deriv.: m.p. 75°. $[\alpha]_{578}^{18}$ − 99° in MeOH.

Nitrile: *d*-mandelonitrile, *d*-benzaldehyde cyanhydrin. C_8H_7ON. MW, 133. Needles. M.p. 28·5–29·5°. $[\alpha]_{5461}^{25}$ + 46·9° in C_6H_6. Conc. H_2SO_4 ⟶ magenta-red col.

l-.

Plates. M.p. 133·8°. Sol. H_2O, $CHCl_3$. $[\alpha]_D^{20}$ + 156·57° in H_2O. Heat at 160° for 30 hours ⟶ *dl*-form.

Me ether: *l*-α-methoxyphenylacetic acid. $[\alpha]_D$ + 54° in EtOH.

l-*Menthyl ester*: plates from EtOH. M.p. 99–100°. $[\alpha]_D^{17.5}$ − 9·45° in EtOH. *Acetyl*: needles. M.p. 44·5–45°. $[\alpha]_D^{19}$ + 8·8° in EtOH.

l-*Bornyl ester*: needles. M.p. 50–1°. Very sol. org. solvents. Insol. H_2O. $[\alpha]_D^{19}$ + 23·2° in EtOH.

dl-.

Plates from H_2O. M.p. 118–19°. Very sol. EtOH, Et_2O. Mod. sol. H_2O. $k = 4{\cdot}17 \times 10^{-4}$ at 25°. D_4^{20} 1·300.

Me ether: *dl*-α-methoxyphenylacetic acid. $C_9H_{10}O_3$. MW, 166. Plates from ligroin. M.p. 71–2°. Sol. EtOH, Et_2O. Spar. sol. H_2O, ligroin. $k = 7{\cdot}4 \times 10^{-4}$ at 25°. *Me ester*: $C_{10}H_{12}O_3$. MW, 180. Oil. B.p. 246°, 118–19°/8 mm. *Et ester*: $C_{11}H_{14}O_3$. MW, 194. Oil. B.p. 141°/26 mm., 131°/14 mm. D^0 1·1294. *Chloride*: $C_8H_7O_2Cl$. MW, 170·5. B.p. 80–1°/0·1 mm. Decomp. on dist. at 15 mm. *Nitrile*: C_9H_9ON. MW, 147. Oil. B.p. 116–18°/14 mm. Insol. H_2O.

Et ether: *dl*-α-ethoxyphenylacetic acid. $C_{10}H_{12}O_3$. MW, 180. B.p. 172–3°/17–18 mm. $k = 5{\cdot}3 \times 10^{-4}$ at 25°. *Me ester*: $C_{11}H_{14}O_3$. MW, 194. B.p. 127–9°/14–15 mm. *Et ester*: $C_{12}H_{16}O_3$. MW, 208. B.p. 255°, 134°/13 mm. l-*Menthyl ester*: oil. B.p. 205°/17 mm. D_4^{20} 1·0007. $[\alpha]_D^{20}$ − 65·6°. l-*Bornyl ester*: oil. B.p. 204°/20 mm. D_4^{20} 1·0407. $[\alpha]_D^{20}$ − 27·5°. *Nitrile*: $C_{10}H_{11}ON$. MW, 161. B.p. 122–4°/16 mm. Sol. org. solvents. Spar. sol. H_2O.

Propyl ether: $C_{11}H_{14}O_3$. MW, 194. Yellow oil. $k = 4{\cdot}9 \times 10^{-4}$ at 25°. *Et ester*: $C_{13}H_{18}O_3$. MW, 222. Oil. B.p. 144°/13 mm.

Phenyl ether: *dl*-α-phenoxyphenylacetic acid. $C_{14}H_{12}O_3$. MW, 228. Needles from hot H_2O. M.p. 108°. Very sol. EtOH, Et_2O. *Ureide*: needles from EtOH. M.p. 193°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, Et_2O, ligroin.

Benzyl ether: $C_{15}H_{14}O_3$. MW, 242. Plates. M.p. 93°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Almost insol. H_2O.

Acetyl: *dl*-α-acetoxyphenylacetic acid. Cryst. from C_6H_6, m.p. 79–80°; cryst. + $1H_2O$ from H_2O, m.p. 38–9°. Easily sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. cold H_2O. *Et ester*: needles from Et_2O. M.p. 73·5–74°. Very sol. EtOH, Et_2O. Insol. H_2O. l-*Menthyl ester*: oil. B.p. 205°/7 mm. $[\alpha]_D^{13.5}$ − 57·0° in EtOH. *Chloride*: b.p. 150–5°/33 mm. *Nitrile*: b.p. 152°/25 mm., 137–8°/11 mm.

Isovaleryl: cryst. from ligroin. M.p. 71°.

Me ester: $C_9H_{10}O_3$. MW, 166. Plates from C_6H_6–ligroin. M.p. 58°. B.p. 250° slight decomp., 144°/20 mm.

Et ester: $C_{10}H_{12}O_3$. MW, 180. Needles from pet. ether. M.p. 37°. B.p. 253–5°, 141°/15 mm. *Allyl ether*: $C_{13}H_{16}O_3$. MW, 220. B.p. 163–4°/24 mm. *Benzoyl*: b.p. 227°/20 mm.

Propyl ester: $C_{11}H_{14}O_3$. MW, 194. Needles. M.p. 14–15°. B.p. 263°, 145°/12 mm.

l-*Menthyl ester*: cryst. from pet. ether. M.p. 85–6°. B.p. 225°/30 mm. Sol. C_6H_6, EtOH. Spar. sol. pet. ether. Insol. H_2O. $[\alpha]_D^{16}$ − 74·2° in EtOH. *Benzoyl*: needles from EtOH. M.p. 75–6°. $[\alpha]_D^{23}$ − 44·4° in EtOH.

l-*Bornyl ester*: needles. M.p. 45–7°. B.p. 204°/14 mm. Very sol. most org. solvents. $[\alpha]_D^{20}$ − 30·4° in EtOH.

Phenacyl ester: $C_{16}H_{14}O_4$. MW, 270. Cryst. from EtOH.Aq. M.p. 84–84·5°.

Tropine ester: *see* Homatropine.

Nitrile: *dl*-mandelonitrile, *dl*-benzaldehyde cyanhydrin. C_8H_7ON. MW, 133. Prisms. M.p. 21·5–22°. Sol. EtOH, Et_2O. Insol. H_2O. D_4^{20} 1·1165, D_4^{60} 1·0844. Heat at 170° ⟶ benzaldehyde + HCN. *Benzoyl*: needles from EtOH. M.p. 63–4°. Sol. org. solvents. m-*Nitrobenzoyl*: cryst. from Et_2O. M.p. 83–4°. *Cinnamoyl*: cryst. from EtOH.Aq. M.p. 47–8°. *Anisoyl*: cryst. from EtOH. M.p. 58–9°.

Hydrazide: plates. M.p. 132°. Sol. hot H_2O, hot EtOH. Insol. Et_2O, C_6H_6, ligroin. *Isopropylidene*: plates from EtOH. M.p. 134–5°. *Benzylidene*: needles. M.p. 149°. *Cinnamylidene*: needles from EtOH. M.p. 180°. *Salicylidene*: needles from EtOH. M.p. 179°.

o-*Toluidide*: $C_{15}H_{15}O_2N$. MW, 241. Cryst. from EtOH.Aq. M.p. 72°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$.

p-*Toluidide*: plates from EtOH. M.p. 172°. B.p. above 200°/10 mm.

1-*Naphthalide*: prisms. M.p. 140°. Sol. Me_2CO. Spar. sol. Et_2O, ligroin, CS_2.

2-*Naphthalide*: plates from EtOH. M.p. 189°. Spar. sol. H_2O, EtOH, Et_2O, C_6H_6, $CHCl_3$, ligroin, CS_2.

Phenetidide: *see* Amygdophenine.

Hydroxylamine salt: cryst. from EtOH–Et_2O. M.p. 125°. Sol. EtOH, H_2O. Insol. Et_2O.

Prior to 1923 confusion existed between the *d*- and *l*-forms of mandelic acid. *See* Freudenberg, Brauns, Siegel, *Ber.*, 1923, **56**, 196, *and* Freudenberg, Markert, *Ber.*, 1925, **58**, 1753.

Glucosides: *see* Prunasinic Acid, Sambunigrinic Acid, *and* Sambunigrin.

Gentiobioside: *see* Amygdalin.

Amide: *see* Mandelamide.

Hydroxy-amide: *see* Mandelhydroxamic Acid.

Amidine: *see* Mandelamidine.

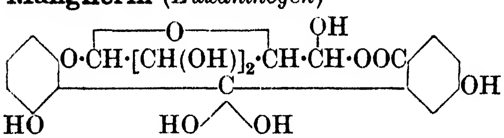
Anilide: *see* Mandelanilide.

Bischoff, Walden, *Ann.*, 1894, **279**, 129.
Walden, *Z. physik. Chem.*, 1895, **17**, 708.
McKenzie, *J. Chem. Soc.*, 1899, **75**, 757.
Rimbach, *Ber.*, 1899, **32**, 2386.
Curtius, Muller, *Ber.*, 1901, **34**, 2796.
McKenzie, *J. Chem. Soc.*, 1904, **85**, 1254.
Findlay, Turner, *J. Chem. Soc.*, 1905, **87**, 755.
Francis, Davis, *J. Chem. Soc.*, 1909, **95**, 1404.
McKenzie, Wren, *J. Chem. Soc.*, 1910, **97**, 484.
Albert, *Ber.*, 1916, **49**, 1384.
Hess, Dorner, *Ber.*, 1917, **50**, 391.
Matheson, Blaikie, E.P., 264,143, (*Chem. Abstracts*, 1928, **22**, 91).
Ausländer, *Chem. Zentr.*, 1930, II, 944.
Smith, *Ber.*, 1931, **64**, 432.
Freudenberg, Todd, Seidler, *Ann.*, 1933, **501**, 210.
Thayer, *Organic Syntheses*, Collective Vol. I, 12.
Corson, Dodge, Harris, Yeaw, *ibid.*, 329.

Mandelonitrile.
See under Mandelic Acid.

Mandelyltropine.
See Homatropine.

Mangiferin (*Euxanthogen*)



$C_{19}H_{18}O_{11}$ MW, 422

Occurs in leaves of *Mangifera indica.* Pale yellow needles + $3H_2O$ from EtOH.Aq. M.p. anhyd. 271°. $[\alpha]_D^{27}$ + 32·8°. Alc. $FeCl_3$ ⟶ green col. Reduces Fehling's on prolonged heating.

Di-Me ether: $C_{21}H_{22}O_{11}$. MW, 450. Cryst. M.p. 276°.

Hepta-acetyl: m.p. about 150°.

Gorter, *Chem. Abstracts*, 1923, **17**, 1472.

α-Mangostin

$C_{23}H_{24}O_6$ MW, 396

Pigment of *Garcinia mangostana*, Linn. Yellow needles from C_6H_6. M.p. 180–1°. Very sol. EtOH, MeOH. Sol. $CHCl_3$, Me_2CO, AcOH, AcOEt, Py. Insol. H_2O. $FeCl_3$ ⟶ green col. Conc. H_2SO_4 ⟶ orange-red sol.

Me ether: $C_{24}H_{26}O_6$. MW, 410. Yellow plates. M.p. 171–2°. *Acetyl*: needles from AcOH. M.p. 193–4°.

Di-Me ether: $C_{25}H_{28}O_6$. MW, 424. Cryst. from EtOH. M.p. 121–2°.

Tri-Me ether: $C_{26}H_{30}O_6$. MW, 438. Yellow needles from EtOH. M.p. 99–100°.

Acetyl deriv.: yellow needles from EtOH. M.p. 112°.

Diacetyl deriv.: yellow prisms or plates from EtOH. M.p. 117°.

Triacetyl deriv.: cryst. from MeOH. M.p. 115–18°.

p-*Nitrobenzoyl deriv.*: yellow needles from EtOH–C_6H_6. M.p. 147°. Sol. C_6H_6, AcOH. Spar. sol. EtOH, Et_2O.

Dragendorff, *Ann.*, 1930, **482**, 280; 1931, **487**, 62.
Murakami, *Ann.*, 1932, **496**, 122.

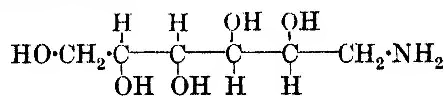
β-Mangostin.

Pigment of *Garcinia mangostana*, Linn. Yellow needles from C_6H_6. M.p. 175·5°.

Dragendorff, *Ann.*, 1930, **482**, 296.

Mannal.
See Glucal.

Mannamine



$C_6H_{15}O_5N$ MW, 181

Cryst. M.p. 139°. Sol. H_2O. Spar. sol. EtOH. $[\alpha]_D$ − 2° in H_2O.

Oxalate: plates. M.p. 186°.

Acetylacetone deriv.: needles. M.p. 172°.

Roux, *Compt. rend.*, 1904, **138**, 504.
Maquenne, *Compt. rend.*, 1903, **137**, 659.

Mannan A

$(C_6H_{10}O_5)_n$ MW, $(162)_n$

Polysaccharide occurring in ivory nuts. $[\alpha]_D^{20}$ − 42·5° in *N*/NaOH. Hyd. ⟶ mannose.

Triacetyl deriv.: powder. M.p. 128–45°. $[\alpha]_D$ − 3·0° in $CHCl_3$.

Patterson, *J. Chem. Soc.*, 1923, **123**, 1147.
Hess, Lüdtke, *Ann.*, 1928, **466**, 18.

Mannan B

$(C_6H_{10}O_5)_n$ MW, $(162)_n$

Polysaccharide. Amorph. Hyd. ⟶ mannose.

Acetyl deriv.: powder from $CHCl_3$–EtOH. $[\alpha]_D^{17}$ − 25·2° in $CHCl_3$.

Lüdtke, *Ann.*, 1927, **456**, 213.
Klages, *Ann.*, **1934**, **512**, **185**.

Mannide

$(C_6H_{10}O_4)_n$ MW, $(146)_n$

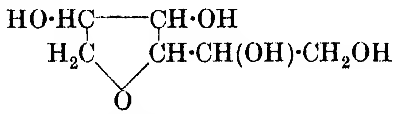
Thick syrup. Sol. H_2O, EtOH. Easily decomp. Long standing in air ⟶ mannitol.

Dilaurate: cryst. from EtOH. M.p. 37·5°. Sol. Et_2O, C_6H_6. n_D^{40} 1·457. $[\alpha]_D^{20}$ + 125° in C_6H_6 or Et_2O.

Distearate: needles from Et_2O. M.p. 51°. Sol. EtOH, Et_2O. Insol. H_2O. $[\alpha]_D^{20}$ + 64·8° in C_6H_6.

Liebermann, *Ber.*, 1884, **17**, 874.
Bloor, *J. Biol. Chem.*, 1912, **11**, 423.
Carré, Mauclère, *Compt. rend.*, 1931, **192**, 1567.

Mannitan



Probable structure

$C_6H_{12}O_5$ MW, 164

Exists in two forms.

(i) Amorph. Sol. H_2O, EtOH. Insol. H_2O. Dextrorotatory. Long standing ⟶ mannitol.

(ii) Cryst. M.p. 137°. Sol. H_2O. Insol. EtOH. $[\alpha]_D^{14}$ − 23·5° in H_2O. Boiling H_2O ⟶ mannitol. H_2O at 295° ⟶ amorph. form.

Di-Et ether: $C_{10}H_{20}O_5$. MW, 220. Syrup. Sol. EtOH, Et_2O. Insol. H_2O.

Diacetyl: syrup. Sol. H_2O, AcOH. Spar. sol. hot EtOH. Insol. Et_2O.

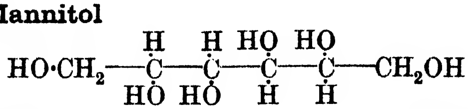
Dilaurate: needles from EtOH. M.p. 122°. Sol. hot EtOH. Spar. sol. Et_2O. $[\alpha]_D^{60}$ + 8·5° in $CHCl_3$.

Distearate: needles from hot EtOH. M.p. 124°. Spar. sol. cold EtOH, C_6H_6. $[\alpha]_D^{60}$ + 8° in $CHCl_3$.

Diacetone deriv.: plates. M.p. 155°.

Bouchardat, *Ann. chim. phys.*, 1875, **6**, 103.
Bloor, *J. Biol. Chem.*, 1912, **11**, 144, 421.
v. Rombergh, v. der Berg, *Chem. Zentr.*, 1923, I, 1086.

Mannitol



$C_6H_{14}O_6$ MW, 182

d-.

Widely distributed in nature. Needles or prisms from H_2O. M.p. 166°. B.p. 290–5°/3–3·5 mm., 276–80°/1 mm. D^{18} 1·521. Sol. to 13% in H_2O at 14°, 1·2% in EtOH at 15°, 0·47% in Py at 26°. Insol. Et_2O. $[\alpha]_D^{25}$ − 0·49° in H_2O. Addition of borax to aq. sol. gives strongly dextrorotatory sol. Sweet taste. Triboluminescent. At 200° ⟶ amorph. mannitan. NaOH dist. ⟶ isomannide. C_2H_5Br + KOH at 100° ⟶ mannitan di-Et ether.

1 : 2-*Di-Me ether*: $C_8H_{18}O_6$. MW, 210. Needles from C_6H_6. M.p. 93°. Sol. H_2O, EtOH, Me_2CO. Spar. sol. Et_2O. $[\alpha]_D^{20}$ − 7·35° in H_2O. *Diacetone deriv.*: b.p. 140–1°/13 mm. Sol. H_2O and most org. solvents. $[\alpha]_D^{20}$ + 25·7° in H_2O, + 21·9° in EtOH.

1 : 2 : 3 : 4-*Tetra-Me ether*: $C_{10}H_{22}O_6$. MW, 238. Syrup. B.p. 167–9°/13 mm. Sol. pet. ether. $[\alpha]_D^{20}$ − 13·02° in H_2O, − 12·54° in EtOH. 5-*Et ether*: $C_{12}H_{26}O_6$. MW, 266. B.p. 140–2°/8 mm. Sol. H_2O and most org. solvents. $[\alpha]_D^{20}$ + 8·9° in EtOH. *Monoacetone deriv.*: b.p. 138–40°/11 mm. Sol. H_2O, org. solvents. $[\alpha]_D^{20}$ + 39·1° in H_2O, + 32·2° in EtOH.

1 : 2 : 4 : 5-*Tetra-Me ether*: b.p. 177°/11 mm. $[\alpha]_D^{20}$ + 39·8° in EtOH, + 38·5° in H_2O.

1 : 2 : 3 : 4 : 5-*Penta-Me ether*: $C_{11}H_{24}O_6$. MW, 252. B.p. 139–41°/12 mm., 142–4°/10 mm. n_D 1·443–6. $[\alpha]_D^{20}$ + 8·3–9·8° in EtOH, + 7·54° in H_2O.

2 : 3 : 4 : 5-*Tetra-acetyl*: cryst. from EtOH–pet. ether. M.p. 123–5°. $[\alpha]_D^{20}$ + 3° in $CHCl_3$.

Hexa-acetyl: cryst. M.p. 119–20°.

2 : 3 : 4 : 5-*Tetrabenzoyl*: cryst. from C_6H_6–pet. ether. M.p. 155° (147°). $[\alpha]_D^{20}$ ± 0° in $CHCl_3$. 1 : 6-*Diacetyl*: cryst. from EtOH. M.p. 146°. 1 : 6-*Di*-p-*toluenesulphonyl*: cryst. from EtOH–AcOEt. M.p. 171°. Sol. Me_2CO, C_6H_6, $CHCl_3$, AcOH, hot Py. Spar. sol. EtOH, Et_2O, pet. ether.

Hexabenzoyl: m.p. 149–50°. $[\alpha]_D^{19}$ + 53·93° in $CHCl_3$.

Hexagalloyl: dark brown amorph. solid. Sol. H_2O, EtOH, Me_2CO. Spar. sol. C_6H_6, $CHCl_3$. $[\alpha]_D^{18}$ + 27·0° in EtOH.

Monosalicyloyl deriv.: cryst. from AcOEt. M.p. 148–9°. Sol. hot H_2O, hot EtOH. Spar. sol. C_6H_6. $FeCl_3$ ⟶ violet col.

Disalicyloyl deriv.: plates from AcOEt. M.p. 182–4°. Sol. Me_2CO, hot EtOH, AcOEt. Spar. sol. hot H_2O, C_6H_6, $CHCl_3$. $FeCl_3$ in EtOH.Aq. ⟶ intense reddish-violet col.

Diacetylsalicyloyl deriv.: cryst. from $CHCl_3$. M.p. 135–6°. Sol. warm EtOH, Me_2CO. Spar. sol. hot H_2O, hot C_6H_6, Et_2O. Bitter taste.

Dianisoyl deriv.: needles or plates from EtOH. M.p. 175–6°. Very sol. hot amyl alcohol, AcOH. Sol. hot EtOH, Me_2CO, AcOEt. Spar. sol. H_2O, hot $CHCl_3$.

Pentanitrate: needles from EtOH. M.p.

181–2°. Sol. 3000 parts H_2O at 15°, 500 parts H_2O at 60°, 0·66 parts EtOH at 12·8°, 0·76 parts Et_2O at 9°. Dextrorotatory. Explodes on concussion. Reduces Fehling's. $FeCl_3$ or $(NH_4)_2S$ ⟶ mannitol.

Hexanitrate : "nitromannitol." Needles. M.p. 112–13°. Sol. warm EtOH, Et_2O, AcOH. Insol. H_2O. D^0 1·604. Dextrorotatory. Decomp. slowly at 100°. Explodes on concussion. $FeCl_3$, $(NH_4)_2S$, or HI ⟶ mannitol.

Monoacetone deriv. : needles from C_6H_6. M.p. 85°. Sol. H_2O, EtOH, Me_2CO. Spar. sol. boiling C_6H_6. $[\alpha]_D^{20}$ + 26·4° in H_2O, + 23·2° in EtOH.

Diacetone deriv. : needles. M.p. 37–9°. Sol. H_2O, EtOH, Me_2CO, C_6H_6. $[\alpha]_D^{20}$ + 19·31° in H_2O, + 15·75° in EtOH.

Triacetone deriv. : prisms from EtOH.Aq. M.p. 68–70°. Sol. EtOH, Et_2O, Me_2CO, $CHCl_3$, AcOEt. Spar. sol. H_2O. $[\alpha]_D^{20}$ + 12·5° in EtOH. Volatile in steam.

l-.

Needles. M.p. 163–4°. Very sol. H_2O. Spar. sol. EtOH, hot MeOH. Sweet taste.

dl-.

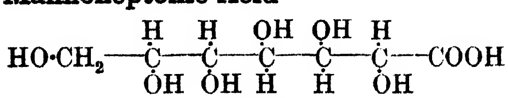
See α-Acritol.

Fischer, *Ber.*, 1890, **23**, 383.
Wigner, *Ber.*, 1903, **36**, 796.
Irvine, Paterson, *J. Chem. Soc.*, 1914, **105**, 907.
Fischer, Bergmann, *Ber.*, 1916, **49**, 297.
Fenaroli, *Chem. Abstracts*, 1922, **16**, 2570.
Micheel, *Ber.*, 1932, **65**, 263; *Ann.*, 1932, **496**, 90.
Müller, *Ber.*, 1932, **65**, 1052.

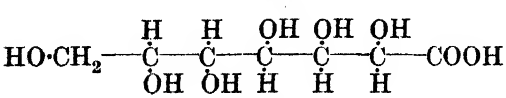
l-α-Mannoheptitol.

See under d-Galaheptitol.

Mannoheptonic Acid



α-Form



β-Form

$C_7H_{14}O_8$ MW, 226

d-.

Exists in α and β forms.

α-Form.

Prisms from H_2O. M.p. 175° with formation of lactone. Sol. 24 parts H_2O at 30°.

Na salt : needles from H_2O. M.p. 220–5°.

NH_4 salt : needles from H_2O. M.p. 154°. $[\alpha]_D^{20}$ + 31·31° initial, + 7·22° final.

Phenylhydrazone : cryst. from H_2O. M.p. 220–3°.

Amide : $C_7H_{15}O_7N$. MW, 225. Cryst. from H_2O. M.p. 193–4°. $[\alpha]_D^{20}$ + 27·8°.

Nitrile : $C_7H_{13}O_6N$. MW, 207. Cryst. M.p. 121–2°. $[\alpha]_D^{20}$ + 31·4° initial, + 23·11° final.

Lactone : $C_7H_{12}O_7$. MW, 208. Needles from EtOH–Et_2O. M.p. 153–5°. $[\alpha]_D^{20}$ + 74·2° in H_2O.

β-Form.

Not known in cryst. state. Very sol. H_2O. Spar. sol. EtOH. Insol. Et_2O.

Phenylhydrazone : needles from 70% EtOH. M.p. 190°. $[\alpha]_D^{27}$ − 25·8°.

l-.

Free acid passes readily into lactone.

Ba salt : spar. sol. H_2O. Insol. EtOH.

Phenylhydrazone : cryst. from H_2O. M.p. 220° decomp.

Lactone : cryst. from EtOH. M.p. 153–5°. $[\alpha]_D^{20}$ + 75·15°. Very sol. H_2O. Spar. sol. abs. EtOH. Insol. Et_2O.

dl-.

Free acid not known.

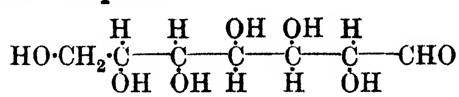
Ca salt : prisms from H_2O.

Phenylhydrazone : needles from H_2O. M.p. 225° decomp.

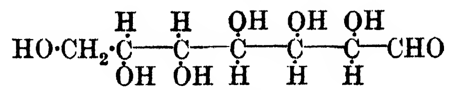
Lactone : cryst. from EtOH. M.p. 85°.

Smith, *Ann.*, 1893, **272**, 183.
Peirce, *J. Biol. Chem.*, 1915, **23**, 327.
Hudson, Monroe, *J. Am. Chem. Soc.*, 1919, **41**, 1140.
Mikšic, *Chem. Abstracts*, 1929, **23**, 2941.

Mannoheptose



α-Form



β-Form

$C_7H_{14}O_7$ MW, 210

d-.

Exists in α and β forms.

α-Form.

Needles from EtOH. M.p. 134–5°. Very sol. H_2O. Spar. sol. EtOH. $[\alpha]_D^{20}$ + 85·05° initial, + 68·64° final.

Phenylhydrazone : needles from H_2O. M.p. 197–200° decomp.

Phenylosazone : needles from EtOH. M.p. 200° decomp.
Hexa-acetyl : two forms. (i) Cryst. from 50% EtOH. M.p. 106°. $[\alpha]_D^{20}$ + 24·2. (ii) Cryst. from Et_2O. M.p. 139–40°. $[\alpha]_D^{20}$ − 31°.

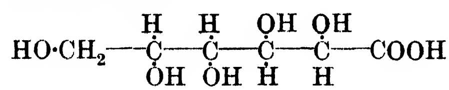
β-*Form*.
Has not been obtained in cryst. state.
Phenylosazone : cryst. M.p. 210°.
p-*Nitrophenylhydrazone* : cryst. from H_2O. M.p. 198°.

l-.
Amorphous.
Phenylhydrazone : cryst. M.p. 196°.

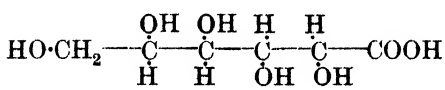
dl-.
Syrup. Very sol. H_2O. Spar. sol. EtOH.
Phenylhydrazone : cryst. M.p. 175–7° decomp.

Hudson, Monroe, *J. Am. Chem. Soc.*, 1924, **46**, 979.
See also first two references above.

Mannonic Acid



d-



l-

$C_6H_{12}O_7$ MW, 196

d-.
Not known in free state. Heating aq. sol. at 20° for a long period ⟶ δ-lactone. Heating for 4 hours at 100° ⟶ γ-lactone.
Na salt : cryst. $[\alpha]_D^{20}$ − 8·82°.
Ca salt : needles + $2H_2O$ from H_2O. M.p. 165°. $[\alpha]_D^{20}$ − 7·52° in H_2O.
Quinine salt : needles from EtOH. M.p. 165°. $[\alpha]_D^{20}$ − 102° in H_2O.
Brucine salt : needles from H_2O. M.p. 212°. $[\alpha]_D^{20}$ − 26·73° in H_2O.
Et ester : $C_8H_{16}O_7$. MW, 224. Needles from EtOH. M.p. 164°. Optically inactive.
Amide : $C_6H_{13}O_6N$. MW, 195. Cryst. from EtOH.Aq. M.p. 176°. $[\alpha]_D^{12}$ − 17·2° in H_2O. N-*Me* : needles. M.p. 165·5°. $[\alpha]_D^{12}$ − 18·1°.
Anilide : $C_{12}H_{17}O_6N$. MW, 271. Cryst. M.p. 176°. $[\alpha]_D^{12}$ − 16·9° in H_2O.
m-*Toluidide* : $C_{13}H_{19}O_6N$. MW, 285. Cryst. M.p. 142°. $[\alpha]_D^{10}$ − 51·5°.
p-*Toluidide* : cryst. M.p. 169°. $[\alpha]_D^{10}$ − 18·1°.
Benzylamide : cryst. M.p. 164°. $[\alpha]_D^{12}$ − 9·1°.
β-*Phenylethylamide* : $C_{14}H_{21}O_6N$. MW, 299. Cryst. M.p. 166°. $[\alpha]_D^{11}$ − 7·5°.
Hydrazide : $C_6H_{14}O_6N_2$. MW, 210. Plates. M.p. 161° decomp. $[\alpha]_D^{15}$ − 2·7° in H_2O, − 38·8° in Py.
Benzylidene deriv. : cryst. M.p. 194° decomp. $[\alpha]_D^{13}$ − 8·0° in Py.
Nitrile : $C_6H_{11}O_4N$. MW, 161. *Penta-acetyl* : cryst. from EtOH. M.p. 94°. $[\alpha]_D^{29}$ − 1·8°.
2 : 3 : 4 : 5-*Tetra-Me ether* : $C_{10}H_{20}O_7$. MW, 252. B.p. 180–2°/12 mm. $[\alpha]_D^{20}$ + 10·1° in MeOH.
1 : 2 : 3 : 4 : 5-*Penta-Me ether* : $C_{11}H_{22}O_7$. MW, 266. Syrup. B.p. 110°/0·18 mm. n_D 1·4409. $[\alpha]_D^{20}$ + 13·3° in EtOH.
γ-*Lactone* : $C_6H_{10}O_6$. MW, 178. Needles from EtOH. M.p. 151°. $[\alpha]_D^{20}$ + 51·8° in H_2O. Very sol. H_2O. Spar. sol. EtOH. HNO_3 ⟶ *d*-mannosaccharic acid. NaHg ⟶ *d*-mannose. Quinoline + H_2O at 140° ⟶ in part *d*-gluconic acid. *Tetra-acetyl* : cryst. M.p. 119°. $[\alpha]_D^{20}$ + 52°. *Tetra-Me ether* : cryst. M.p. 107°. $[\alpha]_D$ + 66·6°.
δ-*Lactone* : 2 : 3 : 4 : 6-*Tetra-Me ether* : needles. M.p. 23–5°. B.p. 104°/0·02 mm. n_D^{16} 1·4650°. $[\alpha]_D^{18}$ + 150° initial, 63° final. *Phenylhydrazide* : plates from C_6H_6. M.p. 184–5°. $[\alpha]_D^{16}$ − 22°.

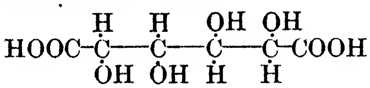
l-.
Not known in free state. Passes readily into the lactone.
Na salt : cryst. $[\alpha]_D$ + 10·1°.
Amide : needles from EtOH.Aq. M.p. 171–2°. $[\alpha]_D^{13}$ + 29·9° in H_2O. NaOCl ⟶ *l*-arabinose.
Hydrazide : plates from EtOH.Aq. M.p. 161–2° decomp. $[\alpha]_D^{14}$ + 4·4° in H_2O. *Benzylidene* : cryst. M.p. 194–5° decomp.
γ-*Lactone* : needles. M.p. 150·5–151°. $[\alpha]_D$ − 51·8° in H_2O. Very sol. H_2O. Spar. sol. EtOH. HNO_3 ⟶ *l*-mannose. *Tetra-Me ether* : plates. M.p. 109°. $[\alpha]_D^{20}$ − 65·5° initial, − 47·4° final. *Tetra-acetyl* : cryst. M.p. 119°. $[\alpha]_D^{20}$ − 52°.
δ-*Lactone* : 3 : 4 : 6 -*Tri-Me ether* : prisms from Et_2O. M.p. 96–7°. $[\alpha]_D$ − 167° initial, − 112·8° final. *Phenylhydrazide* : cryst. from C_6H_6. M.p. 137–9°. 2 : 3 : 4 : 6-*Tetra-Me ether* : low melting solid. B.p. 145–50°/0·06 mm. $[\alpha]_D^{18}$ − 150° initial, − 58·2° final. *Phenylhydrazide* : needles. M.p. 183–4°. $[\alpha]_D^{16}$ + 22°.

dl-.
Not known in free state.
Ca salt : needles. Sol. 60–70 parts boiling H_2O.

γ-Lactone : prisms from H_2O. M.p. 155° after sintering at 149°. NaHg ⟶ *dl*-mannose.

Weerman, *Rec. trav. chim.*, 1917, **37**, 63.
Haworth, Nicholson, *J. Chem. Soc.*, 1926, 1899.
Drew, Goodyear, Haworth, *J. Chem. Soc.*, 1927, 1237.
Haworth, Peat, *J. Chem. Soc.*, 1929, 350.
Upson, Sands, Whitnah, *J. Am. Chem. Soc.*, 1928, **50**, 519.
Nelson, Cretcher, *J. Am. Chem. Soc.*, 1930, **52**, 403.
Wolfrom, Thompson, *J. Am. Chem. Soc.*, 1931, **53**, 622.
Brackenbury, Upson, *J. Am. Chem. Soc.*, 1933, **55**, 2512.
Fischer, *Ber.*, 1890, **23**, 390.
Irvine, Paterson, *J. Chem. Soc.*, 1914, **105**, 913.
Van Wijk, *Rec. trav. chim.*, 1921, **40**, 232.

Mannosaccharic Acid



$C_6H_{10}O_8$ MW, 210

d-.

Cryst. M.p. 128·5°. Does not reduce Fehling's. Passes slowly into dilactone.

Monolactone : *phenylhydrazide*, needles from H_2O. M.p. 190–1° decomp. Sol. hot H_2O. Spar. sol. EtOH.

Dilactone : needles from EtOH or H_2O. M.p. 180–90° decomp. $[\alpha]_D^{23}$ + 201·8° in H_2O. Reduces warm Fehling's. NaHg ⟶ *d*-mannonic acid.

Diamide : $C_6H_{12}O_6N_2$. MW, 208. Cryst. M.p. 188–189·5° decomp. $[\alpha]_D^{20}$ − 24·4°.

l-.

Metasaccharic acid. Free acid not isolated.

Monolactone : *phenylhydrazide*, cryst. + $\frac{1}{2}H_2O$ from H_2O. M.p. 190–2° decomp. Sol. hot H_2O, EtOH.

Dilactone : needles + $2H_2O$. M.p. 68°, anhyd. 180° decomp. Sol. hot H_2O. Spar. sol. EtOH. Insol. Et_2O. Aq. sol. reacts neutral, but becomes acid on standing. Reduces alk. Cu sols. *Diacetyl* : prisms from AcOH. M.p. 155°.

Diamide : leaflets. M.p. 189–90° decomp.

dl-.

Not isolated in free state.

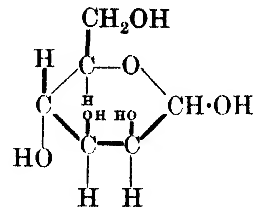
Monolactone : *phenylhydrazide*, cryst. M.p. 190–5° decomp. Sol. hot H_2O.

Dilactone : prisms from H_2O. M.p. 190° decomp. Very sol. hot H_2O.

Diamide : leaflets. M.p. 183–5° decomp.

Kiliani, *Ber.*, 1887, **20**, 341; 1926, **59**, 1473.
Fischer, *Ber.*, 1891, **24**, 539.
Rehorst, *Ber.*, 1932, **65**, 1476.

Mannose



$C_6H_{12}O_6$ MW, 180

d-. Seminose, carubinose.

Rhombohedra or prisms from EtOH.Aq. M.p. 132°. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O. Sweet taste. $[\alpha]_D^{20}$ − 17·0° ⟶ + 14·6° in H_2O. Reduces Fehling's. Fermented by yeast. Gives same osazone as *d*-glucose and *d*-fructose.

1-*Me ether* : α-methylmannoside. $C_7H_{14}O_6$. MW, 194. Cryst. from MeOH. M.p. 189–91°. $[\alpha]_D^{20}$ + 79·3° in H_2O. *Tetra-acetyl* : m.p. 104–5°. $[\alpha]_D^{27}$ − 22·6° in $CHCl_3$.

4-*Me ether* : $C_7H_{14}O_6$. MW, 194. Syrup. $[\alpha]_D^{20}$ + 7·38° in H_2O. Sweet taste. *Phenylhydrazone* : m.p. 179°. *Osazone* : decomp. at 198°. $[\alpha]_D^{20}$ − 35·12°.

Tetra-Me ether : $C_{10}H_{20}O_6$. MW, 236. Syrup. B.p. 187–9°/19 mm.

1 : 2 : 3 :4-*Tetra-acetyl* : cryst. from AcOH. M.p. 133·5–136·5°. $[\alpha]_D^{20}$ − 22·5° in $CHCl_3$, $[\alpha]_D^{20}$ − 15° to − 13° in H_2O.

2 : 3 : 4 : 6-*Tetra-acetyl* : m.p. 93°. $[\alpha]_D^{27}$ + 26·3° in $CHCl_3$. Easily reduces hot Fehling's.

Penta-acetyl : *α-form*, m.p. 74°. $[\alpha]_D^{26}$ + 56·6° in $CHCl_3$. *β-Form*, m.p. 117°. $[\alpha]_D^{21}$ − 24·1° in $CHCl_3$.

1-*Bromotetra-acetyl* : m.p. 53–4°. $[\alpha]_D^{26}$ +123·2° in $CHCl_3$.

Diacetone deriv. : needles from pet. ether. M.p. 118°. Sol. H_2O, Et_2O, C_6H_6. Does not reduce Fehling's.

Pentanitrate : needles from EtOH. M.p. 81–2°. $[\alpha]_D^{20}$ + 93·3° in EtOH.Aq.

Oxime : cryst. M.p. 176–84°. Very sol. hot, spar. sol. cold H_2O. Insol. EtOH. $[\alpha]_D$ + 3·1° in H_2O.

Phenylhydrazone : m.p. 199–200°. $[\alpha]_D$ +27·3° to + 28·6° in EtOH–Py.

p-*Tolylhydrazone* : cryst. from EtOH. M.p. 190–1°.

o-*Nitrophenylhydrazone* : m.p. 172–3°. $[\alpha]_D$ + 52° in EtOH–Py.

m-*Nitrophenylhydrazone* : m.p. 162–3°. $[\alpha]_D$ + 26·5° to − 8·3° in EtOH–Py.

p-*Nitrophenylhydrazone* : m.p. 202–3°. $[\alpha]_D$ + 56° in EtOH–Py.

Phenylosazone : *see under d*-Fructose.

l-.

Cryst. from EtOH. M.p. 132°. $[\alpha]_D$ + 14° to − 14°. Very sol. H_2O. Mod. sol. MeOH. Spar. sol. EtOH.

Phenylhydrazone : m.p. 195°.

Phenylosazone : *see under l*-Fructose.

dl-.

Cryst. M.p. 132–3°. Sol. EtOH.Aq. Sweet taste when pure.

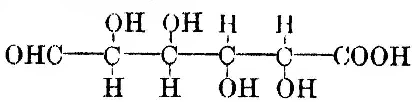
Phenylosazone : osazone of α-acrose. *See under* α-Acrose.

Haworth, Hirst, *J. Chem. Soc.*, 1928, 1221.
Helferich, Leete, *Ber.*, 1929, **62**, 1549.
Pacsu, Kary, *Ber.*, 1929, **62**, 2811.
Butler, Cretcher, *J. Am. Chem. Soc.*, 1931, **53**, 4358, 4363.
Clark, *J. Biol. Chem.*, 1922, **51**, 1.
Riiber, Minsaas, *Ber.*, 1927, **60**, 2411.
Levene, *J. Biol. Chem.*, 1935, **108**, 419.
Hudson, *Organic Syntheses*, Collective Vol. I, 362.

Mannosone.

See Glucosone.

Mannuronic Acid



l-Form

$C_6H_{10}O_7$ MW, 194

l-.

Lactone : $C_6H_8O_6$. MW, 176. M.p. 143–4° decomp. $[\alpha]_D^{27}$ −92·0° in H_2O.

Semicarbazone : m.p. 189°.

d-.

α-*Form.*

Needles from EtOH–Et_2O. Decomp. at 120–30°. Very hygroscopic. $[\alpha]_D^{25}$ + 16·01° to − 6·05° in H_2O.

Lactone : m.p. 143–4°. $[\alpha]_D^{20}$ +95° in H_2O.

β-*Form.*

Cryst. + $\frac{1}{2}H_2O$ from H_2O–Me_2CO–Et_2O. M.p. 165–7°. $[\alpha]_D^{25}$ − 47·9° to − 23·94° in H_2O. At 60° ⟶ lactone.

Lactone : m.p. 140–1°. $[\alpha]_D^{25}$ + 89·8° in H_2O.

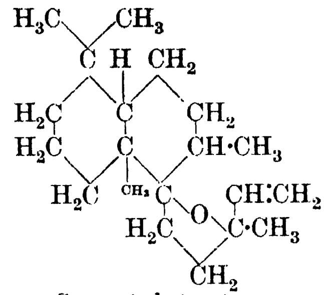
Cinchonine salt : m.p. 154° decomp.

Cinchonidine salt : m.p. 154° decomp.

Brucine salt : m.p. 147° decomp.

Niemann, Link, *J. Biol. Chem.*, 1933, **100**, 407.
Nelson, Cretcher, *J. Am. Chem. Soc.*, 1932, **54**, 3409.
Niemann, McCubbin, Link, *J. Biol. Chem.*, 1934, **104**, 737.
Ault, Haworth, Hirst, *J. Chem. Soc.*, 1935, 517.

Manoyl oxide



Suggested structure

$C_{20}H_{34}O$ MW, 290

Constituent of terpenes of *Dacrydium Colensoi*. Cryst. from MeOH.Aq. or Me_2CO.Aq. M.p. 29°. B.p. 135–7°/0·3 mm. $[\alpha]_D^{13}$ + 19·6° in EtOH. Very sol. most org. solvents. Spar. sol. pet. ether.

Hosking, Brandt, *Ber.*, 1934, **67**, 1175; 1935, **68**, 37.

Margaric Acid.

See Heptadecylic Acid. "Natural" margaric acid (Daturic Acid) is not a pure compound. The following data are given :

M.p. 60°.

Me ester : needles. M.p. 30° (26°). B.p. 184°/9 mm. Sol. EtOH, Et_2O, $CHCl_3$, pet. ether.

Amide : needles from dil. EtOH. M.p. 103°. Spar. sol. Et_2O, pet. ether.

Holde, *Ber.*, 1905, **38**, 1247.
Lipps, Kovács, *J. prakt. Chem.*, 1919, [2], **99**, 243.
Meyer, Beer, *Monatsh.*, 1912, **33**, 319.

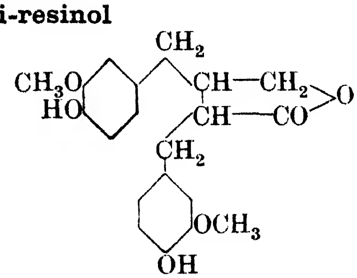
Margaric Aldehyde.

See Heptadecyl Aldehyde.

Marsh Gas.

See Methane.

Matai-resinol



$C_{20}H_{22}O_6$ MW, 358

Constituent of exudation of *Podocarpus Spicatus*. Needles + $1C_2H_5OH$ from EtOH. M.p. 77–8°, anhyd. m.p. 119°. $[\alpha]_D^{15}$ − 4·89°. Very sol. Me_2CO. Sol. EtOH, MeOH, AcOEt, $CHCl_3$. Spar. sol. Et_2O, C_6H_6, toluene. Insol. pet. ether.

Acetyl deriv.: needles from EtOH.Aq. M.p. 110°.

Dibenzoyl deriv.: cryst. from EtOH. M.p. 133°.

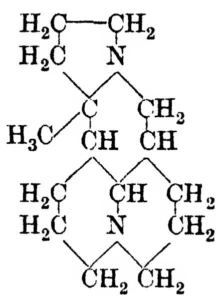
Easterfield, Bee, *J. Chem. Soc.*, 1910, **97**, 1029.
Haworth, Richardson, *J. Chem. Soc.*, 1935, 634.

Matezite.
See under Inositol.

Matezodambose.
See under Inositol.

Matricaria Camphor.
See l-Camphor.

Matridine



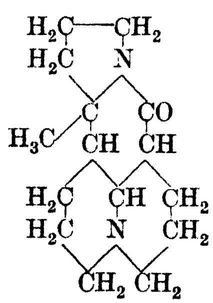
$C_{15}H_{26}N_2$ MW, 234

Needles from pet. ether. M.p. 76°. Sol. cold H_2O. Sublimes.

$B,HAuCl_4$: m.p. 216°.

Kondo, Sato, *Chem. Abstracts*, 1922, **16**, 2107.

Matrine



$C_{15}H_{24}ON_2$ MW, 248

Alkaloid from *Sophora flavescens*. Isomeric with lupanine. Four forms.

α- : needles or plates. M.p. 76°.
β- : prisms. M.p. 87°. $[\alpha]_D^{10}$ − 28·73°.
γ: b.p. 223°/6 mm. D_4^{85} 1·088. $n_D^{85\cdot4}$ 1·52865.
δ- : prisms. M.p. 84°.

Sol. cold H_2O, $CHCl_3$, C_6H_6, CS_2. Spar. sol. Et_2O, pet. ether. Zn dust dist. ⟶ matridine. Red. ⟶ deoxymatrine. HI ⟶ dimatrine.

$B,HAuCl_4$: m.p. 199°.
B_2,H_2PtCl_6: m.p. 249° decomp.
Methiodide: m.p. 211°.

Winterfeld, Kneuer, *Ber.*, 1931, **64**, 150.
Kondo, *Arch. Pharm.*, 1928, **266**, 1.

α-Matrinidine

$C_{12}H_{20}N_2$ MW, 192

Yellow oil. B.p. 282° decomp. D_4^{15} 1·025. n_D 1·5283. $[\alpha]_D^{18}$ − 18·75°.

Acetyl deriv.: m.p. 160°.
Benzoyl deriv.: m.p. 153°.
B,H_2PtCl_6: m.p. 289° decomp.
Picrate: needles. M.p. 228°.

Kondo, Ochiai, *Chem. Zentr.*, 1926, I, 410; 1927, I, 1481.
Kondo, Ochiai, Nakamura, *Chem. Abstracts*, 1929, **23**, 2437.

β-Matrinidine

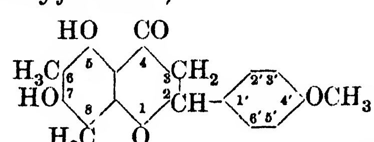
$C_{13}H_{20}N_2$ MW, 204

Yellow oil. B.p. 174–6°/0·6 mm. $[\alpha]_D^{18}$ + 1·68°. D_4^{36} 1·0836. n_D^{20} 1·56208.

$B,HAuCl_4$: m.p. 106°.
B_2,H_2PtCl_6: m.p. 214°.
Picrate: m.p. 184°.

See first reference above.

Matteucinol (5 : 7-*Dihydroxy*-4′-*methoxy*-6 : 8-*dimethylflavanone*)

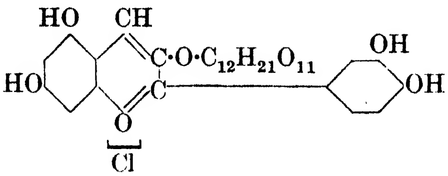


$C_{16}H_{18}O_4$ MW, 274

Occurs in leaves and stems of *Matteucia orientalis*. Yellow needles from MeOH. M.p. 174°. Conc. H_2SO_4 ⟶ brown col. $FeCl_3$ ⟶ indigo-blue col. Sol. most solvents and alkalis. Insol. H_2O, acids.

Munesada, *Chem. Abstracts*, 1924, **18**, 1847.
Fujise, *Chem. Abstracts*, 1930, **24**, 3238.

Mecocyanin chloride (*Cyanidin-3-gentiobioside*)

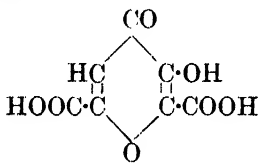


$C_{27}H_{31}O_{16}Cl$ MW, 646·5

Dark red needles with green reflex from 2% alc. HCl. Very sol. H_2O. Spar. sol. EtOH. Insol. Me_2CO. Hyd. ⟶ chrysanthemin ⟶ cyanidin.

Grove, Inubuse, Robinson, *J. Chem. Soc.*, 1934, 1608 (*Bibl.*).

Meconic Acid (*3-Hydroxy-γ-pyrone-2 : 6-dicarboxylic acid*)



$C_7H_4O_7$ MW, 200

Cryst. + $3H_2O$ from H_2O. Loses the $3H_2O$ at 100°. Sol. 4 parts boiling H_2O; 50 parts MeOH, AcOEt; 100 parts Me_2CO. Sol. EtOH, C_6H_6. Spar. sol. amyl alcohol ligroin, CS_2, glycerol. Boiling H_2O ⟶ comenic acid. $FeCl_3$ ⟶ blood red col.

Mono-Me ester: $C_8H_6O_7$. MW, 214. Cryst. M.p. 161°.

Di-Me ester: $C_9H_8O_7$. MW, 228. Cryst. from MeOH. M.p. 117°.

Mono-Et ester: $C_9H_8O_7$. MW, 228. Needles from H_2O. M.p. 179°.

Di-Et ester: $C_{11}H_{12}O_7$. MW, 256. Plates from H_2O. M.p. 111·5°.

Mono-propyl ester: $C_{10}H_{10}O_7$. MW, 242. Cryst. from H_2O. M.p. 165°.

Dipropyl ester: $C_{13}H_{16}O_7$. MW, 284. Cryst. M.p. 105°.

Di-isobutyl ester: $C_{15}H_{20}O_7$. MW, 312. Cryst. M.p. 98°.

Monoamide: $C_7H_5O_6N$. MW, 199. Cryst. from H_2O. M.p. 65°.

Diamide: $C_7H_6O_5N_2$. MW, 198. Grey powder.

Acetyl: needles from H_2O. M.p. 218°.

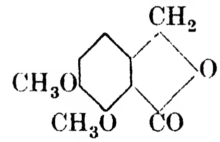
Benzoyl: leaflets. M.p. 248°.

Urethane: cryst. M.p. 124°.

Et ether: $C_9H_8O_7$. MW, 228. Prisms + $1H_2O$ from H_2O. M.p. 200°. *Di-Et ester*: prisms from EtOH. M.p. 61°.

Valenti, *Chem. Zentr.*, 1905, II, 491.
Lautenschlager, *Biochem. Z.*, 1919, **96**, 73.
Mennel, *J. prakt. Chem.*, 1882, **26**, 456.

Meconine (5 : 6-*Dimethoxyphthalide*)

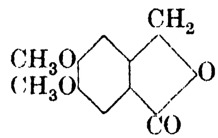


$C_{10}H_{10}O_4$ MW, 194

Needles from H_2O. M.p. 102·5°. Sol. EtOH, Et_2O. Sol. 700 parts H_2O at 15·5°, 22 parts at 100°. Sublimes.

Edwards, Perkin, Stoyle, *J. Chem. Soc.*, 1925, **127**, 195.

***m*-Meconine** (4 : 5-*Dimethoxyphthalide*)

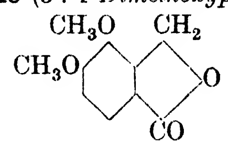


$C_{10}H_{10}O_4$ MW, 194

Cryst. from EtOH.Aq. M.p. 155–7°.

See previous reference.

ψ-Meconine (3 : 4-*Dimethoxyphthalide*)

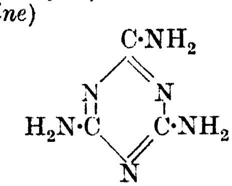


$C_{10}H_{10}O_4$ MW, 194

Needles from H_2O. M.p. 123–4°. Very sol. EtOH. Et_2O, C_6H_6. Spar. sol. H_2O.

Edwards, Perkin, Stoyle, *J. Chem. Soc.*, 1925, **127**, 195.

Melamine (*Cyanuramide, cyanuric triamide, triaminotriazine*)



$C_3H_6N_6$ MW, 126

Prisms. Sol. hot H_2O. Spar. sol. cold H_2O, hot EtOH. Sublimes when carefully heated. Decomp. on strong heating.

B,HCl: needles. Insol. EtOH.

$(B,HCl)_2,PtCl_4$: prisms.

$(B)_2,H_2SO_4$: needles. Spar. sol. H_2O.

B,H_2SO_4 : prisms. $H_2O \longrightarrow$ neutral salt.

Franklin, *J. Am. Chem. Soc.*, 1922, **44**, 504.
Barnett, *J. Phys. Chem.*, 1930, **34**, 1497.

Melampyrin.
See Dulcitol.

Melanuric Acid.
See Ammelide.

Melene

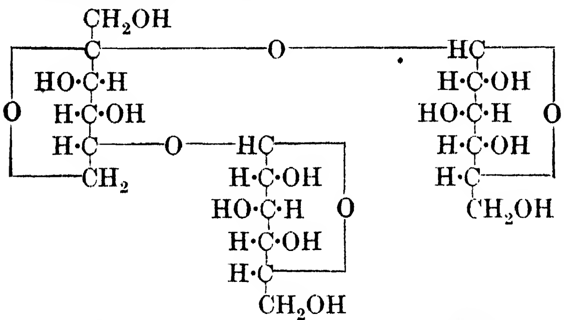
$C_{30}H_{60}$ MW, 420

Occurs in coal tar. Cryst. from petrol. M.p. 62–3°. D^{25}_{25} 0·9037, D^{65}_{65} 0·7913. n^{90} 1·4228.

Marcusson, Böttger, *Ber.*, 1924, **57**, 633.

Meletin.
See Quercitin.

Melezitose (*Melizitose*)



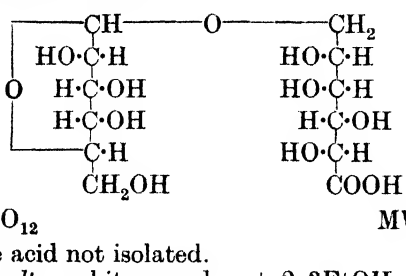
$C_{18}H_{32}O_{16}$ MW, 504

Cryst. M.p. 153–4°. $[\alpha]^{20}_D$ + 88·2° in H_2O, $[\alpha]^{25}_D$ + 88·7° in H_2O. Hyd. $\longrightarrow$ turanose + glucose.

Hendecamethyl ether : $C_{29}H_{54}O_6$. MW, 658. B.p. 236°/0·01 mm. n_D 1·4680. $[\alpha]_D$ + 114° in MeOH.

Leitch, *J. Chem. Soc.*, 1927, 588.
Pacsu, *J. Am. Chem. Soc.*, 1931, **53**, 3099.

Melibionic Acid



$C_{12}H_{22}O_{12}$ MW, 358

Free acid not isolated.

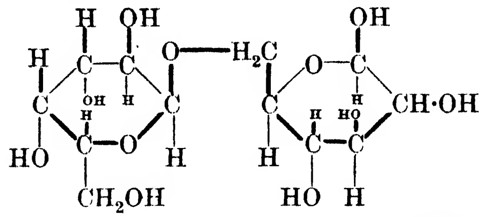
Ca salt : white powder + 2–3EtOH. Does not reduce Fehling's.

Octa-Me ether : $C_{20}H_{38}O_{12}$. MW, 470. *Me ester* : $C_{21}H_{40}O_{12}$. MW, 484. Oil. B.p. 173–5°/0·06 mm. n^{14}_D 1·4640. $[\alpha]^{13}_D$ + 106·4° in H_2O.

Nitrile : $C_{12}H_{21}O_{10}N$. MW, 339. *Octa-acetyl* : powder from H_2O.

Haworth, Loach, Long, *J. Chem. Soc.*, 1927, 3146.
Zemplén, *Ber.*, 1927, **60**, 928.

Melibiose (*Glucose*-6-α-*galactoside*)



$C_{12}H_{22}O_{11}$ MW, 342

Cryst. M.p. 85°. $[\alpha]^{20}_D$ + 110·5° in H_2O initially, + 127° on standing. Dil. min. acids $\longrightarrow$ glucose + galactose.

Oxime : needles. M.p. 186° decomp. Sol. H_2O. Spar. sol. EtOH, MeOH. Less sol. other org. solvents.

Phenylhydrazone : cryst. M.p. 145°. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O, $CHCl_3$, C_6H_6.

Allylphenylhydrazone : m.p. 197°. $[\alpha]_D$ +21·2° in MeOH.

Phenylosazone : yellow needles from toluene. M.p. 178–9°. $[\alpha]^{21}_D$ + 43·15° in Py. Very sol. EtOH, Me_2CO, Py. Less sol. $CHCl_3$, toluene. Spar. sol. H_2O.

p-*Bromophenylosazone* : yellow needles from EtOH. M.p. 182°.

β-*Methyl ether* : methyl-β-melibioside. $C_{13}H_{24}O_{11}$. MW, 356. Amorph. $[\alpha]^{27}_D$ +75·0° in H_2O. *Hepta-Me ether* : $C_{20}H_{38}O_{11}$. MW, 454. Needles from pet. ether. M.p. 106–7°. B.p. 163°/0·015 mm. $[\alpha]_D$ + 97·8° in H_2O. n^{20}_D 1·4662. *Hepta-acetyl* : cryst. from EtOH. M.p. 150°. $[\alpha]^{23}_D$ + 90·5° in $CHCl_3$.

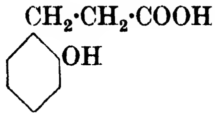
Octa-acetyl : α-*form*, $[\alpha]_D$ + 147·3° in Ac_2O. β-*Form* : cryst. from EtOH. M.p. 177·5°. $[\alpha]^{20}_D$ + 102·5° in $CHCl_3$. Sol. hot EtOH, $CHCl_3$, C_6H_6, AcOH. Mod. sol. Et_2O. Spar. sol. ligroin, CS_2. Insol. cold H_2O.

Fluorohepta-acetyl : m.p. 135°. $[\alpha]^{20}_D$ + 149·7°.
Chlorohepta-acetyl : m.p. 127°. $[\alpha]^{20}_D$ + 192·5°.
Bromohepta-acetyl : m.p. 116°. $[\alpha]^{20}_D$ + 209·9°.

Hudson, Harding, *J. Am. Chem. Soc.*, 1915, **37**, 2734.
Haworth, Loach, Long, *J. Chem. Soc.*, 1927, 3146.
Scheibler, Mittelmeier, *Ber.*, 1890, **23**, 1438.

Pictet, Vogel, *Helv. Chim. Acta*, 1926, **9**, 806.
Zemplén, *Ber.*, 1927, **60**, 923.
Helferich, Bredereck, *Ann.*, 1928, **465**, 170.
Brauns, *J. Am. Chem. Soc.*, 1929, **51**, 1820.
Harding, *Sugar*, 1923, **25**, 514 (*Bibl.*).

Melilotic Acid (*2-Hydroxyhydrocinnamic acid, o-hydroxy-2-phenylpropionic acid, o-hydrocoumaric acid*)



$C_9H_{10}O_3$ MW, 166

Cryst. from H_2O. M.p. 82–3°. Very sol. EtOH, Et_2O. Sol. 20 parts H_2O at 18°. $FeCl_3$ ⟶ blue col. Dist. ⟶ lactone.

Et ester : $C_{11}H_{14}O_3$. MW, 194. Prisms from Et_2O. M.p. 34°. Very sol. EtOH, Et_2O. Insol. H_2O.

Amide : $C_9H_{11}O_2N$. MW, 165. Needles. M.p. 70°. Very sol. hot H_2O, EtOH, Et_2O. *Acetyl* : cryst. from C_6H_6 or H_2O. M.p. 68–70°.

Nitrile : C_9H_9ON. MW, 147. B.p. 147–9°/1 mm. *Acetyl* : cryst. M.p. 60–1°. m-*Nitrobenzoyl* : cryst. from AcOH. M.p. 164–5°.

Lactone : *see* Hydrocoumarin.

Hydrazide : needles from H_2O. M.p. 164–5°. Very sol. EtOH, AcOH. Spar. sol. H_2O, Et_2O, Me_2CO, $CHCl_3$.

Me ether : *see* o-Methoxyhydrocinnamic Acid.

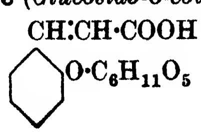
Et ether : o-ethoxyhydrocinnamic acid. $C_{11}H_{14}O_3$. MW, 194. Needles from H_2O. M.p. 80–1°. Very sol. EtOH, Et_2O. Sol. hot H_2O.

Propyl ether : $C_{12}H_{16}O_3$. MW, 208. Cryst. from ligroin. M.p. 63°.

Houben, Pfankuch, *Ber.*, 1926, **59**, 1599.
Auwers, *Ann.*, 1918, **415**, 159.
Stoermer, *Ber.*, 1911, **44**, 647.
Fittig, Ebert, *Ann.*, 1883, **216**, 153.
Pschorr, Einbeck, *Ber.*, 1905, **38**, 2069.
Schroeter, D.R.P., 562,827, (*Chem. Abstracts*, 1933, **27**, 1224).

Melilotol.
See Hydrocoumarin.

Melilotoside (*Glucosido-o-coumaric acid*)



$C_{15}H_{18}O_8$ MW, 326

Glucoside of *Melilotus altissima*, Thuil, and *Melilotus arvensis*, Wallr. Needles from H_2O. M.p. 240–1° decomp. $[\alpha]_D$ −60·9° in 50% EtOH. Very sol. hot H_2O. Sol. EtOH. Spar. sol. cold H_2O, Me_2CO, AcOEt. Hyd. by dil. acids or emulsin.

Shinoda, Imaida, *Chem. Zentr.*, 1934, II, 3388.

Melissane.
See Isotriacontane.

Melissic Acid (*Triacontane-1-carboxylic acid*)

$CH_3·[CH_2]_{29}·COOH$

$C_{31}H_{62}O_2$ MW, 466

Occurs in beeswax. Cryst. from C_6H_6. M.p. 90°. Sol. hot EtOH, C_6H_6. Spar. sol. MeOH, Et_2O.

Me ester : $C_{32}H_{64}O_2$. MW, 480. Needles from ligroin. M.p. 74·5° (71–71·5°). Sol. EtOH, Et_2O, pet. ether.

Et ester : $C_{33}H_{66}O_2$. MW, 494. Needles from EtOH. M.p. 73° (69·5–70°).

Melissyl ester : $C_{64}H_{124}O_2$. MW, 924. Cryst. from C_6H_6 or $CHCl_3$. M.p. 90·5°.

Chloride : $C_{31}H_{61}OCl$. MW, 484·5. M.p. 60°.

Amide : $C_{31}H_{63}ON$. MW, 465. M.p. 116°.

Nitrile : $C_{31}H_{61}N$. MW, 447. M.p. 70°. Very sol. C_6H_6.

Gascard, *Ann. chim.*, 1921, **15**, 350.
Marie, *Ann. chim. phys.*, 1896, **7**, 211.
Schwalb, *Ann.*, 1886, **235**, 126.

Melissyl Alcohol (*Myricyl alcohol, hentriacontanol-1*)

$CH_3·[CH_2]_{29}·CH_2OH$

$C_{31}H_{64}O$ MW, 452

Cryst. from C_6H_6. M.p. 87°. Sol. most org. solvents. Present as palmitate in beeswax.

Acetyl : cryst. from Et_2O. M.p. 70°.

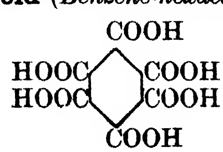
Phenylurethane : m.p. 96°.

See first reference above and also
Heiduschka, Gareis, *J. prakt. Chem.*, 1919, **99**, 308.

Melizitose.
See Melezitose.

Mellithene.
See Hexamethylbenzene.

Mellitic Acid (*Benzene-hexacarboxylic acid*)



$C_{12}H_6O_{12}$ MW, 342

Occurs in many coal and wood products. Needles from EtOH. M.p. 286–8° decomp. Sol. H_2O, EtOH. Heat of comb. C_v 790·8 Cal., C_p 788·2 Cal. Dist. ⟶ pyromellitic acid dianhydride + CO_2. Heat with $CaCO_3$ ⟶ C_6H_6 + CO_2. Heat with glycerol ⟶ trimesic acid + CO_2. Very stable, sol. in boiling conc. H_2SO_4 unchanged. Aq. electrolysis ⟶ CO_2 + H_2 + O_2 + CO.

Tetra-Me ester: $C_{16}H_{14}O_{12}$. MW, 398. M.p. 70–110°.

Penta-Me ester: $C_{17}H_{16}O_{12}$. MW, 412. Needles from H_2O. M.p. 141–4°.

Hexa-Me ester: $C_{18}H_{18}O_{12}$. MW, 426. Needles from EtOH.Aq. M.p. 187–8°. Heat of comb. C_v 1826·5 Cal., C_p 1825·6 Cal.

Hexa-Et ester: $C_{24}H_{30}O_{12}$. MW, 510. M.p. 72–3°.

Di-anhydride: $C_{12}H_2O_{10}$. MW, 306. Cryst. powder. Sol. H_2O ⟶ mellitic acid. Heat ⟶ pyromellitic dianhydride. Ac_2O ⟶ trianhydride.

Trianhydride: $C_{12}O_9$. MW, 288. Cryst. from C_6H_5·COCl. M.p. 320° decomp. Hot H_2O ⟶ mellitic acid. Spar. sol. most org. solvents. Sol. naphthalene and phenanthrene to red sols. Sol. $PhNO_2$ to bluish-green sol. $AlCl_3$ + C_6H_6 ⟶ tribenzoylbenzenetricarboxylic acid.

Hexa-chloride: $C_{12}O_6Cl_6$. MW, 453. Prisms from Et_2O. M.p. 190°. Sublimes at 240°.

Meyer, Raudnitz, *Ber.*, 1930, **63**, 2010.
Phillipi, Rie, *Monatsh.*, 1921, **42**, 5.
v. Pechmann, *Ber.*, 1898, **31**, 502.
Meyer, Steiner, *Monatsh.*, 1914, **35**, 482.

Mellon

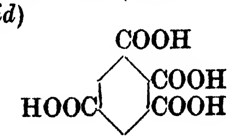
$[(CN)_2NH]_3$

$C_6H_3N_9$ MW, 201

Bright yellow powder. Insol. H_2O, dil. acids and alkalis. Boiling KOH ⟶ potassium mellon + NH_3. Further decomp. ⟶ HCN + C_2N_2 + N_2. Heat at 500° in steam ⟶ CO_2 + NH_3.

Gluud, Keller, Klempt, *Z. angew Chem.*, 1926, **39**, 1071.
Franklin, *J. Am. Chem. Soc.*, 1922, **44**, 506.
Liebig, *Ann.*, 1844, **50**, 342.

Mellophanic Acid (*Benzene*-1 : 2 : 3 : 5-*tetracarboxylic acid*)



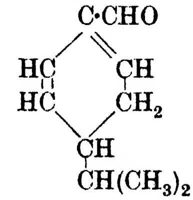
$C_{10}H_6O_8$ MW, 254

Prisms from HCl. M.p. 238–53°. Sol. H_2O, Et_2O.

Tetra-Me ester: $C_{14}H_{14}O_8$. MW, 310. Needles from MeOH. M.p. 107–9°.

Smith, Byrkit, *J. Am. Chem. Soc.*, 1933, **55**, 4305.
Bamford, Simonsen, *J. Chem. Soc.*, 1910, **97**, 1904.

$\Delta^{1,5}$-**p-Menthadienal** ($\Delta^{1:5}$-*Dihydrocuminaldehyde*, 4-*isopropyl*-1-*aldehydo*-1 : 5-*cyclohexadiene*)



$C_{10}H_{14}O$ MW, 150

B.p. 136–40°/15 mm. D^{13} 0·98. n_D^{13} 1·528. Ox. ⟶ cuminic acid.

Oxime: m.p. 42–4°. B.p. 150°/12 mm.

Semicarbazone: needles from MeOH. M.p. 200°.

Phenylhydrazone: m.p. 123–6°.

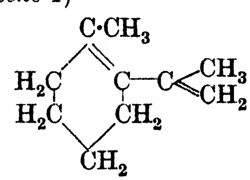
Azine: cryst. from EtOH.Aq. M.p. 111–12°.

Francesconi, Sernagiotto, *Atti accad. Lincei*, 1911, ii, **20**, 326, 338.
Wallach, *Ann.*, 1905, **340**, 3.

$\Delta^{1,8(9)}$-**p-Menthadienal.**

See Perillyl Aldehyde.

$\Delta^{1,8(9)}$-**o-Menthadiene** (1-*Methyl*-2-*isopropenylcyclohexene*-1)

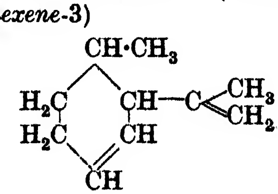


$C_{10}H_{16}$ MW, 136

Liq. with citron-like odour. M.p. − 40°. B.p. 177°. Na + EtOH ⟶ $\Delta^{2,8}$-o-menthene.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1076.

$\Delta^{3,8(9)}$-**o-Menthadiene** (1-*Methyl*-2-*isopropenylcyclohexene*-3)



$C_{10}H_{16}$ MW, 136

Exists in two forms.

"*Cis*":

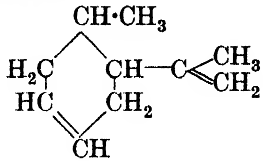
B.p. 169–70°. D_{20}^{20} 0·8507. n_D 1·4749.

"*Trans*":

B.p. 170°. D_{20}^{20} 0·8477. n_D 1·4749.

Perkin, *J. Chem. Soc.*, 1911, **99**, 753.

$\Delta^{4,8(9)}$-*o*-Menthadiene (1-*Methyl*-2-*isopropenylcyclohexene*-4)

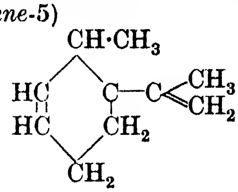


$C_{10}H_{16}$ MW, 136

Liq. with eucalyptus-like odour. B.p. 170–1°. Adds 4 Br. Ac_2O + 1 drop conc. H_2SO_4 ⟶ brown col.

Perkin, *J. Chem. Soc.*, 1911, **99**, 757.

$\Delta^{5,8(9)}$-*o*-Menthadiene (1-*Methyl*-2-*isopropenylcyclohexene*-5)

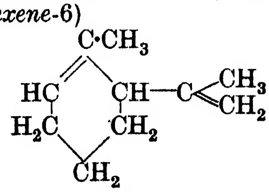


$C_{10}H_{16}$ MW, 136

B.p. 170–1°. D_{17}^{17} 0·8490. n_D 1·4778. Adds 4 Br.

Perkin, *J. Chem. Soc.*, 1911, **99**, 737.

$\Delta^{6,8(9)}$-*o*-Menthadiene (1-*Methyl*-2-*isopropenylcyclohexene*-6)



$C_{10}H_{16}$ MW, 136

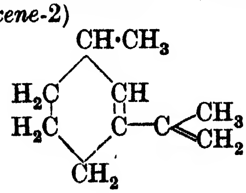
Liq. with eucalyptus-like odour. B.p. 170–1°. D_{20}^{20} 0·8481. n_D 1·4758.

Perkin, *J. Chem. Soc.*, 1911, **99**, 741.

$\Delta^{1,8(9)}$-*m*-Menthadiene.

See Sylvestrene.

$\Delta^{2,8(9)}$-*m*-Menthadiene (1-*Methyl*-3-*isopropenylcyclohexene*-2)



$C_{10}H_{16}$ MW, 136

d-.

B.p. 181°/736 mm. D_{17}^{17} 0·864. n_D 1·4946. $[\alpha]_D$ + 64°.

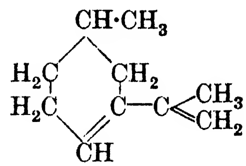
dl-.

Liq. with citron-like odour. B.p. 184–7°. D_{20}^{20} 0·8624. n_D 1·503. Adds 2 Br. Ac_2O + 1 drop conc. H_2SO_4 ⟶ violet col.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1101.

Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1911, **99**, 130.

$\Delta^{3,8(9)}$-*m*-Menthadiene (1-*Methyl*-3-*isopropenylcyclohexene*-3)



$C_{10}H_{16}$ MW, 136

d-.

B.p. 179°/730 mm. n_D 1·4972. $[\alpha]_D$ + 17·5°.

l-.

B.p. 181–2°. $[\alpha]_D$ − 12·9°.

dl-.

Liq. with citron-like odour. B.p. 187°. D_{20}^{20} 0·8609. n_D 1·4975. Oxidises in air. Ac_2O + 1 drop conc. H_2SO_4 ⟶ reddish-violet col.

Luff, Perkin, *J. Chem. Soc.*, 1911, **99**, 526.

$\Delta^{6,8(9)}$-*m*-Menthadiene.

See Isocarvestrene.

$\Delta^{1,3}$-*p*-Menthadiene.

See α-Terpinene.

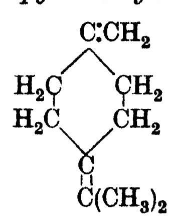
$\Delta^{1,4}$-*p*-Menthadiene.

See γ-Terpinene.

$^{1,4(8)}$-*p*-Menthadiene.

See Terpinolene.

$\Delta^{1(7),4(8)}$-*p*-Menthadiene (*Crithmene*, 1-*methylene*-4-*isopropylidene*-*cyclohexane*)



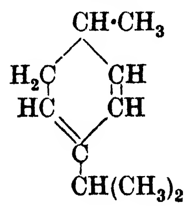
$C_{10}H_{16}$ MW, 136

Constituent of fenchel oil. B.p. 178–80°. HCl ⟶ terpinene dihydrochloride.

Nitrosochloride: cryst. from $CHCl_3$–MeOH. M.p. 110–12°.
Nitrosite: m.p. 89–90°.
Nitrosate: m.p. 104–5° (109°).

Francesconi, Sernagiotto, *Gazz. chim. ital.*, 1913, **43**, 66.
Delépine, de Belsunge, *Bull. soc. chim.*, 1918, **23**, 34.

$\Delta^{1,5}$-*p*-Menthadiene.
See α-Phellandrene.
$\Delta^{1,8(9)}$-*p*-Menthadiene.
See Limonene.
$\Delta^{2,1(7)}$-*p*-Menthadiene.
See β-Phellandrene.
$\Delta^{2,4}$-*p*-Menthadiene (1-*Methyl*-4-*isopropylcyclohexadiene*-2 : 4, *moslene*)

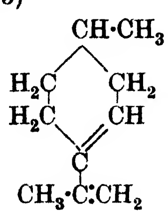


$C_{10}H_{16}$ MW, 136

B.p. 174–6°. D_{27}^{27} 0·8441. n_D^{27} 1·4845. Ox. ⟶ succinic acid. Adds 4 Br. Sol. conc. H_2SO_4 to red sol.

Harries, Majima, *Ber.*, 1908, **41**, 2520.
Harries, *Ann.*, 1903, **328**, 322.

$\Delta^{3,1(7)}$-*p*-Menthadiene.
See β-Terpinene.
$\Delta^{3,8(9)}$-*p*-Menthadiene (1-*Methyl*-4-*isopropenylcyclohexene*-3)



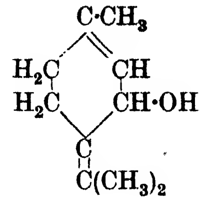
$C_{10}H_{16}$ MW, 136

d-.
Liq. with limonene-like odour. B.p. 184°. D_4^{13} 0·8648. n_α^{13} 1·4943. $[\alpha]_D^{18}$ + 98·2° in C_6H_6.

dl-.
Liq. with citron-like odour. B.p. 184–5°. D_{15}^{15} 0·8390. Adds 2 Br.

Kay, Perkin, *J. Chem. Soc.*, 1906, **89**, 848.

$\Delta^{1,4(8)}$-*p*-Menthadienol-3 (1-*Methyl*-4-*isopropylidene*-1-*cyclohexenol*-3)

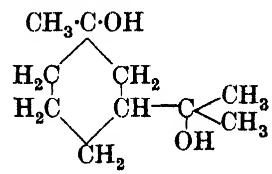


$C_{10}H_{16}O$ MW, 152

Liq. with odour of oranges. B.p. 96–7°/12 mm. n_D^{16} 1·397. Readily dehydrates to *p*-cymene.

Verley, *Bull. soc. chim.*, 1899, **21**, 409.

$\Delta^{1,8(9)}$-*p*-Menthadienol-6.
See Carveol.
$\Delta^{1,8(9)}$-*p*-Menthadienol-7.
See Perillyl Alcohol.
$\Delta^{6,8(9)}$-*m*-Menthadienone-2.
See Silvecarvone.
$\Delta^{1,8}$-*p*-Menthadienone-6.
See Carvone.
***m*-Menthandiol-1 : 8** (1-*Methyl*-3-β-*hydroxyisopropylcyclohexanol*-1)

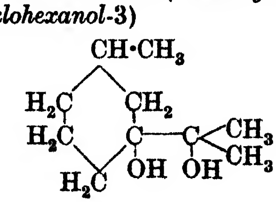


$C_{10}H_{20}O_2$ MW, 172

"*Cis*":
Woolly mass from Et_2O. M.p. 94°. Sol. H_2O, Et_2O.
"*Trans*":
Needles from pet. ether. M.p. 126–7°. Sol. H_2O, EtOH. Spar. sol. pet. ether.
Optically active form: *see* Silveterpin.

Fisher, Perkin, *J. Chem. Soc.*, 1908, **93**, 1889.
Perkin, Tattersall, *J. Chem. Soc.*, 1907, **91**, 502.

***m*-Menthandiol-3 : 8** (1-*Methyl*-3-β-*hydroxyisopropylcyclohexanol*-3)

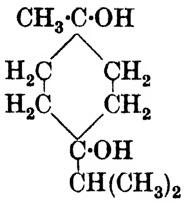


$C_{10}H_{20}O_2$ MW, 172

Cryst. from pet. ether. M.p. 64°. B.p. 140°/23 mm.

Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1911, **99**, 132.

p-Menthandiol-1 : 4 (*Terpinene-terpin*)



$C_{10}H_{20}O_2$ MW, 172

Exists in two forms.

(i) Leaflets from MeOH.Aq. M.p. 137–8°. B.p. 250°. Sol. most org. solvents. Volatile in steam. Oxalic acid ⟶ mixture of 1 : 4-cineol + terpineol-1 + terpineol-4. HCl ⟶ terpinene dihydrochloride.

(ii) Prisms from MeOH.Aq. M.p. 116–17°. Sol. MeOH, AcOEt, $CHCl_3$. Spar. sol. H_2O, Et_2O. Volatile in steam. Same reaction with oxalic acid as above.

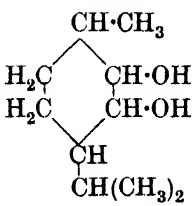
Wallach, Boedecker, *Ann.*, 1907, **356**, 200.

Wallach, *Ber.*, 1907, **40**, 576; *Ann.*, 1912, **392**, 61.

p-Menthandiol-1 : 8.

See Terpin.

p-Menthandiol-2 : 3



$C_{10}H_{20}O_2$ MW, 172

Exists in two forms.

" *Solid* " :

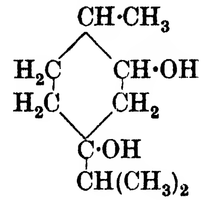
Prisms from pet. ether. M.p. 92°. Sol. most org. solvents. Spar. sol. H_2O. Ox. ⟶ *p*-menthanol-3-one-2 or *p*-menthanol-2-one-3. HI at 185° ⟶ *p*-menthane. P_2O_5 ⟶ propylene + *m*-cresol.

" *Liquid* " :

B.p. 141–3°/13 mm. D_{21}^{21} 0·9950. n_D^{21} 1·4787.

Kondakow, Bachtschiev, *J. prakt. Chem.*, 1901, **63**, 63.

p-Menthandiol-2 : 4

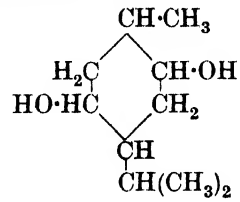


$C_{10}H_{20}O_2$ MW, 172

Cryst. mass. M.p. 93–4°. B.p. 135–40°/9 mm.

Wallach, *Ann.*, 1917, **414**, 201.

p-Menthandiol-2 : 5

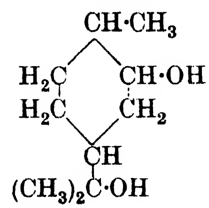


$C_{10}H_{20}O_2$ MW, 172

Needles from C_6H_6. M.p. 112°. B.p. 155°/15 mm. Very sol. most org. solvents. Spar. sol. H_2O.

Henderson, Sutherland, *J. Chem. Soc.*, 1910, **97**, 1618.

p-Menthandiol-2 : 8



$C_{10}H_{20}O_2$ MW, 172

Several modifications are known.

α :

d-.

Cryst. from H_2O. M.p. 112–13°. B.p. 265–70°. $[\alpha]_D^{18}$ + 21°.

l-.

Cryst. from H_2O. M.p. 112–13°. B.p. 265–70°. $[\alpha]_D^{18}$ − 21°.

dl-.

M.p. 108–9°.

β :

Needles from C_6H_6. M.p. 103–4°. $[\alpha]_D^{21}$ +12·6° in EtOH. Sol. H_2O.

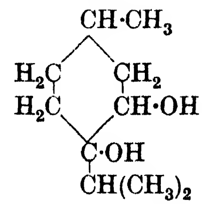
γ-. Dihydrosobrerol, *l*-dihydropinol hydrate. M.p. 158–9°. $[\alpha]_D^{20}$ − 40·2° in EtOH. HBr ⟶ terpinene dihydrobromide.

δ-. Inactive dihydropinol hydrate.

M.p. 139–40°. HBr ⟶ terpinene dihydrobromide. Oxalic acid ⟶ dihydrocarveol.

Wallach, *Ann.*, 1911, **381**, 62; 1917, **414**, 196.
Rupe, Schlochoff, *Ber.*, 1905, **38**, 1721.

p-Menthandiol-3 : 4



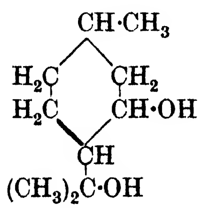
$C_{10}H_{20}O_2$ MW, 172

M.p. 76–7°. B.p. 129–31°/13 mm. D_0^0 1·0159. Boiled with dil. H_2SO_4 ⟶ menthone.

Diacetyl: b.p. 165–72°/21 mm.

Wagner, *Ber.*, 1894, **27**, 1640.

p-Menthandiol-3 : 8 (1-*Methyl*-4-β-*hydroxyisopropylcyclohexanol*-3, *isopulegol hydrate*, *menthoglycol*)



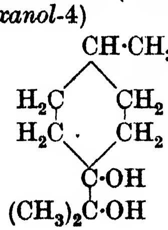
$C_{10}H_{20}O_2$ MW, 172

Needles from pet. ether. M.p. 84–5° (66°). B.p. 144–5°/10 mm. Ac_2O ⟶ monoacetate. Ac_2O + AcONa ⟶ isopulegol acetate.

Monoacetate: b.p. 137–8°/10 mm.

Barbier, Leser, *Compt. rend.*, 1897, **124**, 1309.
Prins, *Chem. Zentr.*, 1917, II, 289.
Grignard, Doeuvre, *Compt. rend.*, 1928, **187**, 273.

p-Menthandiol-4 : 8 (1-*Methyl*-4-β-*hydroxyisopropylcyclohexanol*-4)



$C_{10}H_{20}O_2$ MW, 172

Exists in two forms.

(i) "*High-melting*":

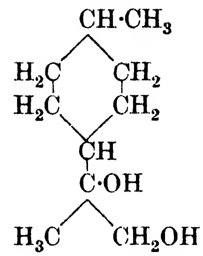
Cryst. from MeOH.Aq. M.p. 97–8°. B.p. 245°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O, ligroin. Volatile in steam. Ox. ⟶ 4-methylcyclohexanone-1.

(ii) "*Low-melting*":

Cryst. from MeOH.Aq. M.p. 82–3°. More sol. than above form. Volatile in steam.

Wallach, *Ann.*, 1910, **374**, 221.

p-Menthandiol-8 : 9 (1-*Methyl*-4-α : β-*dihydroxyisopropylcyclohexane*)

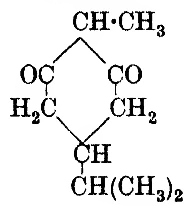


$C_{10}H_{20}O_2$ MW, 172

B.p. 165°. Ox. ⟶ *p*-methylhexahydroacetophenone.

Semmler, Rimpel, *Ber.*, 1906, **39**, 2584.

p-Menthandione-2 : 6



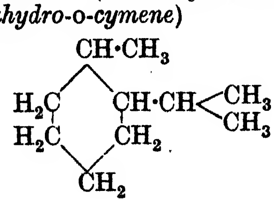
$C_{10}H_{16}O_2$ MW, 168

Leaflets from H_2O. M.p. 170°. Decomp. in exsiccator.

Dioxime: prisms. M.p. 194–6° decomp.

Harries, Stirm, *Ber.*, 1901, **34**, 1932.
Fichter, Jetzer, Leepin, *Ann.*, 1913, **395**, 25.

o-Menthane (1-*Methyl*-2-*isopropylcyclohexane*, *hexahydro*-o-*cymene*)

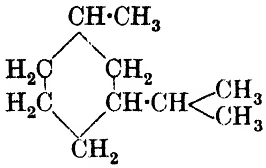


$C_{10}H_{20}$ MW, 140

B.p. 171°. D_0^{21} 0·8135. n_D^{21} 1·447.

Sabatier, Murat, *Ann. chim.*, 1915, **4**, 274.
Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1079.

***m*-Menthane** (1-*Methyl*-3-*isopropylcyclohexane, hexahydro*-m-*cymene*)



$C_{10}H_{20}$ MW, 140

d-.

B.p. 167–8°. D_{0}^{23} 0·8116. n_{D}^{23} 1·446. $[\alpha]_{D}^{23}$ + 1·6°.

l-.

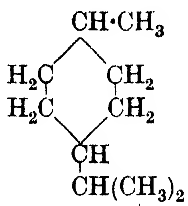
B.p. 167–8°/749 mm. D_{0}^{20} 0·7938. n_{D}^{20} 1·4358. $[\alpha]_{D}$ — 0·3°.

dl-.

B.p. 166–7°. D_{0}^{24} 0·7965. n_{D}^{24} 1·44.

Sabatier, Murat, *Ann. chim.*, 1915, **4**, 275.
Kishner, Sawadowski, *Chem. Zentr.*, 1912, I, 1456.

***p*-Menthane** (*Terpane, menthonaphthene, hexahydro*-p-*cymene*, 1-*methyl*-4-*isopropylcyclohexane*)



$C_{10}H_{20}$ MW, 140

Liq. with faint peppermint-like odour. B.p. 169–70°. D_{0}^{0} 0·8067, D_{D}^{20} 0·7929. n_{D}^{21} 1·4375.

Cis :

B.p. 168·5°. D_{4}^{20} 0·816. n_{D}^{20} 1·4515.

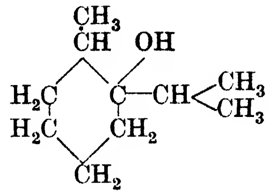
Trans :

B.p. 161°. D_{4}^{20} 0·792. n_{D}^{20} 1·4393.

Skita, Schneck, *Ber.*, 1922, **55**, 148.
Sabatier, Senderens, *Compt. rend.*, 1901, **132**, 566.
Jünger, Klages, *Ber.*, 1896, **29**, 317.
Perkin, Pickles, *J. Chem. Soc.*, 1905, **87**, 652.
Konowalow, *Chem. Zentr.*, 1904, I, 1516.

Menthane-2-acetic Acid.
See 2-Menthylacetic Acid.
Menthane-diol.
See Menthandiol.
Menthane-2-β-propionic Acid.
See 2-Menthyl-β-propionic Acid.

***o*-Menthanol-2** (2-*Methyl*-1-*isopropylcyclohexanol*)

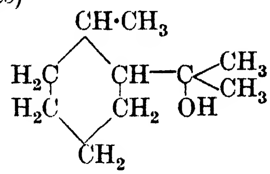


$C_{10}H_{20}O$ MW, 156

B.p. 93–5°/25 mm.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1081.

***o*-Menthanol-8** (1-*Methyl*-2-β-*hydroxyisopropylcyclohexane*)

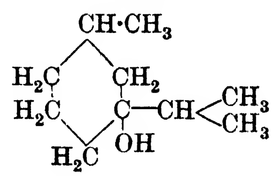


$C_{10}H_{20}O$ MW, 156

Cryst. M.p. 56–8°. B.p. 97–8°/16 mm. Sol. most org. solvents.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1078.

***m*-Menthanol-3** (3-*Methyl*-1-*isopropylcyclohexanol*)

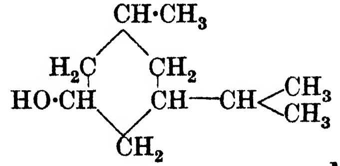


$C_{10}H_{20}O$ MW, 156

B.p. 186–8°, 81–3°/4 mm.

Zelinsky, *Ber.*, 1901, **34**, 2881.

***m*-Menthanol-5** (3-*Methyl*-5-*isopropylcyclohexanol*)



$C_{10}H_{20}O$ MW, 156

" *Cis* " :

B.p. 226–7°. $D_{4}^{13·6}$ 0·9020. $n_{D}^{13·6}$ 1·4645.

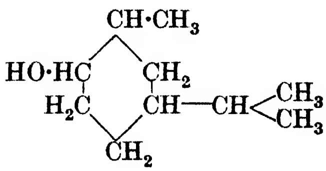
" *Trans* " :

Liq. with peppermint odour. B.p. 227–8°.

D^{22} 0·8989. n_D 1·4596. Sol. most org. solvents. Spar. sol. H_2O.

Knoevenagel, Wiedermann, *Ann.*, 1897, **297**, 128, 169, 182.

***m*-Menthanol-6** (*2-Methyl-4-isopropylcyclohexanol*)

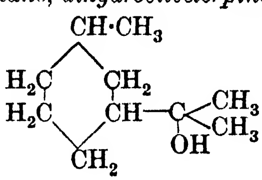


$C_{10}H_{20}O$ MW, 156

B.p. 119–21°/28 mm. D^{20}_{20} 0·9156. n^{20}_D 1·4666. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Henderson, Smeaton, *J. Chem. Soc.*, 1920, **117**, 147.

***m*-Menthanol-8** (*1-Methyl-3-β-hydroxyisopropylcyclohexane, dihydrosilveterpineol*)



$C_{10}H_{20}O$ MW, 156

Exists in two forms.

(i) B.p. 206–9°. D^{20} 0·91. n^{20}_D 1·4663. $[\alpha]_D$ + 1·96° in MeOH. $CrO_3 \longrightarrow$ *d*-1-methylcyclohexanone-3.

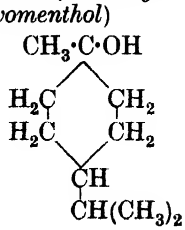
Phenylurethane: m.p. 82–3°.

(ii) B.p. 206–8°. D^{18} 0·909. n^{18}_D 1·4645. $[\alpha]_D$ + 10·35°. $CrO_3 \longrightarrow$ *dl*-1-methylcyclohexanone-3.

Phenylurethane: m.p. 77°.

Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1913, **103**, 1238; *Ann.*, 1913, **399**, 170.

***p*-Menthanol-1** (*1-Methyl-4-isopropylcyclohexanol,* tert.*-carvomenthol*)



$C_{10}H_{20}O$ MW, 156

B.p. 208–9°, 96–100°/17 mm. D^{20} 0·90. n^{20}_D 1·4619.

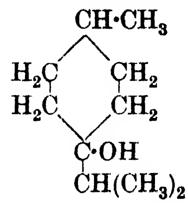
Phenylurethane: m.p. 100–1°.

Baeyer, *Ber.*, 1893, **26**, 2270.
Jordan, U.S.P., 1,782,621, (*Chem. Abstracts*, 1931, **25**, 303).

***p*-Menthanol-2.**
Carvomenthol, *q.v.*

***p*-Menthanol-3.**
See Menthol *and* Isomenthol.

***p*-Menthanol-4** (*4-Methyl-1-isopropylcyclohexanol*)

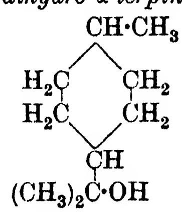


$C_{10}H_{20}O$ MW, 156

B.p. 206–7°, 97–100°/20 mm. D^{20}_4 0·9023. n^{20}_D 1·4619.

Kondakow, Schindelmeiser, *J. prakt. Chem.*, 1903, **67**, 194.
Tschugaeff, *Chem. Zentr.*, 1904, I, 1347.

***p*-Menthanol-8** (*1-Methyl-4-β-hydroxyisopropylcyclohexane, dihydro-α-terpineol*)



$C_{10}H_{20}O$ MW, 156

"*Cis*":

B.p. 210°. D^{20}_{20} 0·9124. n^{20}_D 1·4665.

Phenylurethane: m.p. 90–2°.

"*Trans*":

M.p. 34–5°. B.p. 209–15°. D^{20}_{20} 0·901. n^{20}_D 1·463.

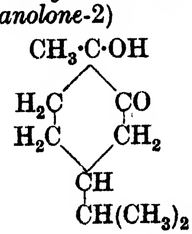
Acetyl: b.p. 104°/16 mm.

Phenylurethane: m.p. 117–18°.

Allophanate: m.p. 187°.

Zeitschel, Schmidt, *Ber.*, 1927, **60**, 1375.
Wallach, *Ann.*, 1911, **381**, 55.
Perkin, Pickles, *J. Chem. Soc.*, 1905, **87**, 650.

1-*p*-Menthanolone-2 (*Hydroxycarvomenthone, 1-hydroxytetrahydrocarvone, 1-methyl-4-isopropyl-1-cyclohexanolone-2*)



$C_{10}H_{18}O_2$ MW, 170

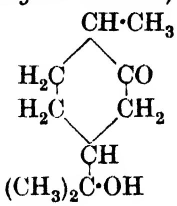
Exists in two forms.

(i) B.p. 118–22°/18 mm. D^{20} 0·977. n_D^{20} 1·469. Reduces $NH_3.AgNO_3$.

(ii) B.p. 128°/14 mm. (118–22°/18 mm.). Oxalic acid at 110–20° ⟶ *dl*-carvotanacetone.

Wallach, *Ann.*, 1918, **414**, 354.
Kötz, Steinhorst, *Ann.*, 1911, **379**, 26.

8-p-Menthanolone-2 (*8-Hydroxytetrahydrocarvone, dihydrocarvone hydrate, 2-methyl-5-β-hydroxyisopropylcyclohexanone*)



$C_{10}H_{18}O_2$ MW, 170

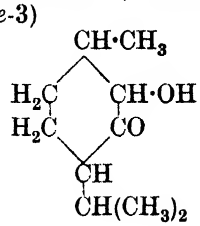
Viscous liq. B.p. 138–9°/9 mm. D_4^{19} 1·006. n_D^{20} 1·476. $[\alpha]_D^{20}$ − 18·5° in EtOH. NaHg ⟶ *p*-menthandiol-2 : 8. Boiling dil. H_2SO_4 ⟶ carvenone.

Oxime: cryst. from EtOH. M.p. 120–1°. Spar. sol. H_2O.

Semicarbazone: cryst. from MeOH. M.p. 150–1° (139°).

Baeyer, *Ber.*, 1895, **28**, 1590.
Knoevenagel, Samel, *Ber.*, 1906, **39**, 685.
Rupe, Liechtenhan, *ibid.*, 1125.

2-p-Menthanolone-3 (*1-Methyl-4-isopropyl-2-cyclohexanolone-3*)

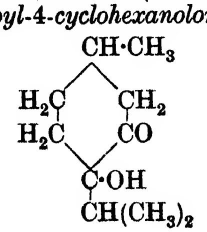


$C_{10}H_{18}O_2$ MW, 170

B.p. 139°/17 mm., 105–15°/13 mm. D^{20} 0·968. n_D^{20} 1·4616.

Semmler, McKenzie, *Ber.*, 1906, **39**, 1163.
Kötz *et al.*, *Ann.*, 1913, **400**, 71.

4-p-Menthanolone-3 (*Menthene-ketol, 1-methyl-4-isopropyl-4-cyclohexanolone-3*)



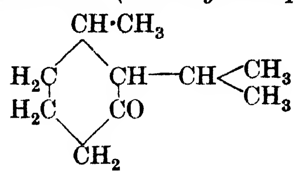
$C_{10}H_{18}O_2$ MW, 170

B.p. 104–5°/13·5 mm. D^0 0·9881. Oxalic acid ⟶ Δ^3-*p*-menthenone-5.

Oxime: plates from EtOH. M.p. 132–3°.

Wagner, *Ber.*, 1894, **27**, 1639.
Kötz, Steinhorst, *Ann.*, 1911, **379**, 23.

o-Menthanone-3 (*3-Methyl-2-isopropylcyclohexanone*)



$C_{10}H_{18}O$ MW, 154

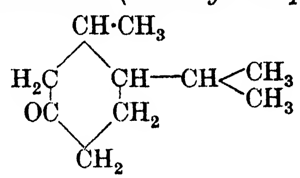
Liq. with peppermint-like odour. B.p. 204°, 95°/25 mm.

Semicarbazone: m.p. 204–5°.

Benzylidene deriv.: m.p. 162°.

Kötz, Blendermann, Mähnert, Rosenbusch, *Ann.*, 1913, **400**, 85.
Dieckmann, *Ber.*, 1912, **45**, 2701.

o-Menthanone-5 (*3-Methyl-4-isopropylcyclohexanone*)



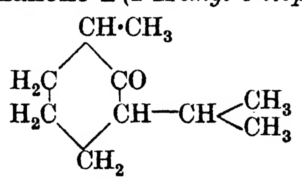
$C_{10}H_{18}O$ MW, 154

B.p. 226–8°/741 mm. D_4^{20} 0·9141. n_D^{20} 1·46. $[\alpha]_D$ + 99° in Et_2O.

Semicarbazone: m.p. 177°.

Wienhaus, Schumm, *Ann.*, 1924, **439**, 41.

m-Menthanone-2 (*2-Methyl-6-isopropylcyclohexanone*)

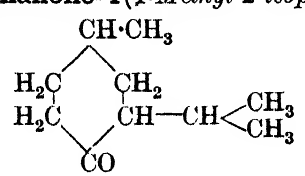


$C_{10}H_{18}O$ MW, 154

B.p. 82°/10 mm. D^{15} 0·9128. Gives no carbonyl derivs.

Kötz, Michels, *Ann.*, 1906, **348**, 96; **350**, 216.

m-Menthanone-4 (*4-Methyl-2-isopropylcyclohexanone*)



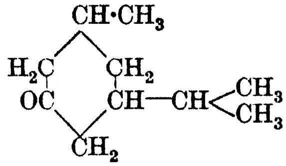
$C_{10}H_{18}O$ MW, 154

B.p. 195°. D^{15} 0·8914.

Oxime: m.p. 105°.

See first reference above.

m-Menthanone-5 (*3-Methyl-6-isopropylcyclohexanone*)



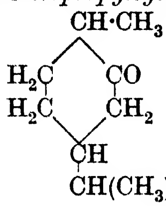
$C_{10}H_{18}O$ MW, 154

Oil with peppermint-like odour. B.p. 224–6°. D_4^{18} 0·9040. n_D^{18} 1·4536.

Semicarbazone: m.p. 179–81°.

Knoevenagel, *Ann.*, 1897, **297**, 172.
Wallach, *Ann.*, 1913, **397**, 210.

p-Menthanone-2 (*Carvomenthone, tetrahydrocarvone, 2-methyl-5-isopropylcyclohexanone*)



$C_{10}H_{18}O$ MW, 154

l-.

B.p. 220°. D_4^{20} 0·904. n_D^{20} 1·4553. $[\alpha]_D^{19}$ − 27·95° in MeOH. Ox. ⟶ 2-isopropyl-4-aceto-*n*-valeric acid.

Oxime: needles. M.p. 99–100°. $[\alpha]_D^{18}$ −35·7° in EtOH.

Semicarbazone: needles from EtOH. M.p. 193°. Spar. sol. EtOH.

i-.

B.p. 220–1°. D^{20} 0·904. n_D^{20} 1·454.

Oxime: needles from pet. ether. M.p. 105°. Sol. EtOH. Spar. sol. pet. ether.

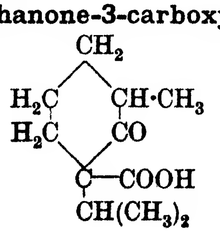
Semicarbazone: plates from MeOH. M.p. 174°.

Wallach, *Ann.*, 1893, **277**, 133; 1911, **381**, 65; 1918, **414**, 349.
Vavon, *Compt. rend.*, 1911, **153**, 70.

p-Menthanone-3.

See Menthone.

m-2-Menthanone-3-carboxylic Acid

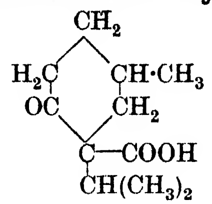


$C_{11}H_{18}O_3$ MW, 198

Et ester: $C_{13}H_{22}O_3$. MW, 226. B.p. 128°/10 mm. Heat ⟶ *m*-menthanone-2.

Kötz, Michels, *Ann.*, 1906, **348**, 95.

m-4-Menthanone-3-carboxylic Acid

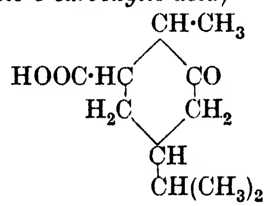


$C_{11}H_{18}O_3$ MW, 198

Et ester: $C_{13}H_{22}O_3$. MW, 226. B.p. 125–7°/10 mm. *Semicarbazone*: cryst. M.p. 130°.

See previous reference.

p-2-Menthanone-6-carboxylic Acid (*Carvomenthone-6-carboxylic acid*)



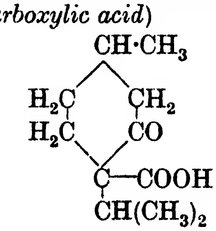
$C_{11}H_{18}O_3$ MW, 198

Prisms from CCl_4. M.p. 146–7°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. H_2O, pet. ether. $[\alpha]_D^{22}$ − 4·3° in AcOEt.

Nitrile: 6-cyanocarvomenthone. $C_{11}H_{17}ON$. MW, 179. Needles from EtOH. M.p. 83–4°. Sol. EtOH, C_6H_6, $CHCl_3$. Alkalis ⟶ carvotanacetone. *Oxime*: cryst. M.p. 156–7°.

Lapworth, *J. Chem. Soc.*, 1906, **89**, 1829.

p-3-Menthanone-4-carboxylic Acid (*Menthone-4-carboxylic acid*)



$C_{11}H_{18}O_3$ MW, 198

Inactive form:

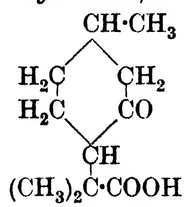
Et ester: $C_{13}H_{22}O_3$. MW, 226. B.p. 165–8°/20 mm. Heat with conc. alc. KOH ⟶ inactive *p*-menthanone-3.

Active form:

Et ester: b.p. 135–7°/10 mm. D^{14} 1·009. Alc. KOH ⟶ dextrorotatory *p*-menthanone-3. *Semicarbazone*: cryst. M.p. 144–5°.

Einhorn, Klages, *Ber.*, 1901, **34**, 3793.
Kötz, Schwarz, *Ann.*, 1907, **357**, 200.

p-3-Menthanone-8-carboxylic Acid (*Menthone-8-carboxylic Acid*)



$C_{11}H_{18}O_3$ MW, 198

Needles from AcOH.Aq. or AcOEt. M.p. 121°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, AcOH. Spar. sol. H_2O. $[\alpha]_D$ − 23·0° in EtOH.

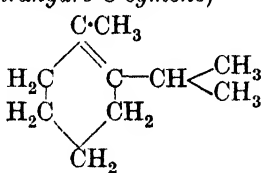
Semicarbazone: needles from MeOH. M.p. 188° decomp. Spar. sol. EtOH, C_6H_6, $CHCl_3$.

Clarke, Lapworth, *J. Chem. Soc.*, 1906, **89**, 1874.

Menthazine.

See under Menthone.

Δ^1-o-Menthene (*1-Methyl-2-isopropylcyclohexene, Δ^1-tetrahydro-*o*-cymene*)

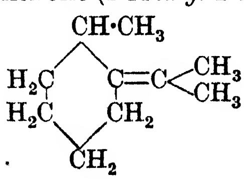


$C_{10}H_{18}$ MW, 138

Liq. with peppermint-like odour. B.p. 165–8°.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1082.

$\Delta^{2(8)}$-o-Menthene (*1-Methyl-2-isopropylidenecyclohexane*)

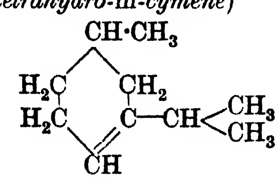


$C_{10}H_{18}$ MW, 138

B.p. 173° (160–2°). D^{20} 0·8345. n_D^{20} 1·467. $KMnO_4 \longrightarrow$ 2-methylcyclohexanol.

Wallach, Churchill, *Ann.*, 1908, **360**, 80.
See also previous reference.

Δ^3-m-Menthene (*3-Methyl-1-isopropylcyclohexene, Δ^3-tetrahydro-*m*-cymene*)



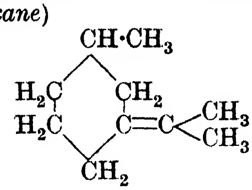
$C_{10}H_{18}$ MW, 138

B.p. 168–9°.

Nitrosochloride: leaflets from EtOH. M.p. 130–2°.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1105.

$\Delta^{3(8)}$-m-Menthene (*1-Methyl-3-isopropylidenecyclohexane*)

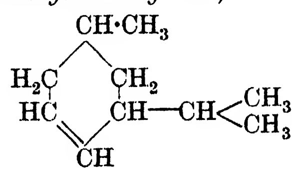


$C_{10}H_{18}$ MW, 138

B.p. 173–5°. D_4^{20} 0·8214. n_D^{20} 1·4670. 1% $KMnO_4 \longrightarrow$ 3-methylcyclohexanone + acetone. 2% $KMnO_4 \longrightarrow$ *i*-2-methyladipic acid.

Wallach, Churchill, *Ann.*, 1908, **360**, 77.
Kishner, Sawadowski, *Chem. Zentr.*, 1912, I, 1456.

Δ^4-m-Menthene (*4-Methyl-6-isopropylcyclohexene, Δ^4-tetrahydro-*m*-cymene*)

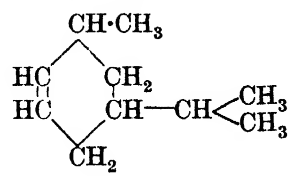


$C_{10}H_{18}$ MW, 138

B.p. 169–70°. D_4^{16} 0·8197. n_D 1·4561.

Knoevenagel, *Ann.*, 1897, **297**, 173.

Δ^5-m-Menthene (*3-Methyl-5-isopropylcyclohexene*)

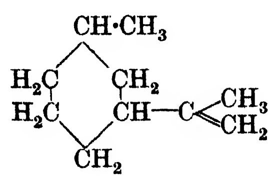


$C_{10}H_{18}$ MW, 138

B.p. 167–8°. D_{20}^{20} 0·8222. n_D 1·4568.

Henderson, Smeaton, *J. Chem. Soc.*, 1920, **117**, 148.

$\Delta^{8(9)}$-m-Menthene (*1-Methyl-3-isopropenylcyclohexane*)



$C_{10}H_{18}$ MW, 138

d-.

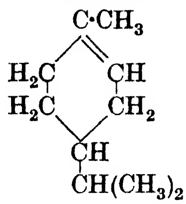
B.p. 170°. D_0^{20} 0·8179. n_D 1·4546. $[\alpha]_D$ + 9·73°. $KMnO_4$ ⟶ *d*-2-methyladipic acid.

l-.

B.p. 170–1°. D_0^{20} 0·8189. n_D 1·4574. $[\alpha]_D$ − 8·06°.

Kishner, *Chem. Zentr.*, 1912, I, 1713.
Kishner, Sawadowski, *ibid.*, 1456.

Δ^1-*p*-Menthene (*Carvomenthene*, *Δ^1-tetrahydro*-p-*cymene*, 1-*methyl*-4-*isopropylcyclohexene*)



$C_{10}H_{18}$ MW, 138

d-.

B.p. 175–7°. D_4^{18} 0·8246. n_D^{18} 1·4563. $[\alpha]_{578}$ + 118°.

Nitrosochloride: m.p. 95–6°. $[\alpha]_{578}$ + 344° in Et_2O.

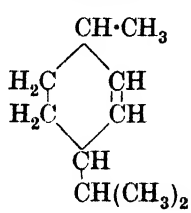
i-.

B.p. 174–5°. D^{21} 0·821. n_D^{21} 1·4551.

Nitrosochloride: cryst. from MeOH. M.p. 95–6°. AcONa ⟶ oxime of *dl*-carvotanacetone.

Vavon, *Compt. rend.*, 1911, **152**, 1675.
Wallach, *Ann.*, 1911, **381**, 58.
Bogert, Hasselström, Firmenich, *Chem. Abstracts*, 1932, **26**, 448.

Δ^2-*p*-Menthene (*Δ^2-Tetrahydro*-p-*cymene*, 3-*methyl*-6-*isopropylcyclohexene*)

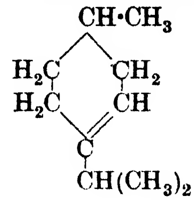


$C_{10}H_{18}$ MW, 138

B.p. 55–6°/12 mm. D^{20} 0·824. n_D^{20} 1·461.

Semmler, *Ber.*, 1909, **42**, 526.
Gachard, *Chem. Abstracts*, 1933, **27**, 3927.
See also last reference above.

Δ^3-*p*-Menthene (*Menthene*, *menthomenthene*, *Δ^3-tetrahydro*-p-*cymene*, 4-*methyl*-1-*isopropylcyclohexene*)



$C_{10}H_{18}$ MW, 138

d-.

Exists in two forms.

(i) B.p. 168°. D_4^{20} 0·8122. n_D^{20} 1·4524. $[\alpha]_D$ + 116·74°.

Nitrosochloride: m.p. 127° (140°). $[\alpha]_D$ + 230° in C_6H_6, + 187·64° in $CHCl_3$.

(ii) B.p. 167–8°. D_4^{20} 0·8078. $[\alpha]_D$ varies from + 29·6° to + 55·4°. Perbenzoic acid ⟶ oxide, b.p. 70–5°/15 mm., D^{14} 0·8989, n_D^{14} 1·4481, $[\alpha]_D^{14}$ + 45·4°.

Nitrosochloride: m.p. 113°. $[\alpha]_D$ + 26·4°.

l-.

B.p. 166–8°. D_{19}^{19} 0·8112. n_D 1·4510. $[\alpha]_D$ − 13·46° in EtOH.

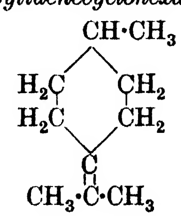
i-.

B.p. 167–9°. D_{20}^{20} 0·8188. n_D 1·4536.

Nitrosochloride: cryst. from MeOH. M.p. 128–9° (133°).

Kötz, Busch, *J. prakt. Chem.*, 1928, **119**, 1.
Tschugajew, *Ber.*, 1899, **32**, 3333; 1902, **35**, 2474; *Chem. Zentr.*, 1904, I, 1347.
Wallach, *Ann.*, 1898, **300**, 285.
Kondakow, Bachtschiew, *J. prakt. Chem.*, 1901, **63**, 57.
Kishner, *Chem. Zentr.*, 1911, II, 1925.
Bogert, Hasselström, Firmenich, *Chem. Abstracts*, 1932, **26**, 448.

$\Delta^{4(8)}$-*p*-Menthene (*Dihydroterpinolene*, 1-*methyl*-4-*isopropylidenecyclohexane*)



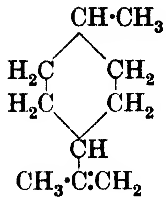
$C_{10}H_{18}$ MW, 138

B.p. 172–4°. D^{21} 0·819. n_D^{21} 1·4568. $KMnO_4$ ⟶ 4-methylcyclohexanone + acetone. Boiling dil. H_2SO_4 ⟶ *i*-Δ^3-*p*-menthene.

Nitrosochloride: m.p. 101–3°. Volatile in steam.

Wallach, Churchill, *Ann.*, 1908, **360**, 73.
Kishner, *Chem. Zentr.*, 1911, II, 1925.

$\Delta^{8(9)}$-*p*-Menthene (1-*Methyl*-4-*isopropenylcyclohexane*)

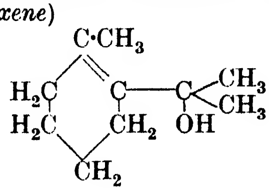


$C_{10}H_{18}$ MW, 138

B.p. 170°. D_0^{20} 0·8142. n_D 1·4523.

Gachard, *Chem. Abstracts*, 1933, **27**, 3927.
See also second reference above.

Δ^{1}-*o*-Menthenol-8 (1-*Methyl*-2-β-*hydroxyisopropylcyclohexene*)

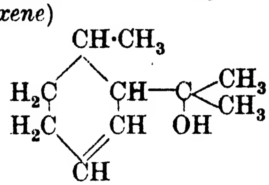


$C_{10}H_{18}O$ MW, 154

B.p. 110–11°/35 mm. Liebermann–Burchard test ⟶ red col.

Kay, Perkin, *J. Chem. Soc.*, 1905, **87**, 1075.

Δ^{3}-*o*-Menthenol-8 (4-*Methyl*-3-β-*hydroxyisopropylcyclohexene*)



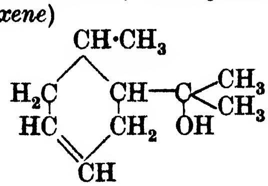
$C_{10}H_{18}O$ MW, 154

"*Cis*":
B.p. 107–8°/30 mm. Oxalic acid ⟶ "*cis*"-$\Delta^{3,8(9)}$-*o*-menthadiene.

"*Trans*":
B.p. 110–11°/30 mm. Oxalic acid ⟶ "*trans*"-$\Delta^{3,8(9)}$-*o*-menthadiene.

Perkin, *J. Chem. Soc.*, 1911, **99**, 751.

Δ^{4}-*o*-Menthenol-8 (4-*Methyl*-5-β-*hydroxyisopropylcyclohexene*)

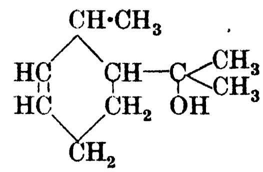


$C_{10}H_{18}O$ MW, 154

Liq. with odour of peppermint. B.p. 110°/30 mm. Dil. H_2SO_4 ⟶ $\Delta^{4,8(9)}$-*o*-menthadiene.
Phenylurethane: m.p. 119–20°.

Perkin, *J. Chem. Soc.*, 1911, **99**, 756.

Δ^{5}-*o*-Menthenol-8 (3-*Methyl*-4-β-*hydroxyisopropylcyclohexene*)

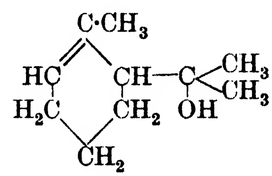


$C_{10}H_{18}O$ MW, 154

B.p. 198–200°, 140°/100 mm., 110–12°/30 mm. D_{20}^{20} 0·9404. n_D 1·4792. Oxalic acid ⟶ $\Delta^{5,8(9)}$-*o*-menthadiene.
Phenylurethane: m.p. 118–19°.

Perkin, *J. Chem. Soc.*, 1911, **99**, 736.

Δ^{6}-*o*-Menthenol-8 (1-*Methyl*-6-β-*hydroxyisopropylcyclohexene*)

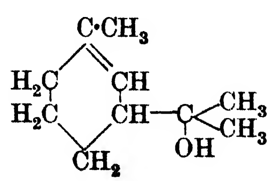


$C_{10}H_{18}O$ MW, 154

B.p. 200–2°, 107–8°/30 mm. D_{20}^{20} 0·9412. n_D 1·4811. Oxalic acid ⟶ $\Delta^{6,8(9)}$-*o*-menthadiene. Liebermann–Burchard test ⟶ orange-brown col.

Perkin, *J. Chem. Soc.*, 1911, **99**, 740.

Δ^{1}-*m*-Menthenol-8 (1-*Methyl*-3-β-*hydroxyisopropylcyclohexene*)

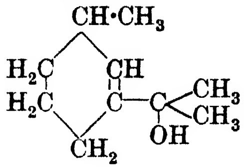


$C_{10}H_{18}O$ MW, 154

B.p. 105–8°/30 mm. D_{15}^{15} 0·9257. n_α^{15} 1·4752. $KHSO_4$ ⟶ carvestrene. Liebermann–Burchard test ⟶ violet col.

Perkin, Tattersall, *J. Chem. Soc.*, 1907, **91**, 498.

Δ^2-*m*-Menthenol-8 (1-*Methyl*-3-β-*hydroxy-isopropylcyclohexene*)



$C_{10}H_{18}O$ MW, 154

d-.

B.p. 206–8°, 103–5°/22 mm. D_{22}^{22} 0·923. n_D 1·4728. $[\alpha]_D + 55{\cdot}56°$. $KMnO_4 \longrightarrow$ 2-methyl-adipic acid.

Phenylurethane: m.p. 124°.

i-.

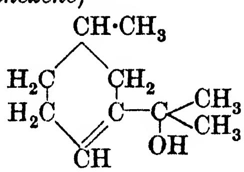
B.p. 110°/30 mm. D_{20}^{20} 0·9281. n_D 1·4772. $KHSO_4 \longrightarrow \Delta^{2,8(9)}$-*m*-menthadiene. Liebermann–Burchard test ⟶ violet-blue col.

Phenylurethane: m.p. 127° decomp.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1101.

Haworth, Perkin, Wallach, *Ann.*, 1911, **379**, 141.

Δ^3-*m*-Menthenol-8 (4-*Methyl*-2-β-*hydroxy-isopropylcyclohexene*)



$C_{10}H_{18}O$ MW, 154

d-.

B.p. 107–8°/25 mm. D_{20}^{20} 0·9235. n_D 1·4791. $[\alpha]_D + 20{\cdot}9°$ in AcOEt. Oxalic acid ⟶ *d*-$\Delta^{3,8(9)}$-*m*-menthadiene.

l-.

B.p. 102–3°/14 mm. $[\alpha]_D - 18{\cdot}5°$ in AcOEt. Oxalic acid ⟶ *l*-$\Delta^{3,8(9)}$-*m*-menthadiene.

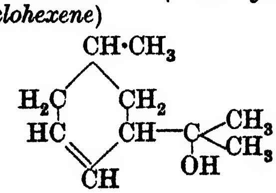
i-.

B.p. 115°/35 mm. D_{20}^{20} 0·9268. n_D 1·4798. Oxalic acid ⟶ *i*-$\Delta^{3,8(9)}$-*m*-menthadiene.

Phenylurethane: m.p. 130°.

Luff, Perkin, *J. Chem. Soc.*, 1911, **99**, 524.

Δ^4-*m*-Menthenol-8 (4-*Methyl*-6-β-*hydroxy-isopropylcyclohexene*)

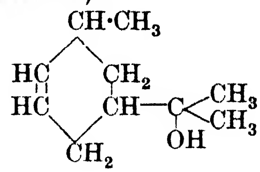


$C_{10}H_{18}O$ MW, 154

B.p. 115–17°/30 mm. Oxalic acid ⟶ $\Delta^{4,8(9)}$-*m*-menthadiene.

Perkin, *J. Chem. Soc.*, 1910, **97**, 2147.

Δ^5-*m*-Menthenol-8 (3-*Methyl*-5-β-*hydroxy-isopropylcyclohexene*)



$C_{10}H_{18}O$ MW, 154

d-.

B.p. 115°/30 mm. $[\alpha]_D^{16} + 36{\cdot}7°$ in EtOH. Oxalic acid ⟶ *d*-$\Delta^{5,8(9)}$-*m*-menthadiene + a little *d*-$\Delta^{5,3(8)}$-*m*-menthadiene. Liebermann–Burchard test ⟶ red col.

l-.

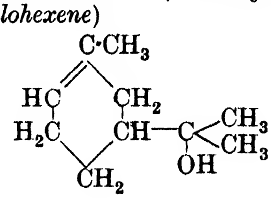
B.p. 104–5°/20 mm. $[\alpha]_D^{17} - 32{\cdot}6°$ in AcOEt. Oxalic acid ⟶ *l*-$\Delta^{5,8(9)}$-*m*-menthadiene + a little *l*-$\Delta^{5,3(8)}$-*m*-menthadiene.

i-.

B.p. 115–17°/30 mm. Oxalic acid ⟶ *i*-$\Delta^{5,8(9)}$-*m*-menthadiene + a little *i*-$\Delta^{5,3(8)}$-*m*-menthadiene.

Perkin, *J. Chem. Soc.*, 1910, **97**, 2139.

Δ^6-*m*-Menthenol-8 (1-*Methyl*-5-β-*hydroxy-isopropylcyclohexene*)



$C_{10}H_{18}O$ MW, 154

B.p. 106–7°/20 mm. D_{20}^{20} 0·9376. n_α^{20} 1·4775. Dil. $H_2SO_4 \longrightarrow$ *cis*-*m*-menthene-diol-1 : 8. HCl ⟶ carvestrene dihydrochloride.

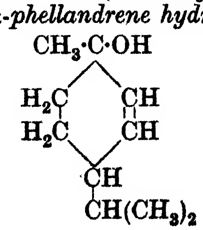
Nitrosochloride: m.p. 125°.

Fischer, Perkin, *J. Chem. Soc.*, 1908, **93**, 1888.

Δ^1-*p*-Menthenol-8.

See α-Terpineol.

Δ^2-*p*-Menthenol-1 (3-*Methyl*-6-*isopropyl-cyclohexenol*-3, α-*phellandrene hydrate*)

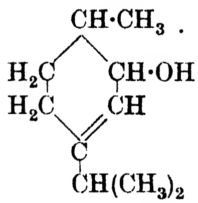


$C_{10}H_{18}O$ MW, 154

B.p. 208–11°, 92°/10 mm. D^1 0·923. n_D^{19} 1·4760.

Wallach, *Ann.*, 1908, **359**, 285.

Δ^3-*p*-Menthenol-2 (*Carvenol*, 4-*methyl*-1-*isopropylcyclohexenol*-3)

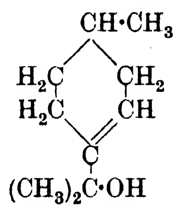


$C_{10}H_{18}O$ MW, 154

B.p. 219–21°, 107–9°/16 mm. D^{22} 0·925. n_D 1·479. CrO_3 ⟶ carvenone. Hydrogenation ⟶ carvomenthol.

Wallach, *Ann.*, 1918, **414**, 202.

Δ^3-*p*-Menthenol-8 (4-*Methyl*-1-β-*hydroxyisopropylcyclohexene*)



$C_{10}H_{18}O$ MW, 154

d-.

B.p. 105°/20 mm. D_{20}^{20} 0·9236. n_D 1·4783. $[\alpha]_D$ + 83·2° in AcOEt. Volatile in steam. Oxalic acid ⟶ *d*-$\Delta^{3,8(9)}$-*p*-menthadiene.

l-.

B.p. 101–2°/14 mm. $[\alpha]_D^{15}$ − 67·3° in C_6H_6. $KHSO_4$ ⟶ terpinene + *l*-$\Delta^{3,8(9)}$-*p*-menthadiene.

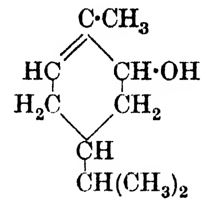
i-.

M.p. 38–40°. B.p. 205°, 120°/25 mm., 102°/14 mm. D_{10}^{10} 0·9251, D_{45}^{45} 0·9055. n_α^{16} 1·4754, n_α^{43} 1·4634. $KHSO_4$ ⟶ terpinene + *i*-$\Delta^{3,8(9)}$-*p*-menthadiene.

Kay, Perkin, *J. Chem. Soc.*, 1906, **89**, 847.
Semmler, Rimpel, *Ber.*, 1906, **39**, 2586.
Chou, Perkin, *J. Chem. Soc.*, 1911, **99**, 537.

$\Delta^{4(8)}$-*p*-Menthenol-1.
See γ-Terpineol.
$\Delta^{4(8)}$-*p*-Menthenol-3.
See Pulegol.

Δ^6-*p*-Menthenol-2 (1-*Methyl*-4-*isopropylcyclohexenol*-6)



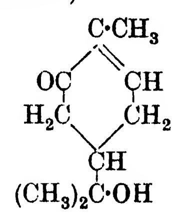
$C_{10}H_{18}O$ MW, 154

B.p. 109–10°/13 mm. D_{15}^{15} 0·9275. $[\alpha]_D$ +7·90°. Perbenzoic acid ⟶ oxide, b.p. 147–8°/17 mm.

Prilezhaev, Verschuk, *Chem. Abstracts*, 1929, **23**, 4464.

$\Delta^{8(9)}$-*p*-Menthenol-1.
See β-Terpineol.
$\Delta^{8(9)}$-*p*-Menthenol-2.
See Dihydrocarveol.
$\Delta^{8(9)}$-*p*-Menthenol-3.
See Isopulegol.
Δ^1-*p*-2-Menthenolone-3.
See Buchu-camphor.

Δ^1-*p*-8-Menthenolone-6 (*Hydroxycarvotanacetone*, *carvone hydrate*, 1-*methyl*-4-β-*hydroxyisopropylcyclohexenone*-6)



$C_{10}H_{16}O_2$ MW, 168

d-.

Cryst. from Et_2O–pet. ether. M.p. 42–3°. B.p. 160°/16 mm., 154°/10 mm. $[\alpha]_D^{20}$ + 43° in EtOH. Spar. sol. H_2O, pet. ether. Heat ⟶ carvacrol + carvone. Na + EtOH ⟶ α-*p*-menthandiol-2 : 8.

Oxime: needles from EtOH.Aq. M.p. 114°.

Semicarbazone: cryst. from EtOH. M.p. 176–9°.

i-.

B.p. 170°/20 mm., 154°/10 mm., 145°/5 mm. D_0^0 1·069. n_D^{14} 1·5065. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. $KMnO_4$ ⟶ acetone + terpenylic acid. NaHg ⟶ Δ^1-*p*-menthene-diol-6 : 8. Oxalic acid ⟶ carvacrol + carvone. Boiling dil. H_2SO_4 ⟶ carvacrol.

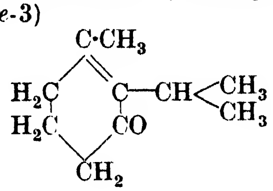
Oxime: needles from EtOH.Aq. M.p. 134° (138·5°). Conc. H_2SO_4 ⟶ 4-aminothymol.

Diacetyl: m.p. 107°.

Semicarbazone: needles from EtOH. M.p. 176°.

Knoevenagel, Samel, *Ber.*, 1906, **39**, 679.
Rupe, Schlochoff, *Ber.*, 1905, **38**, 1719.
Balbiano, Paolini, *Atti accad. Lincei*, 1902, **11**, 67.
Cusmano, *Gazz. chim. ital.*, 1910, **40**, 130.
Henderson, Agnew, *J. Chem. Soc.*, 1909, **95**, 293.

Δ^1-*o*-Menthenone-3 (1-*Methyl-2-isopropylcyclohexenone*-3)



$C_{10}H_{16}O$ MW, 152

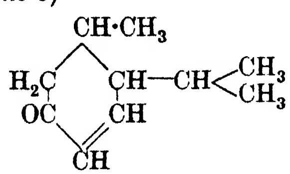
B.p. 217–19°. Ox. ⟶ isobutyric + 3-acetobutyric acids.

Oxime: m.p. 105–6°. Sol. most org. solvents. Spar. sol. H_2O. Volatile in steam. *B,HCl*: m.p. 135°.

Semicarbazone: needles from EtOH. M.p. 167–8°.

Dieckmann, *Ber.*, 1912, **45**, 2700.

Δ^3-*o*-Menthenone-5 (4-*Methyl-3-isopropylcyclohexenone*-6)



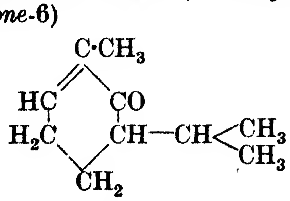
$C_{10}H_{16}O$ MW, 152

B.p. 120–3°/22 mm. D_4^{20} 0·9460. n_D^{20} 1·4912. H ⟶ *o*-menthanone-5.

Semicarbazone: m.p. 188°.

Wienhaus, Schumm, *Ann.*, 1924, **439**, 40.

Δ^6-*m*-Menthenone-2 (1-*Methyl-5-isopropylcyclohexenone*-6)



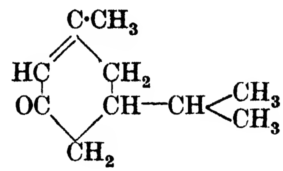
$C_{10}H_{16}O$ MW, 152

B.p. 208–9°. D^{20} 0·9202. n_D^{20} 1·4749.

Semicarbazone: cryst. from MeOH. M.p. 151°.

Wallach, Churchill, *Ann.*, 1908, **360**, 78.

Δ^6-*m*-Menthenone-5 (1-*Methyl-5-isopropylcyclohexenone*-3)



$C_{10}H_{16}O$ MW, 152

B.p. 244°, 150°/45 mm., 124°/15 mm. D^{21} 0·934. n_D^{21} 1·4865°. Misc. with most org. solvents.

Oxime: m.p. 117–18°. Sol. EtOH, C_6H_6. Spar. sol. Et_2O, $CHCl_3$.

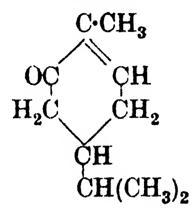
Semicarbazone: cryst. from EtOH. M.p. 166–7°.

Knoevenagel, *Ann.*, 1897, **297**, 146; 1895, **288**, 329.
Wallach, *Ann.*, 1913, **397**, 209.

Δ^1-*p*-Menthenone-3.

See Piperitone.

Δ^1-*p*-Menthenone-6 (*Carvotanacetone*, 1-*methyl-4-isopropylcyclohexenone*-6)



$C_{10}H_{16}O$ MW, 152

d-.

B.p. 227–8°, 96–7°/9 mm. D_4^{19} 0·9351. $[\alpha]_D^{25}$ + 49·5°. Red. ⟶ carvomenthol. Ox. ⟶ pyruvic acid.

Oxime: prisms from EtOH.Aq. M.p. 75–7°. $[\alpha]_D^{17}$ + 19·2°. Volatile in steam.

Semicarbazone: needles from EtOH. M.p. 173–4°. $[\alpha]_D^{21}$ + 114·7°. Insol. H_2O.

l-.

B.p. 227–9°. n_D^{19} 1·482.

Oxime: prisms from MeOH. M.p. 75–6°. $[\alpha]_D$ − 19·1° in MeOH.

Semicarbazone: needles from EtOH. M.p. 135°. $[\alpha]_D^{22}$ − 114° in $CHCl_3$.

i-.

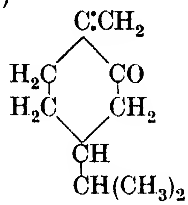
B.p. 228°. D_4^{20} 0·9351. n_D^{20} 1·4805. Ox. ⟶ succinic + pyruvic acids.

Oxime: cryst. from MeOH. M.p. 92–3°.

Semicarbazone: cryst. from MeOH. M.p. 177–8°.

Harries, Stirm, *Ber.*, 1901, **34**, 1930.
Wallach, Beschke, *Ann.*, 1904, **336**, 35.
Vavon, *Compt. rend.*, 1911, **153**, 70.
Borgwardt, Schwenk, *J. Am. Chem. Soc.*, 1934, **56**, 1186.

$\Delta^{1(7)}$-*p*-Menthenone-2 (*5-Isopropyl-2-methylenecyclohexanone*)



$C_{10}H_{16}O$ MW, 152

B.p. 233–5°.

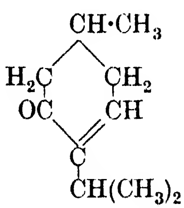
Semicarbazone: prisms + $1H_2O$ from EtOH.Aq. M.p. 222–3°.

Baeyer, Oehler, *Ber.*, 1896, **29**, 35.

Δ^3-*p*-Menthenone-2.

See Carvenone.

Δ^3-*p*-Menthenone-5 (*4-Methyl-1-isopropylcyclohexenone-6*)



$C_{10}H_{16}O$ MW, 152

Exists in three forms.

(i) B.p. 212°. D_4^{20} 0·9158. n_D 1·4731. $[\alpha]_D$ − 77·97°.

Oxime: plates from EtOH. M.p. 62°. $[\alpha]_D$ − 59·88° in EtOH. Volatile in steam. Sol. EtOH, Et_2O, C_6H_6.

Semicarbazone: m.p. 170–1°.

(ii)

Oxime: m.p. 63–6°.

Semicarbazone: prisms from EtOH. M.p. 171–3°.

(iii) *i*-. B.p. 206–8°, 95–7°/12 mm. D^{20} 0·916. n_D^{20} 1·4733.

Oxime: prisms from EtOH.Aq. M.p. 63–6°.

Semicarbazone: m.p. 142°.

Tschugajew, *Chem. Zentr.*, 1904, I, 1347.
Wallach, *Ann.*, 1899, **305**, 272.
Urban, Kremers, *Am. Chem. J.*, 1894, **16**, 396.

$\Delta^{4(8)}$-*p*-Menthenone-3.

See Pulegone.

$\Delta^{8(9)}$-*p*-Menthenone-2.

See Dihydrocarvone.

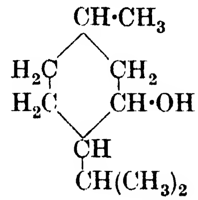
$\Delta^{8(9)}$-*p*-Menthenone-3.

See Isopulegone.

Menthoglycol.

See *p*-Menthandiol-3 : 8.

Menthol (*p-Menthanol-3*, *3-methyl-6-isopropylcyclohexanol*, *hexahydrothymol*, *menthomenthol*)



$C_{10}H_{20}O$ MW, 156

l-.

Constituent of oil of peppermint. Exists in four allotropic forms. Needles from MeOH. M.p. (*a*), 44°, (*b*) 35°, (*c*) 33°, (*d*) 31°. B.p. 216°, 145°/100 mm., 111°/20 mm., 98°/10 mm. D_{15}^{15} 0·904, D_{60}^{60} 0·8835. n_D^{25} 1·458. $[\alpha]_D^{18}$ − 50·1°, $[\alpha]_D^{100}$ − 49·5° in EtOH. Sol. EtOH, Et_2O, AcOH, CS_2. Spar. sol. H_2O. Sol. conc. HCl. Heat of comb. C_p 1509·16 Cal. Heated in bomb tube at 450° ⟶ menthene + menthone. CrO_3 ⟶ menthone + 2-methyl-4-isobutyryl-*n*-valeric acid. HI ⟶ *p*-menthane. $KMnO_4$ ⟶ 2-methyl-4-isobutyryl-*n*-valeric acid + formic, propionic, butyric, oxalic, and 2-methyladipic acids. PCl_5 ⟶ menthyl chloride. Dil. H_2SO_4 at 60° ⟶ Δ^3-*p*-menthene. Conc. H_2SO_4 ⟶ menthane + *p*-cymene + a comp. $C_{20}H_{36}$, b.p. 190–1°/20 mm.

Me ether: methyl 3-*p*-menthyl ether. $C_{11}H_{22}O$. MW, 170. D_4^{20} 0·8607. $[\alpha]_D$ − 95·67°.

Et ether: ethyl 3-*p*-menthyl ether. $C_{12}H_{24}O$. MW, 184. B.p. 211–12°, 103–4°/24 mm. D_4^{20} 0·8537. n_D^{17} 1·4434. $[\alpha]_D^{20}$ − 98·32°.

Propyl ether: $C_{13}H_{26}O$. MW, 198. D_4^{20} 0·8519. $[\alpha]_D$ − 92·4°.

Allyl ether: $C_{13}H_{24}O$. MW, 196. B.p. 103–4°/13 mm. D_4^{20} 0·8763. $[\alpha]_D$ − 98·3°.

Methylene ether: dimentholformal. $C_{21}H_{40}O_2$. MW, 324. Needles. M.p. 57°. B.p. 337°. $[\alpha]_D^{24}$ − 77·9° in EtOH. Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O.

d-β-*Glucoside*: prisms + H_2O from H_2O. M.p. 77–9°. $[\alpha]_D^{20}$ − 93° in EtOH. Sol. EtOH. Spar. sol. H_2O, AcOEt, Et_2O, C_6H_6. Insol. pet. ether. *Tetra-acetyl deriv.*: needles from 50% EtOH. M.p. 130°. Sol. Et_2O, Me_2CO. Spar. sol. H_2O. Insol. pet. ether.

Formyl: m.p. 9°. B.p. 219°, 98°/15 mm. D_4^{20} 0·9359. $[\alpha]_D^{20}$ − 79·52°.

Acetyl: b.p. 227°, 116°/22 mm., 109°/10 mm. D_4^{20} 0·9185. $[\alpha]_D^{20}$ − 77·6°.

Chloroacetyl: needles from EtOH. M.p. 38°. D_4^{20} 1·0564. $[\alpha]_D$ − 73·86°.

Dichloroacetyl: b.p. 173°/37 mm. D_4^{20} 1·1088. $[\alpha]_D$ − 63·56°.

Trichloroacetyl: b.p. 149°/10 mm. D_4^{20} 1·1796. $[\alpha]_D$ − 59·65°.

Bromoacetyl: b.p. 144–5°/12 mm. D_4^{20} 1·2136. $[\alpha]_D^{25}$ − 61·98°.

Iodoacetyl: b.p. 165°/22 mm. $[\alpha]_D^{20}$ − 47·29°.

Propionyl: b.p. 118°/15 mm. D_4^{20} 0·9184. $[\alpha]_D^{20}$ − 75·5°.

n-*Butyryl*: b.p. 129°/15 mm. D_4^{20} 0·9114. $[\alpha]_D^{20}$ − 70·56°.

Isobutyryl: b.p. 116–17°/12 mm. D_4^{20} 0·9062. $[\alpha]_D^{20}$ − 72°.

n-*Valeryl*: b.p. 141°/15 mm. D_4^{20} 0·9074. $[\alpha]_D^{20}$ − 65·55°.

Isovaleryl: validol. B.p. 129°/9 mm. D_4^{15} 0·9067. n_D^{20} 1·4485. $[\alpha]_D^{20}$ − 64·62°. Used as a prophylactic accessory.

Caproyl: b.p. 153°/15 mm. D_4^{20} 0·9033. $[\alpha]_D^{20}$ − 62·07°.

Heptyl: b.p. 165°/15 mm. D_4^{20} 0·9006. $[\alpha]_D^{20}$ − 58·85°.

Caprylyl: b.p. 175°/15 mm. D_4^{20} 0·8977. $[\alpha]_D^{20}$ − 55·25°.

Stearyl: m.p. 39°. $[\alpha]_D^{20}$ − 36·7° in EtOH.

Crotonyl: b.p. 140°/14 mm. D_4^{20} 0·8325. $[\alpha]_D^{20}$ − 90·67°.

Allylacetyl: b.p. 139–40°/14 mm. $[\alpha]_D^{20}$ −67·32°.

2-*Ethylacrylyl*: b.p. 152–3°/14 mm. $[\alpha]_D^{24}$ − 74·4°.

Sorbyl: b.p. 173°/14 mm. $[\alpha]_D^{20}$ − 83·17°.

Oxalyl: m.p. 68°. B.p. 225°/12 mm. $[\alpha]_D^{15}$ − 104°.

Malonate: *see under* Malonic Acid.

Acid succinate: cryst. from EtOH. M.p. 62°. $[\alpha]_D^{20}$ − 59·63° in C_6H_6. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Succinate: cryst. from EtOH. M.p. 63°. $[\alpha]_D^{18}$ − 81·52° in C_6H_6.

Glutarate: b.p. 240–3°/20 mm. $[\alpha]_D^{15}$ − 80·26° in $CHCl_3$.

Adipate: needles from pet. ether. M.p. 61°. $[\alpha]_D^{15}$ − 83·8° in $CHCl_3$.

Pimelate: b.p. 248–52°/20 mm. $[\alpha]_D^{15}$ −78·31° in $CHCl_3$.

Suberate: m.p. 38–9°. B.p. 257–9°/20 mm. $[\alpha]_D^{15}$ − 73·56° in $CHCl_3$.

Azelate: b.p. 254°/20 mm. $[\alpha]_D^{15}$ − 72·68° in $CHCl_3$.

Sebacate: b.p. 256–8°/20 mm. $[\alpha]_D^{15}$ − 67·08° in $CHCl_3$.

Mucate: cryst. from MeOH. M.p. 168°. $[\alpha]_D^{15}$ − 93·4°.

Carbonate: leaflets from EtOH. M.p. 106°. $[\alpha]_D^{20}$ − 92·52° in C_6H_6. Sol. Et_2O, C_6H_6. Spar. sol. EtOH.

Carbamate: "mentholurethane." Prisms from EtOH. M.p. 161°. Sol. MeOH, AcOH, CS_2, C_6H_6. Spar. sol. H_2O. $[\alpha]_D^{21}$ − 85·11° in $CHCl_3$. Decomp. at 200° ⟶ cyanuric acid. Alc. KOH ⟶ menthane + KCNO.

Monothiocarbamate: "*l*-menthylxanthogenamide." Prisms from EtOH–Et_2O. M.p. 144–5°. $[\alpha]_D$ − 120·8° in C_6H_6. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. pet. ether.

Glycollate: needles from EtOH. M.p. 87°. Sol. most org. solvents. Spar. sol. H_2O.

Methoxyacetyl: b.p. 140°/10 mm.

Ethoxyacetyl: b.p. 153°/20 mm.

d-*Tartrate*: needles from EtOH. M.p. 74–5°. D^{20} 1·054. $[\alpha]_D^{20}$ − 66·63°. *Diacetyl*: cryst. from EtOH. M.p. 84–5°, solidifying and remelting at 108°. D^{14} 1·05. $[\alpha]_D^{18}$ − 52·83° in EtOH.

l-*Tartrate*: needles from pet. ether. M.p. 42°. D^{16} 1·045. $[\alpha]_D^{14}$ − 75·64° in EtOH. *Diacetyl*: cryst. from MeOH.Aq. M.p. 102·5°. D^{16} 1·055. $[\alpha]_D^{20}$ − 72·21° in EtOH.

Mesotartrate: *diacetyl*, cryst. from MeOH. M.p. 129°. D^{130} 0·9683. $[\alpha]_D^{16}$ − 57·2° in EtOH.

Pyruvate: b.p. 136–40°/22 mm. D_4^{20} 0·9852. $[\alpha]_D^{11}$ − 181·7°.

Acetoacetate: m.p. 30–2°. B.p. 145°/11 mm. D_{15}^{15} 0·986. $[\alpha]_D^{20}$ − 70·1° in EtOH. Sol. EtOH, Et_2O, $CHCl_3$, CS_2. Insol. H_2O. Exhibits mutarotation. *Semicarbazone*: needles from EtOH. M.p. 143–4°. $[\alpha]_D$ − 56·1° in C_6H_6. Sol. EtOH, Me_2CO, AcOEt, C_6H_6. Spar. sol. Et_2O. Spar. sol. pet. ether.

Levulinate: b.p. 169°/12 mm. D_4^{20} 0·9773. $[\alpha]_D^{20}$ − 60·6° in C_6H_6.

Allophanate: needles from EtOH. M.p. 215°.

Benzoyl: m.p. 55°.

Cinnamoyl: b.p. 230–3°/27 mm. D_4^{20} 1·0066. n_D^{17} 1·5433. $[\alpha]_D^{20}$ − 76·95° in C_6H_6.

Acid phthalate: (i) labile form, m.p. 110°. (ii) Stable form, m.p. 122°.

Phenylurethane: m.p. 112°.

d-.

M.p. 38–40°. $[\alpha]_D$ + 48·3° in EtOH.

Benzoyl: m.p. 52°.

dl-.

Needles from pet. ether. M.p. 34°. B.p. 216°, 103–5°/16 mm. D_{15}^{15} 0·904. n_D^{20} 1·4615.

Sol. most org. solvents. Insol. H_2O. Ox. ⟶ *dl*-menthone.

Phenylurethane: m.p. 104°.

Acid succinate: needles from pet. ether. M.p. 85°.

Acid phthalate: m.p. 130°.

Beckmann, *J. prakt. Chem.*, 1897, **55**, 14.
Kondakow, Bachtschiew, *J. prakt. Chem.*, 1901, **63**, 56.
Tschugajew, *Ber.*, 1898, **31**, 364; *Chem. Zentr.*, 1902, II, 1238; 1904, I, 1347.
Pickard, Littlebury, *J. Chem. Soc.*, 1912, **101**, 111.
Oppenheim, *Ann.*, 1861, **120**, 351.
Fischer, Raske, *Ber.*, 1909, **42**, 1470.
Hilditch, *J. Chem. Soc.*, 1909, **95**, 1579.
Cohen, *J. Chem. Soc.*, 1911, **99**, 1061.
Patterson *et al.*, *J. Chem. Soc.*, 1906, **89**, 333, 1889.
Lapworth, Hann, *J. Chem. Soc.*, 1902, **81**, 1501.

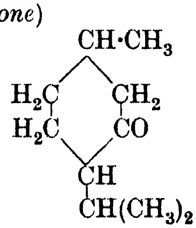
Mentholurethane.
See under Menthol.

Menthomenthene.
See Δ^3-*p*-Menthene.

Menthomenthol.
See Menthol.

Menthonaphthene.
See *p*-Menthane.

Menthone (p-*Menthanone*-3, 3-*methyl*-6-*iso*-*propylcyclohexanone*)



$C_{10}H_{18}O$ MW, 154

l-.

Occurs with menthol in American peppermint oil, geranium oil, etc. Liq. with odour of peppermint. M.p. − 6°. B.p. 207°, 137°/100 mm., 96°/20 mm., 81°/10 mm. D_4^{20} 0·8954, D_4^{130} 0·8073. n_D^{20} 1·4505. $[\alpha]_D^{20}$ − 24·8°. Misc. with most org. solvents. Spar. sol. H_2O. Slowly inverts to *d*-isomenthone. Conc. acids accelerate this inversion. $KMnO_4$ ⟶ *d*-2-methyladipic acid. Red. ⟶ *l*-menthol. P_2S_3 ⟶ Δ^3-*p*-menthene. HI + P ⟶ *p*-menthane.

Oxime: cryst. M.p. 59–60°. Triboluminescent. B.p. 250–1°. $[\alpha]_D$ − 4·16° in EtOH. More stable towards inverting agents than *l*-menthone. Red. ⟶ *l*-menthylamine. $NaNO_2$ ⟶ a per-nitroso deriv. (decomp. at 130° in vacuo). P_2O_5 ⟶ menthonitrile. *Benzoyl*: m.p. 54°. *B,HCl*: needles from EtOH. M.p. 118–19°.

Hydrazone: b.p. 248–9°, 144°/30 mm. D_0^{20} 0·9333. n_D 1·4940. $[\alpha]_D$ − 52·4°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O.

Azine: *l*-menthazine. Needles from MeOH. M.p. 51°. B.p. 218°/40 mm. $[\alpha]_D$ − 107·68° in EtOH.

Semi-oxamazone: needles from EtOH. M.p. 177°. Insol. H_2O, EtOH. Decomp. by boiling H_2O.

Semicarbazone: prisms. M.p. 185–7°. $[\alpha]_D$ − 64° in chloral hydrate. Spar. sol. EtOH. Insol. H_2O.

Thiosemicarbazone: needles from EtOH. M.p. 155–7°.

Phenylsemicarbazone: needles from EtOH. M.p. 180–1°.

d-.

B.p. 204°. D_{18}^{18} 0·895°. $[\alpha]_D^{18}$ + 24·85°.

Oxime: m.p. 59°.

Semicarbazone: m.p. 187–9°.

dl. Thymomenthone.

Liq. with odour of peppermint. B.p. 205° (212°). D^0 0·911. Sol. EtOH, Et_2O, AcOH. Spar. sol. H_2O. H(+ Ni) ⟶ *dl*-menthol + *dl*-neomenthol. Red. with Na ⟶ *dl*-menthol.

Oxime: needles from EtOH. M.p. 80° (81–2°).

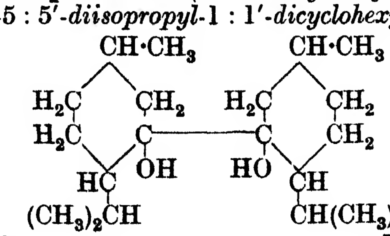
Semicarbazone: needles from MeOH. M.p. 158°.

Sandborn, *Organic Syntheses*, 1932, Collective, Vol. I, 333.
Ciamician, Silber, *Ber.*, 1909, **42**, 1510.
Tutin, Kipping, *J. Chem. Soc.*, 1904, **85**, 66.
Wallach, Tuttle, *Ann.*, 1893, **277**, 157.
Kishner, *Chem. Zentr.*, 1908, I, 1178.
Pickard, Littlebury, *J. Chem. Soc.*, 1912, **101**, 110.
Brunel, *Compt. rend.*, 1905, **140**, 793.

Menthone-carboxylic Acid.
See *p*-3-Menthanone-4-carboxylic Acid *and* *p*-3-Menthanone-8-carboxylic Acid.

Menthonol.
Menthanolone, *q.v.*

Menthopinacone (1 : 1′-*Dihydroxy*-3 : 3′-*dimethyl*-5 : 5′-*diisopropyl*-1 : 1′-*dicyclohexyl*)

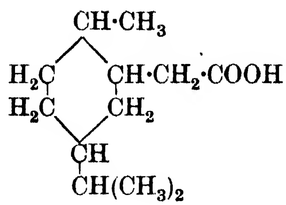


$C_{20}H_{38}O_2$ MW, 310

Needles. M.p. 94°. $[\alpha]_D^{20}$ − 0·48° in EtOH.

Beckmann, *J. prakt. Chem.*, 1897, **55**, 22.

2-p-Menthylacetic Acid (*Menthane-2-acetic acid*)



$C_{12}H_{22}O_2$ MW, 198

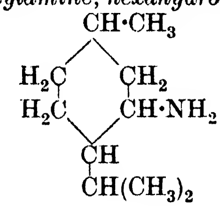
B.p. 162–6°/12 mm.

Et ester: $C_{14}H_{26}O_2$. MW, 226. B.p. 125–6°/12 mm. D_{25}^{25} 0·9253. n_D^{25} 1·4651. $[\alpha]_{5461}$ +7·2°.

p-*Toluidide*: $C_{19}H_{29}O_2N$. MW, 303. Needles from EtOH. M.p. 133°.

Bradfield, Jones, Simonsen, *J. Chem. Soc.*, 1934, 1811.

Menthylamine (3-*Aminomenthane*, 3-*amino-1-methyl-4-isopropyl-cyclohexane*, 3-*methyl-6-isopropylcyclohexylamine*, *hexahydrothymylamine*)



$C_{10}H_{21}N$ MW, 155

Exists in several enantiomorphic forms (neomenthylamine, isomenthylamine, neoisomenthylamine).

l-.

B.p. 212°. D_4^{17} 0·8567. $[\alpha]_D^{19}$ − 34·20°.

B,HCl: needles from H_2O. M.p. above 280°. $[\alpha]_D$ − 36·6° in H_2O.

B,HClO₃: needles. M.p. 168°.

B₄,H₄Fe(CN)₆: needles from EtOH. Decomp. on heating without melting. $[\alpha]_D^{17}$ −42·4° in EtOH.

Formyl: m.p. 102–3°. $[\alpha]_D$ − 83·8° in $CHCl_3$.

Acetyl: m.p. 145°. $[\alpha]_D$ − 81·7° in $CHCl_3$.

Benzoyl: m.p. 157°. $[\alpha]_D$ − 62·8° in $CHCl_3$.

2-*Naphthalene-sulphonyl*: m.p. 135°. $[\alpha]_D$ − 53·3° in $CHCl_3$.

Benzylidene: m.p. 69–70°. $[\alpha]_D$ − 132·5° in $CHCl_3$.

Salicylidene: m.p. 57–8°. $[\alpha]_D$ − 119·2° in $CHCl_3$.

Carbamide: m.p. 134–6°.

Phenylcarbamide: m.p. 140–1°.

Phenylthiocarbamide: m.p. 135°.

dl.

B.p. 208°. Volatile in steam.

B,HCl: needles from MeOH–Me_2CO. M.p. above 250°.

B₂,H₂PtCl₆: prisms from H_2O. M.p. 201–2°.

Picrate: yellow prisms from MeOH. M.p. 196–8°.

Formyl: prisms from pet. ether. M.p. 77–8°.

Acetyl: needles from Et_2O–pet. ether. M.p. 123°.

Benzoyl: prisms from MeOH. M.p. 145–6°.

2-*Naphthalene-sulphonyl*: m.p. 145–6°.

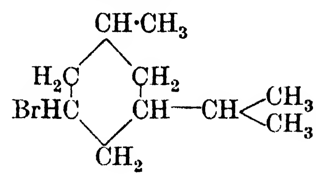
Carbamide: needles from Me_2CO. M.p. 157°.

Phenylcarbamide: needles from MeOH. M.p. 162°.

Phenylthiocarbamide: prisms from MeOH. 151°.

Read, Cook, Shannon, *J. Chem. Soc.*, 1926, 2226.
Read, Robertson, *J. Chem. Soc.*, 1927, 2169.
Read, *Chemical Reviews*, 1930, **7**, 21.
Wallach, *Ann.*, 1893, **276**, 306; 1898, **300**, 278; 1913, **397**, 218.
Mailhe, Murat, *Bull. soc. chim.*, 1911, **9**, 467.
Tutin, Kipping, *J. Chem. Soc.*, 1904, **85**, 65.

sym.-Menthyl bromide (5-*Bromo*-m-*menthane*, 5-*bromo*-1-*methyl*-3-*isopropylcyclohexane*)

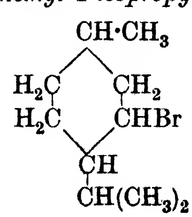


$C_{10}H_{19}Br$ MW, 219

B.p. 104–6°/12 mm. D_4^{15} 1·1992.

Knoevenagel, *Ann.*, 1897, **297**, 171.

sec.-Menthyl bromide (3-*Bromo*-p-*menthane*, 3-*bromo*-1-*methyl*-4-*isopropylcyclohexane*)



$C_{10}H_{19}Br$ MW, 219

Exists in two forms.

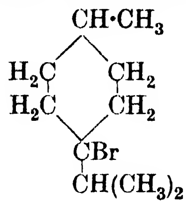
α-.

B.p. 98–9°/14 mm. D_4^{20} 1·1504. $[\alpha]_D$ − 10·45°.

β-.
B.p. 106–7°/20 mm. D_4^{20} 1·1557. $[\alpha]_D$ −23·75°.

Kurssanow, *Chem. Zentr.*, 1923, III, 1074.

***tert*.-Menthyl bromide** (*4-Bromo*-p-*menthane, 4-bromo-1-methyl-4-isopropylcyclohexane*)

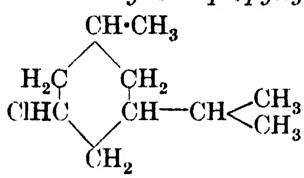


$C_{10}H_{19}Br$ MW, 219

B.p. 98–9°/11 mm. D^{20} 1·165. n_D^{20} 1·4872.

Kondakow, Schindelmeiser, *J. prakt. Chem.*, 1903, **67**, 195, 344.

***sym*.-Menthyl chloride** (*5-Chloro*-m-*menthane, 5-chloro-1-methyl-3-isopropylcyclohexane*)

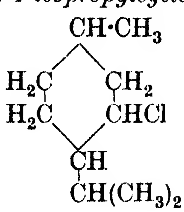


$C_{10}H_{19}Cl$ MW, 174·5

B.p. 94–6°/12 mm. D_4^{14} 0·9720.

Knoevenagel, *Ann.*, 1897, **297**, 171.

***sec*.-Menthyl chloride** (*3-Chloro*-p-*menthane, 3-chloro-1-methyl-4-isopropylcyclohexane*)



$C_{10}H_{19}Cl$ MW, 174·5

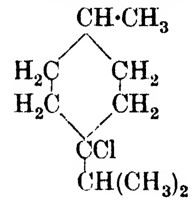
Exists in two forms.

α-.
B.p. 209–10°, 108–10°/30 mm., 87–90°/13 mm. D_{15}^{15} 0·947. $[\alpha]_D^{20}$ − 9·3°. Heated with KOAc, $C_6H_5·NH_2$ or alc. KOH ⟶ Δ^3-*p*-menthene + β-form.

β-.
B.p. 213–14°/738 mm., 94–5°/15 mm. D_4^{20} 0·8385. n_D^{20} 1·4642. $[\alpha]_D$ − 51·55°.

Kurssanow, *Ann.*, 1901, **318**, 328; *Chem. Zentr.*, 1915, I, 893.
Tschugajew, *Chem. Zentr.*, 1904, I, 1348.
Slavinski, *Chem. Zentr.*, 1897, I, 1058.

***tert*.-Menthyl chloride** (*4-Chloro*-p-*menthane, 4-chloro-1-methyl-4-isopropylcyclohexane*)

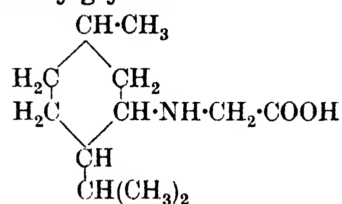


$C_{10}H_{19}Cl$ MW, 174·5

B.p. 86–8°/14 mm. Decomp. on dist. at 760 mm. D_4^{19} 0·9479. n_D^{19} 1·4655. Boiling H_2O ⟶ Δ^3-*p*-menthene.

Kurssanow, *Chem. Zentr.*, 1923, III, 1074.
Auwers, *Ber.*, 1909, **42**, 4906.
Kondakow, *Ber.*, 1895, **28**, 1618.

***l*-3-Menthylglycine**



$C_{12}H_{23}O_2N$ MW, 213

Prisms from H_2O. M.p. 191°. $[\alpha]_D$ −61·5° in $CHCl_3$. Sol. hot H_2O. At m.p. ⟶ *N*-methyl-*l*-menthylamine + CO_2.

Et ester: $C_{14}H_{27}O_2N$. MW, 241. B.p. 139°/10 mm. $[\alpha]_D$ − 56·1° in $CHCl_3$. n_D^{15} 1·4642.

l-*Menthyl ester*: $C_{22}H_{41}O_2N$. MW, 351. Prisms from MeOH. M.p. 63°. $[\alpha]_D^{19·6}$ − 105·3° in $CHCl_3$. N-*Acetyl*: $[\alpha]_D$ − 50·9° in $CHCl_3$. n_D^{15} 1·4821. N-*Benzoyl*: prisms from MeOH. M.p. 96°. $[\alpha]_D$ − 60·8° in $CHCl_3$. N-p-*Nitrobenzoyl*: prisms from MeOH. M.p. 146°. $[\alpha]_D$ − 51·0° in $CHCl_3$. N-3 : 5-*Dinitrobenzoyl*: pale yellow needles from MeOH. M.p. 170°. $[\alpha]_D$ − 23·7° in $CHCl_3$. *B,HCl*: needles. M.p. 69°. $[\alpha]_D$ − 77·7°. *B_2,H_2SO_4*: needles from EtOH. M.p. 191°. $[\alpha]_D$ − 93·0° in $CHCl_3$. *Oxalate*: needles from EtOH. M.p. 168·5°. $[\alpha]_D$ − 76·4°.

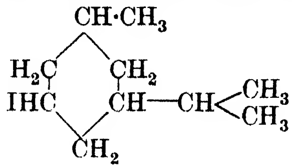
d-*Menthyl ester*: prisms from MeOH. M.p. 82°. $[\alpha]_D$ − 2·0° in $CHCl_3$. N-*Acetyl*: needles from MeOH. M.p. 95°. $[\alpha]_D$ + 24·1° in $CHCl_3$. N-*Benzoyl*: needles from MeOH.Aq. M.p. 106–7°. $[\alpha]_D$ + 8·6°. N-p-*Nitrobenzoyl*: needles from MeOH. M.p. 146°. $[\alpha]_D$ + 13·0°. N-3 : 5-*Dinitrobenzoyl*: needles. M.p. 131°. $[\alpha]_D$ + 38·0°. *B_2,H_2SO_4*: needles from AcOEt. M.p. 176°. $[\alpha]_D$ + 3·7° in $CHCl_3$.

N-*Acetyl*: needles from EtOH. M.p. 154°. $[\alpha]_D$ − 43·6° in $CHCl_3$. Mod. sol. hot H_2O. Very stable towards acids and alkalis.

N-Benzoyl: prisms from Et_2O–pet. ether. M.p. 118°. $[\alpha]_D$ — 73·5°. Insol. H_2O.

Clark, Read, *J. Chem. Soc.*, 1934, 1775.

sym.-Menthyl iodide (*5-Iodo-m-menthane, 5-iodo-1-methyl-4-isopropylcyclohexane*)

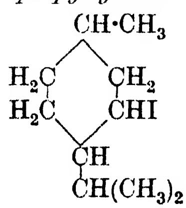


$C_{10}H_{19}I$ MW, 266

B.p. 133–4°/12 mm. D_4^{16} 1·4016.

Knoevenagel, *Ann.*, 1897, **297**, 171.

sec.-Menthyl iodide (*3-Iodo-p-menthane, 3-iodo-1-methyl-4-isopropylcyclohexane*)



$C_{10}H_{19}I$ MW, 266

d-.

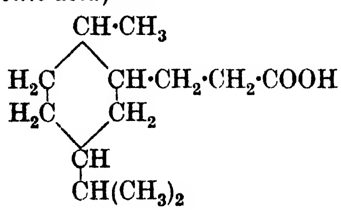
B.p. 122–3°/17 mm. D_4^{20} 1·3586. $[\alpha]_D$ +41·2°.

l-.

B.p. 121–2°/17 mm. $[\alpha]_D$ — 27°.

Kurssanow, *Chem. Zentr.*, 1923, III, 1074.

2-p-Menthyl-β-propionic Acid (*Menthane-2-β-propionic acid*)



$C_{13}H_{24}O_2$ MW, 212

Et ester: $C_{15}H_{28}O_2$. MW, 240. B.p. 145–151°/16 mm. D_{25}^{25} 0·9226. n_D^{25} 1·4659. $[\alpha]_{5461}$ + 17·3°.

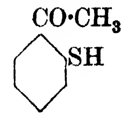
Nitrile: $C_{13}H_{23}N$. MW, 193. B.p. 141–6°/14 mm.

Bradfield, Jones, Simonsen, *J. Chem. Soc.*, 1934, 1812.

l-Menthylxanthogenamide.
See under Menthol.

Mercaptoacetic Acid.
See Thioglycollic Acid.

o-Mercaptoacetophenone (*o-Acetothiophenol*)



C_8H_8OS MW, 152

Oil. B.p. 124–6° in vacuo. Alk. sol. in air ⟶ thioindigo.

Semicarbazone: needles from EtOH. M.p. 235° decomp.

M.L.B., D.R.P., 198,509, (*Chem. Zentr.*, 1908, I, 2118).

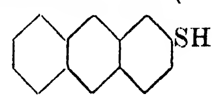
ω-Mercaptoacetophenone.
See Phenacyl Mercaptan.

Mercapto-amino-propionic Acid.
See Cysteine *and* Isocysteine.

Mercaptoaniline.
See Aminothiophenol.

Mercaptoanisole.
See under Thiocatechol, Thiohydroquinone, *and* Thioresorcinol.

2-Mercaptoanthracene (*2-Thioanthrol*)

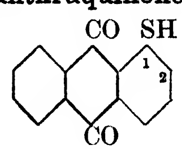


$C_{14}H_{10}S$ MW, 210

Light yellow needles from C_6H_6. Decomp. above 220°. Sol. warm EtOH, C_6H_6, $CHCl_3$, AcOH. Spar. sol. Et_2O. Insol. pet. ether. Very sol. KOH. Less sol. NH_3.

Heffter, *Ber.*, 1895, **28**, 2263.

1-Mercaptoanthraquinone



$C_{14}H_8O_2S$ MW, 240

Orange prisms or yellow needles from AcOH. M.p. 187°. Sol. alc. alkalis with violet col. Spar. sol. EtOH, C_6H_6. Conc. H_2SO_4 ⟶ red sol. Easily oxidised.

S-Me ether: methyl 1-anthraquinonyl sulphide. $C_{15}H_{10}O_2S$. MW, 254. Yellow needles from EtOH. M.p. 218°. Sol. C_6H_6. Mod. sol. EtOH. Spar. sol. pet. ether.

S-Et ether: ethyl 1-anthraquinonyl sulphide. $C_{16}H_{12}O_2S$. MW, 268. Yellow prisms from EtOH. M.p. 183°.

S-Vinyl ether: vinyl 1-anthraquinonyl sulphide. $C_{16}H_{10}O_2S$. MW, 266. Reddish-brown needles from EtOH. M.p. 163°.

S-*Phenyl ether*: phenyl 1-anthraquinonyl sulphide. $C_{20}H_{12}O_2S$. MW, 316. Orange-red needles from AcOH, yellow needles from C_6H_6. M.p. 185°. Sol. EtOH, C_6H_6. Sublimes easily.

S-o-*Tolyl ether*: *o*-tolyl 1-anthraquinonyl sulphide. $C_{21}H_{14}O_2S$. MW, 330. Reddish-brown needles from AcOH. M.p. 216°.

S-p-*Tolyl ether*: *p*-tolyl 1-anthraquinonyl sulphide. Orange-red needles from AcOH or C_6H_6. M.p. 226°.

S-*Benzyl ether*: benzyl 1-anthraquinonyl sulphide. $C_{21}H_{14}O_2S$. MW, 330. Yellow needles from AcOH. M.p. 241°.

Fries, *Ber.*, 1912, **45**, 2971.
Gattermann, *Ann.*, 1912, **393**, 119, 138.
Bayer, D.R.P., 281,102, (*Chem. Zentr.*, 1915, I, 180).
M.L.B., D.R.P., 292,457, (*Chem. Zentr.*, 1916, II, 42).

2-Mercaptoanthraquinone.

Yellow needles from AcOH. M.p. 206°. Spar. sol. usual org. solvents. Violet sols. in alkalis. Conc. $H_2SO_4 \longrightarrow$ red sol.

S-*Me ether*: methyl 2-anthraquinonyl sulphide. Yellow needles from AcOH. M.p. 162°.

S-*Et ether*: ethyl 2-anthraquinonyl sulphide. Yellow needles from EtOH. M.p. 138°.

S-*Vinyl ether*: vinyl 2-anthraquinonyl sulphide. Yellow needles from EtOH.Aq. M.p. 133°.

S-*Allyl ether*: allyl 2-anthraquinonyl sulphide. $C_{17}H_{12}O_2S$. MW, 280. Yellow needles from EtOH. M.p. 126°.

S-*Benzyl ether*: benzyl 2-anthraquinonyl sulphide. Yellow needles from 138°.

Gattermann, *Ann.*, 1912, **393**, 119, 150.
Badische, D.R.P., 247,412, (*Chem. Zentr.*, 1912, II, 166).
Bayer, D.R.P., 281,102, (*Chem. Zentr.*, 1915, I, 180).

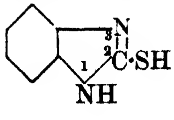
Mercaptobenzene.

See Thiophenol.

Mercaptobenzenesulphonic Acid.

See Thiophenolsulphonic Acid.

2-Mercaptobenziminazole



$C_7H_6N_2S$ MW, 150

Plates from dil. EtOH or NH_3.Aq. M.p. 298° (296–7°). Sol. EtOH. Less sol. H_2O.

1-N-*Me*: $C_8H_8N_2S$. MW, 164. M.p. 190–2°.

1-N-*Phenyl*: $C_{13}H_{10}N_2S$. MW, 226. M.p. 194–5°.

1-N-*Benzyl*: $C_{14}H_{12}N_2S$. MW, 240. M.p. 181–2°.

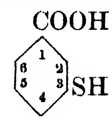
S-*Benzyl*: $C_{14}H_{12}N_2S$. MW, 240. M.p. 186–7°. Insol. alkalis.

Lellmann, *Ann.*, 1883, **221**, 9.
Billeter, Steiner, *Ber.*, 1887, **20**, 231.
I.G., D.R.P., 557,138, (*Chem. Abstracts*, 1933, **27**, 1233).

o-Mercaptobenzoic Acid.

See Thiosalicylic Acid.

m-Mercaptobenzoic Acid



$C_7H_6O_2S$ MW, 154

Plates or needles from EtOH.Aq. M.p. 146–7°. Very sol. H_2O. Sol. EtOH. In moist air $\longrightarrow$ diphenyl disulphide 3 : 3′-dicarboxylic acid.

S-*Me*: $C_8H_8O_2S$. MW, 168. Needles from EtOH.Aq. M.p. 126–7°.

Smiles, Stewart, *J. Chem. Soc.*, 1921, **119**, 1797.

p-Mercaptobenzoic Acid.

Powder. M.p. 219°. Decomp. about 250°. Spar. sol. org. solvents. Readily oxidises.

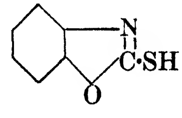
S-*Me*: $C_8H_8O_2S$. MW, 168. Cryst. from H_2O. M.p. 192° (190°).

S-*Et*: $C_9H_{10}O_2S$. MW, 182. Needles from EtOH. M.p. 146°. Sol. EtOH, Et_2O, $CHCl_3$, AcOH. Less sol. C_6H_6. Spar. sol. pet. ether.

S-*Phenyl*: *see* Diphenyl sulphide 4-carboxylic Acid.

Auwers, Beger, *Ber.*, 1894, **27**, 1739.
Smiles, Harrison, *J. Chem. Soc.*, 1922, **121**, 2025.
Thompson, *J. Soc. Chem. Ind.*, 1925, **44**, 196T.

2-Mercaptobenzoxazole (*Thiocarbamidophenol*)

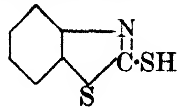


C_7H_5ONS MW, 151

Needles from H_2O. M.p. 196° (193°). Sol. Et_2O, AcOH. Spar. sol. H_2O, EtOH. Sol. NH_3. HCl at 170° $\longrightarrow CO_2 + H_2S +$ *o*-aminophenol.

Kalckhoff, *Ber.*, 1883, **16**, 1825.

2-Mercaptobenzthiazole (2-*Thiocarbamido-thiophenol*, μ-*mercaptobenzthiazole*)



$C_7H_5NS_2$ MW, 167

Needles from MeOH.Aq. M.p. 177–9°. Spar. sol. EtOH, Et_2O, AcOH. Insol. H_2O. Sol. alkalis. Br ⟶ dibromide. Readily oxidised to its ether (*see below*). Widely used as a rubber vulcanisation accelerator.

Me ether: $C_8H_7NS_2$. MW, 181. Prisms from EtOH.Aq. M.p. 52°.

Et ether: $C_9H_9NS_2$. MW, 195. Cryst. from EtOH. M.p. 26°.

Mercaptobenzthiazyl ether: dibenzthiazyl disulphide. $C_{14}H_8N_2S_4$ MW, 332. Needles from C_6H_6. M.p. 186°. Insol. EtOH, alkalis. Rubber vulcanisation accelerator.

Rassow, Döhle, Reim, *Chem. Zentr.*, 1916, II, 394.
Hunter, *J. Chem. Soc.*, 1930, 137.
Jacobson, Frankenbacher, *Ber.*, 1891, **24**, 1403.
Levi, *Gazz. chim. ital.*, 1931, **61**, 383.
Sebrell, Boord, *J. Am. Chem. Soc.*, 1923, **45**, 2397.
I.C.I., E.P., 335,567, (*Chem. Abstracts*, 1931, **25**, 1539).

1-Mercaptobutyric Acid

$CH_3 \cdot CH_2 \cdot CH(SH) \cdot COOH$

$C_4H_8O_2S$ MW, 120

Oil. B.p. 118–22°/19 mm. Sol. H_2O, EtOH, Et_2O.

Biilmann, *Ann.*, 1905, **339**, 368.

2-Mercaptobutyric Acid

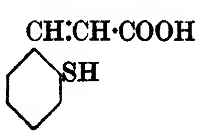
$CH_3 \cdot CH(SH) \cdot CH_2 \cdot COOH$

$C_4H_8O_2S$ MW, 120

B.p. 110–11°/10 mm. Spar. sol. H_2O. At 100° ⟶ 2 : 2′-sulphidobutyric acid.

Lovén, Johansson, *Ber.*, 1915, **48**, 1257.
Johansson, *Chem. Abstracts*, 1917, **11**, 2577.

o-Mercaptocinnamic Acid (o-*Thiocoumaric acid*)



$C_9H_8O_2S$ MW, 180

Needles from H_2O. M.p. about 165° decomp. Very sol. EtOH, AcOH. Less sol. H_2O. H_2SO_4 or Ac_2O ⟶ thiocoumarin. Alk. $K_3Fe(CN)_6$ ⟶ thionaphthene. NaHg ⟶ 2-mercapto-hydrocinnamic acid. Lead acetate ⟶ yellow ppt.

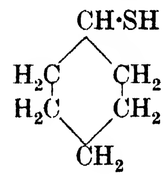
S-*Me*: $C_{10}H_{10}O_2S$. MW, 194. Plates from C_6H_6 or EtOH. M.p. 176°. Sol. EtOH, AcOH. Spar. sol. H_2O.

Me ester: $C_{10}H_{10}O_2S$. MW, 194. Plates. M.p. 114°.

Lactam: *see* Thiocoumarin.

Chmelewsky, Friedländer, *Ber.*, 1913, **46**, 1905.

Mercaptocyclol exane (*Hexahydrothiophenol*)



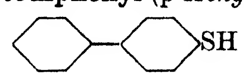
$C_6H_{12}S$ MW, 116

Oil. B.p. 158–60° (155°). D^0 0·9905, D^{20} 0·9782. n_D 1·481. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, cyclohexane. Insol. H_2O. Volatile in steam.

Sabatier, Mailhe, *Compt. rend.*, 1910, **150**, 1220.
Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 288.
Borsche, Lange, *Ber.*, 1906, **39**, 393.

Mercaptocymene.
See Thiocarvacrol *and* Thiothymol.

4-Mercaptodiphenyl (p-*Xenyl mercaptan*)



$C_{12}H_{10}S$ MW, 186

Cryst. from EtOH. M.p. 111–12°. Sol. C_6H_6, CS_2. Less sol. EtOH, Et_2O. Volatile in steam.

S-*Me*: $C_{13}H_{12}S$. MW, 200. Needles from EtOH. M.p. 107–8°.

Gabriel, Deutsch, *Ber.*, 1880, **13**, 387.
Obermeyer, *Ber.*, 1887, **20**, 2927.

α-Mercaptodiphenylacetic Acid.
See Thiobenzilic Acid.

2-Mercaptoethylamine (2-*Aminoethyl mercaptan*, *thioethanolamine*)

$HS \cdot CH_2 \cdot CH_2 \cdot NH_2$

C_2H_7NS MW, 77

Cryst. M.p. 99–100°. Sol. H_2O. Oxidises in air to 2 : 2′-diaminodiethyl sulphide.

B,HCl: cryst. from EtOH. M.p. 70–2°.
Picrate: m.p. 125–6°.

Gabriel, *Ber.*, 1889, **22**, 1139.
Gabriel, Colman, *Ber.*, 1912, **45**, 1643.

α-Mercaptohydrocinnamic Acid

$C_6H_5{\cdot}CH_2{\cdot}CH(SH){\cdot}COOH$

$C_9H_{10}O_2S$ MW, 182

Needles from pet. ether. M.p. 48–9° (46°). B.p. 184–7°/11–12 mm. Sol. EtOH, Et_2O. Mod. sol. pet. ether. Spar. sol. H_2O.

Fischer, Brieger, *Ber.*, 1914, **47**, 2477.
Biilmann, Madsen, *Ann.*, 1914, **402**, 339.

β-Mercaptohydrocinnamic Acid

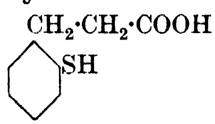
$C_6H_5{\cdot}CH(SH){\cdot}CH_2{\cdot}COOH$

$C_9H_{10}O_2S$ MW, 182

Plates from H_2O. M.p. 111·5–112·5°. Very sol. EtOH, Et_2O, Me_2CO, warm C_6H_6, $CHCl_3$. Spar. sol. pet. ether. Almost insol. cold H_2O. Oxidised by $FeCl_3$.

Fischer, Brieger, *Ber.*, 1914, **47**, 2475.

***o*-Mercaptohydrocinnamic Acid**



$C_9H_{10}O_2S$ MW, 182

Needles from H_2O. M.p. 118°. Very sol. hot H_2O. Sol. org. solvents.

Chmelewsky, Friedländer, *Ber.*, 1913, **46**, 1907.

1-Mercaptoisobutyric Acid

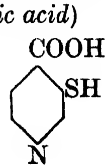
$(CH_3)_2C(SH){\cdot}COOH$

$C_4H_8O_2S$ MW, 120

Cryst. M.p. 47°. B.p. 101–2°/15 mm. Sol. H_2O. k (first) $= 1{\cdot}26 \times 10^{-4}$; (second) $= 0{\cdot}48 \times 10^{-11}$. Ox. ⟶ 1 : 1′-disulphidoisobutyric acid. $FeCl_3$ ⟶ indigo-blue col.

Biilmann, *Ann.*, 1906, **348**, 129.

3-Mercaptoisonicotinic Acid (3-*Mercaptopyridine*-4-*carboxylic acid*)



$C_6H_5O_2NS$ MW, 155

Orange-red needles. M.p. 225° decomp. $FeCl_3$ ⟶ blue col. Alk. sols. oxidise in air.

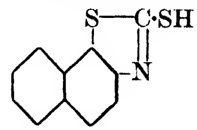
Sucharda, Troszkiewiczówna, *Chem. Zentr.*, 1932, II, 3401.

4-Mercaptoisopentane.
See Isoamyl Mercaptan.

***o*-Mercaptomethyl-benzoic Acid.**
See ω-Mercapto-*o*-toluic Acid.

Mercaptonaphthalene.
See Thionaphthol.

2-Mercapto-α-naphthathiazole

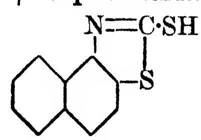


$C_{11}H_7NS_2$ MW, 217

Needles from EtOH. M.p. above 240°. Sol. EtOH, Et_2O, AcOH, C_6H_6. Insol. H_2O.

Jacobson, Frankenbacher, *Ber.*, 1891, **24**, 1406.

2-Mercapto-β-naphthathiazole



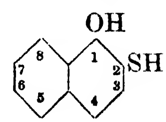
$C_{11}H_7NS_2$ MW, 217

Needles from EtOH. M.p. 232° decomp. Sol. EtOH, Et_2O, AcOH, C_6H_6.

S-*Me*: $C_{12}H_9NS_2$. MW, 231. Needles from EtOH.Aq. M.p. 73–4°. Sol. EtOH.

Jacobson, Frankenbacher, *Ber.*, 1891, **24**, 1409.

2-Mercapto-1-naphthol (1-*Hydroxy*-2-*thionaphthol*)



$C_{10}H_8OS$ MW, 176

Cryst. M.p. about 100° decomp.

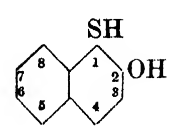
Lesser, Gad, *Ber.*, 1925, **58**, 2558.

5-Mercapto-1-naphthol (5-*Hydroxy*-1-*thionaphthol*).

Cryst. M.p. 115°. $FeCl_3$ ⟶ disulphide.

Watson, Dutt, *J. Chem. Soc.*, 1922, **121**, 2416.

1-Mercapto-2-naphthol (2-*Hydroxy*-1-*thionaphthol*)



$C_{10}H_8OS$ MW, 176

Needles from pet. ether. M.p. 55°.

O-*Me ether*: $C_{11}H_{10}OS$. MW, 190. Plates from EtOH. M.p. 68°.

O-*Acetyl*: needles from CCl_4. M.p. 120°.

Warren, Smiles, *J. Chem. Soc.*, 1931, 918.
Stevenson, Smiles, *J. Chem. Soc.*, 1930, 1743.

6-Mercapto-2-naphthol (*6-Hydroxy-2-thionaphthol*).

Plates from EtOH. M.p. 137°. Sol. EtOH, Et_2O, AcOH. Alk. sols. oxidise easily in air.

Diacetyl: needles from EtOH. M.p. 107°. Sol. EtOH, AcOH.

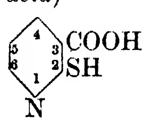
Zincke, Dereser, *Ber.*, 1918, **51**, 357.

7-Mercapto-2-naphthol (*7-Hydroxy-2-thionaphthol*).

M.p. 60–70°.

Watson, Dutt, *J. Chem. Soc.*, 1922, **121**, 2416.

2-Mercaptonicotinic Acid (*2-Mercaptopyridine-3-carboxylic acid*)



$C_6H_5O_2NS$ MW, 155

Yellow needles from EtOH.Aq. M.p. 270° decomp. Warm conc. $H_2SO_4 \longrightarrow$ red sol. $FeCl_3 \longrightarrow$ violet col.

Sucharda, Troszkiewiczówna, *Chem. Zentr.*, 1932, II, 3400.

6-Mercaptonicotinic Acid (*6-Mercaptopyridine-3-carboxylic acid*).

Yellow cryst. M.p. 272° decomp. Sol. EtOH, Et_2O. Spar. sol. cold H_2O.

Räth, *Ann.*, 1931, **487**, 112.

1-Mercapto-*n*-pentane.

See n-Amyl Mercaptan.

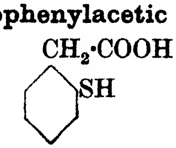
Mercaptophenetole.

See under Thiocatechol, Thiohydroquinone, *and* Thioresorcinol.

Mercaptophenol.

See Thiocatechol, Thiohydroquinone, *and* Thioresorcinol.

***o*-Mercaptophenylacetic Acid**



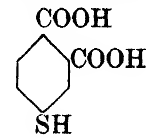
$C_8H_8O_2S$ MW, 168

Plates from H_2O or C_6H_6–ligroin. M.p. 96–7°.

Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O, ligroin.

Marschalk, *Ber.*, 1912, **45**, 1483.

4-Mercaptophthalic Acid

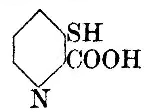


$C_8H_6O_4S$ MW, 198

Yellow cryst. M.p. 160–70°. Sol. hot H_2O, EtOH, Et_2O. Me_2CO, C_6H_6.

Gesellschaft für chemische Industrie in Basle, D.R.P., 189,943, (*Chem. Zentr.*, 1907, II, 2094).

3-Mercaptopicolinic Acid (*3-Mercaptopyridine-2-carboxylic acid*)



$C_6H_5O_2NS$ MW, 155

Orange-yellow prisms from H_2O. M.p. 183·5° decomp. Alk. sols. oxidise in air. Warm conc. $H_2SO_4 \longrightarrow$ red sol. $FeCl_3 \longrightarrow$ blue col.

Sucharda, Troszkiewiczówna, *Chem. Zentr.*, 1932, II, 3400.

Mercaptopropane.

See Isopropyl Mercaptan *and* Propyl Mercaptan.

Mercaptopropionic Acid.

See Thiolactic Acid *and* Thiohydracrylic Acid.

2-Mercaptopropylamine (*Aminoisopropyl mercaptan*)

$$CH_3{\cdot}CH(SH){\cdot}CH_2{\cdot}NH_2$$

C_3H_9NS MW, 91

Cryst. M.p. 63–5°. Sol. H_2O with strong alk. reaction. Phthalic anhydride at 150–80° $\longrightarrow$ 2-mercaptopropyl-phthalimide.

B,HCl: plates from EtOH. M.p. 87–8°.

Picrate: plates from EtOH. M.p. 143–4° decomp.

Gabriel, Leupold, *Ber.*, 1898, **31**, 2838.
Gabriel, *Ber.*, 1916, **49**, 1112.
Mylius, *ibid.*, 1096.

3-Mercaptopropylamine (*3-Aminopropyl mercaptan*)

$$HS{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}NH_2$$

C_3H_9NS MW, 91

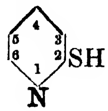
Cryst. M.p. 112–13°. Sol. H_2O with strong alk. reaction.

B,HCl: needles from dil. EtOH. M.p. 69°.

B_2,H_2PtCl_6: decomp. at 155–60°.

Gabriel, Lauer, *Ber.*, 1890, **23**, 89.
Gabriel, *Ber.*, 1916, **49**, 1113.

2-Mercaptopyridine (1-*Pyridyl mercaptan*)



C_5H_5NS MW, 111

Yellowish prisms from C_6H_6. M.p. 125°.

Marckwald, Klemm, Trabert, *Ber.*, 1900, **33**, 1556.
Räth, *Ann.*, 1931, **487**, 110.

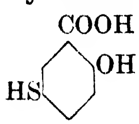
4-Mercaptopyridine (4-*Pyridyl mercaptan*). Yellow needles from EtOH. M.p. 177° decomp. Sol. H_2O, EtOH, AcOH. Mod. sol. Me_2CO, C_6H_6, $CHCl_3$.

Chloroaurate: cryst. M.p. 210°.

Chloroplatinate: yellow cryst. M.p. above 335°.

Koenigs, Kinne, *Ber.*, 1921, **54**, 1359.

5-Mercaptosalicylic Acid



$C_7H_6O_3S$ MW, 170

Pale yellow needles from H_2O. M.p. 150–2°.

S-*Me*: $C_8H_8O_3S$. MW, 184. Pale buff cryst. powder from H_2O. M.p. 126°. Not oxidised by $FeCl_3$.

Stewart, *J. Chem. Soc.*, 1922, **121**, 2560.

1-Mercaptostearic Acid

$CH_3\cdot[CH_2]_{15}\cdot CH(SH)\cdot COOH$

$C_{18}H_{36}O_2S$ MW, 316.

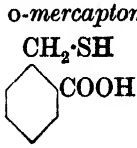
Plates from AcOH or pet. ether. M.p. 80° (74°). Used in soaps as germicide.

Nicolet, Bate, *J. Am. Chem. Soc.*, 1927, **49**, 2065.
Eckert, Halla, *Monatsh.*, 1913, **34**, 1811.

Mercaptosuccinic Acid.
See Thiomalic Acid.

Mercaptotoluene.
See Thiocresol.

ω-Mercapto-o-toluic Acid (*Benzylmercaptan* o-*carboxylic acid*, o-*mercaptomethyl-benzoic acid*)

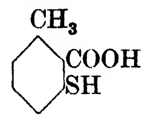


$C_8H_8O_2S$ MW, 168

Needles from H_2O. M.p. 127° decomp. At 140–50° ⟶ thionaphthalide + H_2O.

Graebe, *Ann.*, 1888, **247** 299.

3-Mercapto-o-toluic Acid (m-*Thiocresol*-2-*carboxylic acid*, 6-*methylthiosalicylic acid*)



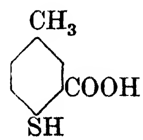
$C_8H_8O_2S$ MW, 168

Cryst.

Nitrile: C_8H_7NS. MW, 149. Needles from pet. ether. M.p. 88°. Easily oxidised to the disulphide.

Hoffa, Heyna, U.S.P., 1,762,720, (*Chem. Zentr.*, 1931, II, 906).

4-Mercapto-m-toluic Acid (p-*Thiocresol*-3-*carboxylic acid*, 5-*methylthiosalicylic acid*, *thio*-p-*cresotinic acid*)



$C_8H_8O_2S$ MW, 168

Needles from C_6H_6. M.p. 155–7°. $FeCl_3$ ⟶ blue col. $K_3Fe(CN)_6$ ⟶ disulphide.

S-*Me*: $C_9H_{10}O_2S$. MW, 182. Plates from C_6H_6-pet. ether. M.p. 140–1°.

Krollpfeiffer, Schultze, Schlumbohm, Sommermeyer, *Ber.*, 1925, **58**, 1668.
Krollpfeiffer, Schultze, Sommermeyer, *ibid.*, 2698.

o-Mercapto-p-toluidine.
See 4-Amino-o-thiocresol.

Mercapto-xylene.
See Thioxylenol.

Mercuri-allyl iodide

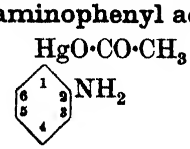
$CH_2{:}CH\cdot CH_2\cdot HgI$

C_3H_5IHg MW, 368·5

M.p. 135°. Spar. sol. cold EtOH. Insol. H_2O. I ⟶ allyliodide + mercuric iodide.

Zinin, *Ann.*, 1855, **96**, 363.
Linnemann, *Ann.*, 1866, **140**, 180.

Mercuri-o-aminophenyl acetate



$C_8H_9O_2NHg$ MW, 351·5

Plates from dil. EtOH. M.p. 158–60°. Sol. EtOH, AcOH, dil. min. acids.

N-*Acetyl*: plates from AcOH. M.p. 156–8°. Br in KBr.Aq. ⟶ *o*-bromoacetanilide.

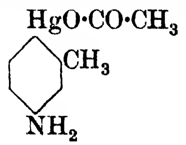
Dimroth, *Ber.*, 1902, **35**, 2039.

Mercuri-*p*-aminophenyl acetate.

Prisms. M.p. 166–7°. Spar. sol. EtOH, $CHCl_3$. Insol. H_2O, Et_2O. Sol. dil. min. acids.
N-*Acetyl*: needles from hot H_2O. M.p. 220–1°.

See above reference.

Mercuri-4-amino-*o*-tolyl acetate

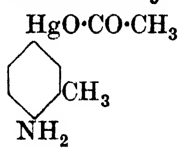


$C_9H_{11}O_2NHg$ MW, 365·5

Needles. M.p. 176°.
N-*Acetyl*: cryst. from dil. EtOH. M.p. 99°.

Vecchiotti, *Gazz. chim. ital.*, 1924, **54**, 419.
Schrauth, Schoeller, Rother, *Ber.*, 1912, **45**, 2814.

Mercuri-4-amino-*m*-tolyl acetate

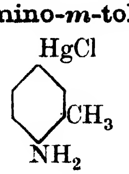


$C_9H_{11}O_2NHg$ MW, 365·5

M.p. 129–30°.
N-*Acetyl*: m.p. 212–13°.

Vecchiotti, Copertini, *Gazz. chim. ital.*, 1929, **59**, 540.

Mercuri-4-amino-*m*-tolyl chloride



C_7H_8NClHg MW, 342

Needles from EtOH. M.p. 178°.
N-*Diacetyl*: m.p. 170°.

Schrauth, Schoeller, Rother, *Ber.*, 1912, **45**, 2811.

Mercuri-*n*-amyl acetate

$CH_3{\cdot}[CH_2]_3{\cdot}CH_2{\cdot}HgO{\cdot}CO{\cdot}CH_3$

$C_7H_{14}O_2Hg$ MW, 330·5

Prisms. M.p. 52°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Mercuri-*n*-amyl bromide

$CH_3{\cdot}[CH_2]_3{\cdot}CH_2{\cdot}HgBr$

$C_5H_{11}BrHg$ MW, 351·5

Cryst. from EtOH. M.p. 127° (122·2–122·4°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 277.

Mercuri-*active*-amyl bromide

$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CH_2{\cdot}HgBr$

$C_5H_{11}BrHg$ MW, 351·5

dl-.
Plates from EtOH. M.p. 119°.

Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 40.

Mercuri-*tert.*-amyl bromide

$CH_3{\cdot}CH_2{\cdot}\underset{CH_3}{\overset{CH_3}{C}}{\cdot}HgBr$

$C_5H_{11}BrHg$ MW, 351·5

M.p. 82°.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 822.

Mercuri-*n*-amyl chloride

$CH_3{\cdot}[CH_2]_3{\cdot}CH_2{\cdot}HgCl$

$C_5H_{11}ClHg$ MW, 307

Plates from EtOH. M.p. 110°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 277.

Mercuri-*n*-amyl cyanide

$CH_3{\cdot}[CH_2]_3{\cdot}CH_2{\cdot}HgCN$

$C_6H_{11}NHg$ MW, 297·5

Needles from dil. MeOH. M.p. 39°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 295.

Mercuri-*n*-amyl hydroxide

$CH_3{\cdot}[CH_2]_3{\cdot}CH_2{\cdot}HgOH$

$C_5H_{12}OHg$ MW, 288·5

M.p. 50°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 286.

Mercuri-*n*-amyl iodide

$CH_3\cdot[CH_2]_3\cdot CH_2\cdot HgI$

$C_5H_{11}IHg$ MW, 398·5

Plates from EtOH. M.p. 110°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 278.
Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 40.

Mercuri-*active*-amyl iodide

$CH_3\cdot CH_2\cdot CH(CH_3)\cdot CH_2\cdot HgI$

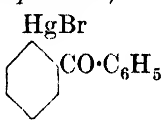
$C_5H_{11}IHg$ MW, 398·5

dl-.

Plates from EtOH. M.p. 128°.

See second reference above.

Mercuri-o-benzoylphenyl bromide (*o-Mercuribromobenzophenone*)

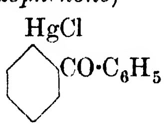


$C_{13}H_9OBrHg$ MW, 461·5

Cryst. M.p. 176°. Spar. sol. EtOH, Et_2O. Br ⟶ *o*-bromobenzophenone.

Dimroth, *Ber.*, 1902, **35**, 2868.

Mercuri-o-benzoylphenyl chloride (*o-Mercurichlorobenzophenone*)



$C_{13}H_9OClHg$ MW, 417

Plates from EtOH. M.p. 167—8°. Sol. Me_2CO, $CHCl_3$, AcOEt. Spar. sol. ligroin. HCl ⟶ benzophenone + mercuric chloride.

Dimroth, *Ber.*, 1902, **35**, 2868.
Grignard, Abelmann, *Bull. soc. chim.*, 1916, **19**, 20.

Mercuri-benzyl acetate

$C_6H_5\cdot CH_2\cdot HgO\cdot CO\cdot CH_3$

$C_9H_{10}O_2Hg$ MW, 350·5

Needles. M.p. 126°.

Wolff, *Ber.*, 1913, **46**, 66.

Mercuri-benzyl bromide

$C_6H_5\cdot CH_2\cdot HgBr$

C_7H_7BrHg MW, 371·5

Plates. M.p. 119°.

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.
See also previous reference.

Mercuri-benzyl chloride

$C_6H_5\cdot CH_2\cdot HgCl$

C_7H_7ClHg MW, 327

Plates from EtOH–xylene. M.p. 104°.

Wolff, *Ber.*, 1913, **46**, 66.
Hilpert, Grüttner, *Ber.*, 1915, **48**, 913.

Mercuri-benzyl cyanide

$C_6H_5\cdot CH_2\cdot HgCN$

C_8H_7NHg MW, 317·5

Needles. M.p. 124°.

Wolff, *Ber.*, 1913, **46**, 66.

Mercuri-benzyl iodide

$C_6H_5\cdot CH_2\cdot HgI$

C_7H_7IHg MW, 418·5

Plates. M.p. 177°.

See previous reference.

Mercuri-benzyl nitrate

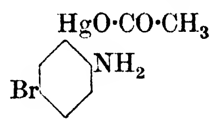
$C_6H_5\cdot CH_2\cdot HgNO_3$

$C_7H_7O_3NHg$ MW, 353·5

Needles from Et_2O. M.p. 90–1° decomp.

Johns, Peterson, Hixon, *J. Am. Chem. Soc.*, 1930, **52**, 2821.

Mercuri-5-bromo-2-aminophenyl acetate

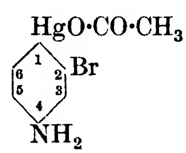


$C_8H_8O_2NBrHg$ MW, 430·5

M.p. 194°. Sol. EtOH, AcOH. Insol. H_2O.
N-*Acetyl*: m.p. 204°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 237.

Mercuri-2-bromo-4-aminophenyl acetate



$C_8H_8O_2NBrHg$ MW, 430·5

M.p. 181°. Sol. EtOH, AcOH. Insol. H_2O.
N-*Acetyl*: m.p. 215°.

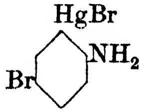
Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 187.

Mercuri-3-bromo-4-aminophenyl acetate.

M.p. 152–3°.
N-*Acetyl*: m.p. 220–1°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 242.

Mercuri-5-bromo-2-aminophenyl bromide

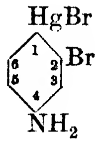


$C_6H_5NBr_2Hg$ MW, 451·5

Decomp. at 194°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 238.

Mercuri-2-bromo-4-aminophenyl bromide



$C_6H_5NBr_2Hg$ MW, 451·5

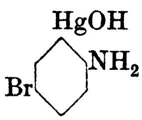
M.p. 215°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 187.

Mercuri-3-bromo-4-aminophenyl bromide.
M.p. 213–14°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 243.

Mercuri-5-bromo-2-aminophenyl hydroxide

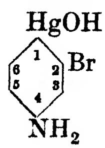


$C_6H_6ONBrHg$ MW, 388·5

Cryst. from EtOH. M.p. 180°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 237.

Mercuri-2-bromo-4-aminophenyl hydroxide



$C_6H_6ONBrHg$ NW, 388·5

M.p. 170°.

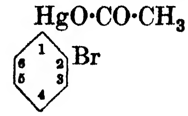
Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 187.

Mercuri-3-bromo-4-aminophenyl hydroxide.
M.p. 253–4°.

Vecchiotti, *Gazz. chim. ital.*, 1928, **58**, 242.

***o*-Mercuribromobenzophenone.**
See Mercuri-*o*-benzoylphenyl bromide.

Mercuri-*o*-bromophenyl acetate



$C_8H_7O_2BrHg$ MW, 415·5

Cryst. from C_6H_6. M.p. 124°.

Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1328.

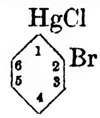
Mercuri-*m*-bromophenyl acetate.
Cryst. M.p. 160°.

See previous reference.

Mercuri-*p*-bromophenyl acetate.
Cryst. M.p. 196° (188°). Conc. $HNO_3 \longrightarrow$ *p*-bromonitrobenzene.

Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1327.
Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, **138**, 67.
König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 169.

Mercuri-*o*-bromophenyl chloride



$C_6H_4ClBrHg$ MW, 392

M.p. 155°. Part. sublimes at 100°. Br in AcOH $\longrightarrow$ *o*-dibromobenzene.

Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1328.

Mercuri-*m*-bromophenyl chloride.
M.p. 198°. Br in AcOH $\longrightarrow$ *m*-dibromobenzene.

See previous reference.

Mercuri-*p*-bromophenyl chloride.
M.p. 250° (235°).

Hanke, *J. Am. Chem. Soc.*, 1923, **45**, 1327.
König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 169.
Nesmejanov, *Ber.*, 1929, **62**, 1016.

Mercuri-*n*-butyl acetate

$CH_3\cdot[CH_2]_2\cdot CH_2\cdot HgO\cdot CO\cdot CH_3$

$C_6H_{12}O_2Hg$ MW, 316·5

Prisms. M.p. 56°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Mercuri-*n*-butyl bromide

$CH_3\cdot[CH_2]_2\cdot CH_2\cdot HgBr$

C_4H_9BrHg MW, 337·5

Cryst. from EtOH. M.p. 136°, (130°, 128°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 156.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 276.

Mercuri-*sec.*-butyl bromide

$$CH_3\cdot CH_2\cdot\overset{CH_3}{\overset{|}{C}H}\cdot HgBr$$

C_4H_9BrHg MW, 337·5

Cryst. from EtOH. M.p. 39°.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 821.
Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Mercuri-*tert.*-butyl bromide

$$(CH_3)_3C\cdot HgBr$$

C_4H_9BrHg MW, 337·5

M.p. 106° decomp.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 822.

Mercuri-*n*-butyl chloride

$$CH_3\cdot[CH_2]_2\cdot CH_2\cdot HgCl$$

C_4H_9ClHg MW, 293

Cryst. from EtOH. M.p. 130° (125·5°).

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 156.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 276.

Mercuri-*sec.*-butyl chloride

$$CH_3\cdot CH_2\cdot\overset{CH_3}{\overset{|}{C}H}\cdot HgCl$$

C_4H_9ClHg MW, 293

Cryst. from EtOH. M.p. 30·5°.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 821.

Mercuri-*n*-butyl cyanide

$$CH_3\cdot[CH_2]_2\cdot CH_2\cdot HgCN$$

C_5H_9NHg MW, 283·5

Needles from dil. MeOH. M.p. 42°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-*n*-butyl hydroxide

$$CH_3\cdot[CH_2]_2\cdot CH_2\cdot HgOH$$

$C_4H_{10}OHg$ MW, 274·5

Cryst. from Py. M.p. 68°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 285.

Mercuri-*n*-butyl iodide

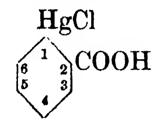
$$CH_3\cdot[CH_2]_2\cdot CH_2\cdot HgI$$

C_4H_9IHg MW, 384·5

Cryst. from EtOH.Aq. M.p. 117°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 277.
Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 41.

Mercuri-*o*-carboxyphenyl chloride (*o-Mercurichloro-benzoic acid*)



$C_7H_5O_2ClHg$ MW, 357

Cryst. from hot H_2O. M.p. 253°.

Me ester: $C_8H_7O_2ClHg$. MW, 371. Needles from dil. EtOH or AcOEt. M.p. 184–5° (162°). Insol. H_2O, pet. ether.

Et ester: $C_9H_9O_2ClHg$. MW, 385. M.p. 256°.

Pesci, *Atti accad. Lincei*, 1900, **9**, 255; 1901, **10**, 362, 413.
Schoeller, Scrauth, Heuter, *Ber.*, 1920, **53**, 636.
Nesmejanov, Makarova, *Chem. Abstracts*, 1932, **26**, 4028, 5295.

Mercuri-*m*-carboxyphenyl chloride (*m-Mercurichlorobenzoic acid*).

M.p. 264° (258°).

Me ester: m.p. 208°.

Et ester: m.p. 172°.

König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 170.
See also last reference above.

Mercuri-*p*-carboxyphenyl chloride (*p-Mercurichlorobenzoic acid*).

M.p. 273°. Sol. EtOH. Insol. H_2O. I $\longrightarrow$ *p*-iodobenzoic acid.

Me ester: m.p. 259°.

Et ester: m.p. 222–3°.

Michaelis, Richter, *Ann.*, 1901, **315**, 35.
Nesmejanov, Makarova, *Chem. Abstracts*, 1932, **26**, 4028, 5295.

Mercuri-cetyl bromide (*Mercuri-hexadecyl bromide*)

$$CH_3\cdot[CH_2]_{14}\cdot CH_2\cdot HgBr$$

$C_{16}H_{33}BrHg$ MW, 505·5

Plates from EtOH. M.p. 101·5°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 280.

Mercuri-cetyl chloride (*Mercuri-hexadecyl chloride*)

$CH_3{\cdot}[CH_2]_{14}{\cdot}CH_2{\cdot}HgCl$

$C_{16}H_{33}ClHg$ MW, 461

Plates from EtOH. M.p. 102°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 281.

Mercuri-cetyl hydroxide (*Mercuri-hexadecyl hydroxide*)

$CH_3{\cdot}[CH_2]_{14}{\cdot}CH_2{\cdot}HgOH$

$C_{16}H_{34}OHg$ MW, 442·5

Needles from EtOH. M.p. 78°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 287.

Mercuri-cetyl iodide (*Mercuri-hexadecyl iodide*)

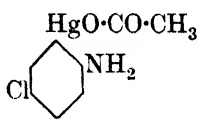
$CH_3{\cdot}[CH_2]_{14}{\cdot}CH_2{\cdot}HgI$

$C_{16}H_{33}IHg$ MW, 552·5

Plates from EtOH. M.p. 82°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 281.

Mercuri-5-chloro-2-aminophenyl acetate



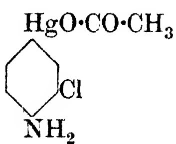
$C_8H_8O_2NClHg$ MW, 386

Needles. M.p. 207°. Sol. EtOH, AcOH. Insol. H_2O.

N-*Acetyl*: m.p. 200°.

Vecchiotti, *Gazz. chim. ital.*, 1924, **54**, 422.

Mercuri-3-chloro-4-aminophenyl acetate



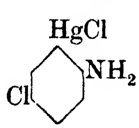
$C_8H_8O_2NClHg$ MW, 386

Needles from EtOH. M.p. 134°.

N-*Acetyl*: m.p. 238–9°.

Vecchiotti, Michetti, *Gazz. chim. ital.*, 1925, **55**, 378.

Mercuri-5-chloro-2-aminophenyl chloride

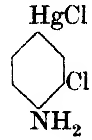


$C_6H_5NCl_2Hg$ MW, 362·5

Needles. M.p. 205° decomp.

Vecchiotti, *Gazz. chim. ital.*, 1924, **54**, 424.

Mercuri-3-chloro-4-aminophenyl chloride



$C_6H_5NCl_2Hg$ MW, 362·5

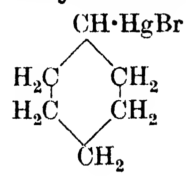
M.p. 174° decomp.

Vecchiotti, Michetti, *Gazz. chim. ital.*, 1925, **55**, 379.

Mercuri-chlorobenzoic Acid.
See Mercuri-carboxyphenyl chloride.

Mercuri-chlorobenzophenone.
See Mercuri-benzoylphenyl chloride.

Mercuri-cyclohexyl bromide

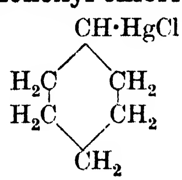


$C_6H_{11}BrHg$ MW, 363·5

Leaflets from C_6H_6. M.p. 153° (141°). Sol. Py. Less sol. Et_2O, C_6H_6. Insol. H_2O. Sensitive to light.

Grüttner, *Ber.*, 1914, **47**, 1653.
Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.
Tiffeneau, Gannagé, *Chem. Zentr.*, 1921, I, 766.

Mercuri-cyclohexyl chloride

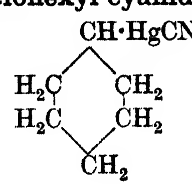


$C_6H_{11}ClHg$ MW, 319

Plates. M.p. 163–4° (159°).

Grüttner, *Ber.*, 1914, **47**, 1654.
See also last reference above.

Mercuri-cyclohexyl cyanide

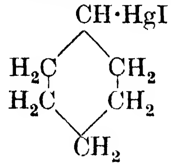


$C_7H_{11}NHg$ MW, 309·5

Leaflets from EtOH. M.p. 144°. Sensitive to light.

Grüttner, *Ber.*, 1914, **47**, 1656.
Tiffeneau, Gannagé, *Chem. Zentr.*, 1921, I, 766.

Mercuri-cyclohexyl iodide



$C_6H_{11}IHg$ MW, 410·5

Plates. M.p. 143°. Sensitive to light.

Grüttner, *Ber.*, 1914, **47**, 1654.
See also second reference above.

Mercuri-decyl bromide

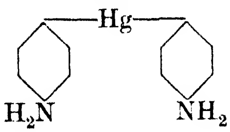
$CH_3\cdot[CH_2]_8\cdot CH_2\cdot HgBr$

$C_{10}H_{21}BrHg$ MW, 421·5

Cryst. from EtOH. M.p. 111·0–111·4°.

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.

***p*-Mercuri-dianiline** (p-*Mercuri-bis-aniline, mercury di*-p-*aminophenyl*)

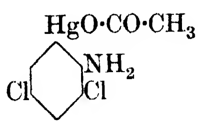


$C_{12}H_{12}N_2Hg$ MW, 384·5

Needles. M.p. 174°.
N : N'-*Diacetyl* : needles. M.p. 244–6°.

Pesci, *Gazz. chim. ital.*, 1893, **23**, 529.

Mercuri-3 : 5-dichloro-2-aminophenyl acetate

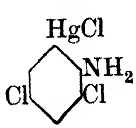


$C_8H_7O_2NCl_2Hg$ MW, 420·5

M.p. 170–1°.
N-*Acetyl* : m.p. 233°.

Vecchiotti, Carani, *Gazz. chim. ital.*, 1926, **56**, 150.

Mercuri-3 : 5-dichloro-2-aminophenyl chloride

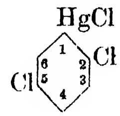


$C_6H_4NCl_3Hg$ MW, 397

M.p. 193°.

Vecchiotti, Carani, *Gazz. chim. ital.*, 1926, **56**, 151.

Mercuri-2 : 5-dichlorophenyl chloride



$C_6H_3Cl_3Hg$ MW, 382

M.p. 208°. Sol. hot EtOH, Me_2CO, AcOEt, hot C_6H_6. Insol. H_2O, pet. ether.

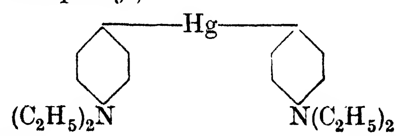
Nesmejanov, *Ber.*, 1929, **62**, 1017.
Nesmejanov, Gluschnev, Epifanski, Flegontov, *Ber.*, 1934, **67**, 133.

Mercuri-3 : 5-dichlorophenyl chloride.

M.p. 208°. Sol. hot EtOH, Me_2CO, hot C_6H_6. Mod. sol. Et_2O, hot $CHCl_3$. Insol. H_2O, pet. ether.

See first reference above.

***p*-Mercuri-di-diethylaniline** (*Mercury di-diethylaminophenyl*)

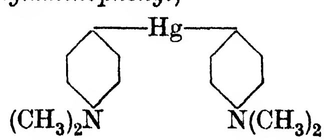


$C_{20}H_{28}N_2Hg$ MW, 496·5

Prisms from C_6H_6. M.p. 160·6°. Sol. Et_2O. Insol. EtOH.

Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 220.

***p*-Mercuri-di-dimethylaniline** (*Mercury di*-p-*dimethylaminophenyl*)

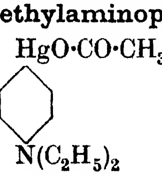


$C_{16}H_{20}N_2Hg$ MW, 440·5

Needles + C_6H_6 from C_6H_6. Loses C_6H_6 on standing. M.p. 169°. Sol. $CHCl_3$, dil. min. acids. Spar. sol. EtOH, Et_2O.

Hein, Wagler, *Ber.*, 1925, **58**, 1507.

Mercuri-*p*-diethylaminophenyl acetate

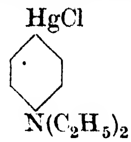


$C_{12}H_{17}O_2NHg$ MW, 407·5

Needles. M.p. 104·4°. Sol. EtOH, Et_2O, dil. AcOH.

Piccinini, *Gazz. chim. ital.*, 1893, **23**, 534.

Mercuri-*p*-diethylaminophenyl chloride

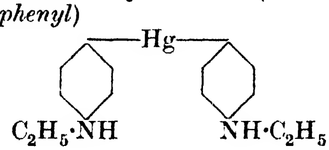


$C_{10}H_{14}NClHg$ MW, 384

Needles. M.p. 164·5°. Spar. sol. hot H_2O.

See previous reference.

***p*-Mercuri-di-ethylaniline** (*Mercury di*-p-*ethylaminophenyl*)

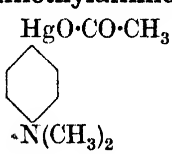


$C_{16}H_{20}N_2Hg$ MW, 440·5

Needles from xylene, or plates from EtOH or C_6H_6. M.p. 166°.

Ruspaggiari, *Gazz. chim. ital.*, 1893, **23**, 544.
Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 219.

Mercuri-*p*-dimethylaminophenyl acetate

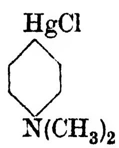


$C_{10}H_{13}O_2NHg$ MW, 379·5

Needles. M.p. 165°. Sol. $CHCl_3$, dil. AcOH, C_6H_6. Insol. H_2O.

Pesci, *Gazz. chim. ital.*, 1893, **23**, 521.
Dimroth, *Ber.*, 1902, **35**, 2045.

Mercuri-*p*-dimethylaminophenyl chloride

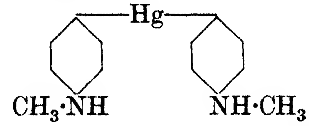


$C_8H_{10}NClHg$ MW, 356

Plates from EtOH. M.p. 225° decomp. Sol. HCl, $CHCl_3$. Less sol. C_6H_6.

See second reference above and also
Michaelis, Rabinerson, *Ber.*, 1890, **23**, 2342.

***p*-Mercuri-di-methylaniline** (*Mercury di*-p-*methylaminophenyl*)



$C_{14}H_{16}N_2Hg$ MW, 412·5

Needles from C_6H_6. M.p. 178–9°. Spar. sol. EtOH. Insol. Et_2O.

Pesci, *Gazz. chim. ital.*, 1893, **23**, 529.

Mercuri-ethyl acetate

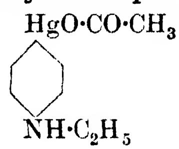
$CH_3·CH_2·HgO·CO·CH_3$

$C_4H_8O_2Hg$ MW, 288·5

M.p. 54°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Mercuri-*p*-ethylaminophenyl acetate

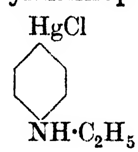


$C_{10}H_{13}O_2NHg$ MW, 379·5

Prisms. M.p. 130°. Sol. EtOH. Insol. H_2O.

Ruspaggiari, *Gazz. chim. ital.*, 1893, **23**, 544.
Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 219.

Mercuri-*p*-ethylaminophenyl chloride



$C_8H_{10}NClHg$ MW, 356

Plates. M.p. 142°. Sol. hot EtOH. Insol. H_2O.

See previous references.

Mercuri-ethyl bromide

$CH_3·CH_2·HgBr$

C_2H_5BrHg MW, 309·5

Cryst. from EtOH. M.p. 198° (193·5°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 273.

Mercuri-ethyl chloride

$CH_3 \cdot CH_2 \cdot HgCl$

C_2H_5ClHg MW, 265

Cryst. from EtOH. M.p. 192·5°. Insol. H_2O. Spar. sol. Et_2O.

Crymble, *J. Chem. Soc.*, 1914, **105**, 668.
Willgerodt, *Ber.*, 1898, **31**, 921.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 274.

Mercuri-ethyl cyanide

$CH_3 \cdot CH_2 \cdot HgCN$

C_3H_5NHg MW, 255·5

Needles from dil. MeOH. M.p. 77°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-ethyl hydroxide

$CH_3 \cdot CH_2 \cdot HgOH$

C_2H_6OHg MW, 246·5

M.p. 37°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 283.

Mercuri-ethyl iodide

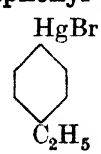
$CH_3 \cdot CH_2 \cdot HgI$

C_2H_5IHg MW, 356·5

Cryst. from EtOH. M.p. 186° (182°).

Crymble, *J. Chem. Soc.*, 1914, **105**, 668.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 274.

Mercuri-*p*-ethylphenyl bromide

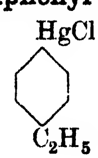


C_8H_9BrHg MW, 385·5

M.p. 227–8°.

Whitmore, Sobatzki, *J. Am. Chem. Soc.*, 1933, **55**, 1130.

Mercuri-*p*-ethylphenyl chloride

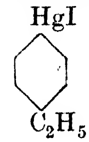


C_8H_9ClHg MW, 341

M.p. 221°.

See previous reference.

Mercuri-*p*-ethylphenyl iodide



C_8H_9IHg MW, 432·5

M.p. 229°.

See previous reference.

Mercuri-heptyl acetate

$CH_3 \cdot [CH_2]_5 \cdot CH_2 \cdot HgO \cdot CO \cdot CH_3$

$C_9H_{18}O_2Hg$ MW, 358·5

Plates. M.p. 54°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Mercuri-heptyl bromide

$CH_3 \cdot [CH_2]_5 \cdot CH_2 \cdot HgBr$

$C_7H_{15}BrHg$ MW, 379·5

Cryst. from EtOH. M.p. 118·5° (114·5°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 279.

Mercuri-heptyl chloride

$CH_3 \cdot [CH_2]_5 \cdot CH_2 \cdot HgCl$

$C_7H_{15}ClHg$ MW, 335

Plates from EtOH. M.p. 119·5°.

See last reference above.

Mercuri-heptyl cyanide

$CH_3 \cdot [CH_2]_5 \cdot CH_2 \cdot HgCN$

$C_8H_{15}NHg$ MW, 325·5

Yellow needles from dil. MeOH. M.p. 53°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 295.

Mercuri-heptyl hydroxide

$CH_3 \cdot [CH_2]_5 \cdot CH_2 \cdot HgOH$

$C_7H_{16}OHg$ MW, 316·5

Plates. M.p. 54°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 286.

Mercuri-heptyl iodide

$CH_3 \cdot [CH_2]_5 \cdot CH_2 \cdot HgI$

$C_7H_{15}IHg$ MW, 426·5

Plates from EtOH. M.p. 103°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 280.

Mercuri-hexyl acetate

$CH_3 \cdot [CH_2]_4 \cdot CH_2 \cdot HgO \cdot CO \cdot CH_3$

$C_8H_{16}O_2Hg$ MW, 344·5

Plates. M.p. 50°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.

Mercuri-hexyl bromide

$CH_3 \cdot [CH_2]_4 \cdot CH_2 \cdot HgBr$

$C_6H_{13}BrHg$ MW, 365·5

Cryst. from EtOH. M.p. 127·5° (122·0–122·2°, 118·5°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 278.

Mercuri-hexyl chloride

$CH_3 \cdot [CH_2]_4 \cdot CH_2 \cdot HgCl$

$C_6H_{13}ClHg$ MW, 321

Plates from EtOH. M.p. 125°.

See last reference above.

Mercuri-hexyl cyanide

$CH_3 \cdot [CH_2]_4 \cdot CH_2 \cdot HgCN$

$C_7H_{13}NHg$ MW, 311·5

Cryst. from dil. MeOH. M.p. 38°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 295.

Mercuri-hexyl hydroxide

$CH_3 \cdot [CH_2]_4 \cdot CH_2 \cdot HgOH$

$C_6H_{14}OHg$ MW, 302·5

Plates. M.p. 54·5°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 286.

Mercuri-hexyl iodide

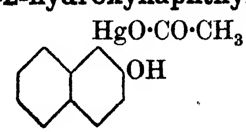
$CH_3 \cdot [CH_2]_4 \cdot CH_2 \cdot HgI$

$C_6H_{13}IHg$ MW, 412·5

Plates from EtOH. M.p. 110°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 279.

1-Mercuri-2-hydroxynaphthyl acetate

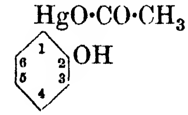


$C_{12}H_{10}O_3Hg$ MW, 402·5

Needles. M.p. 185° decomp. Spar. sol. most org. solvents.

Bamberger, *Ber.*, 1898, **31**, 2624.

Mercuri-o-hydroxyphenyl acetate



$C_8H_8O_3Hg$ MW, 352·5

Needles or prisms. M.p. 157°. Decomp. at 210–15°.

Me ether: $C_9H_{10}O_3Hg$. MW, 366·5. M.p. 124°.

Mameli, *Gazz. chim. ital.*, 1922, **52**, 352.
König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 169.

Mercuri-p-hydroxyphenyl acetate.

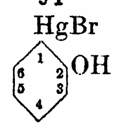
Needles or prisms. M.p. 165°. Decomp. at 210–15°.

Me ether: needles from dil. EtOH. M.p. 176·5°.

Et ether: $C_{10}H_{12}O_3Hg$. MW, 380·5. M.p. 162°.

See previous references.

Mercuri-o-hydroxyphenyl bromide



C_6H_5OBrHg MW, 373·5

Needles. M.p. 130–2° (122°). Decomp. at 195°.

Mameli, *Gazz. chim. ital.*, 1922, **52**, 352.
Caius, Wadia, *J. Ind. Chem. Soc.*, 1929, **6**, 616.

Mercuri-p-hydroxyphenyl bromide.

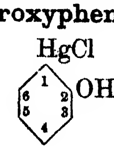
Cryst. M.p. 144–6°. Decomp. at 200–210°.

Me ether: C_7H_7OBrHg. MW, 387·5. M.p. 187°.

Et ether: C_8H_9OBrHg. MW, 401·5. M.p. 241·5°.

See first reference above and also
Michaelis, Geisler, *Ber.*, 1894, **27**, 259.
Michaelis, Robinerson, *Ber.*, 1890, **23**, 2345.

Mercuri-o-hydroxyphenyl chloride



C_6H_5OClHg MW, 329

Cryst. from hot H_2O or EtOH.Aq. M.p. 152·5° (146·5°).

Acetyl: m.p. 170–1°.
Me ether: C_7H_7OClHg. MW, 343. Cryst. from C_6H_6. M.p. 180–1° (173–4°).

Dimroth, *Ber.*, 1902, **35**, 2853.
Whitmore, Middleton, *J. Am. Chem. Soc.*, 1921, **43**, 622.
Nesmejanov, *Ber.*, 1929, **62**, 1015.
Caius, Wadia, *J. Ind. Chem. Soc.*, 1929, **6**, 616.

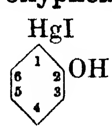
Mercuri-*m*-hydroxyphenyl chloride.
Powder from EtOH.Aq. M.p. 240·5–241·5°.
Me ether: m.p. 158°.

Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4422.
König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 170.

Mercuri-*p*-hydroxyphenyl chloride.
Plates from Me_2CO. M.p. 226–7° (224–5°, 216°). HCl ⟶ phenol + mercuric chloride.
Acetyl: m.p. 235°.
Me ether: plates. M.p. 239°. Sol. $CHCl_3$, hot C_6H_6. Spar. sol. EtOH.
Et ether: C_8H_9OClHg. MW, 357. M.p. 249–50° (241·5°, 238°, 234°).

Dimroth, *Ber.*, 1902, **35**, 2853.
Whitmore, Middleton, *J. Am. Chem. Soc.*, 1921, **43**, 622.
Nesmejanov, *Ber.*, 1929, **62**, 1015.
Caius, Wadia, *J. Ind. Chem. Soc.*, 1929, **6**, 616.
Michaelis, Robinerson, *Ber.*, 1890, **23**, 2344.

Mercuri-*o*-hydroxyphenyl iodide



C_6H_5OIHg MW, 420·5

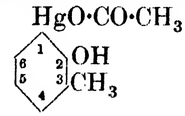
Prisms. M.p. 121° (106·5°). Decomp. at 200–210°.
Me ether: C_7H_7OIHg. MW, 434·5. Needles. M.p. 165°.

Mameli, *Gazz. chim. ital.*, 1922, **52**, 352.

Mercuri-*p*-hydroxyphenyl iodide.
Powder. M.p. 134·5°. Decomp. at 200–210°.
Me ether: plates. M.p. 227°.
Et ether: C_8H_9OIHg. MW, 448·5. Needles. M.p. 216°.

See above reference and also
Michaelis, Geisler, *Ber.*, 1894, **27**, 259.
Michaelis, Rabinerson, *Ber.*, 1890, **23**, 2345.

Mercuri-2-hydroxy-*m*-tolyl acetate



$C_9H_{10}O_3Hg$ MW, 366·5

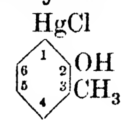
M.p. 123–5°. Br ⟶ 3-bromo-*o*-cresol.

Mameli, *Gazz. chim. ital.*, 1926, **56**, 955.

Mercuri-4-hydroxy-*m*-tolyl acetate.
M.p. 153–5°. Br ⟶ 5-bromo-*o*-cresol.

Mameli, *Gazz. chim. ital.*, 1926, **56**, 952.

Mercuri-2-hydroxy-*m*-tolyl chloride



C_7H_7OClHg MW, 343

M.p. 160–2°.

Mameli, *Gazz. chim. ital.*, 1926, **56**, 957.

Mercuri-4-hydroxy-*m*-tolyl chloride.
M.p. 200–2° decomp.

See previous reference.

Mercuri-6-hydroxy-*m*-tolyl chloride.
Needles from C_6H_6. M.p. 166°. Becomes turbid at 176° and resolidifies at 183°. Sol. EtOH.
Benzoyl: m.p. 241–2°.

Dimroth, *Ber.*, 1902, **35**, 2857.

Mercuri-isoamyl bromide

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}HgBr$

$C_5H_{11}BrHg$ MW, 351·5

M.p. 80°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3010.

Mercuri-isoamyl chloride

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}HgCl$

$C_5H_{11}ClHg$ MW, 307

M.p. 86°. Sol. hot EtOH, Et_2O. Insol. H_2O. Sublimes.

See previous reference.

Mercuri-isoamyl iodide

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}HgI$

$C_5H_{11}IHg$ MW, 398·5

Plates from EtOH. M.p. 122°. Sol. Et_2O. Spar. sol. hot, insol. cold H_2O.

See previous reference.

Mercuri-isobutyl bromide

$(CH_3)_2CH{\cdot}CH_2{\cdot}HgBr$

C_4H_9BrHg MW, 337·5

Cryst. from EtOH.Aq. M.p. 55·5°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

Mercuri-isobutyl iodide

$(CH_3)_2CH{\cdot}CH_2{\cdot}HgI$

C_4H_9IHg MW, 384·5

Cryst. from EtOH.Aq. M.p. 72°.

See previous reference.

Mercuri-isopropyl acetate

$(CH_3)_2CH{\cdot}HgO{\cdot}CO{\cdot}CH_3$

$C_5H_{10}O_2Hg$ MW, 302·5

M.p. 95°.

Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercuri-isopropyl bromide

$(CH_3)_2CH{\cdot}HgBr$

C_3H_7BrHg MW, 323·5

Needles. M.p. 98° (93·5°).

Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.
See also above reference.

Mercuri-isopropyl chloride

$(CH_3)_2CH{\cdot}HgCl$

C_3H_7ClHg MW, 279

Needles. M.p. 97°.

Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercuri-isopropyl iodide

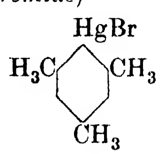
$(CH_3)_2CH{\cdot}HgI$

C_3H_7IHg MW, 370·5

M.p. 125°.

See previous reference.

Mercuri-mesityl bromide (*Mercuri-*2 : 4 : 6-*trimethylphenyl bromide*)

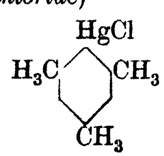


$C_9H_{11}BrHg$ MW, 399·5

M.p. 194°.

Michaelis, *Ber.*, 1895, **28**, 592.

Mercuri-mesityl chloride (*Mercuri-*2 : 4 : 6-*trimethylphenyl chloride*)

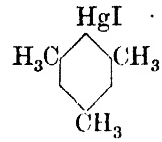


$C_9H_{11}ClHg$ MW, 355

Needles. M.p. 200°.

See previous reference.

Mercuri-mesityl iodide (*Mercuri-*2 : 4 : 6-*trimethylphenyl iodide*)



$C_9H_{11}IHg$ MW, 446·5

Needles. M.p. 178°.

See previous reference.

Mercuri-methyl acetate

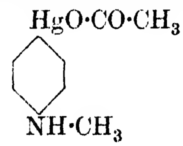
$CH_3{\cdot}HgO{\cdot}CO{\cdot}CH_3$

$C_3H_6O_2Hg$ MW, 274·5

Plates. M.p. 101°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 295.

Mercuri-*p*-methylaminophenyl acetate

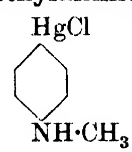


$C_9H_{11}O_2NHg$ MW, 365·5

Plates. M.p. 149° decomp. Sol. hot EtOH, dil. AcOH. Insol. H_2O, Et_2O.

Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 216.

Mercuri-*p*-methylaminophenyl chloride



C_7H_8NClHg MW, 342

Yellow powder. M.p. 108° decomp.

Pesci, *Zeitschrift für anorganische Chemie*, 1897, **15**, 217.

Mercuri-methyl bromide

$CH_3{\cdot}HgBr$

CH_3BrHg MW, 295·5

Cryst. from EtOH. M.p. 172° (160·8–161·3°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Crymble, *J. Chem. Soc.*, 1914, **105**, 668.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 272.

Mercuri-methyl chloride

$CH_3{\cdot}HgCl$

CH_3ClHg MW, 251

Cryst. from EtOH. M.p. 170°. Volatile in steam.

Seidel, *J. prakt. Chem.*, 1884, **29**, 136.
Hilpert, Ditmar, *Ber.*, 1913, **46**, 3740.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 273.
See also second reference above.

Mercuri-methyl cyanide

$CH_3{\cdot}HgCN$

C_2H_3NHg MW, 241·5

Acicular plates with faint garlic odour. M.p. 93°. Sol. H_2O, EtOH, C_6H_6. Mod. sol. Et_2O. Insol. ligroin.

Coates, Hinkel, Angel, *J. Chem. Soc.*, 1928, 542.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-methyl hydroxide

$CH_3{\cdot}HgOH$

CH_4OHg MW, 232·5

M.p. 137° (106°).

Hinkel, Angel, *J. Chem. Soc.*, 1927, 1950.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 282.

Mercuri-methyl iodide

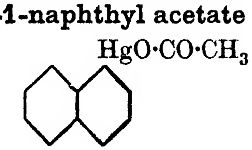
$CH_3{\cdot}HgI$

CH_3IHg MW, 342·5

Cryst. from EtOH. M.p. 152° (145°). Sol. Et_2O. Insol. H_2O.

Crymble, *J. Chem. Soc.*, 1914, **105**, 668.
Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 156.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 273.
See also first reference above.

Mercuri-1-naphthyl acetate

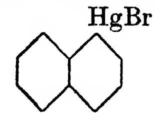


$C_{12}H_{10}O_2Hg$ MW, 386·5

Needles from EtOH. M.p. 154°. Sol. hot EtOH, AcOH, $CHCl_3$, CS_2, C_6H_6. Spar. sol. Et_2O. Insol. H_2O. HCl $\longrightarrow$ naphthalene, acetic acid, and mercuric chloride. I $\longrightarrow$ 1-iodonaphthalene, mercuric iodide, and acetic acid.

Dimroth, *Ber.*, 1902, **35**, 2035.

Mercuri-1-naphthyl bromide

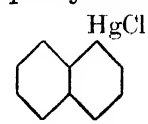


$C_{10}H_7BrHg$ MW, 407·5

Needles or plates. M.p. 202°. Sol. EtOH, $CHCl_3$, CS_2, C_6H_6. Insol. H_2O.

Otto, *Ann.*, 1870, **154**, 190.
Hilpert, Grüttner, *Ber.*, 1913, **46**, 1686.

Mercuri-1-naphthyl chloride

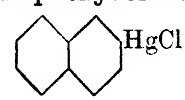


$C_{10}H_7ClHg$ MW, 363

Plates from toluene. M.p. 193° (188–9°). Mod. sol. EtOH, C_6H_6. Insol. H_2O.

Steinkopf, *Ann.*, 1917, **413**, 330.
McClure, Lowy, *J. Am. Chem. Soc.*, 1931, **53**, 319.
Nesmejanov, *Ber.*, 1929, **62**, 1014.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 289.

Mercuri-2-naphthyl chloride

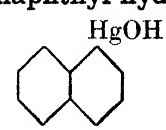


$C_{10}H_7ClHg$ MW, 363

M.p. 270°.

Nesmejanov, *Ber.*, 1929, **62**, 1014.

Mercuri-1-naphthyl hydroxide

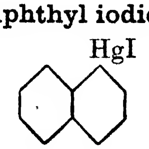


$C_{10}H_8OHg$ MW, 344·5

Sinters at 228°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 289.

Mercuri-1-naphthyl iodide

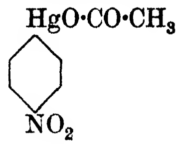


$C_{10}H_7IHg$ MW, 454·5

Plates from toluene. M.p. 219° (185·5–186°). Sol. hot EtOH, $CHCl_3$, C_6H_6, CS_2. Spar. sol. cold EtOH, Et_2O. Insol. H_2O.

See previous reference and also
Steinkopf, *Ann.*, 1917, **413**, 330.

Mercuri-*p*-nitrophenyl acetate

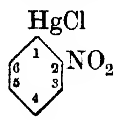


$C_8H_7O_4NHg$ MW, 381·5

Cryst. from EtOH. M.p. 202–203·5°.

Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, **138**, 66.

Mercuri-*o*-nitrophenyl chloride



$C_6H_4O_2NClHg$ MW, 358

Yellow needles from ligroin or plates from AcOH. M.p. 185° (181–2°). Sol. hot EtOH, Et_2O, Me_2CO. Insol. H_2O. Br in KBr.Aq.⟶ *o*-bromonitrobenzene.

Dimroth, *Ber.*, 1902, **35**, 2036.
Kharasch, Chalkley, *J. Am. Chem. Soc.*, 1921, **43**, 611.
Dimroth, Schweizer, Bamberger, *Ann.*, 1926, **446**, 153.
Nesmejanov, Gluschnev, Epifanski, Flegontov, *Ber.*, 1934, **67**, 133.

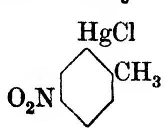
Mercuri-*m*-nitrophenyl chloride.
Cryst. from EtOH. M.p. 236–7°.

Kharasch, Chalkley, *J. Am. Chem. Soc.*, 1921, **43**, 612.
See also last two references above.

Mercuri-*p*-nitrophenyl chloride.
Cryst. from EtOH. M.p. 265–6° decomp.

Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, **138**, 67.
Nesmejanov, Gluschnev, Epifanski, Flegontov, *Ber.*, 1934, **67**, 133.
See also first reference above.

Mercuri-5-nitro-*o*-tolyl chloride

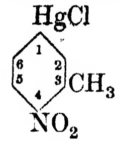


$C_7H_6O_2NClHg$ MW, 372

Needles from Me_2CO. M.p. 230–1°.

Coffey, *J. Chem. Soc.*, 1926, 3220.

Mercuri-4-nitro-*m*-tolyl chloride



$C_7H_6O_2NClHg$ MW, 372

Needles from Me_2CO. M.p. 210°.

Coffey, *J. Chem. Soc.*, 1926, 642.

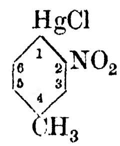
Mercuri-5-nitro-*m*-tolyl chloride.
Needles from AcOH. M.p. 294°. Br in KBr.Aq. ⟶ 5-bromo-3-nitrotoluene.

Coffey, *J. Chem. Soc.*, 1926, 3223.

Mercuri-6-nitro-*m*-tolyl chloride.
Needles from Me_2CO. M.p. 226–7°.

Coffey, *J. Chem. Soc.*, 1926, 3222.

Mercuri-2-nitro-*p*-tolyl chloride



$C_7H_6O_2NClHg$ MW, 372

Pale yellow needles from Me_2CO. M.p. 210°. Sinters at 207°.

Coffey, *J. Chem. Soc.*, 1926, 3223.

Mercuri-3-nitro-*p*-tolyl chloride.
Needles from Me_2CO. M.p. 220·5–221°. Sol. Me_2CO, hot AcOH. Spar. sol. other org. solvents. Br in $CHCl_3$ ⟶ 4-bromo-2-nitrotoluene.

Coffey, *J. Chem. Soc.*, 1926, 638.

Mercuri-nonyl bromide

$CH_3 \cdot [CH_2]_7 \cdot CH_2 \cdot HgBr$

$C_9H_{19}BrHg$ MW, 407·5

Cryst. from EtOH. M.p. 111·6–112·0° (109°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Mercuri-octyl bromide

$CH_3 \cdot [CH_2]_6 \cdot CH_2 \cdot HgBr$

$C_8H_{17}BrHg$ MW, 393·5

Cryst. from EtOH. M.p. 114·8–115° (109°).

See first reference above and also
Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.

Mercuri-octyl hydroxide

$CH_3\cdot[CH_2]_6\cdot CH_2\cdot HgOH$

$C_8H_{18}OHg$ MW, 330·5

Yellow plates. M.p. 75°. Sol. EtOH. Spar. sol. H_2O.

Eichler, *Ber.*, 1879, **12**, 1882.

Mercuri-phenacyl chloride

$C_6H_5\cdot CO\cdot CH_2\cdot HgCl$

C_8H_7OClHg MW, 355

Needles from ligroin. M.p. 145–6°. HCl ⟶ acetophenone + mercuric chloride. Br ⟶ phenacyl bromide.

Dimroth, *Ber.*, 1902, **35**, 2869.
Grignard, Abelmann, *Bull. soc. chim.*, 1916, **19**, 19.

Mercuri-phenyl acetate

$C_6H_5\cdot HgO\cdot CO\cdot CH_3$

$C_8H_8O_2Hg$ MW, 336·5

Prisms from C_6H_6. M.p. 149°. Sol. hot H_2O, EtOH, AcOH, C_6H_6. HCl ⟶ C_6H_6 + $CH_3\cdot COOH$ + $HgCl_2$. I ⟶ iodobenzene + CH_3COOH + HgI_2.

Maynard, *J. Am. Chem. Soc.*, 1924, **46**, 1511.
Dimroth, *Ber.*, 1899, **32**, 759.
Seide, Scherlin, Bras, *J. prakt. Chem.*, 1933, **138**, 66.
I.G., D.R.P., 548,902, (*Chem. Abstracts*, 1932, **26**, 4068); 553,280, (*Chem. Abstracts*, 1932, **26**, 5965).

Mercuri-phenyl bromide

$C_6H_5\cdot HgBr$

C_6H_5BrHg MW, 357·5

Plates from hot C_6H_6 or Py. M.p. 276° (280°, 291°).

Hilpert, Grüttner, *Ber.*, 1913, **46**, 1686.
Dreher, Otto, *Ann.*, 1870, **154**, 111.
Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Mercuri-phenyl chloride

$C_6H_5\cdot HgCl$

C_6H_5ClHg MW, 313

Plates from hot C_6H_6. M.p. 258° (271°, 250°). Spar. sol. cold EtOH, cold C_6H_6. Insol. H_2O. Sublimes. NaI in Me_2CO ⟶ mercuri-phenyl iodide.

Steinkopf, *Ann.*, 1917, **413**, 329.
Roeder, Blasi, *Ber.*, 1914, **47**, 2751.
McClure, Lowy, *J. Am. Chem. Soc.*, 1931, **53**, 319.
Nesmejanov, *Ber.*, 1929, **62**, 1013.

Mercuri-phenyl cyanide

$C_6H_5\cdot HgCN$

C_7H_5NHg MW, 303·5

Plates from C_6H_6. M.p. 203–4°. I ⟶ CNI + mercuri-phenyl iodide.

Otto, *J. prakt. Chem.*, 1870, **1**, 182.

Mercuri-phenyl hydroxide

$C_6H_5\cdot HgOH$

C_6H_6OHg MW, 294·5

Prisms. Sinters at 195°. M.p. above 200°. Sol. EtOH, C_6H_6. Spar. sol. cold H_2O. Liberates NH_3 from ammonium salts. Forms salts with acids.

Otto, *J. prakt. Chem.*, 1870, **1**, 183.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 287.

Mercuri-phenyl iodide

$C_6H_5\cdot HgI$

C_6H_5IHg MW, 404·5

Plates from hot C_6H_6. M.p. 266° (269°). Sol. $CHCl_3$, hot C_6H_6. Prac. insol. cold EtOH, Et_2O, cold C_6H_6. Insol. H_2O.

Steinkopf, *Ann.*, 1917, **413**, 329.
Dreher, Otto, *Ann.*, 1870, **154**, 109.
Nesmejanov, *Ber.*, 1929, **62**, 1013.

Mercuri-phenyl nitrate

$C_6H_5\cdot HgNO_3$

$C_6H_5O_3NHg$ MW, 339·5

Plates from EtOH. M.p. 188° decomp. Sol. hot EtOH, C_6H_6. Spar. sol. hot H_2O.

Woollett, Coulter, *J. Am. Chem. Soc.*, 1934, **56**, 1922.
Challenger, Rothstein, *J. Chem. Soc.*, 1934, 1260.
Bamberger, *Ber.*, 1897, **30**, 512.

Mercuri-phenyl thiocyanate

$C_6H_5\cdot HgSCN$

C_7H_5NSHg MW, 335·5

Plates from EtOH or C_6H_6. M.p. 231–232·5°. Insol. H_2O.

Steinkopf, *Ann.*, 1921, **424**, 60.
Otto, *J. prakt. Chem.*, 1870, **1**, 182.
Söderbäck, *Ann.*, 1919, **419**, 266.

Mercuri-picryl chloride.

See Mercuri-2 : 4 : 6-trinitrophenyl chloride.

Mercuri-propyl acetate

$CH_3\cdot CH_2\cdot CH_2\cdot HgO\cdot CO\cdot CH_3$

$C_5H_{10}O_2Hg$ MW, 302·5

M.p. 57–8°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 296.
Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercuri-propyl bromide

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}HgBr$

C_3H_7BrHg MW, 323·5

Cryst. from EtOH. M.p. 140° (138°, 135·4°).

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, **55**, 4207.
Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 274.

Mercuri-propyl chloride

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}HgCl$

C_3H_7ClHg MW, 279

Cryst. from EtOH.Aq. M.p. 147° (140°, 143°).

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3010.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 275.
Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercuri-propyl cyanide

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}HgCN$

C_4H_7NHg MW, 269·5

Needles from dil. MeOH. M.p. 28°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 294.

Mercuri-propyl hydroxide

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}HgOH$

C_3H_8OHg MW, 260·5

Cryst. from Py. M.p. 78°.

Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 284.

Mercuri-propyl iodide

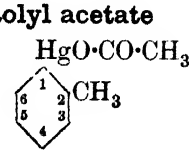
$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}HgI$

C_3H_7IHg MW, 370·5

Cryst. from EtOH.Aq. M.p. 113°.

Marvel, Gauerke, Hill, *J. Am. Chem. Soc.*, 1925, **47**, 3011.
Slotta, Jacobi, *J. prakt. Chem.*, 1929, **120**, 275.

Mercuri-*o*-tolyl acetate



$C_9H_{10}O_2Hg$ MW, 350·5

M.p. 101°.

König, Scharrnbeck, *J. prakt. Chem.*, 1930, **128**, 170.

Mercuri-*m*-tolyl acetate.

Needles from H_2O. M.p. 83–4°. Sol. hot H_2O, EtOH.

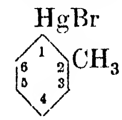
Michaelis, *Ber.*, 1895, **28**, 590.

Mercuri-*p*-tolyl acetate.

Prisms from EtOH or C_6H_6. M.p. 153°.

Dreher, Otto, *Ann.*, 1870, **154**, 174.

Mercuri-*o*-tolyl bromide



C_7H_7BrHg MW, 371·5

Needles from EtOH or xylene. M.p. 169·5°. Sol. hot C_6H_6, aniline, Py. Pptd. on addition of pet. ether. Spar. sol. cold EtOH, Et_2O, C_6H_6, $CHCl_3$, Me_2CO. KI in EtOH ⟶ mercuri-*o*-tolyl iodide.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 914.
Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.
Whitmore, Sobatzki, *J. Am. Chem. Soc.*, 1933, **55**, 1128.

Mercuri-*m*-tolyl bromide.

Needles from EtOH. M.p. 184°.

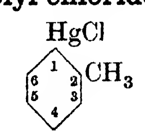
See second reference above and also
Michaelis, *Ber.*, 1895, **28**, 590.

Mercuri-*p*-tolyl bromide.

Needles from C_6H_6. M.p. 234–5° (231°). Spar. sol. most org. solvents.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 914.
Hill, *J. Am. Chem. Soc.*, 1928, **50**, 167.

Mercuri-*o*-tolyl chloride



C_7H_7ClHg MW, 327

Cryst. from EtOH. M.p. 146° (143°).

Dimroth, *Ber.*, 1899, **32**, 761.
McClure, Lowy, *J. Am. Chem. Soc.*, 1931, **53**, 319.
Nesmejanov, *Ber.*, 1929, **62**, 1014.

Mercuri-*m*-tolyl chloride.

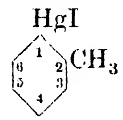
Needles. M.p. 159–60°. Sol. $CHCl_3$, C_6H_6. Spar. sol. EtOH. Sublimes.

Michaelis, *Ber.*, 1895, **28**, 589.
Michaelis, Genzken, *Ann.*, 1887, **242**, 185.

Mercuri-*p*-tolyl chloride.
Plates from hot C_6H_6. M.p. 238–9° (232–3°). Sol. hot C_6H_6. Spar. sol. hot EtOH. Insol. H_2O. NaI in Me_2CO ⟶ mercuri-*p*-tolyl iodide.

Whitmore, Hamilton, Thurman, *J. Am. Chem. Soc.*, 1923, **45**, 1066.
Peters, *Ber.*, 1905, **38**, 2569.
Dimroth, *Ber.*, 1899, **32**, 761.
McClure, Lowy, *J. Am. Chem. Soc.*, 1931, **53**, 319.
Nesmejanov, *Ber.*, 1929, **62**, 1014.

Mercuri-*o*-tolyl iodide



C_7H_7IHg MW, 418·5

Prisms from EtOH. M.p. 176–177·5°.

Hilpert, Grüttner, *Ber.*, 1915, **48**, 914.
Whitmore, Sobatzki, *J. Am. Chem. Soc.*, 1933, **55**, 1128.

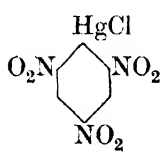
Mercuri-*m*-tolyl iodide.
Plates. M.p. 161–2°.

Michaelis, *Ber.*, 1895, **28**, 590.

Mercuri-*p*-tolyl iodide.
Cryst. from toluene. M.p. 217° (213–14°). Spar. sol. most org. solvents.

Steinkopf, *Ann.*, 1917, **413**, 329.
Hilpert, Grüttner, *Ber.*, 1915, **48**, 915.

Mercuri-2 : 4 : 6-trinitrophenyl chloride
(*Mercuri-picryl chloride*)



$C_6H_2O_6N_3ClHg$ MW, 448

Cryst. from EtOH. M.p. 202°. I in KI.Aq. ⟶ 2 : 4 : 6-trinitroiodobenzene (picryl iodide).

Kharasch, *J. Am. Chem. Soc.*, 1921, **43**, 2243.

Mercury di-*p*-aminophenyl.
See *p*-Mercuri-dianiline.

Mercury dibenzyl

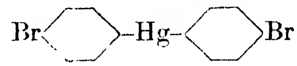
$C_6H_5{\cdot}CH_2{\cdot}Hg{\cdot}CH_2{\cdot}C_6H_5$

$C_{14}H_{14}Hg$ MW, 382·5

Needles from EtOH. M.p. 111°. Sol. $CHCl_3$, CCl_4. Less sol. EtOH, AcOEt, C_6H_6. Insol. Et_2O, pet. ether.

Jones, Werner, *J. Am. Chem. Soc.*, 1918, **40**, 1266.
Banús, *Anales soc. españ. fís. quím.*, 1922, **20**, 667.
Wolff, *Ber.*, 1913, **46**, 64.
Hein, Wagler, *Ber.*, 1925, **58**, 1507.

Mercury di-*p*-bromophenyl



$C_{12}H_8Br_2Hg$ MW, 512·5

Cryst. from Me_2CO. M.p. 243–4°.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1020.
Hein, Wagler, *Ber.*, 1925, **58**, 1509.

Mercury di-*n*-butyl

$CH_3{\cdot}[CH_2]_3{\cdot}CH_2{\cdot}Hg{\cdot}CH_2{\cdot}[CH_2]_2{\cdot}CH_3$

$C_8H_{18}Hg$ MW, 314·5

B.p. 120–3°/23 mm., 105°/10 mm. D_4^{20} 1·7779. n_D^{20} 1·5057.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.
Gilman, Brown, *J. Am. Chem. Soc.*, 1930, **52**, 3314.
Jones, Evans, Gulwell, Griffiths, *J. Chem. Soc.*, 1935, 45.

Mercury di-*sec*.-butyl

$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}Hg{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_3$

$C_8H_{18}Hg$ MW, 314·5

B.p. 91–3°/15 mm., 46°/0·3 mm. D_{20}^{20} 1·763. n_D^{20} 1·511. I ⟶ mercuri-*sec*.-butyl iodide + *sec*.-butyl iodide.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 821.
Tafel, *Ber.*, 1906, **39**, 3628.

Mercury di-*tert*.-butyl

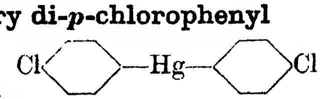
$(CH_3)_3C{\cdot}Hg{\cdot}C(CH_3)_3$

$C_8H_{18}Hg$ MW, 314·5

B.p. 78–82°/5 mm. D_{20}^{20} 1·749. n_D^{20} 1·521.

Marvel, Calvery, *J. Am. Chem. Soc.*, 1923, **45**, 822.

Mercury di-*p*-chlorophenyl



$C_{12}H_8Cl_2Hg$ MW, 423·5

Needles from Me_2CO. M.p. 242–3°.

Hein, Wagler, *Ber.*, 1925, **58**, 1509.

Mercury di-*p*-diethylaminophenyl.
See *p*-Mercuri-di-diethylaniline.

Mercury di-*p*-dimethylaminophenyl. *See p*-Mercuri-di-dimethylaniline.

Mercury diethyl

$CH_3{\cdot}CH_2{\cdot}Hg{\cdot}CH_2{\cdot}CH_3$

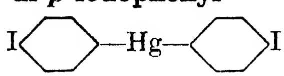
$C_4H_{10}Hg$ MW, 258·5

B.p. 159°, 57°/16 mm. D^{20} 2·4660, $D^{23\cdot2}$ 2·42346. $n_D^{23\cdot2}$ 1·53990. Sol. Et_2O. Less sol. EtOH. Insol. H_2O. Heat of comb. C_v 733·6 Cal. Br ⟶ mercuri-ethyl bromide + ethyl bromide. I ⟶ mercuri-ethyl iodide + ethyl iodide. HCl ⟶ mercuri-ethyl chloride + ethane. $CH_3{\cdot}COOH$ at 120° ⟶ mercuri-ethyl acetate. $HgCl_2$ ⟶ mercuri-ethyl chloride. $KMnO_4$ ⟶ mercuri-ethyl hydroxide. Mg ⟶ magnesium diethyl + mercury. Zn ⟶ zinc diethyl + mercury.

Gilman, Brown, *J. Am. Chem. Soc.*, 1930, **52**, 3314.
Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.
Hein, Wagler, *Ber.*, 1925, **58**, 1506.

Mercury di-*p*-ethylaminophenyl. *See p*-Mercuri-di-ethylaniline.

Mercury di-*p*-iodophenyl



$C_{12}H_8I_2Hg$ MW, 606·5

M.p. 270–2°. Sol. hot Py. Spar. sol. Me_2CO, $CHCl_3$. Prac. insol. MeOH, EtOH. Insol. H_2O.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1020.

Mercury di-isobutyl

$(CH_3)_2CH{\cdot}CH_2{\cdot}Hg{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_8H_{18}Hg$ MW, 314·5

B.p. 205–7°. D^0 1·747, D^{15} 1·835, D_4^{20} 1·6397. n_D^{20} 1·4989. Volatile in steam. I ⟶ mercuri-isobutyl iodide + isobutyl iodide.

Marquardt, *Ber.*, 1888, **21**, 2037.
Ponzio, *Gazz. chim. ital.*, 1900, **30**, 24.
Lewis, Chamberlin, *J. Am. Chem. Soc.*, 1929, **51**, 291.

Mercury di-isopropyl

$(CH_3)_2CH{\cdot}Hg{\cdot}CH(CH_3)_2$

$C_6H_{14}Hg$ MW, 286·5

B.p. 119–21°/125 mm. n_D 1·532.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.
Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercury dimethyl

$CH_3{\cdot}Hg{\cdot}CH_3$

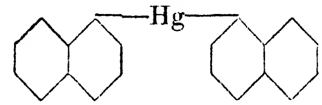
C_2H_6Hg MW, 230·5

Liq. with faint sweet odour. B.p. 92°/761 mm. Sol. EtOH, Et_2O. Insol. H_2O. $D^{22\cdot2}$ 2·95412. $n_D^{22\cdot2}$ 1·53266. Heat of comb. C_v 430·8 Cal. Inflammable. Poisonous. I ⟶ methyl iodide + mercuri-methyl iodide. HCl ⟶ mercuri-methyl chloride + methane. CH_3COOH at 130° ⟶ mercuri-methyl acetate + methane. HgI_2 ⟶ mercuri-methyl iodide. Zn at 120° ⟶ mercury + zinc dimethyl.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.
Maynard, Howard, *J. Chem. Soc.*, 1923, **123**, 960.
Gilman, Brown, *J. Am. Chem. Soc.*, 1930, **52**, 3314.
Fuchs, *J. prakt. Chem.*, 1928, **119**, 209.

Mercury di-*p*-methylaminophenyl. *See p*-Mercuri-di-methylaniline.

Mercury di-1-naphthyl (*Mercury di-α-naphthyl*)

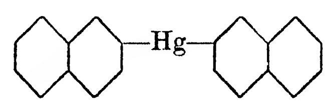


$C_{20}H_{14}Hg$ MW, 454·5

Cryst. M.p. 249° (243°). Sol. hot CS_2, $CHCl_3$. Spar. sol. C_6H_6. Insol. H_2O. H_2SO_4 ⟶ $HgSO_4$ + naphthalene-1-sulphonic acid. $CH_3{\cdot}COOH$ ⟶ mercuri-1-naphthyl acetate + naphthalene. $HgCl_2$ ⟶ mercuri-1-naphthyl chloride.

Hein, Wagler, *Ber.*, 1925, **58**, 1507.
Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1019.

Mercury di-2-naphthyl (*Mercury di-β-naphthyl*)

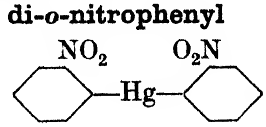


$C_{20}H_{14}Hg$ MW, 454·5

Cryst. from C_6H_6. M.p. 247–8° (238°). Spar. sol. EtOH, Et_2O. Insol. H_2O. Dist. with soda lime ⟶ 2 : 2′-dinaphthyl.

Michaelis, *Ber.*, 1894, **27**, 251.
Chattaway, *J. Chem. Soc.*, 1894, **65**, 877.
Beattie, Whitmore, *J. Am. Chem. Soc.*, 1933, **55**, 1571.

Mercury di-*o*-nitrophenyl

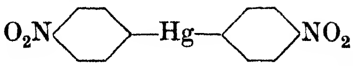


$C_{12}H_8O_4N_2Hg$ MW, 444·5

Needles from hot Me_2CO. M.p. 206–7°.

Hein, Wagler, *Ber.*, 1925, **58**, 1508.

Mercury di-*p*-nitrophenyl



$C_{12}H_8O_4N_2Hg$ MW, 444·5

Decomp. at 320°. Prac. insol. usual org. solvents.

Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1020.

Mercury diphenyl

$C_6H_5{\cdot}Hg{\cdot}C_6H_5$

$C_{12}H_{10}Hg$ MW, 354·5

Needles. M.p. 124·5°. B.p. 204°/10·5 mm. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. H_2O. Turns yellow on exposure to light. HCl ⟶ C_6H_6 + $HgCl_2$. $CH_3{\cdot}COOH$ ⟶ C_6H_6 + mercuri-phenyl acetate. $HgCl_2$ ⟶ mercuri-phenyl chloride. $(CH_3COO)_2Hg$ ⟶ mercuri-phenyl acetate. Cu ⟶ mercury + diphenyl. Mg ⟶ magnesium diphenyl. Zn ⟶ zinc diphenyl. $CH_3{\cdot}COCl$ ⟶ mercuri-phenyl chloride + acetophenone.

Maynard, *J. Am. Chem. Soc.*, 1924, **46**, 1510.
Calvery, *Organic Syntheses*, 1929, IX, 54.
Pfeiffer, Truskier, *Ber.*, 1904, **37**, 1127.
Dreher, Otto, *Ann.*, 1870, **154**, 93.
Steinkopf, Bielenberg, Angestad-Jensen, *Ann.*, 1923, **430**, 71.
Borgstrom, Dewar, *J. Am. Chem. Soc.*, 1929, **51**, 3387.
Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1019.

Mercury dipropyl

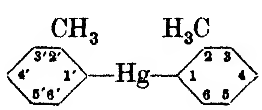
$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}Hg{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$

$C_6H_{14}Hg$ MW, 286·5

B.p. 189–91°, 75–7°/25 mm. Sol. Et_2O. Less sol. EtOH. Insol. H_2O. D^0 2·046, D^{16} 2·124. I ⟶ mercuri-propyl iodide + propyl iodide. Br ⟶ mercuri-propyl bromide. HCl ⟶ mercuri-propyl chloride + propane. Zn at 120° ⟶ zinc dipropyl.

Marvel, Gould, *J. Am. Chem. Soc.*, 1922, **44**, 153.
Goddard, *J. Chem. Soc.*, 1923, **123**, 1168.
Goret, *Chem. Zentr.*, 1922, III, 1371.

Mercury di-*o*-tolyl (*Mercury* 2 : 2′-*dimethyldiphenyl*)



$C_{14}H_{14}Hg$ MW, 382·5

Cryst. from C_6H_6. M.p. 108°. B.p. 219°/14 mm.

Michaelis, *Ann.*, 1896, **293**, 292.

Mercury di-*m*-tolyl (*Mercury* 3 : 3′-*dimethyldiphenyl*).

Needles from AcOEt. M.p. 102°. Sol. Me_2CO, $CHCl_3$, C_6H_6. Less sol. EtOH, Et_2O.

Michaelis, *Ber.*, 1895, **28**, 588.

Mercury di-*p*-tolyl (*Mercury* 4 : 4′-*dimethyldiphenyl*).

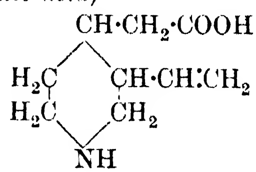
Needles from xylene. M.p. 243–4° (238°). Sol. C_6H_6, $CHCl_3$. Less sol. EtOH. Insol. H_2O. HCl ⟶ toluene + $HgCl_2$. $HgCl_2$ ⟶ mercuri-*p*-tolyl chloride.

Whitmore, Hamilton, Thurman, *J. Am. Chem. Soc.*, 1923, **45**, 1068.
Ladenburg, *Ann.*, 1874, **173**, 162.
Nesmejanov, Kahn, *Ber.*, 1929, **62**, 1019.

Mercury fulminate.

See under Fulminic Acid.

Meroquinene (*Meroquinenine*, 4-[3-*vinyl-piperidyl*]-*acetic acid*)



$C_9H_{15}O_2N$ MW, 169

Needles from MeOH. M.p. 223–4° decomp.
N-*Acetyl*: cryst. M.p. 110°.
N-*Nitroso*: cryst. M.p. 67°.
Et ester: $C_{11}H_{19}O_2N$. MW, 197. *Hydrochloride*: cryst. from EtOH. M.p. 165°.
B,HAuCl₄: cryst. M.p. 142° decomp.

Koenigs, *Ber.*, 1894, **27**, 904, 1500; 1897, **30**, 1327.
Kaufmann, *Ber.*, 1913, **46**, 1829.

Mesacon-α-anilic Acid (*Mesaconic acid α-anilide*)

$CH_3{\cdot}C{\cdot}COOH$
$C_6H_5{\cdot}NH{\cdot}OC{\cdot}CH$

$C_{11}H_{11}O_3N$ MW, 205

Needles from EtOH. M.p. 202°. Sol. MeOH, EtOH. Spar. sol. Et_2O, $CHCl_3$, C_6H_6. Insol. hot H_2O. Hyd. by KOH at 100°.

Me ester: $C_{12}H_{13}O_3N$. MW, 219. Needles from MeOH. M.p. 92°. Sol. EtOH, AcOH, C_6H_6, Et_2O.

Et ester: $C_{13}H_{15}O_3N$. MW, 233. Needles from pet. ether, pet. ether–$CHCl_3$ or 90% AcOH. M.p. 92°. Sol. EtOH, Et_2O, Me_2CO. Spar. sol. C_6H_6, AcOH, hot pet. ether.

Phenyl ester: $C_{17}H_{15}O_3N$. MW, 281. Cryst. from CCl_4. M.p. 114–15°. Sol. EtOH, Et_2O.

Chloride: $C_{11}H_{10}O_2NCl$. MW, 223·5. Cryst. from C_6H_6. M.p. 107°. Sol. Et_2O, C_6H_6, $CHCl_3$. Insol. pet. ether.

Amide: $C_{11}H_{12}O_2N_2$. MW, 204. Needles from H_2O. M.p. 165°. Sol. EtOH, AcOH, hot H_2O. Spar. sol. Et_2O, cold H_2O.

Anschütz, Haas, Sieplein, *Ann.*, 1907, **353**, 181.

Anschütz, Scharfenberg, *ibid.*, 190.

Clarke, *Ann.*, 1908, **359**, 192.

Mesacon-β-anilic Acid (*Mesaconic acid β-anilide*)

$CH_3{\cdot}C{\cdot}CO{\cdot}NH{\cdot}C_6H_5$
$HOOC{\cdot}CH$

$C_{11}H_{11}O_3N$ MW, 205

Plates from hot H_2O. M.p. 163°. Sol. hot H_2O. Hyd. by KOH at 100°.

Me ester: $C_{12}H_{13}O_3N$. MW, 219. M.p. 91–2°.

Et ester: $C_{13}H_{15}O_3N$. MW, 233. Needles from 70% AcOH. M.p. 72°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. C_6H_6, AcOH, hot pet. ether.

Phenyl ester: $C_{17}H_{15}O_3N$. MW, 281. Cryst. from Et_2O or CCl_4. M.p. 121°. Sol. EtOH, $CHCl_3$, C_6H_6, CS_2, Me_2CO.

Anschütz, Haas, Sieplein, *Ann.*, 1907, **353**, 179.

Clarke, *Ann.*, 1908, **359**, 191.

Mesaconic Acid (*Methylfumaric acid*)

$CH_3{\cdot}C{\cdot}COOH\beta$
$\alpha HOOC{\cdot}CH$

$C_5H_6O_4$ MW, 130

Cryst. from H_2O. M.p. 240·5°. Sublimes in rods. Sol. EtOH, Et_2O. Spar. sol. $CHCl_3$, CS_2, ligroin. Sol. 38 parts H_2O at 14°, 1 part at 100°. $k = 8{\cdot}5 \times 10^{-4}$ at 25°.

α-Me ester: $C_6H_8O_4$. MW, 144. Cryst. from pet. ether. M.p. 52°. Sol. to 12·07% in H_2O at 20°. $k = 3{\cdot}53 \times 10^{-4}$ at 23°. β-*Chloride*: $C_6H_7O_3Cl$. MW, 162·5. B.p. 80°/13 mm. β-*Amide*: $C_6H_9O_3N$. MW, 143. Needles from Et_2O. M.p. 103°. β-*Anilide*: *see under* Mesacon-β-anilic Acid. β-p-*Toluidide*: $C_{13}H_{15}O_3N$. MW, 233. M.p. 105°.

β-*Me ester*: needles from pet. ether. M.p. 84°. B.p. 135–7°/13 mm. Very sol. MeOH, Et_2O, $CHCl_3$, CCl_4. Sol. C_6H_6. Sol. to 2·55% in H_2O at 20°. $k = 5{\cdot}1 \times 10^{-4}$. α-*Chloride*: b.p. 92–3°/20 mm., 78–9°/13 mm. D_{20}^{20} 1·232. α-*Amide*: plates from Et_2O. M.p. 117°. Very sol. Me_2CO. Sol. $CHCl_3$, C_6H_6. α-*Anilide*: *see under* Mesacon-α-anilic Acid. α-p-*Toluidide*: needles from MeOH. M.p. 135°.

Di-Me ester: $C_7H_{10}O_4$. MW, 158. B.p. 205·5–206·5°, 100°/16 mm. D_4^4 1·148. n_D^{16} 1·4564. Sol. 122 parts H_2O at 15°.

α-Et ester: $C_7H_{10}O_4$. MW, 158. Needles from C_6H_6. M.p. 67°. B.p. 141·6°/14 mm. Very sol. EtOH, Et_2O, $CHCl_3$. Sol. C_6H_6. Spar. sol. ligroin. Sol. to 1·91% in H_2O at 20°. $k = 3{\cdot}42 \times 10^{-4}$ at 25°. β-*Chloride*: $C_7H_9O_3Cl$. MW, 176·5. B.p. 86–7°/13 mm. D_{20}^{20} 1·173. β-*Amide*: $C_7H_{11}O_3N$. MW, 157. Prisms. M.p. 78°. β-*Anilide*: *see under* Mesacon-β-anilic Acid. β-p-*Toluidide*: $C_{14}H_{17}O_3N$. MW, 247. Needles from 50% AcOH. M.p. 99°.

β-*Et ester*: needles from pet. ether. M.p. 68°. Very sol. EtOH, Et_2O, $CHCl_3$. Sol. C_6H_6. Sol. to 1·49% in H_2O at 20°. $k = 5{\cdot}53 \times 10^{-4}$ at 25°. α-*Chloride*: b.p. 92–3°/16 mm. D_{20}^{20} 1·184. α-*Amide*: cryst. from Et_2O. M.p. 96°. Very sol. EtOH. Sol. $CHCl_3$, C_6H_6. α-*Anilide*: *see under* Mesacon-α-anilic Acid. α-p-*Toluidide*: needles from 70% AcOH. M.p. 103°.

α-Me-β-Et ester: $C_8H_{12}O_4$. MW, 172. B.p. 97–8°/13 mm. D_{20}^{20} 1·079.

β-Me-α-Et ester: b.p. 95·2–95·6°/12 mm. D_{20}^{20} 1·079.

Di-Et ester: $C_9H_{14}O_4$. MW, 186. B.p. 229°, 93–5°/10 mm. D_4^4 1·0598. n_D^{16} 1·4499.

α-Phenyl ester: $C_{11}H_{10}O_4$. MW, 206. Needles from pet. ether. M.p. 99°. β-*Amide*: $C_{11}H_{11}O_3N$. MW, 205. Needles from Et_2O. M.p. 114–15°. β-*Anilide*: *see under* Mesacon-β-anilic Acid. β-p-*Toluidide*: $C_{18}H_{17}O_3N$. MW, 295. Yellowish needles from EtOH. M.p. 129–30°.

Di-phenyl ester: $C_{17}H_{14}O_4$. MW, 282. Yellowish leaflets from CS_2. M.p. 66–7°.

α-Benzyl ester: $C_{12}H_{12}O_4$. MW, 220. Needles from H_2O. M.p. 71·5°.

Dibenzyl ester: $C_{19}H_{18}O_4$. MW, 310. B.p. 160–5°/0·5 mm.

α-Amide: $C_5H_7O_3N$. MW, 129. Cryst. from H_2O. M.p. 222°. Very sol. EtOH, Me_2CO. Spar. sol. Et_2O, C_6H_6.

β-*Amide*: cryst. from H_2O. M.p. 174°. α-p-*Toluidide*: $C_{12}H_{14}O_2N_2$. MW, 218. Needles from H_2O. M.p. 177–8°.

Diamide: $C_5H_8O_2N_2$. MW, 128. Plates from H_2O. M.p. 176·5°.

Dichloride: $C_5H_4O_2Cl_2$. MW, 167. B.p. 64–5°/14 mm.

Hydrazide: cryst. from EtOH.Aq. M.p. 217–18° decomp.

Monoanilide: *see* Mesaconanilic Acid.

Dianilide: mesaconanilide. $C_{17}H_{16}O_2N_2$. MW, 280. Needles. M.p. 185·7°.

α-p-*Toluidide*: $C_{12}H_{13}O_3N$. MW, 219. Needles from H_2O. M.p. 196°.

β-p-*Toluidide* : needles from H_2O. M.p. 184°.

Di-p-*Toluidide* : $C_{19}H_{20}O_2N_2$. MW, 308. Needles from EtOH. M.p. 212°.

Mottern, Keenan, *J. Am. Chem. Soc.*, 1931, **51**, 2347.
Anschütz, Baeumges, *Ann.*, 1928, **461**, 190.
Anschütz, *Ann.*, 1907, **353**, 144.
Perkin, *J. Chem. Soc.*, 1888, **53**, 586.

Mesaconitine

$C_{33}H_{45}O_{11}N$ MW, 631

Alkaloid accompanying aconitine. Occurs abundantly in *Aconitum Manschuricum*, Nakai. Prisms from MeOH. M.p. 208–9° decomp. $[\alpha]_D^{17} + 25{\cdot}4°$.

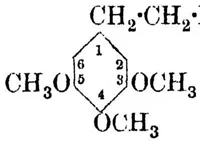
B,HBr : cryst. from H_2O. M.p. 172–3°. $[\alpha]_D - 24{\cdot}8°$.

B,HAuCl₄ : cryst. from $CHCl_3$–Et_2O. M.p. 160° after sintering at 154°.

B,HClO₄ : cryst. from EtOH. M.p. 217–25° decomp.

Morio, *Ann.*, 1929, **476**, 187.

Mescaline (*Mezcaline*, β-[3 : 4 : 5-*trimethoxyphenyl*]-*ethylamine*, 5-β-*aminoethylpyrogallol trimethyl ether*)



$C_{11}H_{17}O_3N$ MW, 211

Cryst. M.p. 35–6°. B.p. 180–180·5°/12 mm. Sol. H_2O, EtOH, $CHCl_3$, C_6H_6. Insol. Et_2O, pet. ether.

B,HCl : cryst. M.p. 181°.

B_2,H_2SO_4 : prisms. M.p. 183–6°.

N-*Benzoyl* : cryst. M.p. 120–1°.

N-m-*Nitrobenzoyl* : cryst. M.p. 160–1°.

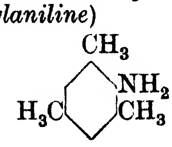
Chloroplatinate : yellow needles. M.p. 187–8°.

Chloroaurate : orange needles. M.p. 140–1° decomp.

Picrate : yellow needles. M.p. 222° (216–18°).

Späth, *Monatsh.*, 1919, **40**, 139.
Jansen, *Rec. trav. chim.*, 1931, **50**, 617.
Slotta, Szyszka, *J. prakt. Chem.*, 1933, **137**, 339; *Ber.*, 1934, **67**, 1106.
Hahn, Wassmuth, *Ber.*, 1934, **67**, 696.
Hahn, *ibid.*, 1210.

Mesidine (*Aminomesitylene*, *mesitylamine*, 2 : 4 : 6-*trimethylaniline*)



$C_9H_{13}N$ MW, 135

B.p. 232–3°.

N-*Acetyl* : prisms from EtOH. M.p. 216–17°. Sublimes undecomp.

N-*Benzoyl* : needles. M.p. 204°.

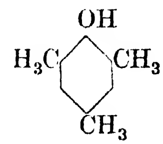
N-m-*Nitrobenzoyl* : prisms from EtOH. M.p. 205–6°.

p-*Toluenesulphonyl* : needles from EtOH. M.p. 167°.

Picrate : yellow prisms from EtOH–pet. ether. M.p. 189–91°.

Ladenburg, *Ann.*, 1876, **179**, 172.
Fittig, Storer, *Ann.*, 1868, **147**, 3.
Hübner, v. Schack, *Ber.*, 1877, **10**, 1711.
Hey, *J. Chem. Soc.*, 1931, 1590.

Mesitol (*Hydroxymesitylene*, 2 : 4 : 6-*trimethylphenol*)



$C_9H_{12}O$ MW, 136

Needles. M.p. 69°. B.p. 220°. Sublimes. Volatile in steam. Sol. EtOH, Et_2O. Spar. sol. H_2O. Sol. caustic alkalis. Insol. NH_4OH, alkali carbonates. $k = 0{\cdot}17 \times 10^{-10}$ at 25°. Ethyl nitrite ⟶ 4-hydroxy-3 : 5-dimethylbenzaldehyde. KOH fusion ⟶ 2-hydroxy-3 : 5-dimethylbenzoic acid. Dehydrogenation ⟶ 3 : 5 : 3′ : 5′-tetramethylstilbenequinone.

Me ether : 2 : 4 : 6-trimethylanisole. $C_{10}H_{14}O$. MW, 150. B.p. 200–3°. D_4^{14} 0·9530. n_D^{14} 1·5016.

Acetyl : b.p. 236°.

Phenylurethane : m.p. 141–2°.

Porter, Thurber, *J. Am. Chem. Soc.*, 1921, **43**, 1194.
Auwers, Bundesmann, Wieners, *Ann.*, 1926, **447**, 193.

Mesitonic Acid (1 : 1-*Dimethyl-levulinic acid*, *acetopivalic acid*)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}\underset{CH_3}{\overset{CH_3}{C}}{\cdot}COOH$$

$C_7H_{12}O_3$ MW, 144

Prisms from H_2O. M.p. 75·5–76·5°. B.p. 138°/15 mm. Sol. H_2O, EtOH, Et_2O, C_6H_6. Spar. sol. ligroin. NaOBr ⟶ 1 : 1-dimethylsuccinic acid. Dil. HNO_3 ⟶ dimethylmalonic acid.

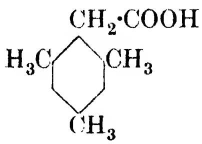
Et ester : $C_9H_{16}O_3$. MW, 172. B.p. 210°.

Oxime : cryst. from C_6H_6. M.p. 93–4°. Very sol. H_2O, EtOH, Et_2O. Sol. C_6H_6.

Semicarbazone: cryst. from EtOH.Aq. M.p. 197·5° decomp.
Phenylhydrazone: cryst. from EtOH. M.p. 135°.

Lapworth, *J. Chem. Soc.*, 1904, **85**, 1220.
Toivonen, *Ann.*, 1919, **419**, 208.
Wallach, Kempe, *Ann.*, 1903, **329**, 99.

Mesitylacetic Acid (2 : 4 : 6-*Trimethylphenylacetic acid*)

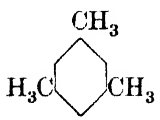


$C_{11}H_{14}O_2$ MW, 178

Needles from ligroin or EtOH.Aq. M.p. 166–8° (164°). Sol. hot H_2O, EtOH, Et_2O. Sublimes in needles.
Me ester: $C_{12}H_{16}O_2$. MW, 192. B.p. 255–6°.
Amide: $C_{11}H_{15}ON$. MW, 177. Plates from H_2O. M.p. 209–10°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$.

Willgerodt, Scholtz, *J. prakt. Chem.*, 1910, **81**, 386.
Meyer, Sudborough, *Ber.*, 1894, **27**, 1587.

Mesityl Aldehyde.
See 2 : 4 : 6-Trimethylbenzaldehyde.
Mesitylamine.
See 3 : 5-Dimethylbenzylamine *and* Mesidine.
Mesityl bromide.
Bromomesitylene, *q.v.*
Mesitylene (1 : 3 : 5-*Trimethylbenzene*)

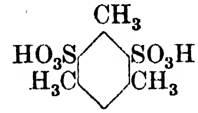


C_9H_{12} MW, 120

Colourless liq. M.p. — 53·5° (— 54·4°). B.p. 164·8–164·9°. $D_4^{17\cdot0}$ 0·8646, D_4^{20} 0·8634. n_D^{20} 1·4967.
Picrate: yellow cryst. M.p. 96·6°.

Ipat'ev, Dolgov, Volnov, *Ber.*, 1930, **63**, 3072.
Baril, Hauber, *J. Am. Chem. Soc.*, 1931, **53**, 1087.
Adams, Hufferd, *Organic Syntheses*, Collective Vol. I, 334.
Tishchenko, *Bull. soc. chim.*, 1933, **53**, 1428.

Mesitylene-disulphonic Acid

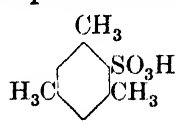


$C_9H_{12}O_6S_2$ MW, 280

Hygroscopic needles.
Na salt: needles + $1\frac{1}{2}H_2O$.
K salt: needles + $2H_2O$ from 80—90% EtOH.
Cu salt: green needles. Decomp. at 120—30°.
Ba salt: needles + $3H_2O$ from H_2O. Decomp. at 115°.
Di-phenyl ester: m.p. 110–11°.
Diamide: $C_9H_{14}O_4N_2S_2$. MW, 278. Cryst. M.p. 244°.
Dichloride: $C_9H_{10}O_4Cl_2S_2$. MW, 317. M.p. 125°.
Dianilide: m.p. 150–1°.

Hollemann, Choufoer, Alozevy, *Rec. trav. chim.*, 1929, **48**, 1075.
Barth, Hertzig, *Monatsh.*, 1880, **1**, 808.
Steinkopf *et al.*, *J. prakt. Chem.*, 1927, **117**, 43.
Backer, *Rec. trav. chim.*, 1935, **54**, 544.

Mesitylene-sulphonic Acid



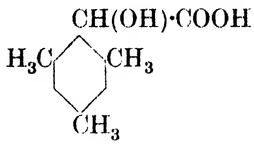
$C_9H_{12}O_3S$ MW, 200

Cryst. from $CHCl_3$. M.p. 78°. Sol. 50% H_2SO_4, warm HCl, $CHCl_3$. Decomp. slowly at 60°.
Amide: $C_9H_{13}O_2NS$. MW, 199. Needles from H_2O or EtOH. M.p. 141–2°. Sublimes.
Methylamide: $C_{10}H_{15}O_2NS$. MW, 213. Needles from EtOH. M.p. 89–90°.
Dimethylamide: $C_{11}H_{17}O_2NS$. MW, 227. Needles from EtOH.Aq. M.p. 45°.
Ethylamide: cryst. from EtOH. M.p. 75°.
Fluoride: $C_9H_{11}O_2FS$. MW, 202. M.p. 73–73·5°. B.p. 125°/12 mm.
Chloride: $C_9H_{11}O_2ClS$. MW, 218·5. Plates from Et_2O. M.p. 57°. Very sol. EtOH, Et_2O.

See last two references above and also
Schreinemakers, *Rec. trav. chim.*, 1897, **16**, 415.
Meyer, *Monatsh.*, 1913, **34**, 573.
Smith, Cass, *J. Am. Chem. Soc.*, 1932, **54**, 1606.

Mesitylenic Acid.
See 3 : 5-Dimethylbenzoic Acid.
Mesitylenic Aldehyde.
See 3 : 5-Dimethylbenzaldehyde.

Mesitylglycollic Acid (2 : 4 : 6-*Trimethylmandelic acid*, 2 : 4 : 6-*trimethylphenylglycollic acid*)



$C_{11}H_{14}O_3$ MW, 194

Plates from H_2O. M.p. 152° (147°). Sol. EtOH, Et_2O. Spar. sol. cold H_2O. Conc. H_2SO_4 ⟶ intense red sol.

Me ester: $C_{12}H_{16}O_3$. MW, 208. Cryst. from ligroin. M.p. 92°.

Feith, *Ber.*, 1891, **24**, 3545.
Meyer, Molz, *Ber.*, 1897, **30**, 1274.

Mesitylglyoxylic Acid.

See 2 : 4 : 6-Trimethylbenzoylformic Acid.

Mesityl oxide (*Isopropylidene-acetone*, 2-*methyl*-2-*pentenone*-4, 4-*keto*-2-*methylpentene*-2)

$$CH_3{\cdot}CO{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_3$$

$C_6H_{10}O$ MW, 98

B.p. 130–1°, 129·5–130°/750 mm., 62·5°/82 mm., 50°/37 mm., 41°/23 mm., 34–5°/11 mm. D_4^{20} 0·86532, D_4^{25} 0·8510, D_4^{122} 0·7590. n_α^{13} 1·44478, n_D^{13} 1·44840.

Oxime: α-*form*, b.p. 84°/11 mm. D_4^{20} 0·876. n_{He}^{20} 1·450. *Acetyl*: b.p. 101°/11 mm. D_4^{20} 0·986. n_{He}^{20} 1·474. β-*Form*: b.p. 95°/11 mm. D_4^{20} 0·881. n_{He}^{20} 1·462. *Acetyl*: b.p. 107°/14 mm. D_4^{20} 0·990. n_{He}^{20} 1·478.

Semicarbazone: α-*form*, cryst. from C_6H_6. M.p. 164°. Exposure to ultra-violet light ⟶ β-form (partly). β-*Form*: cryst. from C_6H_6. M.p. 133–4°.

p-*Nitrophenylhydrazone*: orange needles from EtOH.Aq. M.p. 207°.

2 : 4-*Dinitrophenylhydrazone*: carmine cryst. from EtOH. M.p. 200°.

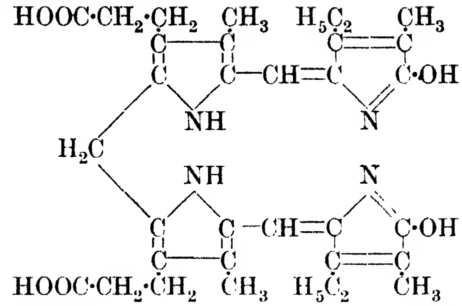
Semi-oxamazone: cryst. from EtOH. M.p. 163–4°.

Dichloride: *see* Methyl 1 : 2-dichloroisobutyl Ketone.

Hydrobromide: *see* Methyl 2-bromoisobutyl Ketone.

Wilson, Pickering, *J. Chem. Soc.*, 1923, **123**, 394.
Wilson, Heilbron, *J. Chem. Soc.*, 1913, **103**, 379.
Auwers, Ottens, *Ber.*, 1924, **57**, 446.
Allen, *J. Am. Chem. Soc.*, 1930, **52**, 2958.
Conant, Tuttle, *Organic Syntheses*, Collective Vol. I, 338.

Mesobilirubin



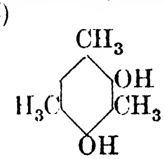
$C_{33}H_{40}O_6N_4$ MW, 588

Needles from Py or prisms from $CHCl_3$. M.p. 315° decomp. Spar. sol. most org. solvents except Py or $CHCl_3$.

Di-Me ester, hydrochloride: $C_{35}H_{44}O_6N_4{,}2HCl$. MW, 689. Cryst. M.p. 190°.

Fischer, Niemann, *Z. physiol. Chem.*, 1923, **127**, 317.
Fischer, Hess, *Z. physiol. Chem.*, 1931, **194**, 193.
Fischer, Adler, *Z. physiol. Chem.*, 1931, **200**, 209.

Mesorcinol (*Dihydroxymesitylene*, 2 : 4 : 6-*trimethylresorcinol*)



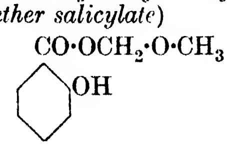
$C_9H_{12}O_2$ MW, 152

Plates. M.p. 149–50°. B.p. 274·5–275·5°. Very sol. EtOH, Et_2O. Sol. C_6H_6. Spar. sol. H_2O.

Diacetyl: plates from EtOH. M.p. 63°. B.p. 305° decomp. Very sol. EtOH, Et_2O. Spar. sol. H_2O.

Knecht, *Ann.*, 1882, **215**, 100.

Mesotan (*Methoxymethyl salicylate*, *methyleneglycol methyl ether salicylate*)



$C_9H_{10}O_4$ MW, 182

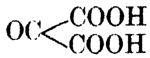
Oil. B.p. 162°/42 mm., 153°/32 mm. Misc. with EtOH, Et_2O, $CHCl_3$, C_6H_6, and fats. Spar. sol. H_2O. Dil. acids ⟶ salicylic acid + formaldehyde + methyl alcohol.

Bayer, D.R.P., 137,585, (*Chem. Zentr.*, 1903, i, 112).
Eichengrun, *Chem. Zentr.*, 1902, II, 1387.

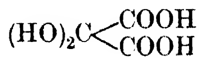
Mesotartaric Acid

See under Tartaric Acid.

Mesoxalic Acid (*Ketomalonic acid, dihydroxymalonic acid*)



(i)



(ii)

$C_3H_2O_5$ ($C_3H_4O_6$) MW, 118 (136)

Exists in free state as dihydroxymalonic acid (ii). Cryst. M.p. 121° (119–21°). Very sol. EtOH, Et_2O. Reduces $NH_3.AgNO_3$. $KMnO_4$ ⟶ oxalic acid. Conc. KOH ⟶ oxalic acid + formic acid. NaHg ⟶ tartronic acid. Boiling H_2O ⟶ glyoxylic acid + CO_2.

Hydrazone: cryst. from C_6H_6–pet. ether. M.p. 80°. B.p. 100°/0·15 mm.

Oxime: *see* Isonitrosomalonic Acid.

Phenylhydrazone: cryst. from EtOH. M.p. 160–4°.

o-*Chlorophenylhydrazone*: yellow prisms. M.p. 187°.

p-*Chlorophenylhydrazone*: yellow prisms. M.p. 192–3°.

2 : 4-*Dichlorophenylhydrazone*: yellow prisms. M.p. 188°.

2 : 4 : 6-*Trichlorophenylhydrazone*: yellow cryst. M.p. 182°.

p-*Bromophenylhydrazone*: yellow prisms. Decomp. without melting.

2 : 4-*Dibromophenylhydrazone*: yellow prisms. M.p. 205°.

p-*Nitrophenylhydrazone*: m.p. 202°.

o-*Tolylhydrazone*: yellow prisms. M.p. 171–2°.

p-*Tolylhydrazone*: yellow prisms. M.p. 178°.

Di-Et acetal: diethoxymalonic acid. $C_7H_{12}O_6$. MW, 192. Needles from C_6H_6. M.p. 160°. Very sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6. *Di-Et ester*: $C_{11}H_{20}O_6$. MW, 248. Plates from EtOH. M.p. 43–4°. B.p. 228°/762 mm.

Di-Me ester: *ketomalonic*, $C_5H_6O_5$. MW, 146. Oil. B.p. 106°/40 mm. D^{27} 1·2464. *Dihydroxymalonic*: $C_5H_8O_6$. MW, 164. Cryst. from C_6H_6 or pet. ether. M.p. 81°. Very sol. H_2O. Sol. EtOH, Et_2O, C_6H_6.

Di-Et ester: *ketomalonic*, $C_7H_{10}O_5$. MW, 174. Oil. B.p. 117°/31 mm., 105–7°/19 mm. $D_4^{15·6}$ 1·1419. $n_D^{15·6}$ 1·419. *Hydrazone*: plates or prisms from C_6H_6. M.p. 78°. B.p. 176°/20 mm. 2 : 4-*Dinitrophenylhydrazone*: yellow cryst. M.p. 128°. *Dihydroxymalonic*: $C_7H_{12}O_6$. MW, 192. Cryst. from C_6H_6. M.p. 57°. Very sol. H_2O. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. ligroin, C_6H_6. *Diacetyl*: needles from Et_2O. M.p. 145° decomp.

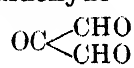
Dianilide: yellow powder. M.p. 190° after sintering at 163°.

Di-o-*toluidide*: needles from H_2O. M.p. 127–31°.

Di-p-*toluidide*: yellow powder. M.p. 187°.

Auwers, Marburg, *Ber.*, 1918, 51, 1116.
Staudinger, Hammet, *Helv. chim. acta*, 1921, **4**, 217.
Chattaway, Harris, *J. Chem. Soc.*, 1922, **121**, 2703.
Auwers, Heyna, *Ann.*, 1923, 434, 165.
Stevens, Ward, *J. Chem. Soc.*, 1924, **125**, 1324.
Gilman, Johnson, *J. Am. Chem. Soc.*, 1928, **50**, 3341.
Corson, Hazen, *Organic Syntheses*, 1930, X, 54.
Nef, *Ann.*, 1892, **270**, 315.
Curtiss, *Am. Chem. J.*, 1906, **35**, 478.
Conrad, Reinbach, *Ber.*, 1902, **35**, 1819.

Mesoxalic Dialdehyde



$C_3H_2O_3$ MW, 86

Not known in the free state. Sol. H_2O. Reduces Fehlings.

Hydrate: $C_3H_4O_4$. MW, 104. Viscous syrup.

Dioxime: *see* Di-isonitrosoacetone.

p-*Nitrophenylhydrazone*: brown plates from EtOH. M.p. 178°.

Harries, Turk, *Ann.*, 1910, **374**, 352.

Mesoxalylurea.

See Alloxan.

Metaboranilide.

See Boranilide.

Metacrolein

$(CH_2{:}CH{\cdot}CHO)_3$

$C_9H_{12}O_3$ MW, 168

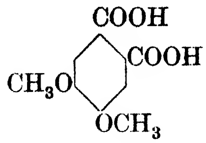
Plates from EtOH. M.p. 50° (45–6°). Sol. EtOH, Et_2O. Very spar. sol. hot H_2O. Volatile in steam. Very feeble aldehydic properties. Dry HCl ⟶ 2-chloropropionaldehyde. Conc. HCl ⟶ acrolein.

Geuther, Cartmell, *Ann.*, 1859, **112**, 6.
Grimaux, Adam, *Compt. rend.*, 1881, **92**, 301.

Metaformaldehyde.

See Trioxymethylene.

Metahemipinic Acid (4 : 5-*Dimethoxyphthalic acid, veratrol*-4 : 5-*dicarboxylic acid*)



$C_{10}H_{10}O_6$ MW, 226

Needles from conc. aq. sol. Prisms + $2H_2O$ from dil. aq. sol. M.p. 174–5° (179–82° rapid heat.). Spar. sol. H_2O. $k = 1{\cdot}4 \times 10^{-3}$ at 25°. HI + P ⟶ 4 : 5-dihydroxyphthalic acid. Conc. HNO_3 ⟶ 4 : 5-dinitroveratrol. KOH fusion ⟶ protocatechuic acid.

Mono-Et ester : $C_{12}H_{14}O_6$. MW, 254. Cryst. from EtOH. M.p. 127°.

Di-Et ester : $C_{14}H_{18}O_6$. MW, 282. Oil. Sol. EtOH, Et_2O.

Mono-Et amide : $C_{12}H_{15}O_5N$. MW, 253. Cryst. from EtOH. Decomp. on heating.

Anhydride : $C_{10}H_8O_5$. MW, 208. M.p. 175°.

Rossin, *Monatsh.*, 1891, **12**, 489, 499.
Goldschmiedt, *Monatsh.*, 1888, **9**, 339.
Perkin, Weizmann, *J. Chem. Soc.*, 1906, **89**, 1651.
Mason, Perkin, *J. Chem. Soc.*, 1914, **105**, 2020.
Meldrum, Parikh, *Brit. Chem. Abstracts*, 1935, 619.

Metaldehyde

$(C_2H_4O)_n$

$(C_2H_4O)_n$ MW, $(44)_n$

Polymer of acetaldehyde. The degree of polymerisation, *n*, varies from 4 (in phenol) to 6 (in thymol).

Needles or prisms from EtOH. M.p. 246·2°. Sol. hot $CHCl_3$. Spar. sol. EtOH, Et_2O, C_6H_6, cold $CHCl_3$. Sublimes. Dil. H_2SO_4 ⟶ acetaldehyde. Cl ⟶ chloral. Does not form derivs. with hydroxylamine.

Haushofer, *Jahresber. Fortschr. Chem.*, 1882, 362.
Smits, De Leeuw, *Z. physik. Chem.*, 1911, **77**, 269.
Kekulé, Zincke, *Ann.*, 1872, **162**, 146.
Hanriot, Oeconomides, *Ann. Chim.*, 1882, **25**, 227.

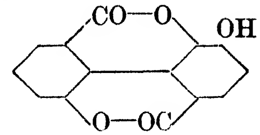
Metanethole.
See under Anethole.

Metanilic Acid.
See Aniline-*m*-sulphonic Acid.

Metasaccharic Acid.
See under Mannosaccharic Acid.

Metastyrene.
See under Styrene.

Metellagic Acid



$C_{14}H_6O_5$ MW, 254

Needles from AcOH. M.p. 273–6°. Sublimes. Sol. hot Py. Alkalis ⟶ yellow col.

Acetyl : leaflets. M.p. 269–71°.

Perkin, Nierenstein, *J. Chem. Soc.*, 1905, **87**, 1426.

Meteloidine

$C_{13}H_{21}O_4N$ MW, 255

Alkaloid from *Datura meteloides*. Needles from C_6H_6. M.p. 141–2°. Sol. EtOH, $CHCl_3$. Spar. sol. H_2O, Et_2O, C_6H_6. $Ba(OH)_2$ ⟶ tiglic acid + teloidine.

B,HBr : needles + $2H_2O$. M.p. 250°.

B,HAuCl₄ : needles + $\frac{1}{2}H_2O$. M.p. 149–50°.

Picrate : plates. M.p. 177–80°.

Pyman, Reynolds, *J. prakt. Chem.*, 1901, **64**, 274.

Methacetin.
p-Acetanisidide. *See under* *p*-Anisidine.

Methacrylic Acid.
See 1-Methylacrylic Acid.

Methanal.
See Formaldehyde.

Methane (*Marsh gas*)

CH_4

CH_4 MW, 16

Occurs widely distributed in nature. Colourless gas. Liq. at − 11° and 180 atm. Solidifies in liquid air. Needles. M.p. − 184°. B.p. − 164°/760 mm., − 130·9°/6·7 atm., − 113·4°/16·4 atm. D^0 0·5547, $D^{-164°}$ 0·466 (air = 1). Sol. H_2O, MeOH, most org. solvents. Sp. heat 8·50 Cal./mol at 15°, 8·08 Cal./mol at − 80°. Dielectric constant 1·00212 at − 154° and 760 mm., 1·000886 at 0° and 760 mm. Stable at 480°. At 1000° ⟶ C + H_2O. Decomp. at 470–570° in presence of Ni or CO. Forms explosive mixtures with air. O_3 at 100° ⟶ H·CHO + H·COOH. Reacts with F at − 187°. Cl in sunlight ⟶ CH_3Cl, CH_2Cl_2, $CHCl_3$, and

CCl_4. $COCl_2$ in presence of C at 400° ⟶ CH_3Cl.

Moissan, Chavanne, *Compt. rend.*, 1905, **140**, 409.
Wroblewski, *Jahresber. Fortschr. Chem.*, 1884, 197.
Heuse, *Ann. phys.*, 1919, **59**, 92.
Bone, Coward, *J. Chem. Soc.*, 1908, **93**, 1206.
Mayer, Altmayer, *Ber.*, 1907, **40**, 2139.
Hansmann, D.R.P., 214,155, (*Chem. Zentr.*, 1909, II, 1510).
Drugman, *J. Chem. Soc.*, 1904, **89**, 941.
Walter, D.R.P., 222,919, (*Chem. Zentr.*, 1910, II, 255).
Hochstetter, D.R.P., 292,089, (*Chem. Zentr.*, 1916, II, 39).

Methane Base.

See 4 : 4′-Tetramethyldiaminodiphenylmethane.

Methane-disulphonic Acid.

See Methionic Acid.

Methane-sulphonic Acid (*Methylsulphonic acid, sulphomethane*)

$CH_3{\cdot}SO_3H$

CH_4O_3S MW, 96

B.p. 167–167·5°/10 mm. D_4^{18} 1·4812. Electrolysis ⟶ CO_2, K_2SO_4, and $K_2S_2O_8$. Heat in strong acid sol. ⟶ formaldehyde.

NH_4 salt: plates. Sol. H_2O.

Me ester: $C_2H_6O_3S$. MW, 110. B.p. 202·7–203°/748 mm. D_0^0 1·3206.

Et ester: $C_3H_8O_3S$. MW, 124. B.p. 85–6°/10 mm. Spar. sol. H_2O.

Anhydride: $C_2H_6O_5S_2$. MW, 174. Prisms from Et_2O. M.p. 71°. B.p. 138°/10 mm. Sol. $CHCl_3$, C_6H_6, hot Et_2O.

Chloride: CH_3O_2ClS. MW, 114·5. B.p. 161–161·5°/730 mm. D_4^{18} 1·48053. Insol. H_2O.

Amide: CH_5O_2NS. MW, 95. Prisms from H_2O. M.p. 88°.

Billeter, *Ber.*, 1905, **38**, 2013.
Fichter, Lichtenhahn, *Ber.*, 1915, **48**, 1961.
Arbusow, *J. Russ. Phys.-Chem. Soc.*, 1909, **41**, 444.

Methane-tetracetic Acid (2 : 2-*Di-[carboxymethyl]-glutaric acid, tetracarboxytetramethylmethane, tetramethylmethane-tetracarboxylic acid*)

$(HOOC{\cdot}H_2C)_2{>}C{<}(CH_2{\cdot}COOH)_2$

$C_9H_{12}O_8$ MW, 248

Rhombohedra from H_2O. M.p. 248°. Sol. Me_2CO. Spar. sol. Et_2O.

Tetra-Me ester: $C_{13}H_{20}O_8$. MW, 304. M.p. 23°. B.p. 192–5°/12 mm.

Tetra-Et ester: $C_{17}H_{28}O_8$. MW, 360. B.p. 211°/20 mm.

Tetrapropyl ester: $C_{21}H_{36}O_8$. MW, 416. B.p. 212–13°/5 mm.

Tetracyclohexyl ester: $C_{33}H_{52}O_8$. MW, 576. Needles from EtOH. M.p. 73·5°.

Tetraphenyl ester: $C_{33}H_{28}O_8$. MW, 552. Leaflets from EtOH. M.p. 116·5°. Very sol. C_6H_6, $CHCl_3$. Sol. EtOH, Et_2O. Spar. sol. pet. ether. Insol. H_2O. Non-volatile in steam.

Tetra-p-nitrophenyl ester: m.p. about 100°.

Tetra-p-tolyl ester: cryst. from EtOH. M.p. 127°.

Tetra-1-naphthyl ester: $C_{49}H_{36}O_8$. MW, 752. Pale yellow needles from EtOH–C_6H_6. M.p. 148°.

Tetra-2-naphthyl ester: yellow needles from EtOH–toluene. M.p. 171·5°.

Tetramenthyl ester: needles from EtOH. M.p. 82–3°.

Tetrachloride: $C_9H_8O_4Cl_4$. MW, 322. Cryst. M.p. about 45°.

Dianhydride: plates from Me_2CO–$CHCl_3$. M.p. 284°.

Ingold, Nickolls, *J. Chem. Soc.*, 1922, **121**, 1645.
Backer, *Rec. trav. chim.*, 1935, **54**, 62.

Methane-triacetic Acid (*Isobutane-tricarboxylic acid, 2-carboxymethylglutaric acid, trimethylmethane-tricarboxylic acid*)

$HOOC{\cdot}H_2C{\cdot}CH{<}(CH_2{\cdot}COOH)_2$

$C_7H_{10}O_6$ MW, 190

Prisms from Et_2O. M.p. 126° (115°). Sol. H_2O, conc. HCl.

Di-Et ester: $C_{11}H_{18}O_6$. MW, 246. *Nitrile*: $C_{11}H_{17}O_4N$. MW, 227. B.p. 158–60°/15 mm.

Tri-Et ester: $C_{13}H_{22}O_6$. MW, 274. B.p. 172–3°/14 mm.

Dianilide: $C_{19}H_{20}O_4N_2$. MW, 340. Needles from AcOH. M.p. 206° (192°).

Ingold, *J. Chem. Soc.*, 1921, **119**, 352.
Dreifuss, Ingold, *J. Chem. Soc.*, 1923, **123**, 2964.
Kohler, Reid, *J. Am. Chem. Soc.*, 1925, **47**, 2808.

Methane-tricarboxylic Acid (*Carboxymalonic acid*)

$HOOC{\cdot}CH{<}(COOH)_2$

$C_4H_4O_6$ **MW, 148**

Tri-Me ester: $C_7H_{10}O_6$. MW, 190. Prisms from MeOH. M.p. 45–6°. B.p. 242·7°, 128°/15 mm. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Sol. dil. alkalis. $FeCl_3 \longrightarrow$ reddish-brown col.

Di-Et ester: $C_8H_{12}O_6$. MW, 204. Decomp. at ord. temps. $\longrightarrow$ malonic ester.

Tri-Et ester: $C_{10}H_{16}O_6$. MW, 232. Cryst. M.p. 27–9°. B.p. 139°/14 mm. $D_4^{14.5}$ 1·1091. $n_D^{14.2}$ 1·42828.

Di-Me mono-Et ester: $C_8H_{12}O_6$. MW, 204. Oil. B.p. 240–1°, 138–9°/12 mm.

Trinitrile: *see* Cyanoform.

Mononitrile di-Et ester: $C_8H_{11}O_4N$. MW, 185. B.p. 120–30°/25 mm. Sol. EtOH, Et_2O, alkalis. Spar. sol. H_2O. D_4^{20} 1·0931. n_D^{20} 1·4263. $k = 3·6 \times 10^{-2}$ at 25°. $KOH \longrightarrow NH_3 +$ malonic acid.

Scholl, Egerer, *Ann.*, 1913, **397**, 362.
Staudinger, Hirzel, *Ber.*, 1917, **50**, 1033; 1916, **49**, 2528.
Auwers, Auffenberg, *Ber.*, 1918, **51**, 1098.
Haller, *Compt. rend.*, 1890, **111**, 54.
Haller, Muller, *Compt. rend.*, 1904, **138**, 445; **139**, 1182.

Methane-trisulphonic Acid

$$HO_3S\cdot CH<^{SO_3H}_{SO_3H}$$

$CH_4O_9S_3$ MW, 256

Needles $+ 4H_2O$ from H_2O. M.p. 150–3°. Sol. H_2O, EtOH. Aq. sol. stable to HNO_3 and Cl.

Bagnall, *J. Chem. Soc.*, 1899, **75**, 278.
Theilkukl, *Ann.*, 1868, **147**, 134.

Methanol.
See Methyl Alcohol.

Methazonic Acid (*Nitro-acetaldoxime*)

$$O_2N\cdot CH_2\cdot CH\colon N\cdot OH$$

$C_2H_4O_3N_2$ MW, 104

Plates from Et_2O, prisms from C_6H_6, leaflets from $CHCl_3$. M.p. 79–80°. Sol. H_2O, EtOH, Et_2O, Me_2CO, hot C_6C_6, hot $CHCl_3$. Decomp. on standing. Red. $\longrightarrow NH_3 + H\cdot COOH$. HCl in $Et_2O \longrightarrow$ chloro-*anti*-glyoxime. $C_6H_5\cdot NH_2$, HCl $\longrightarrow$ hydroxylamine + nitroethylideneaniline. $C_6H_5\cdot NH\cdot NH_2$,HCl $\longrightarrow$ nitroacetaldehyde phenylhydrazone.

Anhydride: *see* Isocyanilic Acid.

Schultze, *Ber.*, 1896, **29**, 2288.
Dunstan, Goulding, *J. Chem. Soc.*, 1900, **77**, 1264.
Meister, *Ber.*, 1907, **40**, 3435.
Steinkopf, *J. prakt. Chem.*, 1910, **81**, 224.

Methebenin.
See under Thebenin.

Methebenol.
See under Thebenol.

1-Methinyl-3-propinyl-propane.
See 1 : 5-Heptadi-ine.

Methionic Acid (*Methane-disulphonic acid*)

$$HO_3S\cdot CH_2\cdot SO_3H$$

$CH_4O_6S_2$ MW, 176

Needles. Decomp. on dist. in high vacuum. At 220–70° and 15–20 mm. $\longrightarrow CO_2$, H_2SO_4, $H_2S_2O_8$, and O_3.

Di-Me ester: $C_3H_8O_6S_2$. MW, 204. Needles. M.p. 47°. B.p. 194–200°/16 mm. Sol. $CHCl_3$, C_6H_6. Spar. sol. Et_2O. Hyd. by hot H_2O.

Di-Et ester: $C_5H_{12}O_6S_2$. MW, 232. Needles from C_6H_6–pet. ether. M.p. 28–9°.

Di-phenyl ester: *see* Methionol.

Di-o-tolylester: *o*-cresomethionol. $C_{15}H_{16}O_6S_2$. MW, 356. Needles from EtOH. M.p. 84°.

Di-m-tolyl ester: *m*-cresomethionol. Cryst. from EtOH. M.p. 56°.

Di-p-tolyl ester: *p*-cresomethionol. Cryst. from EtOH. M.p. 84°.

Dichloride: $CH_2O_4Cl_2S_2$. MW, 213. Exists in two forms. (i) M.p. 8°. B.p. 133°/10 mm. D^{22} 1·821. Sol. Et_2O, $CHCl_3$, C_6H_6. Spar. sol. CCl_4. (ii) Needles or prisms from CCl_4. M.p. 36–7°.

Diamide: $CH_6O_4N_2S_2$. MW, 174. Plates from AcOH. M.p. 233°. Sol. NaOH.

Dianilide: $C_{13}H_{14}O_4N_2S_2$. MW, 326. Cryst. M.p. 192–3°. *Diacetyl*: cryst. from Ac_2O. M.p. 196–7°. *Dibenzoyl*: cryst. from Me_2CO. M.p. 204–5°.

Di-p-nitroanilide: $C_{13}H_{12}O_8N_4S_2$. MW, 416. Yellow prisms from EtOH. M.p. 248–9° decomp.

Di-phenylhydrazide: needles from EtOH. M.p. 118–19° decomp.

Di-benzoylhydrazide: needles from EtOH. M.p. 204–5° decomp.

Schroeter, *Ann.*, 1919, **418**, 161.
Backer, *Rec. trav. chim.*, 1929, **48**, 989.

Methionine (3-*Methylmercapto*-1-*amino*-*butyric acid*)

$$CH_3\cdot S\cdot CH_2\cdot CH_2\cdot CH(NH_2)\cdot COOH$$

$C_5H_{11}O_2NS$ MW, 149

l-.

Hydrolysis product of casein. M.p. 283° decomp., after shrinking and darkening at 278°. $[\alpha]_D^{25} - 6·87°$ in H_2O.

N-*Formyl*: cryst. from EtOH–pet. ether. M.p. 98–9°. $[\alpha]_D^{25} - 10·0°$ in H_2O.

p-*Tolylurea deriv.*: cryst. from EtOH. M.p. 157–8°.
α-Naphthylurea deriv.: m.p. 187–8°.

d-.
$[\alpha]_D^{25}$ + 8·12° in H_2O.

dl-.
M.p. 281° (272°).
N-*Formyl*: cryst. from AcOEt. M.p. 99–100°.
N-*Benzoyl*: cryst. from EtOH.Aq. M.p. 143–5°.
Picrolonate: m.p. 179–80°.

Windus, Marvel, *J. Am. Chem. Soc.*, 1931, **53**, 3490.
Barger, Weichselbaum, *Organic Syntheses*, 1934, XIV, 58.
Mueller, *J. Biol. Chem.*, 1923, **56**, 157.

Methionol (*Methionic acid diphenyl ester*)

$$H_2C<\begin{matrix}SO_2{\cdot}OC_6H_5\\SO_2{\cdot}OC_6H_5\end{matrix}$$

$C_{13}H_{12}O_6S_2$ MW, 328

Needles from CCl_4. M.p. 82°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. pet. ether, H_2O. Sol. dil. alkalis and conc. NH_3. Pptd. unchanged from alk. sol. by dil. acids. Forms metallic salts.
C-*Benzoyl*: m.p. 96°.

Schroeter, *Ann.*, 1919, **418**, 204, 235.

Methone.
See 1 : 1-Dimethylcyclohexanedione-3 : 5.

Methose.
See α-Acrose.

Methoxyacetic Acid (*Glycollic acid methyl ether*)

$$CH_3O{\cdot}CH_2{\cdot}COOH$$

$C_3H_6O_3$ MW, 90

B.p. 203–4°, 96·5°/13 mm. D_4^{20} 1·1768. n_D^{20} 1·41677. $k = 2{\cdot}94 \times 10^{-4}$ at 25°. Electrolysis ⟶ formaldehyde and formic acid.
Me ester: $C_4H_8O_3$. MW, 104. B.p. 131°. D_4^{15} 1·0578. n_D^{20} 1·39636.
Et ester: $C_5H_{10}O_3$. MW, 118. B.p. 143·9°/747 mm. D^{15} 1·0118.
Propyl ester: $C_6H_{12}O_3$. MW, 132. B.p. 165°. D^{15} 0·9897.
Amide: $C_3H_7O_2N$. MW, 89. Cryst. from H_2O. M.p. 96·5° (92°).
Nitrile: C_3H_5ON. MW, 71. B.p. 120°. D_4^{28} 0·9373. n_D^{28} 1·380. Insol. H_2O. Sol. acids and alkalis.
Anhydride: $C_6H_{10}O_5$. MW, 162. B.p. 124–8°/20 mm.
Anilide: $C_9H_{11}O_2N$. MW, 165. Needles from pet. ether. M.p. 58°. B.p. 185–8°/40 mm.

Lambling, *Bull. soc. chim.*, 1897, **17**, 357.
Palomaa, *Chem. Zentr.*, 1912, II, 596; 1913, II, 1959; *Ber.*, 1909, **42**, 1300.
Gauthier, *Ann. chim. phys.*, 1909, **16**, 302.
Saarrow, Allen, *Organic Syntheses*, 1933, XIII, 56.

Methoxyacetone (*Acetol methyl ether, methyl acetonyl ether, acetyldimethyl ether*)

$$CH_3{\cdot}O{\cdot}CH_2{\cdot}CO{\cdot}CH_3$$

$C_4H_8O_2$ MW, 88

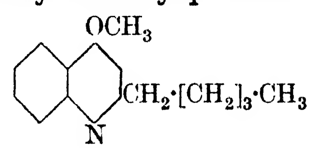
Colourless liq. B.p. 114°/732 mm. D^{20} 0·9570. Sol. H_2O and most org. solvents. Reduces Fehling's. Forms add. comps. with rare earths.
p-*Nitrophenylhydrazone*: yellow needles from C_6H_6–ligroin. M.p. 101–2°.

Gauthier, *Ann. chim. phys.*, 1908, **16**, 318.
Henry, *Compt. rend.*, 1904, **138**, 971.

Methoxyacetophenone.
See under Hydroxyacetophenone *and* Phenacyl Alcohol.

4-Methoxy-1-allylbenzene.
See Esdragol.

4-Methoxy-2-*n*-amylquinoline



$C_{15}H_{19}ON$ MW, 229

Constituent of alkaloids of *Cusparic trifoliata*. Oil. B.p. 190–200°/14 mm.
B_2,H_2PtCl_6: m.p. 220° (in vacuum).
Picrate: cryst. from MeOH. M.p. 132°.

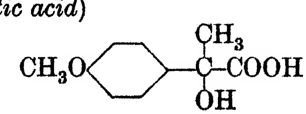
Späth, Pikl, *Ber.*, 1929, **62**, 2244; *Monatsh.*, 1930, **55**, 352.

Methoxyanthranilic Acid.
See under Hydroxyanthranilic Acid.

Methoxyanthraquinone.
See under Hydroxyanthraquinone.

Methoxyanthrone.
See under Oxanthranol.

***p*-Methoxyatrolactinic Acid** (1-p-*Methoxyphenyl-lactic acid*)



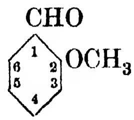
$C_{10}H_{12}O_4$ MW, 196

d-.
Cryst. from C_6H_6. M.p. 146–7°. $[\alpha]_{5461}^{25}$ + 61·0° in EtOH.

l-.
Needles from EtOH. M.p. 146–7°. $[\alpha]^{25}_{5461}$ − 61·7° in EtOH.

McKenzie, Ritchie, *Biochem. Z.*, 1932, **250**, 376.

o-Methoxybenzaldehyde (*Salicylaldehyde methyl ether*)



$C_8H_8O_2$ MW, 136

Prisms. M.p. 36·3°. B.p. 236°, 124–5°/18 mm. D^4_4 1·1445, D^{15}_{15} 1·1354, $D^{20\cdot2}_4$ 1·1326. Sol. Et_2O, $CHCl_3$. Spar. sol. EtOH, C_6H_6. Insol. H_2O. n^{20}_D 1·560. Conc. H_2SO_4 ⟶ yellow sol.

Oxime: exists in two forms. (i) Needles from EtOH.Aq. M.p. 92°. *Me ether*: liq. B.p. 125–7°/16 mm. Volatile in steam. *Acetyl*: cryst. from Et_2O. M.p. 40°. 2 : 4-*Dinitrophenyl ether*: m.p. 184° decomp. p-*Nitrobenzyl ether*: very pale yellow prisms from EtOH. M.p. 88°. N-p-*Nitrobenzyl*: very pale yellow cryst. M.p. 141°. (ii) Cryst. M.p. 143° decomp.

Diacetyl: *o*-methoxybenzylidene diacetate. Prisms. M.p. 75°.

m-*Nitrophenylhydrazone*: reddish-orange cryst. M.p. 176°.

p-*Nitrophenylhydrazone*: brick-red cryst. M.p. 204–5°.

Diphenylenehydrazone: needles from AcOH. M.p. 147–8°.

Anil: yellowish-red oil. B.p. 330–4°, 235–6°/30 mm. Solidifies in freezing mixture.

Scholl, Hilgers, *Ber.*, 1903, **36**, 648.
Posner, *J. prakt. Chem.*, 1910, **82**, 430.
Auwers, *Ann.*, 1915, **408**, 239.
Fear, Menzies, *J. Chem. Soc.*, 1926, 939.
Brady, Klein, *J. Chem. Soc.*, 1927, 874.
Copisarow, *J. Chem. Soc.*, 1929, 588.

m-Methoxybenzaldehyde.

B.p. 230°, 143·5°/50 mm. D^{20}_4 1·1187, D^{14}_4 1·1244. $n^{13\cdot8}_D$ 1·557, n^{20}_D 1·5530. Volatile in steam. Conc. H_2SO_4 ⟶ yellow sol.

Oxime: cryst. from pet. ether. M.p. 39–40°.

Hydrazine deriv. yellow liq. B.p. 174–5°/21 mm.

p-*Nitrophenylhydrazone*: m.p. 171°.

Anil: oil. B.p. 223–5°/18 mm.

Phenylthiosemicarbazone: needles. M.p. 153°.

Posner, *J. prakt. Chem.*, 1910, **82**, 431.
Brady, Dunn, *J. Chem. Soc.*, 1914, **105**, 2412.

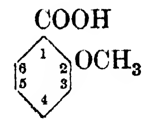
p-Methoxybenzaldehyde.

See Anisaldehyde.

4-Methoxybenzanthrone.

See under 4-Hydroxybenzanthrone.

o-Methoxybenzoic Acid (*Salicylic acid methyl ether*)



$C_8H_8O_3$ MW, 152

Plates from H_2O. M.p. 100–1° (98·5°). Very sol. EtOH, Et_2O. Sol. 200 parts H_2O at 30°. $k = 8{\cdot}2 \times 10^{-5}$ at 25°. Electrolytic reduction ⟶ *o*-methoxybenzyl alcohol. Strong antiseptic and antipyretic.

Me ester: $C_9H_{10}O_3$. MW, 166. B.p. 245–6°, 127–127·5°/11 mm. D^{19}_4 1·1571. $n^{19\cdot5}_D$ 1·534. NH_3.Aq. at 150° ⟶ *o*-methoxybenzamide. KOH ⟶ methyl salicylate.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 246–8°/732 mm., 135–6°/12 mm. D^4_4 1·1256, $D^{14\cdot55}_4$ 1·1156. $n^{14\cdot55}_D$ 1·524.

Phenyl ester: $C_{14}H_{12}O_3$. MW, 228. Prisms from EtOH. M.p. 59°. Very sol. EtOH, Et_2O.

l-*Menthyl ester*: cryst. from EtOH. M.p. 42°. B.p. 226°/12 mm. D^{20}_4 1·045 (super-cooled), D^{100} 0·9823. $[\alpha]^{21}_D$ − 51·08° (super-cooled), $[\alpha]^{100}_D$ − 53·37°. Triboluminescent.

p-*Phenylphenacyl ester*: cryst. M.p. 131°.

Chloride: $C_8H_7O_2Cl$. MW, 170·5. B.p. 254°, 128°/11 mm.

Nitrile: C_8H_7ON. MW, 133. M.p. 24·5°. B.p. 255–6°, 188°/98 mm., 140°/18 mm. D^{15} 1·237 (solid), D^{15}_{15} 1·095 (liq.). Volatile in steam.

Amide: $C_8H_9O_2N$. MW, 151. Plates from H_2O, prisms from Et_2O, needles from C_6H_6. M.p. 129° (127°). Distils undecomp. Conc. H_2SO_4 ⟶ yellow sol. N-*Benzoyl*: needles from EtOH. M.p. 144–5°. Sol. $CHCl_3$. Mod. sol. EtOH, C_6H_6. Spar. sol. Et_2O.

Anilide: $C_{14}H_{13}O_2N$. MW, 227. Cryst. M.p. 131°.

Graebe, *Ann.*, 1905, **340**, 210.
Auwers, *Ann.*, 1915, **408**, 253.
Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1739.
McConnan, Titherley, *J. Chem. Soc.*, 1906, **89**, 1332.
Miller, *Ber.*, 1889, **22**, 2800.

m-Methoxybenzoic Acid.

Needles from H_2O. M.p. 110° (105°). B.p. 170–2°/10 mm. Sol. EtOH, hot H_2O, Et_2O. Electrolytic reduction ⟶ *m*-methoxybenzyl alcohol.

Me ester: oil. B.p. 236–8°, 121–4°/10 mm. D^{20} 1·131. n_D 1·52236.

Et ester: b.p. 250–2°, 158–10°/43·5 mm. D_4^4 1·1147, $D_4^{16\cdot4}$ 1·1032. $n_D^{16\cdot4}$ 1·517.

l-*Menthyl ester*: b.p. 236–7°/30 mm. D_4^{20} 1·034, D_4^{100} 0·9766. $[\alpha]_D^{20}$ – 85·39°, $[\alpha]_D^{100}$ – 83·69°.

Chloride: b.p. 242–3°/733 mm.

Ullmann, Goldberg, *Ber.*, 1902, **35**, 2813.
Auwers, *Ann.*, 1915, **408**, 254.
Ullmann, Uzbachian, *Ber.*, 1903, **36**, 1805.
Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1740.

***p*-Methoxybenzoic Acid.**
See Anisic Acid.

Methoxybenzoylbenzoic Acid.
See under 2′-Hydroxybenzophenone-2-carboxylic Acid *and* 4′-Hydroxybenzophenone-2-carboxylic Acid.

***p*-Methoxybenzoylcarbinol.**
See under *p*-Hydroxyphenacyl Alcohol.

Methoxybenzoyl cyanide.
See under Hydroxybenzoylformic Acid.

Methoxybenzyl Alcohol.
See Anisyl Alcohol *and under* Saligenin *and* *m*-Hydroxybenzyl Alcohol.

Methoxybenzylamine.
See Anisamine *and under* Salicylamine *and* *m*-Hydroxybenzylamine.

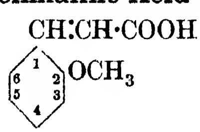
***p*-Methoxybenzyl cyanide.**
See under Homoanisic Acid.

Methoxybenzylideneacetone.
See Anisylideneacetone *and under* *m*-Hydroxybenzylideneacetone *and* Salicylideneacetone.

***p*-Methoxychalkone.**
See Anisylideneacetophenone.

6-Methoxycinchoninic Acid.
See Quininic Acid.

***o*-Methoxycinnamic Acid** (o-*Coumaric acid methyl ether*)



$C_{10}H_{10}O_3$ MW, 178

Trans:

Prisms from EtOH. M.p. 185–6°. Spar. sol. H_2O, MeOH, C_6H_6, ligroin. $k = 2·1 \times 10^{-5}$ at 25°. Polymerises slowly in light. Exposure to ultraviolet light in MeOH or Py ⟶ *cis*-form.

Me ester: $C_{11}H_{12}O_3$. MW, 192. B.p. 303·6°/745 mm., 161–3°/3 mm. $D_4^{16\cdot9}$ 1·1366. $n_D^{16\cdot7}$ 1·5854.

Amide: $C_{10}H_{11}O_2N$. MW, 177. Needles from EtOH. M.p. 194–5° (191–2°).

Cis:

Coumarinic acid methyl ether. Cryst. from EtOH. M.p. 91–2° (88–9°). Very sol. EtOH. Spar. sol. AcOH.Aq., pet. ether. $k = 5·4 \times 10^{-4}$ at 25°. Conc. alkalis in sunlight ⟶ *trans*-form.

Me ester: b.p. 247°/250 mm. D_4^4 1·1494, D_{15}^{15} 1·1406. $n_D^{10\cdot5}$ 1·5718.

Et ester: $C_{12}H_{14}O_3$. MW, 206. B.p. 291–292·5°. $D_4^{16\cdot7}$ 1·1016. $n_D^{16\cdot7}$ 1·5540.

Amide: needles from CS_2. M.p. 62·5–63·5°. Sol. EtOH, Et_2O. Spar. sol. ligroin, CS_2. More sol. than *trans*-form.

Reychler, *Bull. soc. chim.*, 1908, **3**, 552.
Störmer, Friemel, *Ber.*, 1911, **44**, 1843 Note.
Auwers, *Ann.*, 1917, **413**, 267.
Weerman, *Rec. trav. chim.*, 1918, **37**, 5.

***m*-Methoxycinnamic Acid** (m-*Coumaric acid methyl ether*).

Needles from H_2O. M.p. 117°. Very sol. EtOH, Et_2O, C_6H_6. Mod. sol. H_2O.

Me ester: oil. B.p. 305–7°/748 mm.

Posner, *J. prakt. Chem.*, 1910, **82**, 430.

***p*-Methoxycinnamic Acid** (p-*Coumaric acid methyl ether*).

Exists in two forms.

(i) Occurs in roots of *Veronica virginica*, Linn. Needles from EtOH. M.p. 170°. Sol. AcOH. Mod. sol. H_2O, EtOH. Spar. sol. C_6H_6. $k = 2·1 \times 10^{-5}$ at 25°. Ultraviolet light on MeOH or AcOH sols or on alk. sol. ⟶ (ii). Not polymerised by sunlight.

Me ester: $C_{11}H_{12}O_3$. MW, 192. Plates from EtOH. M.p. 90°. B.p. 314–15°/755 mm. Sol. hot EtOH.

Et ester: $C_{12}H_{14}O_3$. MW, 206. Plates from EtOH. M.p. 49–50°. B.p. 315°, 245°/120 mm., 177–80°/12 mm. D_4^{78} 1·0508. $n_D^{59\cdot2}$ 1·562.

Amide: $C_{10}H_{11}O_2N$. MW, 177. Cryst. from EtOH. M.p. 186°. Spar. sol. H_2O.

Chloride: $C_{10}H_9O_2Cl$. MW, 196·5. Cryst. M.p. 50°.

Nitrile: $C_{10}H_9ON$. MW, 159. Cryst. from EtOH. M.p. 64°. B.p. 218–20°/90 mm., 165–72°/18 mm. Very sol. EtOH.

(ii) Cryst. from C_6H_6–pet. ether or H_2O. M.p. 66°. $k = 9·3 \times 10^{-5}$ at 25°. Not polymerised by sunlight. Readily forms liquid crystals.

Amide: cryst. from MeOH. M.p. 129°. Sunlight ⟶ (i).

Knoevenagel, *Ber.*, 1898, **31**, 2606.
Auwers, *Ann.*, 1917, **413**, 268.
Stoermer, *Ber.*, 1911, **44**, 657.
Goldschmidt, Frankel, *Monatsh.*, 1914, **35**, 385.

2-Methoxy-3-cinnamylidene-crotonic Acid.
See Kawaic Acid.

Methoxycoumarin.
See Herniarin *and under* 3-, and 4-Hydroxycoumarin.

6-Methoxy-7 : 8-diethoxycoumarin.
See under Fraxetin.

4-Methoxy-2-[3 : 4-dimethoxyphenyl-ethyl]-quinoline.
See Galipine.

4-Methoxydiphenyl Ether 2-carboxylic Acid.
See under Gentisic Acid.

Methoxydithioformic Acid.
See Methylxanthogenic Acid.

3-Methoxy-4-ethoxyallylbenzene.
See under Eugenol.

3-Methoxy-4-ethoxy-1-propenylbenzene.
See under Isosafroeugenol.

2-Methoxyethylamine (*Methyl 2-aminoethyl ether, ethanolamine methyl ether*)

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_3$

C_3H_9ON MW, 75

B.p. 95°/756 mm. Misc. with H_2O, EtOH. Strong base.
B,HCl : hygroscopic cryst.
Picrolonate : needles. M.p. 235°.
N-Di-Me : methyl dimethylaminoethyl ether. $C_5H_{13}ON$. MW, 103. B.p. 101°/757 mm. D_4^{15} 0·8139, D_4^{20} 0·80988. n_α^{20} 1·95483. Strong base.

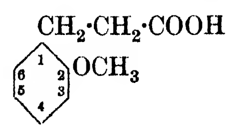
Clarke, *J. Chem. Soc.*, 1912, **101**, 1808.
Traube, Peiser, *Ber.*, 1920, **53**, 1507.

Methoxy-ethylbenzene.
See under Ethylphenol.

5-Methoxy-2-ethyltetrahydrofuran.
See under 3-Hydroxy-*n*-caproic Aldehyde.

Methoxyformamidine.
See O-Methylisourea.

***o*-Methoxyhydrocinnamic Acid** (*Melilotic acid methyl ether, o-hydrocoumaric acid methyl ether*)



$C_{10}H_{12}O_3$ MW, 180

Cryst. from pet. ether. M.p. 92° (87–9°).
Me ester : $C_{11}H_{14}O_3$. MW, 194. B.p. 274–5°/754 mm. 142·5–143°/12 mm. $D_4^{18\cdot4}$ 1·0954. $n_D^{18\cdot4}$ 1·513.
Hydrazide : needles from 25% EtOH. M.p. 83–4°. Sol. EtOH. Spar. sol. Et_2O. Insol. H_2O. *B,HCl* : needles from EtOH–Et_2O. M.p. 166–7°. Sol. H_2O, EtOH, Me_2CO, AcOH.
Amide : $C_{10}H_{13}O_2N$. MW, 179. Needles from EtOH. M.p. 111°.

Pschorr, Einbeck, *Ber.*, 1905, **38**, 2074.
Auwers, *Ann.*, 1918, **415**, 159.
Slotta, Heller, *Ber.*, 1930, **63**, 3036.

***m*-Methoxyhydrocinnamic Acid** (*m-Hydrocoumaric acid methyl ether*).
Needles. M.p. 51° (45°). Very sol. org. solvents.
Chloride : $C_{10}H_{11}O_2Cl$. MW, 198·5. Yellow oil. B.p. 165°/22 mm. Darkens on exposure to air and light.

Tiemann, Ludwig, *Ber.*, 1882, **15**, 2052.
Ingold, Piggott, *J. Chem. Soc.*, 1923, **123**, 1502.

***p*-Methoxyhydrocinnamic Acid** (*Phloretic acid methyl ether, p-hydrocoumaric acid methyl ether*).
Cryst. from EtOH or boiling H_2O. M.p. 104–5°. B.p. 192–4°/15 mm. Sol. EtOH, Et_2O. Sol. 900 parts H_2O at 25°.
Me ester : $C_{11}H_{14}O_3$. MW, 194. Plates from boiling H_2O. M.p. 38°. B.p. 278° (265–70°).
Et ester : $C_{12}H_{16}O_3$. MW, 208. B.p. 152–3°/12 mm.
Chloride : $C_{10}H_{11}O_2Cl$. MW, 198·5. B.p. 161–5°/15 mm.
Amide : $C_{10}H_{13}O_2N$. MW, 179. Prisms from EtOH. M.p. 125–6° (124°).
Nitrile : $C_{10}H_{11}ON$. MW, 161. Oil. B.p. 290–300°, 167°/15 mm., 158°/11 mm.

Bougeault, *Compt. rend.*, 1900, **131**, 44.
Barger, Walpole, *J. Chem. Soc.*, 1909, **95**, 1723.
Goldschmiedt, v. Fraenkel, *Monatsh.*, 1914, **35**, 386.
Ramart-Lucas, Amagat, *Bull. soc. chim.*, 1932, **51**, 108.

2-Methoxy-6-methylanisaldehyde.
See under 5-Hydroxy-3-methoxy-*o*-toluic Aldehyde.

3-Methoxy-*N*-methylanthranilic Acid.
See Damasceninic Acid.

4-Methoxy-*N*-methyl-3-cyano-α-pyridone.
See Ricinine.

3-Methoxy-4 : 5-methylenedioxy-1-allylbenzene.
See Myristicin.

3-Methoxy-4 : 5-methylenedioxybenzaldehyde.
See Myristicinaldehyde.

3-Methoxy-4 : 5-methylenedioxybenzoic Acid.
See Myristicic Acid.

8-Methoxy-6 : 7-methylenedioxy-*N*-methyltetrahydroisoquinoline.
See Hydrocotarnine.

Methoxy-methylenedioxyphthalic Acid.
See Cotarnic Acid *and* Isocotarnic Acid.

3-Methoxy-5-methylsalicylaldehyde.
See 4-Hydroxy-5-methoxy-*m*-toluic Aldehyde.

Methoxymethyl salicylate.
See Mesotan.

6-Methoxy-2-methyltetrahydropyran.
See under 4-Hydroxy-*n*-caproic Aldehyde.

Methoxyphenol.
See Guaiacol *and under* Hydroquinone *and* Resorcinol.

5-Methoxy-2-phenoxybenzoic Acid.
See under Gentisic Acid.

Methoxyphenylacetaldehyde.
See Homoanisaldehyde *and under* Hydroxyphenylacetaldehyde.

***p*-Methoxyphenyl acetate.**
See under Hydroquinone.

Methoxyphenylacetic Acid.
See Homoanisic Acid *and under* Mandelic Acid *and* Hydroxyphenylacetic Acid.

2-Methoxy-6-phenylhexatriene-1-carboxylic Acid.
See Kawaic Acid.

8-Methoxy-2-phenylquinoline-4-carboxylic Acid.
See Isatophan.

Methoxyphenyl styryl Ketone.
See under 2′-, 3′-, and 4′-Hydroxychalkone.

***p*-Methoxyphenylpropylene Glycol.**
See Anethole Glycol.

1-Methoxypropionic Acid (*Lactic acid methyl ether*)

$$CH_3{\cdot}\underset{|}{CH}(OCH_3){\cdot}COOH$$

$C_4H_8O_3$ MW, 104

d-.

Oil. B.p. 108–10°/30 mm. D_4^{20} 1·0908. $[\alpha]_D^{20}$ − 75·47°.

Me ester: $C_5H_{10}O_3$. MW, 118. B.p. 45°/22 mm. D_4^{20} 0·9967. $[\alpha]_D^{10}$ − 97·66°, $[\alpha]_D^{20}$ − 95·53°.

Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 46°/12 mm. D_4^{20} 0·9551. $[\alpha]_D^{20}$ − 90·08°.

Propyl ester: $C_7H_{14}O_3$. MW, 146. B.p. 70–1°/25 mm. $[\alpha]_{578}^{15}$ + 85·4°.

Chloride: $C_4H_7O_2Cl$. MW, 122·5. B.p. 38–9°/41 mm. $[\alpha]_{578}^{20}$ + 91·8°.

Amide: $C_4H_9O_2N$. MW, 103. Cryst. M.p. 81°. $[\alpha]_{578}^{90}$ + 38·2° (liq.). *N-Di-Me*: $C_6H_{13}O_2N$. MW, 131. B.p. 90–1°/18–9 mm. $[\alpha]_{578}^{15}$ +63·9°.

Acetoveratrone deriv.: yellow needles. M.p. 91°. $[\alpha]_{578}^{17}$ + 38·32° in acetylene tetrachloride.

l-.

Not isolated in free state.

Me ester: b.p. 130–1°/760 mm., 40°/18 mm. $D^{16\cdot4}$ 0·9986. $[\alpha]_D^{16\cdot4}$ + 97·16°.

Nitrile: C_4H_7ON. MW, 85. B.p. 115°.

Acetoveratrone deriv.: light yellow needles from Et_2O. M.p. 91°. $[\alpha]_{578}^{18}$ − 38·8° in acetylene tetrachloride.

dl-.

Syrup. Volatile in steam.

Me ester: b.p. 135–8°, 129·5°/752 mm. D_4^{15} 1·0108, D_4^{20} 1·0024. n_D^{20} 1·39685.

Et ester: b.p. 135·5°/760 mm. D^0 0·9906, D^{18} 0·9765.

Amide: cryst. M.p. 81°. *N-Di-Me*: b.p. 90–1°/18–19 m.

Nitrile: b.p. 118°/729 mm. D_4^{20} 0·893. n_D^{20} 1·382.

Acetoveratrone deriv.: prisms from Et_2O. M.p. 74°.

Purdie, Irvine, *J. Chem. Soc.*, 1899, **75**, 486.
Gauthier, *Ann. chim. phys.*, 1909, **16**, 315.
Freudenberg, Wolf, *Ber.*, 1926, **59**, 839.
Freudenberg, Markert, *Ber.*, 1927, **60**, 2452.

2-Methoxypropionic Acid (*Hydracrylic acid methyl ether*)

$$CH_3O{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_4H_8O_3$ MW, 104

B.p. 107°/10 mm. D_4^{15} 1·1064, D_4^{20} 1·1020. $k = 3{\cdot}46 \times 10^{-4}$ at 25°.

Me ester: $C_5H_{10}O_3$. MW, 118. B.p. 142·6–142·8°/760 mm. D_{15}^{15} 1·0148, D_4^{20} 1·0086. n_D^{20} 1·40301.

Amide: $C_4H_9O_2N$. MW, 103. Cryst. M.p. 50·5°.

l-*Menthyl ester*: b.p. 135–7°/10 mm. $[\alpha]_{5461}^{20}$ − 77·01°.

Chloride: $C_4H_7O_2Cl$. MW, 122·5. B.p. 135–6°/758 mm.

Nitrile: C_4H_7ON. MW, 85. B.p. 165·5°/763 mm. D_4^{15} 0·9463, D_4^{25} 0·9367.

Palomaa, *Chem. Zentr.*, 1912, II, 596.
Kilpi, *Z. physik. Chem.*, 1912, **80**, 184; 1914, **86**, 672.
Jones, Powers, *J. Am. Chem. Soc.*, 1924, **46**, 2533.

2-Methoxypropylene.
See under Isopropenyl Alcohol.

Methoxypropylene oxide.
See under Glycide.

1 - [4 - Methoxy - 2 - quinolyl] - 2 - [3 : 4-dimethoxyphenyl]-ethane.
See Galipine.

Methoxysalicylaldehyde.
See under Gentisic Aldehyde, 2 : 3-Dihydroxybenzaldehyde, *and* Resorcylic Aldehyde.

Methoxysalicylic Acid.
See under Gentisic Acid, 2 : 3-Dihydroxybenzoic Acid, *and* Resorcylic Acid.

Methoxysuccinic Acid (*Malic acid methyl ether*)

$$CH_3O{\cdot}CH{\cdot}COOH$$
$$CH_2{\cdot}COOH$$

$C_5H_8O_5$ MW, 148

d-.

Prisms. M.p. 88–90°. $[\alpha]_D^{18}$ + 33·3° in H_2O, $[\alpha]_D^{11}$ + 58·29° in Me_2CO.

Mono-NH_4 salt: $[\alpha]_D^{14}$ + 25·86° in H_2O.

Di-NH_4 salt: $[\alpha]_D^{14}$ + 12·32° in H_2O.

Mono-K salt: cryst. $[\alpha]_D^{18\cdot5}$ + 23·46° in H_2O.

Di-K salt: $[\alpha]_D^{15\cdot5}$ + 9·54° in H_2O.

Di-Me ester: $C_7H_{12}O_5$. MW, 176. B.p. 119°/22 mm. D_4^{12} 1·1498. $[\alpha]_D^{13}$ + 52·51°.

Cinchonine salt: cryst. M.p. 171–3°. $[\alpha]_D^{17}$ + 154·9° in H_2O.

l-.

Cryst. M.p. 89°. $[\alpha]_D^{11}$ − 32·94° in H_2O, $[\alpha]_D^{13}$ − 58·18° in Me_2CO, $[\alpha]_D^{13}$ − 62·93° in AcOEt.

Mono-NH_4 salt: cryst. $[\alpha]_D$ − 25·85° in H_2O.

Mono-K salt: cryst. $[\alpha]_D^{18}$ − 23·59° in H_2O.

Ca salt: $[\alpha]_D^{14\cdot5}$ + 4·30° in H_2O.

Strychnine salt: leaflets. $[\alpha]_D^{12}$ − 29·7° in H_2O.

Mono-Et ester: $C_6H_{10}O_5$. MW, 162. Needles from Et_2O–ligroin. M.p. 46–8°. B.p. about 145°/10 mm. Sol. org. solvents. $[\alpha]_D^{20}$ − 41·85° in H_2O, $[\alpha]_D^{20}$ − 60·9° in Me_2CO. *K salt*: $[\alpha]_D^{16}$ − 19·05° in H_2O.

Di-Me ester: oil. B.p. 113–14°/15 mm. D_4^{20} 1·1415, D_0^{60} 1·0983. $[\alpha]_D^{15}$ − 54·2°.

Di-Et ester: $C_9H_{16}O_5$. MW, 204. B.p. 126°/17 mm. D_4^{20} 1·0676, D_4^{40} 1·0476. $[\alpha]_D^{18}$ − 50·11°.

Dipropyl ester: $C_{11}H_{20}O_5$. MW, 232. B.p. 173–173·5°/58 mm., 145–6°/12 mm. D_4^{20} 1·0312, D_4^{60} 0·9908. $[\alpha]_D^{15}$ − 45·12°.

Dibutyl ester: $C_{13}H_{24}O_5$. MW, 260. B.p. 172°/25 mm. D_4^{15} 1·0149. $[\alpha]_D^{15}$ − 41·63°.

Dichloride: $C_5H_6O_3Cl_2$. MW, 185. B.p. 114–17°/56 mm. D^{22} 1·341. $[\alpha]_D^{20}$ − 54·18° in C_6H_6.

Diamide: *see under* Malamide.

Dianilide: *see under* Malanilide.

dl-.

Cryst. from Et_2O. M.p. 108°. Sol. H_2O, EtOH, Et_2O. HI ⟶ succinic acid.

Di-Me ester: cryst. from CS_2. M.p. 28°. B.p. 218–20°.

Diamide: *see under* Malamide.

Purdie, Williamson, *J. Chem. Soc.*, 1895, **67**, 959.

6-Methoxytetrahydroquinoline.
See Thalline.

***p*-Methoxythioanisole.**
See under Thiohydroquinone.

***p*-Methoxythiophenetole.**
See under Thiohydroquinone.

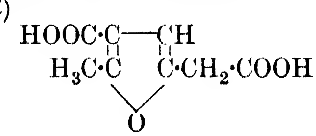
Methoxythiophenol.
See under Thiocatechol, Thiohydroquinone, *and* Thioresorcinol.

ω-Methoxytoluene.
See Methyl benzyl Ether.

***p*-Methoxy-α-toluic Acid.**
See Homoanisic Acid.

***p*-Methoxy-α-toluic Aldehyde.**
See Homoanisaldehyde.

Methronic Acid (*5-Methyl-4-carboxy-α-furylacetic acid*)



$C_8H_8O_5$ MW, 184

Needles from H_2O. M.p. 204°. Sol. EtOH, C_6H_6. Spar. sol. Et_2O, AcOH. Less sol. cold H_2O. Insol. $CHCl_3$, CS_2. Sol. alkalis, cold conc. H_2SO_4. Long heating at m.p. ⟶ pyrotritaric acid + CO_2. Sublimes. Conc. HNO_3 ⟶ oxalic and acetic acids. NH_3.Aq. at 320° ⟶ 2 : 5-dimethylpyrrole.

Mono-Me ester: $C_9H_{10}O_5$. MW, 198. Needles from EtOH. M.p. 98°. Sol. Na_2CO_3.

Di-Me ester: $C_{10}H_{12}O_5$. MW, 212. Oil. Insol. Na_2CO_3.

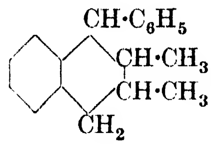
Mono-Et ester: $C_{10}H_{12}O_5$. MW, 212. Needles from H_2O. M.p. 76°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Mod. sol. CS_2. Spar. sol. hot H_2O. *Phenylhydrazine deriv.*: needles from EtOH. M.p. 133–4°. Sol. hot EtOH. Spar. sol. Et_2O. Insol. cold NaOH.

Di-Et ester: $C_{12}H_{16}O_5$. MW, 240. Oil. B.p. 300–5°.

Phenylhydrazine deriv.: needles from EtOH. M.p. 211–12° decomp. Sol. EtOH. Spar. sol. Et_2O. Insol. H_2O. Sol. cold Na_2CO_3.

Polonowsky, *Ann.*, 1888, **246**, 5.
Fittig, v. Eynern, *Ann.*, 1889, **250**, 178.
Trefilew, *Chem. Abstracts*, 1929, **23**, 3926.

Methronol (2:3-*Dimethyl*-1-*phenyl*-1 : 2 : 3 : 4-*tetrahydronaphthalene*)



$C_{18}H_{20}$ MW, 236

B.p. 322–3°. Volatile in steam.

Erdmann, *Ann.*, 1885, **227**, 249.

N-Methylacetamide (*Acetylmethylamine*)

$CH_3{\cdot}CO{\cdot}NH{\cdot}CH_3$

C_3H_7ON MW, 73

Needles. M.p. 28°. B.p. 204–6°. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. ligroin. Forms unstable hydrochloride.

B,HNO₃ : m.p. 58°.

Naegeli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, **12**, 255.
Hofmann, *Ber.*, 1881, **14**, 2729.

N-Methylacetanilide (*Acetylmethylaniline, Exalgin*)

$C_6H_5{\cdot}N{<}^{CH_3}_{CO{\cdot}CH_3}$

$C_9H_{11}ON$ MW, 149

Leaflets from ligroin, needles from Et_2O. M.p. 101–2° (104°). B.p. 253° (245°). D_4^{105} 1·0036, D_4^{145} 0·9703. Hot $HNO_3 \longrightarrow$ 2 : 4-dinitromethylaniline. $ZnCl_2 \longrightarrow$ quinoline + *p*-toluidine. Antipyretic.

Hepp, *Ber.*, 1877, **10**, 329.
Pictet, Crépieux, *Ber.*, 1888, **21**, 1108.
Kaufmann, *Ber.*, 1909, **42**, 3482.

Methyl acetate

$CH_3{\cdot}CO{\cdot}OCH_3$

$C_3H_6O_2$ MW, 74

M.p. − 98·7°. B.p. 57·5°. D_0^0 0·9643, D_{25}^{25} 0·9282, D_4^0 0·9577, D_4^{20} 0·9280, D_4^{55} 0·8825. n_α^{20} 1·35915, n_β^{20} 1·3654, n_γ^{20} 1·3689, n_D^{20} 1·3593. Vap. press. 104·8 mm. at 10°, 169·8 mm. at 20°, 265·8 mm. at 30°, 400·4 mm. at 40°, 588·0 mm. at 50°, 837·5 mm. at 60°. Crit. temp. 233°. Crit. press. 46 atm. Crit. density 0·3252. Mol. b.p. elevation 20·6. Heat of comb. C_p 399·24 Cal. Sol. to 24% in H_2O at 20°. Dissolves many metallic salts. Irradiation by ultraviolet light $\longrightarrow CO_2$, H_2 and CO. ThO_2 at high temp. $\longrightarrow CH_3{\cdot}CO{\cdot}CH_3$, $CH_3{\cdot}O{\cdot}CH_3$ and CO_2.

1-Methylacetoacetic Acid (1-*Acetopropionic acid*)

$CH_3{\cdot}CO{\cdot}\overset{CH_3}{CH}{\cdot}COOH$

$C_5H_8O_3$ MW, 116

Oil. B.p. 224°/34 mm. Sol. H_2O. Heat aq. sol. $\longrightarrow$ methyl ethyl ketone.

Me ester : $C_6H_{10}O_3$. MW, 130. B.p. 177·4°, 80°/20 mm. D^9 1·020, D_{25}^{25} 1·0247. $n_D^{23·8}$ 1·416.

Et ester : $C_7H_{12}O_3$. MW, 144. B.p. 180·8°/743·2 mm., 75·5–76·5°/12 mm. D_4^{18} 1·008. $n_D^{17·8}$ 1·420. $FeCl_3 \longrightarrow$ blue col. *Semicarbazone* : blue cryst. M.p. 183–7° decomp. *Thiosemicarbazone* : cryst. M.p. 192°.

Amide : $C_5H_9O_2N$. MW, 115. Needles from Et_2O. M.p. 73°.

Nitrile : C_5H_7ON. MW, 97. B.p. 145–6°, 78°/19 mm. D_4^{20} 0·9769. Misc. with EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. H_2O. $FeCl_3 \longrightarrow$ dark green col. *Semicarbazone* : needles from EtOH.Aq. M.p. 153°. Insol. Et_2O.

Anilide : $C_{11}H_{13}O_2N$. MW, 191. Prisms from H_2O. M.p. 138–40°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. hot H_2O.

v. Reymenant, *Chem. Zentr.*, 1901, I, 95.
Meyer, *Ber.*, 1912, **45**, 2850.
Riedel, D.R.P., 266,405, (*Chem. Zentr.*, 1913, II, 1716).
Mohr, *J. prakt. Chem.*, 1914, **90**, 198.

1-Methyl-1-acetobutyric Acid.

See 1-Methyl-1-ethylacetoacetic Acid.

1-Methyl-3-acetobutyric Acid

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}COOH$

$C_7H_{12}O_3$ MW, 144

B.p. 157–9°/13 mm.

Et ester : $C_9H_{16}O_3$. MW, 172. B.p. 110–12°/13 mm.

Ruzicka, *Helv. Chim. Acta*, 1919, **2**, 153.

2-Methyl-3-acetobutyric Acid (3-*Acetoisovaleric acid*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}COOH$

$C_7H_{12}O_3$ MW, 144

Oil. B.p. 140–2°/12 mm. Sol. H_2O. $D^{18·7}$ 1·0614. $n_D^{18·2}$ 1·4461. $k = 2·7 \times 10^{-5}$ at 25°.

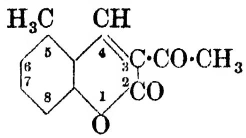
Et ester : $C_9H_{16}O_3$. MW, 172. B.p. 110–11°/13 mm.

Nitrile : $C_7H_{11}ON$. MW, 125. B.p. 105°/11 mm.

Semicarbazone : prisms from H_2O. M.p. 170–4°.

Auwers, Peters, *Ber.*, 1910, **43**, 3091.
Wohl, Maag, *Ber.*, 1910, **43**, 3285.

5-Methyl-3-acetocoumarin



$C_{12}H_{10}O_3$ MW, 202

Yellow needles from EtOH. M.p. 115°. Sol. hot EtOH.

Oxime: needles. M.p. 214° decomp. Spar. sol. boiling EtOH.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 87.

6-Methyl-3-acetocoumarin.

Yellow plates from EtOH. M.p. 128–128·4°. Spar. sol. cold EtOH.

Oxime: yellow cryst. from $PhNO_2$. M.p. 219° decomp. Insol. EtOH, Et_2O, C_6H_6, pet. ether.

Semicarbazone: cryst. from $PhNO_2$. M.p. 211° (charring). Insol. EtOH, AcOEt.

Phenylhydrazone: yellow needles from EtOH. M.p. 193–4°. Spar. sol. Et_2O. Almost insol. cold EtOH.

See previous reference.

7-Methyl-3-acetocoumarin.

Needles from EtOH. M.p. 156–7°. Spar. sol. hot EtOH.

Oxime: yellow needles from EtOH. M.p. 224° decomp. Spar. sol. hot EtOH.

See previous reference.

8-Methyl-3-acetocoumarin.

Yellow needles from EtOH. M.p. 125·8–126·2°. Sol. hot EtOH, C_6H_6. Spar. sol. pet. ether. Insol. H_2O.

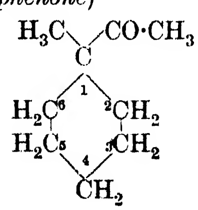
Oxime: needles from boiling EtOH. M.p. 212–13°.

Phenylhydrazone: yellow needles from $PhNO_2$–EtOH. M.p. 168–9°. Spar. sol. hot EtOH.

Semicarbazone: yellow cryst. from $PhNO_2$. M.p. 224–5° decomp. Spar. sol. EtOH.

See previous reference.

1-Methyl-1-acetocyclohexane (1-*Methylhexahydroacetophenone*)



$C_9H_{16}O$ MW, 140

B.p. 83°/18 mm.

Oxime: exists in two forms. (α) Cryst. from EtOH. M.p. 83°. (β) M.p. 45°.

Semicarbazone: exists in two forms. (α) Needles from pet. ether. M.p. 158°. (β) Cryst. from pet. ether. M.p. 176°.

Tarbouriech, *Compt. rend.*, 1909, **149**, 863.

2-Methyl-1-acetocyclohexane (2-*Methylhexahydroacetophenone, methyl hexahydro*-o-*tolyl ketone*).

B.p. 197—200°, 77–80°/18 mm. Combines readily with $NaHSO_3$.

Semicarbazone: cryst. M.p. 172–3°.

Darzens, *Compt. rend.*, 1907, **144**, 1124.

3-Methyl-1-acetocyclohexane (3-*Methylhexahydroacetophenone, methyl hexahydro*-m-*tolyl ketone*).

Active form:

B.p. 199–202°. D^{19} 0·912. n_D^{19} 1·4517.

Semicarbazone: m.p. 180–1°.

dl-.

B.p. 99–100°/38 mm. Does not combine with $NaHSO_3$.

Semicarbazone: m.p. 174–5°.

See previous reference and also
Haworth, Perkin, Wallach, *Ann.*, 1913, **399**, 170.

4-Methyl-1-acetocyclohexane (4-*Methylhexahydroacetophenone, methyl hexahydro*-p-*tolyl ketone*).

B.p. 195–7°, 75–6°/14 mm. D^{18} 0·9055. n_D^{18} 1·4509. Combines readily with $NaHSO_3$.

Oxime: cryst. from MeOH.Aq. M.p. 57–9°. B.p. 125–30°/15 mm.

Semicarbazone: exists in two forms. (i) Cryst. from MeOH. M.p. 159°. (ii) M.p. 175°.

Wallach, *Ann.*, 1912, **381**, 89.

Methyl-acetoheptene.

See under Homomesitones.

3-Methylacetonylacetone (3-*Methylhexandione*-2 : 5, 1 : 2-*diacetopropane*, 2 : 5-*diketo*-3-*methylhexane*)

$$CH_3\cdot CO\cdot CH_2\cdot \overset{CH_3}{CH_2}\cdot CO\cdot CH_3$$

$C_7H_{12}O_2$ MW, 128

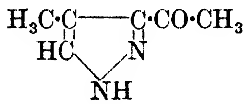
Sweet smelling liq. B.p. 195–6°/740 mm., 71°/10 mm. D_4^{20} 0·9527. n_D^{20} 1·4260. Sol. most org. solvents. Misc. with H_2O in all proportions.

Di-semicarbazone: cryst. from H_2O. M.p. 219–20°.

p-*Nitrophenylhydrazone*: cryst. from toluene. M.p. 112–13°.

Youtz, Perkins, *J. Am. Chem. Soc.*, 1929, **51, 3514.**

Methylacetonylcarbinol.
See Acetoisopropyl Alcohol.
Methyl acetonyl Diketone.
See Hexantrione-2 : 3 : 5.
Methyl acetonyl Ether.
See Methoxyacetone.
***N*-Methyl-2-acetonylpyrrolidine.**
See Hygrine.
Methyl-acetopentene.
See under Homomesitones.
Methylacetophenone.
See Methyl tolyl Ketone.
Methyl-3-acetopropylcarbinol.
See 2-Heptanolone-6.
4-Methyl-3-acetopyrazole



$C_6H_8ON_2$ MW, 124

M.p. 102–3°. B.p. 160–1°/26 mm. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6. Ox. ⟶ 4-methylpyrazole-3-carboxylic acid.

Phenylhydrazone: needles from EtOH.Aq. M.p. 136°.

Klages, Rönneburg, *Ber.*, 1903, **36**, 1131.

6-Methyl-3-acetopyronone-2.
See Dehydracetic Acid.
1-Methyl-1-acetosuccinic Acid (1-*Aceto-pyrotartaric acid*)

$$CH_3\cdot CO\cdot C(CH_3)(COOH)\cdot CH_2\cdot COOH$$

$C_7H_{10}O_5$ MW, 174

Di-Et ester: $C_{11}H_{18}O_5$. MW, 230. B.p. 263°, 154°/20 mm. $Ba(OH)_2$ or HCl ⟶ 2-acetobutyric acid.

Blaise, *Bull. soc. chim.*, 1900, **23**, 920.

2-Methyl-1-acetosuccinic Acid (2-*Aceto-pyrotartaric acid*)

$$CH_3\cdot CO\cdot CH\cdot COOH$$
$$CH_3\cdot CH\cdot COOH$$

$C_7H_{10}O_5$ MW, 174

Free acid not isolated.

Mono-Et ester: $C_9H_{14}O_5$. MW, 202. Prisms. M.p. 66–7°. Sol. most org. solvents. Insol. pet. ether.

Di-Et ester: $C_{11}H_{18}O_5$. MW, 230. B.p. 152°/26 mm., 145–7°/14 mm. $D_4^{17.5}$ 1·0620.

Lactone: cryst. from EtOH. M.p. 176°.

Bischoff, *Ann.*, 1881, **206**, 320.
Willstätter, Clarke, *Ber.*, 1914, **47**, 294.

***N*-Methyl-acet-phenetidide.**
See under *N*-Methylphenetidine.
***N*-Methyl-acet-toluidide.**
See under *N*-Methyltoluidine.
***N*-Methyl-acet-xylidide.**
See under *N*-Methylxylidine.
Methylacetylacetone (3-*Methylpentandione*-2 : 4, 2 : 4-*diketo*-3-*methylpentane* 1 : 1-*diacetyl-ethane*)

$$CH_3\cdot CO\cdot CH(CH_3)\cdot CO\cdot CH_3 \rightleftharpoons CH_3\cdot CO\cdot C(CH_3){=}C(OH)\cdot CH_3$$

$C_6H_{10}O_2$ MW, 114

B.p. 60–5°/13 mm. D_4^{20} 0·976. n_D^{20} 1·4437. The equilibrium mixture contains 47% enol. Forms salts readily with Si, Zn, Ni, Co, Mn, Cr, Tl, Ce, Th, Fe, Al, Pt. Hydroxylamine ⟶ trimethylisoxazole.

Auwers, Jacobsen, *Ann.*, 1922, **426**, 227.
Kaufman, Liepe, *Ber.*, 1925, **58**, 1560.
B.D.C., E.P. 289,493, (*Chem. Abstracts*, 1929, **23**, 606).

Methylacetylcarbinol.
See Acetoïn.
Methylacetylene.
See Allylene.
Methylacetylthiophene.
See Acetomethylthienone.
***sym.*-Methylacetylurea**

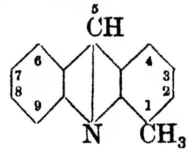
$$CH_3\cdot NH\cdot CO\cdot NH\cdot CO\cdot CH_3$$

$C_4H_8O_2N_2$ MW, 116

Prisms from H_2O. M.p. 180–1°. Sol. hot H_2O, less sol. cold. Spar. sol. EtOH, Et_2O. Heated to 200° ⟶ methyl isocyanate; heated further ⟶ $CO_2 + NH_3$. H_2O at 150° ⟶ $CH_3\cdot NH_2 + CH_3\cdot COOH + CO_2 + NH_3$. Hot conc. HCl ⟶ $CH_3\cdot COOH$ + methylurea. Hot conc. H_2SO_4 ⟶ methane-disulphonic acid. Conc. HNO_3 at room temp. ⟶ $CO_2 + N_2O$. Oxalyl chloride ⟶ 1-methyl-3-acetylparabanic acid.

Behrend, Odenwald, *Ann.*, 1918, **416**, 228.
Young, Clark, *J. Chem. Soc.*, 1898, **73**, 364.
Hofmann, *Ber.*, 1881, **14**, 2727.

1-Methylacridine



$C_{14}H_{11}N$ MW, 193

Needles from EtOH. M.p. 88°. Sol. EtOH. Spar. sol. cold H_2O.

Locher, *Ann.*, 1894, **279**, 279.

2-Methylacridine.

Needles from EtOH. M.p. 125–6°.

Borsche, *Ann.*, 1910, **377**, 118.

3-Methylacridine.

Yellow needles from EtOH.Aq. M.p. 134°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin. Sol. conc. H_2SO_4 to bluish-green fluorescent sol.

Ullmann, *J. prakt. Chem.*, 1887, **36**, 265.

5-Methylacridine (ms-*Methylacridine*).

Plates from ligroin. M.p. 117–18°. Spar. volatile in steam. Ox. ⟶ quinoline-tricarboxylic acid.

Methochloride : needles from H_2O. M.p. 200°.

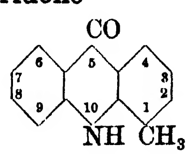
Methiodide : red needles from H_2O. M.p. 235–45° (185°). Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O.

Tartrate : needles from H_2O. M.p. 153–4°.

Picrate : needles from EtOH. M.p. 213–14°.

Königs, *Ber.*, 1899, **32**, 3607.
Kaufmann, Albertini, *Ber.*, 1911, **44**, 2054.

1-Methylacridone



$C_{14}H_{11}ON$ MW, 209

Needles from EtOH. M.p. 345–6°. Sol. hot EtOH. Sublimes.

Pictet, Hubert, *Ber.*, 1896, **29**, 1191.

3-Methylacridone.

Cryst. from EtOH. M.p. 338°. Sol. alc. KOH.

See above reference.

10-Methylacridone (N-*Methylacridone*).

Yellow needles from EtOH. M.p. 203·5°. Sublimes. Alc. sol. fluoresces blue.

Graebe, Lagodzinski, *Ann.*, 1893, **276**, 47.
Pictet, Steinmann, *Ber.*, 1902, **35**, 2536.

1-Methylacrylic Acid (*Methacrylic acid, propylene-2-carboxylic acid*)

$$H_2C:\overset{CH_3}{C}\cdot COOH$$

$C_4H_6O_2$ MW, 86

Prisms. M.p. 15–16°. B.p. 160·5°, 72°/14 mm., 60°/12 mm. D_4^{20} 1·0153. n_D^{20} 1·4314. Sol. H_2O, EtOH, Et_2O. Polymerises on repeated dist., or more rapidly by heating under pressure with HCl. NaHg ⟶ isobutyric acid. HI ⟶ 2-iodoisobutyric acid. Br in CS_2 ⟶ 1 : 2-dibromoisobutyric acid. HOCl ⟶ 2-chloro-1-hydroxyisobutyric acid. KOH fusion ⟶ propionic acid. Used in highly polymerised form as synthetic resin.

Polymer : $(C_4H_6O_2)_8$. MW, 688. Porcelain-like mass. Darkens at 150°, commences to decompose at 200°, liquefies at 300°. Spar. sol. EtOH. Insol. Et_2O, $CHCl_3$, AcOH, C_6H_6. Sol. NH_3. Stable to HNO_3, H_2SO_4, H_2CrO_4, and KOH fusion.

Me ester : *see* Methyl 1-methylacrylate.

Et ester : $C_6H_{10}O_2$. MW, 114. B.p. 118°, 30°/18 mm.

Amide : C_4H_7ON. MW, 85. M.p. 102–6°.

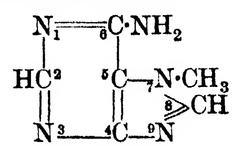
Nitrile : C_4H_5N. MW, 67. B.p. 90–2°. D^{18} 0·7991. Insol. H_2O.

Fittig, Prehn, *Ann.*, 1877, **188**, 47.
Faworsky, *J. prakt. Chem.*, 1895, **51**, 552.
Brühl, *Ann.*, 1880, **200**, 181.
Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 773.
Fittig, Engelhorn, *Ann.*, 1880, **200**, 70.

2-Methylacrylic Acid.

See Crotonic Acid *and* Isocrotonic Acid.

7-Methyladenine (6-*Amino*-7-*methylpurine*)



$C_6H_7N_5$ MW, 149

Powder from H_2O. M.p. 351°. Sol. 29 parts boiling H_2O. Sublimes. HNO_2 ⟶ 7-methylhypoxanthine.

Fischer, *Ber.*, 1898, **31**, 111.

9-Methyladenine.

Prisms from H_2O. M.p. 308–10°. Sol. 14 parts H_2O. HNO_2 ⟶ 9-methylhypoxanthine.

Fischer, *Ber.*, 1898, **31**, 109; 1 99, **32**, 267.

1-Methyladipic Acid (*Pentane-1 : 4-dicarboxylic acid*)

$CH_3·CH·COOH$
CH_2
CH_2
$CH_2·COOH$

$C_7H_{12}O_4$ MW, 160

Cryst. M.p. 64°. B.p. 216–20°/28 mm., 209°/13 mm. Sol. H_2O, EtOH, Et_2O, $CHCl_3$. Less sol. C_6H_6. Spar. sol. pet. ether. k (first) = $4·1 \times 10^{-5}$ at 24·4°. $CrO_3 \longrightarrow$ succinic acid.

Di-Me ester: $C_9H_{16}O_4$. MW, 188. B.p. 116–17°/13 mm., 112–14°/10 mm. D_4^0 1·054.

Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 132–4°/15 mm., 127–9°/13 mm. D_4^0 1·010.

Diamide: $C_7H_{14}O_2N_2$. MW, 158. Cryst. M.p. 186·5°. Sol. H_2O. Spar. sol. org. solvents.

Monoanilide: $C_{13}H_{17}O_3N$. MW, 235. Cryst. from Et_2O–pet. ether. M.p. 122°. Very sol. EtOH. Sol. C_6H_6. Mod. sol. Et_2O. Spar. sol. pet. ether.

Dianilide: $C_{19}H_{22}O_2N_2$. MW, 310. Needles from toluene. M.p. 173–5°. Mod. sol. EtOH. Spar. sol. C_6H_6, toluene.

Bouveault, Locquin, *Bull. soc. chim.*, 1908, **3**, 436, 451.

2-Methyladipic Acid (*Isopentane-1 : 4-dicarboxylic acid, 2-methylbutane-1 : 4-dicarboxylic acid*)

$CH_2·COOH$
$CH_3·CH$
CH_2
$CH_2·COOH$

$C_7H_{12}O_4$ MW, 160

d-.

Cryst. from $CHCl_3$–C_6H_6. M.p. 93–94·5°. B.p. 230°/30 mm., 205°/8 mm. Sol. H_2O, EtOH, $CHCl_3$, Me_2CO, Et_2O, AcOEt. Mod. sol. C_6H_6, toluene, xylene. Spar. sol. pet. ether. $[\alpha]_D$ + 8·62° in H_2O. k (first) = $4·01 \times 10^{-5}$ at 25°.

Mono-Et ester: $C_9H_{16}O_4$. MW, 188. B.p. 164–6°/11 mm. D_0^0 1·0830, D_0^{20} 1·0673.

Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 257°/746 mm., 126·5°/10 mm. D_0^0 1·0128, D_0^{20} 0·9950. n_D 1·4335.

Dipropyl ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 156°/25 mm. D^{20} 0·964.

Di-isobutyl ester: $C_{15}H_{28}O_4$. MW, 272. B.p. 195–6°/30 mm., 169–71°/15 mm. D^{18} 0·947.

Dichloride: $C_7H_{10}O_2Cl_2$. MW, 197. B.p. 117–19°/10 mm. D^{20} 1·2201. n_D 1·4709.

Diamide: $C_7H_{14}O_2N_2$. MW, 158. Cryst. from H_2O. M.p. 191°. Sol. H_2O. Insol. Et_2O.

Monoanilide: $C_{13}H_{17}O_3N$. MW, 235. Needles. M.p. 100–3°. Sol. MeOH, hot C_6H_6, hot toluene.

Dianilide: $C_{19}H_{22}O_2N_2$. MW, 310. Needles from EtOH.Aq. M.p. 203–4° (199–200°). Insol. C_6H_6.

Anhydride: b.p. 165°/1 mm.

Dihydrazide: needles. M.p. 136°. Sol. H_2O, boiling EtOH, Me_2CO.

l-.

Cryst. M.p. 84·5°.

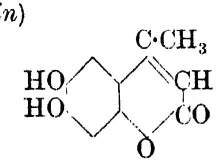
Dianilide: needles. M.p. 199–200°.

dl-.

Needles from C_6H_6. M.p. 97° (89°).

Semmler, *Ber.*, 1893, **26**, 774.
Tiemann, Schmidt, *Ber.*, 1896, **29**, 908.
Markownikoff, *Chem. Zentr.*, 1903, II, 287.
Harries, Neresheimer, *Chem. Zentr.*, 1916, II, 993.
Schrauth, *Chem.-Ztg.*, 1929, **53**, 41.

4-Methylaesculetin (6 : 7-*Dihydroxy-4-methylcoumarin*)



$C_{10}H_8O_4$ MW, 192

Yellow needles from EtOH.Aq. M.p. 272–4°. Sol. hot H_2O, EtOH, AcOH, conc. H_2SO_4, dil. alkalis with blue fluor. $FeCl_3 \longrightarrow$ green sol.

Vliet, *Organic Syntheses*, Collective Volume I, 352.
v. Pechmann, v. Krafft, *Ber.*, 1901, **34**, 423.

Methylal (*Formaldehyde dimethyl acetal, dimethoxymethane, methylene dimethyl ether*)

$CH_2<^{OCH_3}_{OCH_3}$

$C_3H_8O_2$ MW, 76

M.p. − 105°. B.p. 41–2°. D_4^0 0·885, D_4^{15} 0·872. n_D^{18} 1·3589. Mol. b.p. elevation 21·1. Heat of comb. C_v 461·9 Cal., C_p 462·5 Cal., (vapour) C_p 476·1 Cal. Sol. 3 parts H_2O. Misc. with most org. solvents. $HI \longrightarrow CH_3I$ + H·CHO.

Fischer, Giebe, *Ber.*, 1897, **30**, 3054.
Brühl, *ibid.*, 159.
Berthelot, Délépine, *Compt. rend.*, 1900, **130**, 1048.
Timmermans, Martin, *Chem. Abstracts*, 1928, **22**, 4024.

N-Methyl-α-alanine (1-*Methylaminopropionic acid*)

NH·CH$_3$
CH$_3$·CH·COOH

$C_4H_9O_2N$ MW, 103

d-.

Needles + 1H_2O from EtOH. M.p. 300°. Sol. H_2O, hot EtOH. Spar. sol. Me_2CO, AcOEt. Insol. Et_2O, C_6H_6. $[\alpha]_D^{20}$ + 5·6° in H_2O.

B,HCl: m.p. 165–6°. $[\alpha]_D^{21}$ + 5·7° in H_2O.

l-.

Needles + 1H_2O from EtOH. M.p. about 300°. Similar solubilities to *d*-form. $[\alpha]_D^{20}$ −5·9° in H_2O.

dl-.

Prisms from EtOH. Sinters at 280°, part. sublimes at 292°. Sol. hot EtOH. Spar. sol. H_2O. Insol. cold EtOH.

Et ester: $C_6H_{13}O_2N$. MW, 131. B.p. 42–3°/7 mm. D^5 0·9502.

Methylamide: $C_5H_{12}ON_2$. MW, 116. M.p. 43°. B.p. 110°/8 mm. *B,HAuCl$_4$*: m.p. 159–65°. *B$_2$,H$_2$PtCl$_6$*: m.p. 201°.

B,HCl: m.p. 110°.

B,HNO$_3$: m.p. 126°.

B$_2$,H$_2$SO$_4$: m.p. 130–5°.

Fischer, Lipschitz, *Ber.*, 1915, **48**, 364.
Fischer, v. Mechel, *Ber.*, 1916, **49**, 1357.
Lindenburg, *J. prakt. Chem.*, 1875, **12**. 246.
Gansser, *Z. physiol. Chem.*, 1909, **61**, 26.

N-Methyl-β-alanine.

See 2-Methylaminopropionic Acid.

Methyl Alcohol (*Methanol, carbinol, hydroxymethane*)

CH$_3$·OH

CH_4O MW, 32

M.p. − 93·9°. B.p. 64·1°, 59·4°/610 mm., 39·9°/260 mm., ·15°/73 mm. D_4^{-59} 0·866, D_4^0 0·81, D_4^{10} 0·8006, D^{20} 0·7910, D_{15}^{15} 0·7964. n_α^{14} 1·3295, n_γ^{14} 1·338, n_D^{15} 1·3312, n_D^{25} 1·3276. Vap. press. at 0° 29·6 mm., at 10° 54·7 mm., at 20° 96 mm., at 30° 160 mm., at 40° 260·5 mm., at 50° 406 mm., at 60° 625 mm. Sp. heat at 20° 0·6, of vapour at 350° 21·4. Latent heat 292·2 Cal. Heat of comb. (liq.) 170·6 Cal., (vapour) 182·2 Cal. Viscosity at 25° 0·0056. Crit. temp. 241·9°. Crit. press. 78·6 atm. Crit. density 0·2722. Mol. b.p. elevation 8·4. Misc. with H_2O with contraction of vol. and evolution of heat. Misc. with most org. solvents. When moist immiscible with pet. ether. Dissolves many inorganic salts. Combines with $CaCl_2$. Burns with a luminous flame. In iron tube at 600° ⟶ H + H·CHO. In presence of finely divided Ni at 180° ⟶ H·CHO. Less easily oxidised than ethyl alcohol. When moist and exposed in air to sunlight ⟶ H·CHO. Na ⟶ sodium methoxide. HCl + $ZnCl_2$ ⟶ methyl chloride. Mg_3N_2 ⟶ trimethylamine + NH_3. White P at 250° ⟶ PH_3 + H_3PO_4. H_2SO_4 ⟶ dimethyl ether + methyl hydrogen sulphate + dimethyl sulphate. P_2O_5 ⟶ mixture of olefines. $POCl_3$ ⟶ methyl chloride + methyl metaphosphate + HCl. H_2S + ThO_2 at 300° ⟶ methyl mercaptan., CaC_2 at 60°–250° ⟶ crotonylene + 1-butine. Irradiation by ultraviolet light ⟶ H + CO + CO_2. Obtained anhyd. by dist. from metallic Ca.

Methyl-aldehydo-cyclohexane.

See Hexahydrotoluic Aldehyde.

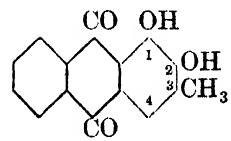
Methylaldehydoguaiacol.

See Hydroxymethoxytoluic Aldehyde.

3-Methyl-4-aldehydoveratrol.

See under 6-Hydroxy-5-methoxy-*o*-toluic Aldehyde.

3-Methylalizarin (1 : 2-*Dihydroxy*-3-*methylanthraquinone*)



$C_{15}H_{10}O_4$ MW, 254

Cryst. M.p. 245°.

Diacetyl: cryst. M.p. 162°.

Mitter, Pal, *J. Indian Chem. Soc.*, 1930, **7**, 261.

4-Methylalizarin (1 : 2-*Dihydroxy*-4-*methylanthraquinone*).

Di-Me ether: $C_{17}H_{14}O_4$. MW, 282. Yellow needles from AcOH. M.p. 224°. Spar. sol. C_6H_6, cold AcOH, pet. ether.

Perkin, Weizmann, *J. Chem. Soc.*, 1906, **89**, 1660.

6-Methylalizarin (1 : 2-*Dihydroxy*-6-*methylanthraquinone*).

Yellow cryst. M.p. 220°.

Diacetyl: cryst. M.p. 190°.

Mitter, Biswas, *J. Indian Chem. Soc.*, 1928, **5**, 777.

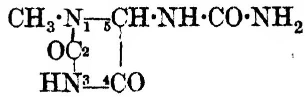
7-Methylalizarin (1 : 2-*Dihydroxy*-7-*methylanthraquinone*).

Orange-red needles from AcOH or AcOEt. M.p. 216°. Sol. EtOH, Me_2CO, $CHCl_3$, AcOH, AcOEt. Spar. sol. Et_2O, C_6H_6. Insol. H_2O, ligroin. Sublimes.

Diacetyl: yellow needles from EtOH. M.p. 176°.

Niementowski, *Ber.*, 1900, **33**, 1632.

1-Methylallantoin (α-*Methylallantoin*)



$C_5H_8O_3N_4$ MW, 172

Cryst. M.p. 255–9° decomp. Sol. 262 parts boiling H_2O.

v. Loeben, *Ann.*, 1897, **298**, 186.
Fischer, Ach, *Ber.*, 1899, **32**, 2745.

3-Methylallantoin (β-*Methylallantoin*).

Prisms $+H_2O$ from H_2O. M.p. 226–7°. HI ⟶ 1-methylhydantoin.

See first reference above.

5-Methylallantoin.

See Pyvuril.

1-Methylallophanic Acid

$H_2N{\cdot}CO{\cdot}N(CH_3){\cdot}COOH$

$C_3H_6O_3N_2$ MW, 118

Plates from C_6H_6. M.p. 146°.

Biltz, Jeltsch, *Ber.*, 1923, **56**, 1916.

3-Methylallophanic Acid

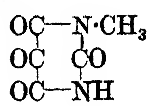
$CH_3{\cdot}NH{\cdot}CO{\cdot}NH{\cdot}COOH$

$C_3H_6O_3N_2$ MW, 118

Cryst. from AcOEt. M.p. 163°.

See previous reference.

Methylalloxan



$C_5H_4O_4N_2$ MW, 156

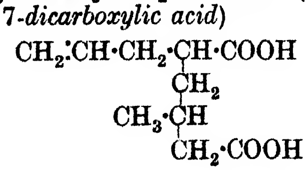
Cryst. from H_2O. M.p. about 156° decomp. Hot HNO_3 ⟶ methylparabanic acid. H_2S ⟶ dimethylalloxantin.

Fischer, Ach, *Ber.*, 1899, **32**, 2731.

Methylallylacetone.

See 1-Heptenone-5.

3-Methyl-1-allyladipic Acid (6-*Methyl*-1-*heptene*-4 : 7-*dicarboxylic acid*)



$C_{10}H_{10}O_4$ MW, 194

d-.

Needles. M.p. 104°. B.p. 235°/20 mm. Spar. sol. H_2O, Et_2O. $[\alpha]_D + 27° 53'$ in EtOH.

Di-Et ester: $C_{14}H_{24}O_4$. MW, 250. B.p. 155°/17 mm.

Haller, Desfontaines, *Compt. rend.*, 1903, **136**, 1614; 1905, **140**, 1206.

Methylallylamine

$CH_2{:}CH{\cdot}CH_2{\cdot}NH{\cdot}CH_3$

C_4H_9N MW, 71

B.p. 64–6°. Misc. with H_2O.

B_2,H_2PtCl_6: yellow cryst. M.p. 164°. Sol. hot H_2O. Insol. EtOH.

Partheil, v. Broich, *Ber.*, 1897, **30**, 619.

Methylallylaniline

$C_6H_5{\cdot}N{<}^{CH_3}_{CH_2{\cdot}CH{:}CH_2}$

$C_{10}H_{13}N$ MW, 147

B.p. 213°/755 mm. D_4^{55} 0·9242.

Picrate: cryst. M.p. 91–2°.

v. Braun, *Ber.*, 1900, **33**, 2733.
Wedekind, *Ber.*, 1899, **32**, 524.

Methylallylcarbinol (1-*Pentenol*-4, 4-*hydroxypentene*-1)

$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}CH{:}CH_2$

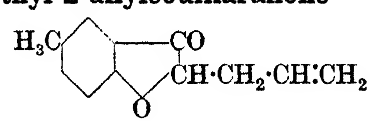
$C_5H_{10}O$ MW, 86

B.p. 115–16°/750 mm. Sol. 8 parts H_2O. D_0^{20} 0·834. n_D^{20} 1·425.

Acetyl: b.p. 133°/743 mm. D_0^{20} 0·891.

Wagner, Kuwschinow, *Ber.*, 1894, **27**, 2434.
Pariselle, *Compt. rend.*, 1912, **154**, 710.

5-Methyl-2-allylcoumaranone



$C_{12}H_{12}O_2$ MW, 188

Prisms from EtOH. M.p. 56–7°. Very sol. most org. solvents.

Semicarbazone: cryst. M.p. 200°.

p-*Nitrophenylhydrazone*: orange needles from EtOH. M.p. 165–7°.

Auwers, *Ber.*, 1928, **61**, 415.

Methyl allyl Ether

$CH_2{:}CH{\cdot}CH_2{\cdot}O{\cdot}CH_3$

C_4H_8O MW, 72

B.p. 46°, 42·5–43°/757 mm. D^{11} 0·77. n_D 1·3778–1·3803.

Irvine, Macdonald, Soutar, *J. Chem. Soc.*, 1915, **107**, 351.

Methyl allyl Ketone (1-*Pentenone*-4, 4-*keto-pentene*-1, *vinylacetone*)

$CH_3·CO·CH_2·CH:CH_2$

C_5H_8O MW, 84

Liq. with unpleasant odour. B.p. 107–8°.
Semicarbazone : m.p. 144–5°.

Blaise, *Bull. soc. chim.*, 1905, **33**, 40.

Methylallylmalonic Acid

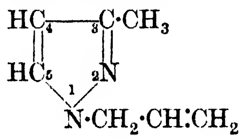
$CH_2:CH·CH_2(CH_3)>C<(COOH)_2$

$C_7H_{10}O_4$ MW, 158

Cryst. from H_2O. M.p. 98–9° (74–6°).
Di-Et ester : $C_{11}H_{18}O_4$. MW, 214. Oil. B.p. 112–15°/17 mm.

Staudinger, Schneider, Scholtz, Strong, *Helv. Chim. Acta*, 1923, **6**, 301.

3-Methyl-1-allylpyrazole



$C_7H_{10}N_2$ MW, 122

Oil. B.p. 171°.
Picrate : plates or needles from MeOH. M.p. 77·5–78·5°. Very sol. EtOH, Et_2O.

Auwers, Bähr, *J. prakt. Chem.*, 1927, **116**, 97.

5-Methyl-1-allylpyrazole.
Oil. B.p. 181–2°.
Picrate : yellow needles from MeOH. M.p. 113–14°.

See previous reference.

Methyl allyl sulphide

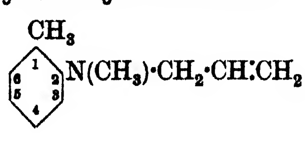
$CH_2:CH·CH_2·S·CH_3$

C_4H_8S MW, 88

Oil. B.p. 91–3°.

Obermeyer, *Ber.*, 1887, **20**, 2925.

***N*-Methyl-*N*-allyl-*o*-toluidine**



$C_{11}H_{15}N$ MW, 161

Oil. B.p. 215–20°.
Picrate : yellow needles from EtOH. M.p. 133–5°.

Wedekind, Oberheide, *Ber.*, 1904, **37**, 3896.

***N*-Methyl-*N*-allyl-*p*-toluidine.**
B.p. 230–2°.
Picrate : yellowish-brown needles. M.p. 124°.

Wedekind, Oberheide, *Ber.*, 1904, **37**, 2719.

Methylamine

$CH_3·NH_2$

CH_5N MW, 31

Gas with strong ammoniacal odour. B.p. 41·0°/4500 mm., − 7·55°/719 mm. 1 vol. H_2O dissolves 1153·9 vols. at 12·5°. $k = 5·0 \times 10^{-4}$ at 25°. D_4^{-79} 0·7691, $D_4^{-10·8}$ 0·699. Crit. temp. 156·9°. Crit. press. 73·6 atm. Heat of comb. (gas) C_p 258·3 Cal., C_v 260·4 Cal., (liq.) C_p 258·1 Cal.

At 1200° ⟶ NH_3 + HCN + CH_4 + H + N. Ox. (+ Cu) ⟶ H·CHO + NH_3. Chloranil + EtOH sol. of hydrochloride ⟶ violet col. (distinction from NH_3). Stable to $KMnO_4$. Used as refrigerant.
B,H₂O : liq. $D^{13·9}$ 0·8993.
B,3H₂O : f.p. − 35·8°.
B,HCl : plates from EtOH. M.p. 225–6°. B.p. 225–30°/15 mm. Sol. EtOH. Insol. Me_2CO, Et_2O, $CHCl_3$.
B,HBr : plates. M.p. 250–1° slight decomp. Sol. EtOH. Spar. sol. Me_2CO. Insol. Et_2O, $CHCl_3$.
B,HI : plates from EtOH–$CHCl_3$. M.p. about 260–70° (220°). Sol. EtOH. Insol. $CHCl_3$, Et_2O.
B,HNO₃ : prisms. M.p. 99–100° (70°). $D_4^{100·7}$ 1·2607.
Formyl : *see* *N*-Methylformamide.
Acetyl : *see* *N*-Methylacetamide.
Diacetyl : methyldiacetamide. B.p. 192°. Misc. with H_2O. Insol. Et_2O.
N-*Nitro* : *see* Methylnitramine.
Di-d-*tartrate* : m.p. 170°.
Di-dl-*tartrate* : m.p. 188°.
Nitromethane comp. : cryst. M.p. − 8 to − 7·5°.
Picrate : yellow plates or prisms from AcOEt. M.p. 215°.

Fischer, *Anleitung zur Darstellung organischer Präparate*, **9** [*Braunschweig* 1920], **33**.
Marvel, Jenkins, *Organic Syntheses*, Collective Volume I, 340.
du Pont de Nemours, E.P., 384,714, (*Chem. Zentr.*, 1933, I, 2313).

Methylaminoacetaldehyde

$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CHO$

C_3H_7ON MW, 73

Not known in free state.

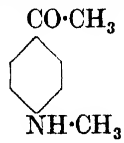
Di-Me acetal: $C_5H_{11}ON$. MW, 101. Oil. B.p. 140°/760 mm.

Di-Et acetal: methylaminoacetal. $C_7H_{15}ON$. MW, 129. B.p. 167°.

Knorr, *Ber.*, 1899, **32**, 729.
Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1922, **121**, 1885.

Methylaminoacetic Acid.
See Sarcosine.

***p*-Methylaminoacetophenone**



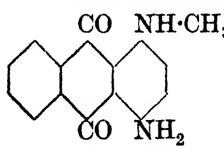
$C_9H_{11}ON$ MW, 149

Plates from H_2O. M.p. 58–9°. Sol. hot H_2O, EtOH, Et_2O.

Staudinger, Kon, *Ann.*, 1911, **384**, 111.
Klingel, *Ber.*, 1885, **18**, 2694.

ω-Methylaminoacetophenone.
See N-Methylphenacylamine.

1-Methylamino-4-aminoanthraquinone



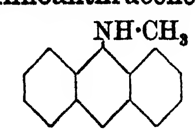
$C_{15}H_{12}O_2N_2$ MW, 252

Violet plates from Py. M.p. 195°.

NN'-Diacetyl: brown needles from AcOH. M.p. 278°.

Bayer, D.R.P., 156,759, (*Chem. Zentr.*, 1905, I, 310).
Drescher, Thomas, U.S.P., 1,528,470, (*Chem. Abstracts*, 1926, **20**, 425).

9-Methylaminoanthracene



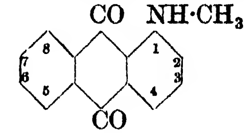
$C_{15}H_{13}N$ MW, 207

Cryst. M.p. 90° (sinters at 85°). Very sol. most org. solvents. Oxidises and decomposes readily in air.

B,HCl: cryst. from EtOH. M.p. 225°.

Meyer, Schlösser, *Ann.*, 1920, **420**, 133.

1-Methylaminoanthraquinone



$C_{15}H_{11}O_2N$ MW, 237

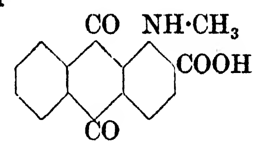
Yellowish-red needles. M.p. 170° (167°). Sol. EtOH, C_6H_6, $CHCl_3$, AcOH. Fuming HCl ⟶ yellow sol. Conc. H_2SO_4 ⟶ yellow sol.

Badische, D.R.P., 256, 515, (*Chem. Zentr.*, 1913, I, 866).
Ullmann, Fodor, *Ann.*, 1911, **380**, 320.
Society of Chemical Industry, Bâle, Swiss P., 132,796, (*Chem. Abstracts*, 1930, **24**, 508).

2-Methylaminoanthraquinone.
Red needles from AcOH. M.p. 226–7°. Sol. AcOH, toluene. Mod. sol. EtOH. Spar. sol. Et_2O. Warm conc. H_2SO_4 ⟶ yellowish green sol.

Bayer, D.R.P., 158,531, (*Chem. Zentr.*, 1905, I, 1517).
Ullmann, Medenwald, *Ber.*, 1913, **46**, 1801.
Scottish Dyes, Ltd., E.P., 319,805, (*Chem. Abstracts*, 1930, **24**, 2612).

1-Methylaminoanthraquinone-2-carboxylic Acid

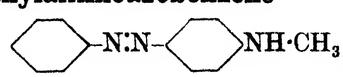


$C_{16}H_{11}O_4N$ MW, 281

Bluish-red needles from AcOH. M.p. about 240° decomp. Alkali salts give bluish-red aq. sols.

Badische, D.R.P., 247,411 (*Chem. Zentr.*, 1912, II, 213).

4-Methylaminoazobenzene



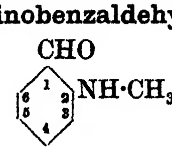
$C_{13}H_{13}N_3$ MW, 211

Red needles. M.p. 180°.

B,HCl: violet needles.

Berju, *Ber.*, 1884, **17**, 1401.

***o*-Methylaminobenzaldehyde**



C_8H_9ON MW, 135

Yellow oil. B.p. 112°/10 mm. Sol. most org. solvents. Sol. HCl. $D_4^{11\cdot8}$ 1·1092. Volatile in steam.

Oxime: needles from pet. ether–ligroin. M.p. 50·5–51°. Very sol. EtOH, C_6H_6. Less sol. H_2O.

B_2,H_2PtCl_6: yellow needles. M.p. 200–1°.

Bamberger, *Ber.*, 1904, **37**, 979.

p-Methylaminobenzaldehyde.

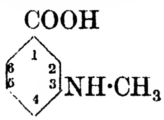
Rhombohedra from H_2O. M.p. 60–1° (57–8°). Sol. usual org. solvents. Sol. aq. bisulphite.

Boehringer, D.R.P., 108,026, (*Chem. Zentr.*, 1900, I, 1114).
Geigy, D.R.P., 103,578, (*Chem. Zentr.*, 1899, II, 927).

o-Methylaminobenzoic Acid.

See N-Methylanthranilic Acid.

m-Methylaminobenzoic Acid



$C_8H_9O_2N$ MW, 151

Plates from pet. ether. M.p. 127°. Very sol. C_6H_6, EtOH, Me_2CO, $CHCl_3$. Insol. cold H_2O, Et_2O, ligroin. Amphoteric. k (acid) = 8×10^{-6}; (base) = $1{\cdot}2 \times 10^{-11}$.

B,HI: cryst. from EtOH. M.p. 215° decomp. Sol. H_2O, EtOH.

Me ester: $C_9H_{11}O_2N$. MW, 165. Cryst. M.p. 72°. Sol. Et_2O. Insol. H_2O.

Et ester: $C_{10}H_{13}O_2N$. MW, 179. *B,HCl*: cryst. from Me_2CO. M.p. 137°.

Houben, Brassert, *Ber.*, 1910, **43**, 209.

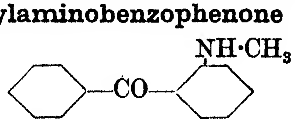
p-Methylaminobenzoic Acid.

Cryst. from EtOH.Aq. or C_6H_6. M.p. 168° (155–7°). Sol. EtOH, hot H_2O, Et_2O, hot C_6H_6, AcOEt. $FeCl_3 \longrightarrow$ reddish-violet col.

Me ester: plates from EtOH.Aq. M.p. 95·5° (75–6°). Sol. EtOH, Et_2O. Insol. H_2O. k = $2{\cdot}08 \times 10^{-12}$ at 25°.

Klaus, Baudisch, *Ber.*, 1918, **51**, 1043.

2-Methylaminobenzophenone



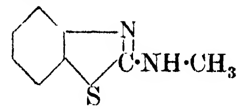
$C_{14}H_{13}ON$ MW, 211

Yellow cryst. from pet. ether. M.p. 69° (66°). B.p. 280–90°, 185–7°/12 mm. Sol. EtOH, C_6H_6, AcOH.

B,HI: cryst. from H_2O. M.p. 184–6°.

Ullmann, Bleier, *Ber.*, 1902, **35**, 4276.
Staudinger, Kon, *Ann.*, 1911, **384**, 103.

2-Methylaminobenzthiazole (See Note under 2-Aminobenzthiazole)

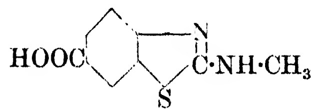


$C_8H_8N_2S$ MW, 164

Prisms from EtOH. M.p. 138°.

Hunter, *J. Chem. Soc.*, 1926, 1394.

2-Methylaminobenzthiazole-6-carboxylic Acid



$C_9H_8O_2N_2S$ MW, 208

Cryst. from EtOH–AcOEt. Does not melt at 298°. Sol. alkalis.

Et ester: $C_{11}H_{12}O_2N_2S$. MW, 236. Plates from EtOH–AcOEt. M.p. 169°. *Acetyl*: prisms from MeOH. M.p. 174°. *Hydrotribromide*: orange cryst. M.p. 137–8° decomp.

Hunter, Parken, *J. Indian Chem. Soc.*, 1932, **9**, 357.

α-Methylaminobenzyl Alcohol (*α-Hydroxy-N-methylbenzylamine*)

$C_6H_5{\cdot}CH(OH){\cdot}NH{\cdot}CH_3$

$C_8H_{11}ON$ MW, 137

Yellowish-grey cryst. from pet. ether. M.p. 180° decomp. Sol. EtOH, Et_2O.

Picrate: yellow cryst. M.p. 238° decomp.

Wood, Lilley, *J. Chem. Soc.*, 1925, **127**, 96.

Methyl o-aminobenzyl Ether.

See under o-Aminobenzyl Alcohol.

3-Methylaminobutyl Alcohol

$$CH_3{\cdot}\overset{NH\cdot CH_3}{CH}{\cdot}CH_2{\cdot}CH_2OH$$

$C_5H_{13}ON$ MW, 103

B.p. 65°/14 mm. Sol. H_2O.

Mannich, Horkheimer, *Arch. Pharm.*, 1926, **264**, 167.

Methyl 4-aminobutyl sulphide (*4-Methylmercapto-butylamine*)

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}S{\cdot}CH_3$

$C_5H_{13}NS$ MW, 119

B.p. 188–9°. Misc. with H_2O, EtOH, Et_2O.

B,HCl: plates from dry Me_2CO. M.p. 153–4°.

Oxalate: cryst. from EtOH.Aq. Decomp. at 202°.

Picrate : m.p. 116–18°.
Picrolonate : decomp. at 172–4°.

Schneider, Kaufmann, *Ann.*, 1912, **392**, 9.

Methyl 4-aminobutyl sulphone (4-*Methylsulphonbutylamine*)

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}SO_2{\cdot}CH_3$

$C_5H_{13}O_2NS$ MW, 151

Cryst. M.p. 42°. B.p. 165°/4 mm. Very sol. H_2O, EtOH. Insol. Et_2O. Very hygroscopic.
B,HCl : plates from EtOH. M.p. 160°. Very sol. H_2O. Insol. cold EtOH.
B,HAuCl₄ : plates from MeOH. M.p. 187–9°. Very sol. H_2O.
B_2,H_2PtCl_6 : yellow cryst. from EtOH.Aq. Decomp. at 205–7°.
Picrate : decomp. at 216°.
Picrolonate : m.p. 144°. Decomp. at 205°.

See previous reference.

Methyl 4-aminobutyl sulphoxide

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}SO{\cdot}CH_3$

$C_5H_{13}ONS$ MW, 135

Decomp. on dist.
B,HCl : very hygroscopic.
Oxalate : plates from EtOH. M.p. 174–9°. Very hygroscopic.
Picrate : m.p. 149°.
Picrolonate : m.p. 195° decomp.

See previous reference.

1-Methylaminobutyric Acid

$CH_3{\cdot}CH_2{\cdot}CH(NH{\cdot}CH_3){\cdot}COOH$

$C_5H_{11}O_2N$ MW, 117

dl-.
Prisms + $1H_2O$ from H_2O. Sublimes readily at 290°. Very sol. H_2O. Spar. sol. EtOH. Insol. Et_2O. Sweet taste.
B,HCl : cryst. M.p. 150° decomp. Very sol. H_2O. Sol. EtOH. Insol. Et_2O.
B_2,H_2SO_4 : needles from EtOH. M.p. 199–200°. Very sol. H_2O.
Et ester : $C_7H_{15}O_2N$. MW, 145. B.p. 51–2°. $D^{10\cdot8}$ 0·9348.
B_2,H_2PtCl_6 : cryst. Decomp. at 210°.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 475,
Knoop, Oesterlin, *Z. physiol. Chem.*, 192. **148**, 294.

2-Methylaminobutyric Acid

$CH_3{\cdot}CH(NH{\cdot}CH_3){\cdot}CH_2{\cdot}COOH$

$C_5H_{11}O_2N$ MW, 117

dl-.
Cryst. + $1H_2O$. M.p. 86–7°, anhyd. 141–2°.
Me ester : $C_6H_{13}O_2N$. MW, 131. B.p. 66°/15 mm.
Et ester : $C_7H_{15}O_2N$. MW, 145. B.p. 72°/12·5 mm. D^{20} 0·92817. n_D^{20} 1·42501.
Lactam : b.p. 73–4°/12 mm.
Methylamide : $C_6H_{15}ON_2$. MW, 131. B.p. 146°/56 mm., 134–6°/10 mm.

Scheibler, Magasanik, *Ber.*, 1915, **48**, 1812.
Breckpot, *Bull. soc. chim. Belg.*, 1923, **32**, 431.
Morsch, *Monatsh.*, 1932, **60**, 64.

3-Methylaminobutyric Acid

$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_5H_{11}O_2N$ MW, 117

Needles from EtOH–Et_2O. M.p. 146° (143–5°). Very sol. H_2O. Sol. 5 parts EtOH. Easily decomp.
B,HCl : plates from H_2O. M.p. 125°. Very sol. H_2O.
B_2,H_2PtCl_6 : cryst. Decomp. at 202°.
p-*Toluenesulphonyl* : m.p. 96–8°.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 53.

β-Methylaminobutyrophenone

$C_6H_5{\cdot}CO{\cdot}CH(NH{\cdot}CH_3){\cdot}CH_2{\cdot}CH_3$

$C_{11}H_{15}ON$ MW, 177

Cryst. M.p. 190–2°.

Abbott Laboratories, U.S.P., 1,767,423, (*Chem. Abstracts*, 1930, **24**, 4359).

5-Methylaminocaproic Acid

$CH_3{\cdot}NH{\cdot}CH_2{\cdot}[CH_2]_4{\cdot}COOH$

$C_7H_{15}O_2N$ MW, 145

Cryst. + $1\frac{1}{2}H_2O$ from H_2O, m.p. about 67°. Cryst. anhyd. from EtOH–Et_2O, m.p. 132°. Very sol. H_2O, EtOH. Spar. sol. Me_2CO, AcOEt. Insol. Et_2O, C_6H_6, pet. ether. Very hygroscopic.

Thomas, Goerne, *Z. physiol. Chem.*, 1919, **104**, 77.
Ruzicka, *Helv. Chim. Acta*, 1921, **4**, 481.

β-Methylaminocinnamic Acid

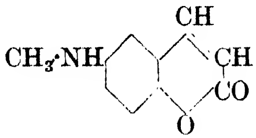
$C_6H_5{\cdot}C(NH{\cdot}CH_3){:}CH{\cdot}COOH$

$C_{10}H_{11}O_2N$ MW, 177

Et ester : $C_{12}H_{15}O_2N$. MW, 205. B.p. 130–4°/2 mm. decomp.

Décombe, *Ann. chim.*, 1932, **18**, 124.

6-Methylaminocoumarin

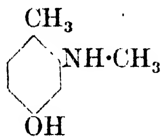


$C_{10}H_9O_2N$ MW, 175

Yellow needles from pet. ether. M.p. 105–6°.

Morgan, Micklethwait, *J. Chem. Soc.*, 1904, **85**, 1237.

2-Methylamino-*p*-cresol



$C_8H_{11}ON$ MW, 137

Cryst. from C_6H_6–ligroin. M.p. about 108°.

Badische, D.R.P., 69,596.

2-Methylaminocrotonic Acid (*Methyl-iminobutyric acid*)

NH·CH₃
$CH_3·C:CH·COOH$

$C_7H_{13}O_2N$ MW, 143

Me ester: $C_8H_{15}O_2N$. MW, 157. Cryst. from pet. ether. M.p. 60·5°. Sol. EtOH, C_6H_6, Et_2O. Spar. sol. pet. ether. Insol. H_2O.
Et ester: $C_9H_{17}O_2N$. MW, 171. Solidifies in freezing mixture. B.p. 215°, 133°/50 mm.

Knoevenagel, Reinecke, *Ber.*, 1899, **32**, 420 (*Note*).
Korschun, Roll, *Bull. soc. chim.*, 1923, **33**, 1106.

Methylamino-cyclohexane.
See N-Methylcyclohexylamine.

2-Methylaminodiethyl Ether (*Methyl-2-ethoxyethyl-amine*)

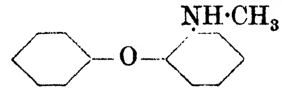
$CH_3·CH_2·O·CH_2·CH_2·NH·CH_3$

$C_5H_{13}ON$ MW, 103

B.p. 114–15°/744 mm. D_4^{20} 0·8363. n_D^{20} 1·4147. Reacts alkaline. Misc. with H_2O, EtOH, Et_2O.
B,HAuCl₄: yellow needles. M.p. 127°.
B_2,H_2PtCl_6: needles. M.p. 208° decomp.
Picrate: prisms from H_2O. M.p. 119°.
Picrolonate: yellow needles. M.p. 111°.

Knorr, Meyer, *Ber.*, 1905, **38**, 3133.

2-Methylaminodiphenyl Ether



$C_{13}H_{13}ON$ MW, 199

M.p. 48°. B.p. 170°/13 mm.
B,HCl: cryst. M.p. 134°.
Picrate: cryst. M.p. 149°.

v. Braun, Weissbach, *Ber.*, 1932, **65**, 1579.

α-Methylaminodiphenylmethane (*Methyl-benzhydrylamine*)

$(C_6H_5)_2CH·NH·CH_3$

$C_{14}H_{15}N$ MW, 197

Cryst. from pet. ether. M.p. 40°. B.p. 168°/20 mm.
B,HCl: needles. M.p. 238°. Sol. H_2O, EtOH.
B,HNO₃: plates from EtOH. M.p. 146°.

Busch, Leefhelm, *J. prakt. Chem.*, 1908, **77**, 22.
Semper, Lichtenstadt, *Ber.*, 1918, **51**, 934.

2-Methylaminoethyl Alcohol (N-*Methyl-ethanolamine, methyl-hydroxyethylamine*)

$CH_3·NH·CH_2·CH_2OH$

C_3H_9ON MW, 75

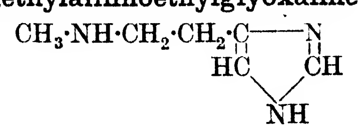
Thick oil. B.p. 169–70°, 159°/747 mm. Misc. with H_2O, EtOH, Et_2O. D^{20} 0·937. n_D^{20} 1·4385. Strongly basic.
B,HAuCl₄: prisms. M.p. 145–6°. Sol. H_2O.
B_2,H_2PtCl_6: plates from H_2O. Decomp. at 125–30°.
Picrate: cryst. M.p. 148–50°.

Knorr, Matthes, *Ber.*, 1898, **25**, 1069.
Chemische Fabrik. auf Actien, E.P., 285,932, (*Chem. Abstracts*, 1929, **23**, 242).

β-Methylaminoethylanisole.
See under Methyl-hydroxyphenylethyl-amine.

Methyl 2-aminoethyl Ether.
See 2-Methoxyethylamine.

4-β-Methylaminoethylglyoxaline

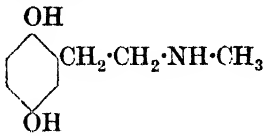


$C_6H_{11}N_3$ MW, 125

B,2HCl: needles from EtOH. M.p. 176–7°. Very sol. H_2O.
B,2HBr: needles from EtOH. M.p. 167°.
Dipicrate: pale yellow needles from H_2O. M.p. 188°.

Garforth, Pyman *J. Chem. Soc.*, 1935, 491.

β-Methylaminoethylhydroquinone (*Methyl-2 : 5-dihydroxyphenylethyl-amine*)



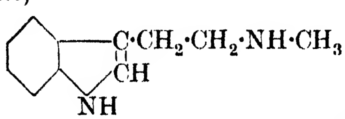
$C_9H_{13}O_2N$ MW, 167

B,HCl : plates from Me_2CO–Et_2O or EtOH–Et_2O. M.p. 128°. Very sol. H_2O, EtOH, AcOH, conc. HCl. Spar. sol. Et_2O. $FeCl_3$ ⟶ transient pale green col. Reduces cold $NH_3.AgNO_3$. Alk. sols rapidly blacken.

Di-Me ether : $C_{11}H_{17}O_2N$. MW, 195. B.p. 155°/8 mm. Spar. sol. H_2O. D_4^{25} 1·0545. n_D^{25} 1·5278. Reacts strongly alkaline. *B,HCl* : needles from EtOH–Et_2O. M.p. 110°. Very sol. H_2O, EtOH. Spar. sol. Et_2O. *B,HI* : pearly plates from EtOH–Et_2O. M.p. 137°.

Buck, *J. Am. Chem. Soc.*, 1932, **54**, 3663.

3-[ω-Methylaminoethyl]-indole (N-*Methyltryptamine*)



$C_{11}H_{14}N_2$ MW, 174

Cryst. M.p. 90°.
B,HCl : m.p. 180°.
Benzoyl deriv. : needles. M.p. 117°.
m-*Chlorobenzoyl* : prisms. M.p. 153°
p-*Nitrobenzoyl* : golden-yellow plates. M.p. 134°.
Phenylcarbamyl deriv. : m.p. 153°.
Picrate : m.p. 191°.

Manske, *Chem. Abstracts*, 1932, **26**, 725.

β-Methylaminoethylphenol.
See Methyl-hydroxyphenylethyl-amine.

6-β-Methylaminoethylpiperonal.
See Hydrastinine.

6-β-Methylaminoethyl-veratric Aldehyde.
See Lodal.

4-β-Methylaminoethylveratrol.
See *N*-Methylhomoveratrylamine.

1-Methylaminoglutaric Acid.
See *N*-Methylglutamic Acid.

α-Methylaminohydrocinnamic Acid (N-*Methylphenyl-α-alanine, 1-methylamino-2-phenylpropionic acid*)

$C_{10}H_{13}O_2N$ $C_6H_5 \cdot CH_2 \cdot CH(NH \cdot CH_3) \cdot COOH$ MW, 179

d-.
Needles from H_2O. Sublimes. Sol. hot H_2O, EtOH, MeOH. Spar. sol. other org. solvents. Sol. dil. acids and alkalis. $[\alpha]_D^{18}$ − 48·4° in *N*/NaOH, $[\alpha]_D^{20}$ − 17·7° in *N*/HCl.

l-.
Needles from H_2O. $[\alpha]_D^{18}$ + 49·7° in 0·1*N*/NaOH.

dl-.
Plates from H_2O. Sublimes at 252–4° with slight decomp.

Fischer, Lipschitz, *Ber.*, 1915, **48**, 372.
Fischer, v. Mechel, *Ber.*, 1916, **49**, 1359.
Friedmann, Gutmann, *Biochem. Z.*, 1910, **27**, 493.

β-Methylaminohydrocinnamic Acid (2-*Methylamino-2-phenylpropionic acid*)

$C_6H_5 \cdot CH(NH \cdot CH_3) \cdot CH_2 \cdot COOH$

$C_{10}H_{13}O_2N$ MW, 179

Cryst. from EtOH or MeOH. M.p. 176–176·5° (168·5–169°). Very sol. HCl. Sol. H_2O. Spar. sol. Me_2CO, Et_2O, C_6H_6, $CHCl_3$.

Et ester : $C_{12}H_{17}O_2N$. MW, 207. Oil. B.p. 142·5°/10·5 mm. Sol. usual org. solvents. Spar. sol. H_2O.

Methylamide : $C_{11}H_{16}ON_2$. MW, 192. Solid. B.p. 195–6°/9·5 mm. decomp. *Oxalate* : cryst. from EtOH–Et_2O. M.p. 154·5–155° decomp.

Evans, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 5003.
Morsch, *Monatsh.*, 1932, **61**, 308.

o-Methylaminohydrocinnamic Acid.
See under Hydrocarbostyril.

Methyl-2-aminoisobutylcarbinol.
See Diacetonalkamine.

Methyl 2-aminoisobutyl Ketone.
See Diacetonamine.

1-Methylaminoisobutyric Acid

$(CH_3)_2C(NH \cdot CH_3)COOH$

$C_5H_{11}O_2N$ MW, 117

Needles from EtOH. Sublimes at 272°. Sol. about 50 parts boiling EtOH.

Nitrile : $C_5H_{10}N_2$. MW, 98. Oil. B.p. 140°, 63–5°/28 mm. Sol. H_2O.

Gabriel, *Ber.*, 1914, **47**, 2923.

1-Methylaminoisocaproic Acid.
See *N*-Methyl-leucine.

Methyl 1-aminoisopropyl sulphide (2-*Methylmercaptopropylamine*)

$$\begin{matrix} CH_3 \\ H_2N\cdot CH_2 \end{matrix}\!\!>CH\cdot S\cdot CH_3$$

$C_4H_{11}NS$ MW, 105

B.p. 158°/763 mm. Misc. with H_2O, EtOH, Et_2O, AcOEt. Insol. pet. ether. Reacts strongly alkaline. Absorbs CO_2 from air. $Ba(MnO_4)_2 \longrightarrow$ sulphone.

Picrate: cryst. M.p. 133–4°.

Mylius, *Ber.*, 1916, **49**, 1099.

Methyl 1-aminoisopropyl sulphone (2-*Methylsulphonpropylamine*)

$$\begin{matrix} CH_3 \\ H_2N\cdot CH_2 \end{matrix}\!\!>CH\cdot SO_2\cdot CH_3$$

$C_4H_{11}O_2NS$ MW, 137

Oil. B.p. about 140°/4 mm. Sol. H_2O. Reacts alkaline. Absorbs CO_2 from the air. Non-volatile in steam.

B,HCl: needles from EtOH. M.p. 111–12°.

Oxalate: needles. M.p. 181–2° decomp. Sol. H_2O.

Picrate: cryst. M.p. 160–1°.

See previous reference.

2-Methylaminoisovaleric Acid

$$\begin{matrix} NH\cdot CH_3 \\ | \\ (CH_3)_2C\cdot CH_2\cdot COOH \end{matrix}$$

$C_6H_{13}O_2N$ MW, 131

Et ester: $C_8H_{17}O_2N$. MW, 159. B.p. 74·5–75·5°/14 mm.

Methylamide: $C_7H_{16}ON_2$. MW, 144. B.p. 138–40°/15 mm.

Philippi, Galter, *Monatsh.*, 1929, **51**, 263.

Methylaminomalonic Acid

$$CH_3\cdot NH\cdot CH<\begin{matrix} COOH \\ COOH \end{matrix}$$

$C_4H_7O_4N$ MW, 133

Plates from H_2O. Decomp. at 137–42°.

Knoop, Oesterlin, *Z. physiol. Chem.*, 1927, **170**, 208.

1-Methylaminopentane.

See *N*-Methyl-*n*-amylamine.

2-Methylaminopentane

$$\begin{matrix} NH\cdot CH_3 \\ | \\ CH_3\cdot CH_2\cdot CH_2\cdot CH\cdot CH_3 \end{matrix}$$

$C_6H_{15}N$ MW, 101

B.p. 103–4°/754 mm. D^{20} 0·947.

B_2,H_2PtCl_6: yellowish-red needles. M.p. 137·5°.

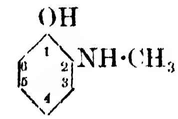
Picrate: cryst. M.p. 77–8°.

Löffler, *Ber.*, 1910, **43**, 2045.

3-Methylaminopentane.

See *N*-Methyl-*sec.*-*n*-amylamine.

o-Methylaminophenol (o-*Hydroxy-methylaniline*)



C_7H_9ON MW, 123

Plates from C_6H_6–pet. ether. M.p. 96–7° (86–7°). $FeCl_3$ in HCl $\longrightarrow$ deep reddish-brown col.

Me ether: see *N*-Methyl-*o*-anisidine.

Lees, Shedden, *J. Chem. Soc.*, 1903, **83**, 756.

m-Methylaminophenol (m-*Hydroxy-methylaniline*).

Liq. Solidifies on standing. B.p. 190°/40 mm., 170°/12 mm. Very sol. EtOH, Et_2O, C_6H_6, AcOEt. Spar. sol. cold H_2O, ligroin. Sol. acids and alkalis.

Badische, D.R.P., 48,151.

Gnehm, Scheutz, *J. prakt. Chem.*, 1933, **63**, 422.

p-Methylaminophenol (p-*Hydroxy-methylaniline*).

Needles from C_6H_6. M.p. 87°.

Me ether: *see* *N*-Methyl-*p*-anisidine.

Et ether see *N*-Methyl-*p*-phenetidine.

B_2,H_2SO_4: metol. Needles from H_2O. M.p. 250–60°. Sol. 25 parts H_2O at 25°. Photographic developer.

Acetyl: needles from pet. ether. M.p. 43°. B.p. 168·5°/9 mm. $FeCl_3$ gives no col. Acid $FeCl_3 \longrightarrow$ benzoquinone on warming. *B,HCl*: plates from EtOH–Et_2O. M.p. 200°. *Picrate*: yellow needles from EtOH. M.p. 157·5°. Insol. C_6H_6.

Benzoyl: prisms from 50% EtOH. M.p. 173–4°. Sol. EtOH, AcOH. Spar. sol. hot C_6H_6. Insol. ligroin.

p-*Toluenesulphonyl*: prisms from C_6H_6–ligroin. M.p. 135°.

Harger, *J. Am. Chem. Soc.*, 1919, **41**, 273.

Galatis, *Ber.*, 1927, **60**, 1399.

MacLeester, U.S.P., 1,882,437, (*Chem. Abstracts*, 1933, **27**, 736).

Sommer, Nassau, U.S.P., 1,886,449, (*Chem. Abstracts*, 1933, **27**, 1363).

α-Methylaminophenylacetic Acid (*N-Methyl-1-phenylglycine, 1-phenylsarcosine*)

$$C_6H_5{\cdot}CH(NH{\cdot}CH_3){\cdot}COOH$$

$C_9H_{11}O_2N$ MW, 165

Leaflets from H_2O. Sublimes at 274° without melting. Spar. sol. EtOH, Et_2O, cold H_2O.

Et ester: $C_{11}H_{15}O_2N$. MW, 193. B.p. 136°/10 mm. Very spar. sol. H_2O.

Amide: $C_9H_{12}ON_2$. MW, 164. Leaflets. M.p. 157°.

Tiemann, Piest, *Ber.*, 1881, **14**, 1982.
Knoop, *Ber.*, 1919, **52**, 2269.
Fourneau, Vila, *Bull. soc. chim.*, 1911, **9**, 985.

2-Methylamino-1-phenylpropanol-1. *See* Ephedrine.

4-Methyl-2-[*p*-aminophenyl]-quinoline. *See* Flavaniline.

Methyl aminophenyl sulphide. *See under* Aminothiophenol.

1-Methylaminopropionic Acid. *See N*-Methyl-α-alanine.

2-Methylaminopropionic Acid (*N-Methyl-β-alanine*)

$$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_4H_9O_2N$ MW, 103

Plates + $1H_2O$ from EtOH. M.p. 99–100°. Sol. H_2O.

B,HCl: needles from EtOH.Aq. M.p. 105°.

B_2,H_2SO_4: needles from EtOH. M.p. 130°. Very sol. H_2O.

B_2,H_2PtCl_6: orange-yellow cryst. from H_2O. M.p. 196° decomp. Very sol. hot H_2O. Insol. EtOH.

Me ester: $C_5H_{11}O_2N$. MW, 117. B.p. 50°/11 mm.

Et ester: $C_6H_{13}O_2N$. MW, 131. B.p. 59–61°/4 mm., 58°/8 mm. D^5 0·9669, D^{20}_{20} 1·0082. n^{20}_D 1·4443. *B,HCl*: cryst. M.p. 59–60°.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 39.
Morsch, *Monatsh.*, 1933, **63**, 220.
Prill, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 1238.

β-Methylaminopropiophenone (*Methyl-1-benzoylethyl-amine, 1-methylaminoethyl phenyl ketone*)

$$C_6H_5{\cdot}CO{\cdot}CH(NH{\cdot}CH_3){\cdot}CH_3$$

$C_{10}H_{13}ON$ MW, 163

Yellow oil. B.p. 120–1°/11 mm.

B,HCl: m.p. 179°.

$B,HAuCl_4$: needles. M.p. 120°.

B_2,H_2PtCl_6: red cryst. from H_2O. M.p. 191–2°.

Picrate: cryst. from EtOH. M.p. 138°.

Skita, Keil, Baesler, *Ber.*, 1933, **66**, 862.
Eberhard, *Arch. Pharm.*, 1915, **253**, 81.

γ-Methylaminopropiophenone (*Methyl-2-benzoylethyl-amine, 2-methylaminoethyl phenyl ketone*)

$$C_6H_5{\cdot}CO{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CH_3$$

$C_{10}H_{13}ON$ MW, 163

B,HCl: plates from Me_2CO. M.p. 139–41°. Very sol. H_2O, EtOH, $CHCl_3$. Less sol. Me_2CO.

Mannich, Heilner, *Ber.*, 1922, **55**, 363.

3-Methylaminopropyl Alcohol (*N-Methyl-3-hydroxypropylamine*)

$$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$$

$C_4H_{11}ON$ MW, 89

B.p. 74–7°/2·5 mm. D^{20}_4 0·9315. n^{27}_D 1·4418. Sol. H_2O.

Benzoyl: b.p. 144–5°/10 mm.

v. Braun, Braunsdorf, *Ber.*, 1921, **54**, 690.
Pierce, *J. Am. Chem. Soc.*, 1928, **50**, 242.

3-Methylaminopropylene Glycol (*Methyl-2:3-dihydroxypropyl-amine, 1-methylamino-2:3-propandiol*)

$$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2OH$$

$C_4H_{11}O_2N$ MW, 105

Oil. B.p. 239–41°/748 mm. Sol. H_2O, EtOH Spar. sol. Me_2CO, Et_2O, AcOEt. Insol. C_6H_6. Absorbs H_2O and CO_2 from the air.

Picrolonate: exists in two forms. (i) Orange prisms from EtOH. M.p. 212°. Very spar. sol. EtOH. (ii) Cryst. from EtOH. M.p. 145°. More sol. than first form.

Knorr, Knorr, *Ber.*, 1899, **32**, 754.

Methyl 3-aminopropyl sulphide (*3-Methylmercaptopropylamine*)

$$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}S{\cdot}CH_3$$

$C_4H_{11}NS$ MW, 105

B.p. 170°. Misc. with H_2O, EtOH, Et_2O. Volatile in steam.

B,HCl: needles. M.p. 136°. Very sol. H_2O, EtOH. Spar. sol. Me_2CO. Hygroscopic.

Oxalate: cryst. Decomp. at 208°.

Picrate: cryst. M.p. 126–7°.

Picrolonate; cryst. M.p. 184–5°.

Schneider, *Ann.*, 1910, **375**, 245

Methyl 3-aminopropyl sulphone (3-*Methylsulphonpropylamine*)

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}SO_2{\cdot}CH_3$

$C_4H_{11}O_2NS$ MW, 137

Cryst. M.p. 44°. B.p. 165–8°/6 mm. Very sol. H_2O. Sol. EtOH. Insol. Et_2O. Very hygroscopic. Reacts strongly alkaline. Fuming HNO_3 ⟶ methane-sulphonic acid.

B,HCl : prisms from EtOH. M.p. 146°. Very sol. H_2O. Sol. 200 parts cold EtOH, 25 parts boiling EtOH.

B_2,H_2PtCl_6 : orange plates from EtOH.Aq. Decomp. at 234°. Very sol. H_2O.

Picrate : cryst. M.p. 190–2°.

Picrolonate : cryst. M.p. 216°.

Schneider, *Ann.*, 1910, **375**, 225.

Methyl 3-aminopropyl sulphoxide

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}SO{\cdot}CH_3$

$C_4H_{11}ONS$ MW, 121

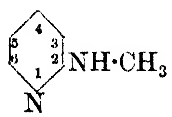
Oxalate : plates. M.p. 197°. Very sol. H_2O. Spar. sol. EtOH.

Picrate : cryst. M.p. 143°.

Picrolonate : cryst. M.p. 210° decomp.

Schneider, *Ann.*, 1912, **386**, 343.

2-Methylaminopyridine (*Methyl-α-pyridylamine*)



$C_6H_8N_2$ MW, 108

M.p. 15°. B.p. 200–1°, 90°/9 mm.

Benzoyl : m.p. 61–2°. B.p. 200°/11 mm.

Picrate : orange-yellow needles from H_2O. M.p. 190°.

Tschitschibabin, Konowalowa, Konowalowa, *Ber.*, 1921, **54**, 816.

Tschitschibabin, Knunjanz, *Ber.*, 1928, **61**, 2215.

4-Methylaminopyridine (*Methyl-γ-pyridylamine*).

Cryst. M.p. 115–18° (108–10°). Sol. H_2O, EtOH, Et_2O, C_6H_6. Not hygroscopic.

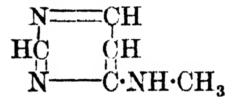
B_2,H_2PtCl_6 : orange-red needles from H_2O. M.p. 232° (214–15°).

Picrate : light yellow prisms or needles from H_2O. M.p. 172° (168·5–169°).

Tschitschibabin, Ossetrova, *Ber.*, 1925, **58**, 1711.

Koenigs, Friedrich, Jurany, *ibid.*, 2574.

4-Methylaminopyrimidine (6-*Methylaminopyrimidine*, 4-*methylamino*-1 : 3-*diazine*)



$C_5H_7N_3$ MW, 109

Cryst. M.p. 74–5°. Reacts strongly alkaline.

B,HCl : needles. Sol. H_2O.

B_2,H_2PtCl_6 : cryst. Mod. sol. H_2O.

Winkelmann, *J. prakt. Chem.*, 1927, **115**, 298.

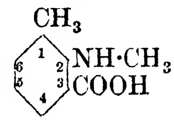
4-Methylaminopyrimidone-2.

See N-Methylcytosine.

Methylaminosuccinic Acid.

See N-Methylaspartic Acid.

2-Methylamino-*m*-toluic Acid



$C_9H_{11}O_2N$ MW, 165

Cryst. M.p. 149°. Alc. sol. shows blue fluor.

Houben, Freund, *Ber.*, 1913, **46**, 3838.

4-Methylamino-*m*-toluic Acid.

Needles by sublimation or cryst. from pet. ether. M.p. about 128°. Alc. sol. shows blue fluor.

See previous reference.

6-Methylamino-*m*-toluic Acid.

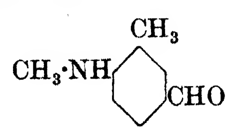
Needles from H_2O. M.p. 201°. Sol. most org. solvents.

Acetyl : cryst. M.p. 232°.

Houben, Schotmüller, Freund, *Ber.*, 1909, **42**, 4490.

Meldrum, Advani, *J. Indian Chem. Soc.*, 1933, **10**, 107.

6-Methylamino-*m*-toluic Aldehyde



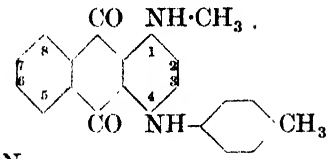
$C_9H_{11}ON$ MW, 149

Plates or needles. M.p. 115°. Sol. EtOH, C_6H_6, AcOH. Spar. sol. H_2O, boiling ligroin.

Ullmann, Frey, *Ber.*, 1904, **37**, 863.

Geigy, D.R.P., 103,578, (*Chem. Zentr.*, 1899, II, 927).

1-Methylamino-4-p-toluidinoanthraquinone



$C_{22}H_{18}O_2N_2$ MW, 342

Dark blue cryst. from MeOH. Sol. $CHCl_3$, Py. Less sol. EtOH. EtOH + HCl ⟶ bluish-red sol. Conc. HCl ⟶ reddish-violet sol. Conc. H_2SO_4 ⟶ greenish-blue sol.

Bayer, D.R.P., 165,139, (*Chem. Zentr.*, 1905, II, 1762).
B.D.C., E.P., 271,602, (*Chem. Abstracts*, 1928, **22**, 1595).

1-Methylamino-5-p-toluidinoanthraquinone.

Needles from Py–MeOH. M.p. 199°. Sol. $CHCl_3$ with bluish-red col. Conc. H_2SO_4 ⟶ yellow sol: + boric acid ⟶ violet. Insol. conc. HCl.

Bayer, D.R.P., 139,581, (*Chem. Zentr.*, 1903, I, 679).

Methyl p-amino-o-tolyl sulphide.
See under 4-Amino-o-thiocresol.

α-Methylaminotriphenylmethane

$(C_6H_5)_3C{\cdot}NH{\cdot}CH_3$

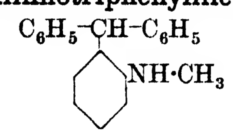
$C_{20}H_{19}N$ MW, 273

Prisms from ligroin. M.p. 73°. Sol. org. solvents. Insol. H_2O.

B,HCl: cryst. M.p. 216°. Sol. EtOH. Spar. sol. H_2O.

Hemilian, Silberstein, *Ber.*, 1884, **17**, 745.
Vasborgh, *J. Am. Chem. Soc.*, 1916, **38**, 2090.

2-Methylaminotriphenylmethane



$C_{20}H_{19}N$ MW, 273

Rhombohedra from C_6H_6. M.p. 130–2°. Sol. C_6H_6. Spar. sol. EtOH, Et_2O.

B,HCl: prisms. M.p. above 210° decomp.

Acetyl: prisms from AcOEt. M.p. 147·5–148·5°.

Baeyer, Villiger, *Ber.*, 1904, **37**, 3207.

1-Methylaminovaleric Acid

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\underset{}{\overset{NH\cdot CH_3}{CH}}{\cdot}COOH$$

$C_6H_{13}O_2N$ MW, 131

Cryst. from EtOH or MeOH. Sublimes at 252°. Sol. H_2O. Spar. sol. cold EtOH. Aq. sol. has sweet taste.

Friedmann, *Beiträge zur Chemischen Physiologie und Pathologie*, 1908, **11**, 170.

4-Methylaminovaleric Acid

$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_6H_{13}O_2N$ MW, 131

Needles or prisms from EtOH–Et_2O. M.p. 126–7° (121–2°). Hygroscopic. At 130–60° ⟶ N-methyl-α-piperidone.

K salt: cryst. M.p. 280°.

B,HCl: cryst. M.p. 93°.

Et ester: $C_8H_{17}O_2N$. MW, 159. *B,HCl*: cryst. from AcOEt. M.p. 108–9°.

Picrate: cryst. + H_2O. M.p. 70–1°.

Ruzicka, *Helv. Chim. Acta*, 1921, **4**, 474.
Prill, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 1238.

Methylamylacetic Acid.
See 1-Methyl-n-heptylic Acid.

Methyl-n-amylacetylene.
See 2-Octine.

1-Methyl-n-amyl Alcohol.
See Methyl-n-butylcarbinol.

2-Methyl-n-amyl Alcohol (*2-Methylpentanol-1*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2OH$$

$C_6H_{14}O$ MW, 102

B.p. 148°/762 mm., 146–7°/749 mm. D^0 0·8396, D_4^{20} 0·8263. n_D^{20} 1·4182. KOH at 240–50° ⟶ 1-methylvaleric acid.

Bouveault, Blanc, D.R.P., 164,294, (*Chem. Zentr.*, 1905, II, 1700).
Skita, *Ber.*, 1915, **48**, 1492.
Wood, Scarf, *J. Soc. Chem. Ind.*, 1923, **42**, 13T.

3-Methyl-n-amyl Alcohol (*3-Methylpentanol-1*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_2OH$$

$C_6H_{14}O$ MW, 102

d-.

B.p. 151–152·1°, 72°/25 mm. D^{15} 0·8295, D^{20} 0·8262, D_4^{27} 0·822. n_D^{25} 1·4182. $[\alpha]_D^{20\cdot5}$ + 8·77°, $[\alpha]_D^{27}$ + 3·62°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.
Bowden, Adkins, *J. Am. Chem. Soc.*, 1934, **56**, 689.

4-Methyl-*n*-amyl Alcohol.
See Isohexyl Alcohol.

N-Methyl-*n*-amylamine (1-*Methylamino-pentane*)

$CH_3\cdot[CH_2]_4\cdot NH\cdot CH_3$

$C_6H_{15}N$ MW, 101

Oil. B.p. 116–18°, 114°/745 mm. D_4^{15} 0·738.
B,HCl: needles. M.p. 181–2°.
B_2,H_2PtCl_6: yellow needles. M.p. 171–3°.
Picrate: cryst. M.p. 121°.

v. Braun, *Ann.*, 1911, **382**, 21.
Löffler, *Ber.*, 1910, **43**, 2040.

N-Methyl-sec.-*n*-amylamine (3-*Methyl-aminopentane*)

$(CH_3\cdot CH_2)(CH_3\cdot CH_2)>CH\cdot NH\cdot CH_3$

$C_6H_{15}N$ MW, 101

B.p. 106–7°.
Acid oxalate: m.p. 142–3°.

Skita, Keil, Havemann, *Ber.*, 1933, **66**, 1410.

2-Methyl-*n*-amylamine (1-*Amino-2-methyl-pentane*)

$CH_3\cdot CH_2\cdot CH_2\cdot CH(CH_3)\cdot CH_2NH_2$

$C_6H_{15}N$ MW, 101

d-.
B.p. 64°/90 mm., 28–30°/4 mm. D_4^{25} 0·763. $[\alpha]_D^{25}$ + 3·84°.
B,HCl: cryst. $[\alpha]_D^{25}$ + 1·51° in 50% EtOH.

Levene, Marker, *J. Biol. Chem.*, 1932, **98**, 1.

3-Methyl-*n*-amylamine (1-*Amino-3-methyl-pentane*)

$CH_3\cdot CH_2\cdot CH(CH_3)\cdot CH_2\cdot CH_2NH_2$

$C_6H_{15}N$ MW, 101

d-.
B.p. 120–4°, 67°/100 mm. D_4^{26} 0·767. n_D^{25} 1·4196. $[\alpha]_D^{26}$ + 4·27°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.

4-Methyl-*n*-amylamine.
See Isohexylamine.

Methyl-*active*-amylaniline

$C_6H_5\cdot N(CH_3)\cdot CH_2\cdot CH<(CH_3)(C_2H_5)$

$C_{12}H_{19}N$ MW, 177

B.p. 244–5°/764 mm., 131–2°/16 mm. D^{15} 0·9220. n_D^{15} 1·5313. $[\alpha]_D^{15}$ + 10·8°.
B,HCl: cryst. M.p. 138°.

Jones, *J. Chem. Soc.*, 1905, **87**, 138.

Methyl-*n*-amylcarbinol (*Heptanol*-2, 2-*hydroxyheptane*)

$CH_3\cdot[CH_2]_4\cdot CH(OH)\cdot CH_3$

$C_7H_{16}O$ MW, 116

d-.
B.p. 73·5°/20 mm. D_4^{20} 0·8190, D_4^{35} 0·8050. n_D^{20} 1·4209. $[\alpha]_D^{20}$ + 11·45° in EtOH, + 13·71° in C_6H_6.
Acetyl: b.p. 71°/17 mm. D_4^{15} 0·8650. n_D^{20} 1·4089. $[\alpha]_D^{20}$ + 8·23°.
Propionyl: b.p. 82°/16 mm. D_4^{20} 0·8601. n_D^{20} 1·4133. $[\alpha]_D^{20}$ + 8·37°.
Butyryl: b.p. 98°/17 mm. D_4^{17} 0·8600. n_D^{20} 1·4160. $[\alpha]_D^{20}$ + 10·16°.
Valeryl: b.p. 116°/18 mm. D_4^{16} 0·8579. n_D^{20} 1·4199. $[\alpha]_D^{20}$ + 10·26°.
Caproyl: b.p. 126°/15 mm. D_4^{20} 0·8541. n_D^{20} 1·4233. $[\alpha]_D^{20}$ + 9·97°.
Lauryl: b.p. 174°/5 mm. D_4^{17} 0·8545. n_D^{20} 1·4376. $[\alpha]_D^{20}$ + 7·58°.
Myristyl: b.p. 197°/4 mm. D_4^{17} 0·8562. n_D^{20} 1·4416. $[\alpha]_D^{20}$ + 6·59°.
Palmityl: cryst. M.p. 19°. B.p. 213°/9 mm. D_4^{21} 0·8544. n_D^{20} 1·4433. $[\alpha]_D^{20}$ + 6·53°.
Stearyl: cryst. M.p. 29°. B.p. 228°/7 mm. D_4^{35} 0·8454. $[\alpha]_D^{20}$ + 6·06°.
Acid phthalate: *brucine salt*, m.p. 137–8°. $[\alpha]_D$ + 4·42°. *Strychnine salt*: m.p. 203–4°. $[\alpha]_D$ − 18·89°.

l-.
B.p. 74·5°/23 mm. D_4^{20} 0·8184. $[\alpha]_D^{17}$ −10·48°.
Acid phthalate: *cinchonidine salt*, m.p. 108–9°. $[\alpha]_D$ − 70·36°.

dl-.
B.p. 158–60° (155–157·5°), 66·7°/16·5 mm. D_4^0 0·8315, D_4^{20} 0·8167. n_D^{20} 1·4210. Insol. H_2O.
3 : 5-*Dinitrobenzoyl*: m.p. 49·4°.
1-*Naphthylurethane*: m.p. 54°.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 58; 1914, **105**, 830.
Whitmore, Otterbacher, *Organic Syntheses*, 1930, X, 60.

Methyl-sec.-*n*-amylcarbinol (3-*Ethylpentanol*-4, 3-*ethyl*-4-*hydroxypentane*, 1 : 1-*diethyliso-propyl alcohol*)

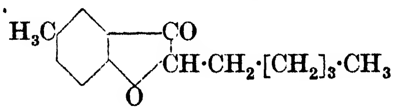
$(CH_3\cdot CH_2)_2CH\cdot CH(OH)\cdot CH_3$

$C_7H_{16}O$ MW, 116

B.p. 148–52°. D^0 0·8531. Ox. ⟶ diethyl-acetone.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.

4-Methyl-2-*n*-amylcoumaranone

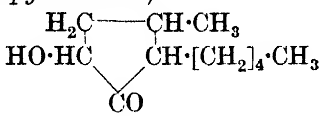


$C_{14}H_{18}O_2$ MW, 218

Yellow oil. B.p. 175°/18 mm.

Auwers, Wegener, *J. prakt. Chem.*, 1923, **106**, 248.

4-Methyl-3-*n*-amylcyclopentanolone- (*Tetrahydropyrethrolone*)



$C_{11}H_{20}O_2$ MW, 184

Oil. B.p. 160–2°/10 mm., 108–10°/0·1 mm., $[\alpha]_D^{20}$ − 11·32°. Reduces $NH_3.AgNO_3$ and warm Fehling's.

Me ether: $C_{12}H_{22}O_2$. MW, 198. Oil. B.p. 128°/12 mm.

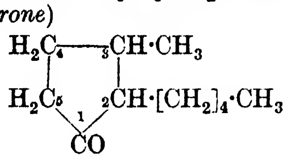
Acetyl: oil. B.p. 110°/0·16 mm.

Semicarbazone: cryst. from $CHCl_3$. M.p. 189–90° decomp. Very sol. MeOH. Insol. C_6H_6.

p-*Nitrophenylosazone*: cryst. from Py–C_6H_6. Decomp. at 350°.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 225.

3-Methyl-2-*n*-amylcyclopentanone (*Tetrahydropyrethrone*)



$C_{11}H_{20}O$ MW, 168

B.p. 100–1°/12 mm.

Semicarbazone: *l*-, cryst. from MeOH. M.p. 194°. *r*-, cryst. from C_6H_6. M.p. 159–60°.

p-*Nitrophenylhydrazone*: *r*-, cryst. from EtOH. M.p. 87°.

Oxime: oil. B.p. 100–2°/0·4 mm., 84–5°/0·1 mm.

Iso-oxime: oil. B.p. 130–1°/0·8 mm., 120°/0·1 mm.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 236, 245.

4-Methyl-2-*n*-amylcyclopentanone.

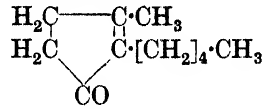
B.p. 107–9°/14 mm.

Semicarbazone: cryst. M.p. 147–8°.

p-*Nitrophenylhydrazone*: cryst. M.p. 134–5°.

Ruzicka, Staudinger, *Helv. Chim. Acta*, 1924, **7**, 248.

3-Methyl-2-*n*-amyl-Δ²-cyclopentenone



$C_{11}H_{18}O$ MW, 166

Oil. B.p. 115–17°/12 mm.

Semicarbazone: cryst. from C_6H_6. M.p. 175–6°.

p-*Nitrophenylhydrazone*: cryst. from MeOH. M.p. 118–19°.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 257.

Methyl *n*-amyl Diketone.

See Acetylcaproyl.

Methyl *n*-amyl Ether

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_3$

$C_6H_{14}O$ MW, 102

B.p. 99–100°/760 mm.

Lespieau, *Compt. rend.*, 1912, **154**, 887.

Methyl *active*-amyl Ether

$\genfrac{}{}{0pt}{}{C_2H_5}{CH_3}{>}CH{\cdot}CH_2{\cdot}O{\cdot}CH_3$

$C_6H_{14}O$ MW, 102

B.p. 87·5–88·5°/731 mm. D_4^{18} 0·754. $n_D^{20\cdot2}$ 1·3849. $[\alpha]_D^{18}$ + 0·61°.

Guye, Chavanne, *Bull. soc. chim.*, 1896, **15**, 300.

Methyl-*n*-amylglyoxal.

See Acetylcaproyl.

Methyl-*n*-amylglyoxime.

See under Acetylcaproyl.

Methyl *n*-amyl Ketone (*Heptanone*-2, 2-*keto-heptane*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_7H_{14}O$ MW, 114

F.p. − 35·5°. B.p. 151·45°, 148–51°/750 mm., 111°/21 mm. D_4^0 0·83239, D_4^{15} 0·81966, D_4^{30} 0·80680. n_D^{20} 1·41433. Forms bisulphite comp.

Semicarbazone: cryst. M.p. 120°.

2 : 4-*Dinitrophenylhydrazone*: yellowish-orange cryst. M.p. 89°.

Johnson, Hager, *Organic Syntheses*, Collective Volume I, 343.

Methyl *sec.*-*n*-amyl Ketone.

See 3-Ethylpentanone-2.

Methyl *active*-amyl Ketone (3-*Methylhexanone*-5, 5-*keto*-3-*methylhexane*)

$\genfrac{}{}{0pt}{}{C_2H_5}{CH_3}{>}CH{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_7H_{14}O$ MW, 114

B.p. 146–7°, 139°/762 mm. Misc. with most org. solvents. Sol. conc. HCl, H_2SO_4, HNO_3. Forms bisulphite comp.

Kohler, *Am. Chem. J.*, 1907, **38**, 527.
Clarke, *J. Am. Chem. Soc.*, 1908, **30**, 1150.

Methylamylnonylcarbinol.
See 6-Methylpentadecanol-6.

Methyl *active*-amyl sulphide

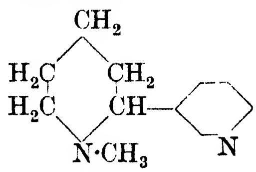
$$\begin{matrix} C_2H_5 \\ CH_3 \end{matrix} > CH \cdot CH_2 \cdot S \cdot CH_3$$

$C_6H_{14}S$ MW, 118

B.p. 138–9°/751 mm. D_0^{19} 0·84. $[\alpha]_D$ +12·30°.

Brjuchonenko, *J. prakt. Chem.*, 1899, **59**, 46.

***N*-Methylanabasine**



$C_{11}H_{16}N_2$ MW, 176

B.p. 268°/760 mm., 121°/7 mm. D_4^{20} 1·0148. n_D^{15} 1·5328. $[\alpha]_D^{15}$ − 85·1° (− 84·34°).

B,HgCl₂ : needles from H_2O. M.p. 129° decomp.

Picrate : cryst. from EtOH. M.p. 287–8° decomp.

Picrolonate : yellow needles from EtOH. M.p. 234–6° decomp.

Methiodide : yellow needles from EtOH. M.p. 245–7°. Sol. H_2O. Spar. sol. cold EtOH.

Orechoff, Norkina, *Ber.*, 1932, **65**, 726.

Methylanhydrochelidonine

$C_{21}H_{19}O_4N$ MW, 349

Cryst. M.p. 152–3°. Optically inactive.

Methochloride : m.p. 215–17°.

Methiodide : cryst. M.p. 242–4°.

Methonitrate : m.p. 260–1°.

Gadamer, Dieterle, *et al.*, *Arch. Pharm.*, 1924, **262**, 249.

Methylaniline

$$C_6H_5 \cdot NH \cdot CH_3$$

C_7H_9N MW, 107

F.p. − 57°. B.p. 196·1° (193·8°)/760 mm., 156°/250 mm., 95°/25 mm., 79·2°/10 mm. D_4^4 0·9993, D_4^{18} 0·9879, D_4^{20} 0·98912. $n_D^{16 \cdot 6}$ 1·57292, $n_D^{21 \cdot 2}$ 1·57021. Crit. temp. 428·6°. Insol. H_2O. $k = 2{\cdot}5 \times 10^{-10}$ at 18°.

B,HCl : needles from $CHCl_3$–Et_2O. M.p. 121–2°. Very sol. $CHCl_3$. Sol. EtOH. Insol. Et_2O, C_6H_6.

B,HBr : needles. M.p. 98–9°. Sol. H_2O. Insol. Et_2O. Hygroscopic.

B,HI : cryst. M.p. 124°.

B_2,H_2PtCl_6 : orange cryst. from HCl.Aq. M.p. 199° decomp.

B_2,H_2PtBr_6 : red cryst. M.p. 227–8°.

B_2,H_2SnCl_6 : cryst. M.p. 251° decomp. Sol. H_2O.

Oxalate : m.p. 113°.

Acid tartrate : m.p. 192°.

Picrate : yellow cryst. from MeOH. M.p. 144·5°.

N-*Acetyl* : *see* *N*-Methylacetanilide.

N-*Benzoyl* : *N*-methylbenzanilide. Cryst. from ligroin. M.p. 63°. B.p. 331–2°. Sol. usual org. solvents. Insol. H_2O.

N-*Nitro* : *see* methylphenylnitramine.

N-*Nitroso* : methylphenylnitrosamine. M.p 13°. B.p. 128–128·4°/19 mm., 120·9–121·5°/13 mm. D_4^{20} 1·1240. n_D^{20} 1·57688. *B,HCl* : pale yellow needles. Decomp. at 120–30°.

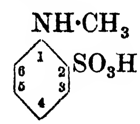
1-*Naphthalenesulphonyl* : cryst. M.p. 147°. 100 parts H_2O dissolve 1·65 parts at 15°.

2-*Naphthalenesulphonyl* : cryst. M.p. 213°.

Naphthalene-2 : 6-*disulphonyl* : cryst. M.p. 272°. 100 parts H_2O dissolve 3·2 parts at 20°.

Ullmann, *Ann.*, 1903, **327**, 110.
Wedekind, *Ber.*, 1899, **32**, 519.
Ullmann, *Enzyklopädie der technischen Chemie*, Vol. I [*Berlin-Wien* 1914], **443**.
Frankland, Challenger, Nicholls, *J. Chem. Soc.*, 1919, **115**, 198.
Tsuipin, *Chem. Abstracts*, 1933, **27**, 4782.

Methylaniline-*o*-sulphonic Acid (N-*Methylorthanilic acid*)



$C_7H_9O_3NS$ MW, 187

Decomp. at 182°. Salts are very sol. H_2O.

Amide : $C_7H_{10}O_2N_2S$. MW, 186. Needles from H_2O. M.p. 114·5–115·5°. N-*Acetyl* : prisms from EtOH. M.p. 174–7°.

Claasz, *Ann.*, 1911, **380**, 312.
Ekbom, *Bihang till Svenska Vet.-Akad. Handlinger*, **27**, II, No. 1, 4.

Methylaniline-*m*-sulphonic Acid (N-*Methylmetanilic acid*).

Needles from H_2O. Decomp. at 285–90°. 100 parts H_2O dissolve 7·63 parts at 15°. Insol.

EtOH. KOH fusion ⟶ *m*-methylaminophenol.

Badische, D.R.P., 48,151.
Gnehm, Scheutz, *J. prakt. Chem.*, 1901, **63**, 410.

Methylaniline-*p*-sulphonic Acid (*N-Methylsulphanilic acid*).

Plates from H_2O. M.p. 244–5° decomp. 100 parts H_2O dissolve 28·4 parts at 13°. Insol. EtOH. Violet-brown col. with $FeCl_3$.

Rossow, Döhle, Reim, *J. prakt. Chem.*, 1916, **93**, 191.
Halberkann, *Ber.*, 1921, **54**, 1836.

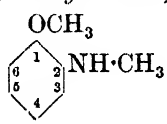
Methylanisaldehyde.

See under 5-Hydroxy-*o*-toluic Aldehyde *and* 6-Hydroxy-*m*-toluic Aldehyde.

Methylanisic Acid.

See under 5-Hydroxy-*o*-toluic Acid *and* 6-Hydroxy-*m*-toluic Acid.

***N*-Methyl-*o*-anisidine** (o-*Methylaminoanisole*, o-*methoxy-methylaniline*)



$C_8H_{11}ON$ MW, 137

Cryst. M.p. 33–33·5°. B.p. 218–20°, 141–3°/46–7 mm. Sol. ord. org. solvents. Reduces $NH_3.AgNO_3$ and $AuCl_3$. Oxidising agents give brownish-red cols. HNO_2 ⟶ yellow nitrosamine.

Picrate: yellow plates from EtOH. M.p. 139°.

Diepolder, *Ber.*, 1899, **32**, 3515.

***N*-Methyl-*p*-anisidine** (p-*Methylaminoanisole*, p-*methoxy-methylaniline*).

Cryst. from ligroin. M.p. 37°. B.p. 135–6°/19 mm., 111–13°/9 mm. Sol. most org. solvents.

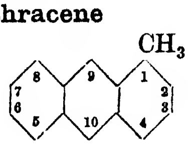
B_2,H_2SnCl_6: plates. M.p. 91°.

Fröhlich, Wedekind, *Ber.*, 1907, **40**, 1010.
Späth, Brunner, *Ber.*, 1925, **58**, 522.

Methyl anisyl Ketone.

See Anisylacetone.

1-Methylanthracene



$C_{15}H_{12}$ MW, 192

Needles from MeOH. M.p. 85–6°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Alc. sol. shows blue fluor. Conc. H_2SO_4 ⟶ yellowish-green sol. Irradiation ⟶ dimethyldianthracene (m.p. 246°). CrO_3 in AcOH ⟶ 1-methylanthraquinone.

Picrate: cryst. M.p. 113–15°.

Fischer, Sapper, *J. prakt. Chem.*, 1911, **83**, 203.
Keimatsu, Hirano, Yoshimi, *Chem. Abstracts*, 1930, **24**, 5037.

2-Methylanthracene.

Plates by sublimation with greenish-blue fluor. M.p. 207° (199°). Very sol. C_6H_6, $CHCl_3$, CS_2. Spar. sol. EtOH, Et_2O, AcOH. Very spar. sol. MeOH, Me_2CO. Insol. H_2O. CrO_3 in AcOH ⟶ 2-methylanthraquinone. Excess CrO_3 ⟶ anthraquinone-2-carboxylic acid.

Fischer, *J. prakt. Chem.*, 1909, **79**, 555.
Scholl, Lenko, *Monatsh.*, 1918, **39**, 237.
General Aniline Works, U.S.P., 1,776,924, (*Chem. Abstracts*, 1930, **24**, 5765).

9-Methylanthracene (ms-*Methylanthracene*).

Needles from 96% EtOH. M.p. 81·5° (79–80°). B.p. 196–7°/12 mm. Very sol. usual org. solvents. Conc. H_2SO_4 ⟶ green sol.

Picrate: reddish-brown needles. M.p. 137° decomp.

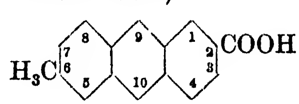
Sieglitz, Marx, *Ber.*, 1923, **56**, 1620.

6-(or 7)Methylanthracene-1-carboxylic Acid.

Golden yellow cryst. from EtOH or AcOH. M.p. 344°. Spar. sol. EtOH, AcOH. Sols fluoresce blue. Soda-lime at 400° ⟶ 2-methylanthracene.

Lavaux, *Ann. chim.*, 1910, **21**, 136.

6-Methylanthracene-2-carboxylic Acid (6-*Methyl*-β-*anthroic acid*)



$C_{16}H_{12}O_2$ MW, 236

Yellow plates from AcOH. M.p. 347° Sol. AcOH. Spar. sol. EtOH. Sols fluoresce blue.

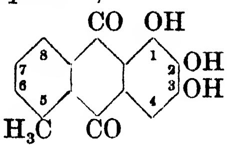
See previous reference and also
Seer, *Monatsh.*, 1911, **32**, 153.

2-Methylanthracene-9(or 10)-carboxylic Acid.

Cryst. from C_6H_6. M.p. 197° decomp. Sol. most org. solvents. CrO_3 ⟶ 2-methylanthraquinone.

Liebermann, *Ber.*, 1912, **45**, 1214.

5-Methylanthragallol (5 : 6 : 7-*Trihydroxy-1-methylanthraquinone*)



$C_{15}H_{10}O_5$ MW, 270

Cryst. M.p. 235–40°.
Triacetyl: m.p. 217–18°.

Liebermann, v. Kostanecki, Cahn, *Ann.*, 1887, **240**, 284.

6-Methylanthragallol (5 : 6 : 7-*Trihydroxy-2-methylanthraquinone*).
Sublimes in orange-red needles. M.p. 275°.

See previous reference.

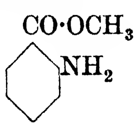
7-Methylanthragallol (6 : 7 : 8-*Trihydroxy-2-methylanthraquinone*).
Cryst. M.p. 312–13°.
Triacetyl: cryst. M.p. 188–90°.

See previous reference.

8-Methylanthragallol (6 : 7 : 8-*Trihydroxy-1-methylanthraquinone*).
Yellow needles from EtOH. M.p. 297–8° decomp. Sol. hot H_2O, EtOH, AcOH. Spar. sol. C_6H_6. Sublimes in red needles. Conc. H_2SO_4 ⟶ red sol. Conc. H_2SO_4 + trace HNO_3 ⟶ green sol. Conc. KOH ⟶ green sol. ⟶ violet on dilution. Hot NH_3.Aq. ⟶ blue sol.
Triacetyl: yellow plates from AcOH. M.p. 208–10°. Sol. hot EtOH, Me_2CO, C_6H_6, $CHCl_3$, AcOH.

See previous reference.

Methyl anthranilate

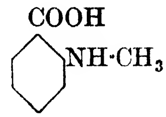


$C_8H_9O_2N$ MW, 151

Occurs in Neroli, Ylang-Ylang, Bergamot, Jasmine and other essential oils and in grape juice. Cryst. M.p. 24–5°. B.p. 135·5°/15 mm., 126·2–126·8°/12 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O. Alc. sols. show blue fluor. $D_4^{18.6}$ 1·16822. $k = 1{\cdot}7 \times 10^{-12}$ at 25°. Volatile in steam. Used in perfumery as artificial orange blossom.
B,HCl: needles. M.p. 181°. Sol. H_2O.
N-*Formyl*: needles from ligroin. M.p. 58°. Sol. H_2O, EtOH.
$C_8H_9O_2N$, $C_6H_3(NO_2)_3$-1 : 3 : 5 : orange-yellow needles from EtOH. M.p. 106°.
Picrate: yellow needles. M.p. 106°.

Erdmann, Erdmann, D.R.P., 110,386, (*Chem. Zentr.*, 1900, II, 461).
Meyer, *Monatsh.*, 1904, **25**, 1202.

***N*-Methylanthranilic Acid** (o-*Methylaminobenzoic acid*)



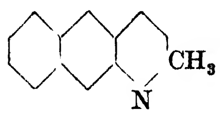
$C_8H_9O_2N$ MW, 151

Plates from EtOH or ligroin. M.p. 182° (175°). Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Sol. 250 parts boiling H_2O. Amphoteric. $k_{(acid)} = 4{\cdot}6 \times 10^{-6}$; $k_{(base)} = 9{\cdot}4 \times 10^{-13}$ at 25°. Alkali salts show blue fluor. in aq. sol. Sublimes readily. Heat above m.p. ⟶ methylaniline. Sodamide + KOH fusion ⟶ indoxyl. KOH fusion in air ⟶ indigo.
B,HCl: needles. M.p. 141°. Sol. EtOH. Spar. sol. H_2O, Et_2O.
Me ester: $C_9H_{11}O_2N$. MW, 165. Constituent of mandarin oil. Cryst. from pet. ether. M.p. 19°. B.p. 256°/760 mm., 130–1°/15 mm. D^{15} 1·120, $D_4^{12.3}$ 1·1348. $n_D^{12.3}$ 1·58395. $k = 3{\cdot}36 \times 10^{-11}$ at 25°. *B,HCl*: needles from EtOH. M.p. 218°. Sol. H_2O. Insol. Et_2O.
Et ester: $C_{10}H_{13}O_2N$. MW, 179. M.p. 39°. B.p. about 270°, 172–5°/45 mm. Sol. Et_2O. Insol. H_2O.
Phenyl ester: $C_{14}H_{13}O_2N$. MW, 227. Yellow needles from EtOH.Aq. M.p. 70–1°. Sol. most org. solvents with strong blue fluor.
Amide: $C_8H_{10}ON_2$. MW, 150. Plates from EtOH. M.p. 159–60°. Sol. EtOH. Dil. sols show blue fluor.
Hydrazide: needles from C_6H_6. M.p. 141–2°. Spar. sol. ligroin. C_6H_6 sol. shows blue fluor.
Acethydrazide: cryst. from C_6H_6. M.p. 152°. Sol. EtOH, dil. acids.
Benzhydrazide: cryst. from EtOH. M.p. 192°. Spar. sol. C_6H_6.
N-*Acetyl*: *hydrazide*, cryst. from EtOH. M.p. 234–5°. Sol. EtOH, dil. acids. Spar. sol. C_6H_6, ligroin.

Vorländer, v. Schilling, Schrödter, *Ber.*, 1901, **34**, 1645.
Willstätter, Kahn, *Ber.*, 1904, **37**, 405.
Houben, Brassert, *Ber.*, 1906, **39**, 3235.
Houben, *Ber.*, 1909, **42**, 3194.
Heller, Göring, Kloss, Köhler, *J. prakt. Chem.*, 1925, **111**, 49.

Methylanthranol.
See Methylanthrone.

2-Methyl-α-anthrapyridine (2-*Methyl*-6:7-*benzquinoline*)



$C_{14}H_{11}N$ MW, 193

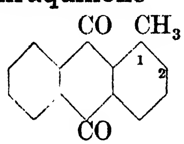
Plates from pet. ether. M.p. 129°. B.p. about 210° (in vacuo). Sol. EtOH, Et_2O, $CHCl_3$, AcOEt, CS_2. Less sol. pet. ether. Sols. show strong green or violet fluor. Sublimes.

B,HCl: needles. M.p. 200°.

Picrate: needles. M.p. 216°.

Lindner, Stauffer, *Monatsh.*, 1925, **46**, 239.

1-Methylanthraquinone



$C_{15}H_{10}O_2$ MW, 222

Yellow needles from EtOH or AcOH.Aq. M.p. 171–2°. Very sol. C_6H_6. Sol. AcOH, ligroin. Spar. sol. Et_2O. Turns red in air. HNO_3 at 160° ⟶ anthraquinone-1-carboxylic acid.

Fischer, Sapper, *J. prakt. Chem.*, 1911, **83**, 204.

Scholl, Donat, *Ber.*, 1931, **64**, 320.

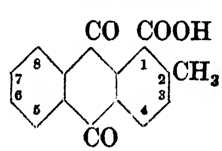
2-Methylanthraquinone.

Needles from EtOH or AcOH. M.p. 177–9° (175°). Sol. EtOH, C_6H_6, AcOH. Less sol. Et_2O. Conc. H_2SO_4 ⟶ yellow sol. KOH + EtOH at 150–70° ⟶ anthraflavone. Zn dust ⟶ 2-methylanthracene. CrO_3 + dil. H_2SO_4 ⟶ anthraquinone-2-carboxylic acid. CrO_3 + AcOH + conc. H_2SO_4 + Ac_2O ⟶ anthraquinone-2-aldehyde.

The volatile constituent of teak-wood to which the name tectoquinone has been given has been found to be identical with 2-methylanthraquinone (Kafuku, Sebe, *Bull. Chem. Soc. Japan*, 1932, **7**, 114).

Fieser, *Organic Syntheses*, Collective Vol. I, 345.

2 - Methylanthraquinone - 1 - carboxylic Acid



$C_{16}H_{10}O_4$ MW, 266

Yellow cryst. from $PhNO_2$. M.p. 263–4°.

Me ester: $C_{17}H_{12}O_4$. MW, 280. Yellow needles from MeOH.Aq. M.p. 178–9°.

Et ester: $C_{18}H_{14}O_4$. MW, 294. Cryst. from AcOEt. M.p. 144°. Sol. EtOH, AcOEt. Spar. sol. C_6H_6.

Phenyl ester: $C_{22}H_{14}O_4$. MW, 342. Plates from AcOEt. M.p. 218–19°.

p-*Bromophenyl ester*: $C_{22}H_{13}O_4Br$. MW, 421. Plates from AcOEt. M.p. 226°.

Chloride: $C_{16}H_9O_3Cl$. MW, 284·5. Cryst. Decomp. about 192°.

Anhydride: $C_{32}H_{18}O_7$. MW, 514. Cryst. from Py. M.p. 268·5°.

Nitrile: $C_{16}H_9O_2N$. MW, 247. Yellow plates from AcOH.Aq. M.p. 268°.

Anilide: yellow cryst. from EtOH. M.p. 287–8°.

Scholl, Semp, Stix, *Ber.*, 1931, **64**, 71.

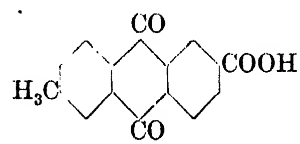
Scholl *et al.*, *Ber.*, 1928, **61**, 979; 1929, **62**, 107.

3 - Methylanthraquinone - 1 - carboxylic Acid.

Cryst. from EtOH or AcOH. M.p. 244–6°. $KMnO_4$ ⟶ anthraquinone-1:3-dicarboxylic acid.

Badische, D.R.P., 259,365, (*Chem. Zentr.*, 1913, I, 1741).

6 - Methylanthraquinone - 2 - carboxylic Acid



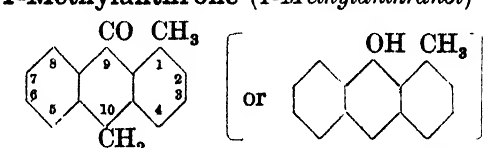
$C_{16}H_{10}O_4$ MW, 266

Yellow needles from AcOH. M.p. 340°. Spar. sol. EtOH.

Lavaux, *Ann. chim.*, 1910, **21**, 139.

Seer, *Monatsh.*, 1911, **32**, 153.

1-Methylanthrone (1-*Methylanthranol*)



$C_{15}H_{12}O$ MW, 208

Yellow cryst. from EtOH. M.p. 126–7°.

v. Braun, Bayer, *Ber.*, 1926, **59**, 914.

2-Methylanthrone (2-*Methylanthranol*).

Plates from MeOH. M.p. 103°. Very sol. Me_2CO, C_6H_6, AcOH. Sol. Et_2O, CCl_4. Ox. ⟶ 2-methylanthraquinone.

Acetyl: cryst. from AcOH. M.p. 143°.
Me ether: $C_{16}H_{14}O$. MW, 222. Cryst. from MeOH. M.p. 77°.

Barnett, Goodway, *J. Chem. Soc.*, 1929, 1757.

3-Methylanthrone (3-*Methylanthranol*).
Yellow cryst. from C_6H_6-pet. ether. M.p. 101°.
Acetyl: colourless cryst. from EtOH. M.p. 139°.

Barnett, Goodway, *J. Chem. Soc.*, 1929, 1758.

10-Methylanthrone (10-*Methylanthranol*, ms-*methylanthrone*).
Yellow needles from MeOH.Aq. M.p. 65°.
Acetyl: yellow needles from EtOH. M.p. 167°.

Barnett, Matthews, *Ber.*, 1926, **59**, 768.

Methylarbutin.
See under Arbutin.

1-N-Methylarginine (1-*Methylamino*-4-*guanidino*-n-*valeric acid*)

$$\begin{array}{l} HN \\ H_2N \end{array}\!\!>C\cdot NH\cdot CH_2\cdot CH_2\cdot CH_2\cdot \underset{}{\overset{NH\cdot CH_3}{\overset{|}{C}H}}\cdot COOH$$

$C_7H_{16}O_2N_4$ MW, 188

Pptd. from acid sol. by phosphotungstic acid.
B,HNO₃: m.p. 192°.
Flavianate: decomp. at 245–6°.
1-N-p-*Toluenesulphonyl*: decomp. at 268°.

Steib, *Z. physiol. Chem.*, 1926, **155**, 286.

4-N-Methylarginine

$$\begin{array}{l} HN \\ H_2N \end{array}\!\!>C\cdot \overset{CH_3}{N}\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{NH_2}{C}H\cdot COOH$$

$C_7H_{16}O_2N_4$ MW, 188

dl-.
B,2HCl: needles from H_2O. Decomp. at 215°. Similar to arginine in behaviour toward alkaloidal reagents.
B,2HNO₃: plates or prisms from EtOH. M.p. 153°. Sol. H_2O, dil. HNO_3.
1-N-*Benzoyl*: needles from EtOH.Aq. M.p. 265° decomp.
Monopicrate: needles from H_2O. Decomp. at 207–9°.
Dipicrate: cryst. Decomp. at 168°.

Thomas, Kapfhammer, Flaschenträger, *Z. physiol. Chem.*, 1922, **124**, 94.

Methylarsenious oxide

$$CH_3\cdot AsO$$

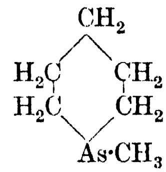
CH_3OAs MW, 106

Cryst. from CS_2. M.p. 95°. Decomp. on dist. Volatile in steam.

Palmer, Dehn, *Ber.*, 1901, **34**, 3597.

1-Methylarsenidine.
See 1-Methylarsepidine.

1-Methylarsepidine (1-*Methylarsenidine*, *methylpentamethylenearsine*)



$C_6H_{13}As$ MW, 160

B.p. 156°/760 mm., 76°/36 mm., 65°/20–2 mm. D^{18} 1·218. Volatile in steam. Heat in sealed tube ⟶ hydrocarbons + mirror of As. Inflammable vapour.
Chloroplatinate: yellow powder. M.p. 163°.
Methiodide: m.p. 290° decomp.

Zappi, *Bull. soc. chim.*, 1916, **19**, 290.

Methylarsine (*Arsinomethane*)

$$CH_3\cdot AsH_2$$

CH_5As MW, 92

B.p. 17°/1140 mm., 2°/760 mm. Sol. EtOH, Et_2O, CS_2. Spar. sol. H_2O. Very poisonous. At 310° ⟶ methane + H + arsine.

Zappi, *Bull. soc. chim.*, 1918, **23**, 323.

Methylarsine dichloride.
See Methyldichloroarsine.

Methylarsine di-iodide.
See Methyldi-iodoarsine.

C-Methylasparagine.
See Homoasparagine.

N-Methylaspartic Acid (*Methylamino-succinic acid*)

$$\begin{array}{l} CH_3\cdot NH\cdot CH\cdot COOH \\ \qquad\qquad\quad | \\ \qquad\qquad\; CH_2\cdot COOH \end{array}$$

$C_5H_9O_4N$ MW, 147

dl-.
Cryst. + $1H_2O$ from H_2O. M.p. 133–4°, anhyd. 178°. 100 parts H_2O dissolve 2·59 parts at 21·2°. Reacts strongly acid.
Mono-Et ester: $C_7H_{13}O_4N$. MW, 175. Needles from EtOH. M.p. 181·5°.
Di-Et ester: $C_9H_{17}O_4N$. MW, 203. Oil. Spar. sol. H_2O.

Monoamide: $C_5H_{10}O_3N_2$. MW, 146. Needles + H_2O. Decomp. at 100°. Very sol. H_2O.

Monomethylamide: $C_6H_{12}O_3N_2$. MW, 160. Leaflets from EtOH.Aq. M.p. 291°.

Körner, Menozzi, *Gazz. chim. ital.*, 1889, **19**, 428.

C-Methylaspartic Acid.
See Homoaspartic Acid.

Methylatophan.
See Methyl-2-phenylquinoline-4-carboxylic Acid *and* 2-*p*-Tolylquinoline-4-carboxylic Acid.

β-Methylatropic Acid.
See 1-Phenylcrotonic Acid.

2-Methylazelaic Acid (2-*Methylheptane*-1:7-*dicarboxylic acid*)

$$HOOC\cdot[CH_2]_5\cdot\overset{CH_3}{C}H\cdot CH_2\cdot COOH$$

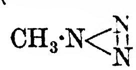
$C_{10}H_{18}O_4$ MW, 202

Cryst. M.p. 43–5°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6.

Di-Et ester: $C_{14}H_{26}O_4$. MW, 258. B.p. 212–15°/100 mm.

Freer, Perkin, *J. Chem. Soc.*, 1888, **53**, 218.

Methyl azide (*Azidomethane, triazomethane*)

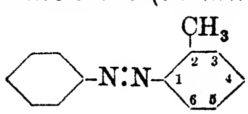


CH_3N_3 MW, 57

B.p. 20–1°. D^8_{15} 0·869. Explodes above 500°.

Dimroth, Wislicenus, *Ber.*, 1905, **38**, 1573.

2-Methylazobenzene (o-*Benzeneazotoluene*)



$C_{13}H_{12}N_2$ MW, 196

Red oil. Does not solidify at − 13°. B.p. 185–3°/28 mm., 180–1°/20 mm. D^{21}_4 1·073.

Löb, D.R.P., 102,891, (*Chem. Zentr.*, 1899, II, 408).
Jacobson, Lischke, *Ber.*, 1895, **28**, 2544.

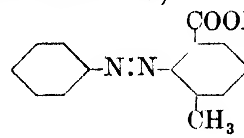
3-Methylazobenzene (m-*Benzeneazotoluene*). Orange-red cryst. M.p. 18–19°. B.p. 175°/19 mm. D^{20}_4 1·065.

Badische, D.R.P., 54,599.
Michaelis, Petou, *Ber.*, 1898, **31**, 991.

4-Methylazobenzene (p-*Benzeneazotoluene*). Orange-red plates from EtOH. M.p. 71–2° (66–7°). B.p. 311–13°/760 mm. Sol. Et_2O, C_6H_6, $CHCl_3$, AcOEt, pet. ether. Less sol. EtOH, AcOH. Sublimes at 80–90°. Volatile in steam. Zn + NaOH ⟶ 4-methylhydrazobenzene. Fe + AcOH ⟶ aniline + *p*-toluidine.

Mills, *J. Chem. Soc.*, 1895, **67**, 930.
Jacobson, Liscke, Askenasy, *Ann.*, 1898, **303**, 368.

6-Methylazobenzene-2-carboxylic Acid (2-*Benzeneazo*-m-*toluic acid*)

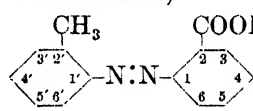


$C_{14}H_{12}O_2N_2$ MW, 240

Red plates + C_6H_6 from C_6H_6–ligroin. M.p. 93°.

Freundler, *Bull. soc. chim.*, 1907, **1**, 223.

2′-Methylazobenzene-2-carboxylic Acid (o-*Tolueneazo*-o-*benzoic acid*)



$C_{14}H_{12}O_2N_2$ MW, 240

Orange-red needles with blue lustre from toluene. M.p. 148°. NaOH + Zn dust at 40° ⟶ 2′-methylhydrazobenzene-2-carboxylic acid.

Chemische Fabrik Weiler ter Meer, D.R.P. 145,063, (*Chem. Zentr.*, 1903, II, 973).

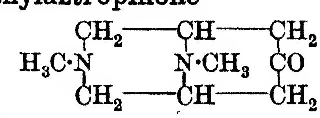
4′-Methylazobenzene-2-carboxylic Acid (p-*Tolueneazo*-o-*benzoic acid*).
Red needles from EtOH.Aq. M.p. 115°. Spar. sol. ligroin. Zn dust in EtOH + AcOH or NH_3.Aq. ⟶ 4′-methylhydrazobenzene-2-carboxylic acid.

Freundler, Sevestre, *Compt. rend.*, 1908, **147**, 982.

4′-Methylazobenzene-3-carboxylic Acid (p-*Tolueneazo*-o-*benzoic acid*).
Yellow plates or orange cryst. from EtOH. M.p. 192°. Sol. EtOH, Et_2O.

Löb, *Ber.*, 1898, **31**, 2204.
Alway, *Ber.*, 1904, **37**, 335.

***N*-Methylaztropinone**



$C_9H_{16}ON_2$ MW, 168

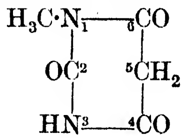
Oil.

Dipicrate: yellow needles from H_2O. M.p. 198° decomp.

Dipiperonylidene deriv.: orange-brown cryst. from isoamyl alcohol. M.p. 214°. Conc. H_2SO_4 ⟶ blue sol.

Blount, Robinson, *J. Chem. Soc.*, 1932, 2487.

1-Methylbarbituric Acid



$C_5H_6O_3N_2$ MW, 142

Plates from EtOH. M.p. 132°. Sol. hot H_2O, MeOH, EtOH, AcOH, $CHCl_3$. Spar. sol. cold H_2O, C_6H_6. Insol. Et_2O, ligroin.

Biltz, Hamburger, *Ber.*, 1916, **49**, 648.

5-Methylbarbituric Acid.

Exists in two stereoisomeric forms.

α-.
M.p. 207°.
Brucine salt: m.p. 220°.

β-.
M.p. 197°.
Brucine salt: m.p. anhyd. 202°.

Nishikawa, *Chem. Abstracts*, 1931, **25**, 5390.

N-Methylbenzanilide.

See under Methylaniline.

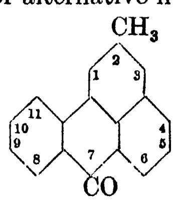
Methylbenzanthracene.

See Methylnaphthanthracene.

Methylbenzanthraquinone.

See Methylnaphthanthraquinone.

2-Methylbenzanthrone (See formulæ under Benzanthrone for alternative numbering)



$C_{18}H_{12}O$ MW, 244

Yellow needles from EtOH or Me_2CO. M.p. 171°. Ox. ⟶ anthraquinone-1-carboxylic acid.

Lüttringhaus, Grosskinsky, D.R.P., 482,839, (*Chem. Zentr.*, 1930, I, 3242).

4-Methylbenzanthrone.

Yellow needles from EtOH. M.p. 199°.

Mayer, Fleckstein, Günther, *Ber.*, 1930, **63**, 1464.

Badische, D.R.P., 200,335, (*Chem. Zentr.*, 1908, II, 655).

8-Methylbenzanthrone.

Yellow needles from AcOEt. M.p. 167–8°. Sol. $CHCl_3$, C_6H_6. Spar. sol. AcOEt. Insol. EtOH, Et_2O. Sol. conc. H_2SO_4 to red sol.

Scholl, Seer, *Ann.*, 1912, **394**, 145.

9-Methylbenzanthrone.

Yellow needles from hot EtOH. M.p. 170°. Spar. sol. EtOH, AcOEt, hot toluene. Sol. conc. H_2SO_4 to red fluor. sol.

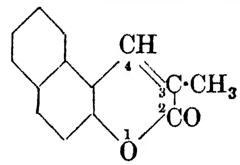
Scholl, Seer, *Ann.*, 1912, **394**, 147.

10-Methylbenzanthrone.

Yellow needles from Me_2CO. M.p. 158–9°.

Scholl, Seer, *Ann.*, 1912, **394**, 148.

3-Methyl-5′ : 6′-benzcoumarin



$C_{14}H_{10}O_2$ MW, 210

Needles from EtOH. M.p. 157°.

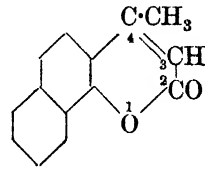
Bartsch, *Ber.*, 1903, **36**, 1969.

4-Methyl-5′ : 6′-benzcoumarin.

Needles from EtOH. M.p. 182–3°.

Bacovescu, *Ber.*, 1910, **43**, 1280.

4-Methyl-7′ : 8′-benzcoumarin

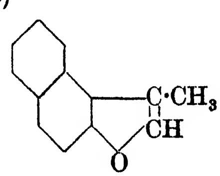


$C_{14}H_{10}O_2$, MW, 210

Needles from EtOH. M.p. 167°. Sol. EtOH, Et_2O, $CHCl_3$.

Bartsch, *Ber.*, 1903, **36**, 1967.

3-Methyl-4′ : 5′-benzcoumarone (3-*Methyl-β-naphthafuran*)

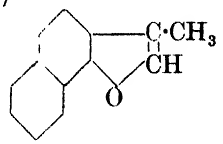


$C_{13}H_{10}O$ MW, 182

Plates from EtOH. M.p. 59°.
Picrate: needles. M.p. 156°.

Stoermer, *Ann.*, 1900, **312**, 312.

3-Methyl-6′ : 7′-benzcoumarone (3-*Methyl-α-naphthafuran*)

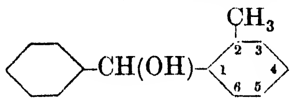


$C_{13}H_{10}O$ MW, 182

Cryst. M.p. 38°. B.p. 302–4°/720 mm. Very sol. most org. solvents. Volatile in steam.

v. Kostanecki, Tambor, *Ber.*, 1909, **42**, 908.

2-Methylbenzhydrol (*α-Hydroxy-2-methyldiphenylmethane phenyl*-o-*tolylcarbinol*)



$C_{14}H_{14}O$ MW, 198

Prisms from ligroin. M.p. 95° (91°). B.p. 323°. Sol. EtOH, Et_2O, C_6H_6. Red sol. in conc. H_2SO_4.

Cohen, *Rec. trav. chim.*, 1919, **38**, 118.
Tschitschibabin, *J. Russ. Phys.-Chem. Soc.*, 1909, **41**, 1117.

3-Methylbenzhydrol (*α-Hydroxy*-3-*methyldiphenylmethane, phenyl*-m-*tolylcarbinol*).

Needles from pet. ether. M.p. 61° (43°). Sol. EtOH.

Montagne, v. Charante, *Rec. trav. chim.*, 1912, **31**, 348.
Cohen, *Rec. trav. chim.*, 1919, **38**, 118.

4-Methylbenzhydrol (*α-Hydroxy*-4-*methyldiphenylmethane, phenyl*-p-*tolylcarbinol*).

Needles from ligroin. M.p. 58° (42°).

Fischer, Fischer, *Ann.*, 1878, **194**, 265.
Elbs, Brand, *Z. Electrochem.*, 1902, **8**, 785.
Cohen, *Rec. trav. chim.*, 1919, **38**, 118.
Marshall, *J. Chem. Soc.*, 1915, **107**, 516.

Methylbenzhydrylamine.

See α-Methylaminodiphenylmethane.

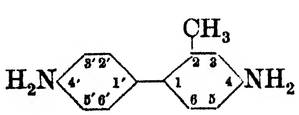
α-Methylbenzhydrylcarbinol.

See 1-Hydroxy-2 : 2-diphenylpropane.

Methyl benzhydryl Ketone.

See unsym.-Diphenylacetone.

2-Methylbenzidine (4 : 4′-*Diamino-2-methyldiphenyl*)



$C_{13}H_{14}N_2$ MW, 198

Amorphous. Very sol. MeOH, Et_2O, C_6H_6. Sol. EtOH, ligroin.

N : N′-*Dibenzylidene* : needles from ligroin. M.p. 111–12°.

N : N′-*Diacetyl* : plates from AcOH. M.p. above 300°.

N : N′-*Disalicyloyl* : needles from ligroin. M.p. 160–5° after sintering at 155°.

Jacobson, Nanninga, *Ber.*, 1895, **28**, 2549.

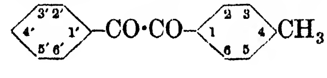
3-Methylbenzidine (4 : 4′-*Diamino-3-methyldiphenyl*).

Amorphous. B.p. 225°/4 mm.

Picrate : yellow solid. M.p. 204°.

Braun, Mintz, *Ber.*, 1917, **50**, 1653.

4-Methylbenzil (*Phenyl* p-*tolyl diketone*)

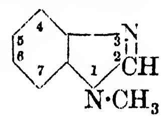


$C_{15}H_{12}O_2$ MW, 224

Cryst. from EtOH. M.p. 99–101°. Distils unchanged in high vacuum. Volatile in steam. KOH at 150° ⟶ phenyl-*p*-tolylglycollic acid.

Weiss, *Monatsh.*, 1920, **40**, 396.

1-Methylbenziminazole



$C_8H_8N_2$ MW, 132

M.p. 66° (61°). B.p. 278°/730 mm. D_4^{20} 1·1254.

Picrate : yellow needles from H_2O. M.p. 246–7°.

Skraup, *Ann.*, 1919, **419**, 72.
Fischer, *Ber.*, 1901, **34**, 939; 1905, **38**, 322.

2-Methylbenziminazole.

Needles from H_2O. M.p. 175–6°. Distils unchanged. Sol. H_2O, NaOH.Aq. Spar. sol. EtOH, Et_2O.

Acetyl : needles from C_6H_6–pet. ether. M.p. 85–6°.

Phillips, *J. Chem. Soc.*, 1928, 2395.
Bamberger, Berlé, *Ann.*, 1893, **273**, 327.

4-Methylbenziminazole (o-*Toliminazole*).

Needles from C_6H_6. M.p. 143°. Sol. H_2O, EtOH.

Hübner, Schüpphaus, *Ber.*, 1884, **17**, 777.

5-Methylbenziminazole (m-*Toliminazole*).

Cryst. from H_2O. M.p. 114°. $KMnO_4$ ⟶ benziminazole-5-carboxylic acid.

Niementowski, *Ber.*, 1897, **30**, 3064.
Fischer, *Ber.*, 1889, **22**, 644.
Bamberger, Berlé, *Ann.*, 1893, **273**, 333.

Methyl benzoate

$C_6H_5{\cdot}CO{\cdot}OCH_3$

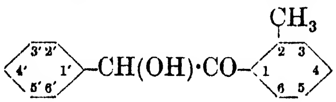
$C_8H_8O_2$ MW, 136

Colourless, pleasant-smelling liquid. M.p. − 12·3°. B.p. 199·6°. D_4^4 1·1035, D_4^{15} 1·0937, $D_4^{19.2}$ 0·902, D_{15}^{15} 1·0942, D_{25}^{25} 1·0869. n_α^{20} 1·5116, n_β^{20} 1·5290, n_γ^{20} 1·5399, n_D^{15} 1·5205. Heat of comb. C_p 943·97 Cal. Vap. press. at 60°, 3·9 mm.; at 70°, 6·8 mm.; at 80°, 11·5 mm.; at 100°, 29·2 mm.; at 130°, 96·3 mm.; at 150°, 190·5 mm.; at 170°, 351·5 mm.; at 190°, 625·9 mm. Insol. H_2O. Misc. with most org. solvents. PCl_5 at 160–80° ⟶ benzoyl chloride. H_3PO_4 at 200° ⟶ benzoic acid + dimethyl ether.

Carius, *Ann.*, 1859, **110**, 210.
Graebe, *Ann.*, 1905, **340**, 246.

Methylbenzoic Acid.
See Toluic Acid.

2-Methylbenzoin (o-*Tolyl α-hydroxybenzyl ketone, β-hydroxy-α-keto-2-methyldiphenylethane*)



$C_{15}H_{14}O_2$ MW, 226

Needles from MeOH.Aq. M.p. 108–9°. Sol. MeOH, Et_2O, C_6H_6, CCl_4. Reduces Fehling's.

McKenzie, Martin, Rule, *J. Chem. Soc.*, 1914, **105**, 1585.

4-Methylbenzoin (p-*Tolyl α-hydroxybenzyl ketone, β-hydroxy-α-keto-4-methyldiphenylethane*). Needles from MeOH.Aq. M.p. 109°. Sol. MeOH, Et_2O, C_6H_6, CCl_4. Reduces Fehling's.

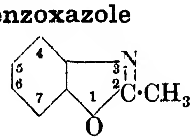
See above reference.

Methylbenzophenone.
See Phenyl tolyl Ketone.

Methylbenzophenone-carboxylic Acid.
See Toluylbenzoic Acid.

Methylbenzoquinone.
See Toluquinone.

2-Methylbenzoxazole



C_8H_7ON MW, 133

B.p. 200–1°. Very sol. EtOH. Insol. H_2O. D_0^0 1·1365.

Ladenburg, *Ber.*, 1876, **9**, 1525.
Skraup, Moser, *Ber.*, 1922, **55**, 1080.

5-Methylbenzoxazole.
Cryst. M.p. 45°.

Hofmann, Miller, *Ber.*, 1881, **14**, 572.

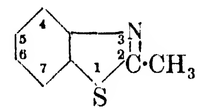
6-Methylbenzoxazole.
Cryst. M.p. 38–9°. B.p. 200°.

See previous reference.

Methylbenzoylcarbinol.
See β-Hydroxypropiophenone.

α-Methyl-β-benzoylstyrene.
See Dypnone.

2-Methylbenzthiazole (μ-*Methylbenzthiazole*)



C_8H_7NS MW, 149

B.p. 238°.
Ethiodide: needles from EtOH. M.p. 190–2°.
Methopicrate: needles from EtOH–Et_2O. M.p. 94°.
Hydrogen sulphate: needles from EtOH–Et_2O. M.p. 177–8°.
Perchlorate: needles from EtOH–Et_2O. M.p. 149°.

Clark, *J. Chem. Soc.*, 1928, 2316.
Mills, *J. Chem. Soc.*, 1922, **121**, 460.
Hofmann, *Ber.*, 1880, **13**, 21, 1236.

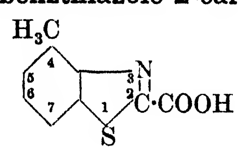
4-Methylbenzthiazole.
B.p. 252–3°.
Methiodide: needles from EtOH. M.p. 201–3°.

Rassow, Reim, *J. prakt. Chem.*, 1916, **93**, 221.

6-Methylbenzthiazole.
M.p. 15°. B.p. 255°. Volatile in steam.
Methiodide: leaflets from EtOH. M.p. 198–204°.
Ethiodide: m.p. 168°.
Picrate: m.p. 152–3°.

Zincke, Siebert, *Ber.*, 1915, **48**, 1251.
Mills, Braunholtz, *J. Chem. Soc.*, 1922, **121**, 1492.
Hess, *Ber.*, 1881, **14**, 492.
See also previous reference.

4-Methylbenzthiazole-2-carboxylic Acid



$C_9H_7O_2NS$ MW, 193

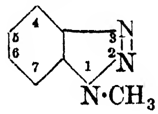
Cryst. M.p. 110–11°.
Amide: $C_9H_8ON_2S$. MW, 192. Cryst. from EtOH. M.p. 163°.

Reissert, Brüggemann, *Ber.*, 1924, **57**, 989.

6-Methylbenzthiazole-2-carboxylic Acid.
Needles. M.p. 110–11° decomp.
Me ester: $C_{10}H_9O_2NS$. MW, 207. Needles from H_2O. M.p. 96°.
Amide: cryst. from EtOH. M.p. 243°.

See previous reference.

1-Methylbenztriazole



$C_7H_7N_3$ MW, 133

Plates from C_6H_6–ligroin. M.p. 64–5°. B.p. 270–1°. Very sol. hot H_2O, EtOH, C_6H_6, AcOH. Less sol. Et_2O. Spar. sol. pet. ether.
Picrate: yellow cryst. from H_2O. M.p. 149°.

Reissert, *Ber.*, 1914, **47**, 675.

4-Methylbenztriazole (o-*Tolylazoimide*, o-*aziminotoluene*).
B.p. 90·5°/31 mm.

Dutt, Whitehead, Wormall, *J. Chem. Soc.*, 1921, **119**, 2091.

5-Methylbenztriazole (m-*Tolylazoimide*, m-*aziminotoluene*).
B.p. 92·5°/31 mm.

See previous reference.

6-Methylbenztriazole (p-*Tolylazoimide*, p-*aziminotoluene*).
B.p. 93°/32 mm.

See previous reference.

Methylbenzyl Alcohol.
See Tolylcarbinol *and* Methylphenylcarbinol.

N-Methylbenzylamine (ω-*Methylaminotoluene*)

$$C_6H_5\cdot CH_2\cdot NH\cdot CH_3$$

$C_8H_{11}N$ MW, 121

Liq. with odour resembling benzylamine. B.p. 180–1. D_{15}^{18} 0·9450. Sol. H_2O.
B,HCl: needles from EtOH–Et_2O M.p. 175°.
B,HI: cryst. from EtOH–Et_2O. M.p. 124°.
B,HAuCl₄: cryst. from H_2O. M.p. 138°.
B_2,H_2PtCl_6: needles from H_2O. M.p. 197°.
Picrate: yellow needles from EtOH. M.p. 117–118°.

Emde, *Arch. Pharm.*, 1909, **247**, 364.
McMeeking, Stevens, *J. Chem. Soc.*, 1933, **349**.

Methylbenzylamine.
See Xylylamine.

N-Methylbenzylaniline (*Benzylmethylaniline*)

$$C_6H_5\cdot N{<}^{CH_3}_{CH_2\cdot C_6H_5}$$

$C_{14}H_{15}N$ MW, 197

B.p. 305–6°, 210°/60 mm., 187–8°/26 mm., 161–2°/8 mm. D_{26}^{26} 1·0422. n_D^{30} 1·6008.
B,2HCl: m.p. 37°.
B,2HI: m.p. 25–6°.
Picrate: needles from EtOH. M.p. 127°.

Wedekind, *Ber.*, 1899, **32**, 519.
Ephraim, Hochuli, *Ber.*, 1915, **48**, 630.
Meisenheimer, Greeske, Willmersdorf, *Ber.*, 1922, **55**, 520.
Desai, *Chem. Abstracts*, 1925, **19**, 2645.

Methylbenzyl bromide.
See Xylyl bromide.

Methylbenzylcarbinol (2-*Hydroxy*-1-*phenylpropane*, 1-*phenylisopropyl alcohol*, β-*hydroxypropylbenzene*)

$$C_6H_5\cdot CH_2\cdot CH(OH)\cdot CH_3$$

$C_9H_{12}O$ MW, 136

d-.
B.p. 125°/25 mm. D_4^0 1·0046, D_4^{20} 0·991, D_4^{142} 0·8812. n_D^{20} 1·5190. $[\alpha]_D^{20}$ + 16·13° in EtOH. Volatile in steam.
Me ether: $C_{10}H_{14}O$. MW, 150. B.p. 85°/12 mm. D_4^{25} 0·9314.
Et ether: $C_{11}H_{16}O$. MW, 164. B.p. 93°/19 mm. D_4^{25} 0·9162.
Propyl ether: $C_{12}H_{18}O$. MW, 178. B.p. 103°/13 mm. D_4^{25} 0·9093.
Butyl ether: $C_{13}H_{20}O$. MW, 192. B.p. 115°/12 mm. D_4^{25} 0·8991.
n-*Amyl ether*: $C_{14}H_{22}O$. MW, 206. B.p. 127°/14 mm. D_4^{25} 0·89.
Acetyl: b.p. 115°/16 mm. $D_4^{17\cdot5}$ 1·0058, D_4^{123} 0·9069. n_D^{20} 1·4897. $[\alpha]_D^{20}$ + 6·41°.
Propionyl: b.p. 121°/15 mm. D_4^{20} 0·989, D_4^{128} 0·8897. $[\alpha]_D^{20}$ + 4·81°.
Butyryl: b.p. 132°/16 mm. D_4^{20} 0·9749, D_4^{129} 0·8782. n_D^{20} 1·4825. $[\alpha]_D^{20}$ + 8·48°.
Valeryl: b.p. 148°/16 mm. D_4^{21} 0·9630. n_D^{20} 1·4812. $[\alpha]_D^{20}$ + 10·76°.
Lauryl: b.p. 183°/5 mm. D_4^{20} 0·9229. n_D^{20} 1·4772. $[\alpha]_D^{21}$ + 8·86°.
Palmityl: m.p. 20·5°. B.p. 235°/6 mm. D_4^{19} 0·9131. n_D^{20} 1·4760. $[\alpha]_D^{22}$ + 7·66°.
Stearyl: m.p. 28·5°. B.p. 215°/2 mm. D_4^{26} 0·9058. $[\alpha]_D^{26}$ + 7·0°.

l-.
$[\alpha]_D$ — 26·6°.

dl-.

B.p. 219–21°, 116°/7·5 mm. D_4^{16} 1·1091. n_D^{16} 1·5628.

Et ether: b.p. 205–6°. D_{18}^{18} 0·9159.

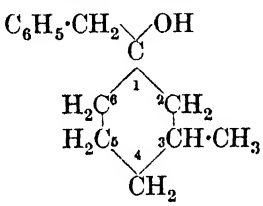
Phenylurethane: m.p. 92°.

Austerweil, Cochin, *Compt. rend.*, 1910, **150**, 1695.
Pickard, Kenyon, *J. Chem. Soc.*, 1914, **105**, 1124, 2270; *Proc. Chem. Soc.*, 1913, **28**, 42.
Phillips, *J. Chem. Soc.*, 1923, **123**, 22.
Tschitschibabin, Jelgasin, *Ber.*, 1914, **47**, 1850.

Methylbenzyl chloride.

See Xylyl chloride.

3-Methyl-1-benzylcyclohexanol



$C_{14}H_{20}O$ MW, 204

Liq. with citron-like odour. B.p. 165°/18 mm. D^{17} 0·9873. n_D 1·532.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1089.

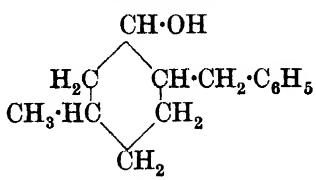
4-Methyl-1-benzylcyclohexanol.

B.p. 159°/6 mm.

Phenylurethane: m.p. 135°.

Sabatier, Mailhe, *Compt. rend.*, 1906, **142**, 440.

5-Methyl-2-benzylcyclohexanol



$C_{14}H_{20}O$ MW, 204

Needles from MeOH. M.p. 101–2°. $[\alpha]_D$ − 53·2° in EtOH. Volatile in steam.

Haller, March, *Compt. rend.*, 1905, **140**, 625.
Wallach, *Ber.*, 1896, **29**, 2961.

Methyl benzyl Ether (ω-*Methoxytoluene*)

$C_6H_5·CH_2·O·CH_3$

$C_8H_{10}O$ MW, 122

B.p. 170–1° (174°). D_4^4 0·9805, D_{15}^{15} 0·9711.

Perkin, *J. Chem. Soc.*, 1896, **69**, 1186, 1190.
v. Braun, *Ber.*, 1910, **43**, 1351.
Riedel, D.R.P., 261,588, (*Chem. Zentr.*, 1913, II, 324).

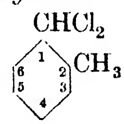
Methylbenzylglycollic Acid.

See 1-Hydroxy-2-phenylisobutyric Acid.

Methylbenzylideneacetone.

See Methyl methylstyryl Ketone.

***o*-Methylbenzylidene chloride** (ω-*Dichloro*-o-*xylene*, o-*xylylidene chloride*)



$C_8H_8Cl_2$ MW, 175

B.p. 105–7°/16 mm.

Asinger, Lock, *Monatsh.*, 1933, **62**, 339.

***m*-Methylbenzylidene chloride** (ω-*Dichloro*-m-*xylene*, m-*xylylidene chloride*).

B.p. 110–11°/15 mm.

Asinger, Lock, *Monatsh.*, 1933, **62**, 340.

***p*-Methylbenzylidene chloride** (ω-*Dichloro*-p-*xylene*, p-*xylylidene chloride*).

Needles. M.p. 48–9°. B.p. 105°/18 mm. Sol. Et_2O, $CHCl_3$, C_6H_6. CrO_3 → terephthalic acid. H_2O at 180° ⟶ *p*-toluic aldehyde.

Gattermann, *Ann.*, 1906, **347**, 353.
Auwers, Keil, *Ber.*, 1903, **36**, 1875.
Asinger, Lock, *Monatsh.*, 1933, **62**, 341.

Methylbenzylidenehydrazine (*Benzaldehyde methylhydrazone*)

$C_6H_5·CH{:}N·NH·CH_3$

$C_8H_{10}N_2$ MW, 134

Plates from EtOH. M.p. 179°. Spar. sol. ligroin.

Harries, Haga, *Ber.*, 1898, **31**, 62.

Methyl benzyl Ketone (*Acetonylbenzene*, *phenylacetone*, β-*ketopropylbenzene*, 1-*phenyl*-2-*propanone*)

$C_6H_5·CH_2·CO·CH_3$

$C_9H_{10}O$ MW, 134

M.p. 27°. B.p. 216°, 100–101°/14 mm. D_0^0 1·0247, D_{20}^{20} 1·0175, D_4^{20} 1·0157. n_D^{20} 1·5168. Ox. → acetic + benzoic acids. NaHg → methylbenzylcarbinol. ZnHg + HCl ⟶ propylbenzene. Gives iodoform reaction and forms bisulphite comp.

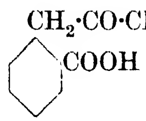
Oxime: prisms from pet. ether. M.p. 68–70°.

p-*Toluenesulphonyl*: cryst. from ligroin. M.p. 78°.

Semicarbazone: prisms from EtOH. M.p. 197–8°. Spar. sol. EtOH, Et_2O.

Apitzsch, *Ber.*, 1905, **38**, 2897.
Senderens, *Compt. rend.*, 1910, **150**, 1338.
Tiffeneau, *Compt. rend.*, 1906, **142**, 1539.
Danilov, Venus-Danilova, *Ber.*, 1927, **60**, 1067.
Nober, Friedolsheim, *Ann.*, 1926, **449**, 121.

Methyl benzyl Ketone o-carboxylic Acid (*o-Acetonylbenzoic acid, methyl o-carboxybenzyl ketone*)



$C_{10}H_{10}O_3$ MW, 178

Needles from C_6H_6–pet. ether. M.p. 118–19°. Sol. hot H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6.

Oxime: leaflets from 50% EtOH. M.p. 162°. Spar. sol. EtOH, Et_2O.

Gottlieb, *Ber.*, 1899, **32**, 965.

Methyl benzyl sulphide.
See under Benzyl Mercaptan.

Methyl benzyl sulphone

$C_6H_5{\cdot}CH_2{\cdot}SO_2{\cdot}CH_3$

$C_8H_{10}O_2S$ MW, 170

Needles from H_2O. M.p. 127°.

Fromm, Palma, *Ber.*, 1906, **39**, 3315.

***N*-Methylbiuret.**
See under Biuret.

Methyl borate.
See Trimethyl borate.

2-Methylborneol.
See Homoborneol.

1-Methylbrassylic Acid (*1-Methylundecane-1 : 11-dicarboxylic acid*)

$$HOOC{\cdot}[CH_2]_{10}{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_{14}H_{26}O_4$ MW, 258

Cryst. from C_6H_6–pet. ether. M.p. 87·5–88·5°.

Di-Me ester: $C_{16}H_{30}O_4$. MW, 286. B.p. 185°/9 mm.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 175.

2-Methylbrassylic Acid (*2-Methylundecane-1 : 11-dicarboxylic acid*)

$$HOOC{\cdot}[CH_2]_9{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}COOH$$

$C_{14}H_{26}O_4$ MW, 258

Cryst. from EtOH.Aq. or C_6H_6–pet. ether. M.p. 68·5–69·5°.

Di-Me ester: $C_{16}H_{30}O_4$. MW, 286. B.p. 182–5°/8 mm. D^{15} 0·958.

See previous reference.

3-Methylbrassylic Acid (*3-Methylundecane-1 : 11-dicarboxylic acid*)

$$HOOC{\cdot}[CH_2]_8{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_{14}H_{26}O_4$ MW, 258

Cryst. from C_6H_6–pet. ether. M.p. 47°.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, **10**, 689.

Methyl bromide (*Bromomethane*)

CH_3Br

CH_3Br MW, 95

Colourless gas. B.p. 4·5°. Cryst. in liquid air. D_0^0 1·732. Heat of comb. C_p 184·71 Cal. Latent heat at 20° 61·52 kg.-cal./kg. Used as a refrigerating agent and has no corrosive action. Vapour is poisonous.

Steinkopf, Frommel, *Ber.*, 1905, **38**, 1865.
Bygdén, *J. prakt. Chem.*, 1911, **83**, 421.
Hsia, *Chem. Abstracts*, 1931, **25**, 5221.

Methyl 4-bromobutyl Ketone (*4-Acetobutyl bromide, 6-bromohexanone-2*)

$CH_2Br{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_6H_{11}OBr$ MW, 179

B.p. 214–15°/720 mm., 155–60°/150 mm., 135–7°/90 mm. D_0^0 1·3496. Sol. EtOH, Et_2O. Alkalis ⟶ allylacetone. Boiling H_2O ⟶ 1-hexanolone-5. Alc. NH_3 ⟶ tetrahydropicoline.

Lipp, *Ann.*, 1896, **289**, 195.

Methyl 6-bromohexyl Ether (*6-Bromo-1-methoxyhexane*)

$CH_2Br{\cdot}[CH_2]_4{\cdot}CH_2{\cdot}O{\cdot}CH_3$

$C_7H_{15}OBr$ MW, 195

Liq. with faint fruity odour. B.p. 112°/35 mm. D^{21} 1·194.

Dionneau, *Compt. rend.*, 1907, **145**, 128.

Methyl 2-bromoisobutyl Ketone (*Mesityl oxide hydrobromide, 2-bromo-2-methylpentanone-4*)

$(CH_3)_2CBr{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_6H_{11}OBr$ NW, 179

B.p. 52–3°/11 mm. Darkens rapidly in air and on distillation at ord. press. finally yielding a resin.

Rupe, Kessler, *Ber.*, 1909, **42**, 4715.

Methyl p-bromophenyl sulphide.
See under p-Bromothiophenol.

Methyl 3-bromopropyl Ether.
See under 3-Bromopropyl Alcohol.

Methyl 2-bromopropyl Ketone (*4-Bromopentanone-2*)

$CH_3{\cdot}CHBr{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

C_5H_9OBr MW, 165

B.p. 62°/20 mm., 50–55°/15 mm. Hot $KHCO_3$.Aq. ⟶ methyl propenyl ketone.

Blaise, *Bull. soc. chim.*, 1905, **33**, 43.
Wohl, Maag, *Ber.*, 1910, **43**, 3283.

Methyl 3-bromopropyl Ketone (*5-Bromopentanone-2, 3-acetopropyl bromide*)

$BrCH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

C_5H_9OBr MW, 165

B.p. 188–90° part. decomp., 106°/60 mm. Sol. Et_2O. Spar. sol. H_2O. Boiling H_2O ⟶ 3-acetopropyl alcohol. Alc. NH_3 ⟶ α-methylpyrroline. Methylamine ⟶ *N*-α-dimethylpyrroline.

Lipp, *Ber.*, 1889, **22**, 1206.
Marshall, Perkin, *J. Chem. Soc.*, 1891, **59**, 860, 876.

Methyl-ψ-brucidine

$C_{24}H_{30}O_3N_2$ MW, 394

Plates from EtOH. M.p. 198–9°. Sol. Me_2CO, C_6H_6, AcOH. Insol. H_2O.

B,2HI: plates from H_2O. M.p. 259° decomp.

Methiodide: plates from MeOH. M.p. 297° decomp.

Gulland, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1651.

1-Methylbutadiene-1 : 3.
See 1 : 3-Pentadiene.

2-Methylbutadiene-1 : 3.
See Isoprene.

2-Methylbutadiene-2 : 3.
See unsym.-Dimethylallene.

2-Methyl-1 : 3-butadiene-1 : 4-dicarboxylic Acid.
See 2-Methylmuconic Acid.

2-Methylbutane.
See Isopentane.

2-Methylbutane-1 : 1-dicarboxylic Acid.
See sec.-Butylmalonic Acid.

2-Methylbutane-1 : 2-dicarboxylic Acid.
See 1-Methyl-1-ethylsuccinic Acid.

2-Methylbutane-1 : 3-dicarboxylic Acid.
1 : 2-Dimethylglutaric Acid, *q.v.*

2-Methylbutane-2 : 3-dicarboxylic Acid.
See Trimethylsuccinic Acid.

3-Methylbutane-1 : 1-dicarboxylic Acid.
See Isobutylmalonic Acid.

3-Methylbutane-1 : 2-dicarboxylic Acid.
See Isopropylsuccinic Acid.

3-Methylbutane-1 : 3-dicarboxylic Acid.
1 : 1-Dimethylglutaric Acid, *q.v.*

3-Methylbutane-2 : 2-dicarboxylic Acid.
See Methylisopropylmalonic Acid.

Methylbutane-tricarboxylic Acid.
See Isopentane-tricarboxylic Acid.

2-Methylbutanol-3.
See Methylisopropylcarbinol.

2-Methylbutanone-3.
See Methyl isopropyl Ketone.

Methylbutenine.
See Isopropenylacetylene.

2-Methyl-1-butenol-3.
See Methylisopropenylcarbinol.

Methyl-γ-butenylcarbinol.
See 1-Hexenol-5.

***sym*.-Methyl-α-butenyl-ethylene.**
See 2 : 4-Heptadiene.

2-[2-Methyl-β-butenyl]-guanidine.
See Galegine.

Methyl α-butenyl Ketone.
See 3-Hexenone-2.

Methyl β-butenyl Ketone.
See 2-Hexenone-5.

Methyl-γ-butenyl Ketone.
Allylacetone, *q.v.*

3-Methylbutine-1.
See Isopropylacetylene.

Methylbutylacetic Acid.
See 1-Methylcaproic Acid.

Methylbutylacetylene (*2-Heptine*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}C{\vdots}C{\cdot}CH_3$

C_7H_{12} MW, 96

B.p. 111–13°/750 mm. (111·5–112·5°). D_0^0 0·7632, D_4^{21} 0·748. n_D^{21} 1·4208. Heat with H_2O at 325° ⟶ methyl *n*-amyl ketone + ethyl *n*-butyl ketone.

Béhal, *Ann. chim.*, 1888, **15**, 427.
Desgrez, *Ann. chim.*, 1894, **3**, 234.
Gredy, *Compt. rend.*, 1933, **197**, 327.

Methylbutylallylcarbinol.
See 4-Methyl-1-octenol-4.

Methyl-n-butylamine

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CH_3$

$C_5H_{13}N$ MW, 87

B.p. 90·5–91·5°/764 mm. D_4^{15} 0·7367, $D_4^{18\cdot1}$ 0·7363. $n_D^{18\cdot1}$ 1·40180.

B,HCl: plates from Me_2CO. M.p. 170–1°. Sol. H_2O, EtOH, Me_2CO, $CHCl_3$.

B_2,H_2PtCl_6: yellow needles. M.p. 205–6° decomp. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O.
Picrate: plates from EtOH. M.p. 111–12°. Spar. sol. H_2O. N-*Nitroso*: b.p. 198°.

Löffler, Freytag, *Ber.*, 1909, **42**, 3429.
Franchimont, van Erp, *Rec. trav. chim.*, 1895, **14**, 323.
Graymore, *J. Chem. Soc.*, 1932, 1355.

Methyl-*sec*.-*n*-butylamine

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}NH{\cdot}CH_3$$

$C_5H_{13}N$ MW, 87

dl-.
B.p. 78–9°. D^{15} 0·740.
$B,HAuCl_4$: yellow needles. M.p. 58°.
B_2,H_2PtCl_6: orange cryst. M.p. 151°.
Picrate: m.p. 78°.

Löffler, *Ber.*, 1910, **43**, 2041.

Methyl-*tert*.-butylamine

$$(CH_3)_3C{\cdot}NH{\cdot}CH_3$$

$C_5H_{13}N$ MW, 87

B.p. 58–60° (54–6°).
Phenylurea: m.p. 118°.

Sabatier, Mailhe, *Bull. soc. chim.*, 1907, **1**, 615.

2-Methyl-*n*-butylamine (active-*Amylamine*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}NH_2$$

$C_5H_{13}N$ MW, 87

d-.
B.p. 95·5–96°. Sol. H_2O. D^{18} 0·7550, D_4^{25} 0·7505. $[\alpha]_D^{25} - 5{\cdot}86°$.
B,HCl: m.p. 176°. Hygroscopic.
B_2,H_2PtCl_6: yellow plates. Decomp. at 240°. Mod. sol. H_2O. Spar. sol. EtOH.

Marckwald, *Ber.*, 1904, **37**, 1048.
Ehrlich, *Ber.*, 1907, **40**, 2548.
Plimpton, *J. Chem. Soc.*, 1881, **39**, 334.

Methylbutylaniline

$$C_6H_5{\cdot}N{<}\begin{matrix}CH_3\\CH_2{\cdot}[CH_2]_2{\cdot}CH_3\end{matrix}$$

$C_{11}H_{17}N$ MW, 163

B.p. 240–244° (225–30°).
Picrate: yellow needles from EtOH. M.p. 141–2° (90°). Sol. C_6H_6, hot EtOH.

Fröhlich, Wedekind, *Ber.*, 1907, **40**, 1648.
Komatsu, *Chem. Zentr.*, 1913, I, 799.

Methyl-*n*-butylcarbinol (1-*Methyl*-n-*amyl alcohol*, 2-*hydroxyhexane*, 1-*methylpentanol*-1, *hexanol*-2)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3$$

$C_6H_{14}O$ MW, 102

d-.
B.p. 137–8°. $D_4^{16·8}$ 0·8179. n_D^{20} 1·4135. $[\alpha]_D^{19}$ + 11·6°, $[\alpha]_D^{20}$ + 12·70° in EtOH (13·95° in C_6H_6).
Acetyl: $C_8H_{16}O_2$. MW, 144. B.p. 57°/20 mm. D_4^{18} 0·8658.
Propionyl: $C_9H_{18}O_2$. MW, 158. B.p. 76°/15 mm. D_4^{20} 0·8644. n_D^{20} 1·4081. $[\alpha]_D^{20}$ + 9·76°.
Butyryl: $C_{10}H_{20}O_2$. MW, 172. B.p. 85°/20 mm. D_4^{21} 0·8744.
Valeryl: $C_{11}H_{22}O_2$. MW, 186. B.p. 106°/21 mm. D_4^{14} 0·8606.
Caproyl: $C_{12}H_{24}O_2$. MW, 200. B.p. 116°/17 mm. D_4^{20} 0·8575. n_D^{20} 1·4202. $[\alpha]_D^{20}$ + 10·84°.
Palmityl: $C_{22}H_{44}O_2$. MW, 340. M.p. 21°. B.p. 179°/2 mm. D_4^{26} 0·8492. $[\alpha]_D^{20}$ + 6·87°.
Stearyl: $C_{24}H_{48}O_2$. MW, 368. M.p. 28°. B.p. 195°/3 mm. $D_4^{21·5}$ 0·8514. $[\alpha]_D^{20}$ + 6·16°.

l-.
$[\alpha]_D^{25} - 1{\cdot}75°$.
1-*Naphthylurethane*: $[\alpha]_D^{25} - 4{\cdot}28°$ in EtOH.

dl-.
B.p. 136° (138–9°/732 mm., 139·5°/745 mm.) D_4^0 0·8287, D_{20}^{20} 0·823. n_D^{18} 1·4190. $HNO_3 \longrightarrow$ acetylbutyryl.
3 : 5-*Dinitrobenzoyl*: m.p. 38·5°.
1-*Naphthylurethane*: m.p. 60·5°.

Ponzio, *Gazz. chim. ital.*, 1901, **31**, 404.
Sabatier, Senderens, *Compt. rend.*, 1903, **137**, 302.
Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 834.
Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 58.
Terentiev, *Bull. soc. chim.*, 1926, **39**, 46.
Lespieau, Lombard, *Bull. soc. chim.*, 1935, **2**, 373.

Methyl-*sec*.-*n*-butylcarbinol (2-*Hydroxy*-3-*methylpentane*, 3-*methylpentanol*-2)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH(OH){\cdot}CH_3$$

$C_6H_{14}O$ MW, 102

B.p. 134°. D_4^{19} 0·8307 (0·8037). n_D^{18} 1·4205.

Wislicenus, *Ann.*, 1883, **219**, 309.

Methyl-*tert*.-butylcarbinol (*Pinacolin alcohol*, 3-*hydroxy*-2 : 2-*dimethylbutane*, 3 : 3-*dimethylbutanol*-2)

$$(CH_3)_3C{\cdot}CH(OH){\cdot}CH_3$$

$C_6H_{14}O$ MW, 102

d-.

B.p. 120°/760 mm. D_4^{16} 0·8219, D_4^{25} 0·810, D_4^{33} 0·8075, $D_4^{51\cdot7}$ 0·7918. n_D^{20} 1·4146. $[\alpha]_D^{20}$ + 7·71°.

Acetyl: b.p. 141°/756 mm. D_4^{25} 0·856. n_D^{25} 1·4001. $[\alpha]_D^{25}$ + 9·63°.

Benzoyl: b.p. 105–105·5°/5 mm. D_4^{25} 0·970. n_D^{25} 1·4882. $[\alpha]_D^{26}$ + 27·92°.

dl-.

M.p. 5·6° (4°). B.p. 121° (120–120·6°/760 mm.). D^0 0·8347, D_4^{20} 0·8185, D^{25} 0·8122. Spar. sol. H_2O. Heat of comb. C_v 947·3 Cal., C_p 949·0 Cal. CrO_3 ⟶ pinacolin + pivalic acid.

Acetyl: b.p. 141·2–141·4°/740 mm.

Phenylurethane: m.p. 79°.

Delacre, *Chem. Zentr.*, 1906, I, 1234.
Richard, *Ann. chim.*, 1910, **21**, 346.
Pickard, Kenyon, *J. Chem. Soc.*, 1914, **105**, 1120.
Stevens, *J. Am. Chem. Soc.*, 1933, **55**, 4239.

1-Methyl-4-*tert*.-butylcyclohexanone-3. *See* Homomenthone.

2-Methylbutylene-1 (*γ-Amylene, unsym.-methylethylethylene*)

$$\begin{array}{c}CH_3\\ CH_3{\cdot}CH_2{\cdot}\overset{|}{C}{:}CH_2\end{array}$$

C_5H_{10} MW, 70

B.p. 32°/758 mm. D_0^0 0·6668. n_D^{16} 1·378. HCl.Aq. ⟶ 2-chloroisopentane. HBr.Aq. ⟶ 2-bromoisopentane.

Le Bel, *Bull. soc. chim.*, 1876, **25**, 546.
Michael, Zeidler, *Ann.*, 1911, **385**, 251.
Leendertse, Tulleners, Waterman, *Rec. trav. chim.*, 1933, **52**, 520.

3-Methylbutylene-1 (*Isopropylethylene, α-isoamylene, isopentene-1, 2-vinylpropane*)

$$\begin{array}{c}CH_3\\ CH_3{\cdot}\overset{|}{C}H{\cdot}CH{:}CH_2\end{array}$$

C_5H_{10} MW, 70

B.p. 20·1°/760 mm. D^0 0·648, D_4^{15} 0·63197 (0·6338). n_D^{15} 1·3675. HCl.Aq. ⟶ 3-chloroisopentane. HCl in AcOH ⟶ 50% 3-chloroisopentane + 50% 4-chloroisopentane. HBr.Aq. ⟶ 3-bromoisopentane. Heat ⟶ 2-methylbutylene-2.

Ipatiev, *Chem. Zentr.*, 1901, I, 1195.
Michael, Zeidler, *Ann.*, 1911, **385**, 250.
Norris, Reuter, *J. Am. Chem. Soc.*, 1927, **49**, 2629.
Leendertse, Tulleners, Waterman, *Rec. trav. chim.*, 1933, **52**, 517.

2-Methylbutylene-2 (*Isopentene-2, β-isoamylene, trimethylethylene, isopropylidene-ethane, 2-ethylidenepropane*)

$$\begin{array}{c}CH_3\\ CH_3{\cdot}CH{:}\overset{|}{C}{\cdot}CH_3\end{array}$$

C_5H_{10} MW, 70

B.p. 38·42° (37·2°)/760 mm. D^0 0·6783, D_4^{15} 0·66708, D_4^{25} 0·65694. n_D^{15} 1·3908. $KMnO_4$ ⟶ trimethylethylene glycol + $CH_3{\cdot}CO{\cdot}CH_3$ + $CH_3{\cdot}COOH$ + $CH_3{\cdot}CHO$. HBr.Aq. → 2-bromoisopentane. HOCl ⟶ 3-chloro-2-hydroxyisopentane.

Kahlbaum, D.R.P., 66,866.
Ipatiev, Huhn, *Ber.*, 1903, **36**, 2015.
Michael, Zeidler, *Ann.*, 1911, **385**, 251.
Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 1002.
Hibbert, *J. Am. Chem. Soc.*, 1915, **37**, 1753.
Norris, Reuter, *J. Am. Chem. Soc.*, 1927, **49**, 2630.
Whitmore, Stahly, *J. Am. Chem. Soc.*, 1933, **55**, 4156.
I.G., D.R.P., 565,160, (*Chem. Abstracts*, 1933, **27**, 992).

1-Methyl-1-butylene-1-carboxylic Acid. *See* 1-Methyl-2-ethylacrylic Acid.

2-Methyl-1-butylene-1-carboxylic Acid. *See* 2-Methyl-2-ethylacrylic Acid.

3-Methyl-1-butylene-1-carboxylic Acid. *See* 2-Isopropylacrylic Acid.

3-Methyl-1-butylene-2-carboxylic Acid. *See* 1-Isopropylacrylic Acid.

3-Methyl-1-butylene-3-carboxylic Acid. Dimethylvinylacetic Acid, *q.v.*

1-Methyl-2-butylene-1-carboxylic Acid. *See* 1-Methyl-2-ethylidenepropionic Acid.

2-Methyl-2-butylene-1-carboxylic Acid (*2-Methyl-2-pentenoic acid, 2-ethylidenebutyric acid*)

$$\begin{array}{c}CH_3\\ CH_3{\cdot}CH{:}\overset{|}{C}{\cdot}CH_2{\cdot}COOH\end{array}$$

$C_6H_{10}O_2$ MW, 114

Oil. B.p. 199°, 116°/23 mm., 96°/10 mm. $D_4^{23\cdot2}$ 0·97845. $n_D^{23\cdot2}$ 1·44692. $k = 2{\cdot}88 \times 10^{-5}$ at 25°.

Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 62°/13 mm. $D_4^{18\cdot8}$ 0·91633. $n_D^{18\cdot8}$ 1·43638.

Chloride: C_6H_9OCl. MW, 132·5. B.p. 57°/25 mm.

Amide: $C_6H_{11}ON$. MW, 113. Plates from C_6H_6–pet. ether. M.p. 123–4°.

p-*Toluidide*: $C_{13}H_{17}ON$. MW, 203. Needles from pet. ether — C_6H_6. M.p. 84°.

Fichter, Gisiger, *Ber.*, 1909, **42**, 4708.
Kon, Linstead, *J. Chem. Soc.*, 1925, **127**, 623.

3-Methyl-2-butylene-1-carboxylic Acid.
See Pyroterebic Acid.

3-Methyl-2-butylene-2-carboxylic Acid.
See Trimethylacrylic Acid.

2-Methyl-1-butylene-1 : 1-dicarboxylic Acid (1-*Methylpropylidene-malonic acid*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{C}{=}C{<}{\begin{matrix}COOH\\COOH\end{matrix}}$$

$C_7H_{10}O_4$ MW, 158

Et ester: $C_9H_{14}O_4$. MW, 186. *Nitrile*: $C_9H_{13}O_2N$. MW, 167. B.p. 104–8°/8 mm. Alc. KOH ⟶ cyanoacetic acid. $Ba(OH)_2$ ⟶ malonic acid.

Scheiber, Meisel, *Ber.*, 1915, **48**, 259.

3-Methyl-1-butylene-1 : 1-dicarboxylic Acid.
See Isobutylidene-malonic Acid.

3-Methyl-1-butylene-1 : 2-dicarboxylic Acid.
See Isopropylfumaric Acid *and* Isopropylmaleic Acid.

1-Methyl-1-butylene-1 : 3-dicarboxylic Acid.
See 1 : 3-Dimethylglutaconic Acid.

2-Methyl-1-butylene-1 : 3-dicarboxylic Acid.
See 2 : 3-Dimethylglutaconic Acid.

3-Methyl-1-butylene-1 : 3-dicarboxylic Acid.
See 3 : 3-Dimethylglutaconic Acid.

1-Methyl-1-butylene-2 : 3-dicarboxylic Acid.
See 1-Methyl-2-ethylidenesuccinic Acid.

3-Methyl-1-butylene-2 : 3-dicarboxylic Acid (3 : 3-*Dimethylitaconic acid*)

$$\begin{matrix}CH_2{:}C{\cdot}COOH\\(CH_3)_2C{\cdot}COOH\end{matrix}$$

$C_7H_{10}O_4$ MW, 158

Cryst. M.p. 140–1°. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6. Insol. pet. ether. $k = 1{\cdot}67 \times 10^{-4}$ at 25°.

Di-Et ester: $C_{11}H_{18}O_4$. MW, 214. B.p. 173–6°/755–60 mm., 126–7°/20 mm. D_{10}^{10} 1·0169, D_{20}^{20} 1·0091. $n_\alpha^{17\cdot4}$ 1·43577.

Bone, Henstock, *J. Chem. Soc.*, 1903, **83**, 1388.

2-Methyl-1-butylene-3 : 4-dicarboxylic Acid (*Isopropenylsuccinic acid*)

$$CH_2{:}\overset{CH_3}{C}{\cdot}\underset{CH_2\cdot COOH}{CH}{\cdot}COOH$$

$C_7H_{10}O_4$ MW, 158

Cryst. from H_2O. M.p. 146–7°. Sol. 7·56% in H_2O at 15°. Sol. 19·47% in Et_2O at 15°.

Fittig, Petkow, *Ann.*, 1899, **304**, 208.

3-Methyl-2-butylene-1 : 2-dicarboxylic Acid.
See Isopropylidenesuccinic Acid.

2-Methyl-2-butylene-1 : 4-dicarboxylic Acid.
See 2-Methyl-Δ^2-dihydromuconic Acid.

1-Methyl-2-butylene-2 : 3-dicarboxylic Acid.
See dibasic-Hæmatommic Acid.

1-Methyl-1-butylene-1 : 2 : 4-tricarboxylic Acid.
See tribasic-Hæmatommic Acid.

Methyl *n*-butyl Ether (1-*Methoxybutane*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_3$$

$C_5H_{12}O$ MW, 88

B.p. 71° (70·3°). D_4^0 0·7635, D_4^{15} 0·74773, D_4^{20} 0·74433 (0·7441). n_α^{20} 1·37202, n_γ^{20} 1·38306.

Henry, *Bull. soc. chim.*, 1892, **7**, 150.
Clarke, *J. Chem. Soc.*, 1912, **101**, 1801.
Cerchez, *Bull. soc. chim.*, 1928, **43**, 766.
Bennett, Philip, *J. Chem. Soc.*, 1928, 1930.

Methyl-*sec.*-*n*-butyl Ether (2-*Methoxybutane*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}O{\cdot}CH_3$$

$C_5H_{12}O$ MW, 88

B.p. 59°. D_4^0 0·7621, D_4^{20} 0·7415.

Bennett, Philip, *J. Chem. Soc.*, 1928, 1930.

Methyl *tert.*-butyl Ether

$$(CH_3)_3C{\cdot}O{\cdot}CH_3$$

$C_5H_{12}O$ MW, 88

B.p. 54–5°/764 mm. (54°). Insol. H_2O. D^0 0·7642, D_4^{20} 0·7578. n_D^{20} 1·37566.

Henry, *Rec. trav. chim.*, 1904, **23**, 327.
Lazinski, Swadkowski, *Chem. Zentr.*, 1903, I, 1119.
Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2095.
Edlund, Evans, U.S.P., 1,968,601, (*Chem. Abstracts*, 1934, **28**, 5831).

Methylbutylethylene.

See 2-Heptene, 2-Methyl-1-hexene, *and* 4-Methyl-2-hexene.

***unsym.*-Methylbutylhydrazine**

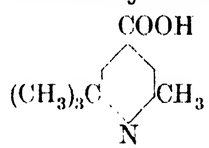
$$CH_3{\cdot}[CH_2]_2{\cdot}CH_2 \text{>} N{\cdot}NH_2 \quad (CH_3)$$

$C_5H_{14}N_2$ MW, 102

B.p. 50–51°/38 mm. D^{16} 0·8092, D_4^{21} 0·804. n_D^{21} 1·4258. Misc. with H_2O, EtOH, Et_2O.

Franchimont, van Erp, *Rec. trav. chim.*, 1895, **14**, 318.
Brühl, *Ber.*, 1897, **30**, 161.

2-Methyl-6-*tert*.-butylisonicotinic Acid



$C_{13}H_{15}O_2N$ MW, 217

Plates from H_2O. M.p. 219°. Very sol. EtOH, NaOH, dil. HCl. Sol. Me_2CO, H_2O, AcOEt, C_6H_6, pet. ether. Spar. sol. Et_2O.

Mumm, Neumann, *Ber.*, 1926, **59**, 1623.

Methyl *n*-butyl Ketone (*Hexanone*-2, 2-*ketohexane*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_3$$

$C_6H_{12}O$ MW, 100

B.p. 127°/761 mm. (126–126·5°/760 mm.). D^0 0·8298. Heat of comb. C_v 901·0 Cal., C_p (liq.) 902·5 Cal., C_p (gas) 916·7 Cal. $CrO_3 \longrightarrow$ acetic, butyric, and valeric acids. H (+ Ni) $\longrightarrow$ methyl-*n*-butylcarbinol. Forms bisulphite comp.

Oxime: b.p. 185°/757 mm. slight decomp., 138°/112 mm. D_4^{20} 0·8971. n_D^{20} 1·4464.

Semicarbazone: m.p. 118°.

2 : 4-*Dinitrophenylhydrazone*: m.p. 106°.

Michael, Hartman, *Ber.*, 1907, **40**, 144.
Wagner, *J. prakt. Chem.*, 1891, **44**, 285.
Clarke, *J. Am. Chem. Soc.*, 1909, **31**, 560.
Grignard, Chambret, *Compt. rend.*, 1926, **182**, 299.
Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 14.

Methyl *sec*.-*n*-butyl Ketone (3-*Methylpentanone*-2, 2-*keto-3-methylpentane*, 2-*acetobutane*)

$$CH_3CH_2{\cdot}CH(CH_3){\cdot}CO{\cdot}CH_3$$

$C_6H_{12}O$ MW, 100

B.p. 118°. D_4^{14} 0·8181, D_4^{18} 0·8145, D_0^{24} 0·811. n_D^{18} 1·4002.

Oxime: b.p. 89°/20 mm.

Wislicenus, *Ann.*, 1883, **219**, 308.
Courtot, *Bull. soc. chim.*, 1906, **35**, 981.
Tafel, *Ber.*, 1912, **45**, 452.

Methyl *tert*.-butyl Ketone.

See Pinacolin.

1-Methyl-2-*tert*.-butyl-lactic Acid.

See 1-Hydroxy-1 : 3-dimethylisocaproic Acid.

Methylbutylmalonic Acid (*Hexane*-2 : 2-*dicarboxylic acid*)

$$CH_3{\cdot}[CH_2]_2{\cdot}CH_2(CH_3) \text{>} C \text{<} (COOH)_2$$

$C_8H_{14}O_4$ MW, 174

Needles from C_6H_6–pet. ether. M.p. 99–101°. Sol. H_2O, EtOH, Et_2O.

Di-Me ester: $C_{10}H_{18}O_4$. MW, 202. B.p. 219–21°.

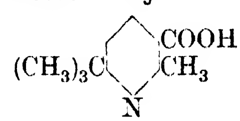
Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 237°.

Rasetti, *Bull. soc. chim.*, 1905, **33**, 687.

2-Methyl-*n*-butyl Mercaptan.

See active-Amyl Mercaptan.

2-Methyl-6-*tert*.-butylnicotinic Acid



$C_{13}H_{15}O_2N$ MW, 217

Plates from H_2O. M.p. 137–8°. Very sol. EtOH, dil. HCl. Sol. H_2O, Me_2CO, AcOEt, C_6H_6, pet. ether. Spar. sol. Et_2O.

Mumm, Neumann, *Ber.*, 1926, **59**, 1623.

Methyl-*sec*.-*n*-butylphenylcarbinol (3-*Methyl*-2-*phenylpentanol*-2)

$$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}C(OH)(C_6H_5){\cdot}CH_3$$

$C_{12}H_{18}O$ MW, 178

Mobile liq. B.p. 129–30°/20 mm. D^{18} 0·952. n_D^{16} 1·5157. Does not form a phenylurethane.

Apolit, *Ann. chim.*, 1924, **2**, 88.
Bodroux, Taboury, *Compt. rend.*, 1909, **148**, 1675.

Methyl butyl selenide

$$CH_3{\cdot}[CH_2]_3{\cdot}Se{\cdot}CH_3$$

$C_5H_{12}Se$ MW, 151

B.p. 141°/760 mm. D_4^{25} 1·1875. $n_D^{24\cdot5}$ 1·47710.

Tschugajew, *Ber.*, 1909, **42**, 52.

***N*-Methyl-*N'*-*sec*.-*n*-butylthiourea**

$$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}NH{\cdot}CS{\cdot}NH{\cdot}CH_3$$

$C_6H_{14}N_2S$ MW, 146

d-.
Prisms. M.p. 84°. $[\alpha]_D^{20}$ + 30·5° in EtOH, + 29·5° in $CHCl_3$.
dl-.
Cryst. from EtOH.Aq. M.p. 79–80°.

Urban, *Arch. Pharm.*, 1904, **242**, 59.
Dixon, *J. Chem. Soc.*, 1893, **63**, 322.

1-Methylbutyraldehyde (*Methylethylacetaldehyde*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CHO$$

$C_5H_{10}O$ MW, 86

B.p. 92–3°. Insol. H_2O. Polymerised by HCl.
Oxime : b.p. 149–51°/749 mm.
Semicarbazone : needles from EtOH.Aq. M.p. 103°.
2 : 4-*Dinitrophenylhydrazone* : cryst. from EtOH. M.p. 120·5°.
Azine : b.p. 200–2°.

Linstead, Mann, *J. Chem. Soc.*, 1930, 2069.
Neustädter, *Monatsh.*, 1906, **27**, 928.

2-Methylbutyraldehyde.
See Isovaleraldehyde.

Methyl butyrate

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}OCH_3$$

$C_5H_{10}O_2$ MW, 102

B.p. 102·3°/760 mm. D_4^0 0·91939 (0·92006), D_4^{20} 0·8982, D_4^{102} 0·8054. n_α^{20} 1·38693, n_β^{20} 1·39359, n_γ^{20} 1·39742.

Young, Thomas, *J. Chem. Soc.*, 1893, **63**, 1229.
Gartenmeister, *Ann.*, 1886, **233**, 267.
Administration der Minenvon Buchsweiler Akt.-Ges., D.R.P., 232,818, (*Chem. Zentr.*, 1911, I, 1090).

1-Methylbutyric Acid (*Methylethylacetic acid, butane-2-carboxylic acid*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_5H_{10}O_2$ MW, 102

d-.
B.p. 177° (174°). D_4^{20} 0·9419. $[\alpha]_D^{21}$ + 17·6°, $[\alpha]_D^{24}$ + 18·2°.
Me ester : $C_6H_{12}O_2$. MW, 116. B.p. 113°/713–15 mm. D_4^{22} 0·882. $n_D^{20\cdot7}$ 1·3936. $[\alpha]_D^{22}$ + 22·03°.
Et ester : $C_7H_{14}O_2$. MW, 130. B.p. 131–3°/730 mm. D_4^{22} 0·864. $n_D^{20\cdot4}$ 1·3964. $[\alpha]_D^{22}$ + 17·59°.
Propyl ester : $C_8H_{16}O_2$. MW, 144. B.p. 154–7°/730 mm. D_4^{22} 0·860. $n_D^{20\cdot4}$ 1·4033. $[\alpha]_D^{22}$ + 15·29°.
Isopropyl ester : b.p. 140–4°/727 mm. D^{15-20} 0·8510.
Butyl ester : $C_9H_{18}O_2$. MW, 158. B.p. 173–6°/730 mm. D_4^{22} 0·856. $n_D^{20\cdot2}$ 1·4090. $[\alpha]_D^{22}$ + 13·87°.
sec.-n-*Butyl ester* : b.p. 164–7°/727 mm. D^{15-20} 0·8534.
Isobutyl ester : b.p. 165–7°/715 mm. D_4^{22} 0·855. n_D^{20} 1·4059. $[\alpha]_D^{22}$ + 13·78°.
Isoamyl ester : $C_{10}H_{20}O_2$. MW, 172. B.p. 185–7°/720 mm. D^{17} 0·857.
Amide : $C_5H_{11}ON$. MW, 101. Cryst. M.p. 111°. Sol. H_2O, EtOH, $CHCl_3$. Spar. sol. pet. ether, C_6H_6. $[\alpha]_D$ + 18° 19′ in H_2O.
Brucine salt : $C_5H_{10}O_2,C_{23}H_{26}O_4N_2,3H_2O$. Prisms. M.p. 95°, anhyd. 30–3°.

l-.
B.p. 176–7° (173–4°). D_4^{20} 0·934. $[\alpha]_D$ − 17·85°.
Brucine salt : prisms. M.p. 100°, anhyd. 88°. Spar. sol. cold H_2O.

dl-.
B.p. 177° (175°/767 mm.). D_{20}^{20} 0·938. $D_{17\cdot4}^{24}$ 0·938. $k = 1{\cdot}68\ (1{\cdot}64) \times 10^{-5}$ at 25°.
Et ester : b.p. 133·5°. $D_{17\cdot5}^{22}$ 0·8695.
Chloride : C_5H_9OCl. MW, 120·5. B.p. 115–16°.
Amide : cryst. from Et_2O. M.p. 112°.
Anhydride : $C_{10}H_{18}O_3$. MW, 186. B.p. 103–4°/17 mm.
Nitrile : C_5H_9N. MW, 83. B.p. 125°. D_4^0 0·8061.
Hydrazide : m.p. 78°.

Gilman, Kirby, *Organic Syntheses*, Collective Vol. I, 1932, 353.
Auwers, Fritzweiler, *Ann.*, 1897, **298**, 166.
Saur, *Ann.*, 1877, **188**, 261.
Marckwald, *Ber.*, 1904, **37**, 352, 1045, 1368.
Guye, Chavanne, *Bull. soc. chim.*, 1896, **15**, 295.
Taverne, *Rec. trav. chim.*, 1894, **13**, 197.

2-Methylbutyric Acid.
See Isovaleric Acid.

2-Methylbutyrolactam.
See 4-Methyl-2-pyrrolidone.

Methylbutyrophenone.
See Propyl tolyl Ketone.

2-Methyl-4-butyrylphloroglucinol 1-methyl Ether.
See Aspidinol.

N-Methylcadaverine (*1-Amino-5-methyl-amino-pentane*)

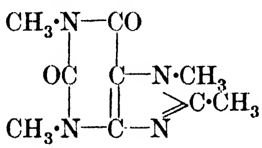
$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}NH_2$

$C_6H_{16}N_2$ MW, 116

B.p. 177–8°.
B,H₂PtCl₆ : needles. M.p. 228°.
B,2HAuCl₄,H₂O : prisms. M.p. 61°, anhyd. 121–30°.

Enger, *Z. physiol. Chem.*, 1930, **189**, 239.

Methylcaffeine (*1 : 3 : 7 : 8 - Tetramethyl - xanthine*)

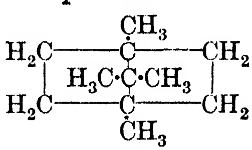


$C_9H_{12}O_2N_4$ MW, 208

Plates from 95% EtOH. M.p. 207–208·5°. Sol. EtOH, Me_2CO, $CHCl_3$, C_6H_6.

Huston, Allen, *J. Am. Chem. Soc.*, 1934, **56**, 1793.

4-Methylcamphane



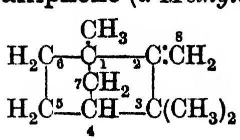
$C_{11}H_{20}$ MW, 152

Cryst. M.p. 138–9°. B.p. 170–170·5°/752 mm.

Nametkin, Brüssoff, *Ann.*, 1927, **459**, 162.

2-Methylcamphanol-2.
See Homoborneol.

1-Methylcamphene (*α-Methylcamphene*)



$C_{11}H_{18}$ MW, 150

Cryst. from MeOH. M.p. 41–3° (28°). B.p. 170·5–171°/764 mm.

Nametkin, Chuchrikoff, *Ann.*, 1923, **432**, 216.
Nametkin, Brüssoff, *Ber.*, 1924, **57**, 1258.

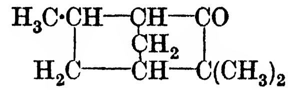
6-Methylcamphene (*β-Methylcamphene*).
Cryst. from MeOH. M.p. 100–1°. B.p. 170–170·5°/760 mm.

Nametkin, Schlesinger, *Ann.*, 1923, **432**, 225.

8-Methylcamphene (*ω-Methylcamphene*).
B.p. 178°. D^{15} 0·884–8. $[\alpha]_D$ + 4·28°. Racemises slowly on standing.

Langlois, *Ann. chim.*, 1919, **12**, 316, 343.

6-Methylcamphenilone (*β-Methylcamphenilone*)

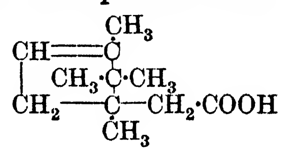


$C_{10}H_{16}O$ MW, 152

Cryst. M.p. 141–2°. Stable to HNO_3.
Oxime : needles from EtOH.Aq. M.p. 172°. Sol. EtOH, $CHCl_3$.
Hydrazone : m.p. 85–7°. B.p. 245–7°/770 mm.
Semicarbazone : small prisms from MeOH. M.p. 231–2°.
Azine : cryst. from EtOH.Aq. M.p. 163–4°.

Nametkin, Brüssoff, *Ann.*, 1923, **432**, 227.

5-Methyl-α-campholenic Acid

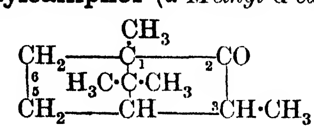


$C_{11}H_{18}O_2$ MW, 182

Cryst. M.p. 36·5–37°. B.p. 150–151·5°/12 mm. D_4^{40} 0·9841. n_D^{40} 1·46982.
Amide : $C_{11}H_{19}ON$. MW, 181. Needles from ligroin. M.p. 99–100°.
Nitrile : $C_{11}H_{17}N$. MW, 163. B.p. 115–19°/18 mm. D_4^{18} 0·9217. n_D^{18} 1·47221.

Bredt-Savelsberg, Buchkremer, *Ber.*, 1931, **64**, 607.

3-Methylcamphor (*α-Methyl-*d*-camphor*)



$C_{11}H_{18}O$ MW, 166

Plates from EtOH.Aq. M.p. 38–9°. B.p. 220–1°, 88–9°/85 mm. Very sol. EtOH, Et_2O. $[\alpha]_D^{25}$ + 30° in EtOH.
Oxime : needles from EtOH.Aq. M.p. 55°. Very sol. org. solvents. $[\alpha]_D^{20}$ + 30·3°. Insol. alkalis.

Glover, *J. Chem. Soc.*, 1908, **93**, 1291.
Riedel, D.R.P., 266,405, (*Chem. Zentr.*, 1913, II, 1716).

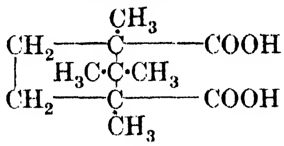
4-Methylcamphor.
Cryst. from EtOH. M.p. 168°. B.p. 213–213·5°/767 mm. Sol. H_2O, org. solvents.

Oxime: needles from MeOH.Aq. M.p. 132–3°. Very volatile.

Semicarbazone: plates from EtOH. M.p. 255–7° decomp.

Bredt-Savelsberg, Buchkremer, *Ber.*, 1931, **64**, 600.

3-Methylcamphoric Acid



$C_{11}H_{18}O_4$ MW, 214

Cryst. M.p. 191°. Sol. hot H_2O, EtOH, Et_2O.

Dichloride: $C_{11}H_{16}O_2Cl_2$. MW, 251. B.p. 155°/15 mm.

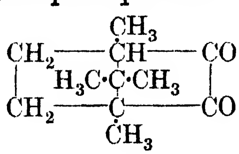
Monoamide: $C_{11}H_{19}O_3N$. MW, 213. Cryst. M.p. 162–3°.

Anhydride: cryst. M.p. 205·5–207°.

Bredt-Savelsberg, *J. prakt. Chem.*, 1918, **98**, 100.

Nametkin, Chuchrikoff, *Ann.*, 1923, **432**, 221.

4-Methylcamphorquinone



$C_{11}H_{16}O_2$ MW, 180

Yellow cryst. from EtOH. M.p. 199–200°. In daylight ⟶ 3-methylcamphoric anhydride.

Hydrazone: cryst. M.p. 108–9°.

Nametkin, Brüssoff, *J. prakt. Chem.*, 1932, **135**, 155.

3-Methylcapric Acid

$CH_3\cdot[CH_2]_5\cdot CH(CH_3)\cdot CH_2\cdot CH_2\cdot COOH$

$C_{11}H_{22}O_2$ MW, 186

Oil. B.p. 150–2°/12 mm.

p-*Toluidide*: m.p. 34–6°.

1-*Naphthalide*: m.p. 61–2°.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 255.

4-Methylcapric Acid

$CH_3\cdot[CH_2]_4\cdot CH(CH_3)\cdot[CH_2]_3\cdot COOH$

$C_{11}H_{22}O_2$ MW, 186

l-.

B.p. 135°/3 mm. D_4^{25} 0·893. $[\alpha]_D^{25}$ −0·18°.

Et ester: $C_{13}H_{26}O_2$. MW, 214. B.p. 140°/25 mm. D_4^{24} 0·864.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 153; 1933, **103**, 299.

8-Methylcapric Acid

$CH_3\cdot CH(CH_3)\cdot[CH_2]_7\cdot COOH$

$C_{11}H_{22}O_2$ MW, 186

Plates. B.p. 174–174·5°/23 mm.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 449.

1-Methylcaproic Acid (1-*Methylhexoic acid, 1-butylpropionic acid, methylbutylacetic acid*)

$CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH(CH_3)\cdot COOH$

$C_7H_{14}O_2$ MW, 130

d-.

Oil. B.p. 105°/5 mm. $[\alpha]_D^{22}$ + 19·6° in Et_2O.

Chloride: $C_7H_{13}OCl$. MW, 148·5. B.p. 45–8°/9 mm.

l-.

Oil. B.p. 105°/5 mm. $[\alpha]_D^{25}$ − 15·25° in Et_2O. D_4^{25} 0·909. n_D^{25} 1·4189.

dl-.

Oil. B.p. 209·6°, 203–5°/683 mm., 100°/12 mm. Misc. with EtOH, Et_2O, MeOH, $CHCl_3$, CS_2, C_6H_6 in all proportions.

Me ester: $C_8H_{16}O_2$. MW, 144. B.p. 159–60°.

Et ester: $C_9H_{18}O_2$. MW, 158. B.p. 174–5°.

Chloride: b.p. 45–8°/9 mm.

Amide: $C_7H_{15}ON$. MW, 129. Needles from H_2O. M.p. 70–72·5°.

Anilide: cryst. from EtOH. M.p. 98°.

p-*Bromoanilide*: cryst. from EtOH. M.p. 114°.

p-*Toluidide*: cryst. M.p. 85°.

p-*Anisidide*: cryst. M.p. 103°.

Reichstein, Trivelli, *Helv. Chim. Acta*, 1932, **15**, 258.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 571.

Rasetti, *Bull. soc. chim.*, 1905, **33**, 689.

2-Methylcaproic Acid (2-*Methylhexoic acid, 2-propylbutyric acid*)

$CH_3\cdot CH_2\cdot CH_2\cdot CH(CH_3)\cdot CH_2\cdot COOH$

$C_7H_{14}O_2$ MW, 130

d-.

Chloride: $C_7H_{13}OCl$. MW, 148·5. B.p. 82°/50 mm. D^{26} 0·954. n_D^{25} 1·4293. $[\alpha]_D^{26}$ + 2·47°.

Amide: $C_7H_{15}ON$. MW, 129. Cryst. M.p. 91°. $[\alpha]_D^{26}$ − 4·16° in EtOH.
Nitrile: $C_7H_{13}N$. MW, 111. B.p. 95°/70 mm. D_4^{26} 0·810. n_D^{25} 1·4137. $[\alpha]_D^{26}$ 3·28°.
p-*Nitrophenyl ester*: b.p. 124·5°/0·15 mm. $[\alpha]_D^{23·5}$ 1·45°. D_4^{25} 1·1121. n_D^{25} 1·5113.

l-.
Oil. B.p. 113°/17 mm. D_4^{27} 0·911. n_D^{25} 1·4214. $[\alpha]_D^{27}$ − 2·52°. Undergoes Walden inversion on treatment with $SOCl_2$.
Et ester: $C_9H_{18}O_2$. MW, 158. B.p. 60°/10 mm. D_4^{27} 0·806. n_D^{30} 1·4102. $[\alpha]_D^{27}$ − 0·42°, $[\alpha]_D^{29}$ − 1·86° in C_6H_6, − 1·91° in $CHCl_3$.

dl-.
B.p. 212–13°/755 mm. D_4^{20} 0·9187. n_D^{20} 1·4222.
Et ester: b.p. 176–7°/756 mm. D_4^{20} 0·8679. n_D^{20} 1·4119.
Chloride: b.p. 163–4°/751 mm. D_4^{20} 0·967.
Amide: cryst. from EtOH.Aq. M.p. 97°.
Nitrile: b.p. 171–2°/749 mm. D_4^{20} 0·8109. n_D^{20} 1·4143.

Dewall, Weehering, *Bull. soc. chim. Belg.*, 1924, **33**, 495.
Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.
Stevens, *J. Am. Chem. Soc.*, 1934, **56**, 997.

3-Methylcaproic Acid.
See active-Amylacetic Acid.

4-Methylcaproic Acid.
See Isoamylacetic Acid.

2-Methylcaproic Aldehyde (2-*Propylbutyraldehyde*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CHO$$

$C_7H_{14}O$ MW, 114

B.p. 141°/725 mm. D_4^{20} 0·8203. n_D^{20} 1·4122.
Semicarbazone: m.p. 108–9°.

Fourneau, Benoit, Firmenich, *Bull. soc. chim.*, 1930, **47**, 858.
Dewael, Weckering, *Bull. soc. chim. Belg.*, 1924, **33**, 495.

2-Methylcaprylic Acid

$$CH_3{\cdot}[CH_2]_4{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}COOH$$

$C_9H_{16}O_2$ MW, 156

d-.
Chloride: $C_9H_{15}OCl$. MW, 174·5. B.p. 95°/20 mm. D_4^{24} 0·935. n_D^{25} 1·4362. $[\alpha]_D^{24}$ + 1·36°.
Amide: $C_9H_{17}ON$. MW, 155. $[\alpha]_D^{24}$ − 6·68°.
Nitrile: $C_9H_{15}N$. MW, 137. B.p. 135°/85 mm. D_4^{23} 0·813. n_D^{25} 1·4239. $[\alpha]_D^{23}$ + 4·02°.

l-.
B.p. 135°/16 mm. D_4^{23} 0·899. n_D^{25} 1·4298. $[\alpha]_D^{23}$ − 4·57°.
Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. 117°/35 mm. D_4^{23} 0·860. n_D^{25} 1·4200. $[\alpha]_D^{23}$ − 2·03°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 95.

3-Methylcaprylic Acid

$$CH_3{\cdot}[CH_2]_3{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_9H_{16}O_2$ MW, 156

l-.
B.p. 149°/22 mm. D_4^{25} 0·871. $[\alpha]_D^{25}$ − 1·33°.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 162.

4-Methylcaprylic Acid

$$CH_3{\cdot}[CH_2]_2{\cdot}\overset{CH_3}{CH}{\cdot}[CH_2]_2{\cdot}CH_2{\cdot}COOH$$

$C_9H_{16}O_2$ MW, 156

l-.
B.p. 127°/5 mm. D_4^{25} 0·901. $[\alpha]_D^{25}$ − 0·37°.
Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. 112°/30 mm. D_4^{22} 0·865.

See previous reference.

5-Methylcaprylic Acid

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}[CH_2]_4{\cdot}COOH$$

$C_9H_{16}O_2$ MW, 156

d-.
B.p. 139°/20 mm. D_4^{25} 0·899. $[\alpha]_D^{25}$ + 2·49°.
Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. 110°/25 mm. D_4^{24} 0·868.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 163; 1933, **103**, 299.

6-Methylcaprylic Acid

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}[CH_2]_5{\cdot}COOH$$

$C_9H_{16}O_2$ MW, 156

B.p. 248°/765 mm., 140·5°/15 mm. Very spar. sol. H_2O.
Et ester: $C_{11}H_{20}O_2$. MW, 184. B.p. 220·5°/765 mm.
Amide: $C_9H_{17}ON$. MW, 155. Cryst. M.p. 106·5°.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 433.

Methylcarbamic Acid (*Methylaminoformic acid*)

$$CH_3{\cdot}NH{\cdot}COOH$$

$C_2H_5O_2N$ MW, 75

Not known in free state.

Methylamine salt: $C_2H_5O_2N,CH_3NH_2$. Cryst. M.p. 105°. Very sol. H_2O, EtOH. Heat at 170° ⟶ dimethylurea.

Et ester: *see* Methylurethane.

Amide: *see* Methylurea.

Chloride: C_2H_4ONCl. MW, 93·5. Cryst. M.p. about 90°.

Schmidt, *Ber.*, 1903, **36**, 2476.
Gattermann, Schmidt, *Ann.*, 1888, **244**, 35.
Fichter, Becker, *Ber.*, 1911, **44**, 3481.

Methylcarbanilic Acid.

See *N*-Methylphenylcarbamic Acid *and* Tolylcarbamic Acid.

***N*-Methylcarbanilide** (N-*Methyl*-sym.-*diphenylurea*)

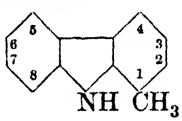
$C_6H_5{\cdot}N(CH_3){\cdot}CO{\cdot}NH{\cdot}C_6H_5$

$C_{14}H_{14}ON_2$ MW, 226

Needles from EtOH or xylene. M.p. 106° (104°). B.p. 203–5° decomp. Very sol. Et_2O, C_6H_6, $CHCl_3$, AcOH. Spar. sol. hot H_2O, cold EtOH. Insol. ligroin. Dist. ⟶ methylaniline + phenyl isocyanate.

Gebhardt, *Ber.*, 1884, **17**, 2093.

1-Methylcarbazole



$C_{13}H_{11}N$ MW, 181

Plates from ligroin. M.p. 120·5°. Sol. EtOH, Et_2O, AcOH, C_6H_6. Spar. sol. ligroin.

Picrate: red needles from EtOH. M.p. 143·5°.

Ullmann, *Ann.*, 1904, **332**, 86.

2-Methylcarbazole.

Plates from EtOH. M.p. 259°.

Picrate: red needles from C_6H_6. M.p. 167°.

Borsche, *Ann.*, 1908, **359**, 75.

3-Methylcarbazole.

Plates from AcOH. M.p. 207°. Sol. Et_2O, C_6H_6. Spar. sol. EtOH, AcOH. Pale green sol. in H_2SO_4, addn. of HNO_3 ⟶ deep green.

Picrate: scarlet needles from C_6H_6. M.p. 179°.

Oakeshott, Plant, *J. Chem. Soc.*, 1926, 1212.
Ullmann, *Ber.*, 1898, **31**, 1697.

***N*-Methylcarbazole.**

See under Carbazole.

Methylcarbithionic Acid.

See Dithioacetic Acid.

5-Methylcarbostyril.

See 2-Hydroxy-4-methylquinoline.

Methyl-carboxybenzyl Alcohol.

See Hydroxymethyl-toluic Acid.

Methyl carboxybenzyl Ketone.

See Methyl benzyl Ketone carboxylic Acid.

5-Methyl-4-carboxy-α-furylacetic Acid.

See Methronic Acid.

***N*-Methyl-2-carboxymethylpiperidine-4-carboxylic Acid.**

See Granatic Acid.

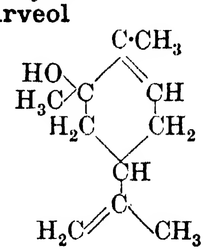
2-[*N*-Methyl-4-carboxypiperidyl]-acetic Acid.

See Granatic Acid.

Methylcarbylamine.

See Methyl isocyanide.

6-Methylcarveol



$C_{11}H_{18}O$ MW, 166

Oil. B.p. 117–18°/19 mm., 101–2°/8·5 mm. D^{20} 0·9449, $D_4^{20·4}$ 0·9471. $n_D^{20·4}$ 1·4911. $[\alpha]_D^{20}$ + 40·44°, $[\alpha]_D^{20·4}$ + 36·08°.

Klages, Sommer, *Ber.*, 1906, **39**, 2309.
Rupe, Emmerich, *Ber.*, 1908, **41**, 1397.

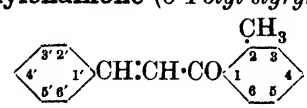
Methylcatechol.

See 2 : 3-Dihydroxytoluene *and* Homocatechol.

α-Methylchalkone.

See Dypnone.

2-Methylchalkone (o-*Tolyl styryl ketone*)



$C_{16}H_{14}O$ MW, 222

Oil. B.p. 209–11°/19 mm., 197°/7 mm.

Weygand, Schachter, *Ber.*, 1935, **68**, 231.

3-Methylchalkone (m-*Tolyl styryl ketone*).

Exists in two forms.

(i) *Stable form*:

Yellow needles. M.p. 61°.

Dipicrate: cryst. from C_6H_6. M.p. 107°.

(ii) *Labile form*:

M.p. 51°.

See previous reference.

4-Methylchalkone (p-*Tolyl styryl ketone*).
Exists in seven forms, m.ps., 74·5°, 56·5°, 55·5°, 54·5°, 48°, 46·5°, 44·5°.
Oxime : m.p. 130–2°.
Picrate : m.p. 99–100°.

Weygand, Baumgärtel, *Ann.*, 1929, **469**, 253.
Stobbe, Bremer, *J. prakt. Chem.*, 1929, **123**, 1.

2′-Methylchalkone (*Phenyl* o-*methylstyryl ketone*).
Oil. B.p. 218–19°/12 mm.

Weygand, Schächer, *Ber.*, 1935, **68**, 231.

3′-Methylchalkone (*Phenyl* m-*methylstyryl ketone*).
Exists in four forms.
Stable form :
Yellow needles from EtOH. M.p. 66°.
Three labile forms :
Cryst. M.ps., 53°, 67°, 68°, all of which are interconvertible.

See previous reference.

4′-Methylchalkone (*Phenyl* p-*methylstyryl ketone*).
Yellow needles from ligroin. M.p. 96·5°. Very sol. most org. solvents.
Oxime : needles from EtOH. M.p. 91°.

Hanzlik, Bianchi, *Ber.*, 1899, **32**, 2283.

Methylchavicol.
See Esdragol.

Methyl chloride (*Chloromethane*)

CH_3Cl

CH_3Cl MW, 50·5

Colourless gas. M.p. — 93°. B.p. — 24·09°. Sol. to 4 parts by vol. in H_2O at 16°, 35 parts in EtOH, 40 parts in AcOH. Crit. temp. 416·2°. Crit. press. 65·09 atm. Used extensively as refrigerant and fire extinguisher.

Norris, Taylor, *J. Am. Chem. Soc.*, 1924, **46**, 752.

Methyl 1-chloroethyl Ether

$CH_3\cdot CHCl\cdot O\cdot CH_3$

C_3H_7OCl MW, 94·5

B.p. 72–3°/751 mm. D_4^{20} 0·9902. n^{20} 1·4004. Hydrolyses and polymerises readily.

Henze, Murchison, *J. Am. Chem. Soc.*, 1931, **53**, 4077.

Methyl 2-chloroethyl Ether

$CH_2Cl\cdot CH_2\cdot O\cdot CH_3$

C_3H_7OCl MW, 94·5

B.p. 90·5°. D_4^{20} 1·031. 100 parts H_2O dissolve 8 parts by weight at ord. temp.

Bennet, Heathcot, *J. Chem. Soc.*, 1929, 270.
Swallen, Boord, *J. Am. Chem. Soc.*, 1930, **52**, 653.

Methyl 1-chloroethyl Ketone (3-*Chlorobutanone*)

$CH_3\cdot CHCl\cdot CO\cdot CH_3$

C_4H_7OCl MW, 106·5

B.p. 115°, 40°/30 mm. KCN ⟶ 1-acetopropionitrile. HNO_3 ⟶ 1-chloropropionic acid.
Semicarbazone : needles from AcOEt. M.p. 138–9°.

Curd, Robertson, *J. Chem. Soc.*, 1933, 717.

Methyl 2-chloroethyl Ketone (4-*Chlorobutanone*)

$CH_2Cl\cdot CH_2\cdot CO\cdot CH_3$

C_4H_7OCl MW, 106·5

B.p. 50–5°/16 mm. NH_2OH ⟶ 3-methylisoxazoline. $H_2N\cdot NH_2$ ⟶ 3-methylpyrazoline. $C_6H_5\cdot NH\cdot NH_2$ ⟶ 3-methyl-1-phenylpyrazoline.

Schering-Kahlbaum, U.S.P., 1,737,203, (*Chem. Abstracts*, 1930, **24**, 626).
Maire, *Bull. soc. chim.*, 1908, **3**, 268.

Methyl 2-chloroethyl sulphide

$ClCH_2\cdot CH_2\cdot S\cdot CH_3$

C_3H_7ClS MW, 110·5

B.p. 44°/20 mm. D_{20}^{20} 1·1245. n_D^{30} 1·4902. Vesicant.

Kirner, *J. Am. Chem. Soc.*, 1928, **50**, 2452.

Methylchloroform.
See 1 : 1 : 1-Trichloroethane.

Methyl chloroformate

$ClCO\cdot OCH_3$

$C_2H_3O_2Cl$ MW, 94·5

B.p. 72–3°/767 mm. D_4^{20} 1·2231. n_D^{20} 1·38675. Burns with green flame. Decomp. by boiling H_2O.

Klepl, *J. prakt. Chem.*, 1882, **26**, 448.
Karvonen, *Chem. Zentr.*, 1919, III, 808.

Methyl 2-chloroisopropyl Ether

$$ClCH_2\cdot \overset{CH_3}{CH}\cdot O\cdot CH_3$$

C_4H_9OCl MW, 108·5

B.p. 103–4°/760 mm. D_4^{20} 1·009. n_D^{20} 1·41372.

Dewael, *Bull. soc. chim., Belg.*, 1930, **39**, 395.

Methyl chloromethyl Ether.
See Chlorodimethyl Ether.

Methyl 2-chloropropyl Ether

$CH_3{\cdot}CHCl{\cdot}CH_2{\cdot}O{\cdot}CH_3$

C_4H_9OCl MW, 108·5

B.p. 98–9°/756 mm. D^{20} 0·9946. n_D^{20} 1·40754.

Dewael, *Bull. soc. chim. Belg.*, 1925, **34**, 343.

Methyl 3-chloropropyl Ether

$ClCH_2{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_3$

C_4H_9OCl MW, 108·5

B.p. 110·4–110·6°/756·6 mm. (109–12°). D_4^0 1·0233, D_4^{20} 1·0013. n_D^{20} 1·41308.

Karvonen, *Chem. Zentr.*, 1912, II, 1271.
Paul, *Ann. chim.*, 1932, **18**, 315.

Methyl 3-chloropropyl sulphide

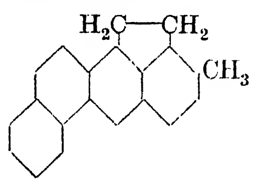
$ClCH_2{\cdot}CH_2{\cdot}CH_2{\cdot}S{\cdot}CH_3$

C_4H_9ClS MW, 124·5

B.p. 71·2°/29 mm. D_{20}^{20} 1·0863. n_D^{30} 1·4833.

Kirner, *J. Am. Chem. Soc.*, 1928, **50**, 2453.

Methylcholanthrene



$C_{21}H_{16}$ MW, 268

Straw-yellow needles from C_6H_6. M.p. 176·5–177·5°. Does not react with maleic anhydride. Very potent carcinogenic compound.

Picrate: purplish-black needles from C_6H_6. M.p. 180–1° (177–8°).

Cook, Haslewood, *J. Chem. Soc.*, 1934, 430.
Fieser, Seligman, *J. Am. Chem. Soc.*, 1935, **58**, 228.

α-Methylcholine (*Trimethylhydroxyisopropylammonium hydroxide*)

$$(CH_3)_3N{<}^{\overset{CH_3}{|}\ CH{\cdot}CH_2OH}_{OH}$$

$C_6H_{17}O_2N$ MW, 135

Colourless syrup. Very hygroscopic. Reacts alkaline. Intrajejunal administrations of large doses in anæsthetised dogs causes variations of blood pressure, hypotension, tachycardia, and bradycardia. The acetyl derivs. are more suitable than acetylcholine. Compound described as α-methylcholine in early literature is incorrectly named.

Iodide: m.p. 296°.
Acetyl: m.p. 152–4°.
B,HAuCl₄: m.p. 247°.
B₂,H₂PtCl₆: m.p. 228°.
Picrate: m.p. 265°.

Major, Cline, *J. Am. Chem. Soc.*, 1932, **54**, 242.
Karrer, *Helv. Chim. Acta*, 1922, **5**, 477.

β-Methylcholine (*Trimethylhydroxypropylammonium hydroxide*)

$$(CH_3)_3N{<}^{CH_2{\cdot}CH(OH){\cdot}CH_3}_{OH}$$

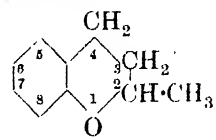
$C_6H_{17}O_2N$ MW, 135

Identical in properties with α-methylcholine.

Chloride: needles from butyl alcohol. M.p. 165°.
Acetyl: very hygroscopic solid. M.p. 172–3°.
B,HAuCl₄: m.p. 196°.
B₂,H₂PtCl₆: m.p. 257°.
Picrate: needles from EtOH. M.p. 163°.

See first reference above.

2-Methylchroman



$C_{10}H_{12}O$ MW, 148

Liq. with peppermint-like odour. B.p. 223–6°, 100–102°/11 mm. $n_D^{13\cdot5}$ 1·532. Sol. most org. solvents. Sol. conc. $H_2SO_4 \longrightarrow$ red sol.

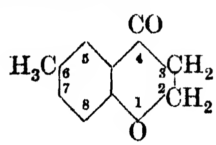
Harries, Busse, *Ber.*, 1895, **28**, 502.
Stoermer, Schäffer, *Ber.*, 1903, **36**, 2872.
Baker, Walker, *J. Chem. Soc.*, 1935, 648.

6-Methylchroman.

Yellowish liq. with peppermint-like odour. B.p. 234°, 107°/12 mm. D_4^{14} 1·0374. n_D^{14} 1·542.

Auwers, *Ann.*, 1918, **415**, 154.
v. Braun, Grabowski, Kirschbaum, *Ber.*, 1913, **46**, 1273.

6-Methylchromanone



$C_{10}H_{10}O_2$ MW, 162

Prisms from pet. ether. M.p. 34–6°. B.p. 141–3°/13·5 mm. $D_4^{57\cdot2}$ 1·1245. $n_D^{57\cdot1}$ 1·555. Very sol. org. solvents.

Oxime: needles from pet. ether. M.p. 84–5°. Very sol. MeOH, EtOH.

p-*Nitrophenylhydrazone*: orange-red needles from MeOH–Me_2CO. M.p. 222°. Sol. hot Me_2CO. Spar. sol. EtOH.

Semicarbazone: prisms from AcOH. M.p. 248–9°. Sol. hot AcOH. Very spar. sol. MeOH, EtOH, AcOEt.

Auwers, Krollpfeiffer, *Ber.*, 1914, **47**, 2587.
Powell, Johnson, *J. Am. Chem. Soc.*, 1924, **46**, 2863.

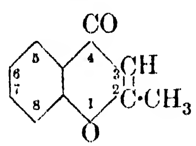
7-Methylchromanone.

Pale yellow liq. B.p. 138°/13 mm.

Oxime: needles from hot H_2O. M.p. 98–9°.

Powell, Johnson, *J. Am. Chem. Soc.*, 1924, **46**, 2863.

2-Methylchromone



$C_{10}H_8O_2$ MW, 160

Needles from pet. ether. M.p. 72–3° (70–1°). Sol. conc. H_2SO_4 with violet-blue fluor.

Bloch, v. Kostanecki, *Ber.*, 1900, **33**, 1999.
Simonis, Remmert, *Ber.*, 1914, **47**, 2232.
Wittig, Bangert, Richter, *Ann.*, 1925, **446**, 169.

6-Methylchromone.

Needles from boiling H_2O. M.p. 88–9°. Sol. EtOH, ligroin. Sol. conc. H_2SO_4 with blue fluor.

Oxamino-oxime: needles from MeOH. M.p. 143–4°.

Ruhemann, Bauer, *J. Chem. Soc.*, 1901, **79**, 474.

7(or 5-)Methylchromone.

Needles from H_2O. M.p. 72–3°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. boiling H_2O. Sol. conc. H_2SO_4 with blue fluor.

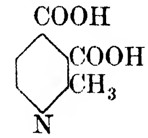
Ruhemann, Bausor, *J. Chem. Soc.*, 1901, **79**, 473.

8-Methylchromone.

Needles from pet. ether. M.p. 84–5°. Very sol. EtOH. Sol. hot H_2O. Sol. conc. H_2SO_4 with blue fluor.

See previous reference.

2-Methylcinchomeronic Acid (*α-Picoline-3:4-dicarboxylic acid*)



$C_8H_7O_4N$ MW, 181

Plates or needles from H_2O. M.p. 250–5° decomp. Spar. sol. H_2O. Almost insol. Et_2O, C_6H_6, ligroin.

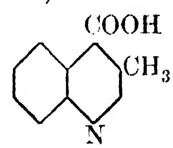
Anhydride: needles from ligroin. M.p. 92°.

Mumm, Hüneke, *Ber.*, 1918, **51**, 158.

2-Methylcinchoninic Acid.

See Quinaldine-4-carboxylic Acid.

3-Methylcinchoninic Acid (*3-Methylquinoline-4-carboxylic acid*)



$C_{11}H_9O_2N$ MW, 187

Plates from H_2O. M.p. 254°. Spar. sol. Me_2CO. Insol. Et_2O, C_6H_6, ligroin.

Miller, *Ber.*, 1890, **23**, 2257.

Methylcinchophene.

See Methyl-2-phenylquinoline-4-carboxylic Acid *and* 2-*p*-Tolylquinoline-4-carboxylic Acid.

α-Methylcinnamaldehyde (*1-Benzylidenepropionaldehyde, 1-methyl-2-phenylacrolein*)

$$C_6H_5\cdot CH{:}\overset{CH_3}{C}\cdot CHO$$

$C_{10}H_{10}O$ MW, 146

B.p. 150°/100 mm. (148–9°/27 mm.), 131–2°/16 mm. D_4^{17} 1·0407. n_D^{17} 1·6057.

Semicarbazone: cryst. from EtOH.Aq. M.p. 207–8°.

v. Miller, Kinkelin, *Ber.*, 1886, **19**, 526.
Auwers, *Ber.*, 1912, **45**, 2777.
Knorr, Weissenborn, U.S.P., 1,716,822, (*Chem. Abstracts*, 1929, **23**, 3214).

β-Methylcinnamaldehyde (*2-Benzylidenepropionaldehyde, 2-methyl-2-phenylacrolein*)

$$C_6H_5\cdot\overset{CH_3}{C}{:}CH\cdot CHO$$

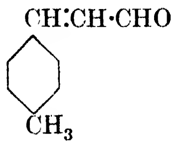
$C_{10}H_{10}O$ MW, 146

B.p. 122–30°/12 mm.

Semicarbazone: yellow needles from EtOH. M.p. 201°.

Rupe, Giesler, *Helv. Chim. Acta*, 1928, **11**, 656.

***p*-Methylcinnamaldehyde** (2-p-*Tolylacrolein*)



$C_{10}H_{10}O$ MW, 146

Yellow leaflets from EtOH.Aq. M.p. 41·5°. B.p. 154°/25 mm. Very labile.

Oxime: leaflets from EtOH. M.p. 136°.

Semicarbazone: needles from EtOH. M.p. 210°.

Scholtz, Wiedemann, *Ber.*, 1903, **36**, 850.

Methyl cinnamate

$C_6H_5{\cdot}CH{:}CH{\cdot}CO{\cdot}OCH_3$

$C_{10}H_{10}O_2$ MW, 162

Occurs in essential oil of various plants. Cryst. from pet. ether or EtOH.Aq. M.p. 36·5° (34·7°). B.p. 261°/750 mm., 148·8°/100 mm., 142–5°/20 mm., 126·8°/10 mm., 112·0°/5 mm. D_4^{35} 1·0700, D_4^{50} 1·0573, D_4^{75} 1·0340.

Jacger, *Z. anorg. allgem. Chem.*, 1917, **101**, 140.

Kendall, Booge, *J. Am. Chem. Soc.*, 1916, **38**, 1723.

Riiber, *Ber.*, 1915, **48**, 827.

α-Methylcinnamic Acid (1-*Benzylidenepropionic acid*, 1-*methyl-2-phenylacrylic acid*)

$C_6H_5{\cdot}CH{:}C(CH_3){\cdot}COOH$

$C_{10}H_{10}O_2$ MW, 162

(i) *Labile form.* Allo-α-methylcinnamic Acid. Cryst. from pet. ether. M.p. 91–2°. Sol. to 0·76% in pet. ether at 18°. Boiling HCl ⟶ stable form.

Aniline salt: needles from pet. ether–C_6H_6. M.p. 74–74·5°.

Me ester: $C_{11}H_{12}O_2$. MW, 176. Oil. B.p. 112°/16 mm.

Amide: $C_{10}H_{11}ON$. MW, 161. Needles from EtOH.Aq. M.p. 137–8°.

(ii) *Stable form.*

Dimorphous. (i) Prisms from EtOH.Aq. M.p. 81–2°. Sol. to 2·27% in pet. ether at 20°. (ii) Needles from pet. ether. M.p. 74°. Sol. to ·87% in pet. ether at 20°.

Phenylhydrazine salt: cryst. from C_6H_6–pet. ether. M.p. 64–5°.

Me ester: b.p. 137–8°/16 mm.

Et ester: $C_{12}H_{14}O_2$. MW, 190. B.p. 254–60°, 142–3°/12 mm. $D_4^{20.6}$ 1·0321. $n_\alpha^{20.6}$ 1·5475.

Propyl ester: $C_{13}H_{16}O_2$. MW, 204. B.p. 162–5°/30 mm. D_{15}^{15} 1·027.

Isopropyl ester: b.p. 155–60°/20 mm. D_{15}^{15} 1·026.

Chloride: $C_{10}H_9OCl$. MW, 180·5. Needles from Et_2O. M.p. 50°. B.p. 126–7°/12 mm.

Amide: plates from H_2O. M.p. 128°. Spar. sol. EtOH, Et_2O.

Cohen, Whiteley, *J. Chem. Soc.*, 1901, **79**, 1312.

Rupe, Busolt, *Ann.*, 1909, **369**, 321.

Stoermer, Voht, *Ann.*, 1915, **409**, 51.

β-Methylcinnamic Acid (2-*Phenylcrotonic acid*)

$C_6H_5{\cdot}C(CH_3){:}CH{\cdot}COOH$

$C_{10}H_{10}O_2$ MW, 162

(i) *Cis-*: *Labile form.* Allo-β-methylcinnamic Acid.

Plates from CS_2. M.p. 131·5°. B.p. 170–2°/14 mm. 100 gm. C_6H_6 dissolve 7·85 gm. at 21°. 100 gm. pet. ether dissolve 0·8 gm. at 21°. Conc. H_2SO_4 or boiling dil. HCl ⟶ *trans* form.

Me ester: $C_{11}H_{12}O_2$. MW, 176. Cryst. M.p. 26·5–27·5°. B.p. 135°/27 mm., 113·5°/8 mm. $D_4^{38.1}$ 1·0373. $n_D^{38.1}$ 1·528.

Amide: $C_{10}H_{11}ON$. MW, 161. Plates from ligroin. M.p. 94–5°. Very sol. EtOH, $CHCl_3$. Sol. CS_2, Et_2O. Spar. sol. pet. ether.

Anilide: $C_{16}H_{15}ON$. MW, 237. Needles from ligroin. M.p. 93°.

(ii) *Trans-*: *Stable form.*

Cryst. from ligroin. M.p. 98·5°. Very sol. $CHCl_3$. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin, CS_2. Very spar. sol. H_2O.

Me ester: cryst. M.p. 29° (29–30°). B.p. 152°/30 mm., 129–129·5°/11 mm. D_4^{38} 1·0542. $n_\alpha^{37.8}$ 1·5444.

Et ester: $C_{12}H_{14}O_2$. MW, 190. B.p. 146–8°/16·5 mm., 138°/9 mm. $D_4^{19.1}$ 1·0392. $n_D^{16.6}$ 1·5456.

Amide: needles from ligroin. M.p. 119°.

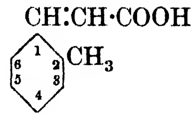
Anilide: needles. M.p. 121°.

Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 968.

Auwers, Eisenlohr, *J. prakt. Chem.*, 1911, **84**, 86.

Auwers, *Ann.*, 1917, **413**, 272.

o-Methylcinnamic Acid (2-o-*Tolylacrylic acid*)



$C_{10}H_{10}O_2$ MW, 162

Cryst. from EtOH. M.p. 74–5°.

Et ester: $C_{12}H_{14}O_2$. MW, 190. B.p. 148·4°/12 mm. $D_4^{16·4}$ 1·0427. $n_D^{16·3}$ 1·556.

Auwers, *Ann.*, 1917, **413**, 265.

m-Methylcinnamic Acid (2-m-*Tolylacrylic acid*).

Needles from H_2O. M.p. 115°. Distils undecomp. Very sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. ligroin. Volatile in steam.

Nitrile: $C_{10}H_9N$. MW, 143. B.p. 170°/30 mm. D^0 1·03.

Fiquet, *Ann. chim.*, 1893, **29**, 478.
v. Miller, Rohde, *Ber.*, 1890, **23**, 1899.

p-Methylcinnamic Acid (2-p-*Tolylacrylic acid*).

Exists in two forms.

(i) *Higher melting form.*

Needles from EtOH or C_6H_6. M.p. 198–9°. Sol. hot H_2O, EtOH, C_6H_6. Insol. ligroin.

Me ester: $C_{11}H_{12}O_2$. MW, 176. Needles from EtOH.Aq. M.p. 57–8°. B.p. 164–5°/32 mm. $D_4^{55·9}$ 1·0270. $n_D^{56·6}$ 1·558.

Et ester: b.p. 278°, 158–9°/17 mm. $D_4^{16·4}$ 1·0336. $n_D^{15·9}$ 1·5630.

Nitrile: m.p. 69–80°.

Amide: $C_{10}H_{11}ON$. MW, 161. Plates from $CHCl_3$. M.p. 189–90°.

(ii) *Lower melting form.*

Plates or needles. M.p. 75–6°. Very sol. EtOH, Et_2O, CS_2, $CHCl_3$. Boiling dil. HCl ⟶ higher melting form.

Me ester: b.p. 141–2°/23 mm.

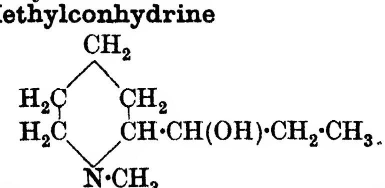
Amide: needles from C_6H_6 or EtOH.Aq. M.p. 116–116·5°.

Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 980.
Auwers, *Ber.*, 1912, **45**, 2781.
Fiquet, *Ann. chim.*, 1893, **29**, 483.

Methylcitraconic Acid.

See Ethylmaleic Acid.

N-Methylconhydrine



$C_9H_{19}ON$ MW, 157

d-.

B.p. 94–5°/11 mm. D_4^{20} 0·9400. n_D^{19} 1·47076.

dl-.

Exists in two forms.

(α) B.p. 97–9°/16 mm.

Methiodide: prisms from MeOH. M.p. 178–9°.

Picrate: cryst. from EtOH. M.p. 79–80°.

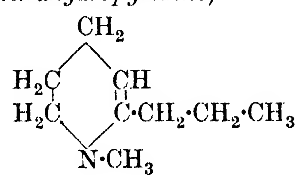
(β) B.p. 91–100°/15 mm.

Methiodide: prisms from EtOH. M.p. 174°.

Picrate: plates from EtOH. M.p. 133–4°.

Hess, Grau, *Ann.*, 1925, **441**, 101.
Hess, *Ber.*, 1920, **53**, 136.

N-Methyl-γ-coniceine (N-*Methyl-2-propyl-1 : 4 : 5 : 6-tetrahydropyridine*)



$C_9H_{17}N$ MW, 139

B.p. 182°, 73°/10 mm. $D_4^{7·8}$ 0·8783. $n_D^{7·8}$ 1·48364.

B,HCl: cryst. + H_2O. M.p. 89°.

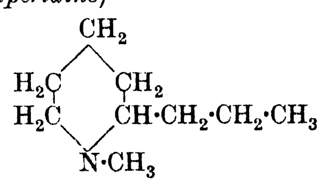
B,HAuCl$_4$: cryst. from EtOH. M.p. 80°.

B,HClO$_4$: cryst. from EtOH. M.p. 130–3°.

Picrate: m.p. 170–1°.

Lukeš, Smetáčková, *Chem. Abstracts*, 1934, **28**, 5825.

N-Methylconiine (*Methylconicine*, N-*methyl-2-propylpiperidine*)



$C_9H_{19}N$ MW, 141

d-.

Occurs in hemlock. B.p. 173–4°/757 mm. Spar. sol. cold H_2O. D_4^{23} 0·8326, $D^{24·3}$ 0·8318. $n_D^{12·8}$ 1·45384. $[\alpha]_D^{23}$ + 82·4°.

B,HCl: needles from EtOH. M.p. 192–3° (188–9°). $[\alpha]_D$ + 27·8°. Sublimes above 240°.

B,HAuCl$_4$: yellow needles from H_2O. M.p. 78°. Spar. sol. hot H_2O.

B$_2$,H$_2$PtCl$_6$: m.p. 158–60°. Very sol. H_2O. Insol. EtOH, Et_2O.

l-.

Occurs in hemlock. B.p. 175·6°/767 mm. D_2^2 0·8349. $[\alpha]_D^{20}$ − 81·9°.

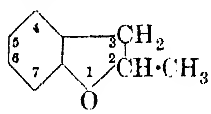
B,HCl: needles. M.p. 192–3° (191–2°). Sol. H_2O, EtOH. Insol. Et_2O. $[\alpha]_D$ − 27·2°.

B,HBr : needles from H_2O, plates from EtOH. M.p. 189–90°. $[\alpha]_D^{25}$ − 21·1° in H_2O.
B,HI : plates. M.p. 147°.
B,HAuCl$_4$: plates. M.p. 77–8°.
B$_2$,H$_2$PtCl$_6$: orange cryst. M.p. 153–4°. Sol. H_2O.
B,HCl,3HgCl$_2$: cryst. M.p. 153–4°. Sol. H_2O.
Picrate : needles from H_2O. M.p. 121–2°. Spar. sol. H_2O.

dl-.
B.p. 175·5°. $D_4^{16·5}$ 0·8389. $n_D^{16·7}$ 1·45222.
B,HCl : m.p. 165–7°.
B,HAuCl$_4$: cryst. from EtOH.Aq. M.p. 90°.
B$_2$,H$_2$PtCl$_6$: cryst. from EtOH.Aq. M.p. 197°.
Picrate : cryst. from H_2O. M.p. 112–14°.

Hess, Eichet, *Ber.*, 1917, **50**, 1386.
Ahrens, *Ber.*, 1902, **35**, 1330.
Passon, *Ber.*, 1891, **24**, 1678.
Lukeš, Smetáčková, *Chem. Abstracts*, 1934, **28**, 5825.

2-Methylcoumaran



$C_9H_{10}O$ MW, 134

B.p. 197–8°, 93–4°/23 mm., 82–3°/14 mm. D^{24} 1·032, D_4^{14} 1·0363. n_D^{22} 1·531.

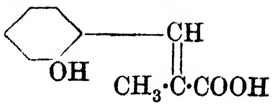
Auwers, *Ann.*, 1918, **415**, 150.
Adams, Rindfusz, *J. Am. Chem. Soc.*, 1919, **41**, 657, 660.

5-Methylcoumaran.
Liq. with peppermint-like odour. B.p. 210–11°, 88–9°/12 mm. D_4^{19} 1·0463. n_D^{19} 1·54.

Stoermer, Göhl, *Ber.*, 1903, **36**, 2877.
Auwers, *Ann.*, 1918, **415**, 149.

Methylcoumaranone.
See 3-Hydroxy-methylcoumarone.

α-Methyl-*o*-coumaric Acid (2-*Hydroxy-α-methylcinnamic acid*, 1-*salicylidenepropionic acid.* Cf. α-Methyl-*o*-coumarinic Acid)



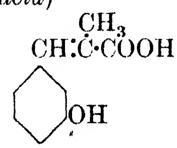
$C_{10}H_{10}O_3$ MW, 178

Needles from C_6H_6. M.p. 138° decomp. Sol. EtOH, Et_2O, $CHCl_3$, AcOH. Mod. sol. C_6H_6. Alk. sols fluoresce. Conc. $H_2SO_4 \longrightarrow$ yellow sol.

Me ether : $C_{11}H_{12}O_3$. MW, 192. Prisms or needles from EtOH. M.p. 108°. Sol. EtOH, C_6H_6. Spar. sol. H_2O, pet. ether. *Me ester* : $C_{12}H_{14}O_3$. MW, 206. Oil. B.p. 286°, 165°/13 mm. $D_4^{15·4}$ 1·1259. $n_D^{15·2}$ 1·572.
Et ether : $C_{12}H_{14}O_3$. MW, 206. Leaflets or prisms from EtOH. M.p. 133° (130–1°).

Perkin, *J. Chem. Soc.*, 1877, **31**, 415.
Moureu, *Bull. soc. chim.*, 1896, **15**, 1022.
Klages, *Ber.*, 1904, **37**, 3988.
Fries, Volk, *Ann.*, 1911, **379**, 98.
Auwers, *Ann.*, 1917, **413**, 269.

α-Methyl-*m*-coumaric Acid (3-*Hydroxy-α-methylcinnamic acid*)

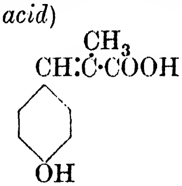


$C_{10}H_{10}O_3$ MW, 178

Leaflets from H_2O. M.p. 130°.
Me ether : $C_{11}H_{12}O_3$. MW, 192. Needles from H_2O. M.p. 92–93·5°.
Et ether : $C_{12}H_{14}O_3$. MW, 206. Needles from EtOH.Aq. M.p. 98° (80°). *Me ester* : $C_{13}H_{16}O_3$. MW, 220. Oil. B.p. 175–6°/14 mm.

Werner, *Ber.*, 1895, **28**, 2000.
Moureu, *Bull. soc. chim.*, 1896, **15**, 1022.
Klages, *Ber.*, 1904, **37**, 3989.

α-Methyl-*p*-coumaric Acid (4-*Hydroxy-α-methylcinnamic acid*)

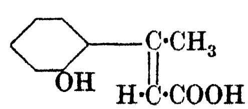


$C_{10}H_{10}O_3$ MW, 178

Me ether : 1-anisylidenepropionic acid. $C_{11}H_{12}O_3$. MW, 192. Leaflets from EtOH. M.p. 157° (154°). *Et ester* : $C_{13}H_{16}O_3$. MW, 220. B.p. 176–7°/15 mm. $D_4^{15·6}$ 1·0894. $n_D^{15·6}$ 1·570.

Perkin, *J. Chem. Soc.*, 1877, **31**, 411.
Wallach, Evans, *Ann.*, 1907, **357**, 76.
Auwers, Auffenberg, *Ber.*, 1919, **52**, 111.

β-Methyl-*o*-coumaric Acid (2-*Hydroxy-β-methylcinnamic acid.* Cf. β-Methyl-*o*-coumarinic Acid)



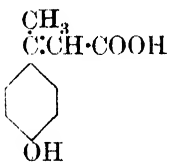
$C_{10}H_{10}O_3$ MW, 178

Needles from MeOH.Aq. M.p. 157° (154°). Sol. EtOH, Et_2O, AcOH. Spar. sol. C_6H_6.

Me ether: $C_{11}H_{12}O_3$. MW, 192. Leaflets and prisms from ligroin. M.p. 96·5° (95°). Sol. EtOH, Et_2O, $CHCl_3$, Mod sol. CS_2. Spar. sol. H_2O, C_6H_6, pet. ether. *Me ester*: $C_{12}H_{14}O_3$. MW, 206. B.p. 178–9°/28 mm., 172–3°/26 mm. $D_4^{16·8}$ 1·1036. $n_D^{16·7}$ 1·549.

Fries, Volk, *Ann.*, 1911, **379**, 94.
Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 960.
Lindenbaum, *Ber.*, 1917, **50**, 1273.
Auwers, *Ann.*, 1917, **413**, 277.
Stoermer, Sandow, *Ber.*, 1920, **53**, 1285.

β-Methyl-p-coumaric Acid (*4-Hydroxy-β-methylcinnamic acid, 2-hydroxyphenylcrotonic acid*)



$C_{10}H_{10}O_3$ MW, 178

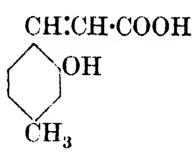
Prisms from EtOH. M.p. 163°.

Me ether: $C_{11}H_{12}O_3$. MW, 192. Cryst. from EtOH. M.p. 156–5°. *Et ester*: $C_{13}H_{16}O_3$. MW, 220. Oil. B.p. 182–4°/14 mm.

Et ether: $C_{12}H_{14}O_3$. MW, 206. Cryst. from EtOH. M.p. 122–3°. Sol. CS_2.

Schroeter, *Ber.*, 1908, **41**, 9.
Lindenbaum, *Ber.*, 1917, **50**, 1273.
Dixit, *J. Indian Chem. Soc.*, 1931, **8**, 792.

4-Methyl-o-coumaric Acid (*2-Hydroxy-4-methylcinnamic acid*)



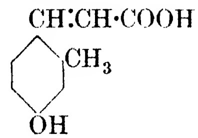
$C_{10}H_{10}O_3$ MW, 178

Needles from EtOH. Decomp. at 195°. Sol. Et_2O, AcOH. Mod. sol. EtOH, C_6H_6, $CHCl_3$. Sol. alkalis with green fluor.

Et ester: $C_{12}H_{14}O_3$. MW, 206. Leaflets from MeOH. M.p. 105°. Sol. AcOH, Et_2O. Mod. sol. EtOH, C_6H_6.

Fries, Klostermann, *Ann.*, 1908, **362**, 12.

2-Methyl-p-coumaric Acid (*4-Hydroxy-2-methylcinnamic acid*)

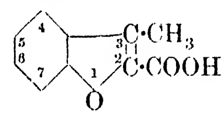


$C_{10}H_{10}O_3$ MW, 178

Me ether: $C_{11}H_{12}O_3$. MW, 192. Cryst. from AcOH. M.p. 185°. Sol. hot H_2O.

Perkin, Weizmann, *J. Chem. Soc.*, 1906, **89**, 1652.

3-Methylcoumarilic Acid (*3-Methylcoumarone-2-carboxylic acid*)



$C_{10}H_8O_3$ MW, 176

Needles from EtOH.Aq. M.p. 188°. Rapid heat. ⟶ 3-methylcoumarone.

Me ester: $C_{11}H_{10}O_3$. MW, 190. Needles from hot H_2O. M.p. 70°.

Et ester: $C_{12}H_{12}O_3$. MW, 204. Plates from C_6H_6. M.p. 51°. B.p. 290°, 170°/17 mm. D_4^{57} 1·1164. n_D^{56} 1·548.

Amide: $C_{10}H_9O_2N$. MW, 175. Needles from H_2O. M.p. 145°.

Peters, Simonis, *Ber.*, 1908, **41**, 832.
Hantzsch, *Ber.*, 1886, **19**, 1292.
Auwers, *Ann.*, 1915, **408**, 277.

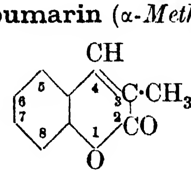
6-Methylcoumarilic Acid (*6-Methylcoumarone-2-carboxylic acid*).

Needles from EtOH. M.p. 193–4°. Dist. with soda-lime ⟶ 6-methylcoumarone.

Et ester: needles from pet. ether. M.p. 42–3°. B.p. 169–169·5°/14 mm. D_4^{44} 1·1167. n_D^{44} 1·556.

Auwers, *Ann.*, 1915, **408**, 278.
Stoermer, *Ann.*, 1900, **312**, 282.

3-Methylcoumarin (*α-Methylcoumarin*)



$C_{10}H_8O_2$ MW, 160

Cryst. from EtOH. M.p. 91°. B.p. 292·5°. Sol. EtOH.

Oxime: needles from H_2O. M.p. 166°. *Acetyl deriv.*: cryst. from EtOH. M.p. 56°.

Phenylhydrazone: yellow needles from EtOH. M.p. 116°.

Aldringen, *Ber.*, 1891, **24**, 3460.
Fries, Volk, *Ann.*, 1911, **379**, 99.
Simonis, *Ber.*, 1915, **48**, 1584.

4-Methylcoumarin (β-*Methylcoumarin*).
Needles from H_2O or prisms from C_6H_6. M.p. 82°. Sol. warm conc. alkalis.
Picrate: yellow needles. M.p. 65°.

Fries, Volk, *Ann.*, 1911, **379**, 94 (*Note*).
Ghosh, *J. Chem. Soc.*, 1915, **107**, 1600.

5-Methylcoumarin.
Needles from H_2O or EtOH.Aq. M.p. (anhyd.) 65·8°, $(+\frac{1}{4}C_6H_6)$ 56·5–56·7°. B.p. 173–4°/12 mm. Very sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 88.

6-Methylcoumarin.
Needles from EtOH. M.p. 74·6–75° (73–4°). B.p. 303°/725 mm., 174°/14 mm. Very sol. EtOH, Et_2O, C_6H_6. Spar. sol. pet. ether.
Mercurichloride: $C_{10}H_8O_2,HgCl_2$. Cryst. from Et_2O. M.p. 189–90°.
Platinichloride: yellow cryst. M.p. 65°.

Thompson, Edie, *J. Am. Chem. Soc.*, 1925, **47**, 2558.
See also previous reference.

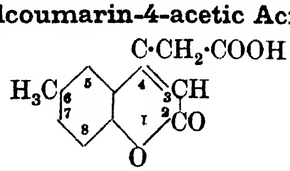
7-Methylcoumarin.
Needles or plates from EtOH.Aq. M.p. 128°. B.p. 171·5°/11 mm. Very sol. EtOH, AcOH. Spar. sol. H_2O.
Oxime: needles from H_2O. M.p. 178°.
Phenylhydrazone: yellow needles from EtOH. M.p. 139°.

Posner, Hess, *Ber.*, 1913, **46**, 3826.
Clayton, *J. Chem. Soc.*, 1908, **93**, 527.
Fries, Klostermann, *Ber.*, 1906, **39**, 872.

8-Methylcoumarin.
Needles from EtOH. M.p. 109–10°. B.p. 178°/20 mm. Very sol. hot EtOH, C_6H_6, Et_2O, CCl_4.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 79.
Posner, Hess, *Ber.*, 1913, **46**, 3822.

6-Methylcoumarin-4-acetic Acid



$C_{12}H_{10}O_4$ MW, 218

Needles from EtOH. M.p. 181°. At m.p. ⟶ 4 : 6-dimethylcoumarin.
Et ester: $C_{14}H_{14}O_4$. MW, 246. Needles. M.p. 131°.
Anilide: cryst. from AcOH. M.p. 242–3°. Spar. sol. EtOH, C_6H_6.

Dey, *J. Chem. Soc.*, 1915, **107**, 1636.

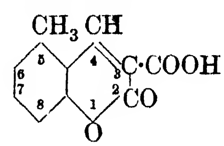
7-Methylcoumarin-4-acetic Acid.
Cryst. M.p. 190° decomp. Sol. EtOH, AcOH. Spar. sol. Et_2O, C_6H_6. Above m.p. ⟶ 4 : 7-dimethylcoumarin.
Et ester: needles from EtOH. M.p. 132°. Sol. EtOH, $CHCl_3$. Less sol. Me_2CO, AcOH. Spar. sol. pet. ether.
m-*Tolyl ester*: $C_{19}H_{16}O_4$. MW, 308. Needles from EtOH. M.p. 214°. Sol. Me_2CO. Less sol. EtOH, C_6H_6, AcOH. Spar. sol. pet. ether.
Anilide: needles from AcOH. M.p. 250°.

Fries, Volk, *Ann.*, 1911, **379**, 100.

8-Methylcoumarin-4-acetic Acid.
Needles. M.p. 184° decomp. At m.p. ⟶ 4 : 8-dimethylcoumarin.
Et ester: needles. M.p. 114°.

Dey, *J. Chem. Soc.*, 1915, **107**, 1636.

5-Methylcoumarin-3-carboxylic Acid



$C_{11}H_8O_4$ MW, 204

Needles from EtOH. M.p. 162–3°. Heat ⟶ 5-methylcoumarin.
Et ester: $C_{13}H_{12}O_4$. MW, 232. Needles from 50% EtOH. M.p. 122–122·5°.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 85.

6-Methylcoumarin-3-carboxylic Acid.
Yellowish needles from EtOH. M.p. 166·8°. Sol. hot AcOH. Spar. sol. H_2O. Heat ⟶ 6-methylcoumarin.
Et ester: plates from EtOH. M.p. 103–4°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. hot H_2O, pet. ether.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 88.

7-Methylcoumarin-3-carboxylic Acid.
Leaflets. M.p. 199–200°. Sol. hot AcOH. Spar. sol. hot H_2O, EtOH. Heat ⟶ 7-methylcoumarin.

Et ester: leaflets from EtOH.Aq. M.p. 101–2°. Sol. hot EtOH. Insol. pet. ether.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 82.

8-Methylcoumarin-3-carboxylic Acid.

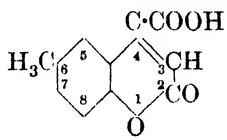
Needles from C_6H_6. M.p. 142–3°. B.p. 240–5°/18 mm. Sol. AcOH, CCl_4, hot C_6H_6. Spar. sol. H_2O, ligroin. Heat ⟶ 8-methylcoumarin.

Et ester: cryst. from C_6H_6-pet. ether. M.p. 81°. Sol. hot H_2O, EtOH, C_6H_6, CCl_4. Insol. cold H_2O, pet. ether.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, **35**, 78.

Posner, Hess, *Ber.*, 1913, **46**, 3823.

6-Methylcoumarin-4-carboxylic Acid



$C_{11}H_8O_4$ MW, 204

M.p. 208–10°.

Et ester: $C_{13}H_{12}O_4$. MW, 232. Needles from AcOH. M.p. 155–7°.

Dey, *J. Chem. Soc.*, 1915, **107**, 1644.

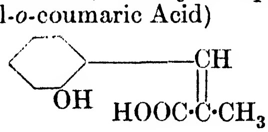
7-Methylcoumarin-4-carboxylic Acid.

M.p. 200°.

Et ester: yellow needles. M.p. 94–6°.

Dey, *J. Chem. Soc.*, 1915, **107**, 1645.

α-Methyl-o-coumarinic Acid (2-*Hydroxy-α-methylcinnamic acid*, 1-*salicylidenepropionic acid*. Cf. α-Methyl-*o*-coumaric Acid)

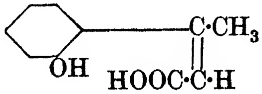


$C_{10}H_{10}O_3$ MW, 178

Me ether: $C_{11}H_{12}O_3$. MW, 192. Prisms from EtOH. M.p. 118°. Sol. EtOH. Mod. sol. hot pet. ether. *Me ester*: $C_{12}H_{14}O_3$. MW, 206. B.p. 274–5°. D_{15}^{15} 1·1112.

Perkin, *J. Chem. Soc.*, 1881, **39**, 429.

β-Methyl-o-coumarinic Acid (2-*Hydroxy-β-methylcinnamic acid*. Cf. β-Methyl-*o*-coumaric Acid)



$C_{10}H_{10}O_3$ MW, 178

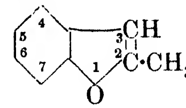
Me ether: $C_{11}H_{12}O_3$. MW, 192. Cryst. from H_2O or ligroin. M.p. 123–4°. Sol. EtOH, $CHCl_3$. Mod. sol. C_6H_6. Spar. sol. Et_2O, CS_2, pet. ether. *Me ester*: $C_{12}H_{14}O_3$. MW, 206. B.p. 164°/28 mm., 157·5–158·5°/25 mm. $D_4^{16.8}$ 1·0980. n_D^{17} 1·5335.

Stoermer, Grimm, Laage, *Ber.*, 1917, **50**, 978.

Auwers, *Ann.*, 1917, **413**, 277.

Stoermer, Sandow, *Ber.*, 1920, **53**, 1285.

2-Methylcoumarone



C_9H_8O MW, 132

B.p. 197·3–197·8°, 78°/12 mm. $D_4^{14.4}$ 1·0588, D_4^{20} 1·054. n_D 1·56145.

Picrate: cryst. M.p. 72–4°.

Auwers, *Ann.*, 1921, **422**, 151.

Stoermer, Barthelmess, *Ber.*, 1915, **48**, 67 (*Note*).

Claisen, *Ber.*, 1920, **53**, 324.

3-Methylcoumarone.

B.p. 196–7°/742 mm. $D_4^{23.4}$ 1·0540. $n_D^{23.1}$ 1·553. Very volatile in steam.

Tetrameric form: yellowish powder. M.p. about 200°. Spar. sol. EtOH, Et_2O.

Hexameric form: amorph. M.p. below 100°. Very sol. Et_2O, $CHCl_3$.

Auwers, *Ann.*, 1915, **408**, 273.

Stoermer, *Ann.*, 1900, **312**, 275.

See also second reference above.

5-Methylcoumarone.

B.p. 83·5°/17 mm. $D_4^{19.2}$ 1·0603. n_D^{19} 1·557.

Hexameric form: yellow powder. Very sol. $CHCl_3$, Et_2O. Spar. sol. EtOH, AcOH.

Auwers, *Ann.*, 1915, **408**, 274.

Stoermer, Barthelmess, *Ber.*, 1915, **48**, 65.

6-Methylcoumarone.

B.p. 192–3°.

Picrate: yellow needles. M.p. 67°.

Hexameric form: yellow powder. Very sol. $CHCl_3$, Et_2O. Spar. sol. EtOH, AcOH.

Octameric form: yellowish-brown powder. M.p. about 130°. Sol. Et_2O, $CHCl_3$, C_6H_6.

Stoermer, *Ber.*, 1897, **30**, 1706; *Ann.*, 1900, **312**, 282.

7-Methylcoumarone.

B.p. 190–1°. D^{19} 1·0490. n_D^{17} 1·5525.

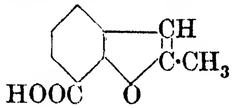
Picrate: yellow needles. M.p. 109°.

Hexameric form: brownish powder. M.p. about 100°.

See second reference above.

Methylcoumarone-2-carboxylic Acid.
See Methylcoumarilic Acid.

2-Methylcoumarone-7-carboxylic Acid

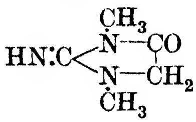


$C_{10}H_8O_3$ MW, 176

Cryst. from EtOH.Aq. M.p. 152°. Sublimes.

Adams, Rindfusz, *J. Am. Chem. Soc.*, 1919, **41**, 664.
Claisen, *Ber.*, 1920, **53**, 324.

3-Methylcreatinine



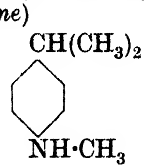
$C_5H_9ON_3$ MW, 127

Needles. Very hygroscopic. Reacts strongly alkaline. Picric acid + NaOH ⟶ red col.
B,HCl: needles. Very sol. H_2O.
B,HI: needles from EtOH. M.p. 212°.
B,HAuCl$_4$: yellow needles or prisms. M.p. 176°.
Picrate: yellow needles. M.p. 183°.

Korndörfer, *Arch. Pharm.*, 1904, **242**, 641.

Methylcrotonic Acid.
See Angelic Acid, Tiglic Acid, *and* 2:2-Dimethylacrylic Acid.

N-Methyl-*p*-cumidine (N-*Methyl*-4-*isopropylaniline*, 4-*methylaminoisopropylbenzene*, 4-*methylaminocumene*)

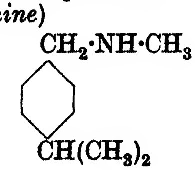


$C_{10}H_{15}N$ MW, 149

Oil. B.p. 111–12°/11 mm.
B,HCl: cryst. M.p. 128°. Sol. H_2O.
B$_2$,H$_2$PtCl$_6$: cryst. from H_2O + trace HCl. M.p. 192°.
Picrate: cryst. from MeOH. M.p. 147°.

Sachs, Weigort, *Ber.*, 1907, **40**, 4359.

N-Methylcuminylamine (N-*Methyl*-p-*isopropylbenzylamine*)



$C_{11}H_{17}N$ MW, 163

B.p. 121°/23 mm. Strong base.
B,HCl: needles from H_2O. M.p. 165°. Sol. H_2O, EtOH. Insol. Et_2O.
B,HBr: plates from H_2O. M.p. 178°. Insol. Et_2O.
B,HAuCl$_4$: yellow needles. M.p. 141°.
B$_2$,H$_2$PtCl$_6$: yellow needles from H_2O. M.p. 193°.
Picrate: yellow needles from EtOH. M.p. 137°.

Schwabbauer, *Ber.*, 1902, **35**, 413.

Methyl cumyl Ketone.
See Isopropylacetophenone.

Methyl cyanide.
See Acetonitrile.

Methyl 1-cyanoacetoacetate (1-*Cyanoacetoacetic methyl ester*)

$$CH_3\cdot CO\cdot CH(CN)\cdot CO\cdot OCH_3$$

$C_6H_7O_3N$ MW, 141

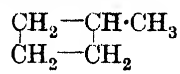
Needles. M.p. 46–7°. Insol. H_2O. Sol. EtOH, Et_2O. Forms Na, Ca, and Ba derivs.

Guinchant, *Ann. chim.*, 1918, **9**, 80.

1-Methyl-1-cyanobutyric Acid.
See under Methylethylmalonic Acid.

Methylcyclene.
See under Tricyclene.

Methylcyclobutane

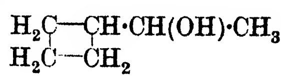


C_5H_{10} MW, 70

B.p. 35–6°/753 mm. D_4^0 0·7135, D_4^{20} 0·6931. n_D^{15} 1·386, n_D^{20} 1·3836.

Filipow, *J. prakt. Chem.*, 1916, **93**, 177.
Demjanow, Dojarenko, *Chem. Zentr.*, 1913, I, 2027.

Methylcyclobutylcarbinol (*α-Hydroxyethylcyclobutane*)



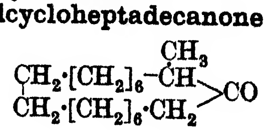
$C_6H_{12}O$ MW, 100

Liq. with peppermint odour. B.p. 144–5°. D_4^{10} 0·9075, D_4^{20} 0·8997. $n_D^{18\cdot8}$ 1·14451.

Perkin, Sinclair, *J. Chem. Soc.*, 1892, **61**, 50.

Methyl cyclobutyl Ketone.
See Acetocyclobutane.

2-Methylcycloheptadecanone

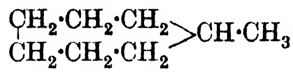


$C_{18}H_{34}O$ MW, 266

Liq. with musk-like odour. B.p. 150°/0·5 mm. *Semicarbazone*: cryst. from MeOH. M.p. 142–3°.

Ruzicka, Schinz, Pfeiffer, *Helv. Chim. Acta*, 1928, **11**, 698.

Methylcycloheptane (*Methylsuberane*)

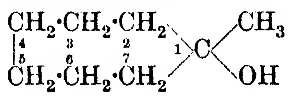


C_8H_{16} MW, 112

B.p. 134°. D_4^{18} 0·9981. n_D^{18} 1·439. Heat of comb. C_v 1254·8 Cal.

Zelinsky, *Bull. soc. chim.*, 1907, 2, 1319.
Subow, *Chem. Zentr.*, 1913, I, 2026.

1-Methylcycloheptanol



$C_8H_{16}O$ MW, 128

B.p. 183·5°. D_4^{21} 0·9392 (D^{22} 0·9285). n_D^{22} 1·4677. $KHSO_4$ ⟶ 1-methylcycloheptene.

Zelinsky, *Bull. soc. chim.*, 1907, 2, 1319.
Wallach, *Ann.*, 1906, **345**, 140.

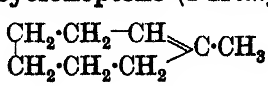
2-Methylcycloheptanol.

Cis:
B.p. 191°/753 mm. D^{15} 0·9492. n_D^{15} 1·4762.
Acid phthalate: cryst. from C_6H_6-pet. ether. M.p. 86°.
Phenylurethane: cryst. from EtOH. M.p. 40–1°.

Trans:
B.p. 194°/768 mm. D^{15} 0·9422. n_D^{15} 1·4740.
Acid phthalate: cryst. from C_6H_6-pet. ether. M.p. 98°.
Phenylurethane: cryst. from EtOH. M.p. 59–60°.

Godchot, Cauquil, *Compt. rend.*, 1930, **190**, 642.

1-Methylcycloheptene (1-*Methylsuberene*)

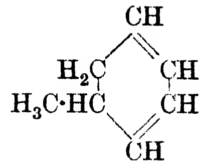


C_8H_{14} MW, 110

B.p. 137·5–138·5°. D^{20} 0·824. n_D^{20} 1·4581. Ox. ⟶ 5-aceto-*n*-caproic acid.
Nitrosochloride: m.p. 106°.

Wallach, *Ann.*, 1906, **345**, 140.

5-Methyl-$\Delta^{1,3}$-cyclohexadiene ($\Delta^{2,4}$-*Dihydrotoluene*)



C_7H_{10} MW, 94

B.p. 100·5–101·5°/762 mm. $D_4^{22·5}$ 0·8252. $n_D^{22·5}$ 1·4662. Oxidises readily in air.

Harries, *Ann.*, 1913, **395**, 255.

Several other methylcyclohexadienes of unknown constitution are described in the literature.
(i) B.p. 110°/741 mm. D_4^{20} 0·8292. n_D^{20} 1·4710.
(ii) B.p. 105–6°. D_4^{20} 0·8274. n_D^{20} 1·4680.

Zelinsky, Gorsky, *Ber.*, 1908, **41**, 2485, 2630.

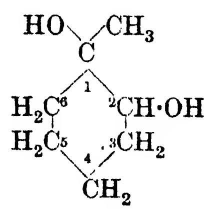
(iii) B.p. 110°. D_4^{20} 0·8354. n_D^{20} 1·4763.

Harries, *Ber.*, 1908, **41**, 1698.

(iv) B.p. 108–10°. D_4^{20} 0·7970. n_D^{20} 1·4444.

Pictet, Ramseyer, Kaiser, *Compt. rend.*, 1916, **163**, 359.

1-Methylcyclohexandiol-1 : 2 (1-*Methylhexahydrocatechol*, 1 : 2-*dihydroxyhexahydrotoluene*)



$C_7H_{14}O_2$ MW, 130

Cis:
Cryst. from Et_2O. M.p. 67°. Forms cryst. salt with boric acid and KOH.
Acetone comp.: b.p. 183·5–184°. D_4^{16} 0·9701. n_D^{16} 1·4496.

Trans:
Prisms from $CHCl_3$–pet. ether. M.p. 84°.

Nametkin, Jarzeff, *Ber.*, 1923, **56**, 1803.
Böeseken, *ibid.*, 2409.

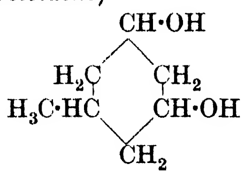
4-Methylcyclohexandiol-1 : 2 (4-*Methylhexahydrocatechol*, *hexahydrohomocatechol*, 3 : 4-*dihydroxyhexahydrotoluene*).

Cis:
Rhombohedra from Et_2O–pet. ether. M.p. 63–4°. B.p. 131–2°/12 mm.

Trans :
Needles from Et_2O–pet. ether. M.p. 35–7°. B.p. 125–125·5°/15 mm.

Nametkin, Brüssoff, *Ber.*, 1923, **56**, 1808.

5-Methylcyclohexandiol-1 : 3 (3 : 5-*Dihydroxyhexahydrotoluene*)

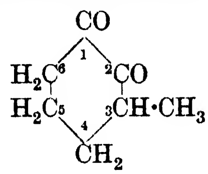


$C_7H_{14}O_2$ MW, 130

Exists in two forms.
(i) Needles from AcOEt. M.p. 75°. Sol. cold H_2O, EtOH, warm Me_2CO, $CHCl_3$, AcOEt.
(ii) Needles from AcOEt. M.p. 143·5°. Less sol. Et_2O than (i).

Crossley, Renouf, *J. Chem. Soc.*, 1915, **107**, 605

3-Methylcyclohexandione-1 : 2



$C_7H_{10}O_2$ MW, 126

Cryst. from pet. ether. M.p. 64–5° (62–3°). Sol. H_2O. Distils undecomp. $FeCl_3 \longrightarrow$ violet col. Reduces $NH_3.AgNO_3$, Fehling's, and Au sols.
Dioxime : cryst. M.p. 166°.
Monosemicarbazone : needles from EtOH. M.p. 174–5°.
Monophenylhydrazone : sinters at 88°, m.p. 131°.
Mono-p-tolylhydrazone : exists in two forms. (i) M.p. 117–18°. (ii) M.p. 91–3°.
Monoacetylphenylhydrazone : m.p. 137–40°.
Monoacetyl-p-*tolylhydrazone* : m.p. 117–20°.

Wallach, *Ann.*, 1918, **414**, 314.
Sen, Ghosh, *Chem. Abstracts*, 1928, **22**, 1145.

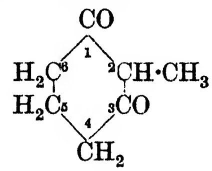
4-Methylcyclohexandione-1 : 2.
Needles. M.p. 35–6°. B.p. 85°/12 mm. Sol. H_2O and most org. solvents. Alc. $FeCl_3 \longrightarrow$ red col.
Monoxime : cryst. M.p. 158–9°.
Dioxime : cryst. from MeOH. M.p. 181° (168°). Sol. EtOH, Et_2O, AcOEt.

Kötz, Nussbaum, Lakens, *J. prakt. Chem.*, 1914, **90**, 369.

5-Methylcyclohexandione-1 : 2.
Dioxime : cryst. M.p. 185°.

Wallach, *Chem. Abstracts*, 1925, **19**, 487.

2-Methylcyclohexandione-1 : 3



$C_7H_{10}O_2$ MW, 126

Cryst. M.p. 210° decomp.
Dioxime : needles. M.p. 220°. Spar. sol. H_2O, EtOH.

Blaise, Maire, *Compt. rend.*, 1907, **144**, 573.

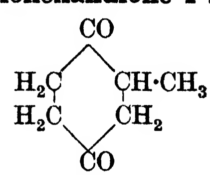
4-Methylcyclohexandione-1 : 3.
Oil.
Di-semicarbazone : amorph. M.p. 224–5° decomp. Insol. usual solvents.

Gilling, *J. Chem. Soc.*, 1913, **103**, 2034.

5-Methylcyclohexandione-1 : 3.
Cryst. from AcOEt. M.p. 128° (122°). Sol. hot H_2O, EtOH, $CHCl_3$. Spar. sol. Et_2O, ligroin. Aq. sol. reacts acid. $k = 0{\cdot}57 \times 10^{-5}$ at 25°. $FeCl_3 \longrightarrow$ wine-red col.
Dioxime : prisms from H_2O, needles from EtOH. M.p. 155–7°. Spar. sol. cold H_2O.
Di-semicarbazone : amorph. Decomp. at 225°. Insol. usual solvents.

Vorländer, Kalkow, *Ber.*, 1897, **30**, 1801.
Crossley, Renouf, *J. Chem. Soc.*, 1915, **107**, 605.

Methylcyclohexandione-1 : 4

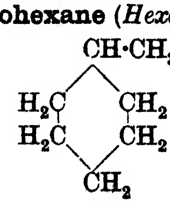


$C_7H_{10}O_2$ MW, 126

Plates from ligroin. M.p. 50°. Sol. H_2O. Sublimes in vacuo. No col. with $FeCl_3$.
Di-semicarbazone : cryst. M.p. 240° decomp. Insol. most solvents.

Helferich, *Ber.*, 1921, **54**, 161.

Methylcyclohexane (*Hexahydrotoluene*)



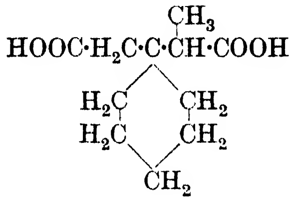
C_7H_{14} MW, 98

Occurs in various petroleum oils. B.p. 100·4°. $D_4^{15.5}$ 0·7773, D_4^{20} 0·7695. n_D^{15} 1·4253.

Auwers, Eisenlohr, *Z. physik. Chem.*, 1913, **83**, 432.
Chavanne, Simon, *Compt. rend.*, 1919, **169**, 286.
Skita, Meyer, *Ber.*, 1912, **45**, 3592.

Methylcyclohexane-carboxylic Acid.
See Hexahydrotoluic Acid.

α-Methylcyclohexane-1 : 1-diacetic Acid (1-*Methyl-2-pentamethyleneglutaric acid*)



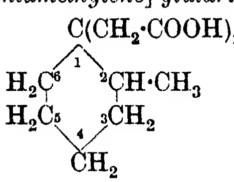
$C_{11}H_{18}O_4$ MW, 214

Prisms from EtOH.Aq. or C_6H_6–pet. ether. M.p. 144–5°.

Anhydride: needles from pet. ether. M.p. 62°.

Kon, Thorpe, *J. Chem. Soc.*, 1922, **121**, 1801.

2-Methylcyclohexane-1 : 1-diacetic Acid (2-[2-*Methylpentamethylene*]-*glutaric acid*)



$C_{11}H_{18}O_4$ MW, 214

Plates from EtOH.Aq. or needles from C_6H_6. M.p. 148°. Spar. sol. C_6H_6.

Kon, Thorpe, *J. Chem. Soc.*, 1919, **115**, 694.

3-Methylcyclohexane-1 : 1-diacetic Acid (2-[3-*Methylpentamethylene*]-*glutaric acid*).

Needles from dil. EtOH or C_6H_6. M.p. 143°.

Di-Et ester: $C_{15}H_{26}O_4$. MW, 270. B.p. 174°/22 mm.

Anhydride: $C_{22}H_{34}O_7$. MW, 410. Needles from pet. ether. M.p. 19°. B.p. 212°/20 mm.

Mono-anilide: $C_{17}H_{23}O_3N$. MW, 289. Exists in two forms. (i) Plates from EtOH. M.p. 172°. (ii) Needles or plates. M.p. 141°.

Anil: needles from EtOH. M.p. 137°.

Thorpe, Wood, *J. Chem. Soc.*, 1913, **103**, 1597.
Desai, *J. Chem. Soc.*, 1932, 1060.

4-Methylcyclohexane-1 : 1-diacetic Acid (2-[4-*Methylpentamethylene*]-*glutaric acid*).

Needles from EtOH.Aq. M.p. 158°. Sol. C_6H_6.

Di-Et ester: b.p. 178°/24 mm.

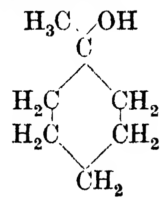
Anhydride: plates from pet. ether. M.p. 53°. B.p. 212°/50 mm.

Mono-anilide: exists in two forms. (i) Needles from EtOH. M.p. 184°. (ii) Needles from EtOH. M.p. 148°.

Anil: needles from EtOH.Aq. M.p. 140°.

See previous references.

1-Methylcyclohexanol

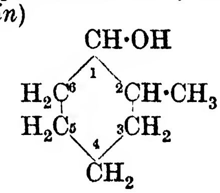


$C_7H_{14}O$ MW, 114

Cryst. M.p. 24–5°. B.p. 155°, 56·5°/10 mm. $D_4^{24.9}$ 0·9249. n_D 1·45874.

Auwers, Hinterseber, Treppmann, *Ann.*, 1915, **410**, 274.

2-Methylcyclohexanol (*Hexahydro*-o-*cresol*, 2-*methylhexalin*)



$C_7H_{14}O$ MW, 114

Cis:

M.p. − 9·5 to − 9·2°. B.p. 165°. D_4^{20} 0·9337. n_D^{20} 1·4640.

p-*Nitrobenzoyl*: m.p. 53° (55–6°).
3 : 5-*Dinitrobenzoyl*: m.p. 99–100°.
Acid phthalate: m.p. 104°.
Phenylurethane: m.p. 93–4° (90–91°).

Trans:

M.p. − 21·2° to − 20·5°. B.p. 166·5°. D_4^{20} 0·9238. n_D^{20} 1·4611.

p-*Nitrobenzoyl*: m.p. 65°.
3 : 5-*Dinitrobenzoyl*: m.p. 114–15°.
Acid phthalate: m.p. 124–5°.
Neutral oxalate: leaflets from pet. ether. M.p. 61°.
Phenylurethane: m.p. 105°.

Skita, Faust, *Ber.*, 1931, **64**, 2884.
Hückel, Hagenguth, *Ber.*, 1931, **64**, 2892.
Vavon, Perlin, Horeau, *Bull. soc. chim.*, 1932, **51**, 644.

3-Methylcyclohexanol (*Hexahydro*-m-*cresol*, 3-*methylhexalin*).

Cis :
B.p. 173–4°. $D_4^{21.8}$ 0·9173. $n_D^{21.8}$ 1·45403.
3 : 5-*Dinitrobenzoyl* : m.p. 91–2°.
Phenylurethane : m.p. 87–8°.

Trans :
B.p. 174–5°/762 mm. $D_4^{21.8}$ 0·9145. $n_D^{21.8}$ 1·45497.
3 : 5-*Dinitrobenzoyl* : m.p. 97–8°.
Phenylurethane : m.p. 93–4°.

Skita, Faust, *Ber.*, 1931, **64**, 2878.

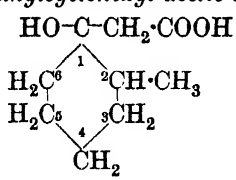
4-Methylcyclohexanol (*Hexahydro*-p-*cresol*, 4-*methylhexalin*).

Cis :
B.p. 173–4°/750 mm. $D_4^{21.5}$ 0·9129. $n_D^{21.5}$ 1·45427.
3 : 5-*Dinitrobenzoyl* : m.p. 134°.
Phenylurethane : m.p. 118–19°.

Trans :
B.p. 173–174·5°/745 mm. $D_4^{20.7}$ 0·9118. $n_D^{20.7}$ 1·45307.
3 : 5-*Dinitrobenzoyl* : m.p. 139–140°.
Phenylurethane : m.p. 124–5°.

See above reference.

2-Methylcyclohexanol-1-acetic Acid (1-*Hydroxy-2-methylcyclohexyl-acetic acid*)



$C_9H_{16}O_3$ MW, 172

Cryst. from C_6H_6-ligroin. M.p. 67–8°.
Et ester : $C_{11}H_{20}O_3$. MW, 200. B.p. 131–6°/18 mm.

Wallach, Beschke, *Ann.*, 1906, **347**, 337.
Auwers, Ellinger, *Ann.*, 1912, **387**, 230.

3-Methylcyclohexanol-1-acetic Acid (1-*Hydroxy-3-methylcyclohexyl-acetic acid*).

Active form :
Et ester : $C_{11}H_{20}O_3$. MW, 200. B.p. 126–8°/15 mm. D_4^{15} 1·004. $[\alpha]_D + 1° 44'$.

Inactive form :
Me ester : $C_{10}H_{18}O_3$. MW, 186. B.p. 120–5°/23 mm.
Et ester : b.p. 126–8°/15 mm. D_4^{15} 1·004.

v. Braun, Teuffert, *Ber.*, 1925, **58**, 2210.

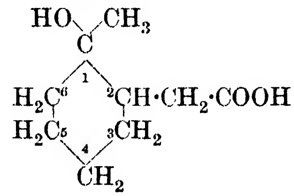
4-Methylcyclohexanol-1-acetic Acid (1-*Hydroxy-4-methylcyclohexyl-acetic acid*).

Exists in two forms.

(i) Rhombohedra from EtOH.Aq. M.p. 141°. Sol. most org. solvents. Spar. sol. H_2O, ligroin.
(ii) Prisms + H_2O from H_2O. M.p. 48–50°, anhyd. 89–90°. Very sol. most org. solvents. Sol. H_2O. Spar. sol. ligroin.

Marckwald, Meth, *Ber.*, 1906, **39**, 1174.
Wallach, *Ann.*, 1909, **365**, 265.

1-Methylcyclohexanol-2-acetic Acid (2-*Hydroxy-2-methylcyclohexyl-acetic acid*)



$C_9H_{16}O_3$ MW, 172

Cryst. from pet. ether. M.p. 107°.
Lactone : $C_9H_{14}O_2$. MW, 154. B.p. 136–7°/13 mm. D_4^{19} 1·0680. n_D^{19} 1·4764.

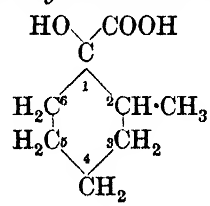
v. Braun, Münch, *Ann.*, 1928, **465**, 65.

5-Methylcyclohexanol-2-acetic Acid (2-*Hydroxy-4-methylcyclohexyl-acetic acid*).

Lactone : $C_9H_{14}O_2$. MW, 154. B.p. 143–9°/16 mm.

Kötz, Hoffmann, *J. prakt. Chem.*, 1925, **110**, 101.

2-Methylcyclohexanol-1-carboxylic Acid (2-*Hydroxyhexahydro*-o-*toluic acid*)



$C_8H_{14}O_3$ MW, 158

Cryst. from C_6H_6. M.p. 109°. Sol. 50 parts H_2O at 19°. Sol. Me_2CO, Et_2O. Less sol. C_6H_6, pet. ether.
Et ether : $C_{10}H_{18}O_3$. MW, 186. Plates from formic acid. M.p. 81°. Sol. Me_2CO, pet. ether. Very spar. sol. cold H_2O.

Sernow, *Ber.*, 1899, **32**, 1169.

3-Methylcyclohexanol-1-carboxylic Acid (3-*Hydroxyhexahydro*-m-*toluic acid*).

Exists in two forms. (i) Plates from H_2O. M.p. 103–4°. B.p. 170–5°/20 mm. decomp. Sol. hot H_2O. (ii) B.p. 260–70°/723 mm. decomp., 163–6°/12 mm.
Amide : $C_8H_{15}O_2N$. MW, 157. Leaflets

from C_6H_6. M.p. 120–1°. *Benzoyl*: cryst. M.p. 135–6°.

Nitrile: $C_8H_{13}ON$. MW, 139. Cryst. from hot pet. ether. M.p. 63–4°. Sublimes easily. *Benzoyl*: cryst. M.p. 125–6°. Spar. sol. Et_2O.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, **87**, 1098.
Markownikow, Smirnow, *Chem. Zentr.*, 1907, I, 1407.
Aloy, Rabaut, *Compt. rend.*, 1913, **156**, 1548.

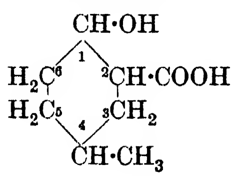
4-Methylcyclohexanol-1-carboxylic Acid
(4-*Hydroxyhexahydro*-p-*toluic acid*).

Exists in three forms. (i) Plates from H_2O. M.p. 130–2°. Sol. EtOH, Et_2O. Spar. sol. cold H_2O. (ii) Cryst. from H_2O. M.p. 115°. Sol. H_2O, EtOH, Me_2CO, Et_2O. Less sol. C_6H_6, ligroin. (iii) Cryst. M.p. 80–1°.

Amide: *benzoyl*, cryst. M.p. 122°.
Nitrile: *benzoyl*, cryst. M.p. 86°.

Perkin, *J. Chem. Soc.*, 1906, **89**, 835.
Skita, Levi, *Ber.*, 1908, **41**, 2933.
See also last reference above.

4-Methylcyclohexanol-2-carboxylic Acid
(4-*Hydroxyhexahydro*-m-*toluic acid*)



$C_8H_{14}O_3$ MW, 158

Cryst. from Et_2O. M.p. 114°. Sol. H_2O, EtOH. Spar. sol. cold Et_2O.

Et ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 132–4°/17 mm.

Gardner, Perkin, Watson, *J. Chem. Soc.*, 1910, **97**, 1769.

5-Methylcyclohexanol-2-carboxylic Acid
(3-*Hydroxyhexahydro*-p-*toluic acid*).

d-.

Cryst. from Et_2O. M.p. 129–30°. B.p. 185–90°/22 mm.

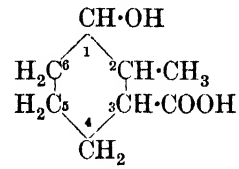
Et ester: b.p. 135°/20 mm. D_{20}^{20} 1·026. n_D 1·458. $[\alpha]_D + 5{\cdot}9°$ in AcOEt.

dl-.

Prisms from Et_2O. M.p. 130–1°. Sol. EtOH. Less sol. H_2O, C_6H_6, $CHCl_3$.

See previous reference and also
Chou, Perkin, *J. Chem. Soc.*, 1911, **99**, 532.

2-Methylcyclohexanol-3-carboxylic Acid
(6-*Hydroxyhexahydro*-o-*toluic acid*)



$C_8H_{14}O_3$ MW, 158

Cis:

Exists in two forms. (i) Cryst. from Et_2O. M.p. 150–1°. Sol. H_2O. Spar. sol. dry Et_2O. (ii) Cryst. from H_2O. M.p. about 128–30°.

Trans:

Prisms from Et_2O. M.p. 170–2°. B.p. 188°/15 mm. Sol. H_2O. Spar. sol. cold Et_2O.

Baudisch, Perkin, *J. Chem. Soc.*, 1909, **95**, 1887.

4-Methylcyclohexanol-3-carboxylic Acid
(4-*Hydroxyhexahydro*-o-*toluic acid*).

Cis:

Exists in two forms. (i) Prisms from H_2O or Et_2O. M.p. 190–1° decomp. Spar. sol. H_2O. (ii) Cryst. from H_2O. M.p. 126–8°.

Trans:

Exists in two forms. (i) Cryst. from H_2O. M.p. 163–5°. Spar. sol. EtOH. Decomp. about 220–5°. (ii) Cryst. from Et_2O or H_2O. M.p. 122–3°. Sol. H_2O. Less sol. Et_2O.

Baudisch, Hibbert, Perkin, *J. Chem. Soc.*, 1909, **95**, 1878.

5-Methylcyclohexanol-3-carboxylic Acid
(5-*Hydroxyhexahydro*-m-*toluic acid*).

Cis:

Plates from Et_2O. M.p. 138–9°. Very sol. H_2O. Spar. sol. Et_2O.

Trans:

Cryst. from H_2O. M.p. 138–9°. Sol. H_2O. Spar. sol. Et_2O.

Meldrum, Perkin, *J. Chem. Soc.*, 1909, **95**, 1898.

6-Methylcyclohexanol-3-carboxylic Acid
(2-*Hydroxyhexahydro*-p-*toluic acid*).

Active form:

Cryst. from AcOEt–ligroin. M.p. 153°. Sol. H_2O, EtOH, Et_2O.

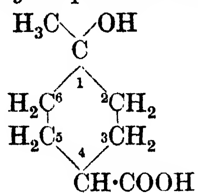
dl-.

Cis: Prisms from H_2O. M.p. 130–2°. Sol. H_2O, Et_2O.

Trans: Plates from H_2O. M.p. 160–1°. Spar. sol. H_2O, Et_2O.

Semmler, *Ber.*, 1903, **36**, 767.
Meldrum, Perkin, *J. Chem. Soc.*, 1908, **94**, 1421.

1-Methylcyclohexanol-4-carboxylic Acid (1-*Hydroxyhexahydro*-p-*toluic acid*)



$C_8H_{14}O_3$ MW, 158.

Plates from H_2O. M.p. 153°. Sol. H_2O. Distils in vacuo.

Stephan, Helle, *Ber.*, 1902, **35**, 2158.
Perkin, *J. Chem. Soc.*, 1904, **85**, 660.

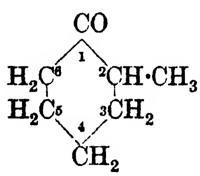
2-Methylcyclohexanol-4-carboxylic Acid (6-*Hydroxyhexahydro*-m-*toluic acid*).

Cis:
Needles from H_2O. M.p. about 140–1°. Spar. sol. H_2O.

Trans:
Needles from H_2O, cryst. from Et_2O. M.p. 115–17°.

Fisher, Perkin, *J. Chem. Soc.*, 1908, **93**, 1883.

2-Methylcyclohexanone (2-*Ketohexahydrotoluene*)



$C_7H_{12}O$ MW, 112

Oil. B.p. 166°. D_4^{20} 0·9250. n_D^{20} 1·4483.
Oxime: cryst. M.p. 43°. B.p. 112–13°/13 mm.
Semicarbazone: cryst. M.p. 191°.
Phenylhydrazone: oil. B.p. 220°/35–40 mm.

Skita, *Ber.*, 1923, **56**, 1016.

3-Methylcyclohexanone (3-*Ketohexahydrotoluene*).

d-.
B.p. 169°. D_4^{21} 0·915. n_D^{21} 1·4456. $[\alpha]_D^{15}$ + 13·38°.
Oxime: cryst. M.p. 43–4°. B.p. 216–17°, 110°/18 mm. $[\alpha]_D^{22}$ − 42·07° in MeOH.Aq. *Benzoyl deriv.*: (i) m.p. 96–7°. $[\alpha]_D^{22}$ + 20°. (ii) M.p. 82–3°. $[\alpha]_D^{21}$ − 86°: both derivs. regenerate original oxime with KOH.
Azine: yellow oil. B.p. 230°/124 mm., 187°/30 mm. $[\alpha]_D$ − 51·22°.
Semioxamazone: needles from Et_2O. M.p. 153–4°.
Semicarbazone: plates from MeOH. M.p. 180°.
Hydrazone: oil. B.p. 154°/71 mm. D_0^{17} 0·9603. n_D^{17} 1·5043. $[\alpha]_D$ − 35·94°.

dl-.
B.p. 168°, 60–60·2°/15 mm. D_4^{20} 0·9136°. n_D^{20} 1·4430.
Oxime: oil. *Benzoyl deriv.*: (i) M.p. 105–6°. (ii) M.p. 70–2°: both derivs. give an oxime, m.p. 18–24°, with alkalis.
Semicarbazone: plates from MeOH. M.p. 178–9°.
Phenylsemicarbazone: cryst. M.p. 186°.
Phenylhydrazone: cryst. from EtOH.Aq. M.p. 94°. *Picrate*: plates. M.p. 155°.
m-*Nitrophenylhydrazone*: cryst. from EtOH. M.p. 90°.
Dibenzylidene deriv.: cryst. M.p. 118°.

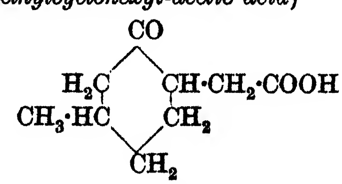
Wallach, *Ber.*, 1899, **32**, 3338; *Ann.*, 1896, **289**, 339; 1904, **332**, 338.
Haworth, Perkin, Wallach, *J. Chem. Soc.*, 1913, **103**, 1239.
Skita, *Ber.*, 1923, **56**, 1016.
Borsche, *Ann.*, 1908, **359**, 61, 68.

4-Methylcyclohexanone (4-*Ketohexahydrotoluene*).

B.p. 170·5°. D_4^{20} 0·9138. n_D^{20} 1·4439.
Oxime: cryst. M.p. 37–9° (36°). B.p. 114°/14 mm.
Semicarbazone: prisms from MeOH. M.p. 197°.
o-*Nitrophenylhydrazone*: crimson prisms from EtOH. M.p. 59°.
m-*Nitrophenylhydrazone*: orange-red prisms from EtOH. M.p. 80–1°.
p-*Nitrophenylhydrazone*: yellow needles from EtOH. M.p. 128·5°.

Skita, *Ber.*, 1923, **56**, 1016.
Plant, Rosser, *J. Chem. Soc.*, 1928, 2457.

5-Methylcyclohexanone-2-acetic Acid (2-*Keto-4-methylcyclohexyl-acetic acid*)

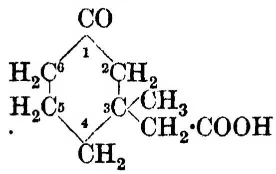


$C_9H_{14}O_3$ MW, 170

Et ester: $C_{11}H_{18}O_3$. MW, 198. Oil. B.p. 145–55° in vacuo. *Semicarbazone*: cryst. from AcOEt. M.p. 116°.

Kötz, Kayser, *Ann.*, 1906, **350**, 243.

3-Methylcyclohexanone-3-acetic Acid (3-*Keto*-1-*methylcyclohexyl-acetic acid*)



$C_9H_{14}O_3$ MW, 170

M.p. 37°. B.p. 196°/15 mm.

Et ester: $C_{11}H_{18}O_3$. MW, 198. Oil. B.p. 147°/15 mm. No col. with $FeCl_3$. *Semicarbazone*: prisms from Et_2O. M.p. 158–9°.

Semicarbazone: powder from MeOH. M.p. 189°.

Farmer, Ross, *J. Chem. Soc.*, 1925, **127**, 2635.

5-Methylcyclohexanone-3-acetic Acid (3-*Keto*-5-*methylcyclohexyl-acetic acid*).

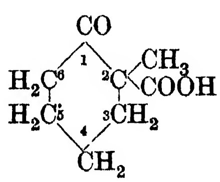
Needles from pet. ether. M.p. 77°. B.p. 185°/9 mm.

Et ester: b.p. 144°/13 mm. *Semicarbazone*: prisms from AcOEt. M.p. 152°.

Semicarbazone: cryst. powder from MeOH. M.p. 218°.

Farmer, Mehta, *J. Chem. Soc.*, 1931, 2567.

2 - Methylcyclohexanone - 2 - carboxylic Acid



$C_8H_{12}O_3$ MW, 156

Et ester: $C_{10}H_{16}O_3$. MW, 184. Oil. B.p. 113°/11 mm., 108–9°/11–12 mm. Insol. alkalis. No $FeCl_3$ reaction. *Semicarbazone*: cryst. M.p. 152°. *Phenylhydrazone*: m.p. 82°.

Dieckmann, *Ber.*, 1900, **33**, 2683.
Kötz, Michels, *Ann.*, 1906, **350**, 212.

4 - Methylcyclohexanone - 2 - carboxylic Acid (4-*Ketohexahydro*-m-*toluic acid*).

Prisms from Et_2O. M.p. 101°. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. cold H_2O. Alc. $FeCl_3$ ⟶ reddish-purple col. ⟶ bluish-red on addn. of H_2O.

6-Methylcyclohexanone-3-carboxylic Acid

Et ester: b.p. 128–30°/20 mm., 110°/10 mm. *Semicarbazone*: m.p. 134°.

Gardner, Perkin, Watson, *J. Chem. Soc.*, 1910, **97**, 1769.

5 - Methylcyclohexanone - 2 - carboxylic Acid (3-*Ketohexahydro*-p-*toluic acid*).

d-.

Prisms from Et_2O or pet. ether. M.p. about 102–3°. $[\alpha]_D^{17}$ + 97·2° in EtOH. Alc. $FeCl_3$ ⟶ reddish-purple col.

Et ester: oil. B.p. 134–7°/26 mm. $[\alpha]_D^{17.5}$ + 84·2° in EtOH.

dl-.

Prisms from Et_2O. M.p. 100–103° decomp. Sol. EtOH, Et_2O. Mod. sol. C_6H_6, pet. ether. Spar. sol. cold H_2O.

Et ester: oil. B.p. 132–5°/24 mm. Alc. $FeCl_3$ ⟶ intense violet col.

See previous reference.

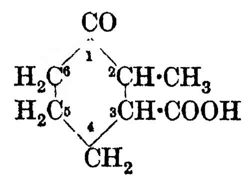
6 - Methylcyclohexanone - 2 - carboxylic Acid (2-*Ketohexahydro*-m-*toluic acid*).

Syrup.

Et ester: b.p. 125–30°/20 mm., 115°/12 mm. *Semicarbazone*: m.p. 140°.

See previous reference.

2 - Methylcyclohexanone - 3 - carboxylic Acid (6-*Ketohexahydro*-o-*toluic acid*)



$C_8H_{12}O_3$ MW, 156

Cryst. M.p. about 97°.

Semicarbazone: cryst. M.p. 200–5° decomp.

Baudisch, Perkin, *J. Chem. Soc.*, 1909, **95**, 1886.

5 - Methylcyclohexanone - 3 - carboxylic Acid (5-*Ketohexahydro*-m-*toluic acid*).

Syrup. B.p. 192°/15 mm.

Et ester: $C_{10}H_{16}O_3$. MW, 184. Oil. B.p. 138–40°/15 mm.

Oxime: prisms from Et_2O. M.p. 142°. Sol. warm Et_2O.

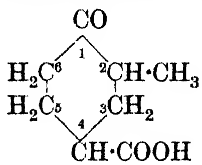
Meldrum, Perkin, *J. Chem. Soc.*, 1909, **95**, 1899.

6 - Methylcyclohexanone - 3 - carboxylic Acid (2-*Ketohexahydro*-p-*toluic acid*).

Cryst. from Et_2O. M.p. 112–13°. Sol. H_2O. Spar. sol. Et_2O.
Et ester : oil. B.p. 146–8°/25 mm.
Oxime : prisms from H_2O. M.p. about 193–5°. Sol. boiling H_2O. Spar. sol. Et_2O.
Semicarbazone : cryst. from H_2O. M.p. 193–5° decomp. Spar. sol. H_2O, EtOH.

Meldrum, Perkin, *J. Chem. Soc.*, 1908, **93**, 1425.

2 - Methylcyclohexanone - 4 - carboxylic Acid (6-*Ketohexahydro*-m-*toluic acid*)



$C_8H_{12}O_3$ MW, 156

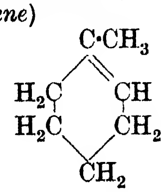
Cryst. M.p. 93–4°. B.p. 190–200°/20 mm. Sol. hot H_2O, EtOH, C_6H_6, $CHCl_3$. Spar. sol. Et_2O, pet. ether.
Oxime : needles from H_2O. M.p. 171–2°. Spar. sol. cold H_2O.
Semicarbazone : cryst. from H_2O. M.p. about 200° decomp.

Fischer, Perkin, *J. Chem. Soc.*, 1908, **93**, 1880.

3 - Methylcyclohexanone - 4 - carboxylic Acid (5-*Ketohexahydro-o-toluic acid*).
Et ester : $C_{10}H_{16}O_3$. MW, 184. B.p. 127–9°/15 mm.

Skita, *Ber.*, 1909, **42**, 1631.

1-Methylcyclohexene (Δ^1-*Tetrahydrotoluene*, 2-*methylcyclohexene*)



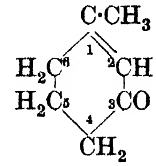
C_7H_{12} MW, 96

B.p. 109–11°. D_8^{14} 0·8145. $n_D^{18.5}$ 1·4503.
Nitrosite : yellow plates. M.p. 102°.
Nitrosate : cryst. from C_6H_6. M.p. 115°.
Nitrosochloride : cryst. from C_6H_6. M.p. 95–7°.

Roth, Auwers, *Ann.*, 1915, **407**, 154.
Haworth, *J. Chem. Soc.*, 1913, **103**, 1246 (*Note*).
Murat, *Ann. chim.*, 1909, **16**, 124.

Methylcyclohexene-carboxylic Acid. *See* Tetrahydrotoluic Acid.

1-Methylcyclohexenone-3 (3-*Methyl*-Δ^2-*cyclohexenone*)



$C_7H_{10}O$ MW, 110

M.p. about −21°. B.p. 197° (200–202°), 94·5–95·5°/22 mm. D_4^{20} 0·9693. n_D^{20} 1·49475. Heat of comb. C_v 942·8 Cal., C_p 944·0 Cal. Misc. with H_2O in all proportions. Volatile in steam.
Semicarbazone : cryst. from EtOH. M.p. 201° (198°).
Oxime : exists in two forms. *Labile* : m.p. 63°. B.p. 130–1°/18 mm. *Stable* : prisms from Et_2O. M.p. 88–9°. *Hydrochloride* : prisms or plates from EtOH–ligroin. M.p. 159°.
Thiosemicarbazone : m.p. 136–8°.

Rabe, Pollock, *Ber.*, 1912, **45**, 2926.
Harries, *Ber.*, 1914, **47**, 790.

2-Methylcyclohexenone-3 (2-*Methyl*-Δ^2-*cyclohexenone*).
B.p. 178–9°. D_4^{20} 0·966. n_D^{20} 1·4833.
Oxime : needles. M.p. 62–3°. *Benzoyl* : m.p. 142–3°.
Semicarbazone : m.p. 211° (rapid heat.), 207–8° (slow heat.).

Wallach, *Ann.*, 1908, **359**, 303.
Urion, *Compt. rend.*, 1934, **199**, 363.

4-Methylcyclohexenone-3 (6-*Methyl*-Δ^2-*cyclohexenone*).
B.p. 172–3°. Sol. H_2O. Volatile in steam.
Semicarbazone : cryst. from MeOH. M.p. 177–8°

Kötz, Steinhorst, *Ann.*, 1911, **379**, 17.

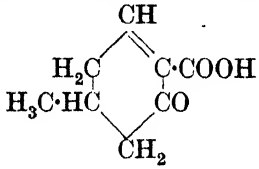
5-Methylcyclohexenone-3 (5-*Methyl*-Δ^2-*cyclohexenone*).
B.p. 189° (170°), 86°/15 mm. D^{26} 0·919. n_D^{26} 1·44635.
Semicarbazone : cryst. from MeOH. M.p. 159–60°.

Kötz, Steinhorst, *Ann.*, 1911, **379**, 19.

6-Methylcyclohexenone-3 (4-*Methyl*-Δ^2-*cyclohexenone*).
B.p. 175–6°, 81–5°/13 mm. Volatile in steam.
Semicarbazone : m.p. 184–5°.

Kötz, Blendermann, Mähnert, Rosenbusch, *Ann.*, 1913, **400**, 86.

5-Methyl-3-cyclohexenone-2-carboxylic Acid (*5-Keto-Δ^3-tetrahydro-p-toluic acid*)



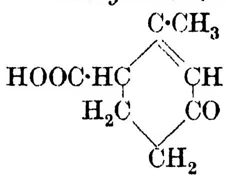
$C_8H_{10}O_3$ MW, 154

Cryst. from EtOH.Aq. M.p. 153°. Sublimes.

Et ester: $C_{10}H_{14}O_3$. MW, 182. Yellow oil. B.p. 113°/12 mm.

Kötz, Grethe, *J. prakt. Chem.*, 1909, **80**, 496.

1-Methyl-3-cyclohexenone-6-carboxylic Acid (*5-Keto-Δ^6-tetrahydro-o-toluic acid*)

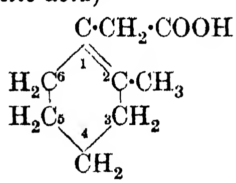


$C_8H_{10}O_3$ MW, 154

Et ester: $C_{10}H_{14}O_3$. MW, 182. B.p. 135–6°/9 mm. D^{20} 1·0702. n_D^{20} 1·4857.

Cornubert, Humeau, *Bull. soc. chim.*, 1931, **49**, 1515.

2-Methylcyclohexenylacetic Acid (*Tetrahydro-o-tolylacetic acid*)



$C_9H_{14}O_2$ MW, 154

B.p. 106–8°/2 mm. $D_4^{21 \cdot 1}$ 1·0373. $n_D^{21 \cdot 1}$ 1·48704.

Et ester: $C_{11}H_{18}O_2$. MW, 182. B.p. 111–12°/18 mm. $D_4^{22 \cdot 8}$ 0·9655. $n_D^{22 \cdot 8}$ 1·46529.

Amide: $C_9H_{15}ON$. MW, 153. Plates from EtOH.Aq. or C_6H_6–pet. ether. M.p. 138°.

Chloride: $C_9H_{13}OCl$. MW, 172·5. B.p. 104–5°/13 mm.

Nitrile: $C_9H_{13}N$. MW, 135. B.p. 101°/14 mm. D_4^{21} 0·9834. n_D^{21} 1·4762.

Anilide: needles from EtOH.Aq. or AcOEt–pet. ether. M.p. 143°.

Kon, Thakur, *J. Chem. Soc.*, 1930, 2221.

3-Methylcyclohexenylacetic Acid (*Tetrahydro-m-tolylacetic acid*).

d-.

Amide: needles from AcOEt–pet. ether. M.p. 150°. $[\alpha]_D$ + 90° in Me_2CO.

Nitrile: b.p. 151°/90 mm. n_D 1·476. $[\alpha]_D$ + 69·4° in Me_2CO.

dl-.

Cryst. from hexane. M.p. 38°. B.p. 126°/2 mm. $D_4^{15 \cdot 3}$ 1·0274. $n_D^{15 \cdot 4}$ 1·4824.

Me ester: $C_{10}H_{16}O_2$. MW, 168. B.p. 101·3°/13 mm. $D_4^{17 \cdot 7}$ 0·9676. $n_D^{15 \cdot 7}$ 1·4582.

Et ester: b.p. 112°/17 mm., 109·8°/12 mm. $D_4^{17 \cdot 2}$ 0·9490, $D_4^{20 \cdot 5}$ 0·9530. $n_D^{15 \cdot 2}$ 1·4559.

Chloride: b.p. 82–4°/6 mm.

Amide: plates from Et_2O. M.p. 150°.

Nitrile: b.p. 152°/90 mm.

Haworth, Fyfe, *J. Chem. Soc.*, 1914, **105**, 1664.

Auwers, Ellinger, *Ann.*, 1912, **387**, 232.

Kon, Thakur, *J. Chem. Soc.*, 1930, 2223.

4-Methylcyclohexenylacetic Acid (*Tetrahydro-p-tolylacetic acid*).

d-.

$[\alpha]_D^{19}$ + 16·00° in C_6H_6.

l-.

$[\alpha]_D$ − 12·80° in C_6H_6.

dl-.

Cryst. M.p. 42–3°. B.p. 137–8°/14 mm. Sol. most org. solvents. Spar. sol. H_2O.

Me ester: b.p. 97·5–97·7°/12 mm. $D_4^{17 \cdot 7}$ 0·9608.

Et ester: oil. B.p. 111°/14 mm.

Amide: cryst. from EtOH. M.p. 155–6°.

p-*Toluidide*: needles from C_6H_6–pet. ether. M.p. 119°.

Nitrile: b.p. 155–6°/100 mm., 107°/15 mm.

Marckwald, Meth, *Ber.*, 1906, **39**, 1175.

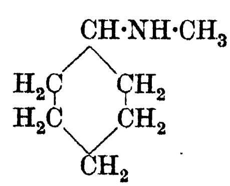
Kon, Thakur, *J. Chem. Soc.*, 1930, 2225.

Harding, Haworth, Perkin, *J. Chem. Soc.*, 1908, **93**, 1967.

Methylcyclohexyl-acetic Acid.

See Hexahydrotolylacetic Acid.

N-Methylcyclohexylamine (*Methylaminocyclohexane*)



$C_7H_{15}N$ MW, 113

B.p. 145–7°.

B,HCl: cryst. M.p. 193°.

·N-*Acetyl*: b.p. 249°/740 mm.

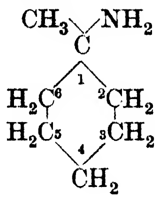
N-*Benzoyl*: needles from pet. ether. M.p. 85–6°.

N-*Nitroso*: yellow liq. B.p. 121°/12 mm.

Picrate: yellow cryst. from EtOH. M.p. 170°.

Skita, Rolfes, *Ber.*, 1920, **53**, 1249.
I.G., D.R.P., 523,033, (*Chem. Abstracts*, 1931, **25**, 3358).

1-Methylcyclohexylamine



$C_7H_{15}N$ MW, 113

F.p. − 96°. B.p. 142–142·5°/750 mm. (143°/744 mm.). D_4^0 0·8729, D_4^{10} 0·8652, D_4^{20} 0·8565. n_D^{19} 1·4536.
B,HCl: m.p. 256–7°.
B,HAuCl₄: m.p. about 225° decomp.
B_2,H_2PtCl_6: decomp. at 260°.
Benzoyl: needles from EtOH.Aq. M.p. 101–101·5°.

Gutt, *Ber.*, 1907, **40**, 2069.
Nametkin, *Chem. Zentr.*, 1910, II, 1377.

2-Methylcyclohexylamine (*Hexahydro*-o-*toluidine*).

Cis:
B.p. 153·5–154°. D_4^{20} 0·8778. n_D^{20} 1·4688.
Acetyl: hexahydroacet-*o*-toluidide. M.p. 82°.
Benzoyl: cryst. from C_6H_6–pet. ether. M.p. 107°.

Trans:
B.p. 149·7–150·2°. D_4^{20} 0·8688. n_D^{20} 1·4650.
Acetyl: hexahydroacet-*o*-toluidide. M.p. 57°.
Benzoyl: cryst. from C_6H_6–pet. ether. M.p. 146°.
$B,HAuCl_4$: yellow needles. M.p. 205–7°. Sol. EtOH.
B_2,H_2PtCl_6: yellow plates. M.p. about 250°.
Picrate: yellow cryst. M.p. 78–9°.

Skita, *Ber.*, 1923, **56**, 1014.
I.G., E.P., 290,175, (*Chem. Abstracts*, 1929, **23**, 846).

3-Methylcyclohexylamine (*Hexahydro*-m-*toluidine*).

Cis:
B.p. 152·7–153·4°. D_4^{20} 0·8552. n_D^{20} 1·4538.
Acetyl: hexahydroacet-*m*-toluidide. M.p. 74·5°.
Benzoyl: m.p. 98°.

Trans:
B.p. 151·5–152·5°. D_4^{20} 0·8572. n_D^{20} 1·4547.
B,HCl: m.p. 174°.
Acetyl: hexahydroacet-*m*-toluidide. M.p. 63°.
Benzoyl: m.p. 127°.

See previous references.

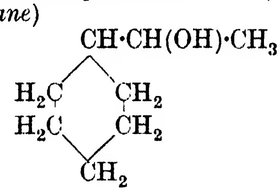
4-Methylcyclohexylamine (*Hexahydro*-p-*toluidine*).

Cis:
B.p. 153·3–153·7°. D_4^{20} 0·8567. n_D^{20} 1·4559.
Acetyl: hexahydroacet-*p*-toluidide. M.p. 79°.
Benzoyl: m.p. 116°.

Trans:
B.p. 151·5–151·9°. D_4^{20} 0·8543. n_D^{20} 1·4550.
Acetyl: hexahydroacet-*p*-toluidide. M.p. 69·5–70°.
Benzoyl: m.p. 180°.

See previous references.

Methylcyclohexylcarbinol (α-*Hydroxyethylcyclohexane*)



$C_8H_{16}O$ MW, 128

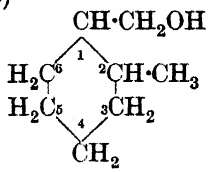
d-.
B.p. 105°/35 mm., 82–3°/12 mm. D_4^{20} 0·9254. n_D^{25} 1·4635. $[\alpha]_D^{20}$ + 5·68°.
Acetyl: b.p. 98°/30 mm. D_4^{17} 0·9500. $[\alpha]_D^{17}$ − 3·12°.
Acid phthalate: cryst. M.p. 75°. Mod. sol. pet. ether. l-*Brucine salt*: cryst. from Me_2CO. M.p. 179°. $[\alpha]_D^{20}$ + 55·4° in 5% EtOH.

l-.
Acid phthalate: cryst. from pet. ether. M.p. 71°. $[\alpha]_D$ − 53° in 5% EtOH. d-*Cinchonine salt*: cryst. from $CHCl_3$–Me_2CO. M.p. 160–5°.

dl-.
B.p. 189°/755 mm., 85–95°/10–12 mm. D_4^0 0·942, D_4^{12} 0·930. n_D^{12} 1·468.
Acid phthalate: cryst. from 85% AcOH. M.p. 140°.

Sabatier, Mailhe, *Compt. rend.*, 1904, **139**, 344.
Dolmeo, Kenyon, *J. Chem. Soc.*, 1926, 1842.
Packendorff, *Ber.*, 1934, **67**, 906.

2-Methylcyclohexylcarbinol (*Hexahydro-o-tolylcarbinol*)



$C_8H_{16}O$ MW, 128

Cis:
B.p. 188–9°. D_4^{20} 0·9342. n_D^{20} 1·4721.

Trans:
B.p. 192–192·5° D_4^{20} 0·9224. n_D^{20} 1·4665.

Skita, Häuber, Schönfelder, *Ann.*, 1923, **431**, 1.

3-Methylcyclohexylcarbinol (*Hexahydro-m-tolylcarbinol*).
B.p. 198–9°. D_4^{20} 0·9222. n_D^{20} 1·4641.

See previous reference.

4-Methylcyclohexylcarbinol (*Hexahydro-p-tolylcarbinol*).

Trans:
B.p. 197·5–198·5°.

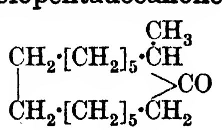
See previous reference and also Perkin, Pope, *J. Chem. Soc.*, 1908, **93**, 1078.

Methyl cyclohexyl Ether.
See under Cyclohexanol.

Methyl cyclohexyl Ketone.
See Acetocyclohexane.

3-Methylcyclopentadecanol.
See Muscol.

2-Methylcyclopentadecanone



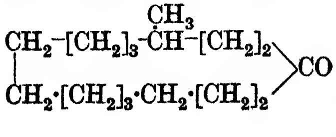
$C_{16}H_{30}O$ MW, 238

B.p. 171–3°/12 mm. D_4^{16} 0·9213. n_D^{16} 1·4812.
Semicarbazone: cryst. from MeOH. M.p. 149–50°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1934, **17**, 1313.

3-Methylcyclopentadecanone.
See Muscone.

4-Methylcyclopentadecanone

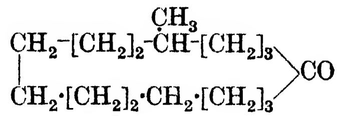


$C_{16}H_{30}O$ MW, 238

Liq. with musk-like odour. B.p. 125°/0·5 mm.
Semicarbazone: cryst. from EtOH. M.p. 161–2°.

Ruzicka, Schinz, Pfeiffer, *Helv. Chim. Acta*, 1928, **11**, 696.

5-Methylcyclopentadecanone

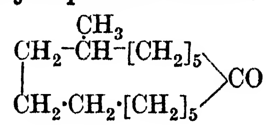


$C_{16}H_{30}O$ MW, 238

Liq. with musk-like odour. B.p. 125°/0·5 mm.
Semicarbazone: cryst. from EtOH. M.p. 164°.

Ruzicka, Schinz, Pfeiffer, *Helv. Chim. Acta*, 1928, **11**, 698.

7-Methylcyclopentadecanone



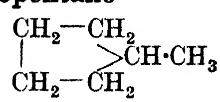
$C_{16}H_{30}O$ MW, 238

B.p. 182–3°/20 mm. D_4^{23} 0·9186. n_D^{23} 1·4781.
Semicarbazone: leaflets from EtOH. M.p. 181–2°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1934, **17**, 1318.

3-Methylcyclopentadecylene.
See Muscene.

Methylcyclopentane

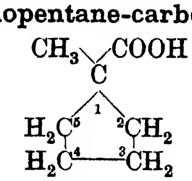


C_6H_{12} MW, 84

B.p. 72–72·2°. D_4^{21} 0·7474. n_D^{21} 1·4088.

Zelinsky, *Ber.*, 1911, **44**, 2781.

1-Methylcyclopentane-carboxylic Acid



$C_7H_{12}O_2$ MW, 128

Oil. B.p. 219–219·5°, 116–17°/16 mm. D_4^0 1·0392, D_4^{20} 1·0218. n_D^{20} 1·4529. Misc. with EtOH, Et_2O. Spar. sol. H_2O.
Me ester: $C_8H_{14}O_2$. MW, 142. B.p. 159·5°/721 mm. D_4^0 0·9850, $D_4^{18.5}$ 0·9657. $n_D^{18.5}$ 1·4373.
Chloride: $C_7H_{11}OCl$. MW, 146·5. B.p. 61°/15 mm.

Amide : $C_7H_{13}ON$. MW, 127. Plates from C_6H_6. M.p. 124–5°. Spar. sol. pet. ether.
Phenyl ester : $C_{13}H_{16}O_2$. MW, 204. B.p. 149–50°/13 mm.

Tschitschibabin, *Chem. Zentr.*, 1913, I, 2028.
Meerwein, *Ann.*, 1915, **405**, 171; 1918, **417**, 263.

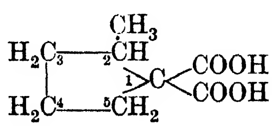
2-Methylcyclopentane-carboxylic Acid.
B.p. 113°/13 mm. D_4^{22} 1·0143. n_D^{22} 1·45042.
Chloride : b.p. 171–2°/758 mm.
Amide : plates from C_6H_6. M.p. 147–8°.

Nenitzescu, Ionescu, *Ann.*, 1931, **491**, 207.

3-Methylcyclopentane-carboxylic Acid.
l-.
B.p. 115–16°/15 mm. D_4^{22} 1·006. n_D^{22} 1·4480. $[\alpha]_D$ − 5·89°. $k = 1{\cdot}07 \times 10^{-5}$ at 25°.
Chloride : b.p. 173–5°.
Amide : prisms from EtOH.Aq. M.p. 149–50°.
dl-.
B.p. 220–1°/771 mm., 108–11°/13 mm. D_4^0 1·0296, D_4^{20} 1·0124.

Faworski, Boshowski, *Chem. Zentr.*, 1915, I, 984.
Zelinsky, *Ber.*, 1902, **35**, 2690.

2-Methylcyclopentane-1 : 1-dicarboxylic Acid



$C_8H_{12}O_4$ MW, 172

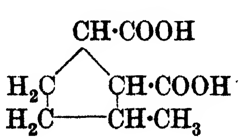
Prisms from Et_2O. M.p. 173–5° ⟶ 2-methylcyclopentane-carboxylic acid. Sol. hot H_2O, EtOH, Et_2O.
Di-Et ester : $C_{12}H_{20}O_4$. MW, 228. B.p. 243–4°.

Colman, Perkin, *J. Chem. Soc.*, 1888, **53**, 193.

3-Methylcyclopentane-1 : 1-dicarboxylic Acid.
Prisms. M.p. 140–2° ⟶ 3-methylcyclopentane-carboxylic acid. Very sol. hot H_2O.

Euler, *Ber.*, 1895, **28**, 2957.

3-Methylcyclopentane-1 : 2-dicarboxylic Acid

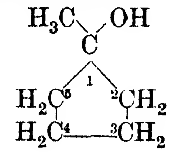


$C_8H_{12}O_4$ MW, 172

Cryst. from HCl. M.p. 104°. Very sol. H_2O. Spar. sol. HCl. Stable to $KMnO_4$.
Di-Et ester : $C_{12}H_{20}O_4$. MW, 228. Yellow oil. B.p. 225°/760 mm.
Anhydride : syrup. B.p. 275°/764 mm.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1365.

1-Methylcyclopentanol



$C_6H_{12}O$ MW, 100

Needles. M.p. 35–7°. B.p. 135–6°/749 mm., 51–3°/16 mm. $D_4^{23\cdot5}$ 0·9041. $n_D^{23\cdot5}$ 1·4429. Sol. most org. solvents. Sublimes.
Allophanate : m.p. 157°.

Chavanne, Devogel, *Bull. soc. chim. Belg.*, 1928, **37**, 141.
Zelinsky, Moser, *Ber.*, 1902, **35**, 2685.

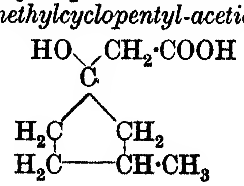
2-Methylcyclopentanol.
Cis :
B.p. 148–9°. D_{16}^{16} 0·9389. n_D^{16} 1·4504.
Phenylurethane : cryst. M.p. 94°.
Allophanate : cryst. M.p. 174°.
Trans :
B.p. 150–1°. D_{16}^{16} 0·9258. n_D^{16} 1·4499.
Phenylurethane : cryst. M.p. 89°.
Allophanate : cryst. M.p. 174°.

Godchot, Bedos, *Compt. rend.*, 1926, **182**, 393.

3-Methylcyclopentanol.
B.p. 148–9°. D^{16} 0·9158. n_D^{16} 1·4487. Sol. EtOH, Et_2O. Very spar. sol. H_2O.
Phenylurethane : cryst. M.p. 82°.

Godchot, Taboury, *Bull. soc. chim.*, 1913, **13**, 592.
Nenitzescu, Ionescu, *Chem. Abstracts*, 1933, **27**, 1329.

3-Methylcyclopentanol-1-acetic Acid (1-*Hydroxy-3-methylcyclopentyl-acetic acid*)



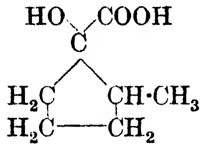
$C_8H_{14}O_3$ MW, 158

Cryst. from C_6H_6–pet. ether. M.p. 56°.
Me ester : $C_9H_{16}O_3$. MW, 172. B.p. 110–15°/12 mm.

Et ester: $C_{10}H_{18}O_3$. MW, 186. B.p. 121°/20 mm., 115–20°/12 mm.

Wallach, Speranski, *Ann.*, 1901, **314**, 160.
Desai, *J. Chem. Soc.*, 1932, 1074.

2 - Methylcyclopentanol - 1 - carboxylic Acid

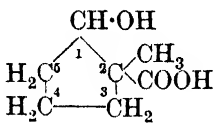


$C_7H_{12}O_3$ MW, 144

Cryst. + $\frac{1}{2}H_2O$ from H_2O. M.p. 74–5°.

Wallach, *Ann.*, 1918, **414**, 315.

2 - Methylcyclopentanol - 2 - carboxylic Acid



$C_7H_{12}O_3$ MW, 144

Cryst. B.p. 160°/12 mm. Very sol. H_2O.
Et ester: $C_9H_{16}O_3$. MW, 172. Oil. B.p. 158–60°/100 mm., 105°/12 mm. *Acetyl*: oil. B.p. 147–51°/40 mm.

Dobson, Ferns, Perkin, *J. Chem. Soc.*, 1909, **95**, 2016.

3 - Methylcyclopentanol - 2 - carboxylic Acid.

Et ester: b.p. 115–17°/2 mm.

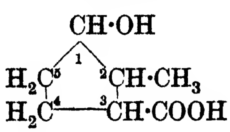
Böeseken, Slooff, Hoeffelmann, Hirsch, *Rec. trav. chim.*, 1933, **52**, 892.

5 - Methylcyclopentanol - 2 - carboxylic Acid.

Oil. B.p. about 160°/12 mm.
Et ester: oil. B.p. 110–11°/14 mm.

Dieckmann, *Ann.*, 1901, **317**, 75.

2 - Methylcyclopentanol - 3 - carboxylic Acid



$C_7H_{12}O_3$ MW, 144

Syrup. B.p. 182–5°/20 mm. Sol. H_2O.

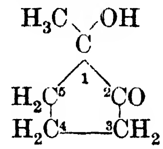
Haworth, Perkin, *J. Chem. Soc.*, 1908, **93**, 584.

4 - Methylcyclopentanol - 3 - carboxylic Acid.

Syrup. B.p. 183–5°/16 mm. decomp.
Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 127–8°/13 mm.

Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 770.

1-Methyl-1-cyclopentanolone-2



$C_6H_{10}O_2$ MW, 114

B.p. 79–81°/15 mm. D^{16} 1·051. n_D^{16} 1·4734. Sol. H_2O, EtOH, Et_2O.

Godchot, *Compt. rend.*, 1914, **158**, 507.

4-Methyl-1-cyclopentanolone-2.

B.p. 86°/12 mm. Misc. with most org. solvents. No col. with alc. $FeCl_3$. Ox. ⟶ 2-methylglutaric acid.
Me ether: $C_7H_{12}O_2$. MW, 128. B.p. 171–2°/14 mm.
Et ether: $C_8H_{14}O_2$. MW, 142. B.p. 83–5°/12 mm.
Acetyl: b.p. 109°/14 mm. *Semicarbazone*: cryst. from C_6H_6. M.p. 174°. p-*Nitrophenylhydrazone*: m.p. 163°.
Benzoyl: m.p. 55–6°. B.p. 140°/1 mm.

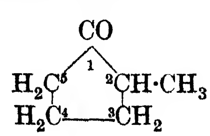
Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 387.

5-Methyl-1-cyclopentanolone-2.

Yellowish liq. B.p. 97–8°/23 mm., 83–5°/12 mm. Sol. most org. solvents. Aq. sol. reacts acid to litmus. Ox. ⟶ 1-methylglutaric acid. Alc. $FeCl_3$ ⟶ violet-red col.
Acetyl: b.p. 120–30°/144 mm.
Phenylhydrazone: m.p. 183–4°.

Godchot, Taboury, *Compt. rend.*, 1913, **156**, 1779.
Rojahn, Rühl, *Arch. Pharm.*, 1926, **264**, 211.

2-Methylcyclopentanone (*α-Methylcyclopentanone*)



$C_6H_{10}O$ MW, 98

B.p. 139°. D_4^{20} 0·9139. n_D^{20} 1·4364.

Oxime: b.p. 103°/22 mm. *Benzoate*: m.p. 63·5°.
Semicarbazone: m.p. 184° (171°).

Bouveault, *Bull. soc. chim.*, 1899, **21**, 1022.
van Rysselberge, *Chem. Abstracts*, 1927, **21**, 375.

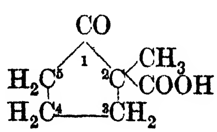
3-Methylcyclopentanone.

d-.
B.p. 143°, 42·5–44°/13 mm. D_4^{19} 0·9140. n_D^{19} 1·4340. $[\alpha]_D^{12}$ + 132·96°, $[\alpha]_D^{15·5}$ + 124·2° in EtOH. Heat of comb. C_v 840·7 Cal., C_p 841·9 Cal. Sol. H_2O.
Oxime: exists in two forms. (α) Needles. M.p. 91–92·5°. $[\alpha]_D^{13}$ + 51·05° in Et_2O. *Benzoyl*: m.p. 60–1°. $[\alpha]_D^{13}$ + 29·77° in Et_2O. (β) Needles. M.p. 67–9°. $[\alpha]_D^{10}$ + 47·99° in Et_2O. *Benzoyl*: m.p. 60–1°. $[\alpha]_D^{9}$ + 34·64° in Et_2O.
Semicarbazone: m.p. 184–5°.

i-.
B.p. 144–144·5°, 57–9°/29 mm., 38°/11 mm. D^{22} 0·913. n_D 1·4329. Sol. H_2O.
Oxime: cryst. M.p. 60–70°.
Semicarbazone: cryst. from EtOH. M.p. 185°.

Vogel, *J. Chem. Soc.*, 1931, 907.
Bayer, D.R.P., 256,622, (*Chem. Zentr.*, 1913, I, 865).
Wallach, *Ann.*, 1904, **332**, 349; 1912, **394**, 371; 1918, **414**, 321.
Nenitzescu, Ionescu, *Chem. Abstracts*, 1933, **27**, 1329.
Zelinsky, *Ber.*, 1902, **35**, 2489.

2-Methylcyclopentanone-2-carboxylic Acid



$C_7H_{10}O_3$ MW, 142

Me ester: $C_8H_{12}O_3$. MW, 156. B.p. 105–6°/15 mm. D_4^0 1·103. NaOMe ⟶ 1-methyladipic dimethyl ester. *Semicarbazone*: leaflets. M.p. 187°.
Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 120–2°/30 mm., 113°/22 mm., 103°/11 mm. D_4^0 1·0529. Insol. NaOH. No col. with alc. $FeCl_3$. Hot conc. HCl ⟶ 2-methylcyclopentanone. NaOEt ⟶ 1-methyladipic diethyl ester. *Semicarbazone*: cryst. M.p. 153°.
Nitrile: 2-methyl-2-cyanocyclopentanone. C_7H_9ON. MW, 123. B.p. 230°. Sol. 30 vols. H_2O. KOH ⟶ 4-cyano-*n*-caproic acid. *Semicarbazone*: plates from EtOH. M.p. 210°.

Bouveault, Locquin, *Compt. rend.*, 1908, **146**, 138.
Best, Thorpe, *J. Chem. Soc.*, 1909, **95**, 711.
Bouveault, *Bull. soc. chim.*, 1899, **21**, 102.

4-Methylcyclopentanone-2-carboxylic Acid.

Non-cryst. syrup.
Me ester: $C_8H_{12}O_3$. MW, 156. B.p. 110°/16 mm. D^{15} 1·07. $[\alpha]_D$ + 91·7° in EtOH.
Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 107–8°/11 mm. D^{15} 1·05. $[\alpha]_D$ + 78·24° in EtOH. Alc. $FeCl_3$ ⟶ violet col. Alc. KOH ⟶ 2-methyladipic acid.
Propyl ester: $C_{10}H_{16}O_3$. MW, 184. B.p. 123–4°/15 mm. D^{15} 1·029. $[\alpha]_D$ + 64·45° in EtOH.
Isobutyl ester: $C_{11}H_{18}O_3$. MW, 198. B.p. 145°/25 mm. D^{15} 0·956. $[\alpha]_D$ + 66·9° in EtOH.

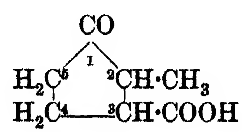
Haller, Desfontaines, *Compt. rend.*, 1905, **140**, 1206.
Dieckmann, *Ann.*, 1901, **317**, 78.

5-Methylcyclopentanone-2-carboxylic Acid.

Me ester: $C_8H_{12}O_3$. MW, 156. B.p. 113–14°/19 mm. *Semicarbazone*: cryst. + $\frac{1}{2}H_2O$ from EtOH.Aq. M.p. 118°.
Et ester: $C_9H_{14}O_3$. MW, 170. Oil with characteristic odour. B.p. 117–18°/20 mm., 108–9°/13 mm. D_4^0 1·057. Alc. $FeCl_3$ ⟶ deep blue col. Hot dil. HCl ⟶ 2-methylcyclopentanone.

Bouveault, Locquin, *Compt. rend.*, 1908, **146**, 84, 138.

2-Methylcyclopentanone-3-carboxylic Acid



$C_7H_{10}O_3$ MW, 142

Cryst. from Et_2O. M.p. 95°. B.p. 190–3°/20 mm. Sol. most org. solvents. Spar. sol. pet. ether.
Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 130–5°/20 mm.
Oxime: m.p. 155°. Sol. H_2O, EtOH. Spar. sol. Et_2O, $CHCl_3$, C_6H_6.
Semicarbazone: cryst. powder from H_2O. M.p. 200–2° decomp.

Haworth, Perkin, *J. Chem. Soc.*, 1908, **93**, 582.

3 - Methylcyclopentanone - 3 - carboxylic Acid.

d-.

B.p. 166–70°/12 mm. D^{16} 1·1533. n_D 1·472. $[\alpha]_D$ + 13·15° in 50% EtOH.

Oxime: m.p. 145°.

Semicarbazone: cryst. from MeOH. M.p. 198–9°.

dl-.

B.p. 170°/12 mm.

Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 115°/12 mm.

Semicarbazone: cryst. from H_2O. M.p. 189–90°.

Ruzicka, *Ber.*, 1917, **50**, 1368.
Semmler, Bartelt, *Ber.*, 1906, **39**, 3961.

4 - Methylcyclopentanone - 3 - carboxylic Acid.

M.p. 49–50°. B.p. 175–7°/15 mm. Sol. most org. solvents.

Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 128°/19 mm. *Semicarbazone*: cryst. from Et_2O. M.p. 124–6°.

Oxime: cryst. from Et_2O. M.p. 135–6°.

Semicarbazone: cryst. from H_2O. M.p. 215–17°.

Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 769.

5 - Methylcyclopentanone - 3 - carboxylic Acid.

B.p. 172–5°/16 mm., 162–5°/12 mm.

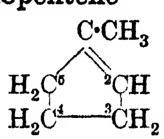
Et ester: $C_9H_{14}O_3$. MW, 170. B.p. 126–7°/20 mm., 115–17°/14 mm. *Semicarbazone*: cryst. from Et_2O. M.p. 138–40°.

Oxime: cryst. from EtOH. M.p. 166–7° (176–7°) decomp.

Semicarbazone: m.p. 202–3° decomp.

Hope, Perkin, *J. Chem. Soc.*, 1911, **99**, 775.

1-Methylcyclopentene



C_6H_{10} MW, 82

M.p. − 127°. B.p. 76°. D_4^0 0·7979. n_D^{18} 1·4347. Ox. ⟶ 4-aceto-*n*-valeric acid.

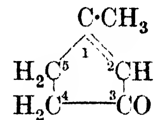
Chavanne, Devogel, *Bull. soc. chim. Belg.*, 1928, **37**, 141.

3-Methylcyclopentene.

B.p. 69–71°. D_4^{18} 0·7663. n_D^{18} 1·4222. $[\alpha]_D$ + 59·07°. Ox. ⟶ 1-methylglutaric acid.

Zelinsky, *Ber.*, 1902, **35**, 2491.

1-Methylcyclopentenone-3 (3-*Methyl*-Δ^2-*cyclopentenone*)



C_6H_8O MW, 96

B.p. 157–8°. D^{26} 0·9712. n_D^{26} 1·4714. Sol. H_2O, most org. solvents. $KMnO_4$ ⟶ formic + succinic acids.

Oxime: plates. M.p. 127°. Sol. H_2O.

Semicarbazone: plates. M.p. 230°.

Godchot, Taboury, *Compt. rend.*, 1913, **156**, 1780.

2-Methylcyclopentenone-3 (2-*Methyl*-Δ^2-*cyclopentenone*).

Oil. B.p. 157°. D_4^{16} 0·98075. n_D^{15} 1·4762. $KMnO_4$ ⟶ acetic + succinic acids.

Oxime: plates from H_2O. M.p. 128°. Very sol. EtOH. Insol. pet. ether. *Acetyl*: m.p. 73°. B.p. 123°/10 mm.

Wislicenus, Looft, *Ann.*, 1893, **275**, 372.
Godchot, *Compt. rend.*, 1914, **158**, 506.

5-Methylcyclopentenone-3 (4-*Methyl*-Δ^2-*cyclopentenone*).

B.p. 57–9°/11 mm.

Semicarbazone: m.p. 223°.

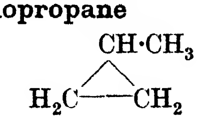
p-*Nitrophenylhydrazone*: m.p. 175–6°.

Staudinger, Ruzicka, *Helv. Chim. Acta*, 1924, **7**, 390.

Methylcyclopentenyl-isobutyric Acid.
See α-Fencholenic Acid.

Methyl-cyclopentylamine.
See Amino-methylcyclopentane.

Methylcyclopropane

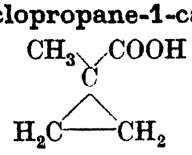


C_4H_8 MW, 56

Gas. B.p. 4–5°. D_0^{20} 0·6912. Sol. conc. H_2SO_4 with polymerisation.

Demjanow, *Ber.*, 1895, **28**, 22.

1-Methylcyclopropane-1-carboxylic Acid



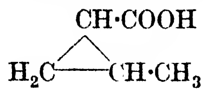
$C_5H_8O_2$ MW, 100

Cryst. from hot H_2O. M.p. 28–31°. B.p. 183–5°/762 mm.

Me ester: $C_6H_{10}O_2$. MW, 114. B.p. 121–3°.

Kohn, Mendelewitsch, *Monatsh.*, 1921, **42**, 227.

2-Methylcyclopropane-1-carboxylic Acid



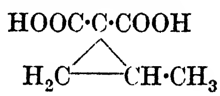
$C_5H_8O_2$ MW, 100

B.p. 190–1°/745 mm., 96·5°/14 mm. D_4^0 1·030, D_4^{20} 1·0267. n_D^{20} 1·4411. Sol. 12 parts H_2O at 15°.

Chloride: C_5H_7OCl. MW, 118·5. B.p. 39·5°/15 mm.

Marburg, *Ann.*, 1897, **294**, 131.
Wohlgemuth, *Ann. chim.*, 1915, **3**, 159.

2-Methylcyclopropane-1 : 1-dicarboxylic Acid



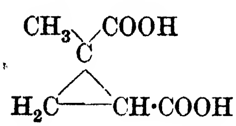
$C_6H_8O_4$ MW, 144

Needles from C_6H_6. M.p. 113·5°. Sol. 1 part cold H_2O. Sol. EtOH, hot $CHCl_3$. Spar. sol. C_6H_6. Insol. ligroin, CS_2.

Di-Et ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 221–2°/760 mm., 106–7°/8 mm. D_4^0 1·0546.

Marburg, *Ann.*, 1897, **294**, 112.

1-Methylcyclopropane-1 : 2-dicarboxylic Acid



$C_6H_8O_4$ MW, 144

Cis:

Prisms from C_6H_6–Me_2CO. M.p. 142°. Hot HCl ⟶ *trans*-form.

Di-Me ester: $C_8H_{12}O_4$. MW, 172. B.p. 104°/14 mm. D_4^{20} 1·112. $n_{He}^{19·5}$ 1·44680.

Anhydride: $C_6H_6O_3$. MW, 126. B.p. 154–7°/19–20 mm., 126–7°/11 mm. D_4^{20} 1·234. $n_{He}^{21·2}$ 1·46756.

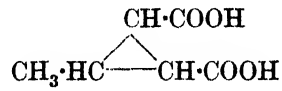
Trans:

Prisms from Me_2CO–C_6H_6. M.p. 168°. Very stable to alk. $KMnO_4$. Acetyl chloride ⟶ anhydride of *cis*-acid.

Di-p-*toluidide*: needles from EtOH. M.p. 255–60°.

Ingold, *J. Chem. Soc.*, 1925, **127**, 396.
Auwers, Cauer, *Ann.*, 1929, **470**, 304.

3-Methylcyclopropane-1 : 2-dicarboxylic Acid



$C_6H_8O_4$ MW, 144

Cis:

Cryst. from $CHCl_3$. M.p. 108° (94°). Very sol. H_2O, Et_2O. Stable to alk. $KMnO_4$.

Anhydride: cryst. M.p. 80°. B.p. 270°.

Trans:

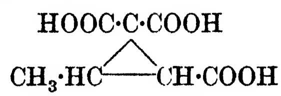
Cryst. from Et_2O or xylene. M.p. 195° (147°). B.p. 180°/20 mm. Sol. H_2O, EtOH, AcOH, Et_2O, hot toluene. Insol. C_6H_6, $CHCl_3$, AcOEt, ligroin, CS_2. Stable to alk. $KMnO_4$.

Di-Me ester: $C_8H_{12}O_4$. MW, 172. B.p. 208·5–209°, 100°/14 mm.

Di-Et ester: $C_{10}H_{16}O_4$. MW, 200. Yellow oil. B.p. 198–200°/14 mm.

Goss, Ingold, Thorpe, *J. Chem. Soc.*, 1923, **123**, 3353.
Feist, *Ann.*, 1924, **436**, 146.

3-Methylcyclopropane-1 : 1 : 2-tricarboxylic Acid



$C_7H_8O_6$ MW, 188

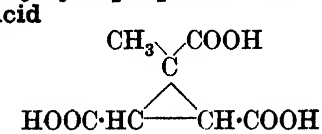
Cryst. from H_2O. M.p. 215° decomp.

Mono-Et ester: $C_9H_{12}O_6$. MW, 216. Plates + $2H_2O$ from H_2O. M.p. 70–1°, anhyd. 150°.

Tri-Et ester: $C_{13}H_{20}O_6$. MW, 272. Oil. B.p. 285–7°, 163–4°/15 mm.

Preisweck, *Ber.*, 1903, **36**, 1085.

1-Methylcyclopropane-1 : 2 : 3-tricarboxylic Acid



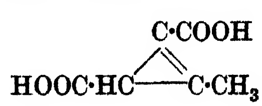
$C_7H_8O_6$ MW, 188

Cryst. from Et_2O. M.p. 192°.

Tri-Me ester: $C_{10}H_{14}O_6$. MW, 230. Prisms from Et_2O or H_2O. M.p. 77° (76·5°). B.p. 170–80°/30 mm.

Buchner, Rehorst, *Ber.*, 1913, **46**, 2686.

2-Methylcyclopropene-1 : 3-dicarboxylic Acid



$C_6H_6O_4$ MW, 142

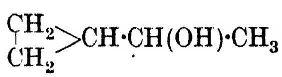
Cryst. + H_2O from H_2O. M.p. 200° decomp. Sublimes in needles. Decomp. on prolonged heating. Sol. hot H_2O, EtOH, Et_2O, Me_2CO, $CHCl_3$. Spar. sol. cold H_2O, CS_2, C_6H_6, ligroin. $k = 5{\cdot}815 \times 10^{-4}$. Forms three esters, labile, normal, and enolic, the latter being readily soluble in cold dilute alkali.

Di-Me ester: $C_8H_{10}O_4$. MW, 170. *Normal*: needles. M.p. 33–4°. B.p. 122°/20 mm. *Labile*: b.p. 135°/20 mm.

Di-Et ester: $C_{10}H_{14}O_4$. MW, 198. *Normal*: cryst. M.p. 38–9°. B.p. 135°/15 mm. *Labile*: b.p. 155°/20 mm.

Goss, Ingold, Thorpe, *J. Chem. Soc.*, 1923, **123**, 348.
Feist, *Ber.*, 1893, **26**, 759.

Methylcyclopropylcarbinol (*α-Hydroxyethyl-cyclopropane*)



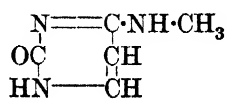
$C_5H_{10}O$ MW, 86

B.p. 123–4°/759 mm., 119–20°. D_4^{20} 0·8805 (0·88778). n_D^{20} 1·4246 (1·42740).

Michiels, *Chem. Zentr.*, 1912, I, 1105.
Henry, *Bull. soc. chim. Belg.*, 1931, **40**, 647.

Methyl cyclopropyl Ketone.
See Acetocyclopropane.

***N*-Methylcytosine** (*4-Methylaminopyrimidone-2*)



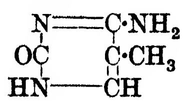
$C_5H_7ON_3$ MW, 125

Cubes from Me_2CO.Aq. M.p. 270°. Sol. H_2O, EtOH. Insol. Me_2CO, Et_2O.

Picrate: prisms from H_2O. M.p. 220–5°.

Case, Hill, *J. Am. Chem. Soc.*, 1929, **51**, 1590.

5-Methylcytosine

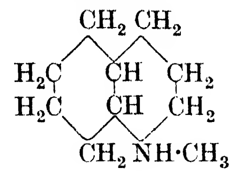


$C_5H_7ON_3$ MW, 125

Prisms from H_2O. M.p. 270° decomp. 100 parts H_2O dissolve 4·5 parts at 25°.

Wheeler, Johnson, *Am. Chem. J.*, 1904, **31**, 591.

***N*-Methyldecahydroquinoline**



$C_{10}H_{17}N$ MW, 151

Cis:
B.p. 208·5–209·5°.
B,HAuCl₄: m.p. 103°.
Picrate: cryst. from EtOH. M.p. 199–200°.

Trans:
B.p. 204–5°.
B,HAuCl₄: m.p. 107·5°.
Picrate: cryst. from H_2O. M.p. 173°.
Picrolonate: cryst. from EtOH. M.p. 205·5°.

Ehrenstein, Bunge, *Ber.*, 1934, **67**, 1728.

1-Methyldecane-1 : 10-dicarboxylic Acid

$$HOOC{\cdot}CH_2{\cdot}[CH_2]_8{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_{13}H_{24}O_4$ MW, 244

Needles from C_6H_6–pet. ether. M.p. 76–76·5°. B.p. 210–15°.

Di-Me ester: $C_{15}H_{28}O_4$. MW, 272. B.p. 187–8°/13 mm. D^{15} 0·966.

Di-Et ester: $C_{17}H_{32}O_4$. MW, 300. B.p. 197°/12 mm. D^{15} 0·940.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 168.

2-Methyldecane-1 : 10-dicarboxylic Acid

$$HOOC{\cdot}CH_2{\cdot}[CH_2]_7{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}COOH$$

$C_{13}H_{24}O_4$ MW, 244

Cryst. from C_6H_6. M.p. 82°. B.p. 237–8°/7 mm., 210–11°/1 mm. Sol. EtOH, Et_2O, Me_2CO, C_6H_6. Spar. sol. H_2O.

Di-Me ester: b.p. 175–6°/8 mm. D^{15} 0·975.

Di-Et ester: b.p. 187–9°/8 mm. D^{15} 0·947.

See previous reference.

3-Methyldecane-1 : 10-dicarboxylic Acid

$$HOOC{\cdot}CH_2{\cdot}[CH_2]_6{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_{13}H_{24}O_4$ MW, 244

Cryst. from C_6H_6–pet. ether. M.p. 71°.

Di-Et ester: b.p. about 140°/0·5 mm.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, **10**, 689.

Methyl n-decyl Ketone (*Dodecanone-2*)

$CH_3\cdot[CH_2]_9\cdot CO\cdot CH_3$

$C_{12}H_{24}O$ MW, 184

M.p. 21°. B.p. 246–7°, 177–8°/100 mm., 144°/11 mm. Ox. ⟶ acetic and capric acids.

Semicarbazone: needles from EtOH.Aq. M.p. 122–3°.

Krafft, *Ber.*, 1882, **15**, 1708.
Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 57.

Methyl n-decyl sulphide

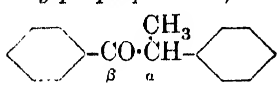
$CH_3\cdot[CH_2]_9\cdot S\cdot CH_3$

$C_{11}H_{24}S$ MW, 188

B.p. 125°/13 mm.

v. Braun, Teuffert, Weissbach, *Ann.*, 1929, **472**, 139.

α-Methyldeoxybenzoin (ms-*Methyldeoxybenzoin, β-phenylpropiophenone*)



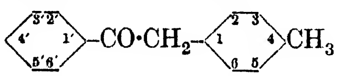
$C_{15}H_{14}O$ MW, 210

Needles from EtOH. M.p. 53°. B.p. 317·5–318·5°.

Oxime: needles. M.p. 120°.

Meyer, Oelkers, *Ber.*, 1888, **21**, 1297.

4-Methyldeoxybenzoin (ω-p-*Tolylacetophenone, phenyl* p-*xylyl ketone*)



$C_{15}H_{14}O$ MW, 210

Cryst. from EtOH. M.p. 94°.

Oxime: m.p. 109°.

Strassmann, *Ber.*, 1889, **22**, 1231.

2′-Methyldeoxybenzoin (o-*Tolyl benzyl ketone*).

B.p. 318–20°.

Mailhe, *Bull. soc. chim.*, 1914, **15**, 325.

3′-Methyldeoxybenzoin (m-*Tolyl benzyl ketone*).

Leaflets. M.p. 42°.

Semicarbazone: m.p. 168°.

See previous reference.

4′-Methyldeoxybenzoin (p-*Tolyl benzyl ketone*).

Leaflets. M.p. 110°. B.p. above 360°. Very sol. $CHCl_3$, C_6H_6. Sol. EtOH, Et_2O. Dil. HNO_3 ⟶ *p*-toluic and terephthalic acids. Na in EtOH ⟶ *p*-tolylbenzylcarbinol.

Oxime: leaflets from EtOH. M.p. 131°.

Azine: yellow needles from $CHCl_3$–EtOH. M.p. 172–3°. Spar. sol. EtOH.

Strassmann, *Ber.*, 1889, **22**, 1229.
Mailhe, *Bull. soc. chim.*, 1914, **15**, 325.

Methyldiacetamide.

See under Methylamine.

2-Methyldiallyl.

See 2-Methyl-1 : 5-hexadiene.

Methyldiallylcarbinol (4-*Methyl*-1 : 6-*heptadienol*-4)

$$CH_2{:}CH\cdot CH_2\cdot C(CH_3)(OH)\cdot CH_2\cdot CH{:}CH_2$$

$C_8H_{14}O$ MW, 126

B.p. 158·4° (157–9°). D_0^0 0·87747 (0·8638), D_0^{20} 0·86134, D_{20}^{20} 0·86258. Heat of comb. C_p 1192·7 Cal. CrO_3 ⟶ acetic acid. $KMnO_4$ ⟶ 2-hydroxy-2-methylglutaric acid.

Acetyl: b.p. 177·3°.

Saizew, *J. prakt. Chem.*, 1907, **76**, 100.
Sorokin, *Ann.*, 1877, **185**, 169.

Methyldi-n-amylcarbinol (6-*Methylundecanol*-6)

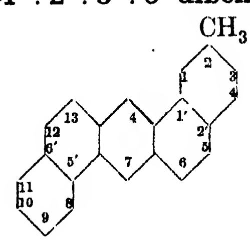
$$CH_3\cdot[CH_2]_4\cdot C(CH_3)(OH)\cdot[CH_2]_4\cdot CH_3$$

$C_{12}H_{26}O$ MW, 186

B.p. 80–3°/2 mm. D_4^{25} 0·8271. n_D^{20} 1·4392.

Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, **55**, 408.

2-Methyl-1′ : 2′ : 5′ : 6′-dibenzanthracene



$C_{23}H_{16}$ MW, 292

Nodules from xylene. M.p. 256–7°. Carcinogenic.

Cook, *J. Chem. Soc.*, 1931, 494.

3-Methyl-1′ : 2′ : 5′ : 6′-dibenzanthracene.

Leaflets from C_6H_6. M.p. 244–5°. Sol. C_6H_6. Spar. sol. AcOH. Sols. show green fluor. Carcinogenic.

See above reference and also
Fieser, Dietz, *Ber.*, 1929, **62**, 1831.

6-Methyl-1′ : 2′ : 5′ : 6′-dibenzanthracene.

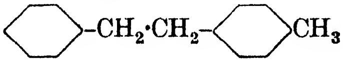
Needles from C_6H_6. M.p. 184–5°. B.p. 260–300°/2–3 mm. Carcinogenic.

Di-picrate: red needles from C_6H_6. M.p. 200–1°.

Cook, *J. Chem. Soc.*, 1933, 1596.

α-Methyldibenzyl.
See 1 : 2-Diphenylpropane.

4-Methyldibenzyl (1-*Phenyl*-2-p-*tolylethane*)



$C_{15}H_{16}$ MW, 196

M.p. 27°. B.p. 286°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6.

Mailhe, de Godon, *Bull. soc. chim.*, 1917, **21**, 63.
Mann, *Ber.*, 1881, **14**, 1646.

***N*-Methyldibenzylamine**

$(C_6H_5{\cdot}CH_2)_2N{\cdot}CH_3$

$C_{15}H_{17}N$ MW, 211

B.p. 304–5°/765·5 mm., 143°/1 mm.
B,HCl: m.p. 200–1°.
B,HBr: cryst. from AcOEt. M.p. 157°. Sol. EtOH, $CHCl_3$, Me_2CO. Insol. Et_2O, C_6H_6.
B,HAuCl₄: yellow needles. Sinters at 125°, m.p. about 135°.
B_2,HAuCl₄,HCl: yellow needles or plates from dil. EtOH. Sinters at 120°, m.p. 134–6°.
B_2,H_2PtCl_6: m.p. 192° decomp. Sol. EtOH. Spar. sol. H_2O.
Picrate: cryst. from dil. EtOH. M.p. 107°.

Emde, *Arch. Pharm.*, 1909, **247**, 367.
v. Meyer, *Chem. Zentr.*, 1909, II, 1800.
Emde, Schellbach, *Arch. Pharm.*, 1911, **249**, 115.
Goss, Ingold, Wilson, *J. Chem. Soc.*, 1926, 2457.

Methyl 1 : 1-dibromoethyl Ketone (3 : 3-*Dibromobutanone*-2)

$CH_3{\cdot}CBr_2{\cdot}CO{\cdot}CH_3$

$C_4H_6OBr_2$ MW, 230

B.p. 194–5°, 80–3°/10 mm. D^{20}_{20} 1·1729. Boiling dil. H_2SO_4 ⟶ diacetyl.

Faworski, Issatschencko, *J. prakt. Chem.*, 1913, **88**, 657.

Methyl 1 : 2-dibromoethyl Ketone (3 : 4-*Dibromobutanone*-2)

$CH_2Br{\cdot}CHBr{\cdot}CO{\cdot}CH_3$

$C_4H_6OBr_2$ MW, 230

B.p. 53°/0·2 mm. Slowly darkens on standing.

Schlotterbeck, *Ber.*, 1909, **42**, 2563.

Methyldi-sec.-butylamine

$(CH_3{\cdot}CH_2{\cdot}CH(CH_3))_2N{\cdot}CH_3$

$C_9H_{21}N$ MW, 143

B.p. 155–7°.
Picrate: cryst. from EtOH. M.p. 92–3°.

Skita, Keil, Havemann, *Ber.*, 1933, **66**, 1409.

Methyldibutylcarbinol (5-*Methylnonanol*-5)

$CH_3{\cdot}[CH_2]_3{\cdot}C(OH)(CH_3){\cdot}[CH_2]_3{\cdot}CH_3$

$C_{10}H_{22}O$ MW, 158

B.p. 91·4–92·4°/15 mm., 84–5°/10 mm. D^{20}_4 0·8290. n^{20}_D 1·4341.

Whitmore, Woodburn, *J. Am. Chem. Soc.*, 1933, **55**, 363.
Stadnikow, *Ber.*, 1914, **47**, 2138.

***N*-Methyl-2 : 6-di-[carboxymethyl]-piperidine.**
See Lobelinic Acid.

Methyldichloroamine.
See *N*-Dichloromethylamine.

Methyldichloroarsine (*Dichloro-methylarsine, methylarsine dichloride*)

$CH_3{\cdot}AsCl_2$

CH_3Cl_2As MW, 161

B.p. 133°. Mod. sol. H_2O. Sol. EtOH, Et_2O. D^{20}_4 1·838.

Uhlinger, Cook, *Chem. Zentr.*, 1919, III, 597.

Methyl 1 : 1-dichlorobutyl Ketone (3 : 3-*Dichlorohexanone*-2)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CCl_2{\cdot}CO{\cdot}CH_3$

$C_6H_{10}OCl_2$ MW, 169

Oil. B.p. 162–4°, 55°/15 mm. D^0 1·1469, D^{21} 1·1263. Zn + HCl ⟶ methyl butyl ketone.

Faworski, *J. prakt. Chem.*, 1895, **51**, 544.

Methyl 1 : 1-dichloroethyl Ketone (3 : 3-*Dichlorobutanone*-2)

$CH_3{\cdot}CCl_2{\cdot}CO{\cdot}CH_3$

$C_4H_6OCl_2$ MW, 141

B.p. 111–12°, 30°/30 mm. D^{17} 1·2025.

Faworski, Desbout, *J. prakt. Chem.*, 1895, **51**, 549.

Methyl 1 : 2-dichloroisobutyl Ketone (2 : 3-*Dichloro-2-methylpentanone*-4, *mesityl oxide dichloride*)

$(CH_3)_2CCl{\cdot}CHCl{\cdot}CO{\cdot}CH_3$

$C_6H_{10}OCl_2$ MW, 169

B.p. 77°/12 mm. D_4^{11} 1·1942.

Pauly, Lieck, *Ber.*, 1900, **33**, 502.

Methyl 1 : 1-dichloropropyl Ketone (3 : 3-*Dichloropentanone*-2)

$CH_3·CH_2·CCl_2·CO·CH_3$

$C_5H_8OCl_2$ MW, 155

B.p. 138°, 55–8°/20 mm. D^{22} 1·1711. Zn + HCl ⟶ methyl propyl ketone.

Faworski, *J. prakt. Chem.*, 1895, **51**, 535.

Methyl diethoxypropionate.
See under Formylacetic Acid.

1-Methyl-1 : 1-diethylacetone.
See 3-Methyl-3-ethylpentanone-2.

Methyldiethylamine

$(C_2H_5)_2N·CH_3$

$C_5H_{13}N$ MW, 87

B.p. 66–7° (63–5°). Sol. H_2O. $k = 2·7 \times 10^{-4}$ at 25°.

B,HCl : m.p. 178·5°. Deliquescent. Sol. EtOH, $CHCl_3$. Insol. Et_2O.

B,HBr : needles from EtOH. M.p. 169°. Deliquescent. Sol. EtOH, $CHCl_3$. Insol. Et_2O.

B,HI : m.p. 115–18°. Deliquescent. Sol. EtOH, $CHCl_3$. Insol. Et_2O.

B_2,H_2PtCl_6 : orange-yellow cryst. M.p. 231°.

Picrate : prisms from H_2O. M.p. 185°.

v. Meyer, Lecco, *Ann.*, 1876, **180**, 184.
Lossen, *Ann.*, 1876, **181**, 379.
Collie, Schryver, *J. Chem. Soc.*, 1890, **57**, 779.
Passon, *Ber.*, 1891, **24**, 1681.
Emmert, *Ber.*, 1909, **42**, 1509.
Bayer, D.R.P., 287,802, (*Chem. Zentr.*, 1915, II, 1033).

2-Methyl-1 : 4-diethylbutadiene-1 : 3.
See 4-Methyloctadiene-3 : 5.

Methyldiethylcarbinol (3-*Methylpentanol*-3, 3-*hydroxy*-3-*methylpentane*)

$$\begin{array}{c} \quad CH_3 \\ CH_3·CH_2·\overset{|}{C}(OH)·CH_2·CH_3 \end{array}$$

$C_6H_{14}O$ MW, 102

B.p. 122·1–122·9°/760 mm. (121–122·5°/758 mm., 122–3°/756·5 mm.). D^0 0·8452, D_0^{20} 0·8237, D_0^{25} 0·8194. n_D^{21} 1·418. Heat of comb. C_v 935·5 Cal., C_p 937·3 Cal.

Acetyl : b.p. 148°. D_{20}^{20} 0·8834.

Pariselle, Simon, *Compt. rend.*, 1921, **173**, 86.
Bayer, D.R.P., 166,899, (*Chem. Zentr.*, 1906, I, 720).
Henry, *Rec. trav. chim.*, 1907, **26**, 94.
Wislicenus, *Ann.*, 1883, **219**, 319.
Reformatski, *J. prakt. Chem.*, 1887, **36**, 340.

1-Methyl-2 : 2-diethylethylene.
See 3-Ethylpentene-2.

1-Methyl-2 : 2-diethylethylene Glycol (3-*Ethylpentandiol*-2 : 3, 3-*ethyl*-2-*pentene glycol*, 2 : 3-*dihydroxy*-3-*ethylpentane*)

$$\begin{array}{c} \qquad\qquad CH_2·CH_3 \\ CH_3·CH(OH)·\overset{|}{C}(OH)·CH_2·CH_3 \end{array}$$

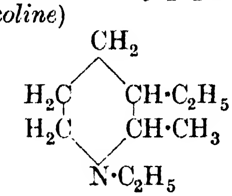
$C_7H_{16}O_2$ MW, 132

B.p. 194–7°, 105°/17 mm. D^{20} 0·957. 25% H_2SO_4 ⟶ *unsym.*-diethylacetone.

Tiffeneau, Dorlencourt, *Compt. rend.*, 1906, **143**, 127.
Gauthier, *Compt. rend.*, 1911, **152**, 1101.

Methyldiethylmethane.
See 3-Methylpentane.

2-Methyl-*N*-3-diethylpiperidine (1 : 3-*Diethyl-α-pipecoline*)



$C_{10}H_{21}N$ MW, 155

B.p. 187–92°/743 mm. D_4^0 (in vacuo) 0·8819, D_4^{27} (in vacuo) 0·8517. Insol. H_2O.

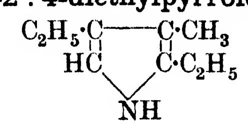
$B,HAuCl_4$: needles. M.p. 73–4°.

$B,HCl,5HgCl_2$: greyish-red cryst. from EtOH. M.p. 84°. Decomp. at 130°.

Picrate : yellow prisms from EtOH. M.p. 117°.

Ladenburg, *Ann.*, 1899, **304**, 70.
See also Lipp, Widnmann, *Ann.*, 1915, **409**, 110.

3-Methyl-2 : 4-diethylpyrrole



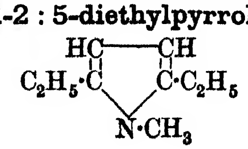
$C_9H_{15}N$ MW, 137

Oil. B.p. 205°/730 mm., 95–6°/11 mm.

Picrate : cryst. from EtOH. M.p. 110°.

Fischer, Seidel, D'Ennequin, *Ann.*, 1933, **500**, 180.

***N*-Methyl-2 : 5-diethylpyrrole**

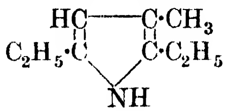


$C_9H_{15}N$ **MW, 137**

Oil. B.p. 201–2°/739 mm., 89·0–89·2°/13 mm.

Lukeš, *Chem. Abstracts*, 1932, **26**, 4328.

3-Methyl-2 : 5-diethylpyrrole



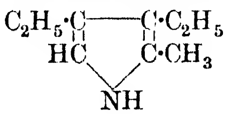
$C_9H_{15}N$ MW, 137

Oil. B.p. 94–5°/15 mm.

Picrate: yellow cryst. from EtOH. M.p. 90–1°.

Fischer, Eismayer, *Ber.*, 1914, **47**, 1827.

2-Methyl-3 : 4-diethylpyrrole



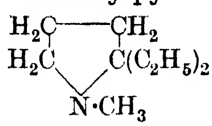
$C_9H_{15}N$ MW, 137

Colourless oil. B.p. 202–3°. D^{17} 0·90996. n_D^{17} 1·49879. Volatile in steam.

Picrate: cryst. from EtOH. M.p. 101°.

Fischer, Baumler, *Ann.*, 1929, **468**, 78.

1-Methyl-2 : 2-diethylpyrrolidine



$C_9H_{19}N$ MW, 141

Oil. B.p. 168°.

B,HCl: hygroscopic cryst. from $CHCl_3$.

Aurichloride: cryst. M.p. 159–63°. Sol. EtOH, $CHCl_3$.

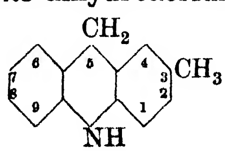
Picrate: cryst. M.p. 233°. Sol. H_2O, EtOH.

Lukeš, *Chem. Abstracts*, 1933, **27**, 5324.

Methyldiglycolamidic Acid.

See Methyliminodiacetic Acid.

3-Methyl-*ms*-dihydroacridine



$C_{14}H_{13}N$ MW, 195

Plates from EtOH. M.p. 157°. Sublimes undecomp. $CrO_3 \longrightarrow$ 3-methylacridine.

Kahn, *Ann.*, 1894, **279**, 274.

5-Methyl-*ms*-dihydroacridine.

Cryst. from EtOH. M.p. 124–125·5°.

N-*Acetyl*: cryst. from AcOEt. M.p. 162°.

$C_{14}H_{13}N,C_6H_3(NO_2)_3$-1 : 3 : 5: black needles from EtOH. M.p. 117–18°.

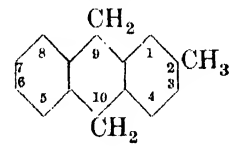
Sastry, *J. Chem. Soc.*, 1916, **109**, 272.
Blum, *Ber.*, 1929, **62**, 892.

***N*-Methyl-*ms*-dihydroacridine** (10-*Methyl-5 : 10-dihydroacridine*).

Cryst. from EtOH.Aq. M.p. 96°.

Pictet, Patry, *Ber.*, 1902, **35**, 2536.

2-Methyl-9 : 10-dihydroanthracene



$C_{15}H_{14}$ MW, 194

White needles from 70% EtOH. M.p. 51°. Darkens in air. Volatile in steam.

Fischer, *J. prakt. Chem.*, 1915, **92**, 51.

9-Methyl-9 : 10-dihydroanthracene (ms-*Methyl*-9 : 10-*dihydroanthracene*).

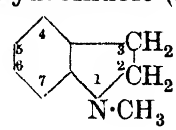
Needles. M.p. 30°. B.p. 314–15°/740 mm. Sol. most org. solvents.

Fischer, Ziegler, *J. prakt. Chem.*, 1912, **86**, 289.

2-Methyl-4 : 5-dihydroglyoxaline.

See Lysidine.

***N*-Methyldihydroindole** (1-*Methylindoline*)



$C_9H_{11}N$ MW, 133

B.p. 216°/728 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O. Volatile in steam.

Picrate: yellow plates from C_6H_6. M.p. 165° (155°).

Wenzing, *Ann.*, 1887, **239**, 246.
Carrasco, *Gazz. chim. ital.*, 1908, **38**, 306.

2-Methyldihydroindole (2-*Methylindoline*).

d-.

N-*Acetyl*: needles from pet. ether. M.p. 89°. $[\alpha]_D$ +59·6° in EtOH.

N-*Benzoyl*: cryst. from dil. EtOH. M.p. 119°. $[\alpha]_D$ +37° in EtOH.

l-.

Liq. with blue fluor. B.p. 228–9°. $[\alpha]_D$ +7·2° in EtOH, −13·5° in Et_2O, +8·3° in C_6H_6.

B,HCl: needles from C_6H_6. M.p. 58°. $[\alpha]_D$ +1·7° in H_2O.

N-*Acetyl*: needles from pet. ether. M.p. 89°. $[\alpha]_D$ −61·9° in EtOH.

N-*Benzoyl*: needles from EtOH. M.p. 119°. $[\alpha]_D$ $-37{\cdot}1°$ in EtOH.

dl-.

B.p. 228–9°, 116–116·5°/20 mm. D_4^{20} 1·0231, $D_4^{23\cdot4}$ 1·0197. $n_D^{23\cdot4}$ 1·5687. $Ag_2SO_4 \longrightarrow$ 2-methylindole. HI + P at 240° $\longrightarrow$ 2-propylaniline.

N-*Acetyl*: needles from ligroin. M.p. 55–6°.
N-*Benzoyl*: prisms from EtOH. M.p. 91·5°.
N-*Benzenesulphonyl*: cryst. from EtOH. M.p. 90°.
Nitroso deriv.: yellow prisms from ligroin. M.p. 54–5°.
Picrate: yellow prisms from C_6H_6. M.p. 151°.

Jackson, *Ber.*, 1881, **14**, 883.
Pope, Clarke, *J. Chem. Soc.*, 1904, **85**, 1331.
Wenzing, *Ann.*, 1887, **239**, 244.
Carrasco, *Gazz. chim. ital.*, 1908, **38**, 305.
v. Braun, Steindorff, *Ber.*, 1904, **37**, 4729.

3-Methyldihydroindole (3-*Methylindoline, 2 : 3-dihydroskatole*).

B.p. 231–2°/744 mm. Sol. EtOH, Et_2O, ligroin. Spar. sol. H_2O.
Picrate: cryst. from C_6H_6. M.p. 149–50°.

Fischer, *Ber.*, 1886, **19**, 1566.
Wenzing, *Ann.*, 1887, **239**, 242.

4-Methyldihydroindole (4-*Methylindoline*).

B.p. 245°, 124–6°/12 mm. D_4^{20} 1·038.
B,HCl: m.p. 235°.
N-*Benzoyl*: m.p. 117–18°.
N-*Benzenesulphonyl*: m.p. 135°.
Picrate: yellow cryst. M.p. 188°.

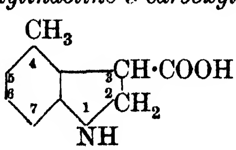
Kruber, *Ber.*, 1929, **62**, 2879.

7-Methyldihydroindole (7-*Methylindoline*).

B.p. 240–3°, 120–2°/10 mm. D_4^{20} 1·044.
B,HCl: m.p. 199–200°.
N-*Benzoyl*: m.p. 106°.
N-*Benzenesulphonyl*: m.p. 131°.
Picrate: yellow cryst. M.p. 186°.

Kruber, *Ber.*, 1926, **59**, 2756.

4 - Methyldihydroindole - 3 - carboxylic Acid (4-*Methylindoline-3-carboxylic acid*)



$C_{10}H_{11}O_2N$ MW, 177

Yellow cryst. from hot H_2O. M.p. 223°. Sol. EtOH, Me_2CO.

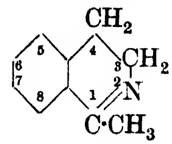
Kruber, *Ber.*, 1929, **62**, 2878.

7 - Methyldihydroindole - 3 - carboxylic Acid (7-*Methylindoline-3-carboxylic acid*).

Needles from EtOH. M.p. 237° decomp. Sol. hot H_2O. Spar. sol. org. solvents.

Kruber, *Ber.*, 1926, **59**, 2755.

1-Methyl-3 : 4-dihydroisoquinoline



$C_{10}H_{11}N$ MW, 145

B.p. 237–42°, 130°/10 mm. Sol. EtOH. Insol. H_2O.
Picrate: m.p. 188–90°.

Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 136.

4-Methyl-3 : 4-dihydroisoquinoline.

Picrate: cryst. M.p. 132–3°.

See previous reference.

5-Methyl-3 : 4-dihydroisoquinoline.

Picrate: cryst. M.p. 182–3° decomp.

See previous reference.

2-Methyl-Δ²-dihydromuconic Acid (2-*Methyl-2-butylene-1 : 4-dicarboxylic acid*)

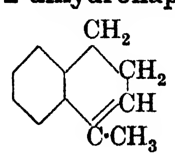
$H_3C{\cdot}C{\cdot}CH_2{\cdot}COOH$
$\quad\;\; \| $
$\quad CH{\cdot}CH_2{\cdot}COOH$

$C_7H_{10}O_4$ MW, 158

Cryst. from H_2O or Et_2O–Me_2CO. M.p. 140–1°. $KMnO_4 \longrightarrow$ acetic acid.
Di-Me ester: $C_9H_{14}O_4$. MW, 186. Oil with odour of melons. B.p. 245°/753 mm. D_4^{20} 1·0824.

Pauly, Will, *Ann.*, 1918, **416**, 14.

4-Methyl-1 : 2-dihydronaphthalene



$C_{11}H_{12}$ MW, 144

B.p. 107°/14 mm. D_4^{20} 0·9901.
Picrate: yellow cryst. from EtOH. M.p. 142°.

Auwers, *Ber.*, 1925, **58**, 151.
Schroeter, *ibid.*, 720.

Methyl - dihydroxyisopropyl - cyclo - hexane.

See *p*-Menthandiol-8 : 9.

Methyl - 2 : 5 - dihydroxyphenylethyl - amine.
See β-Methylaminoethylhydroquinone.

Methyl-2 : 3-dihydroxypropyl-amine.
See 3-Methylaminopropylene Glycol.

Methyldi-iodoarsine (*Di-iodo-methylarsine, methylarsine di-iodide*)

$CH_3{\cdot}AsI_2$

CH_3I_2As MW, 344

Yellow needles from EtOH. M.p. 25°. Decomp. at 200° approx. Sol. EtOH, Et_2O, CS_2. Spar. sol. H_2O.

Auger, *Compt. rend.*, 1906, **142**, 1151.

Methyldi-isoamylcarbinol (2 : 5 : 8-*Trimethylnonanol*-5)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{12}H_{26}O$ MW, 186

B.p. 108–9°/10 mm. D^0 0·847, $D_4^{12\cdot3}$ 0·8373. $n_D^{12\cdot3}$ 1·44253.
Acetyl: b.p. 120°/16 mm. $D_4^{16\cdot9}$ 0·864. $n_D^{16\cdot9}$ 1·43191.

Grignard, *Compt. rend.*, 1901, **132**, 338, (*Chem. Zentr.*, 1901, II, 624).

Methyldi-isobutylcarbinol (2 : 4 : 6-*Trimethylheptanol*-4)

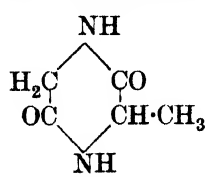
$(CH_3)_2CH{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH_2{\cdot}CH(CH_3)_2$

$C_{10}H_{22}O$ MW, 158

B.p. 180–2°/753 mm., 78–80°/12 mm. D^{21} 0·823. n_D^{18} 1·4334.

Bodroux, Taboury, *Bull. soc. chim.*, 1909, **5**, 813.
Halse, *J. prakt. Chem.*, 1914, **89**, 458.

3-Methyl-2 : 5-diketopiperazine (*Glycylalanine anhydride, methyldiacipiperazine*)



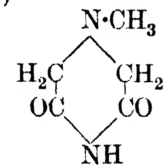
$C_5H_8O_2N_2$ MW, 128

d-.
Cryst. M.p. 247° decomp. Sublimes. $[\alpha]_D^{20}$ − 5·0° in H_2O.

dl-.
Found in dog hair. Needles from EtOH.Aq. M.p. 244° (238–9°). Sol. H_2O, hot EtOH. Spar. sol. Me_2CO. Reacts neutral. Reduces Fehling's and $NH_3.AgNO_3$. Tasteless.

Heimrod, *Ber.*, 1914, **47**, 344.
Abderhalden, Komm, *Z. physiol. Chem.*, 1925, **145**, 308.

4-Methyl-2 : 6-diketopiperazine (*Methyliminodiacetimide*)



$C_5H_8O_2N_2$ MW, 128

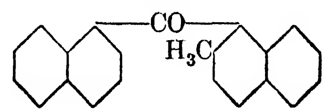
Yellow cryst. from AcOH. M.p. 105–6°.
B,HCl: needles from MeOH–HCl. Darkens at 240–5°.
B,HNO₃: needles from MeOH–HNO_3. Darkens at 130°.

Franchimont, Dubsky, *Rec. trav. chim.*, 1916, **36**, 96.

2-Methyl-1 : 3-di-[*p*-methoxyphenyl]-pentene-1.
See Isoanethole.

Methyl dimethylaminoethyl Ether.
See under 2-Methoxyethylamine.

2-Methyl-1 : 1′-dinaphthyl Ketone

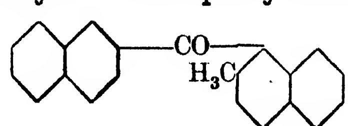


$C_{22}H_{16}O$ MW, 296

Cryst. from EtOH. M.p. 171°. Sol. conc. H_2SO_4 ⟶ orange yellow sol. Heat at b.p. ⟶ 1 : 2 : 7 : 8-dibenzanthracene.

Fieser, Dietz, *Ber.*, 1929, **62**, 1829.

2-Methyl-1 : 2′-dinaphthyl Ketone



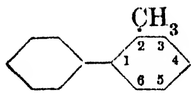
$C_{22}H_{16}O$ MW, 296

Needles from EtOH. M.p. 142–3°. Sol. conc. H_2SO_4 ⟶ orange sol. Heat at b.p. ⟶ 1 : 2 : 5 : 6-dibenzanthracene.

See previous reference.

N-Methyl-2 : 6-diphenacylpiperidine.
See Lobelanine.

2-Methyldiphenyl (*Phenyl*-o-*tolyl*, o-*phenyltoluene*)



$C_{13}H_{12}$ MW, 168

B.p. 261–4° (255–8°), 130–6°/27 mm. D_4^{20} 1·010. CrO_3 or $KMnO_4$ ⟶ diphenyl-2-carboxylic acid.

Sherwood, Short, Stansfield, *J. Chem. Soc.*, 1932, 1834.
Oddo, Curatolo, *Gazz. chim. ital.*, 1895, **25**, 132.
Jacobson, *Ber.*, 1895, **28**, 2551.
Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, **48**, 1376.

3-Methyldiphenyl (*Phenyl*-m-*tolyl*, m-*phenyltoluene*).

B.p. 272–7° (267–9°), 148–50°/20 mm. D^0 1·031, D_4^{22} 1·010. n_D^{22} 1·5916. CrO_3 or $KMnO_4$ ⟶ diphenyl-3-carboxylic acid. HNO_3 ⟶ 4-nitro deriv.

See first reference above and also
Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, **48**, 1379.
Perrier, *Bull. soc. chim.*, 1892, **7**, 181.
Jacobson, *Ber.*, 1895, **28**, 2546.

4-Methyldiphenyl (*Phenyl*-p-*tolyl*, p-*phenyltoluene*).

Plates from MeOH or ligroin. M.p. 49–50° (47–8°). B.p. 267–8°, 134–6°/15 mm. Dil. HNO_3 or $KMnO_4$ ⟶ diphenyl-4-carboxylic acid. CrO_3 ⟶ terephthalic acid. Br in CCl_4 ⟶ 4′-bromo deriv. HNO_3 ⟶ 2-, 3-, and 4′-nitro derivs.

Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, **48**, 1375.
Sherwood, Short, Stansfield, *J. Chem. Soc.*, 1932, 1834.
Kliegl, Huber, *Ber.*, 1920, **53**, 1655.
Gattermann, *Ann.*, 1906, **347**, 381.
Oddo, Curatolo, *Gazz. chim. ital.*, 1895, **25**, 130.
Möhlau, Berger, *Ber.*, 1893, **26**, 1997.
Carnelley, *J. Chem. Soc.*, 1880, **37**, 706.

***N*-Methyldiphenylamine** (*Diphenylmethylamine*)

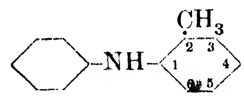
$(C_6H_5)_2N{\cdot}CH_3$

$C_{13}H_{13}N$ MW, 183

B.p. 295·5–296·5° (290°, 282°), 291·7–292·2°/740·8 mm., 175°/31 mm. D_4^4 1·0603, D_{20}^{20} 1·0491, D_4^{20} 1·0476. n_D^{20} 1·61928, $n_D^{24·6}$ 1·6166. Br in AcOH ⟶ 4 : 4′-dibromo-, and 2 : 4 : 2′ : 4′-tetrabromo derivs.

Girard, *Bull. soc. chim.*, 1875, **23**, 2.
Ullmann, *Ann.*, 1903, **327**, 113.
Bardy, *Z. Chem.*, 1871, 469.
Wieland, *Ber.*, 1919, **52**, 890.

2-Methyldiphenylamine (N-*Phenyl*-o-*toluidine, phenyl*-o-*tolylamine*)



$C_{13}H_{13}N$ MW, 183

M.p. 41° (38°). B.p. 305°/727·5 mm. Violet-blue col. with HNO_3.

Merz, Paschkowezky, *J. prakt. Chem.*, 1893, **48**, 461.
Ullmann, *Ann.*, 1907, **355**, 324.
Société anonyme pour l'industrie chimique à Bâle, E.P., 250,819, (*Chem. Abstracts*, 1927, 21, 1273).

3-Methyldiphenylamine (N-*Phenyl*-m-*toluidine, phenyl*-m-*tolylamine*).

M.p. 30°. B.p. 315°/724 mm. Sol. EtOH, Et_2O, C_6H_6. Green col. with HNO_3 in H_2SO_4.

Zega, Buch, *J. prakt. Chem.*, 1886, **33**, 542.
Ullmann, *Ann.*, 1907, **355**, 325.

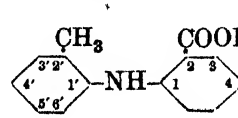
4-Methyldiphenylamine (N-*Phenyl*-p-*toluidine, phenyl*-p-*tolylamine*).

Cryst. M.p. 89° (87°). B.p. 334°, 317–18°/727·5 mm., 316·6°/704 mm. Blue col. with HNO_3. Br in AcOH ⟶ tetrabromo deriv.

N-*Acetyl* : cryst. from EtOH. M.p. 52°.

Hofmann, *Ann.*, 1864, **132**, 291.
de Laire, Girard, Chapotaut, *Ann.*, 1866, **140**, 347.
Merz, Paschkowezky, *J. prakt. Chem.*, 1893, **48**, 455.
Buch, *Ber.*, 1884, **17**, 2634.
Goldberg, Sissoeff, *Ber.*, 1907, **40**, 4543.
Ullmann, *Ann.*, 1907, **355**, 325.
Chapman, *J. Chem. Soc.*, 1929, 2136.

2′-Methyldiphenylamine-2-carboxylic Acid (N-o-*Tolylanthranilic acid*, 2-o-*toluidinobenzoic acid*)



$C_{14}H_{13}O_2N$ MW, 227

Leaflets from C_6H_6. M.p. 179° (188–9°). Sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin. Insol. dil. acids. Violet sol. in conc. H_2SO_4. Heat to 230° ⟶ 2-methyldiphenylamine.

Locher, *Ann.*, 1894, **279**, 277.
Höchster Farbewerke, D.R.P., 145,189, (*Chem. Zentr.*, 1903, II, 1097).

3′ - Methyldiphenylamine - 2 - carboxylic Acid (N-m-*Tolylanthranilic acid*, 2-m-*toluidinobenzoic acid*).

Leaflets from C_6H_6. M.p. 139°. Sol. EtOH, Et_2O, AcOH, C_6H_6. Spar. sol. ligroin. Insol. H_2O. Sol. conc. H_2SO_4 ⟶ yellow sol. with green fluor. Dist. ⟶ 3-methyldiphenylamine.

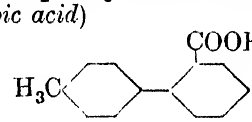
Ullmann, Bader, *Ann.*, 1907, **355**, 324.

4′ - Methyldiphenylamine - 2 - carboxylic Acid (N-p-*Tolylanthranilic acid*, 2-p-*toluidinobenzoic acid*).

Needles from EtOH. M.p. 191–2° (196°). Sol. EtOH, Et_2O, C_6H_6. Heat ⟶ 4-methyldiphenylamine.

Höchster Farbewerke, D.R.P., 145,189, (*Chem. Zentr.*, 1903, II, 1097).
Ullmann, Bader, *Ann.*, 1907, **355**, 325.

4′-Methyldiphenyl-2-carboxylic Acid (2-p-*Tolylbenzoic acid*)

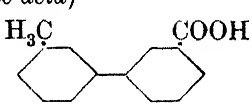


$C_{14}H_{12}O_2$ MW, 212

M.p. 179–80° (173°). Sol. hot EtOH. Insol. H_2O, cold EtOH.

Carnelly, *J. Chem. Soc.*, 1877, **32**, 655.

3′-Methyldiphenyl-3-carboxylic Acid (3-m-*Tolylbenzoic acid*)

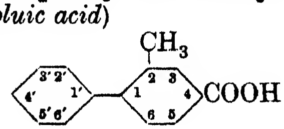


$C_{14}H_{12}O_2$ MW, 212

Needles from EtOH. M.p. 204°. Sol. Et_2O, $CHCl_3$. Spar. sol. H_2O.

Perrier, *Bull. soc. chim.*, 1892, **7**, 183.

2-Methyldiphenyl-4-carboxylic Acid (6-*Phenyl*-m-*toluic acid*)



$C_{14}H_{12}O_2$ MW, 212

Leaflets from pet. ether. M.p. 169–70°. Sol. MeOH, EtOH, AcOH. Spar. sol. Et_2O.

Me ester: $C_{15}H_{14}O_2$. MW, 226. Leaflets from MeOH. M.p. 61–3°.

Auwers, Jülicher, *Ber.*, 1922, **55**, 2183.

4′-Methyldiphenyl-4-carboxylic Acid (4-p-*Tolylbenzoic acid*).

M.p. 243–4° decomp. Sol. Et_2O. Spar. sol. H_2O, EtOH.

Carnelly, *J. Chem. Soc.*, 1877, **32**, 654.

***N*-Methyldiphenylformamidine**

$C_6H_5{\cdot}N{:}CH{\cdot}N(CH_3){\cdot}C_6H_5$

$C_{14}H_{14}N_2$ MW, 210

Bright yellow oil. B.p. 218–19°/26 mm. Sol. most org. solvents.

B,HCl: m.p. 228°.

B,HAuCl₄: m.p. 145°.

Wheeler, Johnson, *Am. Chem. J.*, 1898, **20**, 859.

***N*-Methyl-2 : 6-di-[β-phenylethyl]-piperidine.**

See Lobelan.

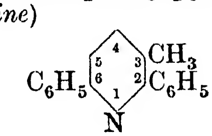
Methyldiphenylmethane.

See Phenyltolylmethane.

α-Methyldiphenylmethane.

See unsym.-Diphenylethane.

3-Methyl-2 : 6-diphenylpyridine (2 : 6-*Diphenyl*-β-*picoline*)



$C_{18}H_{15}N$ MW, 245

Yellow oil. B.p. 253–5°/25 mm.

B,HCl,2HgCl₂: needles from H_2O. M.p. 160°.

Scholtz, *Ber.*, 1899, **32**, 1939.

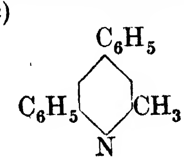
4-Methyl-2 : 6-diphenylpyridine (2 : 6-*Diphenyl*-γ-*picoline*).

Needles from ligroin. M.p. 72–3°. Weakly basic.

B,HNO₃: needles. M.p. 185°.

Dilthey, *J. prakt. Chem.*, 1916, **94**, 74.

2-Methyl-4 : 6-diphenylpyridine (4 : 6-*Diphenyl*-α-*picoline*)



$C_{18}H_{15}N$ MW, 245

Cryst. from ligroin. M.p. 73°.

B,HNO₃: needles from dil. HNO_3. M.p. 185°. Very sol. H_2O.

Gastaldi, *Gazz. chim. ital.*, 1922, **52**, i, 169.

Methyldiphenyl sulphide.
See Phenyl tolyl sulphide.
Methyldiphenyl sulphone.
See Phenyl tolyl sulphone.
Methyldipropenyl.
See 2-Methyl-2 : 4-hexadiene *and* 3-Methyl-2 : 4-hexadiene.
Methyldipropylacetic Acid.
See 1-Methyl-1-propyl-*n*-valeric Acid.
Methyldipropylamine

$$(CH_3{\cdot}CH_2{\cdot}CH_2)_2N{\cdot}CH_3$$

$C_7H_{17}N$ MW, 115

B.p. 117° (113–14°).
B,HCl: hygroscopic cryst.
B_2,H_2PtCl_6: orange-red cryst. M.p. above 200°.

v. Braun, *Ber.*, 1900, **33**, 1446.
Passon, *Ber.*, 1891, **24**, 1680.

Methyldipropylcarbinol (*4-Methylheptanol-4, 4-hydroxy-4-methylheptane*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 161·5°, 159–61°/755 mm., 61–3°/12 mm. D_4^{20} 0·82479. Heat of comb. C_p 1246·4 Cal. $CrO_3 \longrightarrow$ mainly acetic and propionic acids.
Acetyl: b.p. 174–6°/759·3 mm. D_0^0 0·8738, D_{20}^{20} 0·8588.

Gortalow, Saizew, *J. prakt. Chem.*, 1886, **33**, 203.
Halse, *J. prakt. Chem.*, 1914, **89**, 453.
Stadnikow, *Ber.*, 1914, **47**, 2137.

Methyldithiocarbamic Acid (*N-Methylaminodithioformic Acid*)

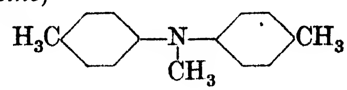
$$CH_3{\cdot}NH{\cdot}CSSH$$

$C_2H_5NS_2$ MW, 107

Free acid not isolated.
Me ester: $C_3H_7NS_2$. MW, 121. B.p. 155–6°/20 mm. Alc. NH_3 at 100° $\longrightarrow$ methyl mercaptan + methylthiourea.
Et ester: methyldithiourethane. $C_4H_9NS_2$. MW, 135. M.p. 30–2°. B.p. 103–4°/3 mm.
Methylamine salt: m.p. 114–15° decomp.

Freund, Asbrand, *Ann.*, 1895, **285**, 175.
Delépine, *Bull. soc. chim.*, 1908, **3**, 641.
Delépine, Schving, *Bull. soc. chim.*, 1910, **7**, 896.
Bodendorf, *J. prakt. Chem.*, 1930, **126**, 233.

Methyldithiourethane.
See under Methyldithiocarbamic Acid.
***N*-Methyl-4 : 4′-ditolylamine** (*Di-p-tolylmethylamine*)



$C_{15}H_{17}N$ MW, 211

B.p. 235–40°/20 mm. Does not form salts.

Girard, *Bull. soc. chim.*, 1875, **24**, 120.

1-Methyldivinyl.
See 1 : 3-Pentadiene.
2 - Methyldodecane - 1 : 12 - dicarboxylic Acid

$$HOOC{\cdot}[CH_2]_{10}{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2{\cdot}COOH$$

$C_{15}H_{28}O_4$ MW, 272

Cryst. from EtOH. M.p. 75·2°. B.p. 239–41°/4 mm. Sol. Et_2O, hot C_6H_6.
Dinitrile: $C_{15}H_{26}N_2$. MW, 234. B.p. 229–32°/16 mm. D^{15} 0·901.

Chuit *et al.*, *Helv. Chim. Acta*, 1927, **10**, 178.

4 - Methyldodecane - 1 : 12 - dicarboxylic Acid

$$HOOC{\cdot}[CH_2]_8{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}[CH_2]_3{\cdot}COOH$$

$C_{15}H_{28}O_4$ MW, 272

Cryst. from C_6H_6–pet. ether. M.p. 74–5°.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, **10**, 689.

Methyldodecanol.
See 2-Methyldodecyl Alcohol *and* Methylethylnonylcarbinol.
2-Methyldodecyl Alcohol (*2-Methyldodecanol-1*)

$$CH_3{\cdot}[CH_2]_9{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2OH$$

$C_{13}H_{28}O$ MW, 200

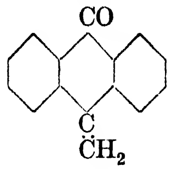
l-.
B.p. 105°/1·4 mm. $[\alpha]_D^{25}$ +2·34°.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 587.

Methylene acetate.
See Methylene diacetate.
Methyleneacetone.
See Methyl vinyl Ketone.
3-Methyleneallyl Alcohol.
See 4-Hydroxy-1 : 2-butadiene.

Methyleneaniline.
See Anhydroformaldehydeaniline.

Methylene-anthrone



$C_{15}H_{10}O$ MW, 206

Yellow prisms from ligroin. M.p. 148°. Sol. MeOH, AcOH, C_6H_6, $CHCl_3$.

Meyer, *Ann.*, 1920, **420**, 135.

Methylene benzoate.
See Methylene dibenzoate.

Methylene bromide (*Dibromomethane*)

CH_2Br_2

CH_2Br_2 MW, 174

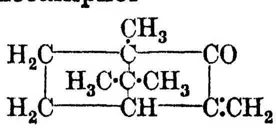
F.P. − 52·7°. B.p. 96·95°. D_4^{15} 2·80986, D_{15}^{15} 2·4985, D_{25}^{25} 2·47745. 100 gm. H_2O dissolve 1·173 gm. at 0°, 1·146 gm. at 10°, 1·148 gm. at 20°, 1·176 gm. at 30°. n_{He}^{15} 1·54463.

Perkin, *J. Chem. Soc.*, 1884, **45**, 520.
Hartman, Dreger, *Organic Syntheses*, 1929, IX, 56.

Methylene bromoiodide.
See Bromoiodomethane.

1-Methylenebutyric Acid.
See 1-Ethylacrylic Acid.

Methylenecamphor



$C_{11}H_{16}O$ MW, 164

Cryst. M.p. 43·5–44°. B.p. 218°. $[\alpha]_D$ + 127·5° in EtOH. Very sol. most org. solvents. Polymerises on repeated dist.

Rupe, Akermann, Takagi, *Helv. Chim. Acta*, 1918, **1**, 468.
Minguin, *Compt. rend.*, 1903, **136**, 752.

Methylene chloride (*Dichloromethane*)

CH_2Cl_2

CH_2Cl_2 MW, 85

F.P. − 96·8°. B.p. 39·95° (40—1°). D_4^{15} 1·33479. n_{He}^{15} 1·42721.

I.C.I., U.S.P., 1,918,624, (*Chem. Abstracts*, 1933, **27**, 4816).
Panizzon, *Helv. Chim. Acta*, 1932, **15**, 1191.
Thorpe, *J. Chem. Soc.*, 1880, **37**, 194.

Methylene chlorobromide.
See Chlorobromomethane.

Methylene cyanide.
See Malonitrile.

3-Methylene-1-decylene.
See Heptoprene.

Methylenediacetamide.
See Diacetylmethylenediamine.

Methylene diacetate (*Diacetoxymethane, methylene acetate*)

$CH_3·CO·O·CH_2·O·CO·CH_3$

$C_5H_8O_4$ MW, 132

B.p. 169–71°/745 mm., 62–4°/11 mm. D_{20}^{20} 1·136. Misc. in all proportions with Et_2O, EtOH. Spar. sol. H_2O.

Descude, *Ann. chim.*, 1902, **29**, 513.
Wegscheider, Späth, *Monatsh.*, 1915, **36**, 33.
Knoevenagel, *Ann.*, 1914, **402**, 127.

Methylenedianiline.
See Diphenylmethylenediamine.

Methylene dibenzoate (*Dibenzoyloxy-methane, methylene benzoate*)

$C_6H_5·CO·O·CH_2·O·CO·C_6H_5$

$C_{15}H_{12}O_4$ MW, 256

Prisms from Et_2O. M.p. 99°. B.p. 225° decomp. Sol. Et_2O, Me_2CO, C_6H_6, CCl_4. Spar. sol. EtOH, pet. ether. Insol. H_2O.

Wegscheider, Späth, *Monatsh.*, 1909, **30**, 859.

Methylene-dicotoin.
See Fortoin.

Methylene diethyl Ether.
See under Formaldehyde.

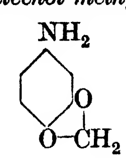
Methylene dimethyl Ether.
See Methylal.

Methylenedioxyacetanilide.
See under Methylenedioxyaniline.

3 : 4-Methylenedioxyacetophenone.
See Acetopiperone.

Methylenedioxy-allylbenzene.
See Safrol.

3 : 4-Methylenedioxyaniline (4-*Aminobenzdioxole*, 4-*aminocatechol methylene ether*)



$C_7H_7O_2N$ MW, 137

Needles from pet. ether. M.p. 44° (44–6°), B.p. 144°/16 mm. Sol. EtOH, Et_2O, $CHCl_3$.

C_6H_6. Spar. sol. pet. ether, cold H_2O. Volatile in steam with part. decomp.

B,HCl : m.p. 210° decomp.

B_2,H_2SO_4 : needles from H_2O or EtOH. M.p. 250° decomp.

N-*Acetyl* : 3 : 4-methylenedioxyacetanilide. Needles from H_2O. M.p. 135°. Sol. EtOH, Et_2O, C_6H_6.

Picrate : m.p. 192–5° decomp. after darkening at 188°.

Rupe, Majewski, *Ber.*, 1900, **33**, 3403.

Methylenedioxybenzaldehyde.
See Piperonal.

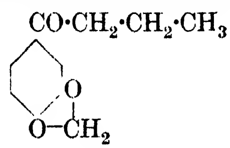
Methylenedioxybenzene.
See under Catechol.

Methylenedioxybenzoic Acid.
See Piperonylic Acid.

3 : 4-Methylenedioxybenzylacetone.
See Piperonylacetone.

3 : 4-Methylenedioxybenzyl Alcohol.
See Piperonyl Alcohol.

3 : 4-Methylenedioxybutrophenone



$C_{11}H_{12}O_3$ MW, 192

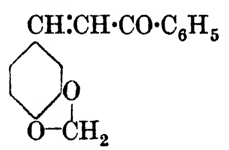
Cryst. from EtOH–pet. ether. M.p. 47°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. AcOH, ligroin.

Oxime : cryst. from EtOH. M.p. 75°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O.

Semicarbazone : needles from EtOH.Aq. M.p. 193–4°.

Mameli, Alagna, *Gazz. chim. ital.*, 1906, **36**, i, 137.

3 : 4-Methylenedioxychalkone (*ω-Piperonylideneacetophenone*)



$C_{16}H_{12}O_3$ MW, 252

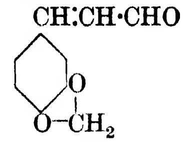
Yellow needles from EtOH. M.p. 122°. Sol. conc. $H_2SO_4 \longrightarrow$ orange-yellow sol.

Semicarbazone : m.p. 203–5°.

Picrate : orange needles. M.p. 126–8°.

v. Kostanecki, Schneider, *Ber.*, 1896, **29**, 1892.

3 : 4 - Methylenedioxycinnamaldehyde (*Piperonylidene-acetaldehyde*)



$C_{10}H_8O_3$ MW, 176

Cryst. from pet. ether. M.p. 84·5–85·5°. Sol. most org. solvents.

Oxime : exists in three forms. (i) Needles from C_6H_6. M.p. 195°. (ii) Plates from EtOH. M.p. 191°. (iii) Needles from C_6H_6. M.p. 155°.

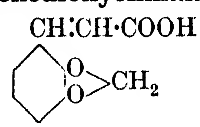
Semicarbazone : cryst. from Py. M.p. 234° (226°).

Phenylhydrazone : yellow needles from EtOH. M.p. 163–4° (160°).

Anil : yellow needles from EtOH. M.p. 118°.

Winzheimer, *Ber.*, 1908, **41**, 2380.
Angeli, Alessandri, Pegna, *Atti accad. Lincei*, 1910, **19**, 657.

2 : 3-Methylenedioxycinnamic Acid

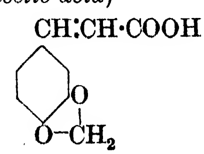


$C_{10}H_8O_4$ MW, 192

Prisms from MeOH.Aq. or AcOEt. M.p. 194°. Spar. sol. H_2O.

Perkin, Trikojus, *J. Chem. Soc.*, 1926, 2932.

3 : 4 - Methylenedioxycinnamic Acid (*Piperonylidene-acetic acid*)



$C_{10}H_8O_4$ MW, 192

(i) *High melting form.*

Needles from EtOH. M.p. 242°. Very sol. EtOH, Et_2O. Spar. sol. H_2O. $k = 2{\cdot}5 \times 10^{-5}$ at 25°.

Me ester : $C_{11}H_{10}O_4$. MW, 206. Plates from MeOH. M.p. 133–4°.

Et ester : $C_{12}H_{12}O_4$. MW, 220. Needles from EtOH. M.p. 67–8°. B.p. 190–2°/12 mm.

Amide : $C_{10}H_9O_3N$. MW, 191. Needles from EtOH. M.p. 180°. N-*Butyl* : cryst. from pet. ether–C_6H_6. M.p. 85–6°. N-sec.-*Butyl* : needles from EtOH. M.p. 161–2°. N-*Isobutyl* :

see Fagaramide. N-tert.-*Butyl*: yellow prisms from EtOH. M.p. 138–9°.

Anilide: plates from EtOH. M.p. 158°.

(ii) *Low melting form, allo-form.*

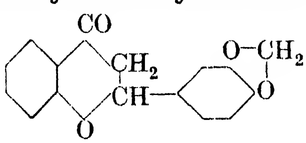
Cryst. from CS_2. M.p. 99–100°. Sol. to 5·9% in C_6H_6 at 18°. $k = 11{\cdot}0 \times 10^{-5}$ at 25°.

Aniline salt: cryst. from H_2O. M.p. 83·5–84°.

Amide: plates from Et_2O. M.p. 131°.

Thoms, Thümen, *Ber.*, 1911, **44**, 3721.
Roth, Stoermer, *Ber.*, 1913, **46**, 272.
Posner, *J. prakt. Chem.*, 1910, **82**, 434.

3′ : 4′-Methylenedioxyflavanone

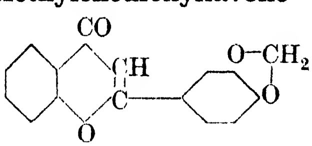


$C_{16}H_{12}O_4$ MW, 268

Needles from CS_2. M.p. 127–8°. Red sol. in conc. H_2SO_4.

Hattori, *Bull. Chem. Soc. Japan*, 1927, **2**, 171.
Ryan, Cruess-Callaghan, *Proceedings of the Royal Irish Academy*, 1929, **39**, 124.

3′ : 4′-Methylenedioxyflavone

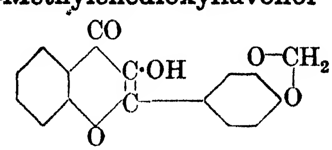


$C_{16}H_{10}O_4$ MW, 266

Faintly yellow needles from ligroin. M.p. 206° (200–1°). Spar. sol. EtOH. Yellow sol. in conc. H_2SO_4. No col. with $FeCl_3$.

See first reference above and also
Auwers, Anschütz, *Ber.*, 1921, **54**, 1558.

3′ : 4′-Methylenedioxyflavonol



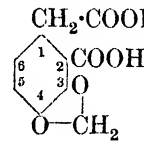
$C_{16}H_{10}O_5$ MW, 282

Pale yellow needles from EtOH. M.p. 214–15°. Reddish-brown sol. in conc. H_2SO_4. $FeCl_3 \longrightarrow$ brownish-violet col.

Me ether: $C_{17}H_{12}O_5$. MW, 296. Prisms from MeOH. M.p. 155°.

Hattori, *Bull. Chem. Soc. Japan*, 1927, **2**, 171.

3 : 4-Methylenedioxyhomophthalic Acid



$C_{10}H_8O_6$ MW, 224

Plates from H_2O. M.p. 203–4° decomp.

Anhydride: $C_{10}H_6O_5$. MW, 206. Plates from C_6H_6. M.p. 195°.

Haworth, Perkin, Stevens, *J. Chem. Soc.*, 1926, 1769.

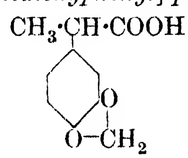
4 : 5-Methylenedioxyhomophthalic Acid.

Needles from H_2O. M.p. 236° decomp.

Perkin, Robinson, *J. Chem. Soc.*, 1907, **91**, 1086.

3 : 4-Methylenedioxyhydratropic Acid

(α-[3 : 4-*Methylenedioxyphenyl*]-*propionic acid*)



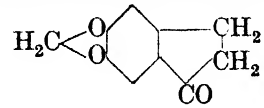
$C_{10}H_{10}O_4$ MW, 194

Needles from H_2O. M.p. 80°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. pet. ether, cold H_2O.

Amide: $C_{10}H_{11}O_3N$. MW, 193. Cryst. from H_2O. M.p. 124°.

Hoering, *Ber.*, 1908, **41**, 3082.
Bougault, *Bull. soc. chim.*, 1901, **25**, 857.

5 : 6-Methylenedioxyhydrindone-1



$C_{10}H_8O_3$ MW, 176

Leaflets from EtOH. M.p. 161°. Sol. EtOH, AcOH, AcOEt, boiling C_6H_6. Spar. sol. pet. ether. Sol. conc. H_2SO_4 with cherry-red col. Dil. $HNO_3 \longrightarrow$ hydrastic acid.

Oxime: prisms from MeOH. Decomp. about 246°.

Semicarbazone: m.p. 253°. Prac. insol. EtOH.

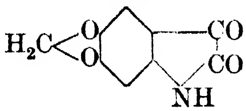
Isonitroso deriv.: yellow needles from EtOH. Decomp. about 230°.

2-*Benzylidene*: yellow prisms from EtOH. M.p. 200°.

Perkin, Robinson, *J. Chem. Soc.*, 1907, **91**, 1084.
Borsche, Eberlein, *Ber.*, 1914, **47**, 1469.

3 : 4 - Methylenedioxyhydrocinnamic Acid.
See Piperonylacetic Acid.

5 : 6-Methylenedioxyisatin



$C_9H_5O_4N$ MW, 191

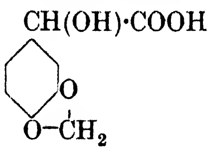
Crimson needles from H_2O. M.p. 284° decomp. Sol. AcOH. Mod. sol. H_2O, EtOH. Sol. conc. H_2SO_4 with blue col. ⟶ red on addition of H_2O.

Gulland, Robinson, Scott, Thornley, *J. Chem. Soc.*, 1929, 2931.

Methylenedioxyisopropyl Alcohol.
See 1 : 3-Methylene-glycerol.

3 : 4 - Methylenedioxy - 1 - γ - ketobutyl-benzene.
See Piperonylacetone.

3 : 4-Methylenedioxymandelic Acid (*α-Hydroxyhomopiperonylic acid*)



$C_9H_8O_5$ MW, 196

Plates from EtOH.Aq. M.p. 162° (156°). Sol. H_2O, Et_2O. Spar. sol. C_6H_6. Sol. conc. H_2SO_4 with violet col.

Et ester: $C_{11}H_{12}O_5$. MW, 224. Needles from xylene. M.p. 72°. B.p. 197°/15 mm., 179–81°/8 mm.

Amide: $C_9H_9O_4N$. MW, 195. Plates from EtOH–AcOEt. M.p. 140°. Sol. H_2O. O-*Acetyl*: rods from EtOH. M.p. 143°.

Nitrile: piperonal cyanhydrin. $C_9H_7O_3N$. MW, 177. Liq. O-*Acetyl*: plates from EtOH. M.p. 71°. Sol. C_6H_6. Insol. ligroin. O-*Benzoyl*: cryst. from EtOH. M.p. 57°.

Acetyl: prisms from H_2O or EtOH. M.p. 161°.

Anilide: needles. M.p. 114°. O-*Benzoyl*: cryst. from C_6H_6. M.p. 160°.

Barger, Ewins, *J. Chem. Soc.*, 1909, **95**, 554.
Albert, *Ber.*, 1916, **49**, 1384.
Passerini, *Gazz. chim. ital.*, 1924, **54**, 538.

4 : 5-Methylenedioxy-2-β-methylamino-ethylbenzaldehyde.
See Hydrastinine.

3 : 4 - [Methylenedioxy - 6 - methylcarb - amyl]-benzoylformic Acid.
See Hydrastininic Acid.

6 : 7 -Methylenedioxy-2-methylnaphthalene.
See Podophyllomerol.

6 : 7 - Methylenedioxy - *N* - methyltetra - hydroisoquinoline.
See Hydrohydrastinine.

3 : 4-Methylenedioxyphenylacetaldehyde.
See Homopiperonal.

3 : 4-Methylenedioxyphenylacetic Acid.
See Homopiperonylic Acid.

Methylenedioxyphenylbutadiene - carb - oxylic Acid.
See Piperic Acid *and* Isopiperic Acid.

Methylenedioxyphenylbutylene - carb - oxylic Acid.
See Hydropiperic Acid.

2 - [3 : 4 - Methylenedioxyphenylethyl] - acrylic Acid.
See β-Hydropiperic Acid.

2-[3 : 4 - Methylenedioxyphenyl] - ethyl Alcohol.
See Homopiperonyl Alcohol.

2-[3 : 4 - Methylenedioxyphenyl] - ethyl - amine.
See Homopiperonylamine.

3 : 4 - Methylenedioxyphenylethylidene - propionic Acid.
See α-Hydropiperic Acid.

3 : 4 - Methylenedioxyphenylpropenyl - acetic Acid.
See α-Hydropiperic Acid.

Methylenedioxyphenylvinylacrylic Acid.
See Piperic Acid *and* Isopiperic Acid.

4 : 5-Methylenedioxyphthalic Acid.
See Hydrastic Acid.

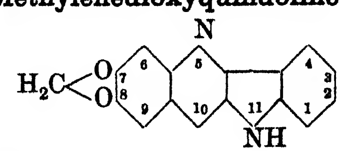
4 : 5-Methylenedioxyphthalimide.
See under Hydrastic Acid.

Methylenedioxy-propenylbenzene.
See Isosafrol.

3 : 4-Methylenedioxypropiophenone.
See Propiopiperone.

Methylenedioxypropyl Alcohol.
See 1 : 2-Methylene-glycerol.

7 : 8-Methylenedioxyquindoline



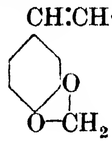
$C_{16}H_{10}O_2N_2$ MW, 262

Yellow prisms from Py. M.p. 280°. Readily sol. hot Py, hot $PhNO_2$. Mod. sol. hot EtOH, toluene. Spar. sol. C_6H_6, pet. ether. Alc. sol.

shows violet fluor. Sol. conc. H_2SO_4 to yellow sol. with blue fluor.

Gulland, Robinson, Scott, Thornley, *J. Chem. Soc.*, 1929, 2935.

3 : 4-Methylenedioxystilbene

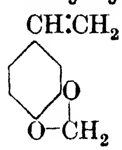


$C_{15}H_{12}O_2$ MW, 224

Needles from EtOH. M.p. 95–6°.

Dey, Row, *Quart. J. Indian Chem. Soc.*, 1925, **1**, 286.

3 : 4-Methylenedioxystyrene



$C_9H_8O_2$ MW, 148

Oil. B.p. 223–5°, 108–9°/20–2 mm., 107–8°/15 mm. D_4^{18} 1·1488. n_D 1·5802. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Volatile in steam.

Böttcher, *Ber.*, 1909, **42**, 256.
Pauly, Neukam, *Ber.*, 1908, **41**, 4155.

Methylenediphenyldiamine.
See Diphenylmethylenediamine.

2-Methylene-1 : 2-diphenyl-lactic Acid.
See 1-Hydroxy-1 : 2-diphenylvinylacetic Acid.

Methylenediurethane (*Dicarbethoxymethylenediamine*)

$CH_2(NH{\cdot}CO{\cdot}OC_2H_5)_2$

$C_7H_{14}O_4N_2$ MW, 190

Cryst. from EtOH or C_6H_6. M.p. 131°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

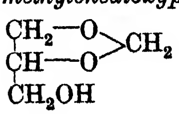
Conrad, Hock, *Ber.*, 1903, **36**, 2206.

1-Methylene-4-ethylidene-2-butylene.
See 1 : 3 : 5-Heptatriene.

Methylene fluorobromide.
See Fluorobromomethane.

1-Methyleneglutaric Acid.
See 1-Butylene-2 : 4-dicarboxylic Acid.

1 : 2-Methylene-glycerol (*Glycerol* 1 : 2-*methylene ether, methylenedioxypropyl alcohol*)



$C_4H_8O_3$ MW, 104

B.p. 195°, 104°/28 mm., 84–5°/11 mm. D_4^{20} 1·2113. n_D^{20} 1·4477.

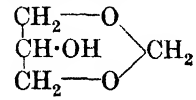
Me ether: $C_5H_{10}O_3$. MW, 118. Mobile liq. B.p. 147°. D_4^{20} 1·0788. n_D^{20} 1·4213.

Benzoyl: prisms. M.p. 26°. B.p. 172–5°/15 mm. n_D^{25} 1·5184.

Phenylurethane: m.p. 72°.

Hibbert, Carter, *J. Am. Chem. Soc.*, 1928, **50**, 3120.
van Roon, *Rec. trav. chim.*, 1929, **48**, 186.

1 : 3-Methylene-glycerol (*Glycerol* 1 : 3-*methylene ether, methylenedioxyisopropyl alcohol*)



$C_4H_8O_3$ MW, 104

Slightly viscous, hygroscopic liq. B.p. 191°, 100°/28 mm., 82°/11 mm. D_4^{20} 1·2256. n_D^{20} 1·4533.

Me ether: b.p. 152°. n_D^{20} 1·4295.

Benzoyl: needles. M.p. 74·6° (72°).

Phenylurethane: needles from EtOH. M.p. 133°.

See above references.

Methylene iodide (*Di-iodomethane*)

CH_2I_2

CH_2I_2 MW, 268

M.p. 6°. B.p. 181° part. decomp., 106–7°/70 mm., 66–70°/11–12 mm. $D_{12\cdot2}^{12\cdot2}$ 3·3394, D_{15}^{15} 3·3326. $n_D^{10\cdot5}$ 1·7559. 100 gm. H_2O dissolve 1·565 gm. at 0°, 1·446 gm. at 10°, 1·419 gm. at 20°, 1·420 gm. at 30°.

Adams, Marvel, *Organic Syntheses*, Collective Vol. I., 350.
Perkin, *J. Chem. Soc.*, 1896, **69**, 1173.

Methylenemalonic Acid (*Ethylene*-1 : 1-*dicarboxylic acid*)

$CH_2{:}C{<}{}^{COOH}_{COOH}$

$C_4H_4O_4$ MW, 116

Does not exist in free state.

Di-Me ester: $C_6H_8O_4$. MW, 144. B.p. 200–3°. Polymerises readily.

Di-Et ester: $C_8H_{12}O_4$. MW, 172. B.p. 208–10°. Polymerises readily to hard mass, sintering at 225°, decomp. at 240–50° (meta polymer). A further polymer (para) has m.p. 154–6°. Sol. hot AcOH. Spar. sol. EtOH, Et_2O, pet. ether, C_6H_6. Insol. H_2O.

Haworth, Perkin, *J. Chem. Soc.*, 1898, **73**, 341.
Meerwein, Schurmann, *Ann.*, 1913, **398**, 214.

Methylene β-propylene dioxide.
See 1 : 3-Dioxan.
1-Methylene-3-propylidene-propane.
See 1 : 4-Heptadiene.
Methylene-succinic Acid.
See Itaconic Acid.
Methylene sulphate

$$CH_2{<}\genfrac{}{}{0pt}{}{O}{O}{>}SO_2$$

CH_2O_4S MW, 110

White amorph. powder. M.p. about 155° decomp. Sol. Me_2CO. Insol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6.

Délepine, *Compt. rend.*, 1899, **129**, 831.

Methyleneurea (*Carbonylmethylenediamine*)

$$CO{<}\genfrac{}{}{0pt}{}{NH}{NH}{>}CH_2$$

$C_2H_4ON_2$ MW, 72

Very difficultly sol. powder. M.p. above 230°. Hyd. by min. acids.

Dixon, Taylor, *J. Chem. Soc.*, 1916, **109**, 1254.

***N*-Methylephedrine** (*α-Hydroxy-β-dimethylaminopropylbenzene*)

$$C_6H_5\cdot CH(OH)\cdot \overset{CH_3}{CH}\cdot N(CH_3)_2$$

$C_{11}H_{17}ON$ MW, 179

l-.

Needles from MeOH. M.p. 87–8°. $[\alpha]_D$ − 29·2° in MeOH.

B,HCl: tablets from EtOH. M.p. 188–9°. $[\alpha]_D$ − 29·8° in H_2O. Sol. H_2O, EtOH. Spar. sol. Me_2CO.

Methiodide: tablets from EtOH. M.p. 212–13°. $[\alpha]_D$ − 21·8°.

Picrate: cryst. from EtOH. M.p. 144°.

Smith, *J. Chem. Soc.*, 1927, 2056.

***N*-Methyl-ψ-ephedrine** (*α-Hydroxy-β-dimethylaminopropylbenzene*)

$$C_6H_5\cdot CH(OH)\cdot \overset{CH_3}{CH}\cdot N(CH_3)_2$$

$C_{11}H_{17}ON$ MW, 179

d-.

Cryst. from pet. ether. M.p. 30°. $[\alpha]_D$ + 48·1°. Readily sol. most org. solvents. Spar. sol. H_2O.

Methiodide: cryst. from EtOH. M.p. 216–17°.

Picrate: cryst. from EtOH. M.p. 152–3°.

See previous reference.

2-Methylerythrene.
See Isoprene.
***N*-Methylethanolamine.**
See 2-Methylaminoethyl Alcohol.
Methyl Ether.
See Dimethyl Ether.
Methyl-2-ethoxyethyl-amine.
See 2-Methylaminodiethyl Ether.
Methyl ethoxyphenyl Ketone.
See under Hydroxyacetophenone.
Methylethylacetic Acid.
See 1-Methylbutyric Acid.

1-Methyl-1-ethylacetoacetic Acid (*1-Methyl-1-acetobutyric acid*)

$$CH_3\cdot CO\cdot \overset{C_2H_5}{\underset{CH_3}{C}}\cdot COOH$$

$C_7H_{12}O_3$ MW, 144

Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 198°, 85°/12 mm. $D_4^{17\cdot8}$ 0·9734. $n_D^{17\cdot7}$ 1·426. *Semicarbazone*: cryst. M.p. 122°.

Amide: $C_7H_{13}O_2N$. MW, 143. Cryst. from H_2O. M.p. 123–4°. Sol. Et_2O, $CHCl_3$.

James, *Ann.*, 1884, **226**, 209.
Meyer, *Monatsh.*, 1906, **27**, 1086.
Auwers, *Ber.*, 1913, **46**, 506.

Methylethylacetylene.
See 2-Pentine.

1-Methyl-2-ethylacrolein (*1-Methyl-1-pentenal, 2-propylidenepropionaldehyde*)

$$CH_3\cdot CH_2\cdot CH{:}\overset{CH_3}{C}\cdot CHO$$

$C_6H_{10}O$ MW, 98

B.p. 134–6°/745 mm. D_4^{25} 0·8544. n_D 1·44647.

Oxime: plates from ligroin. M.p. 48–9°. B.p. 193–4°.

Phenylhydrazone: cryst. M.p. 60°. B.p. 171–5°/10·5 mm.

2 : 4-*Dinitrophenylhydrazone*: carmine cryst. M.p. 159°.

Azine: cryst. M.p. 54–5°. B.p. 150°/20 mm.

Grignard, Abelmann, *Bull. soc. chim.*, 1910, **7**, 642.
Auwers, Kreuder, *Ber.*, 1925, **58**, 1979.
Ssolonina, *J. Russ. Phys.-Chem. Soc.*, 1887, **19**, 309.

2-Methyl-1-ethylacrylic Acid.
See 1-Ethylcrotonic Acid.

1-Methyl-2-ethylacrylic Acid (*β-Amylene β-carboxylic acid, 2-pentene-2-carboxylic acid, 2-*

propylidenepropionic acid, 1-*methyl*-1-*pentenic acid*, 1-*methyl*-1-*butylene*-1-*carboxylic acid*)

$$CH_3\cdot CH_2\cdot CH{:}\overset{CH_3}{C}\cdot COOH$$

$C_6H_{10}O_2$ MW, 114

Prisms. M.p. 24·4° (22–3°). B.p. 213°/750 mm., 112°/12 mm. Sol. Et_2O, $CHCl_3$, CS_2. Spar. sol. H_2O. D_{25}^{25} 0·9812. $k = 1{\cdot}11 \times 10^{-5}$ at 25°. Volatile in steam.

Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 167–8°.

Chloride: C_6H_9OCl. MW, 132·5. B.p. 63°/16 mm.

Amide: $C_6H_{11}ON$. MW, 113. Plates from C_6H_6. M.p. 80°.

Anilide: needles from C_6H_6–pet. ether. M.p. 84°. *Dibromide*: prisms from CS_2. M.p. 96–7°.

Lieben, Zeisel, *Monatsh.*, 1883, **4**, 46.
Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 829.
Goldberg, Linstead, *J. Chem. Soc.*, 1928, 2355.

2-Methyl-2-ethylacrylic Acid (2-*Methyl*-1-*pentenic acid*, 2-*methyl*-1-*butylene*-1-*carboxylic acid*, 2-*ethylcrotonic acid*)

$$CH_3\cdot CH_2\cdot\overset{CH_3}{C}{:}CH\cdot COOH$$

$C_6H_{10}O_2$ MW, 114

Trans:

Needles from pet. ether. M.p. 48–9°. B.p. 121–2°/22 mm. Spar. sol. H_2O. $k = 0{\cdot}74 \times 10^{-5}$ at 25°. Alk. $KMnO_4$ ⟶ methyl ethyl ketone.

Et ester: $C_8H_{14}O_2$. MW, 142. B.p. 67°/24 mm. $D_4^{17\cdot9}$ 0·91413. $n_D^{17\cdot9}$ 1·44110.

Chloride: C_6H_9OCl. MW, 132·5. B.p. 85–6°/20 mm.

Amide: $C_6H_{11}ON$. MW, 113. M.p. 98–9° (94–94·5°).

Nitrile: C_6H_9N. MW, 95. B.p. 162–162·5°/752 mm. D_4^{20} 0·83886. n_D^{20} 1·44454.

p-*Toluidide*: $C_{13}H_{17}ON$. MW, 203. Needles from C_6H_6-pet. ether. M.p. 66–7°.

Cis:

M.p. 12°. B.p. 96°/5 mm. D_4^{20} 0·9830. n_D 1·4650. $k = 0{\cdot}71 \times 10^{-5}$ at 25°.

Amide: m.p. 116–116·8°.

Nitrile: b.p. 142–3°/765 mm. D_4^{20} 0·82196. n_D^{20} 1·42363.

Bruylants, *Chem. Abstracts*, 1932, **26**, 1576.
Kon, Linstead, Wright, *J. Chem. Soc.*, 1934, 602.

1-Methyl-4-ethyladipic Acid (*Heptane*-2:5-*dicarboxylic acid*)

$CH_3\cdot CH\cdot COOH$
CH_2
CH_2
$C_2H_5\cdot CH\cdot COOH$

$C_9H_{16}O_4$ MW, 188

M.p. 58–70°. B.p. 176–8°/0·7 mm. Dist. with $FeSO_4$ ⟶ 3-methyl-4-ethylcyclopentanone.

Dinitrile: 2 : 5-dicyanoheptane. $C_9H_{14}N_2$. MW, 150. B.p. 164–6°/13 mm.

v. Braun, Keller, Weissbach, *Ann.*, 1931, **490**, 183.

2-Methyl-3-ethyladipic Acid (2-*Methyl*-3-*ethylbutane*-1 : 4-*dicarboxylic acid*)

$CH_2\cdot COOH$
$CH_3\cdot CH$
$C_2H_5\cdot CH$
$CH_2\cdot COOH$

$C_9H_{16}O_4$ MW, 188

Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 136–7°/15 mm. n_D^{17} 1·4290.

Cornubert, Borrel, *Bull. soc. chim.*, 1930, **47**, 301.

2-Methyl-4-ethyladipic Acid (2-*Methylhexane*-1 : 4-*dicarboxylic acid*)

$CH_2\cdot COOH$
$CH_3\cdot CH$
CH_2
$C_2H_5\cdot CH\cdot COOH$

$C_9H_{16}O_4$ MW, 188

M.p. 97–8°. $[\alpha]_D$ + 13·31° in EtOH.

Haller, Desfontaines, *Compt. rend.*, 1905, **140**, 1208.

Methylethylallylamine

$$CH_3\cdot CH_2\cdot\overset{CH_3}{N}\cdot CH_2\cdot CH{:}CH_2$$

$C_6H_{13}N$ MW, 99

B.p. 88–9°/762 mm.

Picrate: pale yellow needles. M.p. 90°.

Meisenheimer, Lohsner, *Ann.*, 1922, **428**, 270.

Methylethylallylcarbinol.

See 4-Methyl-1-hexenol-4.

Methylethylamine

$$CH_3\cdot CH_2\cdot NH\cdot CH_3$$

C_3H_9N MW, 59

B.p. 35° (36–7°).

B,HCl: plates from EtOH–Et_2O. M.p. 126–30°. Very sol. H_2O, EtOH. Sol. $CHCl_3$. Insol. Et_2O.

B,HBr: plates from EtOH. M.p. 85–8°.

B,HI: needles from EtOH. M.p. 67°.

Aurichloride: needles. M.p. 179–80°.

Platinichloride: prisms. M.p. 207–8°.

Picrate: yellow needles from EtOH. M.p. 196°.

Meisenheimer, Bernhard, Lohsner, *Ann.*, 1922, **428**, 256.
Graymore, *J. Chem. Soc.*, 1931, 1493.
Skraup, Wiegmann, *Monatsh.*, 1889, **10**, 107.

2-Methyl-2-ethyl-n-amyl Alcohol (*2-Methyl-2-ethylpentanol*-1)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_2\cdot CH_3}{\underset{CH_3}{C}}{\cdot}CH_2OH$$

$C_8H_{18}O$ MW, 130

B.p. 75·5–76°. n_D^{20} 1·4353.

Whitmore, Badertscher, *J. Am. Chem. Soc.*, 1933, **55**, 1565.

Methylethyl-n-amylcarbinol (*3-Methyloctanol*-3)

$$CH_3{\cdot}[CH_2]_4{\cdot}\overset{CH_3}{C}(OH){\cdot}CH_2{\cdot}CH_3$$

$C_9H_{20}O$ MW, 144

dl-.

B.p. 97·5°/50 mm., 80–1°/15 mm., 36–7°/3 mm. D_4^{25} 0·8258. n_D^{25} 1·4257, n_D^{20} 1·4315.

Davies, Dixon, Jones, *J. Chem. Soc.*, 1930, 460.
Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, **55**, 408.
Green, *J. Am. Chem. Soc.*, 1934, **56**, 1167.

Methylethyl-active-amylcarbinol.

3 : 5-Dimethylheptanol-3, *q.v.*

Methylethylaniline

$$C_6H_5{\cdot}N{<}^{CH_3}_{C_2H_5}$$

$C_9H_{13}N$ MW, 135

B.p. 201°. D_4^{55} 0·9193.

B,HCl: m.p. 114°.

B,HI: plates from EtOH. Sol. H_2O. Sublimes.

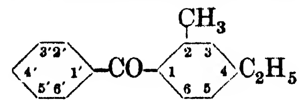
Picrate: yellowish-green prisms. M.p. 134–5°. Sol. EtOH, Et_2O, C_6H_6.

Claus, Howitz, *Ber.*, 1884, **17**, 1325.

Methylethylbenzene.

See Ethyltoluene.

2-Methyl-4-ethylbenzophenone



$C_{16}H_{16}O$ MW, 224

B.p. 318–20°.

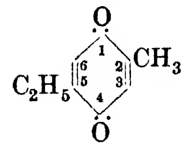
Mailhe, *Bull. soc. chim.*, 1924, **35**, 367.

4-Methyl-4′-ethylbenzophenone.

B.p. 215°/10 mm.

Bailar, *J. Am. Chem. Soc.*, 1930, **52**, 3600.

2-Methyl-5-ethyl-p-benzoquinone



$C_9H_{10}O_2$ MW, 150

Golden-yellow plates or needles. M.p. 55·3°. Sol. EtOH. Spar. sol. cold H_2O. Volatile in steam.

Bayrac, *Bull. soc. chim.*, 1895, **13**, 898.

2-Methyl-6-ethyl-p-benzoquinone.

Yellow needles from pet. ether. M.p. 40–1°. Sol. most org. solvents.

Jones, Kenner, *J. Chem. Soc.*, 1931, 1853.

Methylethylbenzylamine

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{N}{\cdot}CH_2{\cdot}C_6H_5$$

$C_{10}H_{15}N$ MW, 149

B.p. 85–7°/10 mm.

Picrate: pale yellow needles from EtOH. M.p. 113°.

Meisenheimer, Lohsner, *Ann.*, 1922, **428**, 280.

Methylethylbenzylcarbinol (*α-Hydroxy-α-methylbutylbenzene*, *2-hydroxy-1-phenyliso-pentane*, *2-methyl-1-phenylbutanol-2*, *2-methyl-1-phenyl-*sec.-n-*butyl alcohol*)

$$C_6H_5{\cdot}CH_2{\cdot}\overset{CH_3}{C}(OH){\cdot}CH_2{\cdot}CH_3$$

$C_{11}H_{16}O$ MW, 164

B.p. 235–8° slight decomp., 215–25°/747 mm. (with loss of H_2O). D_0^0 0·9927, D_0^{20} 0·9754. n_D^{20} 1·51817.

Konowalow, *J. Russ. Phys.-Chem. Soc.*, 1904, **36**, 229, (*Chem. Zentr.*, 1904, I, 1496).
Davies, Kipping, *J. Chem. Soc.*, 1911, **99**, 298.

2-Methyl-3-ethylbutane-1 : 4-dicarboxylic Acid.
See 2-Methyl-3-ethyladipic Acid.

Methylethylbutylcarbinol (3 - *Methyl - heptanol*-3)

$$CH_3\cdot[CH_2]_3\cdot C(CH_3)(OH)\cdot CH_2\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 163·5°, 158°/745 mm., 64–5°/16 mm. D_4^0 0·8446, D_4^{15} 0·8273. n_D^{19} 1·42735.

Allophanate: m.p. 130°. Spar. sol. EtOH, Et_2O.

v. Rissegehm, *Bull. soc. chim. Belg.*, 1930, **39**, 369.

Methylethyl-*tert*.-butylcarbinol (2 : 2 : 3-*Trimethylpentanol*-3)

$$(CH_3)_3C\cdot C(CH_3)(OH)\cdot CH_2\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 149–52°/760 mm. Misc. with most org. solvents. Insol. H_2O.

Clarke, Jones, *J. Am. Chem. Soc.*, 1912, **34**, 173.

Methylethyl-β-butylene Glycol.
See 2-Methylhexandiol-2 : 4 *and* 3-Methylhexandiol-2 : 4.

3-Methyl-3-ethylbutyric Acid.
See active-Amylacetic Acid.

3-Methyl-1-ethylcaproic Acid (3-*Methylheptane-5-carboxylic acid*)

$$CH_3\cdot CH_2\cdot CH(CH_3)\cdot CH_2\cdot CH(C_2H_5)\cdot COOH$$

$C_9H_{18}O_2$ MW, 158

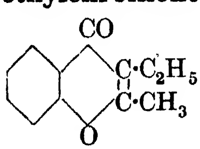
B.p. 230–2°. D_{25}^{25} 0·9087. n_D^{25} 1·43015.

Et ester: $C_{11}H_{22}O_2$. MW, 186. B.p. 197–8°. D_{25}^{25} 0·8671. n_D^{25} 1·41885.

Cope, McElvain, *J. Am. Chem. Soc.*, 1932, **54**, 4323.

Methylethylcarbinol.
See sec.-n-Butyl Alcohol.

2-Methyl-3-ethylchromone

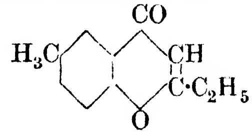


$C_{12}H_{12}O_2$ MW, 188

Plates from EtOH.Aq. M.p. 90°. Sol. 25% HCl. Insol. H_2O. Dil. NaOH ⟶ salicylic acid + diethyl ketone.

Simonis, Lehmann, *Ber.*, 1914, **47**, 696.

6-Methyl-2-ethylchromone



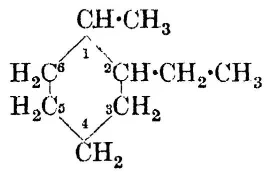
$C_{12}H_{12}O_2$ MW, 188

Prisms from pet. ether. M.p. 51°. Sol. conc. H_2SO_4 with weak blue fluor.

Baker, *J. Chem. Soc.*, 1933, 1389.

3-Methyl-3-ethylcrotonic Acid.
See 3-Methyl-1-hexenic Acid.

1-Methyl-2-ethylcyclohexane (*Hexahydro-o-ethyltoluene*)



C_9H_{18} MW, 126

B.p. 150–2°. D^{20} 0·784. n_D^{20} 1·432. Misc. with most org. solvents. Insol. H_2O.

Kipping, Perkin, *J. Chem. Soc.*, 1890, **57**, 25.

Murat, *Ann. chim.*, 1909, **16**, 117.

1-Methyl-3-ethylcyclohexane (*Hexahydro-m-ethyltoluene*).

l-.

B.p. 148–9°/743 mm. D_4^{17} 0·7896. n_D^{17} 1·4353. $[\alpha]_D$ − 2·9°.

dl-.

B.p. 145–6°. D^0 0·8320, D^{20} 0·8123. n_D 1·460.

Zelinsky, *Ber.*, 1902, **35**, 2680.

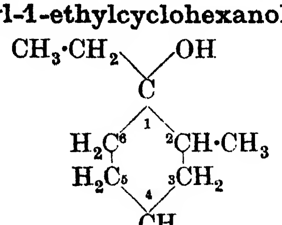
Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1084.

1-Methyl-4-ethylcyclohexane (*Hexahydro-p-ethyltoluen e*).

Liq. with fennel-like odour. B.p. 147°. D_4^0 0·8041, D_4^{15} 0·7884. n_D^{15} 1·435.

Sabatier, Mailhe, *Compt. rend.*, 1906, **142**, 439.

2-Methyl-1-ethylcyclohexanol



$C_9H_{18}O$ MW, 142

Liq. with odour resembling camphor. B.p. 181–2°/745 mm. D^{20} 0·9235. n_D^{20} 1·458.
Acetyl: b.p. 196–8°. D^0 0·946.

Murat, *Ann. chim. phys.*, 1909, **16**, 116.

3-Methyl-1-ethylcyclohexanol.

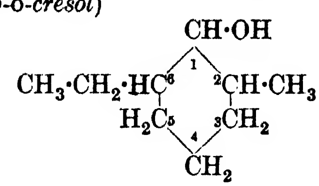
d-.
B.p. 80–1°/16 mm. D_4^{26} 0·8995. n_D^{26} 1·4545. $[\alpha]_D$ + 1·48°.
l-.
B.p. 75·5–76·5°/13 mm. D_4^{20} 0·9098. $[\alpha]_D^{20}$ − 2·68°.
i-.
B.p. 88°/20 mm. D^{20} 0·9013. n_D 1·459.
Acetyl: b.p. 98–100°/20 mm. D^{20} 0·9303. n_D 1·441.
Phenylurethane: prisms from EtOH. M.p. 98°.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1083.
Zelinsky, *Ber.*, 1901, **34**, 2881.
Rupe, Kambli, *Ann.*, 1927, **459**, 209.

4-Methyl-1-ethylcyclohexanol.
B.p. 89°/20 mm. D_4^{16} 0·9130. n_D^{16} 1·460.
Acetyl: b.p. 197°.
Phenylurethane: needles. M.p. 123°.

Sabatier, Mailhe, *Ann. chim. phys.*, 1907, **10**, 559.

2-Methyl-6-ethylcyclohexanol (3-*Ethylhexahydro-o-cresol*)



$C_9H_{18}O$ MW, 142

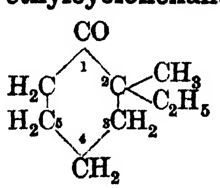
B.p. 202–4°. D_4^{20} 0·9268. n_D^{20} 1·4689.

Haller, *Compt. rend.*, 1913, **157**, 183.

3-Methyl-6-ethylcyclohexanol (4-*Ethylhexahydro-m-cresol*).
B.p. 85–7°/11 mm.

Haller, *Compt. rend.*, 1905, **140**, 129.

2-Methyl-2-ethylcyclohexanone



$C_9H_{16}O$ MW, 140

B.p. 194–6°/760 mm. D_4^{17} 0·9037. n_D^{17} 1·4515.
Benzylidene: m.p. 78–78·5°. B.p. 193–4°/16 mm.

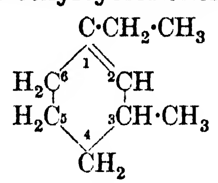
Haller, Cornubert, *Bull. soc. chim.*, 1927, **41**, 380.

5-Methyl-2-ethylcyclohexanone.

d-.
B.p. 83–4°/18 mm. D_4^{15} 0·9016. $[\alpha]_D$ + 8° 32′.
Semicarbazone: m.p. 152–4°.
dl-.
B.p. 197°. D^{20} 0·9000. n_D 1·4485.
Oxime: cryst. from EtOH.Aq. M.p. 80°.
Semicarbazone: m.p. 178–81°.

Wallach, *Ann.*, 1913, **397**, 206.
Haller, *Compt. rend.*, 1905, **140**, 128.

3-Methyl-1-ethylcyclohexene



C_9H_{16} MW, 124

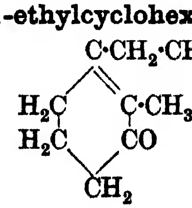
d-.
B.p. 148–9°/743 mm. D_4^{19} 0·8154. n_D^{19} 1·4538. $[\alpha]_D$ + 56·8°.
dl-.
B.p. 149–51°. D^0 0·8366, D^{20} 0·8296. n_D 1·454.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1084.
Zelinsky, Zelikow, *Ber.*, 1901, **34**, 3255.

4-Methyl-1-ethylcyclohexene.
B.p. 149° (153–4°). D_4^0 0·8278, D_4^{16} 0·8169. n_D^{16} 1·453.
Nitrosochloride: exists in two forms. (i) Prisms from Et_2O. M.p. 103–4°. (ii) Cryst. from Et_2O. M.p. 98–9°. (i) is more sol. Me_2CO and ligroin than (ii).

Sabatier, Mailhe, *Compt. rend.*, 1906, **142**, 439.
Wallach, *Ann.*, 1913, **396**, 282.

2-Methyl-1-ethylcyclohexenone-3

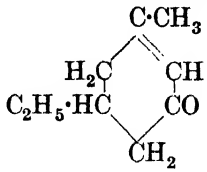


$C_9H_{14}O$ MW, 138

B.p. 105°/19 mm.
Semicarbazone : needles. M.p. 250°.

Blaise, *Compt. rend.*, 1921, **173**, 313.

1-Methyl-5-ethylcyclohexenone-3

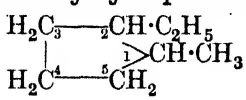


$C_9H_{14}O$ MW, 138

B.p. 223–7°/755 mm., 102°/14 mm.
Semicarbazone : plates from EtOH. M.p. 162–8° decomp.
Thiosemicarbazone : m.p. 150–1°.

Mazurewitsch, *J. Russ. Phys.-Chem. Soc.*, 1911, **43**, 982.

1-Methyl-2-ethylcyclopentane



C_8H_{16} MW, 112

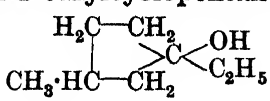
Cis :
B.p. 128°. D_4^{20} 0·7846.
Trans :
B.p. 121–2°. D_4^{20} 0·7696.

Chiurdoglu, *Chem. Abstracts*, 1932, **26**, 4311.

1-Methyl-3-ethylcyclopentane.
B.p. 120–1°. D_4^{16} 0·7669. n_D^{16} 1·4215. $[\alpha]_D$ + 4·34°.

Zelinsky, *Ber.*, 1902, **35**, 2679.

3-Methyl-1-ethylcyclopentanol

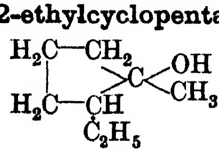


$C_8H_{16}O$ MW, 128

B.p. 71°/21 mm. D_4^{19} 0·8974.

Zelinsky, *Ber.*, 1901, **34**, 3952.

1-Methyl-2-ethylcyclopentanol

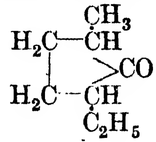


$C_8H_{16}O$ MW, 128

Exists in two forms.
(i) B.p. 64·5°/13 mm. D_4^{20} 0·8902.
(ii) B.p. 67·5°/13 mm. D_4^{20} 0·9061.

Chiurdoglu, *Chem. Abstracts*, 1932, **26**, 4311.

2-Methyl-5-ethylcyclopentanone

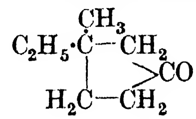


$C_8H_{14}O$ MW, 126

B.p. 164–5°/750 mm. D^{12} 0·900. n_D^{12} 1·4400, n_D^{22} 1·4360.

Cornubert, Borrel, *Bull. soc. chim.*, 1930, **47**, 308.

3-Methyl-3-ethylcyclopentanone

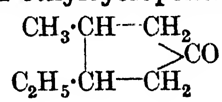


$C_8H_{14}O$ MW, 126

B.p. 174°. D_4^{18} 0·9072.
Semicarbazone : cryst. from EtOH. M.p. 170°.
p-*Nitrobenzylidene* : cryst. from C_6H_6. M.p. 180°.

v. Braun, Keller, Weissbach, *Ann.*, 1931, **490**, 185.

3-Methyl-4-ethylcyclopentanone

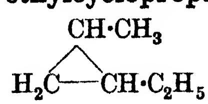


$C_8H_{14}O$ MW, 126

B.p. 180°. D_4^{18} 0·9059.
Oxime : oil. B.p. 117–18°/11 mm.
Semicarbazone : cryst. from EtOH.Aq. M.p. 208–9°.

See previous reference.

1-Methyl-2-ethylcyclopropane

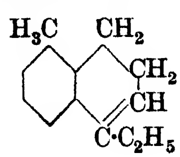


C_6H_{12} MW, 84

B.p. 63·9–64·9°. D_4^{21} 0·6960. n_D^{21} 1·3876.

Lespieau, Wakeman, *Bull. soc. chim.*, 1932, **51**, 390.

8-Methyl-4-ethyl-1 : 2-dihydronaphthalene

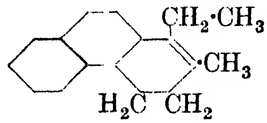


$C_{13}H_{16}$ MW, 172

B.p. 130–1°/12 mm.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 429.

2 - Methyl - 1 - ethyl - 3 : 4 - dihydrophenanthrene



$C_{17}H_{18}$ MW, 222

Plates from EtOH. M.p. 77–8°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

Methyl ethyl Diketone.
See Acetylpropionyl.

α-Methyl-α-ethyldiphenylmethane.
See 2 : 2-Diphenyl-*n*-butane.

***N*-Methylethylenediamine**

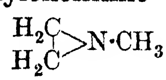
$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CH_3$

$C_3H_{10}N_2$ MW, 74

B,2HCl : cryst. + H_2O from EtOH. M.p. 130–2° decomp.
B,H_2PtCl_6 : m.p. 240–2° decomp.
Picrate : m.p. 220–2°.

Johnson, Bailey, *J. Am. Chem. Soc.*, 1916, **38**, 2141.

***N*-Methylethyleneimine**



C_3H_7N MW, 57

B.p. 27·5°/764 mm. $D^{19·5}$ 0·7572. n_D^{19} 1·3885. Misc. with H_2O. Hot dil. H_2SO_4 ⟶ methyl-2-hydroxyethylamine. C_6H_5COCl + NaOH ⟶ *N*-methyl-*N*-β-chloroethylbenzamide.
B,$HAuCl_4$: yellow cryst. M.p. 95°. Sol. EtOH. Spar. sol. H_2O.
Picrate : yellow cryst. M.p. 120–122°. Spar. sol. EtOH, cold H_2O.

Marckwald, Frobenius, *Ber.*, 1901, **34**, 3552.

Methyl ethyl Ether

$CH_3{\cdot}CH_2{\cdot}O{\cdot}CH_3$

C_3H_8O MW, 60

B.p. 10·8°. D_0^0 0·7252. Heat of comb. C_p 505·87 Cal.
B,HBr : f.p. − 30°.
B,HI : cryst. M.p. 22°.

McIntosh, *J. Am. Chem. Soc.*, 1908, **30**, 1104.
Dobriner, *Ann.*, 1888, **243**, 2.

***sym*.-Methylethylethylene.**
See 2-Pentene.

***unsym*.-Methylethylethylene.**
See 2-Methylbutylene-1.

***sym*.-Methylethylethylenediamine**

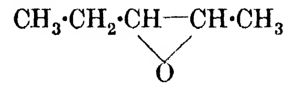
$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}C_2H_5$

$C_5H_{14}N_2$ MW, 102

B.p. 133°. Misc. with H_2O. Decomp. in air.
B,2HCl : cryst. from EtOH. M.p. 217–18°.
B_2,H_2PtCl_6 : cryst. M.p. 240°. Sol. hot H_2O.

v. Braun, Heider, Müller, *Ber.*, 1918, **51**, 739.

***sym*.-Methylethylethylene oxide** (*2-Pentene oxide*, *1-methyl-β-butylene oxide*, *1-ethylpropylene oxide*)

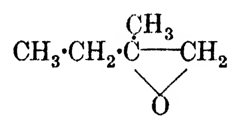


$C_5H_{10}O$ MW, 86

B.p. 80°. H_2O at 100° ⟶ pentandiol-2 : 3.

Eltekoff, *J. Chem. Soc., Abstracts*, 1883, **44**, 566.

***unsym*.-Methylethylethylene oxide** (*2-Methyl-α-butylene oxide*, *2-ethylpropylene oxide*)

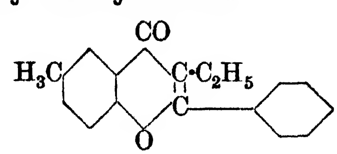


$C_5H_{10}O$ MW, 86

B.p. 82–3°. D^0 0·843. $NH(CH_3)_2$ in C_6H_6 at 125° ⟶ 1-dimethylamino-2-methylbutanol-2. Kaolin at 400° ⟶ 2-methylbutyraldehyde, isoprene, and trimethylethylene. Alumina at 250–60° ⟶ 2-methylbutyraldehyde.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.
Riedel, D.R.P., 199,148, (*Chem. Zentr.*, 1908, II, 121).

6-Methyl-3-ethylflavone

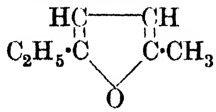


$C_{18}H_{16}O_2$ MW, 264

Needles from MeOH. M.p. 73–4°.

Wittig, Bangert, Richter, *Ann.*, 1925, **446**, 188.

2-Methyl-5-ethylfuran



$C_7H_{10}O$ MW, 110

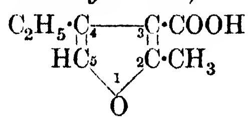
Oil. B.p. 118—19°. Misc. with most solvents. Insol. H_2O.

Fittig, Dietzel, *Ann.*, 1889, **250**, 210.

Methylethylfurfurylamine.

See under N-Methylfurfurylamine.

2-Methyl-4-ethyl-β-furoic Acid (*2-Methyl-4-ethylfuran-3-carboxylic acid*).



$C_8H_{10}O_3$ MW, 154

Cryst. from Et_2O-pet. ether. M.p. 105–6°. Sublimes in vacuo.

Reichstein, Hirt, *Helv. Chim. Acta*, 1933, **16**, 10.

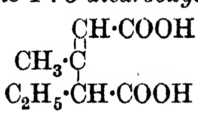
2-Methyl-5-ethyl-β-furoic Acid (*2-Methyl-5-ethylfuran-3-carboxylic acid, methyluvinic acid*).

Cryst. from pet. ether. M.p. 98·5–99°.

Et ester: $C_{10}H_{14}O_3$. MW, 182. Oil. B.p. 98–104°/11 mm.

See previous reference.

2-Methyl-3-ethylglutaconic Acid (*2-Methyl-1-pentene-1 : 3-dicarboxylic acid*)



$C_8H_{12}O_4$ MW, 172

Trans:

Needles from H_2O. M.p. 98°. Sol. Et_2O, C_6H_6. Warm with HCl ⟶ *cis*-form. Ca and Ba salts are sol. H_2O.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 144°/15 mm., 136°/12 mm. D_4^{20} 1·005. n_D^{20} 1·454. HCl ⟶ *cis*-acid.

Et ester-nitrile: $C_{10}H_{15}O_2N$. MW, 181. B.p. 141°/20 mm.

Cis:

Plates from H_2O. M.p. 164° ⟶ anhydride. Ca and Ba salts are insol. H_2O.

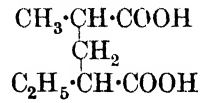
Di-Et ester: b.p. 143°/15 mm., 126°/10 mm. D_4^{20} 1·0076. n_D^{20} 1·4528.

Mononitrile: $C_8H_{11}O_2N$. MW, 153. Cryst. M.p. 175–6°. Sublimes. Spar. sol. H_2O, EtOH. Insol. Et_2O.

Anhydride: $C_8H_{10}O_3$. MW, 154. Plates from pet. ether. M.p. 53°.

Kon, Watson, *J. Chem. Soc.*, 1932, 10.
Bland, Thorpe, *J. Chem. Soc.*, 1912, **101**, 1569.

1-Methyl-3-ethylglutaric Acid (*Hexane-2 : 4-dicarboxylic acid*)



$C_8H_{14}O_4$ MW, 174

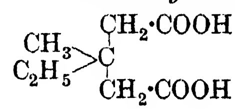
Exists in two forms.

(i) Paramethylethylglutaric acid. Needles from H_2O. M.p. 105°. Very sol. most solvents. Spar. sol. H_2O, ligroin. Insol. CS_2, xylene. $k = 5{\cdot}9 \times 10^{-5}$ at 25°.

(ii) Mesomethylethylglutaric acid. Needles from H_2O. M.p. 61°. $k = 5{\cdot}7 \times 10^{-5}$ at 25°.

Bischoff, *Ber.*, 1891, **24**, 1053.

2-Methyl-2-ethylglutaric Acid (*2-Methyl-2-ethylpropane-1 : 3-dicarboxylic acid*)



$C_8H_{14}O_4$ MW, 174

Needles from H_2O. M.p. 87°. B.p. 260°/740 mm. k (first) $= 2{\cdot}42 \times 10^{-4}$ at 25°: (second) $= 2{\cdot}01 \times 10^{-7}$ at 25°.

Me ester: $C_9H_{16}O_4$. MW, 188. B.p. 128°/19 mm.

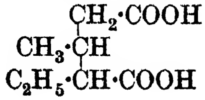
Anhydride: cryst. M.p. 25. B.p. 185°/20 mm.

Monoanilide: $C_{14}H_{19}O_3N$. MW, 249. Cryst. from $CHCl_3$–pet. ether. M.p. 105°.

1-*Naphthalide*: needles from EtOH. M.p. 126°.

Singh, Thorpe, *J. Chem. Soc.*, 1923, **123**, 117.
Thole, Thorpe, *J. Chem. Soc.*, 1911, **99**, 440.

2-Methyl-3-ethylglutaric Acid (*2-Methylpentane-1 : 3-dicarboxylic Acid*)



$C_8H_{14}O_4$ MW, 174

Two forms are described in the literature.

(i) Prisms from H_2O. M.p. 100–1°. Sol. H_2O, Et_2O. $k = 6{\cdot}7 \times 10^{-5}$ at 25°.

(ii) *Cis*: prisms from $CHCl_3$–ligroin. M.p. 88°.

Imide: exists in two forms. (i) Needles from Et_2O–ligroin. M.p. 92°. (ii) Prisms from Et_2O–ligroin. M.p. 102°.

v. Pechmann, *Ber.*, 1900, **33**, 3340.
Michael, Ross, *J. Am. Chem. Soc.*, 1931, **53**, 1167.

1-Methyl-3-ethylglycerol.
See Hexantriol-2 : 3 : 4.

Methylethylglycine (*Methylethylaminoacetic acid*)

$$\begin{matrix}CH_3\\C_2H_5\end{matrix}>N\cdot CH_2\cdot COOH$$

$C_5H_{11}O_2N$ MW, 117

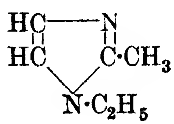
Free acid not isolated.
Cu salt: blue plates + $3H_2O$ from H_2O. Very sol. EtOH.
Me ester: $C_6H_{13}O_2N$. MW, 131. B.p. 151–2°. Sol. H_2O.
Et ester: $C_7H_{15}O_2N$. MW, 145. Oil. B.p. 164–5°. *B,HCl*: ppt. from Et_2O. M.p. 132°.

Willstätter, *Ber.*, 1902, **35**, 607.
Jones, Major, *J. Am. Chem. Soc.*, 1930, **52**, 1082.

Methylethylglycollic Acid.
See 1-Hydroxy-1-methylbutyric Acid.

Methylethyglyoxal.
See Acetylpropionyl.

2-Methyl-1-ethylglyoxaline (2-*Methyl*-1-*ethyliminazole*)

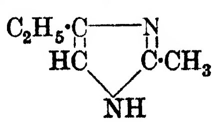


$C_6H_{10}N_2$ MW, 110

B.p. 212–13°. D^{15} 0·982. Misc. with H_2O.
B,2HCl,ZnCl₂: prisms. M.p. 159–60°. Sol. H_2O.
Picrate: cryst. from EtOH. M.p. 171° (168–9°).

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 722.

2-Methyl-4-ethylglyoxaline (2-*Methyl*-4-*ethyliminazole*)

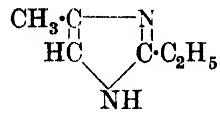


$C_6H_{10}N_2$ MW, 110

Oxalate: cryst. from Et_2O. M.p. 141°.
Picrate: yellow needles from H_2O. M.p. 90–1°.

See previous reference.

4-Methyl-2-ethylglyoxaline (4-*Methyl*-2-*ethyliminazole*)

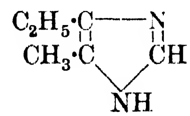


$C_6H_{10}N_2$ MW, 110

Cryst. M.p. 45°. Very sol. H_2O, EtOH. Spar. sol. EtO. Hygroscopic.
B,HCl: plates. M.p. 132°. Hygroscopic.
B,HNO₃: cryst. M.p. 129°.
Oxalate: plates from Me_2CO.Aq. M.p. 145°.
Picrate: yellow prisms from H_2O. M.p. 131°.

Windaus, Langenbeck, *Ber.*, 1922, **55**, 3707.

5-Methyl-4-ethylglyoxaline (5-*Methyl*-4-*ethyliminazole*)



$C_6H_{10}N_2$ MW, 110

Plates.
B,HAuCl₄: cryst. M.p. 167°. Spar. sol. most solvents.
Picrate: needles from 50% EtOH. M.p. 155–8°.

See previous reference and also
Jänecke, *Ber.*, 1899, **32**, 1097.

Methylethylglyoxime.
See under Acetylpropionyl.

2-Methyl-3-ethylheptanol-3 (*Ethylisopropylbutylcarbinol*)

$$CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{C_2H_5}{C}(OH)\cdot \overset{CH_3}{CH}\cdot CH_3$$

$C_{10}H_{22}O$ MW, 158

B.p. 191–5°. D^{20} 0·8455. n_D 1·4378.

Wallach, Gröppel, *Ann.*, 1915, **408**, 201.

2-Methyl-5-ethylheptanol-3

$$CH_3\cdot CH_2\cdot \overset{C_2H_5}{CH}\cdot CH_2\cdot CH(OH)\cdot \overset{CH_3}{CH_2}\cdot CH_3$$

$C_{10}H_{22}O$ MW, 158

B.p. 92°/28 mm.
Acetyl: b.p. 94–6°/23–5 mm.

Fourneau, Matti, *J. pharm. chim.*, 1931, **14**, 527.

2-Methyl-5-ethylheptanol-5 (*Diethylisoamylcarbinol*)

$$CH_3\cdot CH_2\cdot \overset{C_2H_5}{C}(OH)\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{CH}\cdot CH_3$$

$C_{10}H_{22}O$ MW, 158

B.p. 83–6°/15 mm. D^0 0·852, $D_4^{10\cdot4}$ 0·844. n_D 1·44092.

Grignard, *Bull. soc. chim.*, 1904, **31**, 752.

2-Methyl-4-ethylheptanone-6

$$\begin{matrix} & & C_2H_5 & & CH_3 & \\ CH_3\cdot CO\cdot CH_2\cdot & CH\cdot & & CH_2\cdot & CH\cdot & CH_3 \end{matrix}$$

$C_{10}H_{18}O$ MW, 154

Semicarbazone: cryst. from MeOH.Aq. M.p. 102°.

Fischer, Löwenberg, *Ber.*, 1933, **66**, 674.

2-Methyl-5-ethylheptanone-4.
See Isobutyl *sec.-n*-amyl Ketone.

4-Methyl-3-ethyl-2-heptenone-5.
See under Homomesitones.

4-Methyl-3-ethyl-3-heptenone-2.
See under Homomesitones.

4-Methyl-3-ethyl-3-heptenone-5.
See under Homomesitones.

4-Methyl-5-ethyl-3-heptenone-6.
See under Homomesitones.

2-Methyl-4-ethyl-2-heptenone-6

$$\begin{matrix} & C_2H_5 & & CH_3 & \\ CH_3\cdot CO\cdot CH_2\cdot & CH\cdot & CH: & C\cdot & CH_3 \end{matrix}$$

$C_{10}H_{16}O$ MW, 152

B.p. 74–5°/13 mm. D_4^{20} 0·8430. n_D^{20} 1·4546.
Semicarbazone: cryst. from MeOH. M.p. 127–8°.

Fischer, Löwenberg, *Ber.*, 1933, **66**, 674.

Methylethylhexanol-1.
See Methylethyl-*n*-hexyl Alcohol.

2-Methyl-4-ethylhexanol-4 (*Diethylisobutylcarbinol*)

$$\begin{matrix} & C_2H_5 & & CH_3 & \\ CH_3\cdot CH_2\cdot & C(OH)\cdot & CH_2\cdot & CH\cdot & CH_3 \end{matrix}$$

$C_9H_{20}O$ MW, 144

B.p. 172°. D_4^{22} 0·8396. n_D^{13} 1·43457.

Masson, *Compt. rend.*, 1901, **132**, 483.

2-Methyl-2-ethyl-*n*-hexyl Alcohol (*2-Methyl-2-ethylhexanol-1*)

$$\begin{matrix} & CH_3 & \\ CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot & C\cdot & CH_2OH \\ & C_2H_5 & \end{matrix}$$

$C_9H_{20}O$ MW, 144

B.p. 85·5–86°/11 mm. n_D^{20} 1·4401.

Whitmore, Badertscher, *J. Am. Chem. Soc.*, 1933, **55**, 1565.

3-Methyl-2-ethyl-*n*-hexyl Alcohol (*3-Methyl-2-ethylhexanol-1*)

$$\begin{matrix} & H_3C & C_2H_5 & \\ CH_3\cdot CH_2\cdot CH_2\cdot & CH\cdot & CH\cdot & CH_2OH \end{matrix}$$

$C_9H_{20}O$ MW, 144

B.p. 83–6°/10 mm. D_{25}^{25} 0·8383. n_D^{25} 1·4356.

Connor, Adkins, *J. Am. Chem. Soc.*, 1932, **54**, 4689.

5-Methyl-2-ethyl-*n*-hexyl Alcohol (*5-Methyl-2-ethylhexanol-1*)

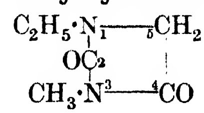
$$\begin{matrix} & CH_3 & & C_2H_5 & \\ CH_3\cdot & CH\cdot & CH_2\cdot CH_2\cdot & CH\cdot & CH_2OH \end{matrix}$$

$C_9H_{20}O$ MW, 144

B.p. 84–6°/10 mm. D_{25}^{25} 0·8232. n_D^{25} 1·4304.

See previous reference.

3-Methyl-1-ethylhydantoin



$C_6H_{10}O_2N_2$ MW, 142

Prisms. M.p. 93°. B.p. 278°. Very sol. H_2O and most org. solvents.

Biltz, Slotta, *J. prakt. Chem.*, 1926, **113**, 261.

5-Methyl-5-ethylhydantoin.

Prisms from MeOH. M.p. 149° (146°). Sol. usual org. solvents.

Biltz, Slotta, *J. prakt. Chem.*, 1926, **113**, 250.

Bergs, D.R.P., 566,094, (*Chem. Abstracts*, 1933, **27**, 1001).

Bucherre, Lieb, *J. prakt. Chem.*, 1934, **141**, 28.

1-Methyl-1-ethylhydracrylic Acid (*2'-Hydroxy-1 : 1-dimethylbutyric acid*)

$$\begin{matrix} & CH_3 & \\ HO\cdot CH_2\cdot & C\cdot & COOH \\ & CH_2\cdot CH_3 & \end{matrix}$$

$C_6H_{12}O_3$ MW, 132

Cryst. from Et_2O–pet. ether. M.p. 56°. Ox. ⟶ methylethylacetaldehyde + methylethylmalonic acid.

Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 115°/36 mm., 108°/25 mm. *Acetyl*: b.p. 113°/20 mm.

Blaise, Marcilly, *Bull. soc. chim.*, 1903, **31**, 322.

β-Methyl-β-ethylhydrocinnamic Acid (*2-Methyl-2-phenylvaleric acid*)

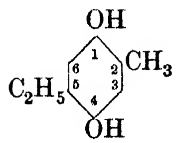
$$\begin{matrix} & C_2H_5 & \\ C_6H_5\cdot & C\cdot & CH_2\cdot COOH \\ & CH_3 & \end{matrix}$$

$C_{12}H_{16}O_2$ MW, 192

B.p. 174°/14 mm.
Quinine salt: cryst. from EtOH.Aq. M.p. 86–8°.

Inglis, *J. Chem. Soc.*, 1911, **99**, 542.

2-Methyl-5-ethylhydroquinone (2 : 5-*Dihydroxy*-p-*ethyltoluene*)



$C_9H_{12}O_2$ MW, 152

Plates. M.p. 165°.

Bayrac, *Ann. chim. phys.*, 1897, **10**, 73.

2-Methyl-6-ethylhydroquinone (2 : 5-*Dihydroxy*-m-*ethyltoluene*).

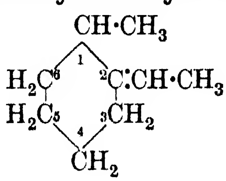
Needles from C_6H_6. M.p. 99–100°.

Jones, Kenner, *J. Chem. Soc.*, 1931, 1853.

***N*-Methyl-*O*-ethylhydroxylamine.**
See under N-Methylhydroxylamine.

3-Methyl-3-ethylidenecrotonic Acid.
See 3-Methylsorbic Acid.

1-Methyl-2-ethylidenecyclohexane



C_9H_{16} MW, 124

B.p. 158°. D^0 0·823, D^{20} 0·81. n_D 1·47.

Murat, *Ann. chim. phys.*, 1909, **16**, 125.

1-Methyl-3-ethylidenecyclohexane.

l-.
B.p. 152°. D_{19}^{19} 0·8135. n_D 1·459. $[\alpha]_D$ −50°
Nitrosochloride: prisms from Me_2CO. M.p. 114°.

dl-.
B.p. 153°. n_D 1·4584.

Wallach, Evans, *Ann.*, 1908, **360**, 51.
Haworth, Perkin, Wallach, *Ann.*, 1911, **379**, 144.

1-Methyl-4-ethylidenecyclohexane.

B.p. 152–3°. D^{21} 0·81. n_D^{21} 1·4571.
Nitrosochloride: cryst. from Et_2O–MeOH when two forms are obtained. Least sol., needles, m.p. 117–18°: more sol., plates, m.p. 113–14°. Both forms are volatile in steam.

Wallach, Rentschler, *Ann.*, 1909, **365**, 271.
Perkin, Wallach, *Ann.*, 1910, **374**, 202.

1-Methyl-2-ethylidenepropionic Acid (1-*Methyl-2-butylene-1-carboxylic acid, 2-pentene-4-carboxylic acid, methylpropenylacetic acid, 2-ethylideneisobutyric acid*)

$$CH_3{\cdot}CH{:}CH{\cdot}\underset{}{\overset{CH_3}{\overset{|}{C}H}}{\cdot}COOH$$

$C_6H_{10}O_2$ MW, 114

B.p. 198–9°/740 mm. D^{15} 0·966. n_D^{15} 1·4402. $k = 2{\cdot}99 \times 10^{-5}$ at 25°. Heat of comb. C_p 797·9 Cal.

Fichter, Rudin, *Ber.*, 1904, **37**, 1616.

1-Methyl-2-ethylidenesuccinic Acid (1 : 3-*Dimethylitaconic acid, 2-pentene-3 : 4-dicarboxylic acid, 1-methyl-1-butylene-2 : 3-dicarboxylic acid*)

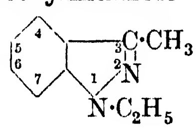
$$\begin{array}{c} CH_3{\cdot}CH{\cdot}COOH \\ | \\ CH_3{\cdot}CH{:}C{\cdot}COOH \end{array}$$

$C_7H_{10}O_4$ MW, 158

Cryst. from H_2O. M.p. 202° decomp. Mod. sol. $CHCl_3$, C_6H_6, CS_2, pet. ether. Spar. sol. hot H_2O, Et_2O.
Anhydride: oil. B.p. 131°/16 mm.

Fichter, Schlaepfer, *Ber.*, 1906, **39**, 1535.

3-Methyl-1-ethylindazole



$C_{10}H_{12}N_2$ MW, 160

Cryst. M.p. 29–30°. B.p. 245·5°. Misc. with EtOH, Et_2O. Mod. sol. H_2O. Volatile in steam.
Picrate: needles or plates from EtOH. M.p. 192–4°.

Auwers, *Ber.*, 1919, **52**, 1338.

5-Methyl-1-ethylindazole.

B.p. 125–6°/12 mm.
Picrate: greenish-yellow cryst. M.p. 146–7°.

Auwers, Lohr, *J. prakt. Chem.*, 1924, **108**, 297.

3-Methyl-2-ethylindazole.

Oil. B.p. 284–5°.
Picrate: prisms from EtOH. M.p. 212–13°.

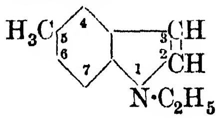
Auwers, *Ber.*, 1919, **52**, 1338.

5-Methyl-2-ethylindazole.

B.p. 151°/15 mm.
Picrate: yellow cryst. M.p. 160–1°.

Auwers, Lohr, *J. prakt. Chem.*, 1924, **108**, 297.

5-Methyl-1-ethylindole



$C_{11}H_{13}N$ MW, 159

B.p. 253–5°. Volatile in steam.

Hegel, *Ann.*, 1886, **232**, 218.

3-Methyl-2-ethylindole (2-*Ethylskatole*).

Plates from pet. ether. M.p. 66°. B.p. 185°/35 mm. Sol. most org. solvent. Spar. sol. H_2O.

Picrate: red needles. M.p. 150–1°. Sol. C_6H_6.

Plancher, *Gazz. chim. ital.*, 1898, **28**, 388.

2-Methyl-3-ethylindole.

B.p. 291–3°/750 mm. (287–90°), 192–5°/50 mm., 156–8°/12 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Picrate: red cryst. M.p. 152–3° (148–50°). Spar. sol. cold C_6H_6.

Fischer, *Ann.*, 1886, **236**, 132.
Fischer, Steche, *Ann.*, 1887, **242**, 362.
Ciamician, Plancher, *Ber.*, 1896, **29**, 2476; *Gazz. chim. ital.*, 1898, **28**, 347.
Oddo, Alberti, *Gazz. chim. ital.*, 1933, **63**, 239.

Methylethylisoamylcarbinol.

See 2 : 5-Dimethylheptanol-5.

Methylethylisobutylamine

$$(CH_3)_2CH{\cdot}CH_2{\cdot}N{<}^{CH_3}_{C_2H_5}$$

$C_7H_{17}N$ MW, 115

B.p. 105°.

B,HI: cryst. from Me_2CO. M.p. 132°.

B, $HAuCl_4$: m.p. 99°. Spar. sol. H_2O.

B_2,H_2PtCl_6: m.p. 197° decomp. Mod. sol. H_2O. Spar. sol. EtOH.

Marckwald, v. Droste-Huelshoff, *Ber.*, 1899, **32**, 562.

Methylethylisobutylcarbinol.

See 2 : 4-Dimethylhexanol-4.

Methylethylisobutylmethane.

See 2 : 4-Dimethyl-*n*-hexane.

Methylethylisopropylcarbinol (2 : 3-*Dimethylpentanol*-3)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}(OH){\cdot}CH(CH_3)_2$$

$C_7H_{16}O$ MW, 116

B.p. 139·4–139·9°/760 mm. (136°/760 mm., 122–4°), 138–40°/750 mm., 50°/18 mm., 44–5°/14 mm., 42–3°/11 mm., 38–9°/7 mm. D^0 0·8487 (0·8586), D_4^{20} 0·8402 (0·833). n_D^{20} 1·4287 (1·4280, 1·427). Ox. ⟶ acetone + methyl ethyl ketone + acetic acid.

Kaschirski, *J. Russ. Phys.-Chem. Soc.*, 1881, **13**, 89.
Harding, Walsh, Weizmann, *J. Chem. Soc.*, 1911, **99**, 450.
Whitmore, Evers, *J. Am. Chem. Soc.*, 1933, **55**, 813.
Pariselle, Simon, *Compt. rend.*, 1921, **173**, 86.

Methylethylketazine

$$^{CH_3\cdot CH_2}_{CH_3}{>}C{:}N{\cdot}N{:}C{<}^{CH_2\cdot CH_3}_{CH_3}$$

$C_8H_{16}N_2$ MW, 140

B.p. 171–2°/760 mm. (169–70°, 168–72°, 167–8°), 85·7°/37 mm., 75°/12 mm., 72°/10 mm. D_4^{20} 0·8404, D^{24} 0·8335, $D_4^{26\cdot 6}$ 0·8338. $n_D^{26\cdot 6}$ 1·45160, n_D^{20} 1·4511.

Curtius, Thun, *J. prakt. Chem.*, 1891, **44**, 165.
Scholtz, *Ber.*, 1896, **29**, 611.

Methyl ethyl Ketone (2-*Ketobutane*, *butanone*)

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH_3$$

C_4H_8O MW, 72

F.p. − 86·35° (− 85·9°). B.p. 79·6°/760 mm., 81°/762·5 mm. D^0 0·82961, D_4^{15} 0·81005, D_4^{20} 0·8054. n_D^{15} 1·38140. CrO_3 ⟶ acetic acid. HNO_3 (D 1·38) ⟶ diacetyl + dinitroethane + acetic acid + NH_3. H (+ Ni) ⟶ methylethylcarbinol. HNO_2 ⟶ isonitrosomethyl ethyl ketone. PCl_5 ⟶ 2 : 2-dichlorobutane. $NH_2{\cdot}NH_2$ ⟶ methylethylketazine. Forms bisulphite comp.

Oxime: b.p. 152°. D_4^{20} 0·9232. Misc. with EtOH, Et_2O. Sol. 10 parts H_2O.

Di-Et acetal: b.p. 120°, 68°/100 mm.

Cyanhydrin: *see under* 1-Hydroxy-1-methylbutyric Acid.

Semicarbazone: m.p. 148° (139°).

2-*Phenylsemicarbazone*: plates. M.p. 168°.

4-p-*Bromophenylsemicarbazone*: m.p. 175°.

4-m-*Nitrophenylsemicarbazone*: pale yellow cryst. M.p. 205°.

p-*Tolylsemicarbazone*: m.p. 183–4°.

2 : 4-*Diphenylthiosemicarbazone*: needles from EtOH. M.p. 174°.

Phenylhydrazone: b.p. 190°/100 mm.

o-*Nitrophenylhydrazone*: orange-yellow cryst. M.p. 73°.

m-*Nitrophenylhydrazone*: yellow cryst. M.p. 99·5°.

p-*Nitrophenylhydrazone* : yellow needles. M.p. 128–9° (124°).

2 : 4-*Dinitrophenylhydrazone* : yellow cryst. M.p. 115°.

Methylphenylhydrazone : b.p. 176–7°/135 mm.

o-*Chlorobenzoylhydrazone* : plates. M.p. 81–2°.

p-*Chlorobenzoylhydrazone* : m.p. 161–2°.

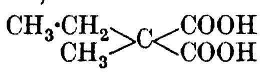
m-*Nitrobenzoylhydrazone* : plates. M.p. 112°.

Frankland, Duppa, *Ann.*, 1866, **138**, 336.
Böcking, *Ann.*, 1880, **204**, 17.
Kanonnikow, Saizew, *Ann.*, 1875, **175**, 377.
Nef, *Ann.*, 1900, **310**, 323.
Schramm, *Ber.*, 1883, **16**, 1581.
Senderens, *Bull. soc. chim.*, 1909, **5**, 484.
Meerwein, *Ann.*, 1913, **398**, 249.

1-Methyl-2-ethylmaleic Acid.

See dibasic-Hæmatinic Acid.

Methylethylmalonic Acid (*Butane*-2 : 2-*dicarboxylic acid*)



$C_6H_{10}O_4$ MW, 146

Prisms or needles from Et_2O. M.p. 122° (118°). Sol. H_2O, EtOH, Et_2O. Heat of comb. C_v = 676·0 Cal. k (first) = $1{\cdot}67 \times 10^{-3}$ ($1{\cdot}61 \times 10^{-3}$) at 25° : (second) = $0{\cdot}17 \times 10^{-6}$. Heat at 180° ⟶ 1-methylbutyric acid.

Di-Me ester : $C_8H_{14}O_4$. MW, 174, B.p. 189–91°, 90°/21 mm. D_4^{20} 1·0497. n_D^{20} 1·42175.

Di-Et ester : $C_{10}H_{18}O_4$. MW, 202. B.p. 207–8°, 102°/17 mm. D_{15}^{15} 0·994, $D_4^{18\cdot2}$ 0·9970. $n_D^{18\cdot2}$ 1·41896.

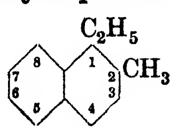
Me ester-amide : needles. M.p. 106–8°.

Diamide : $C_6H_{12}O_2N_2$. MW, 144. Cryst. from H_2O. M.p. 182–3°.

Nitrile : 1-methyl-1-cyanobutyric acid. $C_6H_9O_2N$. MW, 127. M.p. 39°. *Et ester* : $C_8H_{13}O_2N$. MW, 155. B.p. 198°. *Amide* : $C_6H_{10}ON_2$. MW, 126. Needles. M.p. 87°.

Conrad, Bischoff, *Ann.*, 1880, **204**, 147.
Neustädter, *Ann.*, 1907, **351**, 310.
Meyer, *Monatsh.*, 1906, **27**, 47.
Alexander Wacker Ges. für elektrochem. Ind. G.m.b.H., D.R.P. 579,308, (*Chem. Abstracts*, 1933, **27**, 4545).

2-Methyl-1-ethylnaphthalene



$C_{13}H_{14}$ MW, 170

B.p. 135–45°/11 mm.

Picrate : golden-yellow needles from MeOH. M.p. 110–11°.

Styphnate : yellow needles from MeOH. M.p. 141°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 79.

5-Methyl-1-ethylnaphthalene (1-*Methyl*-5-*ethylnaphthalene*).

Plates from EtOH. M.p. 40°. B.p. 133°/10 mm. n_D^{30} 1·600.

Picrate : orange needles. M.p. 97°.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 429.

6-Methyl-1-ethylnaphthalene (2-*Methyl*-5-*ethylnaphthalene*).

B.p. 135–8°/12 mm.

Picrate : golden-yellow needles. M.p. 81·5°.

Styphnate : yellow needles from MeOH. M.p. 90°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 33.

7-Methyl-1-ethylnaphthalene (2-*Methyl*-8-*ethylnaphthalene*).

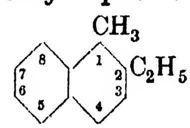
B.p. 128°/11 mm.

Picrate : golden-yellow needles. M.p. 106°.

Styphnate : yellow needles. M.p. 142–3°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 34.

1-Methyl-2-ethylnaphthalene



$C_{13}H_{14}$ MW, 170

B.p. 140–5°/11 mm.

Picrate : orange needles from MeOH. M.p. 97°.

Styphnate : yellow needles from MeOH. M.p. 114°.

Brunner, Grof, *Monatsh.*, 1934, **64**, 78.

5-Methyl-2-ethylnaphthalene (1-*Methyl*-6-*ethylnaphthalene*).

B.p. 140°/12 mm. n_D^{20} 1·598.

Picrate : yellow needles from EtOH. M.p. 82°.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 431.

8-Methyl-2-ethylnaphthalene (1-*Methyl*-7-*ethylnaphthalene*).

B.p. 133°/12 mm. n_D^{20} 1·5970. Ox. ⟶ naphthalene-1 : 7-dicarboxylic acid.

Picrate : m.p. 97° (95°).

Styphnate: m.p. 126°.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 428.
Nakamura, Ota, *Proceedings of the Imperial Academy, Tokyo*, 1934, **10**, 215.
Ruzicka, Eichenberger, *Helv. Chim. Acta*, 1930, **13**, 1123.
Ruzicka, van Melsen, *Helv. Chim. Acta*, 1931, **14**, 404.

Methylethylnonylcarbinol (*3-Methyldodecanol-3*)

$$CH_3\cdot[CH_2]_8\cdot\underset{}{\overset{CH_3}{C}}(OH)\cdot CH_2\cdot CH_3$$

$C_{13}H_{28}O$ MW, 200

B.p. 131–40°/14 mm., 126–9°/10 mm.

Locquin, Wouseng, *Compt. rend.*, 1922, **174**, 1428.
Thoms, Ambrus, *Arch. Pharm.*, 1925, **263**, 267.

2-Methyl-2-ethylpentanol-1.
See 2-Methyl-2-ethyl-*n*-amyl Alcohol.

2-Methyl-3-ethylpentanol-2 (*Dimethyl*-sec.-n-*amylcarbinol*)

$$CH_3\cdot CH_2\cdot\overset{C_2H_5}{CH}\cdot\underset{CH_3}{C}(OH)\cdot CH_3$$

$C_8H_{18}O$ MW, 130

Liq. with aromatic odour. B.p. 156°. Misc. with EtOH, Et_2O, $CHCl_3$, C_6H_6, ligroin.

Clarke, *Am. Chem. J.*, 1908, **39**, 574.

2-Methyl-3-ethylpentanol-3 (*Diethylisopropylcarbinol*)

$$CH_3\cdot CH_2\cdot\overset{C_2H_5}{C}(OH)\cdot\overset{CH_3}{CH}\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 159·5–161°/750 mm. D^{20}_{20} 0·8295.

Grigorovitch, Pavloff, *J. Chem. Soc., Abstracts*, 1893, **64**, 124.

2-Methyl-3-ethylpentanol-4 (*3-Isopropylpentanol-2*)

$$CH_3\cdot CH(OH)\cdot\overset{C_2H_5}{CH}\cdot CH(CH_3)_2$$

$C_8H_{18}O$ MW, 130

B.p. 172°. Misc. with EtOH, Et_2O, $CHCl_3$, C_6H_6.

Clarke, *Am. Chem. J.*, 1908, **39**, 578.

3-Methyl-3-ethylpentanone-2 (*1-Methyl-1:1-diethylacetone, 3-methyl-3-acetopentane*)

$$CH_3\cdot CH_2\cdot\underset{C_2H_5}{\overset{CH_3}{C}}\cdot CO\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 153·5–154°. D^{20}_4 0·8389.
Semicarbazone: m.p. 168°. Spar. sol. EtOH.

Nybergh, *Ber.*, 1922, **55**, 1963.

2-Methyl-3-ethylpentanone-4 (*2-Methyl-3-acetopentane*)

$$CH_3\cdot CO\cdot\overset{C_2H_5}{CH}\cdot CH(CH_3)_2$$

$C_8H_{16}O$ MW, 128

Liq. with camphor-like odour. B.p. 154°. Misc. with EtOH, Et_2O, $CHCl_3$, C_6H_6, AcOH.

Clarke, *Am. Chem. J.*, 1908, **39**, 577.

2-Methyl-4-ethylpentene-2 (*3-Isopropylidene-pentane, 1:1-dimethyl-2:2-diethylethylene*)

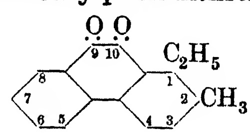
$$CH_3\cdot CH_2\cdot\overset{C_2H_5}{C}{:}C(CH_3)_2$$

C_8H_{16} MW, 112

B.p. 114·5–116·5°/741 mm.

Grigorowitsch, Pawlow, *J. Russ. Phys.-Chem. Soc.*, 1891, **23**, 172.

2-Methyl-1-ethylphenanthraquinone



$C_{17}H_{14}O_2$ MW, 250

Red needles from AcOH. M.p. 157–9°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

7-Methyl-1-ethylphenanthraquinone.

Orange plates from EtOH. M.p. 154–5°.

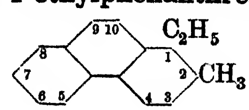
Haworth, *J. Chem. Soc.*, 1932, 2719.

1-Methyl-2-ethylphenanthraquinone.

Orange plates from EtOH. M.p. 163°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 461.

2-Methyl-1-ethylphenanthrene



$C_{17}H_{16}$ MW, 220

Plates from MeOH. M.p. 80°.
Picrate: yellow needles from MeOH. M.p. 134–5°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

7-Methyl-1-ethylphenanthrene.
See Homopimanthrene.

1-Methyl-2-ethylphenanthrene.

Plates from EtOH. M.p. 100°.
Picrate: yellow needles from MeOH. M.p. 134–5°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 461.

Methylethylphenylcarbinol (*α-Hydroxy-sec.-n-butylbenzene, 2-phenyl-sec.-n-butyl alcohol, 2-phenylbutanol-2*)

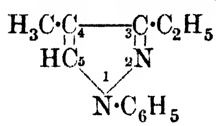
$$C_6H_5{\cdot}\overset{CH_3}{\overset{|}{C}}(OH){\cdot}CH_2{\cdot}CH_3$$

$C_{10}H_{14}O$ MW, 150

B.p. 211–12°, 103–4°/16 mm., 102°/14 mm. D^0 0·9964, D_4^{22} 0·9845. n_D^{22} 1·5158.

Klages, *Ber.*, 1902, **35**, 3507.
Tiffeneau, *Ann. chim.*, 1907, **10**, 362.

4-Methyl-3-ethyl-1-phenylpyrazole



$C_{12}H_{14}N_2$ MW, 186

B.p. 282–4° D^{15} 1·0476.

Claisen, Meyerowitz, *Ber.*, 1889, **22**, 3276.
Bouveault, *Bull. soc. chim.*, 1890, **4**, 649.
Mohr, *J. prakt. Chem.*, 1914, **90**, 520.

3-Methyl-4-ethyl-1-phenylpyrazole.

B.p. 294·5–295·5°.
$B_2,H_2PtCl_6,2H_2O$: yellowish-red cryst. M.p. 169°.
$B,HAuCl_4$: yellow needles from alc. HCl. M.p. 141–2°.
Picrate: yellow cryst. from EtOH. M.p. 129·5–130°.

Stoermer, Martinsen, *Ann.*, 1907, **352**, 331.

5-Methyl-1-ethyl-3-phenylpyrazole.

B.p. 170°/14 mm. D_4^{20} 1·048. n_H^{20} 1·582.
Picrate: m.p. 196–7°.

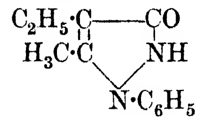
Auwers, Stuhlmann, *Ber.*, 1926, **59**, 1050.

3-Methyl-1-ethyl-5-phenylpyrazole.

B.p. 145°/14 mm. D_4^{20} 1·034. n_{He}^{20} 1·562.
Picrate: m.p. 116–17°.

See previous reference.

5-Methyl-4-ethyl-1-phenylpyrazolone-3 (*3-Methyl-4-ethyl-2-phenylpyrazolone-5*)

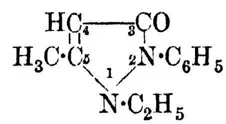


$C_{12}H_{14}ON_2$ MW, 202

Needles from AcOH. M.p. 172°. Sol. EtOH, C_6H_6, dil. acids and alkalis.

Michaelis, Drews, *Ann.*, 1906, **350**, 326.

5-Methyl-1-ethyl-2-phenylpyrazolone-3 (*3-Methyl-2-ethyl-1-phenylpyrazolone-5, homoantipyrine*)

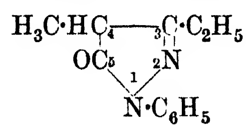


$C_{12}H_{14}ON_2$ MW, 202

M.p. 72–3°. $D_4^{99·7}$ 1·0692. $n_{He}^{99·7}$ 1·55566.
$B_2,H_2PtCl_6,2H_2O$: orange-red needles from H_2O. M.p. 180°.

Himmelbauer, *J. prakt. Chem.*, 1896, **54**, 191.
Knorr, *Ann.*, 1896, **293**, 3.
Mannich, Krösche, *Arch. Pharm.*, 1912, **250**, 653.

4-Methyl-3-ethyl-1-phenylpyrazolone-5



$C_{12}H_{14}ON_2$ MW, 202

M.p. 112·5° (111·5°). Sol. EtOH, $CHCl_3$. Spar. sol. H_2O, Et_2O.

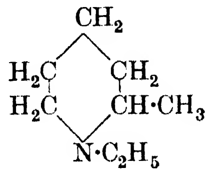
Schroeter, Kesseler, Liesche, Müller, *Ber.*, 1916, **49**, 2719.
Emmerling, Kristeller, *Ber.*, 1906, **39**, 2453.

3-Methyl-4-ethyl-1-phenylpyrazolone-5.

Needles from MeOH. M.p. 108°.

Mitra, *J. Ind. Chem. Soc.*, 1933, **10**, 493.
Knorr, Blank, *Ber.*, 1884, **17**, 2051.

2-Methyl-1-ethylpiperidine (N-*Ethyl-α-pipecoline*)



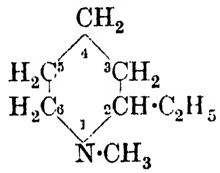
$C_8H_{17}N$ MW, 127

d-.
B.p. 148°. $[\alpha]_D^{15}$ + 101·9°.

dl-.
B.p. 148–9°/758 mm. (145–7°). D^{18} 0·8361.

Goodyear, F.P., 751,286, (*Chem. Abstracts*, 1934, **28**, 1049).
Leithe, *Ber.*, 1930, **63**, 805.
Winans, Adkins, *J. Am. Chem. Soc.*, 1932, **54**, 310.
Hohenemser, Wolffenstein, *Ber.*, 1899, **32**, 2522.

1-Methyl-2-ethylpiperidine



$C_8H_{17}N$ MW, 127

B.p. 150–151·5° (152°), 153·4–154·5°/730 mm. D_0^0 0·8541. Sol. 100 parts H_2O. Volatile in steam.
B,HCl: hygroscopic needles from EtOH. M.p. 153–4°.
B,HAuCl₄: yellow needles. M.p. 118–19° (122–3°). Sol. EtOH. Spar. sol. H_2O.
Picrate: yellow needles from H_2O. M.p. 175–6°.
B,HCl,6HgCl₂: cryst. M.p. 202–5°.

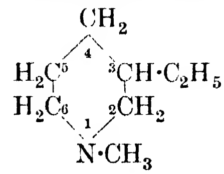
Ladenburg, *Ber.*, 1898, **31**, 291; *Ann.*, 1888, **247**, 71.
Lipp, *Ber.*, 1900, **33**, 3516.
Heidrich, *Ber.*, 1901, **34**, 1891.

6-Methyl-2-ethylpiperidine (2-*Methyl-6-ethylpiperidine*, 6-*ethyl-α-pipecoline*)
Exists in two forms.
(I).
d-.
$[\alpha]_D^{17.5}$ + 14°.
B,HAuCl₄: plates. M.p. 133·5–134·5°.
B₂,H₂PtCl₆: prisms. M.p. 204–6° decomp.
l-.
$[\alpha]_D^{17}$ − 14·1°.
B,HCl: needles. M.p. 287–8°.
dl-.
B.p. 151–151·5°/755 mm. $D^{14.5}$ 0·8306.
B,HCl: needles. M.p. 253·5–254°.
B,HAuCl₄: yellow cryst. M.p. about 134°.
B₂,H₂PtCl₆: prisms. M.p. 188–90°. Sol. H_2O.
Picrate: needles. M.p. about 135°.

(II). Iso-6-methyl-2-ethylpiperidine.
B.p. 157–157·7°/756 mm. $D^{14.5}$ 0·8450.
B,HCl: needles. M.p. 171·5–172·5°.
B₂,H₂PtCl₆: needles. M.p. 196–7°.
Picrate: plates. M.p. 101·5–102°.

Löffler, Thiel, *Ber.*, 1909, **42**, 138.

1-Methyl-3-ethylpiperidine



$C_8H_{17}N$ MW, 127

B.p. 153·1°/756 mm., 148–51°/726 mm. D^0 0·8394. Prac. insol. H_2O.
B,HCl: needles or prisms from H_2O. M.p. 170–2° (174–6°). Sol. H_2O, EtOH.
B,HAuCl₄: needles from H_2O. M.p. 101–1° (104–5°).
B₂,2HCl,3HgCl₂: needles from H_2O. M.p. 91–2°. Sol. hot H_2O, EtOH.
B₂,H₂PtCl₆: orange-red prisms from EtOH. M.p. 145–8°. Sol. H_2O.
Picrate: needles from Et_2O. M.p. 133–4°. Sol. hot H_2O, EtOH.

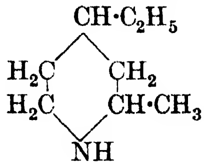
Ladenburg, *Ber.*, 1898, **31**, 289; *Ann.*, 1898, **301**, 147.
Lipp, Widnmann, *Ber.*, 1905, **38**, 2276; *Ann.*, 1915, **409**, 79.

4-Methyl-3-ethylpiperidine (3-*Ethyl-γ-pipecoline, hexahydro-β-collidine*).
B.p. 175–80°, 63–5°/12 mm. Sol. Et_2O.
B,HAuCl₄: yellow needles from EtOH–Et_2O. M.p. 126–8°.
B₂,H₂PtCl₆: orange-red needles from dil. HCl or plates from EtOH. M.p. 207° decomp.
Oxalate: cryst. from EtOH–Et_2O. M.p. 185–7°.

de Montmollin, Martenet, *Helv. Chim. Acta*, 1929, **12**, 608.
de Montmollin, Swiss P., 127,779, (*Chem. Abstracts*, 1929, **23**, 2190).
Koenigs, Bernhart, *Ber.*, 1905, **38**, 3048.
Oechsner de Coninck, *Bull. soc. chim.*, 1884, **42**, 122.

6-Methyl-3-ethylpiperidine.
See Copellidine *and* Isocopellidine.

2-Methyl-4-ethylpiperidine (4-*Ethyl-α-pipecoline, hexahydro-α-collidine*)



$C_8H_{17}N$ MW, 127

B.p. 155–60°. D^0 0·8515, D^{20} 0·8389.
B,HCl : needles. M.p. 213°. Sol. H_2O, EtOH.

Ladenburg, Schultz, *Ann.*, 1888, **247**, 96.

2-Methyl-2-ethylpropane-1 : 3-dicarboxylic Acid.
See 2-Methyl-2-ethylglutaric Acid.

Methylethylpropenylcarbinol.
See 4-Methyl-2-hexenol-4.

2-Methyl-2-ethylpropionic Acid.
See 2-Methylvaleric Acid.

Methylethylpropylacetic Acid.
See 3-Methylhexane-3-carboxylic Acid.

Methylethylpropylamine

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}N(CH_3){\cdot}CH_2{\cdot}CH_3$

$C_6H_{15}N$ MW, 101

B.p. 91–2°.
B,HCl : needles from Me_2CO. M.p. 177–9°.
B_2,H_2PtCl_6 : orange needles. M.p. 176–7°.
Picrate : yellow leaflets from EtOH. M.p. 94–5°.

Emmert, *Ber.*, 1909, **42**, 1510.
Meisenheimer, Bernhard, *Ann.*, 1922, **428**, 258.

Methylethylpropylcarbinol (3-*Methylhexanol*-3)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH_2{\cdot}CH_3$

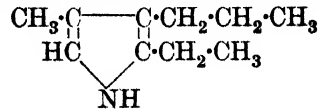
$C_7H_{16}O$ MW, 116

B.p. 140·3°/745 mm. (139–41°), 56°/16–20 mm. D_0^{20} 0·82338, D_0^{30} 0·81519. n_D^{20} 1·4231. $CrO_3 \longrightarrow$ acetic + propionic acids.
Acetyl : b.p. 158–9°.
Allophanate : m.p. 148°.

Pawlow, *Ann.*, 1877, **188**, 122.
Sokolow, *J. prakt. Chem.*, 1889, **39**, 431.
Halse, *J. prakt. Chem.*, 1914, **89**, 452.
Whitmore, Badertscher, *J. Am. Chem. Soc.*, 1933, **55**, 4160.

Methylethylpropylmethane.
See 3-Methylhexane.

4-Methyl-2-ethyl-3-propylpyrrole

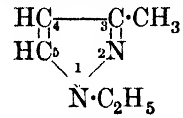


$C_{10}H_{17}N$ MW, 151

B.p. 82°/12 mm. Resinifies in air.
Picrate : m.p. 168°.

Fischer, Klarer, *Ann.*, 1926, **447**, 58.

3-Methyl-1-ethylpyrazole



$C_6H_{10}N_2$ MW, 110

B.p. 152°. D_4^{20} 0·936. n_{He}^{20} 1·4675.
Picrate : yellow needles from MeOH. M.p. 114–15°.

Auwers, Broche, *Ber.*, 1922, **55**, 3900.
Auwers, Hollmann, *Ber.*, 1926, **59**, 605, 1297.

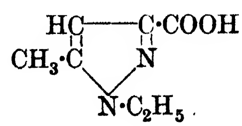
5-Methyl-1-ethylpyrazole.

$C_6H_{10}N_2$ MW, 110

B.p. 161°. D_4^{20} 0·951. n_{He}^{20} 1·4741.
Picrate : m.p. 143° (139–41°).

See second reference above and also Auwers, Cauer, *Ber.*, 1928, **61**, 2409.

5-Methyl-1-ethylpyrazole-3-carboxylic Acid

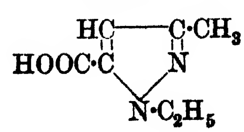


$C_7H_{10}O_2N_2$ MW, 154

Cryst. from H_2O or C_6H_6. M.p. 136–7°. Sol. EtOH. Spar. sol. H_2O, Et_2O, C_6H_6.
Et ester : $C_9H_{14}O_2N_2$. MW, 182. B.p. about 285°, 154°/12 mm. D_4^{20} 1·079. n_{He}^{20} 1·4922. Sol. conc. HCl, reppd. on dilution.

Auwers, Hollmann, *Ber.*, 1926, **59**, 603.

3-Methyl-1-ethylpyrazole-5-carboxylic Acid



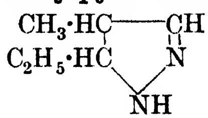
$C_7H_{10}O_2N_2$ MW, 154

Cryst. from H_2O or C_6H_6. M.p. 141–2°. Sol. EtOH. Spar. sol. H_2O, Et_2O, C_6H_6.

Et ester: $C_9H_{14}O_2N_2$. MW, 182. B.p. about 235°, 101·5–102·0°/12 mm. D_4^{20} 1·040. n_{He}^{20} 1·4768. *Picrate*: cryst. from MeOH.Aq. M.p. 68–9°. Decomp. on cryst. from C_6H_6 or ligroin.

See previous reference.

4-Methyl-5-ethylpyrazoline



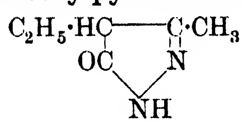
$C_6H_{12}N_2$ MW, 112

Liq. with peppermint-like odour. B.p. 180°, 105–7°/18 mm., 65–7°/10 mm. Misc. with EtOH, Et_2O, $CHCl_3$. Fehling's ⟶ blue ppt.

N-*Benzenesulphonyl*: m.p. 118°.

Locquin, Heilmann, *Compt. rend.*, 1925, **180**, 1759.
Curtius, Rechnitz, *J. prakt. Chem.*, 1916, **94**, 317.

3-Methyl-4-ethylpyrazolone-5

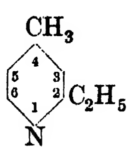


$C_6H_{10}ON_2$ MW, 126

Plates from hot H_2O or dil. EtOH. M.p. 229° (226°, 190°). Sol. EtOH. Spar. sol. Et_2O. Prac. insol. C_6H_6.

Locquin, *Compt. rend.*, 1902, **135**, 110.
Wolff, Thielepape, *Ann.*, 1920, **420**, 280.
De, Dutt, *J. Indian Chem. Soc.*, 1930, **7**, 473.
Backer, Meyer, *Rec. trav. chim.*, 1926, **45**, 86.

4-Methyl-2-ethylpyridine (2-*Ethyl-γ-picoline*)



$C_8H_{11}N$ MW, 121

B.p. 172–3°.

Picrate: yellow prisms from EtOH. M.p. 122–3°.

B,HAuCl₄: m.p. 80°.

B₂,H₂PtCl₆: m.p. 176° decomp.

Bardhan, *J. Chem. Soc.*, 1929, 2230.
Tschitschibabin, *J. Russ. Phys.-Chem. Soc.*, 1924, **54**, 607.
Eckert, Loria, *Monatsh.*, 1917, **38**, 233.

6-Methyl-2-ethylpyridine (5-*Ethyl-α-picoline*).

B.p. 160–161·5°/760 mm. D^{15} 0·9229. Spar. sol. H_2O. Volatile in steam. $KMnO_4$ ⟶ pyridine-2 : 6-dicarboxylic acid. Na + EtOH ⟶ 6-methyl-2-ethylpiperidine.

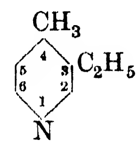
$B,HAuCl_4$: yellow needles. M.p. 127·5–128·5°.

B_2,H_2PtCl_6: cryst. M.p. 188–90° decomp.

Picrate: yellow plates from EtOH. M.p. 127–127·5°.

Schultz, *Ber.*, 1887, **20**, 2722.
Ladenburg, *Ann.*, 1888, **247**, 46.
Löffler, Thiel, *Ber.*, 1909, **42**, 137.
Eckert, Loria, *Monatsh.*, 1917, **38**, 228.

4-Methyl-3-ethylpyridine (β-*Collidine*, 3-*ethyl-γ-picoline*)



$C_8H_{11}N$ MW, 121

B.p. 195–6°/753 mm. (179°), 76°/12 mm. D^0 0·9656. Sol. EtOH, Et_2O. Spar. sol. H_2O. Volatile in steam. Cold $KMnO_4$ ⟶ 4-methylpyridine-3-carboxylic acid + pyridine-3 : 4-dicarboxylic acid. Hot $KMnO_4$ ⟶ nicotinic acid. Na + EtOH ⟶ 4-methyl-3-ethylpiperidine.

B,HCl: hygroscopic plates.

$B,HAuCl_4$: m.p. 140–1°.

B_2,H_2PtCl_6: orange-red cryst. M.p. 234–5° decomp.

$B_2,2HCl,HgCl_2$: needles. M.p. 106°. Sol. EtOH. Spar. sol. H_2O.

Picrate: cryst. from dil. EtOH. M.p. 148–50°.

Oechsner de Coninck, *Ann. chim.*, 1882, **27**, 469.
Koenigs, *Ber.*, 1894, **27**, 1503.
Rabe, Jantzen, *Ber.*, 1921, **54**, 928.
Ruzicka, Fornasir, *Helv. Chim. Acta*, 1919, **2**, 338.
Koenigs, Hoffmann, *Ber.*, 1925, **58**, 194.

6-Methyl-3-ethylpyridine (2-*Methyl*-5-*ethylpyridine*, 5-*ethyl-α-picoline*, *aldehyde-collidine*).

B.p. 174–6°. D^0 0·9369, D^{23} 0·9184. Volatile in steam. Sol. EtOH, Et_2O, C_6H_6. Prac. insol. H_2O. Sol. dil. acids. $KMnO_4$ ⟶ 6-methylpyridine-3-carboxylic acid + pyridine-2 : 5-dicarboxylic acid.

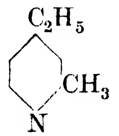
B,HCl: hygroscopic needles.

$B,HAuCl_4$: yellow needles or plates. M.p. 87°. Sol. hot H_2O.

B_2,H_2PtCl_6: orange-red prisms or needles from dil. EtOH. M.p. 180–1°.
$B_2,2HCl,5HgCl_2$: needles. M.p. 64°.
$B,HCl,6HgCl_2$: plates from H_2O. M.p. 168°.
Picrate: yellow plates or needles from H_2O or dil EtOH. M.p. 164–5°.

Krämer, *Ber.*, 1870, **3**, 262.
Ador, Baeyer, *Ann.*, 1870, **155**, 297.
Dürkopf, *Ber.*, 1885, **18**, 920.
Plath, *Ber.*, 1888, **21**, 3086.
Fichter, Labhardt, *Ber.*, 1909, **42**, 4714.
M.L.B., E.P., 147,101, (*Chem. Abstracts*, 1920, **14**, 3676).

2-Methyl-4-ethylpyridine (*α-Collidine, 4-ethyl-α-picoline*)

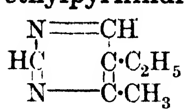


$C_8H_{11}N$ MW, 121

B.p. 179–80° (177–9°/751 mm.). Sol. EtOH, Et_2O, C_6H_6. D^0 0·9291. $KMnO_4 \longrightarrow$ lutidinic acid. Na + EtOH $\longrightarrow$ 2-methyl-4-ethylpiperidine.
$B,HAuCl_4$: yellow needles from H_2O. M.p. 90°. Sol. EtOH, Et_2O.
B_2,H_2PtCl_6: yellow cubes. M.p. 203°. Sol. H_2O.
Picrate: yellow plates from EtOH. M.p. 141–2°. Sol. EtOH. Spar. sol. H_2O.

Schultz, *Ber.*, 1887, **20**, 2725.
Ladenburg, *Ann.*, 1888, **247**, 47.
Eckert, Loria, *Monatsh.*, 1917, **38**, 228.

4-Methyl-5-ethylpyrimidine

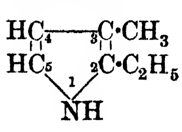


$C_7H_{10}N_2$ MW, 122

B.p. 193·5°/758 mm. Misc. with H_2O.
$B,2HgCl_2$: needles. M.p. 155°.
$B,PtCl_4$: needles. M.p. 210–15°.
$B,AuCl_3$: needles. M.p. 104–6°. Sol. hot H_2O.

Byk, *Ber.*, 1903, **36**, 1917.

3-Methyl-2-ethylpyrrole (*4-Methyl-5-ethylpyrrole*)



$C_7H_{11}N$ MW, 109

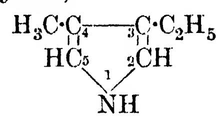
Liq.
Picrate: cryst. from EtOH. M.p. 137°.

Fischer, Wiedemann, *Z. physiol. Chem.*, 1926, **155**, 64.

4-Methyl-2-ethylpyrrole (*3-Methyl-5-ethylpyrrole*).
B.p. 93°/40 mm.
Picrate: m.p. 86°.

Fischer, Klarer, *Ann.*, 1926, **447**, 59.
Fischer, Kürzinger, *Z. physiol. Chem.*, 1931, **196**, 231.

4-Methyl-3-ethylpyrrole (*Opsopyrrole, 3-methyl-4-ethylpyrrole*)



$C_7H_{11}N$ MW, 109

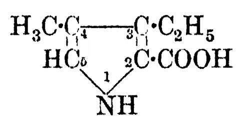
Yellow oil. B.p. 70°/11 mm. D_4^{20} 0·9059. n_D^{20} 1·49126.

Fischer, Sturm, Friedrich, *Ann.*, 1928, **461**, 259.
Fischer, Halbig, *Ann.*, 1926, **450**, 159.

5-Methyl-3-ethylpyrrole (*2-Methyl-4-ethylpyrrole*).
B.p. 86°/20 mm.

Fischer, Klarer, *Ann.*, 1926, **450**, 199.

4-Methyl-3-ethylpyrrole-2-carboxylic Acid



$C_8H_{11}O_2N$ MW, 153

Et ester: $C_{10}H_{15}O_2N$. MW, 181. Cryst. from EtOH.Aq. M.p. 75°. B.p. 174–8°/11 mm.

Fischer, Siedel, Le Thierry d'Ennequin, *Ann.*, 1933, **500**, 190.

5-Methyl-3-ethylpyrrole-2-carboxylic Acid.
Et ester: cryst. from EtOH.Aq. M.p. 86°.

Fischer, Klarer, *Ann.*, 1926, **450**, 200.

3-Methyl-4-ethylpyrrole-2-carboxylic Acid.
Et ester: cryst. M.p. 25°. B.p. 135–45°/11 mm.

Fischer, Siedel, Le Thierry d'Ennequin, *Ann.*, 1933, **500**, 190.

3-Methyl-5-ethylpyrrole-2-carboxylic Acid.

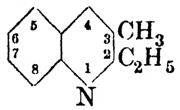
Et ester: cryst. from EtOH. M.p. 74°.

Fischer, Klarer, *Ann.*, 1925, **442**, 3.

2-Methylethylquinoline.

See Ethylquinaldine.

3-Methyl-2-ethylquinoline



$C_{12}H_{13}N$ MW, 171

Prisms from Et_2O or pet. ether. M.p. 57°. B.p. 268–9°/711 mm. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. $CrO_3 \longrightarrow$ 3-methylquinoline-2-carboxylic acid. Sn + HCl $\longrightarrow$ 3-methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline.

$B_2,H_2PtCl_6,2H_2O$: plates or needles. M.p. 238° decomp., anhyd. 249° decomp.

Picrate: yellow cryst. from H_2O or EtOH. M.p. 195° (193°).

Methiodide: yellow needles from EtOH. M.p. 196° part decomp.

Doebner, v. Miller, *Ber.*, 1884, **17**, 1714.
Eliasberg, Friedländer, *Ber.*, 1892, **25**, 1755.
Niementowski, Orzechowski, *Ber.*, 1895, **28**, 2815.
Murakami, *Chem. Abstracts*, 1930, **24**, 2462.

6-Methyl-2-ethylquinoline.

Needles from Et_2O or pet. ether. M.p. 59–60°. B.p. 270°/718 mm.

Picrate: yellow cryst. M.p. 244–5°. Prac. insol. H_2O.

Harz, *Ber.*, 1885, **18**, 3395.

4-Methyl-3-ethylquinoline (3-*Ethyllepidine*).

Sol. Et_2O with blue fluor. Volatile in steam.

B_2,H_2PtCl_6: yellow plates. M.p. 200° decomp.

Picrate: yellow needles from EtOH. M.p. 202°.

Byvanck, *Ber.*, 1898, **31**, 2150.

8-Methyl-6-ethylquinoline.

B.p. 273–5°.

Mailhe, *Bull. soc. chim.*, 1921, **29**, 717.

Methyl ethyl selenide

$$CH_3{\cdot}CH_2{\cdot}Se{\cdot}CH_3$$

C_3H_8Se MW, 123

B.p. 86°. D_4^{23} 1·3134. n_D^{23} 1·4820.

Tschugajew, *Ber.*, 1909, **42**, 53.

β-Methyl-β-ethylstyrene (2-*Benzylidenebutane*, 2-*methyl*-1-*phenylbutylene*-1)

$$C_6H_5{\cdot}CH{:}C{<}^{CH_3}_{C_2H_5}$$

$C_{11}H_{14}$ MW, 146

B.p. 201–2°. n_D^{18} 1·528.

Levy, Tabart, *Bull. soc. chim.*, 1931, **49**, 1781.

1-Methyl-1-ethylsuccinic Acid (2-*Methylbutane*-1 : 2-*dicarboxylic acid, isopentane*-1 : 2-*dicarboxylic acid*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\underset{CH_2\cdot COOH}{C}}{\cdot}COOH$$

$C_7H_{12}O_4$ MW, 160

Prisms from H_2O. M.p. 104°. B.p. 154–6°/12 mm. 100 parts H_2O dissolve 15·4 parts at 15°. Sol. EtOH, Et_2O, hot C_6H_6. Spar. sol. logroin. $k = 9{\cdot}5 \times 10^{-5}$ at 25°. Heat at 135° $\longrightarrow$ anhydride.

Anhydride: $C_7H_{10}O_3$. MW, 142. B.p. 239–45°/765 mm. Spar. sol. H_2O.

Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 120–2°/14 mm.

Auwers, Fritzweiler, *Ann.*, 1897, **298**, 166.
Hell, *Ber.*, 1891, **24**, 1390.
Higson, Thorpe, *J. Chem. Soc.*, 1906, **89**, 1468.
Inglis, *J. Chem. Soc.*, 1911, **99**, 544.
v. Braun, Keller, Weissbach, *Ann.*, 1931, **490**, 185.

1-Methyl-2-ethylsuccinic Acid (*Pentane*-2 : 3-*dicarboxylic acid*)

$$\begin{array}{l} CH_3{\cdot}CH{\cdot}COOH \\ CH_3{\cdot}CH_2{\cdot}CH{\cdot}COOH \end{array}$$

$C_7H_{12}O_4$ MW, 160

Exists in two forms.

(i) Needles from H_2O. M.p. 177–82°. 100 parts H_2O dissolve 3 parts at 17°. Sol. EtOH, Et_2O. Spar. sol. $CHCl_3$. Prac. insol. C_6H_6, logroin. $k = 2{\cdot}10 \times 10^{-4}$ $(2{\cdot}13 \times 10^{-4})$ at 25°.

Anhydride: $C_7H_{10}O_3$. MW, 142. B.p. 245°.

(ii) Needles from H_2O. M.p. 101–2°. 100 parts H_2O dissolve 16·1 parts at 13°. Sol. most org. solvents. $k = 2{\cdot}12 \times 10^{-4}$ $(2{\cdot}01 \times 10^{-4}$, $1{\cdot}98 \times 10^{-4})$ at 25°.

Anhydride : b.p. 245°.

Michael, *Ber.*, 1896, **29**, 1791.
Küster, Haas, *Ann.*, 1906, **345**, 57.
Bischoff, Mintz, *Ber.*, 1890, **23**, 647.
Fichter, *Ann.*, 1908, **361**, 387.
Auwers, Fritzweiler, *Ann.*, 1897, **298**, 162.
v. Braun, Keller, Weissbach, *Ann.*, 1931, **490**, 183.

Methyl ethyl sulphate

$CH_3{\cdot}O{>}SO_2$ / $CH_3{\cdot}CH_2{\cdot}O$

$C_3H_8O_4S$ MW, 140

B.p. 198–200°/742 mm. Used as alkylating agent.

Thayer, *J. Am. Chem. Soc.*, 1924, **46**, 1045.

Methyl ethyl sulphide

$CH_3{\cdot}CH_2{\cdot}S{\cdot}CH_3$

C_3H_8S MW, 76

F.p. − 104·8°. B.p. 66·9°/760 mm. (65–6°). D_4^{21} 0·8369. $KMnO_4$ or HNO_3 ⟶ methyl ethyl sulphoxide + methyl ethyl sulphone. HgI_2 in Me_2CO ⟶ C_3H_8S,HgI_2, m.p. 59°.

Klason, *Ber.*, 1887, **20**, 3413.
Carrara, *Atti accad. Lincei*, 1892, i, 308.

Methyl ethyl sulphite

$CH_3{\cdot}O{>}SO$ / $CH_3{\cdot}CH_2{\cdot}O$

$C_3H_8O_3S$ MW, 124

B.p. 141–2°, 53°/20 mm. D_4^{18} 1·1364. n_D^{11} 1·4167. Alkylating agent.

Voss, Blanke, *Ann.*, 1931, **485**, 274.

Methyl ethyl sulphone

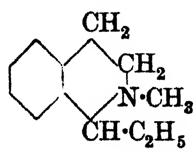
$CH_3{\cdot}CH_2{\cdot}SO_2{\cdot}CH_3$

$C_3H_8O_2S$ MW, 108

Needles from Et_2O. M.p. 36°. Sol. H_2O, EtOH. Spar. sol. Et_2O.

Beckmann, *J. prakt. Chem.*, 1878, **17**, 455.

2-Methyl-1-ethyl-1 : 2 : 3 : 4-tetrahydroisoquinoline

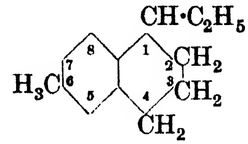


$C_{12}H_{17}N$ MW, 175

Oil. B.p. 135°/30 mm.
Methiodide : cryst. from EtOH.Aq. M.p. 159–60° decomp.

Freund, Bode, *Ber.*, 1909, **42**, 1760.

6-Methyl-1-ethyl-1 : 2 : 3 : 4-tetrahydronaphthalene (6-*Methyl*-1-*ethyltetralin*)



$C_{13}H_{18}$ MW, 174

B.p. 126°/10 mm.

Brunner, Grof, *Monatsh.*, 1934, **64**, 33.

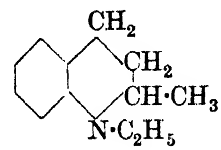
5-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydronaphthalene (5-*Methyl*-2-*ethyltetralin*).
B.p. 130°/16 mm.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 431.

8-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydronaphthalene (8-*Methyl*-2-*ethyltetralin*).
B.p. 129–31°/14 mm.

Harvey, Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 427.

2-Methyl-1-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline (N-*Ethyl*-1 : 2 : 3 : 4-*tetrahydroquinaldine*)

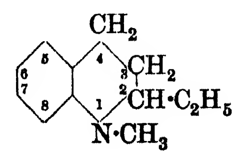


$C_{12}H_{17}N$ MW, 175

d-.
B.p. 256°. D_4^{20} 0·9942. $[\alpha]_D^{20}$ + 12·1°.
Benzyl iodide : orange-red leaflets from H_2O. M.p. 161°.

Scholtz, Pawlicki, *Ber.*, 1905, **38**, 1295.

1-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline



$C_{12}H_{17}N$ MW, 175

B.p. 265–7°/751 mm. n_D^{18} 1·5602. Volatile in steam.
B,HCl : needles. M.p. 207°. Very sol. H_2O, EtOH.
B,HBr : cryst. M.p. 196°.
B,HI : cryst. from EtOH–Et_2O. M.p. 193°. Rapidly turns yellow in light.

Freund, Richard, *Ber.*, 1909, **42**, 1108.

3-Methyl-2-ethyl-1 : 2 : 3 : 4-tetrahydroquinoline.

B.p. 260–2°/718 mm., 136–40°/12 mm. $FeCl_3$ → red col.

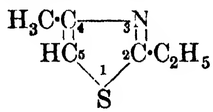
B,HCl : m.p. 193°.

Doebner, Miller, *Ber.*, 1884, **17**, 1716.
Braun, Heymons, *Ber.*, 1930, **63**, 3202.

1-Methyl-4-ethyltetramethylene Glycol.

See Heptandiol-2 : 5.

4-Methyl-2-ethylthiazole



C_6H_9NS MW, 127

B.p. 160·6–161°/728·5 mm.

B_2,H_2PtCl_6 : yellowish-red cryst. M.p. 177° decomp.

Hubacher, *Ann.*, 1890, **259**, 230.

2-Methyl-4-ethylthiazole.

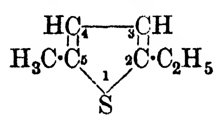
B.p. 169–71°/719 mm.

B_2,H_2PtCl_6 : reddish-yellow prisms. M.p. 182–3° decomp.

Picrate : m.p. 114–15°.

Rublew, *Ann.*, 1890, **259**, 263.

5-Methyl-2-ethylthiophene (2-*Methyl*-5-*ethylthiophene*)



$C_7H_{10}S$ MW, 126

F.p. — 68·4° to — 68·6°. B.p. 159·8–160·4°/760 mm., 53–5°/22 mm. D_4^{20} 0·9663, D_4^{30} 0·9577. n_D^{20} 1·5073, n_D^{30} 1·5024.

Steinkopf, Schubart, *Ann.*, 1921, **424**, 22.
Shepard, *J. Am. Chem. Soc.*, 1932, **54**, 2952.

5-Methyl-3-ethylthiophene (2-*Methyl*-4-*ethylthiophene*).

F.p. — 59° to — 60°. B.p. 162–4°/760 mm. D_4^{20} 0·9742, D_4^{30} 0·9650. n_D^{20} 1·5098, n_D^{30} 1·5048.

See second reference above.

***sym*.-Methylethylthiourea**

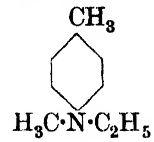
$CH_3 \cdot CH_2 \cdot NH \cdot CS \cdot NH \cdot CH_3$

$C_4H_{10}N_2S$ MW, 118

Cryst. M.p. 54°.

Hofmann, *Ber.*, 1868, **1**, 27.

***N*-Methyl-*N*-ethyl-*p*-toluidine**



$C_{10}H_{15}N$ MW, 149

B.p. 218–20°.

Picrate : yellow needles. M.p. 78°.

Wedekind, Oberheide, *Ber.*, 1904, **37**, 2716.

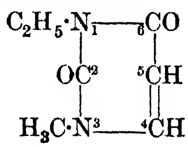
Methyl ethyl Triketone.

See Hexantrione-2 : 3 : 4.

1-Methyl-3-ethyltrimethylene Glycol.

See Hexandiol-2 : 4.

3-Methyl-1-ethyluracil



$C_7H_{10}O_2N_2$ MW, 154

M.p. 60–1°. B.p. 140–1°/4 mm. Very sol. H_2O, EtOH, Et_2O. Spar. sol. ligroin.

Hilbert, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 2005.

4-Methyl-1-ethyluracil.

Needles from EtOH, prisms from ethyl bromide. M.p. 195°. Sol. $CHCl_3$, ethyl bromide. Spar. sol. cold H_2O, EtOH. Insol. Et_2O, ligroin. Alk. sol. decomp. on warming.

Hoffmann, *Ann.*, 1889, **253**, 68.

5-Methyl-3-ethyluracil (3-*Ethylthymine*).

Needles from hot H_2O. M.p. 223°.

Schmidt-Nickels, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 4515.

***sym*.-Methylethylurea**

$CH_3 \cdot CH_2 \cdot NH \cdot CO \cdot NH \cdot CH_3$

$C_4H_{10}ON_2$ MW, 102

M.p. 52–3°. B.p. 266–8°. (Schreiner, (*J. prakt. Chem.*, 1880, **22**, 359) claims to have prepared two isomeric *sym*.-methylethylureas, m.p. 105° and 75° respectively.)

Wurtz, *J. prakt. Chem.*, 1851, **53**, 48.

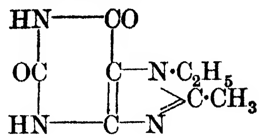
Methylethylvaleric Acid.

See 3-Methylhexane-3-carboxylic Acid *and* 3-Methylhexane-4-carboxylic Acid.

Methylethylvinylcarbinol.

See 3-Methyl-1-pentenol-3.

8-Methyl-7-ethylxanthine



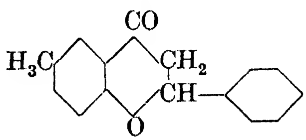
$C_8H_{10}O_2N_4$ MW, 194

Cryst. from AcOH.Aq. M.p. 340° decomp. Sol. alkalis. Insol. EtOH, Et_2O.

Diaz de Plaza, *Chem. Zentr.*, 1927, I, 2653.

Methyleugenol.
See under Eugenol.

6-Methylflavanone

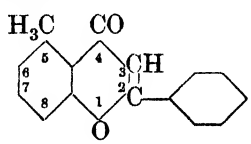


$C_{16}H_{14}O_2$ MW, 238

Plates from EtOH. M.p. 106–7°. Sol. $CHCl_3$, Et_2O, C_6H_6. Spar. sol. cold EtOH, ligroin, pet. ether. Conc. H_2SO_4 ⟶ yellow sol.

Auwers, Müller, *Ber.*, 1908, **41**, 4240.

5-Methylflavone



$C_{16}H_{12}O_2$ MW, 236

Plates from EtOH.Aq. M.p. 129–30°

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1687.

6-Methylflavone.
Needles from pet. ether. M.p. 122–3°. Sol. EtOH. Spar. sol. pet. ether. Conc. H_2SO_4 ⟶ sol. with blue fluor.

Ruhemann, *Ber.*, 1913, **46**, 2193.

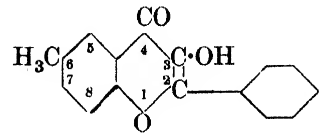
7-Methylflavone.
Yellow prisms from EtOH. M.p. 120°.

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1687.

8-Methylflavone.
Needles from EtOH. M.p. 170°. Spar. sol. cold EtOH, C_6H_6. Almost insol. pet ether. conc. H_2SO_4 ⟶ yellow sol.

Ruhemann, *Ber.*, 1913, **46**, 2192.

6-Methylflavonol



$C_{16}H_{12}O_3$ MW, 252

Yellow plates from AcOH. M.p. 196–7°. Sol. C_6H_6, $CHCl_3$. Spar. sol. Et_2O, cold AcOH. Almost insol. cold EtOH. Conc. H_2SO_4 ⟶ yellow sol. Alkalis ⟶ intense yellow salts, spar. sol. H_2O.
Benzoyl: needles from MeOH. M.p. 167–8°. Conc. H_2SO_4 ⟶ yellow sol.

Auwers, Müller, *Ber.*, 1908, **41**, 4239.

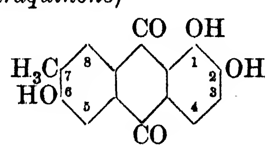
7-Methylflavonol.
Yellow needles from EtOH. M.p. 160°. Sol. EtOH, C_6H_6. Spar. sol. pet. ether. Sol. alkalis. Conc. H_2SO_4 ⟶ yellow sol. with blue fluor.
Acetyl: needles from EtOH.Aq. M.p. 122–3°.

Auwers, Pohl, *Ann.*, 1914, **405**, 292.

8-Methylflavonol.
Needles from EtOH. M.p. 181–2°. Sol. C_6H_6, AcOH. Spar. sol. cold EtOH, ligroin. Conc. H_2SO_4 ⟶ yellow sol. with blue fluor.
Acetyl: needles from EtOH.Aq. M.p. 161–2°.

Auwers, *Ber.*, 1916, **49**, 815.

7-Methylflavopurpurin (3:7:8-*Trihydroxy-2-methylanthraquinone*)



$C_{15}H_{10}O_5$ MW, 270

Reddish-brown needles from $PhNO_2$. M.p. 318–20°. Sol. alkalis with reddish-brown col. Conc. H_2SO_4 ⟶ brownish-red sol.
Tri-Me ether: $C_{18}H_{16}O_5$. MW, 312. Yellow needles from AcOH. M.p. 218°. Sol. C_6H_6, AcOH. Spar. sol. EtOH, Et_2O. Conc. H_2SO_4 ⟶ red sol.
Triacetyl: yellow needles from AcOH. M.p. 204–5°. Sol. AcOH. Mod. sol. Me_2CO, C_6H_6. Spar. sol. EtOH.

Bistrzycki, Krauser, *Helv. Chim. Acta*, 1923, **6**, 759.
Keimatsu, Hirano, *Chem. Abstracts*, 1930, **24**, 1373.

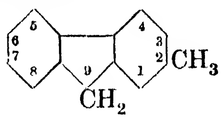
8-Methylflavopurpurin (3:7:8-*Trihydroxy-1-methylanthraquinone*).

Needles from $PhNO_2$. M.p. above 330°. Sol. alkalis. Conc. $H_2SO_4 \longrightarrow$ violet sol.

Tri-Me ether: yellow needles from AcOH. M.p. 197°. Sol. AcOH, C_6H_6. Spar. sol. EtOH, Me_2CO. Conc. $H_2SO_4 \longrightarrow$ reddish-violet col.

See first reference above.

2-Methylfluorene



$C_{14}H_{12}$ MW, 180

Plates from EtOH. M.p. 104°. B.p. 317–19°/760 mm.

Kruber, *Ber.*, 1932, **65**, 1395.

3-Methylfluorene.

Plates from EtOH. M.p. 88°.

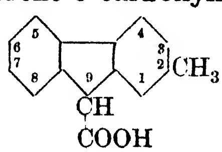
Sieglitz, Schatzkes, *Ber.*, 1921, **54**, 2071.

9-Methylfluorene.

Prisms. M.p. 46–7°. B.p. 154–6°/15 mm. Sol. usual org. solvents. Insol. H_2O. Volatile in steam.

Wislicenus, Mocker, Ber., 1913, **46**, 2780.

2-Methylfluorene-9-carboxylic Acid



$C_{15}H_{12}O_2$ MW, 224

Needles from EtOH or toluene. M.p. 210–11°. Heat above m.p. $\longrightarrow$ 2-methylfluorene.

Me ester: $C_{16}H_{14}O_2$. MW, 238. Needles from EtOH. M.p. 104–5°.

Kruber, *Ber.*, 1932, **65**, 1394.

3-Methylfluorene-9-carboxylic Acid.

Cryst. from C_6H_6–pet. ether. M.p. about 210° decomp.

Vorländer, Pritzche, *Ber.*, 1913, **46**, 1795.

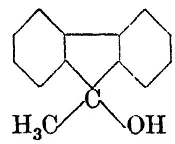
9-Methylfluorene-9-carboxylic Acid.

Plates from EtOH, needles from C_6H_6. Sol. EtOH, Et_2O, hot AcOH. Spar. sol. pet. ether. Almost insol. hot H_2O. Heat at 250° $\longrightarrow$ 9-methylfluorene. Conc. $H_2SO_4 \longrightarrow$ greenish-yellow sol. $\longrightarrow$ red on heating.

Me ester: $C_{16}H_{14}O_2$. MW, 238. Cryst. M.p. 33°. B.p. 188–90°/14 mm. Sol. usual org. solvents. Conc. $H_2SO_4 \longrightarrow$ greenish yellow col. $\longrightarrow$ reddish-brown on heating.

Wislicenus, Mocker, *Ber.*, 1913, **46**, 2779.

9-Methyl-9-fluorenol (*Methyldiphenylene-carbinol*)



$C_{14}H_{12}O$ MW, 196

Prisms from C_6H_6. M.p. 174·5°. Sol. warm C_6H_6, EtOH. Spar. sol. Et_2O, ligroin. Conc. $H_2SO_4 \longrightarrow$ brown sol.

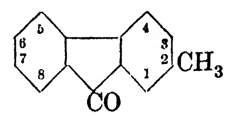
Et ether: $C_{16}H_{16}O$. MW, 224. Prisms from Et_2O. M.p. 85–6° (84°).

Acetyl: prisms from Et_2O. M.p. 75°.

Benzoyl: cryst. from EtOH. M.p. 173°.

Daufresne, *Bull. soc. chim.*, 1907, **1**, 1233.
Wieland, Cerezo, *Ann.*, 1927, **457**, 249.

2-Methylfluorenone



$C_{14}H_{10}O$ MW, 194

Yellow needles from ligroin. M.p. 92°.

Kruber, *Ber.*, 1932, **65**, 1394.

3-Methylfluorenone.

Yellow plates from EtOH.Aq. M.p. 68° (66·5°). Sol. most org. solvents. Spar. sol. ligroin. Insol. H_2O.

Ullmann, Mallet, *Ber.*, 1898, **31**, 1694.

Methyl fluoride (*Fluoromethane*)

CH_3F

CH_3F MW, 59

B.p. − 78·2°/760 mm. Crit. temp. 44·55° (44·9°). Crit. press. 58·0 ± 0·2 atm. 100 vols. H_2O dissolve 166 vols. of the gas at 15°.

Moles, Batuecas, *J. chim. phys.*, 1919, **17**, 537.
Cawood, Patterson, *J. Chem. Soc.*, 1932, 2180.

***N*-Methylformamide** (*Formylmethylamine*)

$H{\cdot}CO{\cdot}NH{\cdot}CH_3$

C_2H_5ON MW, 59

B.p. 180–5°. D^{19} 1·011. Sol. H_2O, EtOH. Insol. Et_2O.

Gautier, *Ann.*, 1869, **151**, 241.
Schmidt, E.P., 252,460, (*Chem. Abstracts*, 1927, **21**, 2273).

Methyl formate

H·CO·OCH$_3$

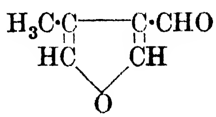
$C_2H_4O_2$ MW, 60

F.p. $-$ 99·0°. B.p. 31·50°. D^0 1·00317, D^{15} 0·98674, D^{30} 0·95973. n^{15}_{He} 1·34648.

Young, Thomas, *J. Chem. Soc.*, 1893, **63**, 1195.
Gesellschaft für Kohlentechnick, D.R.P., 595,307, (*Chem. Abstracts*, 1934, **28**, 4072).

Methylfumaric Acid.
See Mesaconic Acid.

4-Methyl-β-furaldehyde (4-*Methylfuran*-3-*aldehyde*)

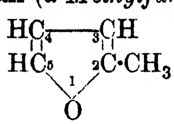


$C_6H_6O_2$ MW, 110

Oil. B.p. 55°/11 mm.
Semicarbazone: cryst. from EtOH.Aq. M.p. 217–18° decomp.
Hydrazone: cryst. M.p. about 44–5°.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, **16**, 35.

2-Methylfuran (α-*Methylfurfuran*, *silvan*)



C_5H_6O MW, 82

Exists in two forms.
(i) B.p. 63–63·5°. D^{20}_0 0·9159. Misc. with EtOH, Et_2O. Spar. sol. H_2O. Turns yellow in air. Decomp. by strong NaOH.
(ii) B.p. 78·5–79°/42 mm. D^{18}_4 0·9406. n^{18}_D 1·457. Unstable. Alkalis ⟶ (i).

Harries, *Ber.*, 1898, **31**, 37.
Kizhner, *Chem. Abstracts*, 1932, **26**, 5299.
Société anonyme des Distilleries des Deux-Sèvres, F.P., 639,756, (*Chem. Abstracts*, 1929, **23**, 609).

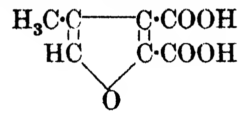
3-Methylfuran (β-*Methylfurfuran*).
B.p. 65·5° (63–4°). D^{18}_4 0·923. n^{18}_D 1·4255. Gives bluish-green col. with pine shavings.

Reichstein, Zschokke, *Helv. Chim. Acta*, 1931, **14**, 1276.
Asahina, Tanake, *Acta Phytochimica*, 1924, **2**, 21, (*Chem. Zentr.*, 1924, II, 1694).

4-Methylfuran-3-aldehyde.
See 4-Methyl-β-furaldehyde.

Methylfuran-carboxylic Acid.
See Methyl-β-furoic Acid *and* Methylpyromucic Acid.

4-Methylfuran-2 : 3-dicarboxylic Acid

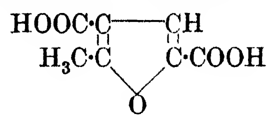


$C_7H_6O_5$ MW, 170

Cryst. from hot H_2O. M.p. 233° decomp. Sublimes in high vacuo.
2-*Amide*: $C_7H_7O_4N$. MW, 169. Cryst. from hot. H_2O. M.p. 228–30°.
2-*Nitrile*: $C_7H_5O_3N$. MW, 151. Cryst. M.p. about 195–9°.

Reichstein, Zschokke, *Helv. Chim. Acta* 1931, **14**, 1274.

5-Methylfuran-2 : 4-dicarboxylic Acid

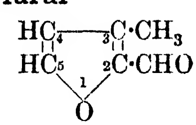


$C_7H_6O_5$ MW, 170

Cryst. M.p. 270–2°. Sublimes in vacuo.

Gilman, Calloway, Smith, *J. Am. Chem. Soc.*, 1934, **56**, 221.

3-Methylfurfural



$C_6H_6O_2$ MW, 110

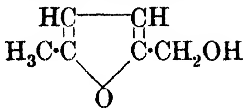
Oil. B.p. 60–1°/12 mm.
Oxime: m.p. 73–6°. B.p. about 106°/12 mm.
Semicarbazone: cryst. from EtOH. M.p. 216–18° decomp.

Reichstein, Zschokke, Georg, *Helv. Chim. Acta*, 1931, **14**, 1280.

5-Methylfurfural.
Oil. B.p. 187°/760 mm., 79–81°/12 mm. D^{18}_4 1·1072. Sol. 30 parts H_2O.
Oxime: *anti*, prisms from ligroin. M.p. 51–2°. *Syn*, needles from ligroin. M.p. 112°.
Semicarbazone: cryst. M.p. 210–11° (176–7°).
Phenylhydrazone: m.p. 147–8°.
p-*Nitrophenylhydrazone*: scarlet ppt. from EtOH.Aq. M.p. 130°.

Rinkes, *Organic Syntheses*, 1934, XIV, 62.
Fromherz, Meigen, *Ber.*, 1907, **40**, 404.
Reichstein, *Helv. Chim. Acta*, 1930, **13**, 346.

5-Methylfurfuryl Alcohol

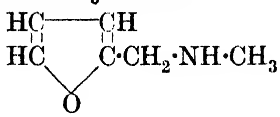


$C_6H_8O_2$ MW, 112

B.p. 194–6°/744 mm., slight decomp., 97–9°/36 mm., 70–3°/6 mm. D_4^{20} 1·0769. n_D^{20} 1·4853.
Diphenylurethane: cryst. from pet. ether. M.p. 52–3°.

Scott, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 2554.

***N*-Methylfurfurylamine**

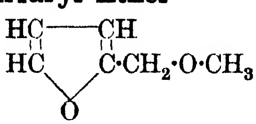


C_6H_9ON MW, 111

Oil. B.p. 65–7°/21 mm., 59–60°/25 mm. Strong base.
B,HCl: plates. M.p. 139°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6.
B,HBr: needles or plates. M.p. 131°. Sol. EtOH. Insol. Et_2O.
N-Et: methylethylfurfurylamine. $C_8H_{13}ON$. MW, 139. B.p. 69–70°/23 mm. B_2,H_2PtCl_6: m.p. 147°. Sol. H_2O. *Picrate*: m.p. 91°. Sol. EtOH. *Methiodide*: m.p. 101°. Sol. EtOH.
N-*Benzoyl*: b.p. 180–5°/5 mm.
Picrate: yellow needles from EtOH. M.p. 144°. Sol. H_2O, EtOH.

Schwabbauer, *Ber.*, 1902, **35**, 411.
v. Braun, Köhler, *Ber.*, 1918, **51**, 86.

Methyl furfuryl Ether

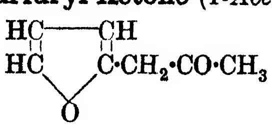


$C_6H_8O_2$ MW, 112

B.p. 134–5°/762 mm. D_4^{20} 1·0163. n_D^{20} 1·4570.

Kirner, *J. Am. Chem. Soc.*, 1928, **50**, 1958.

Methyl furfuryl Ketone (1-*Acetonylfuran*)

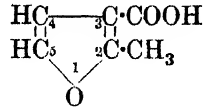


$C_7H_8O_2$ MW, 124

B.p. 179–80°. Sol. dil. HCl.
Oxime: b.p. 135–40°/25 mm.
Semicarbazone: cryst. M.p. 173–4°.

Darzens, *Compt. rend.*, 1906, **142**, 215.

2-Methyl-β-furoic Acid (2-*Methylfuran*-3-*carboxylic acid*)



$C_6H_6O_3$ MW, 126

Cryst. from H_2O. M.p. 102–3°. Sol. EtOH, Et_2O, AcOH, pet. ether.
Et ester: $C_8H_{10}O_3$. MW, 154. B.p. 85–7°/20 mm.
Hydrazide: m.p. 149·5–150°.

Benary, *Ber.*, 1911, **44**, 496.
Gilman, Burtner, Smith, *Rec. trav. chim.*, 1932, **51**, 407.

4-Methyl-β-furoic Acid (4-*Methylfuran*-3-*carboxylic acid*).

Needles from C_6H_6–pet. ether. M.p. 138–9°. Sol. H_2O. No ppt. with $FeCl_3$. Not acid to Congo.
Chloride: $C_6H_5O_2Cl$. MW, 144·5. B.p. 59°/11 mm.

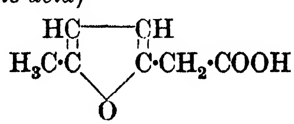
Reichstein, Zschokke, *Helv. Chim. Acta*, 1931, **14**, 1275.

5-Methyl-β-furoic Acid (5-*Methylfuran*-3-*carboxylic acid*).

Cryst. from hot H_2O. M.p. 119°.

Gilman, Burtner, Smith, *J. Am. Chem. Soc.*, 1933, **55**, 405.

5-Methyl-α-furylacetic Acid (5-*Methylfuran-2-acetic acid*)

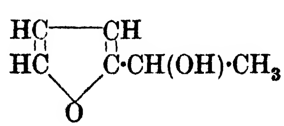


$C_7H_8O_3$ MW, 140

Needles from pet. ether. M.p. 61–2° (57–8°). Sol. H_2O.
Nitrile: oil. B.p. 79–84°/10 mm.

Reichstein, Zschokke, *Helv. Chim. Acta*, 1932, **15**, 252.

Methyl-2-furylcarbinol (2-α-*Hydroxyethylfuran*)



$C_6H_8O_2$ MW, 112

B.p. 76–7°/23 mm. D_{25}^{25} 1·0771. n_D^{25} 1·4785.

Peters, Fischer, *J. Am. Chem. Soc.*, 1930, **52**, 2081.

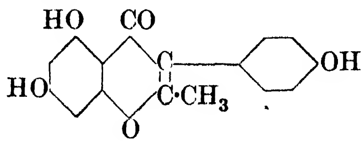
Methyl 2-α-furylethyl Ketone.
See Furfurylacetone.

Methyl α-furyl Ketone.
See 2-Acetofurone.

Methylgalactoside.
See under Galactose.

Methylgallic Acid. 4 : 5-Dihydroxy-3-methoxybenzoic Acid.
See under Gallic Acid.

2-Methylgenistein (*2-Methylprunetol, 5 : 7 : 4′-trihydroxy-2-methyl isoflavone*)



$C_{16}H_{12}O_5$ MW, 284

Needles $+H_2O$ from EtOH.Aq. M.p. 258–9° slight decomp. $FeCl_3 \longrightarrow$ violet col., changing to brownish-green. Conc. $H_2SO_4 \longrightarrow$ pale yellow sol. with bluish-green fluor.

4′-Me ether: $C_{17}H_{14}O_5$. MW, 298. Prisms from EtOH. M.p. 205°. Colourless sols in alkalis. Alc. $FeCl_3 \longrightarrow$ reddish-violet col. changing to brownish-green. Conc. $H_2SO_4 \longrightarrow$ sol. with weak blue fluor. *Diacetyl*: needles from EtOH. M.p. 208–9°.

7 : *4′-Di-Me ether*: $C_{18}H_{16}O_5$. MW, 312. Needles from EtOH. M.p. 197–9°.

Tri-Me ether: $C_{19}H_{18}O_5$. MW, 326. M.p. 175–6°. Conc. $H_2SO_4 \longrightarrow$ pale yellow sol. with blue fluor. No col. with $FeCl_3$.

7 : *4′-Diacetyl*: pink prisms from AcOH. M.p. 171°. Violet col. with alc. $FeCl_3$.

Triacetyl: needles from EtOH. M.p. 214°. Spar. sol. EtOH.

Baker, Robinson, *J. Chem. Soc.*, 1926, 2716.

Methyl geranyl Ketone

$$(CH_3)_2C{:}CH{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}CO{\cdot}CH_3$$

$C_{12}H_{20}O$ MW, 180

B.p. 238°/721 mm., 94°/2 mm. D^{15} 0·8796. n_D^{20} 1·4598.

Barbier, *Helv. Chim. Acta*, 1934, **17**, 1028.

Methyl-glucoheptoside.
See under Glucoheptose.

Methyl-glucoheptuloside.
See under Glucoheptulose.

Methylglucoside.
See under Glucose.

α-Methylglutaconic Acid (*3-Methylglutaconic acid, 1-butylene-1: 3-dicarboxylic acid*)

$$HOOC{\cdot}\overset{CH_3}{CH}{\cdot}CH{:}CH{\cdot}COOH$$

$C_6H_8O_4$ MW, 144

Cis:

Cryst. from ligroin. M.p. 118°. Sol. $CHCl_3$, Et_2O. Acids or alkalis $\longrightarrow$ *trans*-form.

Anhydride: needles from Et_2O. M.p. 85°. Sol. $CHCl_3$, AcOEt. Spar. sol. Et_2O.

Mono-anilide: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH.Aq. M.p. 148°. Loses CO_2 above m.p. Heat at 150° $\longrightarrow$ *trans*-form.

Trans:

Prisms from H_2O. M.p. 145–6°. Very sol. warm H_2O. Sol. EtOH. Spar. sol. $CHCl_3$. Less sol. Et_2O, AcOEt than *cis*-form.

Di-Et ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 244°/754 mm., 165°/60 mm.

Monoamide: $C_6H_9O_3N$. MW, 143. Plates $+ H_2O$ from H_2O. M.p. 182–3° decomp. Sol. H_2O. Spar. sol. EtOH. Almost insol. AcOEt.

Mono-anilide: $C_{12}H_{13}O_3N$. MW, 219. Needles from AcOEt. M.p. 189°. Loses CO_2 at 195°.

Thole, Thorpe, *J. Chem. Soc.*, 1911, **99**, 2215.
Feist, Pomme, *Ann.*, 1909, **370**, 61.
Thorpe, Wood, *J. Chem. Soc.*, 1913, **103**, 1582.

β-Methylglutaconic Acid (*2-Methylpropylene-1 : 3-dicarboxylic acid, isobutylene-1 : 3-dicarboxylic acid, 2-methylglutaconic acid*)

$$HOOC{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}COOH$$

$C_6H_8O_4$ MW, 144

Cis:

Prisms from H_2O. M.p. 147–9°. Sol. H_2O, EtOH. Spar. sol. Et_2O, $CHCl_3$. Insol. C_6H_6. $k = 1{\cdot}29 \times 10^{-4}$ at 25°. Sublimes.

Mono-Et ester: $C_8H_{12}O_4$. MW, 172. Needles from C_6H_6–pet. ether. M.p. 73°. Sol. most org. solvents.

Di-Et ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 165°/70 mm., 131°/9 mm. D_4^{20} 1·034. n_{He}^{20} 1·452.

Anhydride: needles from pet. ether, cryst. from $CHCl_3$. M.p. 86°.

Mono-anilide: $C_{12}H_{13}O_3N$. MW, 219. Needles from C_6H_6. M.p. 143°. Spar. sol. C_6H_6. Heat at 150° $\longrightarrow$ hydroxyanil.

Trans:

Cryst. M.p. 115–16°. Spar. sol. cold $CHCl_3$. $k = 1{\cdot}39 \times 10^{-4}$ at 25°.

Di-Et ester: b.p. 167°/68 mm., 127°/12 mm. D_4^{20} 1·034. n_{He}^{20} 1·452.

Bland, Thorpe, *J. Chem. Soc.*, 1912, **101**, 865, 1557.

N-Methylglutamic Acid (1-*Methylamino-glutaric acid*)

$$CH_3{\cdot}NH{\cdot}CH{\cdot}COOH$$
$$CH_2$$
$$CH_2{\cdot}COOH$$

$C_6H_{11}O_4N$ MW, 161

Rhombohedra from H_2O. M.p. 156–8°. Decomp. at 200°.

B,HCl: cryst. M.p. 210–13° (159–60°).

Di-Et ester: $C_{10}H_{19}O_4N$. MW, 217. B.p. 108–9°/2 mm. Misc. with H_2O.

N-Acetyl: cryst. from AcOH. Decomp. at 203°.

N-p-*Toluenesulphonyl*: cryst. from toluene–EtOH. M.p. 131–2°.

Knoop, Oesterlin, *Z. physiol. Chem.*, 1927, **170**, 186.

Sugasawa, *Chem. Zentr.*, 1928, I, 1646.

2-Methylglutaraldehyde (2-*Methylglutaric dialdehyde*, 1 : 3-*dialdehydoisobutane*, 2-*methylpropane*-1 : 3-*diol*, *isobutane*-1 : 3-*dialdehyde*)

$$H_3C{\cdot}CH{<}^{CH_2{\cdot}CHO}_{CH_2{\cdot}CHO}$$

$C_6H_{10}O_2$ MW, 114

Oil. B.p. 220°, 140–60°/20 mm. Forms bisulphite comp.

Riban, *Bull. soc. chim.*, 1872, **18**, 63.

1-Methylglutaric Acid (*Butane*-1 : 3-*dicarboxylic acid*)

$$CH_3{\cdot}CH{\cdot}COOH$$
$$CH_2$$
$$CH_2{\cdot}COOH$$

$C_6H_{10}O_4$ MW, 146

Prisms from H_2O. M.p. 79° (77–8°). B.p. 205–8°/12 mm. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6. Heat of comb. C_v 670·5 Cal. $k = 5{\cdot}4 \times 10^{-5}$ at 25°.

1-*Nitrile*: $C_6H_9O_2N$. MW, 127. Prisms from H_2O. M.p. 95–6°. Sol. H_2O, C_6H_6, $CHCl_3$. Mod. sol. Et_2O. *Et ester*: $C_8H_{13}O_2N$. MW, 155. B.p. 210°.

Dinitrile: $C_6H_8N_2$. MW, 108. B.p. 269–71°, 134°/13 mm. Sol. H_2O, EtOH, Et_2O.

Anhydride: oil. B.p. 272–5°.

Monoanilide: $C_{12}H_{15}O_3N$. MW, 221. Exists in two forms. (i) M.p. 114–15°. (ii) M.p. about 100°.

Dianilide: needles from EtOH.Aq. M.p. 175–6°. Spar. sol. Et_2O, C_6H_6, AcOH.

Mono-p-*toluidide*: $C_{13}H_{17}O_3N$. MW, 235. Exists in two forms. (i) Cryst. from Et_2O. M.p. 126°. (ii) Cryst. from Et_2O. M.p. 98–9°. More sol. than first form.

Di-p-*toluidide*: needles from EtOH. M.p. 174–5°. Sol. EtOH, AcOH. Spar. sol. Et_2O. Almost insol. C_6H_6.

Mono-2-naphthalide: plates from EtOH. M.p. 115–19°. Sol. EtOH, Et_2O. Spar. sol. C_6H_6.

Di-2-naphthalide: cryst. from EtOH. M.p. 227–8°.

Howles, Udall, Thorpe, *J. Chem. Soc.*, 1900, **77**, 947.

Franke, Kohn, *Monatsh.*, 1902, **23**, 745.

Auwers, *Ann.*, 1896, **292**, 210.

2-Methylglutaric Acid (*Isobutane*-1 : 3-*dicarboxylic acid*, *ethylidene-diacetic acid*)

$$CH_3{\cdot}CH{<}^{CH_2{\cdot}COOH}_{CH_2{\cdot}COOH}$$

$C_6H_{10}O_4$ MW, 146

Prisms and plates from $CHCl_3$–CS_2. M.p. 87°. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6, $CHCl_3$. Almost insol. CS_2, ligroin. $k = 6{\cdot}00 \times 10^{-5}$ at 25°.

Et ester: *nitrile*, $C_8H_{13}O_2N$. MW, 155. B.p. 205°.

Dinitrile: $C_6H_8N_2$. MW, 108. B.p. 140°/10 mm.

Anhydride: prisms from CS_2. M.p. 41°. B.p. 276–8°, 180–2°/25 mm. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6, AcOH. Spar. sol. cold H_2O, pet. ether.

Monoanilide: cryst. from H_2O or C_6H_6. M.p. 121° (117°).

Mono-p-*toluidide*: needles from hot H_2O. M.p. 135°.

Mono-1-*naphthalide*: cryst. from hot EtOH.Aq. M.p. 170·5°. Sol. H_2O, most org. solvents except ligroin, CS_2.

Mono-2-naphthalide: needles. M.p. 143°. Sol. C_6H_6, hot H_2O, EtOH, $CHCl_3$. Insol. Et_2O, ligroin.

Blaise, Gault, *Bull. soc. chim.*, 1907, **1**, 88.

Darbishire, Thorpe, *J. Chem. Soc.*, 1905, **87**, 1717.

Komppa, *Chem. Abstracts*, 1931, **25**, 3625.

2-Methylglyceric Acid.

See 1 : 2-Dihydroxybutyric Acid.

1-Methylglycerol (1 : 2 : 3-*Trihydroxybutane*)

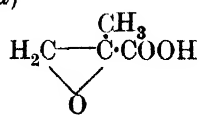
$$CH_3{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_2OH$$

$C_4H_{10}O_3$ MW, 106

Liq. with sweet taste. B.p. 172–5°/27 mm., 110–12°/11 mm. n_D 1·4462.

Gilchrist, Purves, *J. Chem. Soc.*, 1925, **127**, 2744.

1-Methylglycidic Acid (*Propylene oxide 2-carboxylic acid*)



$C_4H_6O_3$ MW, 102

d-.

Syrup.

K salt: plates from EtOH. $[\alpha]_D^{20}$ −17·6° in H_2O. Sol. EtOH.

dl-.

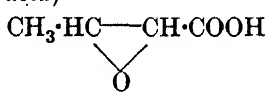
Liq. Sol. H_2O, EtOH, Et_2O.

K salt: plates. Sol. H_2O, hot EtOH.

Et ester: $C_6H_{10}O_3$. MW, 130. B.p. 162–4°. D^0 1·0686, D^{15} 1·0546. Insol. H_2O.

Melikow, Zelinsky, *Ber.*, 1888, **21**, 2053.
Kay, *J. Chem. Soc.*, 1909, **95**, 562.

2-Methylglycidic Acid (*Propylene oxide 1-carboxylic acid*)



$C_4H_6O_3$ MW, 102

Exists in two forms.

(i) Prisms from Et_2O. M.p. 84°. Very sol. H_2O, EtOH, Et_2O.

Et ester: $C_6H_{10}O_3$. MW, 130. B.p. 172–4°. D^0 1·0658, D^{15} 1·0534. Insol. H_2O.

(ii) 2-Methylisoglycidic Acid.

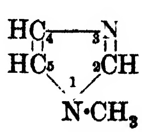
K salt: prisms + H_2O from H_2O. M.p. 82°.

See previous references and also
Kaufmann, D.R.P., 528,506, (*Chem. Abstracts*, 1931, **25**, 5178).

Methylglycine.
See Sarcosine.

Methylglyoxal.
See Pyruvic Aldehyde.

1-Methylglyoxaline (1-*Methyliminazole, oxalmethyline*)



$C_4H_6N_2$ MW, 82

F.p. − 6°. B.p. 195–6°, 94–5°/14–15 mm. D^{10} 1·0363. Misc. with H_2O.

B_2,H_2PtCl_6: orange-red needles or prisms. M.p. 190–1°.

$B,HAuCl_4$: yellow cryst. M.p. 118–20°.

$B_2,2HCl,ZnCl_2$: cryst. M.p. 128–31°. Sol. H_2O. Mod. sol. EtOH. Insol. Et_2O.

Picrate: yellow needles. M.p. 158–9°.

Methiodide: solid. Very hygroscopic. *B_2,H_2PtCl_6*: plates. M.p. 202–3° decomp.

Wohl, Marckwald, *Ber.*, 1889, **22**, 1359.
Sarasin, *Helv. Chim. Acta*, 1923, **6**, 374.

2-Methylglyoxaline (2-*Methyliminazole, glyoxalethyline, para-oxalmethyline*).

Needles from C_6H_6. M.p. 136°. B.p. 267°. Sol. H_2O, EtOH. Spar. sol. cold C_6H_6.

Picrate: needles from boiling H_2O. M.p. 213°.

Acid oxalate: prisms from H_2O. M.p. 160°.

Radziszewski, *Ber.*, 1883, **16**, 488.
Fargher, Pyman, *J. Chem. Soc.*, 1919, **115**, 231.

4-Methylglyoxaline (4(5)-*Methyliminazole, 5-methylglyoxaline*).

Cryst. M.p. 56°. B.p. 263°, 120–5°/0·02 mm. Sol. H_2O, EtOH.

B,HNO_3: plates or needles. M.p. 110° decomp.

N-*Benzoyl*: needles. M.p. 54–5°. Very sol. EtOH, Et_2O, Me_2CO, C_6H_6. Sol. pet. ether, ligroin.

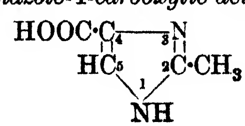
$B,HAuCl_4$: prisms. M.p. 200–1°. Spar. sol. cold H_2O.

Picrate: yellow cryst. from H_2O. M.p. 159–60°.

Gabriel, Pinkus, *Ber.*, 1893, **26**, 2205.
Yabuta, Kambe, *Chem. Abstracts*, 1930, **24**, 3509.
Weidenhagen, Herrmann, *Chem. Zentr.*, 1935, I, 2982.

Methylglyoxaline-acetic Acid.
See Methyliminazolylacetic Acid.

2-Methylglyoxaline-4-carboxylic Acid (2-*Methyliminazole-4-carboxylic acid*)



$C_5H_6O_2N_2$ MW, 126

Prisms + H_2O from H_2O. M.p. 262°. Sol. 20 parts boiling H_2O. Insol. usual org. solvents.

B,HCl: prisms from H_2O. M.p. 268°.

B,HNO_3: prisms from H_2O. M.p. 190° (240°).

Et ester: $C_7H_{10}O_2N_2$. MW, 154. Needles

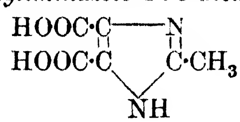
from AcOEt. M.p. 156°. Sol. EtOH, AcOEt. Spar. sol. H_2O.
Anilide: needles + H_2O from H_2O. M.p. anhyd. 208°.
Picrate: cubes + $2H_2O$ from H_2O. M.p. 200–224°.

Fargher, Pyman, *J. Chem. Soc.*, 1919, **115**, 230, 1017.

1-Methylglyoxaline-5-carboxylic Acid (1-*Methyliminazole*-5-*carboxylic acid*).
Me ester: $C_6H_8O_2N_2$. MW, 140. Prisms from MeOH. M.p. 68–70°. Sol. H_2O, EtOH, $CHCl_3$. Spar. sol. cold Et_2O. *Picrate*: yellow prisms from H_2O. M.p. 171°. Spar. sol. cold H_2O, MeOH, EtOH.
Picrate: leaflets from H_2O. M.p. 198–9°. Spar. sol. H_2O, EtOH.

Hubball, Pyman, *J. Chem. Soc.*, 1928, 28.

2-Methylglyoxaline-4 : 5-dicarboxylic Acid (2-*Methyliminazole*-4 : 5-*dicarboxylic acid*)



$C_6H_6O_4N_2$ MW, 170

Needles and prisms from H_2O. Decomp. about 300°. Sol. 200 parts boiling H_2O. Very hygroscopic.
K salt: needles. M.p. 271°. Spar. sol. cold H_2O.
Di-Et ester: $C_{10}H_{14}O_4N_2$. MW, 226. Needles. M.p. 88°. Sol. H_2O, EtOH, $CHCl_3$.
5-*Chloride*: $C_6H_5O_3N_2Cl$. MW, 188·5. Plates. M.p. above 300°. Insol. EtOH, Et_2O, $CHCl_3$.
B,HCl: m.p. 187°. Sol. H_2O, EtOH, $CHCl_3$. Insol. Et_2O.

Tamamushi, *Chem. Abstracts*, 1934, **28**, 150.
Fargher, Pyman, *J. Chem. Soc.*, 1919, **115**, 229.

Methylglyoxime (*Pyruvic aldehyde dioxime*)

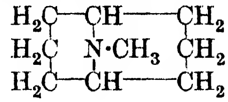
$CH_3{\cdot}C(:N{\cdot}OH){\cdot}CH:N{\cdot}OH$

$C_3H_6O_2N_2$ MW, 102

Prisms from EtOH. M.p. 157° (153°). Sol. EtOH, Et_2O. Spar. sol. cold H_2O. Sublimes in needles.
Mono-Me ether: $C_4H_8O_2N_2$. MW, 116. M.p. 98–9°. *Acetyl*: m.p. 43°.
Di-Me ether: $C_5H_{10}O_2N_2$. MW, 130. B.p. 145·5–146·5°
Dibenzoyl: needles. M.p. 164–5°.

Avogadro, Tavola, *Gazz. chim. ital.*, 1925, **55**, 323.
Ponzio, *Gazz. chim. ital.*, 1921, **51**, ii, 213.

N-Methylgranatanine



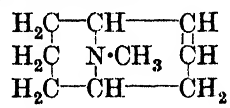
$C_9H_{17}N$ MW, 139

Cryst. M.p. 55–8° (50°). B.p. 192–3°/763 mm. (196–9°/725 mm.), 78·5°/15 mm. Sol. H_2O, EtOH, Et_2O, C_6H_6, pet. ether. Stable to $KMnO_4$.
B,HAuCl₄: yellow needles from H_2O. M.p. 243–4° decomp. Spar. sol. H_2O.
B_2,H_2PtCl_6: prisms. M.p. 220–1° decomp. Sol. H_2O.
Picrate: yellow plates from EtOH.Aq. M.p. about 300°.
Methiodide: prisms from H_2O. M.p. above 330°.

Ciamician, Silber, *Ber.*, 1893, **26**, 2744.
Piccinini, *Gazz. chim. ital.*, 1902, **32**, i, 262.
Willstätter, Veraguth, *Ber.*, 1905, **38**, 1986.

N-Methylgranataninol.
See N-Methylgranatoline.

N-Methylgranatenine

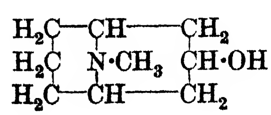


$C_9H_{15}N$ MW, 137

Cryst. M.p. 17·2–17·4°. B.p. 186–186·5°/732 mm., 62·0–62·2°/9 mm. D_4^{20} 0·961.
$B,HAuCl_4$: cryst. from dil. HCl. M.p. 220° decomp.
B_2,H_2PtCl_6: prisms from H_2O. M.p. 221° decomp. Spar. sol. H_2O.
Picrate: cryst. M.p. 286° decomp.
Methiodide: cryst. from H_2O. M.p. above 315°. Sol. 3 parts hot H_2O, 20–25 parts at 20°. Spar. sol. EtOH. Insol. $CHCl_3$.

Ciamician, Silber, *Ber.*, 1893, **26**, 2750.
Willstätter, Waser, *Ber.*, 1911, **44**, 3431.

N-Methylgranatoline (N-*Methylgranataninol*)



$C_9H_{17}ON$ MW, 155

Exists in two stereoisomeric forms.

I. ψ-Methylgranatoline.

Cryst. from pet. ether. M.p. 100°. B.p. 251°.

B,HAuCl$_4$: yellow needles from H_2O. M.p. 213°.

Methiodide : plates from H_2O. M.p. 307°. Spar. sol. hot H_2O.

Benzoyl : needles. M.p. 34°. B.p. 230°/24 mm. Sol. org. solvents. *B,HCl* : m.p. 235°. Sol. H_2O. Spar. sol. cold EtOH. *B,HI* : prisms from H_2O. M.p. 242–3°. *B$_2$,H$_2$SO$_4$* : cryst. + $3H_2O$. M.p. 181°. *B,HNO$_3$* : cryst. M.p. 227°. *Methiodide* : m.p. above 300°.

N-*Oxide* : $C_9H_{17}O_2N$. MW, 171. Cryst. from $Me_2CO–Et_2O$. M.p. 218°. $SO_2 \longrightarrow$ methylgranatoline. *B,HCl* : m.p. 210°. *Picrate* : m.p. 254°.

Cinnamoyl : cryst. M.p. 62–3°.

p-*Nitrobenzoyl* : needles from H_2O. M.p. 149–50°.

p-*Aminobenzoyl* : cryst. M.p. 194–6°.

Tropic acid ester : *B,HBr*, cryst. from EtOH. M.p. 220°. Sol. H_2O. Spar. sol. cold EtOH. Anæsthetic.

II. Isomethylgranatoline.

Prisms from pet. ether. M.p. 69–70° (65°). More sol. than first form. $KMnO_4 \longrightarrow$ ψ-pelletierine.

B,HAuCl$_4$: prisms from H_2O. M.p. 210–11° decomp.

Benzoyl : *B,HCl*, needles from EtOH. M.p. about 182°.

Tropic acid ester : *B,HBr*, cryst. from EtOH. M.p. 233°. Sol. H_2O, hot EtOH. Becomes yellow on exposure to light. Anæsthetic.

Mandelic acid ester : *B,HBr*, cryst. from EtOH. M.p. 229°. Sol. H_2O. Spar. sol. cold EtOH. Anæsthetic.

Ciamician, Silber, *Ber.*, 1893, **26**, 2741.
Willstätter, Veraguth, *Ber.*, 1905, **38**, 1989.
Werner, *J. Am. Chem. Soc.*, 1918, **40**, 671.
Tanret, *Compt. rend.*, 1923, **176**, 1659.
Polonovski, Polonovski, *Bull. soc. chim.*, 1927, **41**, 1186.

N-Methylgranatonine.

See ψ-Pelletierine.

Methylguaiacol.

See Creosol *and under* 2 : 3-Dihydroxytoluene *and* Homocatechol.

Methylguanidine

$$HN{:}C\!\left<\begin{matrix}NH{\cdot}CH_3\\NH_2\end{matrix}\right.$$

$C_2H_7N_3$ MW, 73

Product of putrefaction. Solid. Strongly basic. Easily decomp. Poisonous. Reduces $KMnO_4$. KOH $\longrightarrow$ methylamine + NH_3.

Formyl deriv. : m.p. 122°.

Acetyl deriv. : cryst. from EtOH. M.p. 171–2°. *B,HCl* : m.p. 172°.

B,HNO$_3$: cryst. from EtOH. M.p. 148–9°.

B,HNO$_2$: m.p. 150°.

B$_2$,H$_2$SO$_4$: cryst. from H_2O. M.p. 238°.

B,HAuCl$_4$: yellow cryst. M.p. 198–200°.

B$_2$,H$_2$PtCl$_6$: yellowish-red prisms. M.p. 194–5°.

Picrate : yellow plates or needles from H_2O. M.p. 201·5° (200°).

Traube, Gorniak, *Z. angew. Chem.*, 1929, **42**, 379.

Methylguanidinoacetic Acid.

See Creatine.

Methylguanidinobutyric Acid

$$H_2N{\cdot}\underset{NH}{\underset{\|}{C}}{\cdot}\overset{CH_3}{N}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_6H_{13}O_2N_3$ MW, 159

Prisms from H_2O. M.p. 307°. Sol. 20 parts H_2O at 100°, 120 parts at 25°.

B,HCl : cryst. from H_2O. M.p. 117–26°. Very sol. H_2O.

B$_2$,H$_2$SO$_4$: prisms. M.p. 245–6° decomp. Sol. 5 parts hot H_2O. Spar. sol. EtOH.

B,HNO$_3$: cryst. M.p. 123–33°.

B$_2$,H$_2$PtCl$_6$: cryst. from H_2O. M.p. 190–1°.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 61.

Methylguanidinocaproic Acid

$$H_2N{\cdot}\underset{NH}{\underset{\|}{C}}{\cdot}\overset{CH_3}{N}{\cdot}CH_2{\cdot}[CH_2]_4{\cdot}COOH$$

$C_8H_{17}O_2N_3$ MW, 187

Cryst. Decomp. about 285°. Sol. 69 parts H_2O at 20°. Sol. boiling EtOH.

B,HCl : needles from EtOH–Et_2O. M.p. 105° decomp. Very sol. H_2O, EtOH.

B,HNO$_3$: m.p. 80–5°.

Acid oxalate : cryst. M.p. 167–8° decomp. Very sol. hot H_2O. Spar. sol. cold EtOH. Insol. Et_2O.

Thomas, Goerne, *Z. physiol. Chem.*, 1919, **104**, 79.

Methylguanidinopropionic Acid

$$H_2N{\cdot}\underset{NH}{\underset{\|}{C}}{\cdot}\overset{CH_3}{N}{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_5H_{11}O_2N_3$ MW, 145

Prisms $+H_2O$ from H_2O. M.p. anhyd. 201–2° decomp. Sol. hot H_2O.

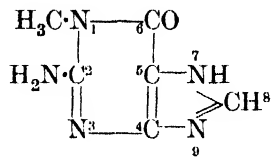
B,HCl : m.p. 160°. Very sol. H_2O, EtOH. Dissociates in aq. sol.

B_2,H_2SO_4 : needles from EtOH.Aq. Decomp. at 145°.

B_2,H_2PtCl_6 : cryst. M.p. 195° decomp. Spar. sol. cold H_2O.

Gansser, *Z. physiol. Chem.*, 1909, **61**, 43.

1-Methylguanine (*2-Amino-1-methylhypoxanthine*)



$C_6H_7ON_5$ MW, 165

Plates or needles from 50% AcOH. Sol. acids. Spar. sol. H_2O, NH_3. Insol. EtOH, Et_2O, $CHCl_3$. $HNO_2 \longrightarrow$ 1-methylxanthine.

B,HCl : plates from dil. HCl.

B_2,H_2SO_4 : needles.

B,HNO_3 : prisms from dil. HNO_3.

B_2,H_2PtCl_6 : yellow needles from dil. HCl.

Bayer, D.R.P., 262,470, (*Chem. Zentr.*, 1913, II, 633).

Traube, Dudley, *Ber.*, 1913, **46**, 3845.

7-Methylguanine (*Epiguanine, 6-hydroxy-2-aminopurine, 2-amino-7-methylhypoxanthine*).

Needles from H_2O. Decomp. on heating. Sol. dil. HCl, H_2SO_4. Less sol. dil. HNO_3. Sol. 900 parts boiling H_2O. $HNO_2 \longrightarrow$ 7-methylxanthine. $KClO_3 + HCl \longrightarrow$ guanidine.

$B,HClO_4$: needles.

B_2,H_2PtCl_6 : prisms.

Picrate : decomp. at 257°. Sol. 2740 parts H_2O at 18°.

Fischer, *Ber.*, 1898, **31**, 544.

8-Methylguanine (*2-Amino-8-methylhypoxanthine*).

Prisms from H_2O. Sol. H_2O. Spar. sol. EtOH, Et_2O.

B,HCl : prisms $+H_2O$ from conc. HCl.

B_2,H_2SO_4 : plates.

B,HNO_3 : oval plates.

Traube *et al.*, *Ann.*, 1923, **432**, 283.

Methylguloside.

See under Gulose.

***N*-Methylguvacine.**

See Arecaidine.

2-Methylheptadecane

$$CH_3{\cdot}[CH_2]_{14}{\cdot}\overset{CH_3}{CH}{\cdot}CH_3$$

$C_{18}H_{38}$ MW, 254

B.p. 311°, 178·5°/15 mm. D^{15} 0·7838. n_D^{14} 1·4394.

Landa, Riedl, *Chem. Zentr.*, 1931, I, 2454.

2-Methyl-2-heptadecylene

$$CH_3{\cdot}[CH_2]_{13}{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_3$$

$C_{18}H_{36}$ MW, 252

M.p. − 2·5°. B.p. 314°, 277°/100 mm. D^{20} 0·7953. Ox. $\longrightarrow$ acetone + pentadecylic acid.

Dibromide : b.p. 267–8°/28 mm.

See previous reference.

1-Methyl-15-heptadecylenic Acid

$$CH_2{:}CH{\cdot}[CH_2]_{13}{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_{18}H_{34}O_2$ MW, 282

Needles from pet. ether. M.p. 43–43·5°. B.p. 186–7°/3 mm.

Me ester : $C_{19}H_{36}O_2$. MW, 294. B.p. 158–9°/3 mm. D^{15} 0·876.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 131.

1-Methylheptadecylic Acid

$$CH_3{\cdot}[CH_2]_{14}{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_{18}H_{36}O_2$ MW, 284

M.p. 34–5° (51°). B.p. 179–83°/5 mm.

Stanley, Jay, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 1265.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1927, **46**, 153.

15-Methylheptadecylic Acid.

See Isostearic Acid.

Methyl heptadecyl Ketone (*Nonadecanone-2, 2-ketononadecane*)

$$CH_3{\cdot}[CH_2]_{16}{\cdot}CO{\cdot}CH_3$$

$C_{19}H_{38}O$ MW, 282

Leaflets from EtOH. M.p. 55–6°. B.p. 266·5°/110 mm. D^{56} 0·8108. Sol. EtOH, Et_2O, Me_2CO, $CHCl_3$, ligroin. Slowly reduces $NH_3.AgNO_3$ and Fehling's.

Oxime : cryst. from EtOH. M.p. 76°.

Thoms, Vogelsang, *Ann.*, 1907, **357**, 161.

6-Methyl-1 : 3-heptadiene (*1-Isobutyl-1 : 3-butadiene*)

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH{:}CH_2$$

C_8H_{14} MW, 110

B.p. 116–18°. D^{22} 0·741.

Fournier, *Bull. soc. chim.*, 1896, **15**, 401.

3-Methyl-2 : 4-heptadiene (1 : 2-*Dimethyl*-4-*ethylbutadiene*-1 : 3)

CH_3
$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}C{:}CH{\cdot}CH_3$

C_8H_{14} MW, 110

B.p. 132–5°. D_4^{15} 0·7667. n_D^{15} 1·4649.

Abelmann, *Ber.*, 1910, **43**, 1585.

4-Methyl-2 : 4-heptadiene (2 : 4-*Dimethyl*-1-*ethylbutadiene*-1 : 3)

CH_3
$CH_3{\cdot}CH_2{\cdot}CH{:}C{\cdot}CH{:}CH{\cdot}CH_3$

C_8H_{14} MW, 110

B.p. 131–2°. D_4^{25} 0·7551. n_D^{25} 1·4621.

Bjelouss, *Ber.*, 1910, **43**, 2332.

6-Methyl-2 : 4-heptadiene (1-*Methyl*-4-*isopropylbutadiene*-1 : 3)

CH_3
$CH_3{\cdot}CH{\cdot}CH{:}CH{\cdot}CH{:}CH{\cdot}CH_3$

C_8H_{14} MW, 110

B.p. 114–16°. D_4^{25} 0·7401. n_D^{25} 1·4397.

Reif, *Ber.*, 1908, **41**, 2745.

5-Methyl-1 : 5-heptadienol-4 (3-*Methyl*-2 : 6-*heptadienol*-4, *allylisobutenylcarbinol*)

CH_3
$CH_3{\cdot}CH{:}C{\cdot}CH(OH){\cdot}CH_2{\cdot}CH{:}CH_2$

$C_8H_{14}O$ MW, 126

Liq. with odour resembling menthol. B.p. 172–3°. decomp., 78–9°/19 mm. D_4^{12} 0·8766. n_D^{12} 1·4648. Absorbs atmospheric oxygen.

Enklaar, *Rec. trav. chim.*, 1916, **36**, 224.

4-Methyl-1 : 6-heptadienol-4.
See Methyldiallylcarbinol.

2-Methyl-2 : 4-heptadienone-6 (4-*Methyl*-1-*acetopentadiene*-1 : 3)

CH_3
$CH_3{\cdot}CO{\cdot}CH{:}CH{\cdot}CH{:}C{\cdot}CH_3$

$C_8H_{12}O$ MW. 124

B.p. 83·5°/9 mm. D_4^{20} 0·8980. n_D^{20} 1·5306. Absorbs atmospheric oxygen. AcOH + H_2SO_4 ⟶ red sol. finally turning deep blue.

Semicarbazone: needles from MeOH. M.p. 192° decomp.

Fischer, Löwenberg, *Ann.*, 1932, **494**, 279.

3-Methyl-2 : 4-heptadienone-6 (3-*Methyl*-1-*acetopentadiene*-1 : 3)

CH_3
$CH_3{\cdot}CO{\cdot}CH{:}CH{\cdot}C{:}CH{\cdot}CH_3$

$C_8H_{12}O$ MW, 124

B.p. 92–3°/12 mm. Decomp. on dist. at atm. press. Resinifies on standing.

Oxime: cryst. from pet. ether. M.p. 71°. B.p. 140–1°/13 mm.

Dautwitz, *Monatsh.*, 1906, **27**, 773.

1-Methylheptaldehyde (2-*Methylheptanal*, 1-*methylœnanthaldehyde*)

CH_3
$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{\cdot}CHO$

$C_8H_{16}O$ MW, 128

B.p. 159–61°/725 mm.

Fourneau, Benoit, Firmenich, *Bull. soc. chim.*, 1930, **47**, 869.

2-Methylheptandione-5 : 6.
See Acetylisocaproyl.

2-Methylheptane (*Iso-octane*)

CH_3
$CH_3{\cdot}[CH_2]_4{\cdot}CH{\cdot}CH_3$

C_8H_{18} MW, 114

Occurs in petroleum. F.p. − 111·3°. B.p. 117·2° (116–18°), 107°/747 mm. D_{15}^{15} 0·7035, D_0^{15} 0·7025. n_D^{20} 1·3981 (1·3949). Heat of comb. C_v 1305 Cal.

Clarke, *J. Am. Chem. Soc.*, 1911, **33**, 520; 1909, **31**, 113, 115.
Washburn, *Chem. Abstracts*, 1934, **28**, 3878.
Buelens, *Chem. Zentr.*, 1909, I, 832.
Leslie, *Bureau of Standards Journal of Research*, 1933, **10**, 609.
Fischer, Treibs, *Ann.*, 1925, **446**, 257.
Brown, Carr, *Ind. Eng. Chem.*, 1926, **18**, 718.

3-Methylheptane (*Methylethylbutylmethane*, 2-*ethylhexane*)

CH_3
$CH_3{\cdot}[CH_2]_3{\cdot}CH{\cdot}CH_2{\cdot}CH_3$

C_8H_{18} MW, 114

d-.
B.p. 110–20°. D^{16} 0·7075, D^{54} 0·680. $[\alpha]_D^{16}$ + 8·40°.

dl-.
B.p. 120–22°. D_{15}^{15} 0·7167, D_4^{20} 0·7069. n_D^{20} 1·398, n_D^{25} 1·4022.

Clarke, *J. Am. Chem. Soc.*, 1909, **31**, 558.
Guye, *Bull. soc. chim.*, 1901, **25**, 550.
Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 355.

4-Methylheptane (*Methyldipropylmethane*)

CH_3
$CH_3{\cdot}[CH_2]_2{\cdot}CH{\cdot}[CH_2]_2{\cdot}CH_3$

C_8H_{18} MW, 114

B.p. 118°. D^{15} 0·7217. n_D^{25} 1·3978.

Clarke, *Ber.*, 1907, **40**, 354.

2-Methylheptane-4-carboxylic Acid.
See 1-Propylisocaproic Acid.

3-Methylheptane-5-carboxylic Acid.
See 3-Methyl-1-ethylcaproic Acid.

4-Methylheptane-4-carboxylic Acid.
See 1-Methyl-1-propyl-*n*-valeric Acid.

2-Methylheptane-1 : 1-dicarboxylic Acid.
See 1-Methyl-*n*-hexylmalonic Acid.

2-Methylheptane-1 : 4-dicarboxylic Acid.
See 3-Methyl-1-propyladipic Acid.

2-Methylheptane-1 : 7-dicarboxylic Acid.
See 2-Methylazelaic Acid.

2-Methylheptane-3 : 4-dicarboxylic Acid.
See 1-Propyl-2-isopropylsuccinic Acid.

2-Methylheptane-3 : 6-dicarboxylic Acid.
See 1-Methyl-4-isopropyladipic Acid.

2-Methylheptane-4 : 4-dicarboxylic Acid.
See Propylisobutylmalonic Acid.

2-Methylheptane-4 : 6-dicarboxylic Acid.
See 1-Methyl-3-isobutylglutaric Acid.

2-Methylheptane-5 : 6-dicarboxylic Acid.
See 1-Methyl-2-isoamylsuccinic Acid.

2-Methylheptane-6 : 7-dicarboxylic Acid.
See Isohexylsuccinic Acid.

3-Methylheptane-2 : 6-dicarboxylic Acid.
See 1 : 2 : 5-Trimethylpimelic Acid.

2-Methylheptane-6 : 6 : 7-tricarboxylic Acid

$$CH_3\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH_2\cdot CH_2\cdot\overset{COOH}{\underset{COOH}{C}}\cdot CH_2\cdot COOH$$

$C_{11}H_{18}O_6$ MW, 246

Cryst. from Et_2O–ligroin. M.p. 141°. Sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$. Insol. ligroin. Heat at 160° ⟶ isohexylsuccinic acid.

Tri-Et ester: $C_{17}H_{30}O_6$. MW, 330. B.p. 172°/9 mm. D_4^{20} 1·0127. n^{20} 1·4370.

Longinow, *J. Russ. Phys.-Chem. Soc.*, 1915, **47**, 1137.

Methylheptanol-1.
See Methyl-*n*-heptyl Alcohol.

2-Methylheptanol-2 (*Dimethyl*-n-*amylcarbinol*)

$$CH_3\cdot[CH_2]_4\cdot\overset{CH_3}{C}(OH)\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 162°, 66–8°/15 mm. D_4^{25} 0·8136. n_D 1·4301.

Muset, *Chem. Zentr.*, 1907, I, 1313.
Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, **55**, 408.

2-Methylheptanol-3.
See Isopropylbutylcarbinol.

2-Methylheptanol-4.
See Propylisobutylcarbinol.

2-Methylheptanol-5.
See Ethylisoamylcarbinol.

2-Methylheptanol-6 (*Methylisohexylcarbinol*, 6-*methylheptanol*-2)

$$(CH_3)_2CH\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 176°. D^{20} 0·8128. n_D 1·4238.

Acetyl: b.p. 187–8°/768 mm. D^{20} 0·8494. n_D 1·4137.

Me ether: $C_9H_{20}O$. MW, 144. B.p. 149–50°. D^{20} 0·7945.

Clarke, *J. Am. Chem. Soc.*, 1909, **31**, 111.
Buelens, *Chem. Zentr.*, 1909, I, 832.

3-Methylheptanol-2

$$CH_3\cdot[CH_2]_3\cdot\overset{CH_3}{CH}\cdot CH(OH)\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 172–3°. D_4^{13} 0·8272. n_D^{13} 1·436.

Acetyl: b.p. 185°. D_4^{21} 0·8545. n_D^{21} 1·418. Fragrant odour. Used in perfumery.

Powell, *J. Am. Chem. Soc.*, 1924, **46**, 2517.

3-Methylheptanol-3.
See Methylethylbutylcarbinol.

3-Methylheptanol-4.
See Propyl-*sec.*-*n*-butylcarbinol.

3-Methylheptanol-5 (*Ethyl*-active-*amylcarbinol*, 5-*methylheptanol*-3)

$$CH_3\cdot CH_2\cdot CH(OH)\cdot CH_2\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH_3$$

$C_8H_{18}O$ MW, 130

Liq. with odour of peppermint. B.p. 167–8° (155°). D^0 0·85, D_4^{25} 0·8425. n_D^{24} 1·433.

Powell, Secoy, *J. Am. Chem. Soc.*, 1931, **53**, 767.
Guerbet, *Compt. rend.*, 1910, **150**, 183.

3-Methylheptanol-6 (5-*Methylheptanol*-2)

$$CH_3\cdot CH(OH)\cdot CH_2\cdot CH_2\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 167–9°. D^{21} 0·8174. $[\alpha]_D^{24}$ + 4·69°.

Welt, *Ann. chim.*, 1895, **6**, 135.

4-Methylheptanol-2

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH_2\cdot CH(OH)\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 168°.

Clarke, *Ber.*, 1907, **40**, 354.

4-Methylheptanol-3

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH(OH)\cdot CH_2\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 98–9°/75 mm. D_4^{25} 0·8268. n_D^{25} 1·426.
Acetyl: b.p. 103–4°/75 mm.

Bjelouss, *Ber.*, 1912, **45**, 628.

4-Methylheptanol-4.
See Methyldipropylcarbinol.

2-Methyl-2-heptanolone-6

$$CH_3\cdot CO\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}}(OH)\cdot CH_3$$

$C_8H_{16}O_3$ MW, 160

M.p. 68°. B.p. 124°/23 mm.
Oxime: b.p. 172°/32 mm. Sol. H_2O, EtOH, Et_2O.

Verley, *Bull. soc. chim.*, 1897, **17**, 186.

2-Methyl-3-heptanolone-6

$$CH_3\cdot CO\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH_3$$

$C_8H_{16}O_3$ MW, 160

B.p. 127°/27 mm. n_D^{23} 1·456.

Verley, *Bull. soc. chim.*, 1897, **17**, 190.

2-Methyl-7-heptanolone-6 (*Hydroxymethyl isohexyl ketone*)

$$HO\cdot CH_2\cdot CO\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH_3$$

$C_8H_{16}O_3$ MW, 160

B.p. 90°/12 mm. D^{20} 0·916. n_D 1·4319. Reduces Fehling's and $NH_3.AgNO_3$. Forms cryst. bisulphite comp.
Oxime: m.p. 89°.
Semicarbazone: m.p. 171°.
Osazone: m.p. 117°.

Wallach, *Ann.*, 1915, **408**, 192.

3-Methyl-3-heptanolone-2

$$CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}}(OH)\cdot CO\cdot CH_3$$

$C_8H_{16}O_3$ MW, 160

B.p. 74°/10 mm. D_4^0 0·931.
Semicarbazone: m.p. 152°.

Leers, *Bull. soc. chim.*, 1926, **39**, 424.

3-Methyl-3-heptanolone-5

$$CH_3\cdot CH_2\cdot CO\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}}(OH)\cdot CH_2\cdot CH_3$$

$C_8H_{16}O_3$ MW, 160

B.p. 85°/15 mm. D_4^{15} 0·9315. n_D^{15} 1·4367.

Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 28.

3-Methyl-4-heptanolone-2

$$CH_3\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CO\cdot CH_3$$

$C_8H_{16}O_3$ MW, 160

B.p. 110°/16 mm. D_4^{20} 0·9238. n_D^{20} 1·442.

Powell, *J. Am. Chem. Soc.*, 1924, **46**, 2515.

4-Methyl-2-heptanolone-6 (4-*Methyl*-6-*heptanolone*-2)

$$CH_3\cdot CO\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH_2\cdot CH(OH)\cdot CH_3$$

$C_8H_{16}O_3$ MW, 160

Yellow liq. B.p. 120°/50 mm. D_4^{16} 0·9299. n_D^{16} 1·439.
Semicarbazone: m.p. 179–80°.

Prileschajew, *Ber.*, 1926, **59**, 197.

2-Methylheptanone-3.
See Isopropyl butyl Ketone.

2-Methylheptanone-4.
See Propyl isobutyl Ketone.

2-Methylheptanone-5.
See Ethyl isoamyl Ketone.

2-Methylheptanone-6.
See Isoamylacetone.

3-Methylheptanone-5.
See Ethyl *active*-amyl Ketone.

3-Methylheptanone-6 (active-*Amylacetone*, 5-*methylheptanone*-2)

$$CH_3\cdot CO\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH_2\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 167–8°, 70°/11 mm. D_4^{20} 0·8295, D^{57} 0·7893. $[\alpha]_D^{20}$ + 8·2°. $FeCl_3 \longrightarrow$ violet-brown col.

Rupe, Wild, *Ann.*, 1918, **414**, 117.
Welt, *Ann. chim.*, 1895, **6**, 134.

4-Methylheptanone-2

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH_2\cdot CO\cdot CH_3$$

$C_8H_{16}O$ MW, 128

Liq. with odour resembling that of bananas. B.p. 156°. Sol. most org. solvents.

Clarke, *Ber.*, 1907, **40**, 353.

6-Methyl-1-heptene (*α-Iso-octene*)

$$CH_3{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$$

C_8H_{16} MW, 112

B.p. 122–4° (113–15°). D_4^{20} 0·7125. n_D^{20} 1·3986.

de Rességuier, *Bull. soc. chim.*, 1914, **15**, 183.
Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 838.

2-Methyl-2-heptene (1 : 1-*Dimethyl-2-butylethylene*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}C(CH_3){\cdot}CH_3$$

C_8H_{16} MW, 112

B.p. 123-5°, 117–19°/740 mm. D^{20} 0·816. n_D^{20} 1·4138.

Muset, *Chem. Zentr.*, 1907, I, 1313.
Church, Whitmore, McGrew, *J. Am. Chem. Soc.*, 1934, **56**, 180.

3-Methyl-2-heptene (1 : 2-*Dimethyl-2-butylethylene, 2-butyl-2-butylene*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3){:}CH{\cdot}CH_3$$

C_8H_{16} MW, 112

B.p. 121°. D_{20}^{20} 0·7296. n_D^{20} 1·4183.

Tuot, *Compt. rend.*, 1933, **197**, 1434.

4-Methyl-3-heptene (1-*Methyl-2-ethyl-1-propylethylene, 2-propyl-2-pentene*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3){:}CH{\cdot}CH_2{\cdot}CH_3$$

C_8H_{16} MW, 112

B.p. 120·4°. D_0^{20} 0·73138, D_4^{25} 0·7411. n_D^{25} 1·41712. $CrO_3 \longrightarrow$ acetic and propionic acids.

Sokoloff, *J. prakt. Chem.*, 1889, **39**, 444.
Bjelouss, *Ber.*, 1912, **45**, 629.

6-Methyl-1-heptene-4 : 7-dicarboxylic Acid.
See 3-Methyl-1-allyladipic Acid.

6-Methyl-2-heptene-2 : 3-dicarboxylic Acid.
See Methylisoamylmaleic Acid.

6-Methyl-3-heptene-1 : 3-dicarboxylic Acid (1-*Isoamylideneglutaric acid*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH{:}C(COOH){\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_{10}H_{16}O_4$ MW, 200

Leaflets from H_2O. M.p. 75°. Sol. Et_2O, $CHCl_3$, warm ligroin, warm CS_2. Spar. sol. cold H_2O.
Dibromide: cryst. from $CHCl_3$–ligroin. M.p. 148°.

Fittig, Bronnert, *Ann.*, 1894, **282**, 344.

2-Methylheptene-2-dione-4 : 6.
See Acetylmesityl oxide.

5-Methyl-1-heptenic Acid (2-*Isoamylacrylic acid, 1-iso-octenic acid*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH{\cdot}COOH$$

$C_8H_{14}O_2$ MW, 142

M.p. 3°. B.p. 239–40°, 122–3°/12 mm. D^{20} 0·938. n_D 1·4511. Very spar. sol. H_2O. Volatile in steam.
Amide: $C_8H_{15}ON$. MW, 141. M.p. 153°.
Dibromide: m.p. 58–9°.

Wallach, *Ann.*, 1915, **408**, 196.
Fittig, Weil, *Ann.*, 1894, **283**, 283.

5-Methyl-2-heptenic Acid (2-*Iso-octenic acid, 2-isoamylidenepropionic acid*)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_2{\cdot}COOH$$

$C_8H_{14}O_2$ MW, 142

B.p. 232°. Insol. H_2O. Volatile in steam.

Fittig, Weil, *Ann.*, 1894, **283**, 279.

5-Methyl-3-heptenic Acid (3-*Iso-octenic acid, 3-isobutylidenebutyric acid*)

$$(CH_3)_2CH{\cdot}CH{:}CH{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$$

$C_8H_{14}O_2$ MW, 142

B.p. 231–3°. Insol. H_2O.

Fromm, Lischke, *Ber.*, 1900, **33**, 1203.

4-Methyl-1-heptenol-4 (*Methylpropylallylcarbinol*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH_2{\cdot}CH{:}CH_2$$

$C_8H_{16}O$ MW, 128

Liq. with camphor-like odour. B.p. 159–60°. D_0^{20} 0·8345. Heat of comb. C_p 1214 Cal.

Semljanitzin, *J. prakt. Chem.*, 1881, **23**, 263.

5-Methyl-1-heptenol-5 (*Methylethyl-γ-butenylcarbinol*)

$$CH_3{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$$

$C_8H_{16}O$ MW, 128

B.p. 65°/14 mm.

Sand, Singer, *Ann.*, 1903, **329**, 176.

5-Methyl-1-heptenol-7 (*3-γ-Butenyl-n-butyl alcohol*)

$$HO\cdot CH_2\cdot CH_2\cdot CH(CH_3)\cdot CH_2\cdot CH_2\cdot CH{:}CH_2$$

$C_8H_{16}O$ MW, 128

B.p. 97–9°/22 mm. D_4^{19} 0·8562. n_D^{19} 1·4470.

v. Braun, Gossel, *Ber.*, 1924, **57**, 378.

6-Methyl-1-heptenol-3 (*Vinylisoamylcarbinol*)

$$CH_3\cdot CH(CH_3)\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot CH{:}CH_2$$

$C_8H_{16}O$ MW, 128

B.p. 88–91°/12 mm. (73–4°/16 mm.). D_4^{20} 0·84.

Acetyl: b.p. 83–4°/18 mm.

Burton, *J. Chem. Soc.*, 1930, 251.
Delaby, Guillot-Allègre, *Bull. soc. chim.*, 1933, **53**, 307.

6-Methyl-1-heptenol-4.
See Isobutylallylcarbinol.

2-Methyl-2-heptenol-6

$$CH_3\cdot CH(OH)\cdot CH_2\cdot CH_2\cdot CH{:}C(CH_3)\cdot CH_3$$

$C_8H_{16}O$ MW, 128

l-.

Occurs in linaloe oil. B.p. 178–80°, 58–9°/3 mm. D^{15} 0·8579. n_D^{20} 1·4495. $[\alpha]_D$ — 11° 34′.

dl-.

B.p. 174–6°, 83–6°/15 mm., 74–5°/10 mm. D^{20} 0·8545. n_D^{20} 1·4505.

Acetyl: b.p. 78°/9 mm. D_4^{18} 0·8928. n_D^{18} 1·4328.

Me ether: $C_9H_{18}O$. MW, 142. B.p. 163–4°, 60°/15 mm., 50°/9 mm. D_4^{18} 0·8103. n_D^{18} 1·4281.

Helferich, *Ber.*, 1919, **52**, 1805.
Schimmel, *Chem. Zentr.*, 1909, I, 22.
Wallach, *Ann.*, 1893, **275**, 171.

3-Methyl-2-heptenol-4

$$CH_3\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot C(CH_3){:}CH\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 74–7°/17 mm. D_{10}^4 0·8722. n_D^{10} 1·45614.

Acetyl: b.p. 79–83°/16 mm.

Abelmann, *Ber.*, 1910, **43**, 1581.

5-Methyl-2-heptenol-4 (sec.-n-*Butylpropenylcarbinol*)

$$CH_3\cdot CH_2\cdot CH(CH_3)\cdot CH(OH)\cdot CH{:}CH\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 69–70°/18 mm. D_4^{20} 0·8473. n_D^{20} 1·4411.

Hess, Wustrow, *Ann.*, 1924, **437**, 262.

6-Methyl-2-heptenol-4 (*Isobutylpropenylcarbinol*)

$$CH_3\cdot CH(CH_3)\cdot CH_2\cdot CH(OH)\cdot CH{:}CH\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 67°/11 mm. D_4^{15} 0·8354. n_D^{15} 1·4392.

Auwers, Westermann, *Ber.*, 1921, **54**, 2996.

2-Methyl-3-heptenol-2

$$CH_3\cdot CH_2\cdot CH_2\cdot CH{:}CH\cdot C(CH_3)(OH)\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 62–3°/14 mm. $D_4^{10\cdot5}$ 0·8398. $n_D^{10\cdot5}$ 1·4416.

Grignard, Dubien, *Ann. chim.*, 1924, **2**, 294.

4-Methyl-3-heptenol-5

$$CH_3\cdot CH_2\cdot CH(OH)\cdot C(CH_3){:}CH\cdot CH_2\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 66°/17 mm. D_4^{18} 0·8525. n_D^{18} 1·4479.

Acetyl: b.p. 113°/80 mm.

Auwers, Westermann, *Ber.*, 1921, **54**, 2996.

5-Methyl-3-heptenol-5 (*Methylethyl-α-butenylcarbinol*)

$$CH_3\cdot CH_2\cdot C(CH_3)(OH)\cdot CH{:}CH\cdot CH_2\cdot CH_3$$

$C_8H_{16}O$ MW, 128

B.p. 103°/75 mm., 62°/15 mm. D_4^{17} 0·8477. n_D^{20} 1·4465.

Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, **39**, 1435.
Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 40.

2-Methyl-1-heptenone-6.
See under 2-Methyl-2-heptenone-6.

2-Methyl-2-heptenone-6 (*6-Keto-2-methylheptene-2, 2-methyl-1-heptenone-6, natural methylheptenone*)

$$CH_3\cdot CO\cdot CH_2\cdot CH_2\cdot CH{:}C(CH_3)\cdot CH_3 \quad (I)$$

or

$$CH_3\cdot CO\cdot CH_2\cdot CH_2\cdot CH_2\cdot C(CH_3){:}CH_2 \quad (II)$$

$C_8H_{14}O$ MW, 126

Present in Ceylon citronella oil, lemon-grass oil, and palmarosa oil. B.p. 172–4°, 108·3°/20 mm., 84°/56 mm., 58·6°/10 mm. n_D^{20} 1·4445. The methylheptenone from lemon-grass oil or obtained from citral by treatment with alkali consists of approx. 80% (I) and 20% (II).

Oxime: b.p. 120°/25 mm., 116°/15 mm. D^{14} 0·919. n_D^{29} 1·475. *Acetyl*: b.p. 140°/30 mm.

Semicarbazone: m.p. about 135°.

p-*Nitrophenylhydrazone*: m.p. 103·5–104°.

Verley, *Bull. soc. chim.*, 1924, **35**, 608, 1653.
Harries, *Ber.*, 1902, **35**, 1179.
Tiemann, Semmler, *Ber.*, 1895, **28**, 2126.

3-Methyl-2-heptenone-5.
See under Homomesitones.

5-Methyl-2-heptenone-6

$$CH_3{\cdot}CO{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

Liq. with odour resembling amyl acetate. B.p. 62–4°/20 mm. D_4^{18} 0·8463. n_D^{18} 1·4345.

v. Braun, Gossel, *Ber.*, 1924, **57**, 377.

6-Methyl-2-heptenone-5

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}CO{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 161–2°. D^{20} 0·842. n_D^{20} 1·43096. Ox. ⟶ oxalic and isobutyric acids.

Oxime: b.p. 99°/12 mm.

Semicarbazone: cryst. from MeOH. M.p. 93–5°.

Wallach, *Ann.*, 1901, **319**, 112.

2-Methyl-3-heptenone-5

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH{:}CH{\cdot}\overset{CH_3}{CH}{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

Liq. with ester-like odour. B.p. 167°/772 mm., 62–5°/23 mm., 53–6°/15 mm.

Semicarbazone: cryst. from MeOH. M.p. 174–5°.

Thoms, Kahre, *Chem. Zentr.*, 1925, II, 547.

2-Methyl-3-heptenone-6 (β-*Isomethylheptenone*)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH{:}CH{\cdot}\overset{CH_3}{CH}{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 163°. D^{20} 0·8345. n_D 1·4315.

Oxime: b.p. 122°/28 mm., 108–10°/15 mm.

Semicarbazone: cryst. from EtOH. M.p. 115°.

Tiemann, Krüger, *Ber.*, 1895, **28**, 2122.

3-Methyl-3-heptenone-2

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CO{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 170–6°, 68–9°/15 mm. D_4^{10} 0·8613. n_D^{10} 1·451.

Oxime: b.p. 119–20°/20 mm.

Semicarbazone: cryst. from EtOH. M.p. 164°.

Powell, *J. Am. Chem. Soc.*, 1924, **46**, 2515.

3-Methyl-3-heptenone-5.
See under Homomesitones.

4-Methyl-3-heptenone-5

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

B.p. 170–2°/735 mm., 96–8°/70 mm. D_4^{15} 0·8773. n_D^{15} 1·4510.

Semicarbazone: m.p. 167°.

2 : 4-*Dinitrophenylhydrazone*: m.p. 147°.

Courtot, Pierron, *Bull. soc. chim.*, 1929, **45**, 291.

6-Methyl-3-heptenone-2 (*Isoamylideneacetone*, α-*isomethylheptenone*)

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH{:}CH{\cdot}CO{\cdot}CH_3$$

$C_8H_{14}O$ MW, 126

Liq. with odour resembling amyl acetate. B.p. 178–80°, 65°/10 mm. D^{17} 0·8443. n_D 1·44275.

Semicarbazone: (a) m.p. 100°. (b) M.p. 118–20°.

Semicarbazide-semicarbazone: cryst. from EtOH. M.p. 157°.

Tiemann, Tigges, *Ber.*, 1900, **33**, 561.
Pastureau, Zamenhof, *Compt. rend.*, 1926, **182**, 323.
Locquin, Heilmann, *Bull. soc. chim.*, 1929, **45**, 1131.

3-Methyl-n-heptyl Alcohol (3-*Methylheptanol*-1)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_2OH$$

$C_8H_{18}O$ MW, 130

l-

B.p. 99°. D_4^{24} 0·824. n_D^{25} 1·4295. $[\alpha]_D^{24}$ − 2·75°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 93.

4-Methyl-n-heptyl Alcohol (*4-Methylheptanol*-1)

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{C}H\cdot CH_2\cdot CH_2\cdot CH_2OH$$

$C_8H_{18}O$ MW, 130

B.p. 188–93°, 81°/18 mm.

Levene, Marker, *J. Biol. Chem.*, 1933, **103**, 303.
Koller, Kandler, *Monatsh.*, 1931, **58**, 230.

5-Methyl-n-heptyl Alcohol (*5-Methylheptanol*-1)

$$CH_3\cdot CH_2\cdot \overset{CH_3}{C}H\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH_2OH$$

$C_8H_{18}O$ MW, 130

d-.

B.p. 87°/20 mm. $[\alpha]_D^{24}$ + 2·99°.

Levene, Marker, *J. Biol. Chem.*, 1933, **103**, 305.

6-Methyl-n-heptyl Alcohol (*6-Methylheptanol*-1, *iso-octyl alcohol*)

$$(CH_3)_2CH\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH_2OH$$

$C_8H_{18}O$ MW, 130

B.p. 188·5°. D^{25} 0·8230.
Phenylurethane: m.p. 81–81·4°.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 452.

N-Methylheptylamine

$$CH_3\cdot [CH_2]_5\cdot CH_2\cdot NH\cdot CH_3$$

$C_8H_{19}N$ MW, 129

B.p. 168°. Spar. sol. H_2O. Volatile in steam.
B_2,H_2PtCl_6: orange leaflets from H_2O. M.p. 168°.
Picrate: yellow needles from EtOH–Et_2O. M.p. 97°.

Braun, *Ann.*, 1911, **382**, 26.

3-Methylheptylamine

$$CH_3\cdot [CH_2]_3\cdot \overset{CH_3}{C}H\cdot CH_2\cdot CH_2NH_2$$

$C_8H_{19}N$ MW, 129

l-.

B.p. 87°/47 mm. D_4^{24} 0·782. n_D^{25} 1·4288. $[\alpha]_D^{24}$ − 1·34°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 95.

Methylheptylcarbinol (*Nonanol*-2)

$$CH_3\cdot [CH_2]_6\cdot CH(OH)\cdot CH_3$$

$C_9H_{20}O$ MW, 144

d-.

B.p. 105°/19 mm. D_4^{20} 0·8230. n_D^{20} 1·4299. $[\alpha]_D^{19}$ + 8·98°. $[\alpha]_D^{20}$ + 11·90° in C_6H_6.

dl-.

F.p. − 35°. B.p. 193–4°, 91°/12 mm. D^{20} 0·84708. *n* 1·43533. Hot 60% $H_2SO_4 \longrightarrow$ 2-nonene.
Me ether: $C_{10}H_{22}O$. MW, 158. B.p. 188–9°. D^{20} 0·8228. Insol. H_2O.
Et ether: $C_{11}H_{24}O$. MW, 172. B.p. about 200°. D^{20} 0·8193. *n* 1·423.
1-*Naphthylurethane*: m.p. 55·5°.
3 : 5-*Dinitrobenzoyl*: m.p. 42·8°.

van Gysegem, *Chem. Zentr.*, 1907, I, 530.
Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 56, 70.

Methyl heptyl Ether

$$CH_3\cdot [CH_2]_5\cdot CH_2\cdot O\cdot CH_3$$

$C_8H_{18}O$ MW, 130

B.p. 149·8°. D_0^0 0·7953.

Dobriner, *Ann.*, 1888, **243**, 3.

1-Methyl-n-heptylic Acid (*1-Methylœnanthylic acid, methylamylacetic acid, 1-amylpropionic acid*)

$$CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{C}H\cdot COOH$$

$C_8H_{16}O_2$ MW, 144

B.p. 121–2°/13 mm.
Chloride: $C_8H_{15}OCl$. MW, 162·5. B.p. 179·5–182°/727 mm.

Karrer, Shibata, Wettstein, Jacubowicz, *Helv. Chim. Acta*, 1930, **13**, 1297.

3-Methyl-n-heptylic Acid (*3-Propylvaleric acid, 3-methylœnanthylic acid*)

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{C}H\cdot CH_2\cdot CH_2\cdot COOH$$

$C_8H_{16}O_2$ MW, 144

d-.

B.p. 132°/22 mm. D_4^{24} 0·882. $[\alpha]_D^{24}$ + 2·11°.
Et ester: $C_{10}H_{20}O_2$. MW, 172. B.p. 104°/32 mm. D_4^{24} 0·859. $[\alpha]_D^{24}$ + 1·41°.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 14.

4-Methyl-n-heptylic Acid (*4-Ethylcaproic acid, 4-methylœnanthylic acid*)

$$CH_3\cdot CH_2\cdot \overset{CH_3}{C}H\cdot CH_2\cdot CH_2\cdot CH_2\cdot COOH$$

$C_8H_{16}O_2$ MW, 144

d-.

B.p. 128°/20 mm. D_4^{26} 0·893. $[\alpha]_D^{26}$ + 2·47°.

Et ester: $C_{10}H_{20}O_2$. MW, 172. B.p. 95°/25 mm. D_4^{23} 0·865. $[\alpha]_D^{23}$ + 2·43°.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 162; 1933, **103**, 304.

5-Methyl-*n*-heptylic Acid (*Isohexylacetic acid, 2-isoamylpropionic acid, 3-isobutylbutyric acid, 4-isopropylvaleric acid, 5-methylœnanthylic acid*)

$(CH_3)_2CH·CH_2·CH_2·CH_2·CH_2·COOH$

$C_8H_{16}O_2$ MW, 144

Solidifies at 0°. B.p. 232°/762 mm., 126–7°/14 mm.

Et ester: $C_{10}H_{20}O_2$. MW, 172. B.p. 200·3°.

Amide: $C_8H_{17}ON$. MW, 143. Plates. M.p. 114°.

Nitrile: $C_8H_{15}N$. MW, 125. B.p. 194°.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 452.

Methyl heptyl Ketone (*Nonanone-2, 2-ketononane*)

$CH_3·[CH_2]_6·CO·CH_3$

$C_9H_{18}O$ MW, 142

Present in attar of rose and in small amount in oil of cloves. F.p. − 15°. B.p. 194–6°, 96–102°/24 mm., 80–2°/15 mm., 75–7°/12 mm. D_4^{22} 0·8188. n_D^{22} 1·4175. Ox. ⟶ acetic and *n*-heptylic acids.

Oxime: m.p. 16°. B.p. 131°/15 mm. D_4^{20} 0·88409. $n_{He\ yellow}^{20}$ 1·45513.

Semicarbazone: m.p. 119–20°.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.

2-Methyl-1-heptylyloctane.

See 7-Methylpentadecanone-9.

Methyl hexadecyl Ketone (*2-Keto-octadecane, octadecanone-2*)

$CH_3·[CH_2]_{14}·CH_2·CO·CH_3$

$C_{18}H_{36}O$ MW, 268

M.p. 52°. B.p. 251–2°/100 mm. Ox. ⟶ acetic and palmitic acids.

Semicarbazone: m.p. 114–16°.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.

Krafft, *Ber.*, 1882, **15**, 1707.

5-Methyl-1 : 2-hexadiene (*Isoamylidene-ethylene, isobutylallene*)

$CH_3·\overset{CH_3}{CH}·CH_2·CH{:}C{:}CH_2$

C_7H_{12} MW, 96

B.p. 96°. D^{19} 0·7225. n_D^{19} 1·4282.

Bouis, *Ann. chim.*, 1928, **9**, 443.

1-Methyl-1 : 3-hexadiene.

See 2 : 4-Heptadiene.

3-Methyl-1 : 3-hexadiene (*1-Methyl-2-ethyl-1-vinylethylene, 2-methyl-1-ethylbutadiene-1 : 3*)

$CH_3·CH_2·CH{:}\overset{CH_3}{C}·CH{:}CH_2$

C_7H_{12} MW, 96

B.p. 101–3°. D_4^{25} 0·7407. n_D^{25} 1·45247.

Bjelouss, *Ber.*, 1912, **45**, 626.

2-Methyl-1 : 5-hexadiene (*2-Methyldiallyl, sym.-vinylisopropenylethane*)

$CH_2{:}CH·CH_2·CH_2·\overset{CH_3}{C}{:}CH_2$

C_7H_{12} MW, 96

B.p. 92·5°/769 mm. $D_4^{18·5}$ 0·7289. $n_D^{17·3}$ 1·42376.

Nitrosochloride: needles from MeOH.Aq. M.p. 75–6°.

Auwers, Moosbrugger, *Ann.*, 1912, **387**, 181.

2-Methyl-2 : 4-hexadiene (*2-Methyldipropenyl, sym.-ethylideneisopropylidene-ethane, 1 : 1 : 4-trimethylbutadiene-1 : 3*)

$CH_3·CH{:}CH·CH{:}\overset{CH_3}{C}·CH_3$

C_7H_{12} MW, 96

B.p. 97–9°. D^0 0·7387, $D_4^{24·5}$ 0·7192. $n_D^{24·5}$ 1·4266.

Reif, *Ber.*, 1908, **41**, 2745.

3-Methyl-2 : 4-hexadiene (*3-Methyldipropenyl, 1 : 2 : 4-trimethylbutadiene-1 : 3*)

$CH_3·CH{:}CH·\overset{CH_3}{C}{:}CH·CH_3$

C_7H_{12} MW, 96

B.p. 107–8°. D^0 0·7753, D_4^{15} 0·7625. n_D^{15} 1·46146.

Abelmann, *Ber.*, 1910, **43**, 1584.

Methylhexahydroacetophenone.

See Methylacetocyclohexane.

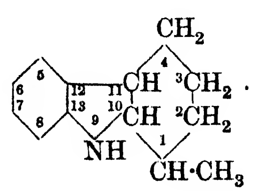
Methylhexahydrobenzaldehyde.

See Hexahydrotoluic Aldehyde.

Methylhexahydrobenzoic Acid.

See Hexahydrotoluic Acid.

1-Methylhexahydrocarbazole (*1-Methylcarbazoline*)



$C_{13}H_{17}N$ MW, 187

B,HCl : needles from EtOH. M.p. 268°.

Plancher, Cecchetti, Ghigi, *Gazz. chim. ital.*, 1929, **59**, 344.

2-Methylhexahydrocarbazole.

Prisms from EtOH.Aq. M.p. 111° (102–3°).
B,HBr : m.p. 230–1°.
B,HI : m.p. 227–9°.
N-*Benzoyl* : prisms from EtOH.Aq. M.p. 89°.
N-*Carbamyl* : cryst. M.p. 153–4°.
N-*Nitroso* : needles. M.p. 62°.

Borsche, *Ann.*, 1908, **359**, 71.

3-Methylhexahydrocarbazole.

Exists in two forms.
(i) Prisms from EtOH. M.p. 58·5°.
(ii) Needles from EtOH. M.p. 128°.
N-*Acetyl* : prisms from EtOH. M.p. 101°.
N-*Benzoyl* : needles from EtOH. M.p. 81·5°.
Picrate : yellow prisms from toluene. M.p. 115–16°.

Plant, Rosser, *J. Chem. Soc.*, 1928, 2460.

6-Methylhexahydrocarbazole.

Prisms. M.p. 43–4°. B.p. 230–40°/14 mm.
N-*Nitroso* : brownish-yellow prisms from Et_2O. M.p. 71°.
Picrate : cryst. M.p. 174° decomp.

Manjunath, *Quart. J. Indian Chem. Soc.*, 1927, **4**, 281.

9-Methylhexahydrocarbazole (N-*Methylcarbazoline*).

B.p. 294–5°/748 mm., 162°/24 mm., 144°/15 mm. D_4^{19} 1·035. n_D^{19} 1·6248.
Picrate : yellow plates. M.p. 143–4° decomp.
Picrolonate : yellow needles from EtOH. M.p. 174–5°.
Methiodide : cryst. from MeOH. M.p. 194–5° decomp. Sol. hot H_2O, MeOH, EtOH. Spar. sol. Et_2O.

Schmidt, Sigwart, *Ber.*, 1912, **45**, 1784.
Perkin, Plant, *J. Chem. Soc.*, 1924, **125**, 1512.

11-Methylhexahydrocarbazole.

B.p. about 158–62°/13 mm.
B,HCl : needles from EtOH. M.p. 220°.
B,HBr : cryst. M.p. 228°.
B,HI : cryst. from EtOH. M.p. 196–7°.
Picrate : yellow cryst. from C_6H_6. M.p. about 161°. Sol. EtOH.

Plancher, Testoni, *Atti accad. Lincei*, 1901, **10**, i, 306.
Plancher, Cecchetti, Ghigi, *Gazz. chim. ital.*, 1929, **59**, 344.

Methylhexahydrocatechol.
See Methylcyclohexandiol-1 : 2.

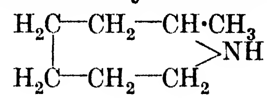
***N*-Methylhexahydrodipicolinic Acid.**
See Scopolinic Acid.

Methyl hexahydrostyryl Ketone.
See Hexahydrobenzylideneacetone.

Methyl hexahydrotolyl Ketone.
See Methylacetocyclohexane.

Methylhexalin.
See Methylcyclohexanol.

2-Methylhexamethyleneimine



$C_7H_{15}N$ MW, 113

Oil. B.p. 148–50°. D^{20} 0·8590. n_D 1·45862. Sol. H_2O with strong alk. reaction.
B,HCl : m.p. 196°.
N-*Nitroso* : oil. B.p. 240–2°/746 mm.
N-*Benzoyl* : b.p. 185–7°/13 mm.
N-*Benzenesulphonyl* : cryst. from 96% EtOH. M.p. 78°.
B,HAuCl$_4$: m.p. 95°.
Platinichloride : needles from 96% EtOH. M.p. 196°.
Picrate : needles. M.p. 131°.

Müller, Krauss, *Monatsh.*, 1932, **61**, 215.
Gabriel, *Ber.*, 1909, **42**, 1263.

2-Methylhexandiol-2 : 4 (1 : 1-*Dimethyl*-3-*ethyltrimethylene glycol*, 3-*methyl*-1-*ethyl*-β-*butylene glycol*)

$CH_3\cdot CH_2\cdot CH(OH)\cdot CH_2\cdot C(CH_3)(OH)\cdot CH_3$

$C_7H_{16}O_2$ MW, 132

B.p. 121°/30 mm. D^{18} 0·9321. n_D^{18} 1·4407.

Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, **39**, 1430.

2-Methylhexandiol-2 : 5 (1 : 1 : 4-*Trimethyltetramethylene glycol*)

$CH_3\cdot CH(OH)\cdot CH_2\cdot CH_2\cdot C(CH_3)(OH)\cdot CH_3$

$C_7H_{16}O_2$ MW, 132

Syrup. B.p. 121°/14 mm. Misc. with H_2O, EtOH, Et_2O.

Losanitsch, *Compt. rend.*, 1911, **153**, 392.

2-Methylhexandiol-2 : 6 (1 : 1-*Dimethylpentamethylene glycol*, 5-*methylhexandiol*-1 : 5)

$HO\cdot CH_2\cdot CH_2\cdot CH_2\cdot CH_2\cdot C(CH_3)(OH)\cdot CH_3$

$C_7H_{16}O_2$ MW, 132

B.p. 135°/19 mm.

Franke, Kohn, *Monatsh.*, 1907, **28**, 1011.

3-Methylhexandiol-1 : 6 (3-*Methylhexamethylene glycol*)

$$HO\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{CH}\cdot CH_2\cdot CH_2OH$$

$C_7H_{16}O_2$ MW, 132

B.p. 160–5°/15 mm.

Bouveault, Blanc, *Compt. rend.*, 1903, **137**, 329.

3-Methylhexandiol-2 : 4 (2-*Methyl*-1-*ethyl*-β-*butylene glycol*, 1 : 2-*dimethyl*-3-*ethyltrimethylene glycol*)

$$CH_3\cdot CH_2\cdot CH(OH)\cdot \overset{CH_3}{CH}\cdot CH(OH)\cdot CH_3$$

$C_7H_{16}O_2$ MW, 132

Thick oil. B.p. 116–18°/16 mm., 112–13°/10 mm.

Abelmann, *Ber.*, 1909, **42**, 2504.

2-Methylhexandione-3 : 5.
See Isobutyrylacetone.
2-Methylhexandione-4 : 5.
See Acetylisovaleryl.
3-Methylhexandione-2 : 4.
See unsym.-Methylpropionylacetone.
3-Methylhexandione-2 : 5.
See 3-Methylacetonylacetone.
2-Methylhexane.
See Isoheptane.

3-Methylhexane (*Methylethylpropylmethane*, 1-*ethyl*-1-*propylethane*)

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{CH}\cdot CH_2\cdot CH_3$$

C_7H_{16} MW, 100

d-.
B.p. 92°. D_4^{24} 0·684. n_D^{25} 1·3854. $[\alpha]_D^{24}$ +1·67°.

l-.
B.p. 92°. D_4^{21} 0·687. n_D^{25} 1·3854. $[\alpha]_D^{21}$ −7·75°.

dl-.
B.p. 91·8°/760 mm. D^{20} 0·6868. n_D^{20} 1·3865.

de Graef, *Bull. soc. chim. Belg.*, 1925, **34**, 427.
Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.

2-Methylhexane-3-carboxylic Acid (*Propylisopropylacetic acid*, 1-*isopropylvaleric acid*, 1-*propylisovaleric acid*)

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{COOH}{CH}\cdot CH(CH_3)_2$$

$C_8H_{16}O_2$ MW, 144

B.p. 112–13°/9 mm. D^{17} 0·9076.
Amide: $C_8H_{17}ON$. MW, 143. Needles from H_2O. M.p. 131–3°. Resembles menthol in odour.

Fischer, Holzapfel, Gwinner, *Ber.*, 1912, **45**, 256.

2-Methylhexane-4-carboxylic Acid (*Ethylisobutylacetic acid*, 1-*isobutylbutyric acid*, 1-*ethylisocaproic acid*)

$$CH_3\cdot CH_2\cdot \overset{COOH}{CH}\cdot CH_2\cdot CH(CH_3)_2$$

$C_8H_{16}O_2$ MW, 144

B.p. 219–20°/729 mm. D^{15} 0·906.
Et ester: $C_{10}H_{20}O_2$. MW, 172. B.p. 178°/747 mm.
Amide: $C_8H_{17}ON$. MW, 143. M.p. 89°.
Chloride: $C_8H_{15}OCl$. MW, 162·5. B.p. 168–71°.
Anilide: $C_{14}H_{21}ON$. MW, 219. Needles from 75% EtOH. M.p. 77–8°.
Hydrazide: m.p. 74°.

Guye, Jeanprêtre, *Bull. soc. chim.*, 1895, **13**, 183.
Curtius *et al.*, *J. prakt. Chem.*, 1930, **125**, 172.
Tiffeneau, *Bull. soc. chim.*, 1923, **33**, 183.

2-Methylhexane-5-carboxylic Acid (*Methylisoamylacetic acid*, 1 : 4-*dimethylcaproic acid*, *isoheptane*-5-*carboxylic acid*, 1-*isoamylpropionic acid*)

$$(CH_3)_2CH\cdot CH_2\cdot CH_2\cdot \overset{COOH}{CH}\cdot CH_3$$

$C_8H_{16}O_2$ MW, 144

B.p. 228–30°, 127–30°/18 mm. D_4^{20} 0·911. Sol. to 0·15% in H_2O at 15°.
Me ester: $C_9H_{18}O_2$. MW, 158. B.p. 172–3°.
Et ester: $C_{10}H_{20}O_2$. MW, 172. B.p. 175°.
Chloride: $C_8H_{15}OCl$. MW, 162·5. B.p. 69°/16 mm. D^0 0·9574.
Amide: $C_8H_{17}ON$. MW, 143. Cryst. from pet. ether. M.p. 99–100°.
p-*Toluidide*: $C_{15}H_{23}ON$. MW, 233. M.p. 75°.

Barbier, Locquin, *Compt. rend.*, 1913, **156**, 1445.
Tiffeneau, Sommaire, *Bull. soc. chim.*, 1923, **33**, 193.
Carleton-Williams, *J. Chem. Soc.*, 1879, **35**, 128.

3-Methylhexane-3-carboxylic Acid (*Methylethylpropylacetic acid*, 1-*methyl*-1-*ethyl*-

valeric acid, 1-*ethyl*-1-*propylpropionic acid,* 1-*methyl*-1-*propylbutyric acid*)

$$\begin{array}{c} \text{COOH} \\ CH_3\cdot CH_2\cdot CH_2\cdot \overset{|}{\underset{|}{C}}\cdot CH_2\cdot CH_3 \\ CH_3 \end{array}$$

$C_8H_{16}O_2$ MW, 144

B.p. 215–20°.

Amide: $C_8H_{17}ON$. MW, 143. Needles. M.p. 46°. B.p. 134–5°/12 mm. Very sol. EtOH, Et_2O, C_6H_6, pet. ether.

Haller, Bauer, *Compt. rend.*, 1909, **148**, 130.

3-Methylhexane-4-carboxylic Acid (2-*Methyl*-1-*ethylvaleric acid,* 1-sec.-n-*butylbutyric acid*)

$$\begin{array}{c} H_3C\quad COOH \\ CH_3\cdot CH_2\cdot CH\cdot CH\cdot CH_2\cdot CH_3 \end{array}$$

$C_8H_{16}O_2$ MW, 144

B.p. 217–20°. D^0 0·9339, D^{18} 0·921.

Me ester: $C_9H_{18}O_2$. MW, 158. B.p. 168–70°. D^{18} 0·8861.

Chloride: $C_8H_{15}OCl$. MW, 162·5. B.p. 66–72°/20 mm.

Amide: $C_8H_{17}ON$. MW, 143. M.p. 114–15°.

Anilide: $C_{14}H_{21}ON$. MW, 219. M.p. 108–9°

Katznelson, Kondakova, *Chem. Abstracts*, 1934, **28**, 5042.

2-Methylhexane-1 : 4-dicarboxylic Acid.
See 2-Methyl-4-ethyladipic Acid.

2-Methylhexane-2 : 5-dicarboxylic Acid.
See 1 : 1 : 4-Trimethyladipic Acid.

2-Methylhexane-3 : 3-dicarboxylic Acid.
See Propylisopropylmalonic Acid.

2-Methylhexane-3 : 6-dicarboxylic Acid.
See 1-Isopropyladipic Acid.

2-Methylhexane-4 : 5-dicarboxylic Acid.
See Methylisobutylsuccinic Acid.

2-Methylhexane-5 : 5-dicarboxylic Acid.
See Methylisoamylmalonic Acid.

2-Methylhexane-5 : 6-dicarboxylic Acid.
See Isoamylsuccinic Acid.

2-Methylhexane-6 : 6-dicarboxylic Acid.
See Isohexylmalonic Acid.

3-Methylhexane-1 : 6-dicarboxylic Acid.
See 3-Methylsuberic Acid.

Methylhexanol-1.
See Methyl-*n*-hexyl Alcohol.

2-Methylhexanol-2 (*Dimethylbutylcarbinol,* 2-*hydroxyisoheptane, isoheptanol*-2)

$$\begin{array}{c} CH_3 \\ CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{|}{C}(OH)\cdot CH_3 \end{array}$$

$C_7H_{16}O$ MW, 116

B.p. 139·4–140·4°/735 mm., 53–5°/15 mm. D_4^{20} 0·8119. n_D^{20} 1·4175.

Whitmore, Woodburn, *J. Am. Chem. Soc.*, 1933, **55**, 362.
Whitmore, Badertscher, *ibid.*, 1560.

2-Methylhexanol-3.
See Propylisopropylcarbinol.

2-Methylhexanol-4.
See Ethylisobutylcarbinol.

2-Methylhexanol-5.
See Methylisoamylcarbinol.

3-Methylhexanol-2 (3-*Propyl*-sec.-n-*butyl alcohol*)

$$\begin{array}{c} CH_3 \\ CH_3\cdot CH_2\cdot CH_2\cdot CH\cdot CH(OH)\cdot CH_3 \end{array}$$

$C_7H_{16}O$ MW, 116

B.p. 79–81°/52 mm. D_4^{25} 0·8820. n_D^{25} 1·42066.

Bjelouss, *Ber.*, 1912, **45**, 627.

3-Methylhexanol-3.
See Methylethylpropylcarbinol.

3-Methylhexanol-4.
See Ethyl-*sec.*-butylcarbinol.

2-Methyl-3-hexanolone-4 (*Isopropylpropionylcarbinol*)

$$\begin{array}{c} CH_3 \\ CH_3\cdot CH_2\cdot CO\cdot CH(OH)\cdot CH\cdot CH_3 \end{array}$$

$C_7H_{14}O_2$ MW, 130

B.p. 85°/45 mm. Reduces Fehling's and $NH_3.AgNO_3$.

Semicarbazone: m.p. 90°.

Gauthier, *Compt. rend.*, 1911, **152**, 1102.

2-Methyl-3-hexanolone-5 (*Isopropylacetonylcarbinol*)

$$\begin{array}{c} CH_3 \\ CH_3\cdot CO\cdot CH_2\cdot CH(OH)\cdot CH\cdot CH_3 \end{array}$$

$C_7H_{14}O_2$ MW, 130

Oil. B.p. 90°/16 mm.

Oxime: oil. B.p. 126–9°/16 mm.

Franke, Kohn, *Monatsh.*, 1899, **20**, 897.

2-Methyl-6-hexanolone-5 (5-*Methyl*-1-*hexanolone*-2, *isocaproylcarbinol*)

$$\begin{array}{c} CH_3 \\ CH_3\cdot CH\cdot CH_2\cdot CH_2\cdot CO\cdot CH_2OH \end{array}$$

$C_7H_{14}O_2$ MW, 130

Et ether: $C_9H_{18}O_2$. MW, 158. B.p. 92·5°/18 mm., 82–3°/9·5 mm.

Blaise, Picard, *Ann. chim. phys.*, 1912, **25**, 265.

3-Methyl-2-hexanolone-4 (3-*Propionyl*-sec.-n-*butyl alcohol*)

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CH(OH){\cdot}CH_3$$

$C_7H_{14}O_2$ MW, 130

B.p. 89–90°/14 mm.

Blaise, Herman, *Compt. rend.*, 1908, **146**, 1327.

3-Methyl-3-hexanolone-2 (*Methylpropylacetylcarbinol*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}(OH){\cdot}CO{\cdot}CH_3$$

$C_7H_{14}O_2$ MW, 130

B.p. 166–8°. Sol. H_2O.
Semicarbazone: m.p. 163–4°.

Locquin, Sung, *Bull. soc. chim.*, 1924, **35**, 604.

3-Methyl-6-hexanolone-2 (4-*Aceto*-n-*amyl alcohol*)

$$CH_3{\cdot}CO{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$$

$C_7H_{14}O_2$ MW, 130

Oil. B.p. 127°/20 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Sachs, *Ber.*, 1899, **32**, 61.

2-Methylhexanone-3.
See Propyl isopropyl Ketone.

2-Methylhexanone-4.
See Ethyl isobutyl Ketone.

2-Methylhexanone-5.
See Methyl isoamyl Ketone.

3-Methylhexanone-2 (2-*Acetopentane*, unsym.-*methylpropylacetone*, 3-*propylbutanone*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CO{\cdot}CH_3$$

$C_7H_{14}O$ MW, 114

B.p. 142–5° (136–40°). D_4^{25} 0·828. n_D^{24} 1·409.
Oxime: b.p. 101–5°/20 mm.
Semicarbazone: plates from H_2O. M.p. 114°.

Hopff, *Ber.*, 1931, **64**, 2742.
Powell, Murray, Baldwin, *J. Am. Chem. Soc.*, 1933, **55**, 1153.

3-Methylhexanone-4.
See Ethyl *sec.*-butyl Ketone.

3-Methylhexanone-5.
See Methyl *active*-amyl Ketone.

2-Methyl-1-hexene (unsym.-*Methylbutylethylene*, 2-*butylpropylene*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\dot{C}}{:}CH_2$$

C_7H_{14} MW, 98

B.p. 91·1–91·5°. D_4^{20} 0·7000. n_D^{20} 1·4040.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3295.

3-Methyl-1-hexene (3-*Propyl*-1-*butylene*, 2-*vinylpentane*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CH{:}CH_2$$

C_7H_{14} MW, 98

B.p. 84–84·1°. D_4^{20} 0·6945. n_D^{20} 1·3970.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3295.

4-Methyl-1-hexene (active-*Amylethylene*, 1-*vinylisopentane*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CH_2{\cdot}CH{:}CH_2$$

C_7H_{14} MW, 98

B.p. 87·2–87·5°. D_4^{20} 0·6969. n_D^{20} 1·3985.

See previous reference.

5-Methyl-1-hexene (*Isoamylethylene*, 1 : 2-*isoheptene*)

$$CH_3{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$$

C_7H_{14} MW, 98

B.p. 84·7°. D_4^{20} 0·6936. n_D^{20} 1·3954.

See previous reference.

2-Methyl-2-hexene (1-*Isopropylidenebutane*, 2-*butylidenepropane*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}\overset{CH_3}{\dot{C}}{\cdot}CH_3$$

C_7H_{14} MW, 98

B.p. 94·4–94·6°. D_4^{20} 0·7089. n_D^{20} 1·4075.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3296.

3-Methyl-2-hexene (2-*Propyl*-2-*butylene*, 2-*ethylidenepentane*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\dot{C}}{:}CH{\cdot}CH_3$$

C_7H_{14} MW, 98

B.p. 93·1–93·3° (85–90°). D_4^{20} 0·7120. n_D^{20} 1·4080.

See previous reference.

4-Methyl-2-hexene (*Methyl*-sec.-*butylethylene*, 1-sec.-*butylpropylene*, 1-*methyl*-1-*ethyl*-2-*butylene*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\dot{C}H}{\cdot}CH{:}CH{\cdot}CH_3$$

C_7H_{14} MW, 98

Exists in two forms:

(i) B.p. 87·1–87·6°. D_4^{20} 0·7007. n_D^{20} 1·3980.
(ii) B.p. 85·1–85·6°. D_4^{20} 0·6981. n_D^{20} 1·4000.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3295.

5-Methyl-2-hexene (1-*Isopropyl-2-butylene*, 1-*isobutylpropylene*)

$$CH_3\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH{:}CH\cdot CH_3$$

C_7H_{14} MW, 98

Exists in two forms.

(i) B.p. 91·1–91·6°. D_4^{20} 0·6990. n_D^{20} 1·3990.
(ii) B.p. 85·6–86·1°. D_4^{20} 0·7020. n_D^{20} 1·3995.

See previous reference.

2-Methyl-3-hexene (1-*Isopropyl*-1-*butylene*, 3-*propylideneisobutane*)

$$CH_3\cdot CH_2\cdot CH{:}CH\cdot\overset{CH_3}{CH}\cdot CH_3$$

C_7H_{14} MW, 98

B.p. 86·4–86·9°. D_4^{20} 0·6942. n_D^{20} 1·3991.

See previous reference.

3-Methyl-3-hexene (2-*Propylidenebutane*, 2-*ethylpentene*-2)

$$CH_3\cdot CH_2\cdot CH{:}\overset{CH_3}{C}\cdot CH_2\cdot CH_3$$

C_7H_{14} MW, 98

B.p. 93·8–94·2°.

Favorski, Zalesskii-Kibardine, *Chem. Abstracts*, 1926, **20**, 2481.

Methylhexene-1-carboxylic Acid.
See Methylheptenic Acid.

5-Methyl-1-hexene-1 : 2-dicarboxylic Acid.
See Isoamylfumaric Acid *and* Isoamylmaleic Acid.

5-Methyl-1-hexene-4 : 4-dicarboxylic Acid.
See Isopropylallylmalonic Acid.

1-Methyl-1-hexenic Acid (1-*Butylidenepropionic acid*, 1-*methyl-2-propylacrylic acid*)

$$CH_3\cdot CH_2\cdot CH_2\cdot CH{:}\overset{CH_3}{C}\cdot COOH$$

$C_7H_{12}O_2$ MW, 128

B.p. 118°/11 mm. D_4^{20} 0·9627. n_D^{20} 1·4601.
Et ester: $C_9H_{16}O_2$. MW, 156. B.p. 72°/10 mm. D_4^{20} 0·9031. n_D^{20} 1·4407.

Kon, Linstead, Maclennan, *J. Chem. Soc.*, 1932, 2458.

2-Methyl-1-hexenic Acid (2-*Methylpropylacrylic acid*, 2-*propylcrotonic acid*)

$$CH_3\cdot CH_2\cdot CH_2\cdot\overset{CH_3}{C}{:}CH\cdot COOH$$

$C_7H_{12}O_2$ MW, 128

Exists in two forms. (i) Cryst. from C_6H_6. M.p. 40°. (ii) Non-crystallisable oil.
Mixture of (i) and (ii):
Mobile liq. B.p. 222–5°, 120°/14 mm. $D_4^{19\cdot2}$ 0·96836. $n_D^{19\cdot2}$ 1·46659.
Nitrile: $C_7H_{11}N$. MW, 109. Oil. B.p. 95–6°/30 mm.

Kon, Leton, Linstead, Parsons, *J. Chem. Soc.*, 1931, 1414.
Gardner, Haworth, *J. Chem. Soc.*, 1909, **95**, 1963.

3-Methyl-1-hexenic Acid (2-sec.-n-*Butylacrylic acid*, 3-*methyl*-3-*ethylcrotonic acid*)

$$CH_3\cdot CH_2\cdot\overset{CH_3}{CH}\cdot CH{:}CH\cdot COOH$$

$C_7H_{12}O_2$ MW, 128

B.p. 125°/13 mm. $D_4^{20\cdot3}$ 0·9441. $n_D^{20\cdot3}$ 1·4526.
Chloride: $C_7H_{11}OCl$. MW, 146·5. B.p. 65–6°/11 mm.
Anilide: $C_{13}H_{17}ON$. MW, 203. Needles from C_6H_6–pet. ether. M.p. 110°.
p-*Toluidide*: $C_{14}H_{19}ON$. MW, 217. Needles from EtOH. M.p. 92°.

Linstead, Mann, *J. Chem. Soc.*, 1930, 2071.

4-Methyl-1-hexenic Acid.
See 1-Isoheptenic Acid.

Methyl-2-hexenic Acid.
See Methylhydrosorbic Acid *and* 2-Isoheptenic Acid.

2-Methyl-3-hexenic Acid (1-*Ethylideneisobutyric acid*, 2-*propenylbutyric acid*)

$$CH_3\cdot CH{:}CH\cdot\overset{CH_3}{CH}\cdot CH_2\cdot COOH$$

$C_7H_{12}O_2$ MW, 128

B.p. 209–10°, 103–5°/9 mm. Spar. sol. H_2O.
Dibromide: plates from $CHCl_3$–ligroin. M.p. 135–6°. Insol. H_2O.

v. Pechmann, *Ber.*, 1900, **33**, 3340.
Burton, Ingold, *J. Chem. Soc.*, 1929, 2031.

4-Methyl-3-hexenic Acid.
See 3-Isoheptenic Acid.

4-Methyl-1-hexenol-4 (*Methylethylallylcarbinol*)

$$CH_3\cdot CH_2\cdot\overset{CH_3}{C}(OH)\cdot CH_2\cdot CH{:}CH_2$$

$C_7H_{14}O$ MW, 114

B.p. 139°. D^0 0·85865, D^{20} 0·84315. Heat of comb. C_p 1060·7 Cal.

Saizew, *J. Russ. Phys.-Chem. Soc.*, 1892, **24**, 469.

5 - Methyl - 1 - hexenol - 3 (*Isobutylvinyl-carbinol*)

$CH_3{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CH(OH){\cdot}CH{:}CH_2$

$C_7H_{14}O$ MW, 114

B.p. 125°, 54–5°/12 mm. D_4^{15} 0·8306, D^{23} 0·8368. n_D^{23} 1·4263.

Douris, *Compt. rend.*, 1913, **157**, 57.
Bouis, *Ann. chim.*, 1928, **9**, 402.

5-Methyl-1-hexenol-4.
See Isopropylallylcarbinol.

5-Methyl-1-hexenol-5 (*Dimethyl-γ-butenyl-carbinol*)

$CH_3{\cdot}C(CH_3)(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{14}O$ MW, 114

B.p. 142·5°, 57°/16 mm. Mod. sol. H_2O. $D_4^{17\cdot4}$ 0·8376, $D_4^{15\cdot1}$ 0·8397. $n_D^{17\cdot8}$ 1·43486.

Auwers, Moosbrugger, *Ann.*, 1912, **387**, 180.
Harries, Langheld, *Ann.*, 1905, **343**, 347.

3-Methyl-2-hexenol-4 (*Ethylisobutenyl-carbinol*)

$CH_3{\cdot}CH_2{\cdot}CH(OH){\cdot}C(CH_3){:}CH{\cdot}CH_3$

$C_7H_{14}O$ MW, 114

B.p. 154–5°, 94–5°/80 mm., 71–3°/28 mm. D^0 0·8857, D_4^{10} 0·8704. n_D^{10} 1·44914.

Abelmann, *Ber.*, 1910, **43**, 1580.

4-Methyl-2-hexenol-4 (*Methylethylpropenyl-carbinol*)

$CH_3{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH{:}CH{\cdot}CH_3$

$C_7H_{14}O$ MW, 114

B.p. 72–3°/60 mm. D^0 0·8471, $D_4^{12\cdot5}$ 0·8360. $n_D^{16\cdot5}$ 1·4268.

Gry, *Bull. soc. chim.*, 1908, **3**, 379.

5 - Methyl - 2 - hexenol - 1 (*3-Isobutylallyl alcohol*)

$CH_3{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CH{:}CH{\cdot}CH_2OH$

$C_7H_{14}O$ MW, 114

B.p. 169°. D^{20} 0·8355. n_D^{20} 1·4390.
Acetyl: b.p. 182–4°. D^{20} 0·8836. n_D^{20} 1·4280.

Bouis, *Ann. chim.*, 1928, **9**, 402.

5-Methyl-2-hexenol-4 (*Isopropylpropenyl-carbinol*)

$CH_3{\cdot}CH(CH_3){\cdot}CH(OH){\cdot}CH{:}CH{\cdot}CH_3$

$C_7H_{14}O$ MW, 114

B.p. 139–40°, 92–4°/105 mm. D^0 0·8496, D_4^{20} 0·8426. n_D^{20} 1·438.

Reif, *Ber.*, 1908, **41**, 2739.

2-Methyl-3-hexenol-2 (*Dimethyl-α-butenyl-carbinol*)

$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}C(CH_3)(OH){\cdot}CH_3$

$C_7H_{14}O$ MW, 114

B.p. 49°/11 mm. D^{18} 0·8536. n_D^{18} 1·443.

Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, **39**, 1430.

3-Methyl-3-hexenol-2

$CH_3{\cdot}CH_2{\cdot}CH{:}C(CH_3){\cdot}CH(OH){\cdot}CH_3$

$C_7H_{14}O$ MW, 114

B.p. 89°/55 mm. $D_4^{9\cdot5}$ 0·8678. $n_D^{9\cdot5}$ 1·44874.

Grignard, *Chem. Zentr.*, 1901, II, 622.

4-Methyl-1-hexenone-5 (*4-Aceto-1-pentene*)

$CH_3{\cdot}CO{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CH{:}CH_2$

$C_7H_{12}O$ MW, 112

Oil. B.p. 138–40°. D^{15} 0·845.

Jacobi, Merling, *Ann.*, 1894, **278**, 11.

5-Methyl-1-hexenone-3 (*Isobutyl vinyl ketone*)

$CH_3{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CO{\cdot}CH{:}CH_2$

$C_7H_{12}O$ MW, 112

B.p. 32°/10 mm.

Blaise, Maire, *Compt. rend.*, 1906, **142**, 216

2-Methyl-2-hexenone-4 (*1-Methyl-2-isopropylideneacetone, 1-propionylisobutylene*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH{:}C(CH_3){\cdot}CH_3$

$C_7H_{12}O$ MW, 112

B.p. 148°.
Semicarbazone: cryst. from EtOH.Aq. M.p. 162°.

Blaise, Maire, *Ann. chim. phys.*, 1908, **15**, 571.

2-Methyl-2-hexenone-5 (*2-Methyl-4-aceto-2-butylene*)

$CH_3{\cdot}CO{\cdot}CH_2{\cdot}CH{:}C(CH_3){\cdot}CH_3$

$C_7H_{12}O$ MW, 112

B.p. 72–4°/30 mm. $D_4^{21.5}$ 0·9012. $n_D^{21.5}$ 1·4317.
Semicarbazone: plates from EtOH.Aq. M.p. 159–60°.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 918.

3-Methyl-2-hexenone-4 (2-*Propionyl*-2-*butylene*)

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}\overset{CH_3}{\overset{|}{C}}{:}CH{\cdot}CH_3$$

$C_7H_{12}O$ MW, 112

B.p. 54·5°/18 mm., 50·5°/13 mm.
Semicarbazone: m.p. 161–2°.
p-*Nitrophenylhydrazone*: yellowish-red needles from AcOH. M.p. 134°.

Blaise, Herman, *Compt. rend.*, 1908, **146**, 1326.

2-Methyl-3-hexenone-5.
See Isobutylideneacetone.

3-Methyl-3-hexenone-2 (2-*Aceto*-2-*pentene*, 1-*methyl*-1-*propylideneacetone*)

$$CH_3{\cdot}CH_2{\cdot}CH{:}\overset{CH_3}{\overset{|}{C}}{\cdot}CO{\cdot}CH_3$$

$C_7H_{12}O$ MW, 112

Oil. B.p. 151° slight decomp., 55–60°/14 mm.

Benary, *Ber.*, 1931, **64**, 2544.

4-Methyl-3-hexenone-2

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}{:}CH{\cdot}CO{\cdot}CH_3$$

$C_7H_{12}O$ MW, 112

Oil. B.p. 147–53°.

Kondakow, *J. Russ. Phys.-Chem. Soc.*, 1894, **26**, 8.

5-Methyl-1-hexine.
See Isoamylacetylene.

***unsym*.-Methylhexylacetone.**
See 3-Methylnonanone-2.

2-Methyl-*n*-hexyl Alcohol (2-*Methylhexanol*-1)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2OH$$

$C_7H_{16}O$ MW, 116

d-.
B.p. 71–2°/15 mm. $[\alpha]_D^{25}$ + 2·47° in EtOH.

dl-.
B.p. 162–4°/750 mm. D_4^{2} 0·8270. n_D^{20} 1·4226.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 571.
Zelinsky, Prewalski, *Chem. Zentr.*, 1908, II, 1855.

3-Methyl-*n*-hexyl Alcohol (3-*Methylhexanol*-1)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2{\cdot}CH_2OH$$

$C_7H_{16}O$ MW, 116

l-.
B.p. 80°/25 mm. D_4^{29} 0·8208. n_D^{30} 1·4202. $[\alpha]_D^{27}$ − 1·60° in $CHCl_3$.
1-*Naphthylurethane*: m.p. 73°.

dl-.
B.p. 168–9°/754 mm. D^{20} 0·8258. n_D^{20} 1·4245.
Acetyl: b.p. 183–4°/754 mm. D^{20} 0·8743. n_D^{20} 1·4156.
1-*Naphthylurethane*: m.p. 45–7°.

Dewael, Weckering, *Bull. soc. chim. Belg.*, 1924, **33**, 495.
Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 89.

4-Methyl-*n*-hexyl Alcohol (4-*Methylhexanol*-1)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$$

$C_7H_{16}O$ MW, 116

d-.
B.p. 77°/20 mm. D_4^{23} 1·809. n_D^{25} 1·4233. $[\alpha]_D^{23}$ + 1·94°.

dl-.
B.p. 173°/761 mm. D^{20} 0·8239. n_D^{20} 1·4219.
Acetyl: b.p. 190°/757 mm. D^{20} 0·8740. n_D^{20} 1·4186.
1-*Naphthylurethane*: m.p. 50°.

See previous references.

5-Methyl-*n*-hexyl Alcohol.
See Isoheptyl Alcohol.

2-Methyl-*n*-hexylamine

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2NH_2$$

$C_7H_{17}N$ MW, 115

l-.
B.p. 62°/22 mm., 49–54°/15 mm. D_4^{27} 0·773. $[\alpha]_D^{25}$ − 11·75°.
B,HCl: $[\alpha]_D^{25}$ − 2·41° in H_2O.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 163.

3-Methyl-*n*-hexylamine

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2{\cdot}CH_2NH_2$$

$C_7H_{17}N$ MW, 115

l-.
B.p. 67°/45 mm. D_4^{26} 0·772. n_D^{25} 1·4249. $[\alpha]_D^{26}$ − 0·25°.

dl-.

B.p. 148–9°/756 mm. D^{20} 0·7787. n_D^{20} 1·4257.

Dewael, Weckering, *Bull. soc. chim. Belg.*, 1924, **33**, 495.
Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.

4-Methyl-n-hexylamine

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2NH_2$$

$C_7H_{17}N$ MW, 115

B.p. 152–3°/750 mm. D^{20} 0·7802. n_D^{20} 1·42383.

Naphthylcarbamate: m.p. 110°.

See first reference above.

Methyl-n-hexylcarbinol.

*See sec.-n-*Octyl Alcohol.

Methyl-n-hexyl Ketone (*2-Keto-octane, octanone-2*)

$$CH_3{\cdot}CH_2{\cdot}[CH_2]_4{\cdot}CO{\cdot}CH_3$$

$C_8H_{16}O$ MW, 128

F.p. — 16°. B.p. 173·6–174°/770 mm., 172·92°/760 mm., 59–60°/11 mm. D_4^{20} 0·8202. n_D^{20} 1·41512. Heat of comb. C_v 1212·9 Cal., C_p 1215·0 Cal.

Oxime: oil. B.p. 213–14°/725 mm., 123°/40 mm., 116·5°/15 mm. D_4^{20} 0·8858. n_D^{20} 1·4511. Sol. most org. solvents.

Semicarbazone: cryst. from EtOH.Aq. M.p. 123°.

Di-Et acetal: b.p. 101–3°/16 mm. D_{25}^{25} 0·8798.

Semioxamazone: cryst. from EtOH. M.p. 115–16°. Easily hyd.

p-*Nitrophenylhydrazone*: cryst. M.p. 92–3°.

2 : 4-*Dinitrophenylhydrazone*: orange cryst. from EtOH. M.p. 58°.

Phenylsemicarbazone: cryst. from EtOH. M.p. 94–5°.

p-*Tolylsemicarbazone*: m.p. 183–4°.

p-*Chlorobenzoylhydrazone*: plates from EtOH. M.p. 121–2°.

m-*Nitrobenzoylhydrazone*: m.p. 100°.

Moureu, Mignonac, *Compt. rend.*, 1920, **171**, 652.
Verhulst, Glorieux, *Bull. soc. chim. Belg.*, 1932, **41**, 501.

1-Methyl-n-hexylmalonic Acid (*2-Methylheptane-1 : 1-dicarboxylic acid, sec.-heptylmalonic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH{<}^{COOH}_{COOH}$$

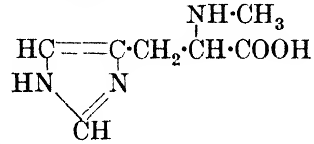
$C_{10}H_{18}O_4$ MW, 202

Cryst. M.p. 97–8°. Sol. EtOH, Et_2O. Spar. sol. H_2O. Insol. ligroin. k (first) = 1·02 × 10^{-3} at 25°: (second) = 0·61 × 10^{-6} at 25°. Heat of comb. C_p 1802·7 Cal.

Di-Et ester: $C_{14}H_{26}O_4$. MW, 258. B.p. 263–5°.

Venable, *Ber.*, 1880, **13**, 1651.

Methylhistidine (*1-Methylamino-2-iminazolylpropionic acid*)



$C_7H_{11}O_2N_3$ MW, 169

l-.

Cryst. + H_2O from H_2O. M.p. 248–9°. $[\alpha]_D$ — 25·98°.

B,2HNO₃: m.p. 216°.

Picrolonate: m.p. 246°.

dl-.

Needles with sweet taste. M.p. 270°.

B,2HCl: plates + H_2O from dil. HCl. M.p. 134°. Sol. H_2O. Spar. sol. EtOH.

B,2HNO₃: decomp. at 144–6°.

B,2HAuCl₄: orange prisms from H_2O. Decomp. at 115°. Spar. sol. H_2O.

Benzoyl deriv.: prisms from H_2O. M.p. 241°.

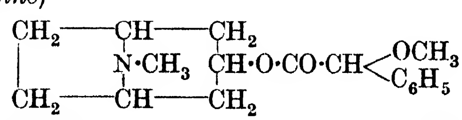
Monopicrate: prisms + $3H_2O$ from H_2O. M.p. 118°. Spar. sol. H_2O.

Sesquipicrate: prisms + $7H_2O$ from H_2O. M.p. 193°.

Dipicrate: needles + $3H_2O$ from H_2O. M.p. 132°.

Fargher, Pyman, *J. Chem. Soc.*, 1921, **119**, 736.
Linneweh, Linneweh, *Z. physiol. Chem.*, 1930, **189**, 80.

Methylhomatropine (*O-Methylmandelyltropine*)



$C_{17}H_{23}O_3N$ MW, 289

Cryst. + $2H_2O$. M.p. 50–5°. B.p. (anhyd.) 144–6°/0·3 mm. Salts very hygroscopic and sol. H_2O.

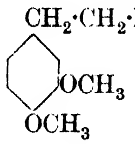
Picrate: yellow needles. M.p. 238°.

Picrolonate: yellow needles. M.p. 226°.

Methiodide: cryst. from Et_2O. M.p. 251°.

v. Braun, Plazek, *Chem. Zentr.*, 1932, II, 1165.

N-Methylhomoveratrylamine (4-β-*Methylaminoethylveratrol, methyl-3 : 4-dimethoxyphenylethyl-amine*)



$C_{11}H_{17}O_2N$ MW, 195

Oil. B.p. 159°/11 mm. D_2^{20} 1·0597. n^{15} 1·5362. Very sol. H_2O with alk. reaction.

B,HI : cryst. from 90% EtOH. M.p. 131°. Very sol. H_2O. Sol. EtOH. Spar. sol. Et_2O.

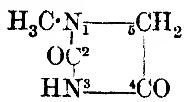
B_2,H_2PtCl_6 : m.p. 190° decomp.

$B,HAuCl_4$: m.p. 148° decomp.

Picrate : m.p. 162–3°.

Buck, *J. Am. Chem. Soc.*, 1930, **52**, 4120.

1-Methylhydantoin



$C_4H_6O_2N_2$ MW, 114

Prisms from C_6H_6. M.p. 184–5°. Sol. hot H_2O, EtOH, $CHCl_3$. Spar. sol. Et_2O.

3-Acetyl : needles from H_2O. M.p. 134–5°.

Fischer, Ach, *Ber.*, 1899, **32**, 2746.
Gaebler, *J. Biol. Chem.*, 1926, **69**, 615.

3-Methylhydantoin.

Prisms from H_2O. M.p. 155–7°. Sol. H_2O, EtOH. Sublimes.

Weitzner, *Ann.*, 1908, **362**, 125.
West, *J. Biol. Chem.*, 1918, **34**, 189.

5-Methylhydantoin.

Prisms + H_2O. M.p. anhyd. 145–6°. Sol. H_2O, EtOH. Spar. sol. Et_2O. Reacts neutral. $Ba(OH)_2$ at 130–45° ⟶ alanine + CO_2 + NH_3.

Bucherer, Steiner, *J. prakt. Chem.*, 1934, **140**, 316.

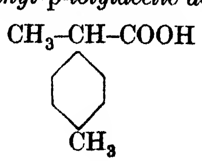
1-Methylhydracrylic Acid.

See 2-Hydroxyisobutyric Acid.

1-Methylhydratropic Acid.

See 1-Phenylisobutyric Acid.

p-Methylhydratropic Acid (1-p-*Tolylpropionic acid, methyl*-p-*tolylacetic acid*)



$C_{10}H_{12}O_2$ MW, 164

Cryst. M.p. 40–1° (34°). B.p. 280°, 161–161·5°/12·5 mm.

Et ester : $C_{12}H_{16}O_2$. MW, 192. Oil. B.p. 123·5°/11 mm.

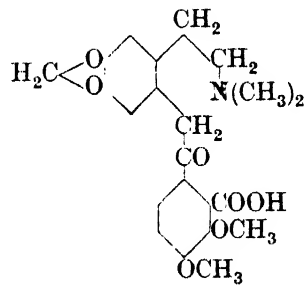
Amide : $C_{10}H_{13}ON$. MW, 163. Cryst. from C_6H_6. M.p. 195°. Very sol. EtOH, MeOH, $CHCl_3$. Sol. hot H_2O, C_6H_6. Spar. sol. Et_2O, ligroin.

Nitrile : $C_{10}H_{11}N$. MW, 145. B.p. 246·5–247·5°, 123°/12·5 mm.

p-*Toluidide* : $C_{17}H_{19}ON$. MW, 253. Cryst. from EtOH. M.p. 102–3°.

Rupe, Wiederkehr, *Helv. Chim. Acta*, 1924, **7**, 657.

Methylhydrasteine (*Methylhydrastine hydrate*)



$C_{22}H_{25}O_7N$ MW, 415

Needles + $2H_2O$ from H_2O or EtOH.Aq. M.p. 151–2°. Sol. hot H_2O, EtOH, alkalis.

B,HCl : needles from EtOH–Et_2O. M.p. 182–3°.

B,HI : cryst. from EtOH. M.p. 216–17°.

B_2,H_2PtCl_6 : yellow cryst. M.p. 208°.

Oxime : prisms from boiling EtOH.Aq. M.p. 202–3° decomp. Insol. H_2O, boiling EtOH.

Me ester : $C_{23}H_{27}O_7N$. MW, 429. Cryst. from MeOH. M.p. 175°.

Et ester : $C_{24}H_{29}O_7N$. MW, 443. Yellow cryst. from EtOH. M.p. 194–5° (95–6°). *B,HNO_3* : needles from EtOH–Et_2O. M.p. 145–6°. *B,HI* : yellow plates from H_2O. M.p. 235–6°. *B_2,H_2PtCl_6* : yellow powder. M.p. 210° (163–4°) decomp.

Amide : $C_{22}H_{26}O_6N_2$. MW, 414. Plates from EtOH. M.p. 180°. Sol. $CHCl_3$. Spar. sol. H_2O, Et_2O, C_6H_6, CS_2. *B,HCl* : needles + $2H_2O$. M.p. 116–18°. *B,HI* : cryst. M.p. 233–5°.

Methylamide : cryst. from EtOH. M.p. 182°. *B,HCl* : needles. M.p. 193°.

Ethylamide : cryst. M.p. 162°.

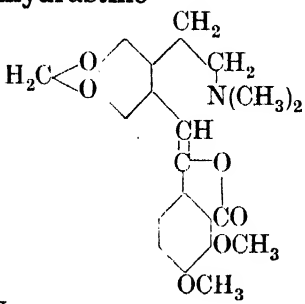
Isoamylamide : cryst. from EtOH. M.p. 171°.

Allylamide : cryst. from EtOH. M.p. 158°.

Imide: cryst. from EtOH. M.p. 192°. *B,HI*: cubes. M.p. 235–7°.

Addinall, Major, *J. Am. Chem. Soc.*, 1933, **55**, 2160.
Schmidt, Schmidt, *Arch. Pharm.*, 1890, **228**, 243.
Freund, Heim, *Ber.*, 1890, **23**, 2897.

Methylhydrastine



$C_{22}H_{23}O_6N$ MW, 397

Yellow needles from EtOH. M.p. 156–7°. Sol. EtOH, Et_2O, C_6H_6, CS_2, AcOEt. Insol. H_2O. Alc. sol. shows green fluor.

B,HCl: yellow needles + H_2O from EtOH. M.p. 233–4°. Sol. H_2O.

B,HI: prisms from EtOH.Aq. M.p. 257–8°. Mod. sol. hot H_2O. Spar. sol. EtOH.

B,HNO₃: yellow needles. M.p. 230–1°. Spar. sol. H_2O.

B,H₂SO₄: yellow needles from EtOH. M.p. 250°.

B₂,H₂PtCl₆: yellow amorph. solid + $2H_2O$. M.p. 199–200°.

Methiodide: yellow prisms from EtOH.Aq. M.p. 250–1°. Sol. EtOH. Less sol. H_2O.

Hydrate: *see* Methylhydrasteine.

See first two references above.

Methylhydrazine (*Hydrazinomethane*)

$CH_3{\cdot}NH{\cdot}NH_2$

CH_6N_2 MW, 46

B.p. 87°/745 mm. Sol. H_2O, EtOH, Et_2O. Reduces Fehling's.

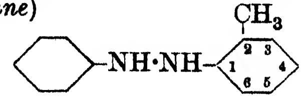
B,H₂SO₄: cryst. from MeOH. M.p. 142°. Sol. H_2O. Spar. sol. EtOH.

Oxalate: needles from EtOH.Aq. M.p. 166°. Sol. H_2O. Insol. EtOH.

Picrate: yellow needles from EtOH. M.p. 166° (162°).

v. Brüning, *Ann.*, 1889, **253**, 7.

2-Methylhydrazobenzene (sym.-*Phenyl*-o-*tolylhydrazine*)



$C_{13}H_{14}N_2$ MW, 198

Plates from EtOH. M.p. 101–2°. Sol. Et_2O, C_6H_6. Spar. sol. EtOH, pet. ether. Insol. H_2O.

Bayer, D.R.P., 52,839.
Jacobson, Lischke, *Ber.*, 1895, **28**, 2544.

3-Methylhydrazobenzene (sym.-*Phenyl*-m-*tolylhydrazine*).

Yellow cryst. from pet. ether. M.p. 59–61°. Very sol. EtOH. Sol. C_6H_6. Spar. sol. Et_2O.

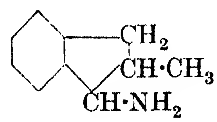
Jacobson, Nanninga, *Ber.*, 1895, **28**, 2549.

4-Methylhydrazobenzene (sym.-*Phenyl*-p-*tolylhydrazine*).

Plates from ligroin. M.p. 91° (86–7°). Sol. EtOH, C_6H_6.

Jacobson, Lischke, *Ann.*, 1898, **303**, 369.

2-Methyl-1-hydrindamine (2-*Methyl*-1-*indanamine*)



$C_{10}H_{13}N$ MW, 147

d-.

Free base strongly dextrorotatory in EtOH.Aq.

Acid-d-*tartrate*: cryst. M.p. 153–5°. Mod. sol. H_2O, EtOH. Almost insol. Et_2O, $CHCl_3$, AcOEt, pet. ether. $[\alpha]_D$ + 32·4° in H_2O.

Acid-l-*tartrate*: cryst. from H_2O. M.p. 197°. $[\alpha]_D$ −6·5° in H_2O.

Phenyl-p-*tolylphosphate*: cryst. from AcOEt–Et_2O. M.p. 135–7°. Very sol. MeOH. Sol. hot Me_2CO, hot AcOEt. Almost insol. cold H_2O. $[\alpha]_D$ + 16·9° in MeOH.

3-*Chloro*-d-*camphor*-8-*sulphonate*: needles from H_2O. Exists in two forms. (i) M.p. 247°. $[\alpha]_D$ + 56·2° in $CHCl_3$, + 60·2° in H_2O. (ii) M.p. 225–30°. $[\alpha]_D$ + 63·6° in $CHCl_3$, + 63·4° in H_2O.

3-*Bromo*-d-*camphor*-8-*sulphonate*: needles from H_2O. M.p. about 249°. Sol. hot H_2O, EtOH, $CHCl_3$. Almost insol. AcOEt. $[\alpha]_D$ + 71·4° in H_2O, + 65·2° in $CHCl_3$.

l-.

Free base strongly lævorotatory in EtOH.Aq.

B,HCl: needles or plates from H_2O. $[\alpha]_D$ − 31·20° in H_2O.

Acid-d-*tartrate*: prisms from H_2O. M.p. 197°. Sol. H_2O. Spar. sol. EtOH. Almost insol. $CHCl_3$, Et_2O, pet. ether. $[\alpha]_D$ − 5·0° in H_2O.

3-*Chloro*-d-*camphor*-8-*sulphonate*: needles from H_2O. Exists in two forms. (i) M.p. 239°.

$[\alpha]_D$ + 3·4° in $CHCl_3$, + 34·1° in H_2O. (ii) M.p. 231–3°. $[\alpha]_D$ + 8·2° in $CHCl_3$, + 35·8° in H_2O.

*3-Bromo-*d*-camphor-8-sulphonate*: needles from H_2O. M.p. 230°. Sol. H_2O, EtOH, $CHCl_3$. Insol. Et_2O, AcOEt, pet. ether. $[\alpha]_D$ + 45·9° in H_2O, + 19·5° in $CHCl_3$.

dl-.

B.p. 231–5°/760 mm. D_0^{20} 0·9939. n_D^{20} 1·5410.

B,HCl: needles. Decomp. at 230°.

B_2,H_2SO_4: needles from H_2O, plates from EtOH. Decomp. at 233–5°.

Acid oxalate: needles + H_2O from H_2O. M.p. 110–11°, anhyd. 143–5°.

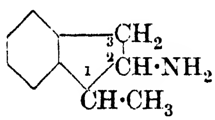
N-*Benzoyl*: m.p. 150°.

Picrate: yellow plates from EtOH. M.p. 230°.

*3-Bromo-*d*-camphor-8-sulphonate*: prisms from Me_2CO. M.p. 171–3°. $[\alpha]_D$ + 51·8° in H_2O, + 44·1° in $CHCl_3$.

Tattersall, Kipping, *J. Chem. Soc.*, 1903, **83**, 925.
Kishner, *J. Russ. Phys.-Chem. Soc.*, 1914, **46**, 1418.

1-Methyl-2-hydrindamine (1-*Methyl-2-indanamine*)



$C_{10}H_{13}N$ MW, 147

B.p. 108–10°/11 mm.

B,HCl: m.p. 202°.

N-*Benzoyl*: cryst. from EtOH. M.p. 137°.

Picrate: m.p. 239°.

v. Braun, Danziger, Koehler, *Ber.*, 1917, **50**, 63.

2-Methyl-2-hydrindamine (2-*Methyl-2-indanamine*).

B.p. 118–19°/18 mm. Spar. sol. H_2O. Alk. $KMnO_4$ ⟶ phthalic acid.

B,HCl: m.p. 241°. Sol. hot EtOH.

B,HBr: m.p. 290–3°.

B_2,H_2PtCl_6: yellow cryst. from EtOH. Decomp. at 220°. Spar. sol. H_2O.

N-*Me*: $C_{11}H_{15}N$. MW, 161. B.p. 113–18°/15 mm. *B,HCl*: cryst. M.p. 212°. *B_2,H_2PtCl_6*: m.p. 197°. *Benzoyl*: cryst. M.p. 95–7°. *Benzenesulphonyl*: m.p. 93–5°. *Picrate*: yellow cryst. M.p. 198–9°.

N-*Acetyl*: cryst. M.p. 127°. Very sol. H_2O. Reacts neutral.

N-*Benzoyl*: needles from EtOH. M.p. 160° (150–2°).

N-*Benzenesulphonyl*: cryst. from EtOH.Aq. M.p. 104°.

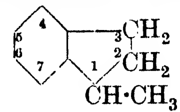
N-*Salicylidene*: yellow cryst. M.p. 92°.

Oxalate: needles from H_2O. M.p. 216–20° decomp.

Picrate: needles from EtOH. M.p. 244°.

v. Braun, Kruber, Danziger, *Ber.*, 1916, **49**, 2648.

1-Methylhydrindene (1-*Methylindane*)



$C_{10}H_{12}$ MW, 132

B.p. 182–3°, 60–70°/12 mm. D_4^{16} 0·9661. n_D 1·5394.

v. Braun, Neumann, *Ber.*, 1917, **50**, 55.

2-Methylhydrindene (2-*Methylindane*).

B.p. 183–5°/747 mm. D_0^{17} 0·9034. n_D^{17} 1·5070.

Kishner, *J. Russ. Phys.-Chem. Soc.*, 1914, **46**, 1420.

4-Methylhydrindene (4-*Methylindane*).

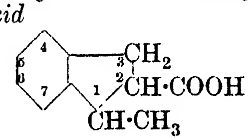
Oil present in coal tar. B.p. 203°. D_4^0 0·9350.

Kruber, *Ber.*, 1924, **57**, 1010.

Methylhydrindene-carboxylic Acid.

See Methylhydrindenic Acid.

1-Methyl-2-hydrindenic Acid (1-*Methylindane-2-carboxylic acid*, 1-*methylhydrindene-2 carboxylic acid*



$C_{11}H_{12}O_2$ MW, 176

d-.

Needles. M.p. 86°. Sol. usual org. solvents. $[\alpha]_D$ + 67·28° in EtOH, + 89·33° in toluene, + 76·86° in C_6H_6.

Me ester: $C_{12}H_{14}O_2$. MW, 190. Cryst. from MeOH. M.p. 68°. $[\alpha]_D$ + 63·22° in EtOH.

Ba salt: needles from EtOH. $[\alpha]_D$ + 24·02° in H_2O.

l-.

Needles from EtOH.Aq. M.p. 86°. $[\alpha]_D$ − 66·66° in EtOH, − 75·56° in C_6H_6.

dl-.

Needles from H_2O. M.p. 82°. B.p. 300–310°. Sol. EtOH, Et_2O. Mod. sol. hot H_2O. Volatile in steam.

Et ester: $C_{13}H_{16}O_2$. MW, 204. B.p. 150–1°/11 mm.

Chloride: $C_{11}H_{11}OCl$. MW, 194·5. B.p. 150°/20 mm.

Amide: $C_{11}H_{13}ON$. MW, 175. Cryst. M.p. 130°. Sol. EtOH, Et_2O.

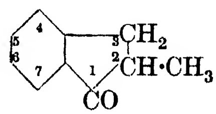
v. Braun, Danziger, Koehler, *Ber.*, 1917, **50**, 62.
Neville, *J. Chem. Soc.*, 1906, **89**, 384.

1-Methyl-4-hydrindenic Acid (*1-Methylindane-4-carboxylic acid, 1-methylhydrindene-4-carboxylic acid*).

Prisms from Me_2CO.Aq. M.p. 138–9°.

Hoyer, *J. prakt. Chem.*, 1934, **139**, 242.

2-Methyl-1-hydrindone (*2-Methylindanone-1*)



$C_{10}H_{10}O$ MW, 146

Oil. B.p. 250°/756 mm., 125°/18 mm., 111–12°/9 mm. $D_4^{21\cdot2}$ 1·0651. n_D^{21} 1·553.

Oxime: cryst. from MeOH.Aq. or pet. ether. M.p. 105–6°. Sol. EtOH, Et_2O. Spar. sol. pet. ether. Insol. H_2O.

Semicarbazone: needles from EtOH.Aq. M.p. 198° (190°). Sol. EtOH, AcOH. Spar. sol. other solvents.

Hydrazone: m.p. 72°. B.p. 166°/14 mm.

Phenylhydrazone: m.p. 95°.

p-*Nitrophenylhydrazone*: m.p. 167–8°.

Mitchell, Thorpe, *J. Chem. Soc.*, 1910, **97**, 2275, 2724.
Kishner, *J. Russ. Phys.-Chem. Soc.*, 1914, **46**, 1413.

3-Methyl-1-hydrindone (*3-Methylindanone-1*).

Yellow oil. B.p. 118–19°/11 mm.

Oxime: cryst. from EtOH. M.p. 141·5°.

Semicarbazone: cryst. from EtOH. M.p. 230–1°.

v. Braun, Kirschbaum, *Ber.*, 1913, **46**, 3044.
I.G., Swiss P., 127,693, (*Chem. Abstracts*, 1929, **23**, 1416).

4-Methyl-1-hydrindone (*4-Methylindanone-1*).

Needles from ligroin. M.p. 95°. Sol. usual solvents. Very volatile in steam. Hot dil. HNO_3 ⟶ 3-methylphthalic acid.

Phenylhydrazone: needles from dil. EtOH. M.p. 132° decomp.

Young, *Ber.*, 1892, **25**, 2104.
I.G., D.R.P., 464,087, (*Chem. Abstracts*, 1928, **22**, 4130).

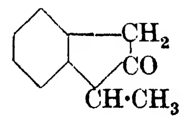
6-Methyl-1-hydrindone (*6-Methylindanone-1*).

Needles from ligroin. M.p. 63°. Sol. EtOH, Et_2O, C_6H_6, ligroin.

Phenylhydrazone: needles from dil. EtOH. M.p. 133° decomp.

v. Miller, Rohde, *Ber.*, 1890, **23**, 1898.
I.G., E.P., 288,441, (*Chem. Abstracts*, 1929, **23**, 606).

1-Methyl-2-hydrindone (*1-Methylindanone-2*)



$C_{10}H_{10}O$ MW, 146

Plates from MeOH. M.p. 62–3°. Stable to $KMnO_4$.

Semicarbazone: m.p. 195°.

Wallach, Beschke, *Ann.*, 1904, **336**, 6.

α-Methylhydrocinnamaldehyde (*1-Benzylpropionaldehyde, methylbenzylacetaldehyde, 2-phenylisobutyraldehyde*)

$$C_6H_5\cdot CH_2\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CHO$$

$C_{10}H_{12}O$ MW, 148

B.p. 226–7°/760 mm., 129–30°/19 mm. Forms cryst. bisulphite comp. Reduces $NH_3.AgNO_3$.

Semicarbazone: m.p. 70–2°.

Darzens, *Compt. rend.*, 1904, **139**, 1216.
v. Miller, Rohde, *Ber.*, 1890, **23**, 1080.

β-Methylhydrocinnamaldehyde (*2-Phenylbutyraldehyde*)

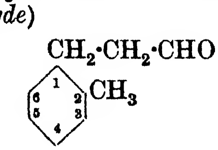
$$C_6H_5\cdot \overset{CH_3}{\overset{|}{C}H}\cdot CH_2\cdot CHO$$

$C_{10}H_{12}O$ MW, 148

B.p. 110°/9 mm.

v. Braun, Grabowski, Kirschbaum, *Ber.*, 1913, **46**, 1282.

***o*-Methylhydrocinnamaldehyde** (*2-o-Tolylpropionaldehyde*)



$C_{10}H_{12}O$ MW, 148

B.p. 120°/13 mm. $D_4^{19\cdot5}$ 0·998. $n_D^{19\cdot5}$ 1·522.

Semicarbazone: m.p. 153°.

Bert, *Compt. rend.*, 1928, **186**, 699.

p-Methylhydrocinnamaldehyde (2-p-*Tolylpropionaldehyde*).

Oil. B.p. 220–30°, 122°/15 mm. D_4^{14} 0·999. n_D^{14} 1·525. Oxidises easily in air.

Semicarbazone: needles. M.p. 174° (170–1°). Spar. sol. cold EtOH.

See previous reference and also
Auwers, *Ber.*, 1906, **39**, 3758.

α-Methylhydrocinnamic Acid (2-*Phenylisobutyric acid, methylbenzylacetic acid,* 1-*benzylpropionic acid*)

$$C_6H_5{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}COOH$$

$C_{10}H_{12}O_2$ MW, 164

d-.

Oil. B.p. 160°/13 mm. D_4^{20} 1·065. $[\alpha]_D$ + 27·06° in C_6H_6, + 27·72° in $CHCl_3$.

Na salt: plates from MeOH–Et_2O. $[\alpha]_D$ + 35·93° in H_2O.

Chloride: $C_{10}H_{11}OCl$. MW, 182·5. B.p. 120–1°/15 mm., 111°/11 mm. D_4^{20} 1·102. $[\alpha]_D$ + 26·28°.

l-*Menthylamide*: $C_{20}H_{31}ON$. MW, 301. Needles from C_6H_6. M.p. 140°. $[\alpha]_D$ + 7·5° in $CHCl_3$.

Benzylanilide: $C_{23}H_{23}ON$. MW, 329. Cryst. M.p. 69–70°. $[\alpha]_D$ + 8·8° in $CHCl_3$.

l-.

Not obtained pure.

dl-.

Plates from EtOH.Aq. M.p. 37·5°. B.p. 272–3°, 160°/12 mm. Very sol. EtOH, Et_2O, hot H_2O.

Me ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 232°.

Et ester: $C_{12}H_{16}O_2$. MW, 192. B.p. 142–3°/20 mm.

Chloride: $C_{10}H_{11}OCl$. MW, 182·5. B.p. 121°/17 mm.

Amide: $C_{10}H_{13}ON$. MW, 163. Needles from EtOH.Aq. M.p. 130°.

Methylanilide: prisms from pet. ether. M.p. 54–5°.

Benzylanilide: prisms from EtOH.Aq. M.p. 69–70°.

Pickard, Yates, *J. Chem. Soc.*, 1909, **95**, 1019.
Kipping, Salway, *J. Chem. Soc.*, 1904, **85**, 445.
Rupe, Busolt, *Ann.*, 1909, **369**, 321.

β-Methylhydrocinnamic Acid (2-*Phenylbutyric acid*)

$$C_6H_5{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}CH_2{\cdot}COOH$$

$C_{10}H_{12}O_2$ MW, 164

d-.

B.p. 135°/4 mm. $[\alpha]_D^{26}$ + 0·96°.

l-.

Oil. B.p. 157·25–157·75°/12 mm., 134°/4 mm., 127°/1 mm. D_4^{26} 1·066. n_D^{28} 1·5138. $[\alpha]_D^{20}$ − 57·23° in C_6H_6, − 26·59° in EtOH.

Et ester: $C_{12}H_{16}O_2$. MW, 192. B.p. 111°/4 mm. D_4^{25} 0·996. n_D^{25} 1·4918. $[\alpha]_D^{25}$ − 9·15°.

l-*Menthyl ester*: prisms from MeOH. M.p. 47–8°. $[\alpha]_D^{20}$ − 76·26° in C_6H_6.

dl-.

Needles from H_2O, prisms from pet. ether, plates from ligroin. M.p. 47° (39–40°). B.p. about 270°, 168–9°/14 mm., 140–5°/3 mm. Sol. hot pet. ether. Spar. sol. hot H_2O.

Me ester: $C_{11}H_{14}O_2$. MW, 178. B.p. 133–4°/22 mm.

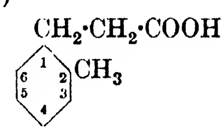
Et ester: $C_{12}H_{16}O_2$ MW, 192. B.p. 118°/9 mm.

Chloride: $C_{10}H_{11}OCl$. MW, 182·5. Oil. B.p. 114°/11 mm.

Amide: $C_{10}H_{13}ON$. MW, 163. Needles from EtOH.Aq. M.p. 106–7° (98·5°).

v. Braun, Grabowski, Kirschbaum, *Ber.*, 1913, **46**, 1280.
Levene, Marker, *J. Biol. Chem.*, 1931, **93**, 749.
See also last reference above.

***o*-Methylhydrocinnamic Acid** (2-o-*Tolylpropionic acid*)



$C_{10}H_{12}O_2$ MW, 164

Prisms from EtOH.Aq. M.p. 102°. Sol. most org. solvents. Mod. sol. hot H_2O. Conc. H_2SO_4 ⟶ 4-methyl-1-hydrindone.

Young, *Ber.*, 1892, **25**, 2104.

***m*-Methylhydrocinnamic Acid** (2-m-*Tolylpropionic acid*).

Needles from ligroin. M.p. 42–3°. Sol. H_2O, EtOH, Et_2O. Conc. H_2SO_4 ⟶ 5- and 7-methyl-1-hydrindone.

v. Miller, Rohde, *Ber.*, 1890, **23**, 1899.

***p*-Methylhydrocinnamic Acid** (2-p-*Tolylpropionic acid*).

Plates from H_2O, needles from ligroin. M.p. 120° (116°). Sol. EtOH, C_6H_6, pet. ether.

Et ester: $C_{12}H_{16}O_2$. MW, 192. Oil. B.p. 263–5°.

Amide: $C_{10}H_{13}ON$. MW, 163. Cryst. from H_2O. M.p. 135° (133°). Sol. EtOH, Et_2O. Spar. sol. cold H_2O.
Nitrile: $C_{10}H_{11}N$. MW, 145. B.p. 137°/15 mm.

v. Miller, Rohde, *Ber.*, 1890, **23**, 1898.
Willgerodt, Hambrecht, *J. prakt. Chem.*, 1910, **81**, 77.

Methylhydrocotoin.
See under Cotoin.

Methyl hydrogen sulphate

$$SO_2<\begin{matrix}OCH_3\\OH\end{matrix}$$

CH_4O_4S MW, 112

Oil. Does not solidify at − 30°. Very sol. H_2O. Less sol. EtOH.
NH_4 salt: plates. M.p. 135°.

Société anonyme des produits chimiques de Fontaines, D.R.P., 193,830, (*Chem. Zentr.*, 1908, I, 1112).

Methylhydroquinone.
See Toluhydroquinone.

1-Methylhydrosorbic Acid (1-*Methyl*-2-*hexenic acid*, 1-*propylideneisobutyric acid*, 1-α-*butenylpropionic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH{:}CH{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_7H_{12}O_2$ MW, 128

B.p. 122°/24 mm., 113·5°/15 mm. D_4^{20} 0·9353. n_D^{20} 1·4379.
Et ester: $C_9H_{16}O_2$. MW, 156. B.p. 78°/25 mm. D_4^{20} 0·8778. n_D^{20} 1·4237.
p-*Bromophenacyl ester*: needles from pet. ether. M.p. 41–2°.
Dibromide: cryst. from pet. ether. M.p. 107–8°.

Kon, Linstead, Maclennan, *J. Chem. Soc.*, 1932, 2453, 2458.
Auwers, Heyna, *Ann.*, 1923, **434**, 158.

2-Methylhydrosorbic Acid (2-*Methyl*-2-*hexenic acid, 2-propylidene butyric acid*)

$$CH_3{\cdot}CH_2{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_2{\cdot}COOH$$

$C_7H_{12}O_2$ MW, 128

B.p. 113°/10 mm. $D_4^{20\cdot7}$ 0·95487. $n_D^{20\cdot7}$ 1·44692.
Et ester: $C_9H_{16}O_2$. MW, 156. B.p. 84–5°/26 mm. $D_4^{20\cdot7}$ 0·89609. n_D^{20} 1·43087.

Kon, Leton, Linstead, Parsons, *J. Chem. Soc.*, 1931, 1415.

3-Methylhydrosorbic Acid (3-*Methyl*-2-*hexenic acid*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_2{\cdot}COOH$$

$C_7H_{12}O_2$ MW, 128

Liq. with unpleasant odour. B.p. 118°/12 mm. $D_4^{16\cdot7}$ 0·9644. $n_D^{16\cdot7}$ 1·4512. Unstable in air 2%. Aq.$KMnO_4$ ⟶ acetic acid + methyl ethyl ketone.
Et ester: $C_9H_{16}O_2$. MW, 156. B.p. 78°/11 mm.
Chloride: $C_7H_{11}OCl$. MW, 146·5. B.p. 65–8°/15 mm.
Anilide: $C_{13}H_{17}ON$. MW, 203. Needles from EtOH.Aq. M.p. 91°.

Linstead, Mann, *J. Chem. Soc.*, 1930, 2071.

4-Methylhydrosorbic Acid.
See 2-Isoheptenic Acid.

Methyl 2-hydroxy-*n*-amyl Ketone.
See 4-Heptanolone-2.

Methyl 4-hydroxy-*n*-amyl Ketone.
See 2-Heptanolone-6.

Methyl hydroxybutyl Ketone.
See Acetobutyl Alcohol, 2-Hexanolone-5, *and* 3-Hexanolone-5.

Methyl-hydroxyethylamine.
See 2-Methylaminoethyl Alcohol.

***N*-Methyl-*N*-2-hydroxyethylaniline**

$$C_6H_5{\cdot}N<\begin{matrix}CH_3\\CH_2{\cdot}CH_2OH\end{matrix}$$

$C_9H_{13}ON$ MW, 151

B.p. 218–19°/110 mm., 150°/14 mm. D^0 1·08065. Insol. H_2O. Oxidises easily. Reduces cold Au and Pt sols.
Benzoyl: cryst. from EtOH. M.p. 48–9° (47°). B.p. 220°/9 mm. *Picrate*: cryst. M.p. 164°.
p-*Nitrobenzoyl*: yellow needles from EtOH. M.p. 70°. Spar. sol. EtOH. *Picrate*: m.p. 177°. Spar. sol. EtOH.
3 : 5-*Dinitrobenzoyl*: deep red cryst. from $CHCl_3$–EtOH. M.p. 121°.

Gault, *Bull. soc. chim.*, 1908, **3**, 373.
v. Braun, Kirschbaum, *Ber.*, 1919, **52**, 1720, 2013.

Methyl 2-hydroxyethyl Ether (*Ethylene glycol monomethyl ether*)

$$HO{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_3$$

$C_3H_8O_2$ MW, 76

B.p. 124·9°/767 mm. D_4^{20} 0·9647, D_{15}^{15} 0·96928. n_D 1·40238. Misc. with H_2O, Et_2O, C_6H_6.

Acetyl: b.p. 145°/762 mm. D_{19}^{19} 1·0090. Sol. H_2O.

Palomaa, *Ber.*, 1909, **42**, 3874.

***N*-Methyl-*N*-[2-hydroxyethyl]-guanidine.**
See Creatinol.

Methyl 1-hydroxyethyl Ketone.
See Acetoin.

Methyl 2-hydroxyethyl Ketone.
See 3-Keto-*n*-butyl Alcohol.

Methyl-hydroxyisopropyl-cyclohexane.
See Menthanol.

Methyl-hydroxyisopropyl-cyclohexanol.
See Menthandiol.

Methyl-hydroxyisopropyl-cyclohexene.
See Menthenol.

Methyl-hydroxyisopropyl-cyclohexenone.
See Δ^1-*p*-8-Menthenolone-6.

***O*-Methylhydroxylamine** (*α-Methylhydroxylamine, methoxylamine, hydroxylamine methyl ether*)

$NH_2{\cdot}O{\cdot}CH_3$

CH_5ON MW, 47

B.p. 49–50°. Reduces cold $NH_3.AgNO_3$ but not Fehling's.
B,HCl: prisms. M.p. 149°.
B_2,H_2SO_4: plates from EtOH.Aq. M.p. 144°.
B,HNO_3: cryst. Detonates violently at 300°.
Picrate: m.p. 175°.

Traube, Ohlendorf, Zander, *Ber.*, 1920, **53**, 1477.

***N*-Methylhydroxylamine** (*β-Methylhydroxylamine, hydroxylaminomethane*)

$CH_3{\cdot}NH{\cdot}OH$

CH_5ON MW, 47

Prisms. M.p. 42° (rapid heat.). B.p. 62·5°/15 mm. Very sol. H_2O, MeOH, EtOH. Spar. sol. Et_2O, C_6H_6, ligroin. D_4^{20} 1·0003. n_D^{20} 1·41638. Hygroscopic. Gradually decomp. on standing. Fehling's $\longrightarrow CO_2 + NH_3 +$ methylamine. $FeCl_3 \longrightarrow$ reddish-violet col.
B,HCl: prisms. M.p. 88–90°. Sol. H_2O, EtOH. Volatile.
B,HBr: needles. M.p. 73°. Hygroscopic.
B_2,H_2SO_4: m.p. 130°.
Oxalate: m.p. 159°.
Picrate: yellow plates from H_2O. M.p. 268° (128–30°). Sol. H_2O, EtOH.
Me ether: *O*:*N*-dimethylhydroxylamine. C_2H_7ON. MW, 61. B.p. 42·2–42·6°. Sweet odour. Does not reduce Fehling's. *B,HCl*: plates. M.p. 115–16°. *B_2,H_2PtCl_6*: red prisms. M.p. 180° decomp.
Et ether: *N*-methyl-*O*-ethylhydroxylamine. C_3H_9ON. MW, 75. B.p. 65–65·5°. Sweet odour. *B,HCl*: needles from $CHCl_3$–Et_2O. M.p. 74–5°. Sol. boiling $CHCl_3$. *B_2,H_2PtCl_6*: orange powder. M.p. 170–1° decomp.

Kjellin, *Ber.*, 1893, **26**, 2382.
Jones, *Am. Chem. J.*, 1907, **38**, 257.
Traube, Schulz, *Ber.*, 1923, **56**, 1856.

Methyl *m*-hydroxy-*p*-methoxyphenylethyl Ketone.
See Isozingerone.

Methyl-hydroxymethyl-acetylene.
See 3-Methylpropargyl Alcohol.

Methyl-hydroxymethyl-benzoic Acid.
See Hydroxymethyl-toluic Acid.

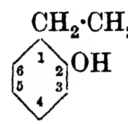
α-Methyl-α-hydroxymethyl-diphenylmethane.
See 1-Hydroxy-2:2-diphenylpropane.

Methyl-hydroxymethyl-indole.
See Methylindolylcarbinol.

Methyl hydroxymethyl Ketone.
See Hydroxyacetone.

Methyl hydroxynaphthyl Ketone.
See Hydroxyacetonaphthone.

Methyl-*o*-hydroxyphenylethyl-amine (*2-Hydroxyphenylethylmethylamine, o-β-methylaminoethylphenol*)



$C_9H_{13}ON$ MW, 151

B,HCl: plates from EtOH–Et_2O or Me_2CO–Et_2O. M.p. 148°. Spar. sol. Et_2O. $FeCl_3 \longrightarrow$ dull violet col. Does not reduce $NH_3.AgNO_3$.
Me ether: *o*-β-methylaminoethylanisole. $C_{10}H_{15}ON$. MW, 165. *B,HCl*: plates from EtOH–Et_2O. M.p. 119°. Sol. H_2O, EtOH. Spar. sol. Et_2O. *B,HI*: prisms from EtOH–Et_2O. M.p. 101°. Sol. H_2O, EtOH.

Buck, *J. Am. Chem. Soc.*, 1932, **54**, 3664.

Methyl-*m*-hydroxyphenylethyl-amine (*3-Hydroxyphenylethylmethylamine, m-β-methylaminoethylphenol*).
B,HCl: plates from EtOH–Et_2O or Me_2CO–Et_2O. M.p. 89°. Spar. sol. Et_2O. $FeCl_3 \longrightarrow$ pale violet col. Does not reduce $NH_3.AgNO_3$.
Me ether: *m*-β-methylaminoethylanisole. $C_{10}H_{15}ON$. MW, 165. *B,HCl*: plates from EtOH. M.p. 119°. Sol. H_2O, EtOH. Spar.

sol. Et_2O. *B,HI*: plates from $EtOH-Et_2O$. M.p. 108°. Sol. H_2O, EtOH.

See previous reference.

Methyl-p-hydroxyphenylethyl-amine (*4-Hydroxyphenylethylmethylamine*, p-β-*methylaminoethylphenol*).

Prisms from EtOH. M.p. 130°. B.p. 183–5°/9 mm. Mod. sol. H_2O. Sol. dil. acids and alkalis. Pptd. by excess NH_3. Reacts alkaline to phenolphthalein. Reduces cold acid $KMnO_4$. Gives intense Millon's reaction.

Me ether: *p*-β-methylaminoethylanisole. $C_{10}H_{15}ON$. MW, 165. N-*Acetyl*: cryst. B.p. 205–8°/18 mm.

N-*Acetyl*: plates from EtOH. M.p. 142°. Sol. MeOH, AcOEt.

B,HCl: plates from $EtOH-Et_2O$. M.p. 148·5°. Sol. H_2O.

B_2,H_2PtCl_6: yellow needles. M.p. 205° decomp.

N-*Benzenesulphonyl*: leaflets from $EtOH-Et_2O$. M.p. 133·5°. Sol. H_2O.

Walpole, *J. Chem. Soc.*, 1910, **97**, 942.

Methyl hydroxyphenyl Ketone.
See Hydroxyacetophenone.

Methyl hydroxyphenyl sulphide.
See under Thiohydroquinone *and* Thioresorcinol.

***N*-Methyl-3-hydroxypropyl-amine.**
See 3-Methylaminopropyl Alcohol.

Methyl 2-hydroxypropyl Ketone.
See Acetoisopropyl Alcohol.

Methyl 3-hydroxypropyl Ketone.
See 3-Acetopropyl Alcohol.

Methyl hydroxytolyl Ketone.
See Hydroxy-methylacetophenone.

Methyl hypochlorite

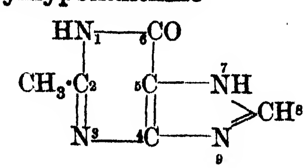
$CH_3{\cdot}OCl$

CH_3OCl MW, 66·5

Liq. B.p. 12°/726 mm. Decomp. easily.

Sandmeyer, *Ber.*, 1886, **19**, 859.

2-Methylhypoxanthine



$C_6H_6ON_4$ MW, 150

Cryst. Sol. 35 parts boiling H_2O, 100 parts cold H_2O. Forms cryst. salts.

Traube *et al.*, *Ann.*, 1923, **432**, 288.

3-Methylhypoxanthine.

Cryst. Decomp. on heating. Sol. 210 parts H_2O. Sol. dil. min. acids. Forms cryst. salts with alkalis.

Traube, Winter, *Arch. Pharm.*, 1906, **244**, 11.

7-Methylhypoxanthine.

Needles from EtOH. M.p. 335° decomp. Sol. hot H_2O. Very sol. dil. min. acids.

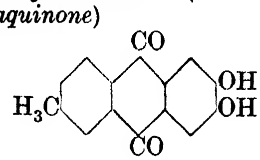
Fischer, *Ber.*, 1897, **30**, 2409.

9-Methylhypoxanthine.

Plates from H_2O. M.p. 390° decomp. Sol. 40 parts boiling H_2O, 414 parts at 20°. Very sol. dil. alkalis.

Fischer, *Ber.*, 1898, **31**, 114.

6-Methylhystazarin (6 : 7-*Dihydroxy*-2-*methylanthraquinone*)



$C_{15}H_{10}O_4$ MW, 254

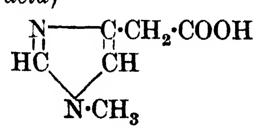
Yellow needles from EtOH. M.p. 320–40° decomp. Spar. sol. EtOH, AcOH. Sol. NH_3 with violet col., NaOH with greenish-blue col., conc. H_2SO_4 with cherry-red col. Zn dust dist. ⟶ 2-methylanthracene.

Diacetyl: yellowish needles from EtOH. M.p. 208°. Sol. EtOH, Me_2CO, AcOH.

Niementowski, *Ber.*, 1900, **33**, 1633.

Methyliminazole.
See Methylglyoxaline.

1-Methyl-4-iminazolylacetic Acid (1-*Methylglyoxaline*-4-*acetic acid*, 1-*methyliminazole*-4-*acetic acid*)



$C_6H_8O_2N_2$ MW, 140

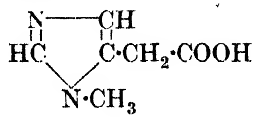
Et ester: $C_8H_{12}O_2N_2$. MW, 168. Brown oil. *Picrate*: yellow fibres from H_2O. M.p. 133–4°. Spar. sol. cold H_2O.

Nitrile: $C_6H_7N_3$. MW, 121. Plates from $CHCl_3$. M.p. 34–6°. Sol. H_2O and most org. solvents. Spar. sol. Et_2O, pet. ether. Very deliquescent. *Acid oxalate*: needles from H_2O or EtOH. M.p. 116–17°. Sol. H_2O. Spar. sol. EtOH. *Picrate*: pale yellow needles from H_2O. M.p. 209–10°. Spar. sol. cold H_2O.

Picrate: prisms from H_2O. M.p. 187–9°.

Pyman, *J. Chem. Soc.*, 1911, **99** 2179.

1-Methyl-5-iminazolylacetic Acid (*1-Methylglyoxaline-5-acetic acid, 1-methyliminazole-5-acetic acid*)



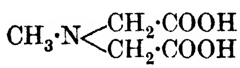
$C_6H_8O_2N_2$ MW, 140

Nitrile: $C_6H_7N_3$. MW, 121. Oil. Sol. H_2O, EtOH, $CHCl_3$. *Acid oxalate*: prisms from EtOH. M.p. 139–40°. Sol. H_2O. Spar. sol. EtOH. *Picrate*: yellow leaflets from H_2O. M.p. 156–7°. Spar. sol. cold H_2O.
Picrate: plates from H_2O. M.p. 180–1°.

See previous reference.

Methyliminobutyric Acid.
See 2-Methylaminocrotonic Acid.

Methyliminodiacetic Acid (*Methyldiglycolamidic acid*)

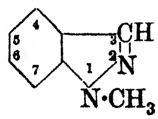


$C_5H_9O_4N$ MW, 147

Cryst. from H_2O. M.p. 226–7° decomp. Sol. H_2O. Insol. EtOH, Et_2O.
Di-Me ester: $C_7H_{13}O_4N$. MW, 175. B.p. 126–128·5°/33–4 mm., 114·5–115·5°/13 mm.
Monoamide: $C_5H_{10}O_3N_2$. MW, 146. Needles from EtOH.Aq. M.p. 168°. Very sol. H_2O. Insol. EtOH, Et_2O.
Diamide: $C_5H_{11}O_2N_3$. MW, 145. Cryst. from MeOH. M.p. 168–9°. Sol. H_2O, MeOH, EtOH. Spar. sol. Et_2O, Me_2CO, C_6H_6, $CHCl_3$, AcOEt, pet. ether. *B,HCl*: needles. M.p. 190–200° decomp. *B,HNO₃*: needles. Decomp. at 178–80°.
Dinitrile: $C_5H_7N_3$. MW, 109. B.p. 145–50°, 70°/45 mm.
Imide: *see* 4-Methyl-2 : 6-diketopiperazine.

Eschweiler, *Ann.*, 1894, **279**, 39.
Franchimont, Dubsky, *Rec. trav. chim.*, 1916, **36**, 95.

1-Methylindazole

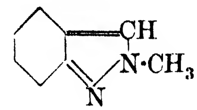


$C_8H_8N_2$ MW, 132

Prisms from pet. ether. M.p. 60–1°. B.p. 231°, 109°/17 mm.
Picrate: yellow needles from EtOH. M.p. 136–7°.
Methiodide: cryst. from EtOH. M.p. 187°.
Picrate: orange needles from EtOH. M.p. 167–8°.

Auwers, Düesberg, *Ber.*, 1920, **53**, 1198.

2-Methylindazole



$C_8H_8N_2$ MW, 132

Prisms and plates from pet. ether. M.p. 56°. B.p. 261°, 135°/16 mm. Sol. most org. solvents.
Picrate: yellow needles from EtOH. M.p. 168°.

Auwers, Düesberg, *Ber.*, 1920, **53**, 1196.

3-Methylindazole.
Long needles from H_2O. M.p. 113°. B.p. 280–1°/736 mm. (277°). Sol. EtOH, Et_2O, $CHCl_3$. Mod. sol. hot H_2O. Insol. conc. NaOH. Volatile in steam. Does not reduce Fehling's.
B,HCl: needles from EtOH–Et_2O. M.p. 177°. Very sol. H_2O, EtOH.
Picrate: m.p. 198·5–199·5°.
Nitroso deriv.: yellow needles from ligroin. M.p. 60·5°. Very sol. EtOH, Et_2O, $CHCl_3$, AcOH. Sol. warm ligroin.

Fischer, Tafel, *Ann.*, 1885, **227**, 317.

5-Methylindazole.
Needles from hot H_2O. M.p. 117°. B.p. 293–4°/747 mm. Sol. EtOH, Et_2O, AcOEt. Spar. sol. ligroin.
Acetyl: (i) *stable form*, plates and needles from pet. ether. M.p. 49°. Sol. Me_2CO, Et_2O, C_6H_6, AcOH. Less sol. MeOH, EtOH. Spar. sol. pet. ether. (ii) *Labile form*: cryst. from Et_2O. M.p. 110–11°. Less sol. org. solvents than stable form.
Propionyl: (i) *stable form*, plates from pet. ether. M.p. 59–60°. Sol. Me_2CO, C_6H_6, AcOH. Less sol. MeOH, EtOH. Spar. sol. cold pet. ether. (ii) *Labile form*: cryst. from Et_2O. M.p. 97–8°. Sol. Et_2O, AcOH. Less sol. MeOH, EtOH, C_6H_6, pet. ether.
Benzoyl: (i) *stable form*, needles from pet. ether. M.p. 89·5–90·5°. Very sol. Et_2O, Me_2CO. Sol. MeOH, EtOH, C_6H_6, AcOH. Spar. sol. pet. ether. (ii) *Labile form*: cryst. from Et_2O. M.p. 120–1°. Sol. Me_2CO, Et_2O, C_6H_6, AcOH. Less sol. MeOH, EtOH. Spar. sol. pet. ether.
Picrate: needles from H_2O. M.p. 169–70°.

Auwers, Schwegler, *Ber.*, 1920, **53**, 1227.

6-Methylindazole.

Plates from H_2O. M.p. 177–8°. Sol. Et_2O, Me_2CO, AcOH. Spar. sol. hot H_2O, cold EtOH, C_6H_6. Insol. pet. ether.

Acetyl: (i) *stable form*, thick oil. B.p. 146–7°/16 mm. (ii) *Labile form*: plates from Et_2O. M.p. 116–18°. Sol. Me_2CO, C_6H_6. Less sol. Et_2O, AcOH. Spar. sol. EtOH. Almost insol. pet. ether.

Picrate: yellow needles from H_2O. M.p. 163·5–164·5°.

Auwers, Schwegler, *Ber.*, 1920, **53**, 1231.

7-Methylindazole.

Long needles from pet. ether. M.p. 138°. Volatile in steam. Sublimes.

1-*Acetyl*: needles from H_2O. M.p. 31–2°.

2-*Acetyl*: cryst. from pet. ether. M.p. 85–6°. Sol. most org. solvents.

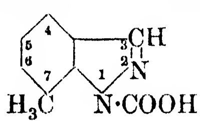
1-*Chloroacetyl*: needles from EtOH. M.p. 93–4°. Sol. Et_2O, Me_2CO, C_6H_6. Mod. sol. MeOH, EtOH, AcOEt. Spar. sol. pet. ether.

2-*Chloroacetyl*: needles from pet. ether. M.p. 125·5–126·5°. Sol. Me_2CO, C_6H_6, AcOH. Less sol. EtOH, Et_2O.

Picrate: yellow needles from EtOH. M.p. 158°.

Auwers, Ernecke, Wolter, *Ann.*, 1930, **478**, 170.

7-Methylindazole-1-carboxylic Acid

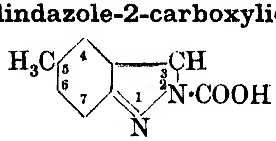


$C_9H_8O_2N_2$ MW, 176

Me ester: $C_{10}H_{10}O_2N_2$. MW, 190. Needles from pet. ether. M.p. 59·5–60·5°. B.p. 166°/13 mm. Sol. most org. solvents.

Auwers, Ernecke, Wolter, *Ann.*, 1930, **478**, 172.

5-Methylindazole-2-carboxylic Acid



$C_9H_8O_2N_2$ MW, 176

Me ester: $C_{10}H_{10}O_2N_2$. MW, 190. Plates. M.p. 65–6°. Sol. most org. solvents.

Et ester: $C_{11}H_{12}O_2N_2$. MW, 204. Needles from EtOH.Aq. M.p. 67–8°. Sol. most org. solvents.

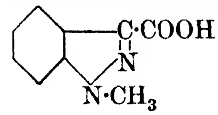
Auwers, Lohr, *J. prakt. Chem.*, 1924, **108**, 308.

7-Methylindazole-2-carboxylic Acid.

Me ester: needles from pet. ether. M.p. 79–80°.

Auwers, Ernecke, Wolter, *Ann.*, 1930. **478**, 172.

1-Methylindazole-3-carboxylic Acid



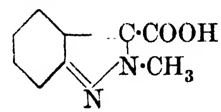
$C_9H_8O_2N_2$ MW, 176

Needles from 30% EtOH. M.p. 213–14°. Sol. most org. solvents. Spar. sol. pet. ether.

Me ester: $C_{10}H_{10}O_2N_2$. MW, 190. Needles from pet. ether. M.p. 75–7°. Sol. most org. solvents.

Auwers, Dereser, *Ber.*, 1919, **52**, 1346.

2-Methylindazole-3-carboxylic Acid



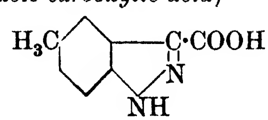
$C_9H_8O_2N_2$ MW, 176

Plates from EtOH. M.p. 224–5° decomp. Sol. hot EtOH, Et_2O, Me_2CO, $CHCl_3$, AcOH. Spar. sol. C_6H_6. Insol. pet. ether.

Me ester: $C_{10}H_{10}O_2N_2$. MW, 190. Yellowish plates from pet. ether. M.p. 61–2°. Sol. most org. solvents.

See previous reference.

5-Methylindazole-3-carboxylic Acid (p-*Methylindazole-carboxylic acid*)

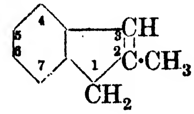


$C_9H_8O_2N_2$ MW, 176

Needles from hot AcOH. M.p. 285–6° decomp. Heat above m.p. ⟶ 5-methylindazole.

Schad, *Ber.*, 1893, **26**, 218.

2-Methylindene



$C_{10}H_{10}$ MW, 130

Oil. B.p. 184–5°/741 mm., 62–5°/20 mm. D_4^{14} 0·9897. n_D^{14} 1·5757. $KMnO_4$ ⟶ phthalic acid. Conc. H_2SO_4 ⟶ orange-red ppt.

v. Braun, Kruber, Danziger, *Ber.*, 1916, **49**, 2652.

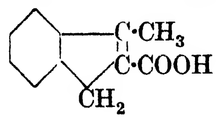
3-Methylindene (*γ-Methylindene*).

B.p. 198·5° (197–200°). D_4^{20} 0·9640. n_D^{27} 1·55907. Decomp. on standing in air.

Picrate: orange-yellow needles from EtOH. M.p. 76–8°. Very unstable.

Thiele, Bühner, *Ann.*, 1906, **347**, 266.
Wislicenus, Hentrich, *Ann.*, 1924, **436**, 19.

3-Methylindene-2-carboxylic Acid



$C_{11}H_{10}O_2$ MW, 174

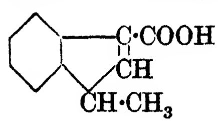
Needles from EtOH. M.p. 200°. Sol. Et_2O, hot EtOH. Insol. H_2O.

Me ester: $C_{12}H_{12}O_2$. MW, 188. Needles from MeOH. M.p. 78°. Sol. EtOH, Et_2O.

Et ester: $C_{13}H_{14}O_2$. MW, 202. Needles from EtOH. M.p. 37–9°. B.p. 164–5°/14 mm. $D_4^{38·6}$ 1·0745. $n_D^{39·1}$ 1·561.

Auwers, *Ann.*, 1918, **415**, 168.
Roser, *Ann.*, 1888, **247**, 157.

1-Methylindene-3-carboxylic Acid



$C_{11}H_{10}O_2$ MW, 174

Me ester: $C_{12}H_{12}O_2$. MW, 188. Yellow oil. B.p. 127°/14 mm. Hot alc. KOH ⟶ 3-methylindene.

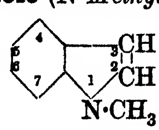
Et ester: $C_{13}H_{14}O_2$. MW, 202. B.p. 132–6°/16 mm.

Wislicenus, Mauthe, *Ann.*, 1924, **436**, 32.

Methylindenone.

See Methylindone.

1-Methylindole (N-*Methylindole*)



C_9H_9N MW, 131

Yellow oil. Does not solidify at − 20°. B.p. 240–1°/720 mm. (239°). Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O. D^0 1·0707. Volatile in steam.

Picrate: red prisms from Et_2O. M.p. 150°. Very sol. hot C_6H_6. Less sol. Et_2O.

Fischer, Hess, *Ber.*, 1884, **17**, 562.
Carrasco, Padoa, *Atti accad. Lincei*, 1906, **15**, II, 729.

2-Methylindole (*Methylketole*, *α-methylindole*).

Found in coal tar. Needles from hot H_2O, plates from EtOH.Aq. M.p. 61°. B.p. 271–2°. Sol. EtOH, Et_2O. Spar. sol. hot H_2O. Heat of comb. C_v = 1167·9 Cal. Triboluminescent. Sols. in EtOH, Et_2O, C_6H_6, $CHCl_3$ fluor. violet to bluish-green in daylight. Heat in sealed tube ⟶ quinoline. Alk. $KMnO_4$ ⟶ acetylanthranilic acid. Decomp. on heating with conc. HCl.

N-*Formyl*: 2-methylindole-*N*-aldehyde. $C_{10}H_9ON$, MW, 159. Plates m.p. 75–6°. B.p. 155°/15 mm. D_4^{16} 1·1353. n_D^{16} 1·6170. Sol. conc. alkalis.

N-*Acetyl*: b.p. 200–10°/40 mm.

$B,HClO_4$: prisms. Decomp. at 170°.

$B_2,HSnCl_5$: m.p. 207°.

Picrate: brownish-red needles. M.p. 139°.

Picryl chloride deriv.: red needles from EtOH. M.p. 115–16°.

$B,C_6H_5(NO_2)_3$-1:3:5: red needles from EtOH. M.p. 152°.

Trinitrotoluene add. comp.: yellow needles from EtOH. M.p. 110°.

Trinitroaniline add. comp.: brick-red needles from EtOH. M.p. 166°.

Ciusa, Vecchiotti, *Atti accad. Lincei*, 1912, **21**, II, 161.
Verley, *Bull. soc. chim.*, 1924, **35**, 1039.
Kruber, *Ber.*, 1926, **59**, 2760.
I.C.I., E.P., 330,332, (*Chem. Abstracts*, 1930, **24**, 5770).
Alessandri, Passerini, *Gazz. chim. ital.*, 1921, **51**, i, 262; *Ber.*, 1927, **60**, 807.

3-Methylindole.

See Skatole.

4-Methylindole.

Found in coal tar. M.p. 5°. B.p. 267°. D_4^{20} 1·062. Resinifies with cold 2·5% HCl.

Picrate: red needles from EtOH. M.p. 194–5°.

Kruber, *Ber.*, 1929, **62**, 2877.

5-Methylindole.

Found in coal tar. Needles from H_2O. M.p. 60° (58·5°). B.p. 267°. Sol. hot H_2O, EtOH, Et_2O, C_6H_6, ligroin. Volatile in steam.

Picrate: red needles from H_2O. M.p. 151°.

Kruber, *Ber.*, 1926, **59**, 2759.
Robson, *J. Biol. Chem.*, 1924, **62**, 506.

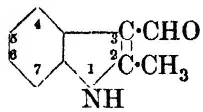
7-Methylindole.

Found in coal tar. Plates from ligroin. M.p. 85°. B.p. 266°.

N-*Benzoyl*: needles from EtOH. M.p. 84°. *Picrate*: red needles from EtOH. M.p. 176°. Spar. sol. EtOH.

Kruber, *Ber.*, 1926, **59**, 2753.

2-Methylindole-3-aldehyde



$C_{10}H_9ON$ MW, 159

Needles from AcOEt. M.p. 198°. Sol. H_2O, EtOH, Et_2O, conc. KOH. Gives faint red col. with pine chip + HCl. Boiling dil. H_2SO_4 ⟶ yellow ⟶ red col. Does not reduce Fehling's.

N-*Me*: $C_{11}H_{11}ON$. MW, 173. Cryst. from MeOH. M.p. 129°. *Oxime*: needles. M.p. 171°. *Phenylhydrazone*: needles. M.p. 154° decomp.

Oxime: needles. M.p. 156–7° (154°).

Semicarbazone: m.p. 224° decomp.

Phenylhydrazone: needles. M.p. 201°.

p-*Nitrophenylhydrazone*: m.p. 273°.

Picrate: m.p. 181° decomp.

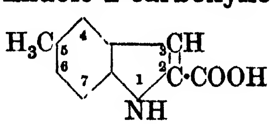
Angeli, Alessandri, *Atti accad. Lincei*, 1914, **23**, II, 93.
König, *J. prakt. Chem.*, 1911, **84**, 213.
Plancher, Ponti, *Atti accad. Lincei*, 1907, **16**, I, 130.

5-Methylindole-3-aldehyde.
Cryst. from EtOH. M.p. 151° (148°).

Robson, *J. Biol. Chem.*, 1924, **62**, 507.

3-Methylindole-carboxylic Acid.
See Skatole-carboxylic Acid.

5-Methylindole-2-carboxylic Acid



$C_{10}H_9O_2N$ MW, 175

Cryst. M.p. 229–30°. Dist. ⟶ 5-methylindole.

Et ester: $C_{12}H_{13}O_2N$. MW, 203. Cryst. M.p. 163°. B.p. 236°/4 mm.

Kruber, *Ber.*, 1926, **59**, 2760.
Robson, *J. Biol. Chem.*, 1924, **62**, 505.

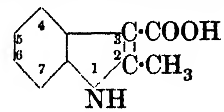
6-Methylindole-2-carboxylic Acid.
Needles from H_2O. M.p. 217°.

Reissert, *Ber.*, 1897, **30**, 1051.

7-Methylindole-2-carboxylic Acid.
Needles from H_2O. M.p. 170°.

Kruber, *Ber.*, 1926, **59**, 2758.

2-Methylindole-3-carboxylic Acid



$C_{10}H_9O_2N$ MW, 175

Prisms from Me_2CO.Aq. M.p. 190° (176°) decomp. Sol. EtOH, Me_2CO, AcOEt. Spar. sol. H_2O, C_6H_6. Insol. ligroin.

Et ester: $C_{12}H_{13}O_2N$. MW, 203. Needles from EtOH. M.p. 134–5°.

Nitrile: $C_{10}H_8N_2$. MW, 156. Needles from EtOH.Aq. M.p. 209–10°. Sol. EtOH, Et_2O, $CHCl_3$. Mod. sol. hot H_2O. N-*Acetyl*: needles from EtOH. M.p. 116°.

Seka, *Ber.*, 1924, **57**, 1870.
Kruber, *Ber.*, 1926, **59**, 2760.
Houben, Fischer, *Ber.*, 1931, **64**, 2640.

4-Methylindole-3-carboxylic Acid.
Cryst. from Me_2CO. M.p. 189° decomp. ⟶ 4-methylindole. Sol. hot EtOH, AcOH. Spar. sol. hot H_2O.

Kruber, *Ber.*, 1929, **62**, 2878.

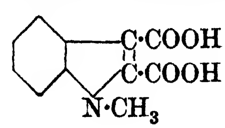
5-Methylindole-3-carboxylic Acid.
Cryst. from Me_2CO.Aq. M.p. 202° decomp. ⟶ 5-methylindole.

Kruber, *Ber.*, 1926, **59**, 2759.

7-Methylindole-3-carboxylic Acid.
Prisms from Me_2CO. M.p. 228° decomp. ⟶ 7-methylindole. Sol. hot EtOH, AcOH. Spar. sol. H_2O.

See previous reference.

1-Methylindole-2 : 3-dicarboxylic Acid



$C_{11}H_9O_4N$ MW, 219

Prisms from EtOH.Aq. M.p. 218° decomp. ⟶ 1-methylindole. Sol. hot EtOH, Et_2O, C_6H_6, ligroin. Spar. sol. cold H_2O.

Mono-Et ester: $C_{13}H_{13}O_4N$. MW, 247. Needles from EtOH. M.p. 158°. Sol. EtOH, C_6H_6, $CHCl_3$. Spar. sol. Et_2O, pet. ether.

Di-Et ester: $C_{15}H_{17}O_4N$. MW, 275. Reddish-brown oil. Volatile in steam.

Dichloride: $C_{11}H_7O_2NCl_2$. MW, 256. Needles from C_6H_6. M.p. about 82°. Easily decomp. by H_2O.

Monoamide: $C_{11}H_{10}O_3N_2$. MW, 218. Prisms. M.p. 204° decomp. *Et ester*: $C_{13}H_{14}O_3N_2$. MW,

246. Needles from C_6H_6 or pet. ether. M.p. 201° decomp.

Diamide: $C_{11}H_{11}O_2N_3$. MW, 217. Needles from hot H_2O. M.p. 267° decomp. Sol. 300 parts hot H_2O.

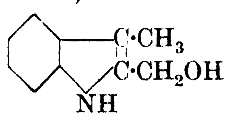
Anhydride: $C_{11}H_7O_3N$. MW, 201. Prisms from AcOEt. M.p. 212°. Sol. Me_2CO, C_6H_6, $CHCl_3$, AcOEt. Spar. sol. Et_2O, pet. ether.

Reif, *Ber.*, 1909, **42**, 3036.

Methylindoline.

See Methyldihydroindole.

3-Methyl-2-indolylcarbinol (3-*Methyl*-2-*hydroxymethylindole*)



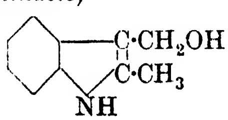
$C_{10}H_{11}ON$ MW, 161

Needles from C_6H_6. M.p. 122°.

N-*Acetyl*: needles from pet. ether. M.p. 90–1°.

Plant, Tomlinson, *J. Chem. Soc.*, 1933, 958.

2-Methyl-3-indolylcarbinol (2-*Methyl*-3-*hydroxymethylindole*)



$C_{10}H_{11}ON$ MW, 161

Plates from EtOH.Aq. M.p. 225°. Insol. dil. HCl.

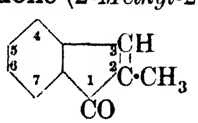
Diacetyl deriv.: cryst. from EtOH. M.p. 147°.

See previous reference and also
Mingoia, *Gazz. chim. ital.*, 1932, **62**, 844.

Methyl 3-indolyl Ketone.

3-Acetoindole, *q.v.*

2-Methylindone (2-*Methyl*-2-*indenone*-1)



$C_{10}H_8O$ MW, 144

Yellow cryst. from EtOH.Aq. M.p. 47–47·5°. B.p. 119–20°/16 mm., 107–8°/9 mm. Sol. most org. solvents. Sol. conc. H_2SO_4 with blue col. Hot alkalis give blue sols from which acids ppte a polymer. $KMnO_4 \longrightarrow$ phthalic acid.

Semicarbazone: yellow needles from EtOH.Aq. M.p. 192–3° decomp.

p-*Nitrophenylhydrazone*: orange cryst. from AcOH. M.p. 195–7°.

p-*Bromophenylhydrazone*: orange cryst. from AcOH. M.p. 122°.

Stoermer, Voht, *Ann.*, 1915, **409**, 56.
Kizhner, *Chem. Abstracts*, 1934, **28**, 1692.

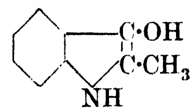
3-Methylindone (3-*Methyl*-2-*indenone*-1).

Yellow oil. B.p. 140–1°/19 mm.

Semicarbazone: yellow cryst. from amyl alcohol. M.p. 208–16° decomp.

Stoermer, Laage, *Ber.*, 1917, **50**, 983.

2-Methylindoxyl (3-*Hydroxy*-2-*methylindole*)



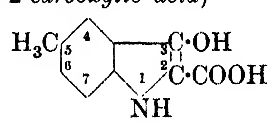
C_9H_9ON MW, 147

Cryst. M.p. 40°. Decomp. slowly to black sticky mass. Conc. HCl $\longrightarrow$ pink sol. which darkens on standing. $H_2SO_4 \longrightarrow$ violet sol. Cold AcOH $\longrightarrow$ yellow sol. $\longrightarrow$ red on heating. Red sol. in $Ac_2O \longrightarrow$ yellow on boiling.

Picrate: reddish cryst. M.p. 128°.

Ingraffia, *Gazz. chim. ital.*, 1933, **63**, 175.

5-Methylindoxylic Acid (3-*Hydroxy*-5-*methylindole*-2-*carboxylic acid*)



$C_{10}H_9O_3N$ MW, 191

Et ester: $C_{12}H_{13}O_3N$. MW, 219. Cryst. M.p. 155–6°. Sol. EtOH, C_6H_6. Insol. H_2O, ligroin. Heat with alkalis $\longrightarrow$ 5 : 5′-dimethyl-indigo.

Anhydride: yellow cryst. Sublimes. Conc. $H_2SO_4 \longrightarrow$ green fluorescent sol.

Blank, *Ber.*, 1898, **31**, 1816; D.R.P., 109,416, (*Chem. Zentr.*, 1900, II, 406).

7-Methylindoxylic Acid (7-*Methyl*-3-*hydroxyindole*-2-*carboxylic acid*).

Needles. M.p. 140°.

Cassella, D.R.P., 109,416, (*Chem. Zentr.*, 1900, II, 406).

Methylinositol.

See under Inositol.

Methyl iodide (*Iodomethane*)

CH_3I

CH_3I MW, 142

F.p. – 66·45°. B.p. 42·50°/760 mm. D_0^0 2·3346, D_4^{30} 2·25102. n_D^{21} 1·5293, $n_{Hg\ yellow}^{15}$ 1·534.

Heat of comb. C_p 194·7 Cal. Methylating agent. Combines with many tertiary bases to give well-characterised methiodides.

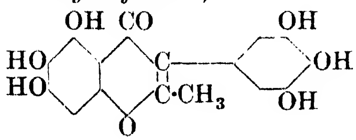
Hydrate : m.p. — 4°.

Timmermans, Delcourt, *J. chim. phys.*, 1934, **31**, 85.
King, *Organic Syntheses*, 1933, XIII, 60.

Methyl 2-iodoethyl Ether.

See under Ethylene iodohydrin.

2-Methylirigenol (5 : 6 : 7 : 3′ : 4′ : 5′-*Hexahydroxy*-2-*methylisoflavone*)



$C_{16}H_{13}O_8$ MW, 333

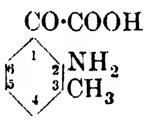
M.p. 325° decomp.

Hexa-Me ether: $C_{22}H_{25}O_8$. MW, 417. M.p. 166°.

6 : 7 : 3′ : 4′ : 5′-*Penta-Me ether* : $C_{21}H_{23}O_8$. MW, 403. M.p. 179–80°. *Acetyl* : m.p. 232–3°.

Baker, Robinson, *J. Chem. Soc.*, 1929, 152.

3-Methylisatic Acid (2-*Amino*-m-*toluylformic acid*)



$C_9H_9O_3N$ MW, 179

Needles from AcOH. M.p. 239–40°.

N-*Acetyl* : needles from AcOH. M.p. 175°.

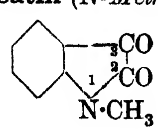
Heller, *Ber.*, 1922, **55**, 2697.
Posner, *Ber.*, 1926, **59**, 1823.

5-Methylisatic Acid (6-*Amino*-m-*toluylformic acid*).

Yellow plates. M.p. 132° decomp. Sol. H_2O, EtOH, Et_2O. Spar. sol. C_6H_6. Sol. alkalis with yellow col. Above m.p. or on acidification ⟶ 5-methylisatin.

Martinet, *Compt. rend.*, 1918, **166**, 953.

N-Methyl-ψ-isatin (N-*Methylisatin*)



$C_9H_7O_2N$ MW, 161

Reddish-yellow needles from H_2O. M.p. 134°. Dimorphous (both forms orthorhombic). Sol. MeOH, EtOH, Me_2CO, C_6H_6, hot H_2O. Mod. sol. Et_2O. Stable in air.

2-*Oxime* : needles from H_2O. M.p. 189–92° (180–3°). *Acetyl* : yellow cryst. M.p. 154–5°.

3-*Hydrazone* : yellow needles from EtOH. M.p. 107–8°. *B,HCl* : m.p. 182°. *Picrate* : m.p. 112°.

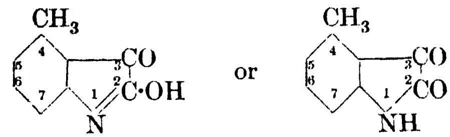
3-*Acetylhydrazone* : yellow needles from EtOH. M.p. 143°.

3-*Phenylhydrazone* : yellow needles from EtOH. M.p. 145–6°. Sol. hot EtOH, C_6H_6. Spar. sol. Et_2O. Insol. ligroin.

2-*Anil* : yellowish-red prisms. M.p. 132°.

Borsche, Meyer, *Ber.*, 1921, **54**, 2851.
Colman, *Ann.*, 1888, **248**, 117.

4-Methylisatin



$C_9H_7O_2N$ MW, 161

Orange plates from EtOH. M.p. 189°.

Mayer, Schulze, *Ber.*, 1925, **58**, 1467.

5-Methylisatin (p-*Methylisatin*).

Red plates from H_2O. M.p. 187°. Spar. sol. cold H_2O.

N-*Acetyl* : yellow needles. M.p. 172°. Sol. C_6H_6, $CHCl_3$. Spar. sol. H_2O, EtOH, Et_2O, CS_2, ligroin.

N-*Propionyl* : plates. M.p. 143°. Sol. most org. solvents. Insol. H_2O.

N-*Benzoyl* : yellowish-green needles from C_6H_6. M.p. 193°. Spar. sol. cold EtOH.

N-p-*Toluenesulphonyl* : m.p. 202–5°.

3-*Phenylhydrazone* : m.p. 268°.

2-[4-*Methyl*]-*anil* : brownish-violet needles from C_6H_6. M.p. 180°. Sol. Me_2CO, C_6H_6. Mod. sol. EtOH.

3-*Anil* : yellowish-red plates or prisms. M.p. 239–40°. Spar. sol. H_2O, cold EtOH.

3-[2-*Methyl*]-*anil* : red prisms from EtOH. M.p. 191°.

3-[4-*Methyl*]-*anil* : yellow needles and plates from EtOH. M.p. 259°. Sol. Et_2O. Spar. sol. cold EtOH. Insol. H_2O. N-*Et* : orange-red prisms. M.p. 151–2°. Sol. EtOH, C_6H_6, $CHCl_3$, CS_2, AcOH. Spar. sol. Et_2O, ligroin. Insol. H_2O. N-*Acetyl* : red needles. M.p. 121–2°. Sol. most org. solvents. Insol. H_2O.

3-[3-*Bromo*-4-*methyl*]-*anil* : red needles and prisms from EtOH. M.p. 210°.

Meyer, *Ber.*, 1883, **16**, 2265.
Duisberg, *Ber.*, 1885, **18**, 197.
Bischler, Muntendam, *Ber.*, 1895, **28**, 731.
Wahl, Faivret, *Ann. chim.*, 1926, **5**, 323.
General Aniline Works, U.S.P., 1,856,210, (*Chem. Abstracts*, 1932, **26**, 3522).

6-Methylisatin.

Orange-red plates from EtOH. M.p. 147°.

3-*Methylanil*: m.p. 65–7°.

Mayer, Schulze, *Ber.*, 1925, **58**, 1467.

7-Methylisatin (o-*Methylisatin*).

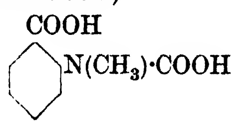
Red cryst. from H_2O or EtOH. M.p. 267°. Sol. Py. Spar. sol. H_2O, EtOH, MeOH, Me_2CO, AcOH, amyl alcohol. Sublimes in red needles.

Monoxime: yellow needles from EtOH. M.p. 235°. Sol. EtOH, Me_2CO, AcOH, AcOEt. Spar. sol. H_2O. Insol. C_6H_6.

Monophenylhydrazone: yellow needles from EtOH–AcOH. M.p. 242°. Sol. most org. solvents.

Bauer, *Ber.*, 1907, **40**, 2656.
Wahl, Faivret, *Ann. chim.*, 1926, **5**, 323.
General Aniline Works, U.S.P., 1,856,210, (*Chem. Abstracts*, 1932, **26**, 3522).

***N*-Methylisatoic Acid** (N-*Methyl*-N-*carboxyanthranilic acid*)



$C_9H_9O_4N$ MW, 195

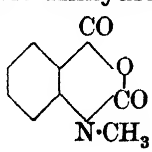
Me ester: $C_{10}H_{11}O_4N$. MW, 209. Cryst. from H_2O. M.p. 137–8°.

Et ester: $C_{11}H_{13}O_4N$. MW, 223. Needles from H_2O. M.p. 118° (108°).

Anhydride: *see N*-Methylisatoic Anhydride.

Houben, *Ber.*, 1909, **42**, 3193.

***N*-Methylisatoic Anhydride**



$C_9H_7O_3N$ MW, 177

Yellow needles from EtOH. M.p. 180° (177°).

See previous reference and also
Heilbron, Kitchen, Parkes, Sutton, *J. Chem. Soc.*, 1925, **127**, 2171.

Methylisoamylacetic Acid.

See 2-Methylhexane-5-carboxylic Acid.

Methylisoamylamine

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CH_3$

$C_6H_{15}N$ MW, 101

B.p. 108–10°/758·5 mm. D_4^{22} 0·7428.

B,HCl: plates from Me_2CO. M.p. 181° (178°). Very sol. H_2O. Sol. EtOH, hot C_6H_6, $CHCl_3$. Insol. Et_2O.

B,HBr: needles. M.p. 183°. Sol. H_2O, EtOH.

B,HAuCl_4: cryst. M.p. 68–70°.

B_2,H_2PtCl_6: yellow needles from EtOH–Et_2O. M.p. 208–9° decomp.

N-*Nitroso*: b.p. 204–5°.

Picrate: m.p. 112°.

Löffler, *Ber.*, 1910, **43**, 2043.
Graymore, *J. Chem. Soc.*, 1932, 1356.

***N*-Methyl-*N*-isoamylaniline**

$C_6H_5{\cdot}N{<}^{CH_3}_{CH_2{\cdot}CH_2{\cdot}CH(CH_3)_2}$

$C_{12}H_{19}N$ MW, 177

B.p. 246–8°. D^{20} 0·906. Insol. H_2O.

Picrate: yellow prisms from EtOH. M.p. 93–4°. Sol. EtOH, C_6H_6.

Thomas, Jones, *J. Chem. Soc.*, 1906, **89**, 294.
Komatsu, *Chem. Zentr.*, 1913, I, 799.

Methylisoamylbenzene.

See Isoamyltoluene.

Methylisoamylcarbinol (2-*Methylhexanol*-5, 5-*hydroxyisoheptane*, 5-*hydroxy*-2-*methylhexane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3$

$C_7H_{16}O$ MW, 116

B.p. 148–50°. $D^{17.5}$ 0·8185. $CrO_3 \longrightarrow$ methyl isoamyl ketone.

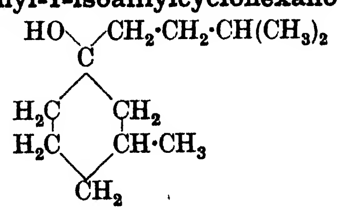
Et ether: $C_9H_{20}O$. MW, 144. B.p. 138–42°/740 mm.

Späth, *Monatsh.*, 1914, **35**, 331.
Rohn, *Ann.*, 1877, **190**, 309.

Methyl isoamyl Diketone.

See Acetylisocaproyl.

3-Methyl-1-isoamylcyclohexanol



$C_{12}H_{24}O$ MW, 184

Oil. B.p. 126–7°/20 mm. D^0 0·8982, D^{22} 0·8856. n_D 1·464.

Acetyl: b.p. 140°/20 mm. D^{20} 0·9146. n_D 1·457.

Phenylurethane: m.p. 128°.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1086.

Methyl isoamyl Ether

$(CH_3)_2CH{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_3$

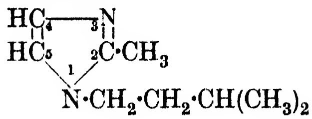
$C_6H_{14}O$ MW, 102

B.p. 91–91·3° (90–1°). D_4^{11} 0·6871.

Riedel, D.R.P., 261,588, (*Chem. Zentr.*, 1913, II, 324).
Cerchez, *Bull. soc. chim.*, 1928, **43**, 766.

Methylisoamylglyoxal.
See Acetylisocaproyl.

2-Methyl-1-isoamylglyoxaline (2-*Methyl*-1-*isoamyliminazole*)



$C_9H_{16}N_2$ MW, 152

B.p. 242–3°.
Picrate: cryst. from EtOH. M.p. 148–9°. Sol. most org. solvents. Insol. H_2O.

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 723.

5-Methyl-4-isoamylglyoxaline (5-*Methyl*-4-*isoamyliminazole*).
Free base not isolated.
B,HNO_3: cryst. from EtOH. M.p. 131–2°.
$B,HAuCl_4$: yellow plates. M.p. 156°.
B_2,H_2PtCl_6: yellow cryst. M.p. 191–2° decomp. Sol. EtOH. Spar. sol. H_2O.

Behr-Bregowski, *Ber.*, 1897, **30**, 1520.

Methylisoamylglyoxime.
See under Acetylisocaproyl.

Methyl isoamyl Ketone (2-*Methylhexan-one*-5, 5-*keto*-2-*methylhexane, isobutylacetone*)

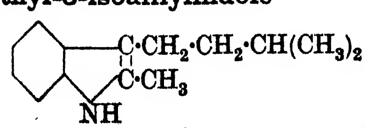
$(CH_3)_2CH·CH_2·CH_2·CO·CH_3$

$C_7H_{14}O$ MW, 114

B.p. 144°/760 mm. D^0 0·8285, $D^{17·2}$ 0·8175.
Oxime: oil. B.p. 195–6°/761 mm. D_4^{20} 0·8881. n_D 1·4448.
Semicarbazone: cryst. from EtOH. M.p. 142–3°.
2 : 4-*Dinitrophenylhydrazone*: orange cryst. M.p. 95°.
Ketazine: b.p. 155–60°/45 mm., 134°/5 mm.

Popow, *Z. Chem.*, 1865, 578.
Locquin, Heilmann, *Bull. soc. chim.*, 1929, **45**, 873 (*Footnote*).

2-Methyl-3-isoamylindole



$C_{14}H_{19}N$ MW, 201

Red oil. B.p. 222–4°/60 mm.
Picrate: dark brown cryst. from EtOH. M.p. 147–9°.

Oddo, Alberti, *Gazz. chim. ital.*, 1933, **63**, 236.

Methylisoamylmaleic Acid (6-*Methyl*-2-*heptene*-2 : 3-*dicarboxylic acid*)

$(CH_3)_2CH·CH_2·CH_2·C·COOH$
$CH_3·C·COOH$

$C_{10}H_{16}O_4$ MW, 200

Free acid not isolated.
Di-Et ester: $C_{14}H_{24}O_4$. MW, 256. B.p. 163°/20 mm.
Anhydride: oil. B.p. 260–2°, 170°/50 mm., 142°/16 mm.
Anil: plates from EtOH.Aq. M.p. 70°. Sol. Et_2O, warm EtOH, C_6H_6, pet. ether. Spar. sol. H_2O.

Auden, Perkin, Rose, *J. Chem. Soc.*, 1899, **75**, 916.

Methylisoamylmalonic Acid (2-*Methyl-hexane*-5 : 5-*dicarboxylic acid*)

$(CH_3)_2CH·CH_2·CH_2(CH_3)>C<(COOH)_2$

$C_9H_{16}O_4$ MW, 188

Cryst. from H_2O. M.p. 131–2°. Loses CO_2 above m.p.
Di-Et ester: $C_{13}H_{24}O_4$. MW, 244. B.p. 242–7°.

Sommaire, *Bull. soc. chim.*, 1923, **33**, 193.

1-Methyl-2-isoamylsuccinic Acid (2-*Methylheptane*-5 : 6-*dicarboxylic acid*)

$CH_3·CH·COOH$
$(CH_3)_2CH·CH_2·CH_2·CH·COOH$

$C_{10}H_{18}O_4$ MW, 202

Exists in two forms:
(i) "*Trans*":
Prisms. M.p. 141–2°. Insol. ligroin. $k = 2·36 \times 10^{-4}$ at 25°.
(ii) "*Cis*":
M.p. 93°. Sol. ligroin. $k = 3·85 \times 10^{-4}$ at 25°. Volatile in steam.

Bone, Sprankling, *J. Chem. Soc.*, 1900, **77**, 1304.
Auden, Perkin, Rose, *J. Chem. Soc.*, 1899, **75**, 918.

Methyl isoamyl sulphide

$(CH_3)_2CH·CH_2·CH_2·S·CH_3$

$C_6H_{14}S$ MW, 118

B.p. 136–8°.

Obermeyer, *Ber.*, 1887, **20**, 2925.

Methylisobutane.
See Tetramethylmethane.

Methylisobutylallylcarbinol (4 : 6-*Dimethyl*-1-*heptenol*-4)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}}(OH){\cdot}CH_2{\cdot}CH{:}CH_2$$

$C_9H_{18}O$ MW, 142

B.p. 180–2°/753 mm. (173°/765 mm.). Sol. EtOH, Et_2O. Insol. H_2O. D_0^{20} 0·8354, D^{21} 0·823. n_D^{19} 1·4443.

Bodroux, Taboury, *Compt. rend.*, 1909, **148**, 1677.
Marko, *Chem. Zentr.*, 1904, II, 185.

Methylisobutylamine

$$(CH_3)_2CH{\cdot}CH_2{\cdot}NH{\cdot}CH_3$$

$C_5H_{13}N$ MW, 87

B.p. 76–8°.
B,HCl : m.p. 179°. Sol. H_2O, $CHCl_3$, hot C_6H_6. Insol. Et_2O.
B,HBr : needles from H_2O. M.p. 203°.
Picrate : yellow needles from EtOH. M.p. 103°.
N-*Nitroso* : b.p. 185–6°.

Graymore, *J. Chem. Soc.*, 1932, 1354.
Stoermer, v. Lepel, *Ber.*, 1896, **29**, 2115.

***N*-Methyl-*N*-isobutylaniline**

$$C_6H_5{\cdot}N{<}\begin{matrix}CH_3\\CH_2{\cdot}CH(CH_3)_2\end{matrix}$$

$C_{11}H_{17}N$ MW, 163

B.p. 227–8°.
B_2,H_2PtCl_6 : cryst. M.p. 180–4°.
Picrate : yellow plates from EtOH. M.p. 99–100°. Sol. hot EtOH, C_6H_6.

Jones, *J. Chem. Soc.*, 1903, **83**, 1408.

Methylisobutylbenzene.
See Isobutyltoluene.

1-Methyl-4-isobutylbutadiene-1 : 3.
See 7-Methyloctadiene-2 : 4.

Methylisobutylcarbinol (4-*Hydroxy*-2-*methylpentane*, 2-*methylpentanol*-4)

$$(CH_3)_2CH{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3$$

$C_6H_{14}O$ MW, 102

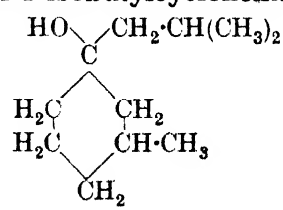
d-.
B.p. 64°/60 mm. (65·5°/45 mm.). D_4^{19} 0·8083, D_4^{28} 0·8014, D_4^{50} 0·7824. n_D^{20} 1·4103, n_D^{25} 1·4100. $[\alpha]_D^{20}$ + 22·4°, $[\alpha]_D^{29}$ + 20·85°.

l-.
$[\alpha]_D^{14}$ − 20·80°.
1-*Naphthylurethane* : m.p. 86–9°. $[\alpha]_D^{22}$ − 3·7° in EtOH.

dl-.
B.p. 135–7° (131·85/760 mm., 130–1°/763 mm.), 50–5°/25 mm. D^0 0·8292 (0·8271, 0·8300), D_0^{17} 0·8183, D_4^{17} 0·8183, D_4^{20} 0·813, D_4^{25} 0·80245. n_D^{17} 1·40759, n_D^{20} 1·411, n_D^{25} 1·40895.
Et ether : $C_8H_{18}O$. MW, 130. B.p. 121–2°. D_0^0 0·7767, D_{18}^{18} 0·7612.
Acetyl : b.p. 147–8°. D^0 0·8805.
Phenylurethane : m.p. 143°.
Allophanate : m.p. 161°.

Clarke, Shreve, *Am. Chem. J.*, 1906, **35**, 515.
Kerp, *Ann.*, 1896, **290**, 148.
Skita, *Ber.*, 1908, **41**, 2939.
Skita, Stuckart, *Ber.*, 1915, **48**, 1495.
Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 56.
Wanin, *Chem. Zentr.*, 1911, II, 194.
Brunel, *J. Am. Chem. Soc.*, 1923, **45**, 1334.
Levene, Mikeska, *J. Biol. Chem.*, 1925, **65**, 509.
Guinot, U.S.P., 1,965,829, (*Chem. Abstracts*, 1934, **28**, 5475).
Levene, Marker, *J. Biol. Chem.*, 1931, **90**, 673.

3-Methyl-1-isobutylcyclohexanol

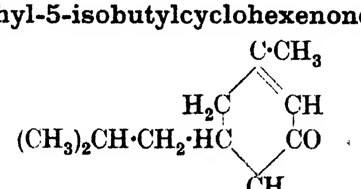


$C_{11}H_{22}O$ MW, 170

Oil. B.p. 107–9°/20 mm. D^0 0·9011, D^{19} 0·8972. n_D 1·465.

Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1086.

1-Methyl-5-isobutylcyclohexenone-3



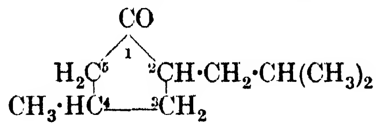
$C_{11}H_{18}O$ MW, 166

Oil. B.p. 146–8°/22 mm., 140–1°/15 mm., 130°/10 mm.
Oxime : needles from EtOH.Aq. M.p. 92–4°. Sol. acids and alkalis. *Benzoyl* : leaflets from EtOH.Aq. M.p. 138–40°.
Semicarbazone : leaflets from EtOH. M.p. 163–7° decomp.

Thiosemicarbazone: m.p. 128–9° decomp.
Hydrazone: needles from EtOH. M.p. 149–51°.

Knoevenagel, *Ann.*, 1895, **288**, 336.

4-Methyl-2-isobutylcyclopentanone



$C_{10}H_{18}O$ MW, 154

Liq. with peppermint-like odour. B.p. 196–7°. $[\alpha]_D + 62°$ in Et_2O.
Oxime: needles from EtOH.Aq. M.p. 92°. Volatile in steam.
Semicarbazone: cryst. from EtOH. M.p. 163–4°. Sol. $CHCl_3$, C_6H_6. Insol. Et_2O, ligroin.

Dieckmann, *Ann.*, 1901, **317**, 85.

5-Methyl-2-isobutylcyclopentanone.

$C_{10}H_{18}O$ MW, 154

B.p. 82–3°/13 mm. D^{15} 0·882. n_D^{15} 1·447.

Cornubert, Borrel, *Bull. soc. chim.*, 1930, **47**, 301.

Methyl isobutyl Diketone.
See Acetylisovaleryl.

Methyl isobutyl Ether

$(CH_3)_2CH{\cdot}CH_2{\cdot}O{\cdot}CH_3$

$C_5H_{12}O$ MW, 88

B.p. 59°/741 mm. (58°). D_4^0 0·7523, D_4^{20} 0·7311.

Rabcewicz-Lubkowsky, *J. prakt. Chem.*, 1912, **86**, 320.
Bennett, Philip, *J. Chem. Soc.*, 1928, 1930.

1-Methyl-3-isobutylglutaric Acid (*2-Methylheptane-4 : 6-dicarboxylic acid*)

$CH_3{\cdot}CH{\cdot}COOH$
CH_2
$(CH_3)_2CH{\cdot}CH_2{\cdot}CH{\cdot}COOH$

$C_{10}H_{18}O_4$ MW, 202

Cis:
Cryst. from ligroin. M.p. 121°.
Anhydride: oil. B.p. 196°/50 mm., 178°/22 mm.

Trans:
Cryst. from ligroin. M.p. 86–7°. HCl ⟶ *cis* form.

Lawrence, *Proc. Chem. Soc.*, 1900, **16**, 154.

2-Methyl-2-isobutylglutaric Acid

$CH_2{\cdot}COOH$
$(CH_3)_2CH{\cdot}CH_2{\cdot}C{\cdot}CH_3$
$CH_2{\cdot}COOH$

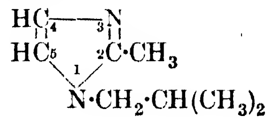
$C_{10}H_{18}O_4$ MW, 202

Cryst. M.p. 63–5°.

Guareschi, *Gazz. chim. ital.*, 1919, **49**, i, 129.

Methylisobutylglyoxal.
See Acetylisovaleryl.

2-Methyl-1-isobutylglyoxaline (*2-Methyl-1-isobutyliminazole*)



$C_8H_{14}N_2$ MW, 138

B.p. 225–6°.
Picrate: cryst. from EtOH. M.p. 151–2°.

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 722.

Methylisobutylglyoxime.
See under Acetylisovaleryl.

Methyl isobutyl Ketone (*Isopropylacetone*, *2-methylpentanone-4*, *4-keto-2-methylpentane*)

$(CH_3)_2CH{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_6H_{12}O$ MW, 100

B.p. 116·85°/760 mm., 115·5°/745 mm., 35–40°/16 mm. Misc. with EtOH, Et_2O, C_6H_6. Insol. H_2O. D_0^0 0·8195, $D_4^{17\cdot4}$ 0·80316, D_4^{20} 0·801. $n_D^{17\cdot4}$ 1·39694, n_D^{20} 1·396. $CrO_3 \longrightarrow$ acetic, isobutyric, and isovaleric acids. Forms bisulphite comp.
Oxime: b.p. 175°. D_4^{17} 0·8935. n_D^{14} 1·456.
Semicarbazone: m.p. 134° (132°).
2 : 4-*Dinitrophenylhydrazone*: m.p. 95°.

Grignard, *Ann. chim.*, 1902, **27**, 571.
Frankland, Duppa, *Ann.*, 1868, **145**, 82.
Salkind, Beburischwili, *Ber.*, 1909, **42**, 4502.
Skita, Stuckart, *Ber.*, 1914, **48**, 1494.
Law, *J. Chem. Soc.*, 1912, **101**, 1547.
Clarke, Shreve, *Am. Chem. J.*, 1906, **35**, 514.
Clarke, *J. Am. Chem. Soc.*, 1908, **30**, 1146.
Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 13.

Methylisobutylmalonic Acid (*2-Methylpentane-4 : 4-dicarboxylic acid*)

$\begin{matrix} CH_3 \\ (CH_3)_2CH{\cdot}CH_2 \end{matrix} > C < \begin{matrix} COOH \\ COOH \end{matrix}$

$C_7H_{14}O_2$ MW, 130

Cryst. from H_2O. M.p. 122°. Very sol. H_2O.
Di-Et ester: $C_{11}H_{22}O_2$. MW, 186. B.p. 230–5°.

Burrows, Bentley, *J. Chem. Soc.*, 1895, **67**, 510.
Tiffeneau, *Bull. soc. chim.*, 1923, **33**, 186.

Methylisobutylsuccinic Acid (2-*Methylhexane*-4 : 5-*dicarboxylic acid*)

$$\begin{array}{l}(CH_3)_2CH\cdot CH_2\cdot CH\cdot COOH \\ \qquad\qquad\qquad CH_3\cdot CH\cdot COOH\end{array}$$

$C_9H_{16}O_4$ MW, 188

Cis:
M.p. 88–9°. Forms liq. anhydride.
Anil: m.p. 94–6°.

Trans:
M.p. 133°. Forms liq. anhydride.
Anil: m.p. 132–3°.

Bone, Sprankling, *J. Chem. Soc.*, 1900, **77**, 1303.

***unsym.*-Methylisobutylurea**

$$\begin{array}{l}(CH_3)_2CH\cdot CH_2 \\ \qquad\qquad CH_3\end{array}\!\!>N\cdot CO\cdot NH_2$$

$C_6H_{14}ON_2$ MW, 130

Cryst. from C_6H_6. M.p. 145–6°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6, ligroin.

Stoermer, v. Lepel, *Ber.*, 1896, **29**, 2117.

Methyl isobutyrate

$$(CH_3)_2CH\cdot CO\cdot OCH_3$$

$C_5H_{10}O_2$ MW, 102

B.p. 93°. D_4^0 0·9112, D_4^{20} 0·8906, D_4^{92} 0·8049. Vap. press. at 0° 12·3 mm., at 10° 22·7 mm., at 20° 41 mm., at 35° 84 mm., at 42° 115 mm., at 55° 203·4 mm., at 70° 345 mm., at 84° 576 mm. Latent heat 79 cal. Heat of comb. C_p 716·94 Cal., C_v 694 Cal. Crit. temp. 267·55°. Crit. vol. 3320 c.cs./gm.

Sabatier, Mailhe, *Compt. rend.*, 1912, **154**, 176.

Methylisobutyrophenone.
See Isopropyl tolyl Ketone.
3-Methyl-2-isobutyrylfuran.
See Elscholtzione.
Methyl isocyanate

$$CH_3\cdot NCO$$

C_2H_3ON MW, 57

Liq. with powerful odour. B.p. 43–5°. Heat of comb. C_p 269·3 Cal., C_v 268·9 Cal. Polymerises to trimethylisocyanuric acid. $H_2O \longrightarrow$ *unsym.*-dimethylurea. KOH $\longrightarrow$ methylamine + CO_2. Condenses with cyanamide to give multiple products.

Gautier, *Ann. chim.*, 1869, **17**, 229.

Methyl isocyanide (*Methylcarbylamine, isoacetonitrile, isocyanomethane*)

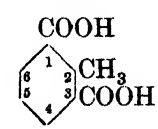
$$CH_3\cdot NC$$

C_2H_3N MW, 41

Liq. with odour resembling acetonitrile. M.p. – 45°. B.p. 59·6°. D^4 0·7557. Sol. 15 parts H_2O. Burns with bluish-green flame. Heat of comb. C_p 318·7 Cal. Readily explodes. H_2O or alkalis $\longrightarrow$ methylamine + formic acid. AcOH $\longrightarrow$ *N*-methylformamide + acetic anhydride. Extremely poisonous. Combines with many inorganic salts.

Gautier, *Ann. chim.*, 1869, **17**, 215.

Methylisohexylcarbinol.
See 2-Methylheptanol-6.
Methyl isohexyl Ketone.
See Isoamylacetone.
Methyl isonitrosobutyl Ketone.
See under Acetylbutyryl.
Methyl isonitrosoethyl Ketone.
See under Diacetyl.
Methyl isonitrosohexyl Ketone.
See under Acetylcaproyl.
Methyl isonitrosoisoamyl Ketone.
See under Acetylisovaleryl.
Methyl isonitrosoisobutyl Ketone.
See under Acetylisobutyryl.
Methyl isonitrosopropyl Ketone.
See under Acetylpropionyl.
***N*-Methylisopelletierine.**
See under Isopelletierine.
2-Methylisophthalic Acid (*Toluene*-2 : 6-*dicarboxylic acid*)



$C_9H_8O_4$ MW, 180

M.p. 228–30°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Graebe, Bossel, *Ann.*, 1896, **290**, 213.

4-Methylisophthalic Acid (*Toluene*-2 : 4-*dicarboxylic acid*, β-*xylidinic acid*).
Needles from hot H_2O. M.p. 320–30°. Sublimes. Sol. Et_2O. Spar. sol. EtOH, hot H_2O. Insol. cold H_2O.
Di-Me ester: $C_{11}H_{12}O_4$. MW, 208. Needles from MeOH. M.p. 80°. Sol. most org. solvents except MeOH, EtOH.

Dinitrile: $C_9H_6N_2$. MW, 142. Needles from EtOH.Aq. M.p. 144–5°. Volatile in steam.

Bentley, Perkin, *J. Chem. Soc.*, 1897, **71**, 176.
Claus, *J. prakt. Chem.*, 1890, **42**, 510.
Borsche, *Ann.*, 1912, **386**, 368.

5-Methylisophthalic Acid (*Toluene-3 : 5-dicarboxylic acid, uvitic acid*).

Needles from boiling H_2O. M.p. 298° (290°). Sol. EtOH, Et_2O, Me_2CO. Spar. sol. hot H_2O, $CHCl_3$, pet. ether. Insol. cold H_2O. $k = 3 \times 10^{-4}$ at 25°. Ox. ⟶ trimesic acid. Heat with $CaCO_3$ ⟶ toluene. Heat Ca salt + $Ca(OH)_2$ ⟶ *m*-toluic acid.

Di-Me ester: $C_{11}H_{12}O_4$. MW, 208. Needles from EtOH.Aq. M.p. 98°.

Di-Et ester: $C_{13}H_{16}O_4$. MW, 236. Cryst. M.p. 35°.

Schorger, *J. Am. Chem. Soc.*, 1917, **39**, 2676.
Fittig, Furtenbach, *Ann.*, 1868, **147**, 296.
Wolff, Heip, *Ann.*, 1899, **305**, 137, 151.

Methylisopropenylcarbinol (*2-Methyl-1-butenol-3, 3-hydroxy-2-methyl-2-butylene*)

$$CH_3{\cdot}CH(OH){\cdot}\overset{CH_3}{C}{:}CH_2$$

$C_5H_{10}O$ MW, 86

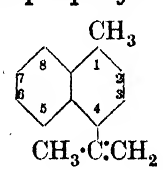
B.p. 115–17°. D^0 0·8571, D^{20} 0·8419. Spar. sol. H_2O. H_2SO_4 isomerises to methyl isopropyl ketone.

Kondakow, *J. Russ. Phys.-Chem. Soc.*, 1885, **17**, 296.
Bayer, D.R.P., 233,519, (*Chem. Zentr.*, 1911, I, 1333).

Methylisopropenylcyclohexane.
See $\Delta^{8,9}$-*m*-Menthene *and* $\Delta^{8,9}$-*p*-Menthene.

Methylisopropenylcyclohexene.
See Menthadiene and references thereunder.

1-Methyl-4-isopropenylnaphthalene



$C_{14}H_{14}$ MW, 182

Picrate: orange needles from EtOH. M.p. 88°.

Barnett, Cook, *J. Chem. Soc.*, 1933, 22.

1-Methyl-7-isopropenylnaphthalene.

$C_{14}H_{14}$ MW, 182

Picrate: cryst. from EtOH. M.p. 87–8°.

Ruzicka, v. Melsen, *Helv. Chim. Acta*, 1931, **14**, 410.

Methylisopropylacetaldehyde.
See 1-Methylisovaleraldehyde.

Methylisopropylacetamide (*N-Acetylmethylisopropylamine*)

$$CH_3{\cdot}CO{\cdot}N{<}^{CH_3}_{CH(CH_3)_2}$$

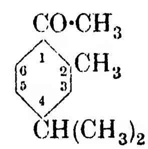
$C_6H_{13}ON$ MW, 115

B.p. 69–70°/13 mm.

v. Braun, Jostes, Wagner, *Ber.*, 1928, **61**, 1428.

Methylisopropylacetic Acid.
See 1 : 2-Dimethylbutyric Acid.

2-Methyl-4-isopropylacetophenone (*6-Aceto-*m*-cymene*)



$C_{12}H_{16}O$ MW, 176

B.p. 125°/12 mm. D_0^0 0·9833, D_{20}^{20} 0·9694. n_D^{20} 1·5246.

Semicarbazone: m.p. 171°.

Oxime: m.p. 93–4°.

Lacourt, *Bull. soc. chim. Belg.*, 1930, **39**, 132.

2-Methyl-5-isopropylacetophenone (*2-Aceto-*p*-cymene*).

B.p. 249–50° (244°, 240°), 142°/37 mm., 139°/19 mm., 124–5°/12 mm. D^0 0·9713, D^{15} 0·9715, D_4^{20} 0·956. Ox. ⟶ 4-methylisophthalic acid. $FeCl_3$ ⟶ red col.

Claus, *J. prakt. Chem.*, 1890, **42**, 568.
Klages, Lickroth, *Ber.*, 1899, **32**, 1563.
Allen, *Organic Syntheses*, 1934, XIV, 1.

Methylisopropylacetylene (*4-Methylpentine-2*)

$$(CH_3)_2CH{\cdot}C{:}C{\cdot}CH_3$$

C_6H_{10} MW, 82

B.p. 71–2°. D^0 0·7321.

Ipatjew, *J. Russ. Phys.-Chem. Soc.*, 1895, **27**, 404.

1 - Methyl - 4 - isopropyladipic Acid (2-*Methylheptane*-3 : 6-*dicarboxylic acid, iso-octane*-3 : 6-*dicarboxylic acid*)

$CH_3·CH·COOH$
CH_2
CH_2
$(CH_3)_2CH·CH·COOH$

$C_{10}H_{18}O_4$ MW, 202

Active form :
Cryst. M.p. 105–6°. B.p. 218–20°/18 mm.
Di-Me ester : $C_{12}H_{22}O_4$. MW, 230. B.p. about 251° part. decomp., 143–4°/22 mm. D^{18}_{18} 0·9938. $[\alpha]_D$ about + 8° 30′.
Di-Et ester : $C_{14}H_{26}O_4$. MW, 258. B.p. 158°/19 mm. D^{18}_{18} 0·9653.
Dichloride : $C_{10}H_{16}O_2Cl_2$. MW, 239. B.p. 247–8°/25 mm. Unstable.
Diamide : $C_{10}H_{20}O_2N_2$. MW, 200. Needles. M.p. 242°. Insol. Et_2O, cold EtOH.

Inactive form :
Cryst. from C_6H_6. M.p. 110–11° (103°). Very spar. sol. cold H_2O.
Di-Et ester : b.p. 144–6°/14 mm.

Martine, *Ann. chim. phys.*, 1904, **3**, 90.
Bouveault, Locquin, *Bull. soc. chim.*, 1908, **3**, 443, 447.
Blanc, *Bull. soc. chim.*, 1905, **33**, 909.

Methylisopropylallylcarbinol (4 : 5-*Dimethyl*-1-*hexenol*-4)

CH_3
$(CH_3)_2CH·C(OH)·CH_2·CH{:}CH_2$

$C_8H_{16}O$ MW, 128

B.p. 155–6° (151–3°). D^{20}_{0} 0·8509, D^{20}_{20} 0·85168. Insol. H_2O.

Schryver, *J. Chem. Soc.*, 1893, **63**, 1336.
Wagner, *Chem. Zentr.*, 1901, I, 668.

Methylisopropylamine

$(CH_3)_2CH·NH·CH_3$

$C_4H_{11}N$ MW, 73

B.p. 50°. D^{19}_{4} 0·7026.
B,HCl : needles. M.p. 77°. Sol. H_2O, EtOH. Insol. Et_2O. Hygroscopic.
Acetyl : *see* Methylisopropylacetamide.
Benzoyl : thick oil. B.p. 144°/13 mm.
Phenylurea : needles from EtOH. M.p. 131°.
Phenylthiourea : needles from EtOH–pet. ether. M.p. 120°.
B,HAuCl$_4$: cryst. M.p. 96–7°. Sol. EtOH. Spar. sol. cold H_2O.
B$_2$*,H*$_2$*PtCl*$_6$: cryst. from H_2O. M.p. 184–9°. Sol. H_2O. Insol. EtOH, Et_2O.

Picrate : yellow needles from H_2O. M.p. 135° (133–4°).

Dunstan, Goulding, *J. Chem. Soc.*, 1901, **79**, 640.
v. Braun, Jostes, Wagner, *Ber.*, 1928, **61**, 1428.

***N*-Methyl-*N*-isopropylaniline**

$C_6H_5·N{<}^{CH_3}_{CH(CH_3)_2}$

$C_{10}H_{15}N$ MW, 149

Oil. B.p. 212–13°.
B$_2$*,H*$_2$*PtCl*$_6$: yellow needles from EtOH. M.p. 196–7° (193–4°).

v. Braun, *Ber.*, 1900, **33**, 2732.
Thomas, Jones, *J. Chem. Soc.*, 1906, **89**, 287.

Methylisopropylaniline.
See *p*-Cymidine *and* Thymylamine.

2-Methyl-5-isopropylanisic Acid.
See under 6-Hydroxy-4-isopropyl-*m*-toluic Acid.

Methylisopropylbenzene.
See Cymene.

Methylisopropylbenzaldehyde.
See Isopropyltoluic Aldehyde.

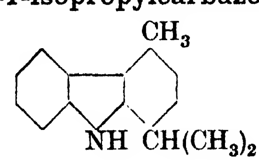
Methylisopropylbenzoic Acid.
See Isopropyltoluic Acid.

***N*-Methyl-*p*-isopropylbenzylamine.**
See *N*-Methylcuminylamine.

1-Methyl-4-isopropylbutadiene-1 : 3.
See 6-Methyl-2 : 4-heptadiene.

2-Methyl-4-isopropylbutadiene-1 : 3.
See 2 : 5-Dimethylhexadiene-1 : 3.

4-Methyl-1-isopropylcarbazole



$C_{16}H_{17}N$ MW, 223

Cryst. M.p. 86°.
Picrate : yellowish-red needles. M.p. 152°.

Borsche, *Ann.*, 1908, **359**, 78.

Methylisopropylcarbinol (2-*Methylbutanol*-3, sec.-*isoamyl alcohol*)

$(CH_3)_2CH·CH(OH)·CH_3$

$C_5H_{12}O$ MW, 88

d-.
B.p. 110–12°. $D^{15.8}_{4}$ 0·8225. n^{20}_{D} 1·3973. $[\alpha]^{20}_{D}$ + 5·34° in EtOH.
Acetyl : b.p. 128·5–129°/758 mm. D^{25}_{4} 0·860. n^{25}_{D} 1·3932. $[\alpha]^{25}_{D}$ + 3·64°.

Benzoyl: b.p. 83–4°/2 mm. D_4^{25} 0·979. n_D^{25} 1·4887. $[\alpha]_D^{25}$ + 9·26°.

dl-.

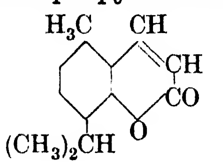
B.p. 112·9–113·9°/760 mm. (110–111·5°).

Me ether: $C_6H_{14}O$. MW, 102. B.p. 81·2–81·5°/737 mm. D_4^{20} 0·7586. n_D^{20} 1·3850.

Chloroacetyl: b.p. 180–1°/738 mm. D_4^{20} 1·0418. n_D^{20} 1·4298.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 628.
Drake, Cooke, *Organic Syntheses*, 1932, XII, 48.
Gustus, Stevens, *J. Am. Chem. Soc.*, 1933, **55**, 385.
Stevens, *ibid.*, 4239.

5-Methyl-8-isopropylcoumarin

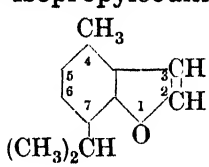


$C_{13}H_{14}O_2$ MW, 202

Needles. M.p. 53°. B.p. 220–30°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, AcOH. Very spar. sol. H_2O.

v. Pechmann, Walsh, *Ber.*, 1884, **17**, 1647.

4-Methyl-7-isopropylcoumarone



$C_{12}H_{14}O$ MW, 174

Oil. B.p. 241–2°. D^{16} 1·0145. n_D^{16} 1·5363. Conc. H_2SO_4 ⟶ yellow col. ⟶ pink on standing.

Stoermer, *Ann.*, 1900, **312**, 306.

7-Methyl-4-isopropylcoumarone.

B.p. 238–40°. D^{17} 1·0166. n_D^{17} 1·5294. Warm conc. H_2SO_4 ⟶ reddish-brown col.

See previous reference.

Methylisopropylcyclohexadiene.
See Menthadiene and references thereunder.

Methylisopropylcyclohexandiol.
See Menthandiol.

Methylisopropylcyclohexane.
See Menthane.

Methylisopropylcyclohexanol.
See Menthanol and references thereunder.

Methylisopropylcyclohexanolone.
See Menthanolone.

Methylisopropylcyclohexanone.
See Menthanone.

Methylisopropylcyclohexene.
See Menthene.

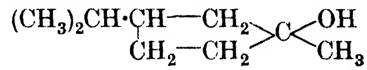
Methylisopropylcyclohexenol.
See Menthenol.

Methylisopropylcyclohexenone.
See Menthenone.

Methylisopropylcyclohexylamine.
See Menthylamine *and* Isomenthylamine.

Methylisopropylcyclopentane-carboxylic Acid.
See Fencholic Acid.

1-Methyl-3-isopropylcyclopentanol



$C_9H_{18}O$ MW, 142

l-.

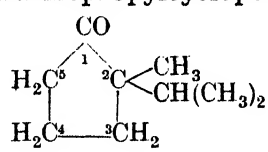
M.p. 76°. B.p. 185–7°. Very volatile. Sublimes in needles.

r-.

M.p. 43–4°. B.p. 185–6°. Sublimes in needles.

Wallach, Challenger, *Ann.*, 1912, **388**, 61.
Wallach, Oldenberg, *Ann.*, 1911, **379**, 204.

2-Methyl-2-isopropylcyclopentanone



$C_9H_{18}O$ MW, 142

B.p. 97·5°/45 mm. $D^{16·5}$ 0·9067. $n_D^{16·5}$ 1·4495.

Semicarbazone: m.p. 170–2°.

Benzylidene deriv.: m.p. 61°. B.p. 208–9°/27 mm.

Cornubert, Borrel, *Bull. soc. chim.*, 1930, **47**, 965.

4-Methyl-2-isopropylcyclopentanone.

Liq. with odour resembling menthone. B.p. 186–7°. D^{20} 0·8850. n_D^{20} 1·4392.

Oxime: m.p. 66°.

Semicarbazone: m.p. 182° (179°).

Wallach, *Ann.*, 1912, **394**, 374.

5 - Methyl - 2 - isopropylcyclopentanone (*Dihydropulegenone, dihydrocamphorphorone*).

r-.

B.p. 184–5°. D^{20} 0·889. n_D 1·4402.

Oxime: m.p. 71–2°.

Semicarbazone: m.p. 198–9°.

Wallach, *Ann.*, 1918, **414**, 343.

Note. Several 5-methyl-2-isopropylcyclopentanones of unknown spacial configuration are described in the literature. *See*

Godchot, Taboury, *Bull. soc. chim.*, 1913, **13**, 600.
Martine, *Ann. chim. phys.*, 1904, **3**, 94.
Crossley, Perkin, *J. Chem. Soc.*, 1898, **73**, 29.
Semmler, McKenzie, *Ber.*, 1906, **39**, 1169.

5-Methyl-3-isopropylcyclopentanone.

B.p. 191–2°, 135–6°/143 mm. D_4^{20} 0·8862. n_D^{19} 1·4413.

Oxime: cryst. M.p. 93–4°.
Semicarbazone: m.p. 175–6° (150–1°).

Toivonen, *Chem. Abstracts*, 1929, **23**, 1625.
Wallach, *Ann.*, 1918, **414**, 362.

Methyl isopropyl Diketone.
See Acetylisobutyryl.

Methyl isopropyl Ether

$(CH_3)_2CH·O·CH_3$

$C_4H_{10}O$ MW, 74

B.p. 32·5°/777 mm. (32°). Spar. sol. H_2O. D_4^0 0·7383, D_4^{15} 0·7237. n_D^{20} 1·35756. Forms cryst. comp. with K_2CO_3.

Henry, *Rec. trav. chim.*, 1904, **23**, 326.

1-Methyl-1-isopropylethylene.
See 2 : 3-Dimethylbutylene-1.

1-Methyl-2-isopropylethylene.
See 4-Methyl-2-pentene.

1-Methyl-2-isopropylglutaric Acid

$CH_3·CH·COOH$
$(CH_3)_2CH·CH$
$CH_2·COOH$

$C_9H_{16}O_4$ MW, 188

Cis:
Prisms from Et_2O or plates from H_2O. M.p. 137–8°. Spar. sol. cold H_2O, Et_2O. Insol. ligroin.

Anhydride: $C_9H_{14}O_3$. MW, 170. Plates from pet. ether. M.p. 44°.
Imide: $C_9H_{15}O_2N$. MW, 169. Needles from H_2O. M.p. 114–15°.

Trans:
Cryst. from H_2O. M.p. 101°.

Howles, Thorpe, Udall, *J. Chem. Soc.*, 1900, **77**, 946.

2-Methyl-2-isopropylglutaric Acid

$CH_2·COOH$
$(CH_3)_2CH·C·CH_3$
$CH_2·COOH$

$C_9H_{16}O_4$ MW, 188.

Plates from C_6H_6. M.p. 100°.
Anhydride: $C_9H_{14}O_3$. MW, 170. Plates from pet. ether. M.p. 41–2°.

Kon, Thorpe, *J. Chem. Soc.*, 1919, **115**, 702.

Methylisopropylglyoxal.
See Acetylisobutyryl.

Methylisopropylglyoxime.
See under Acetylisobutyryl.

***sym.*-Methylisopropylhydrazine**

$(CH_3)_2CH·NH·NH·CH_3$

$C_4H_{12}N_2$ MW, 88

B.p. 100°.
Dibenzoyl: cryst. from Et_2O. M.p. 76–7°.

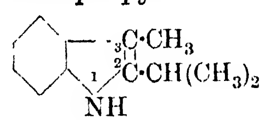
Ramsperger, *J. Am. Chem. Soc.*, 1929, **51**, 918.

Methylisopropylidenecyclohexane.
See Menthene.

Methylisopropylidenecyclohexenol.
See Menthadienol.

Methylisopropylidenecyclopentane-carboxylic Acid.
See β-Fencholenic Acid.

3-Methyl-2-isopropylindole



$C_{12}H_{15}N$ MW, 173

Yellow cryst. B.p. 292°/750 mm., 175–7°/30 mm. Very sol. org. solvents.
Picrate: red needles. M.p. 165–6°. Very sol. boiling C_6H_6.

Plancher, Bonavia, *Gazz. chim. ital.*, 1902, **32**, ii, 421.

2-Methyl-3-isopropylindole.
Light yellow oil. B.p. 173°/15 mm.

Kuroda, *Chem. Zentr.*, 1923, III, 142.

Methyl isopropyl Ketone (*2-Methylbutanone-3*, *3-ketoisopentane*, *2-acetopropane*, *1 : 1-dimethylacetone*)

$(CH_3)_2CH·CO·CH_3$

$C_5H_{10}O$ MW, 86

B.p. 93–4°/752·5 mm. D_4^{16} 0·8046. n_D^{16} 1·38788.

Oxime: b.p. 157–8°.
Cyanhydrin: *see under* 1-Hydroxy-1 : 2-dimethylbutyric acid.
Semicarbazone: cryst. from EtOH. M.p. 114°.
Ketazine: b.p. 165°.

Di-Et acetal: 3 : 3-diethoxyisopentane. $C_9H_{20}O_2$. MW, 160. B.p. 52·4°/20 mm. D^0 0·8627, D^{20} 0·8453.

Semioxamazone: needles from EtOH. M.p. 143°.

p-*Nitrophenylhydrazone*: golden brown cryst. M.p. 103·5°.

2 : 4-*Dinitrophenylhydrazone*: orange-yellow cryst. M.p. 117°.

Bardan, *Bull. soc. chim.*, 1931, **49**, 1875.
Whitmore, Evers, Rothrock, *Organic Syntheses*, 1933, XIII, 68.
I.G., E.P., 318,124, (*Chem. Abstracts*, 1930, **24**, 2140).

Methylisopropylmalonic Acid (3-*Methylbutane*-2 : 2-*dicarboxylic acid, isopentane*-3 : 3-*dicarboxylic acid*)

$$(CH_3)_2CH\!\!>\!C\!<\!\!COOH \quad CH_3 \;\; COOH$$

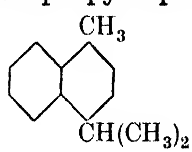
$C_7H_{12}O_4$ MW, 160

Cryst. from C_6H_6. M.p. 124°. $k = 1{\cdot}41 \times 10^{-3}$ at 25°.

Di-Et ester: $C_9H_{16}O_4$. MW, 216. B.p. 221°/752 mm. (217–22°). D^{15} 0·990.

v. Romburgh, *Rec. trav. chim.*, 1886, **5**, 236.
Perkin, *J. Chem. Soc.*, 1896, **69**, 1477.

1-Methyl-4-isopropylnaphthalene



$C_{14}H_{16}$ MW, 184

B.p. 145–8°/12 mm., 135–45°/12 mm. $D_4^{14·5}$ 0·9934. $n_D^{14·5}$ 1·5907.

Picrate: orange-yellow needles from EtOH. M.p. 99–100°.

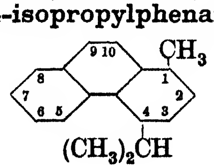
Styphnate: yellow needles from EtOH. M.p. 102°.

Rapson, Short, *J. Chem. Soc.*, 1933, 128.

1-Methyl-7-isopropylnaphthalene.
See Eudalene.

2-Methyl-8-isopropylnaphthalene.
See Apocadalene, Addendum, Vol. I.

1-Methyl-4-isopropylphenanthrene



$C_{18}H_{18}$ MW, 234

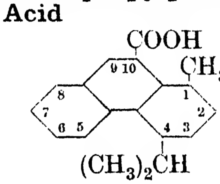
Cryst. from MeOH.Aq. or EtOH.Aq. M.p. 68–68·5°.

Picrate: orange needles from EtOH. M.p. 113·6–114°.

Bogert, Stamatoff, *Rec. trav. chim.*, 1933, **52**, 591.

1-Methyl-7-isopropylphenanthrene.
See Retene.

1-Methyl-4-isopropylphenanthrene-10-carboxylic Acid



$C_{19}H_{18}O_2$ MW, 278

Needles from C_6H_6 or AcOH. M.p. 201–2°. Loses CO_2 at 320°.

Bogert, Stamatoff, *Rec. trav. chim.*, 1933, **52**, 584.

Methylisopropylphenol.
See Isopropylcresol, Carvacrol, *and* Thymol.

Methylisopropylphenylcarbinol (2-*Methyl*-3-*phenylbutanol*-3, 3-*methyl*-2-*phenyl*-sec.-n-*butyl alcohol*)

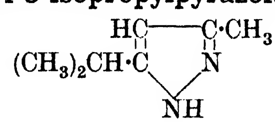
$$CH_3{\cdot}C(C_6H_5)(OH){\cdot}CH(CH_3)_2$$

$C_{11}H_{16}O$ MW, 164

B.p. 196–8°, 118°/24 mm., 109–10°/12 mm. $D_4^{13·5}$ 0·9653. $n_D^{13·5}$ 1·51611.

Klages, *Ber.*, 1903, **36**, 3690.
Auwers, Eisenlohr, *J. prakt. Chem.*, 1910, **82**, 93.

3-Methyl-5-isopropylpyrazole



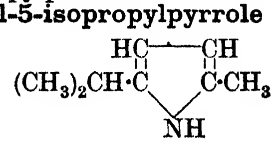
$C_7H_{12}N_2$ MW, 124

Cryst. from EtOH. M.p. 58·9°. B.p. 124–6°/14 mm.

Locquin, Heilmann, *Bull. soc. chim.*, 1929, **45**, 878.

Methylisopropylpyridine.
See Isopropylpicoline.

2-Methyl-5-isopropylpyrrole

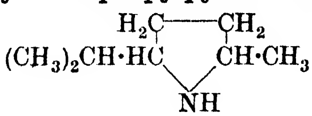


$C_8H_{13}N$ MW, 123

Oil. B.p. 83°/13 mm. D_4^0 0·9269, $D_4^{20·8}$ 0·9108. $n_D^{16·8}$ 1·4998.

Tschugajew, Schlesinger, *J. Russ. Phys.-Chem. Soc.*, 1904, **36**, 1261.

2-Methyl-5-isopropylpyrrolidine



$C_8H_{17}N$ MW, 127

B.p. 150–1°. D^{20} 0·823. n_D^{20} 1·4398.
B,HCl: m.p. 218–20°.
B_2,H_2PtCl_6: m.p. 221–3°.
N-*Benzenesulphonyl*: m.p. 76–8°.
N-*Nitroso*: b.p. 114°/10 mm.

Wallach, *Ber.*, 1905, **38**, 2805.

3-Methyl-6-isopropylsalicylaldehyde.
See 2-Hydroxy-4-isopropyl-*m*-toluic Aldehyde.

3-Methyl-6-isopropylsalicylic Acid.
See 2-Hydroxy-4-isopropyl-*m*-toluic Acid.

Methyl isopropyl sulphide

$(CH_3)_2CH·S·CH_3$

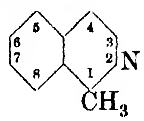
$C_4H_{10}S$ MW, 90

B.p. 93–5°.

Obermeyer, *Ber.*, 1887, **20**, 2923.

Methylisopropylthiophenol.
See Thiocarvacrol *and* Thiothymol.

1-Methylisoquinoline



$C_{10}H_9N$ MW, 143

F.p. 10·4–10·1°. B.p. 248°. $D_4^{20·5}$ 1·0763. $n_D^{20·5}$ 1·6095.
B,HCl: needles. M.p. about 170°.
B,H_2SO_4: prisms. M.p. 246–7°.
$B_2,H_2Cr_2O_7$: yellowish-red prisms from H_2O. Decomp. at 150°.
B_2,H_2PtCl_6: yellowish-red prisms + $2H_2O$ from H_2O. M.p. anhyd. 210°.
Picrate: cryst. from MeOH. M.p. 225–6°.
Methiodide: needles from EtOH. M.p 207·5°. Spar. sol. cold H_2O.

Mills, Smith, *J. Chem. Soc.*, 1922, **121**, 2732.
Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 136.
Pictet, Gams, *Ber.*, 1910, **43**, 2389.

3-Methylisoquinoline.
Cryst. from Et_2O. M.p. 68°. B.p. 246°/761 mm. $k = 4·4 \times 10^{-9}$ at 25°.
B_2,H_2PtCl_6: orange-yellow needles from H_2O. M.p. about 195° decomp.
Picrate: needles. M.p. 197–8°. Spar. sol. H_2O.
Methiodide: golden needles from EtOH. M.p. 219°.

See first reference above.

4-Methylisoquinoline.
B.p. 256°.
B_2,H_2PtCl_6: brownish-red cryst. M.p. 253·5°.
Picrate: needles. M.p. 202–3° (194–5°).

Späth, Berger, Kuntara, *Ber.*, 1930, **63**, 140.
Le Blanc, *Ber.*, 1888, **21**, 2300.

5-Methylisoquinoline.
Picrate: cryst. from MeOH. M.p. 235–6°.

See first reference above.

6-Methylisoquinoline.
Cryst. M.p. 83°. B.p. 263–4°.
Picrate: cryst. M.p. 212°.

Pomeranz, *Monatsh.*, 1897, **18**, 3.

7-Methylisoquinoline.
M.p. 66°.
B_2,H_2PtCl_6: cryst. M.p. 225°.
Dichromate: m.p. 126°.
Picrate: m.p. 197°.

Findeklee, *Ber.*, 1905, **38**, 3549.

8-Methylisoquinoline.
B.p. 258°.
Picrate: yellow needles from H_2O. M.p. 204–5°.

Pomeranz, *Monatsh.*, 1897, **18**, 2.

Methylisoserine.
See 1-Hydroxy-2-aminobutyric Acid *and* 1-Hydroxy-2-aminoisobutyric Acid.

Methyl isothiocyanate

$CH_3·NCS$

C_2H_3NS MW, 73

Cryst. M.p. 35·93°. B.p. 119°/758 mm. $D_4^{37·2}$ 1·06912. n_D 1·52576. Heat of comb. C_v 441·6 Cal.

Delépine, *Bull. soc. chim.*, 1908, **3**, 642.

S-Methylisothiourea (S-*Methyl-ψ-thiourea*)

$C_2H_6N_2S$ MW, 90

Free base not isolated.
B,HCl: cryst. M.p. 59–60°.
B,HI: prisms. M.p. 117°. Sol. H_2O, EtOH.
B,HNO_3: cryst. from HNO_3. M.p. 109–10°. Sol. MeOH, EtOH. Mod. sol. H_2O.

B_2,H_2SO_4: cryst. M.p. 235° decomp. Sol. H_2O.
B,HSCN: m.p. 78–80°.
Salicylate: needles. M.p. 155°.
Picrate: m.p. 221°.

Shildneck, Windus, *Organic Syntheses*, 1932, XII, 52.
Taylor, *J. Chem. Soc.*, 1917, **111**, 655.

O-Methylisourea (*γ-Methyl-ψ-urea, methoxyformamidine*)

O·CH$_3$
H$_2$N·C:NH
α β

$C_2H_6ON_2$ MW, 74

Cryst. M.p. 44–5°. B.p. 82°/9 mm. $k = 6{\cdot}4 \times 10^{-5}$ at 25°. Volatile in EtOH and Et_2O vapours. Takes up H_2O and CO_2 from air.
B,HCl: prisms. M.p. 130°. Very sol. H_2O, EtOH.
B_2,H_2PtCl_6: orange-yellow needles. M.p. 178° decomp.
β-*Acetyl*: cryst. from pet. ether. M.p. 58·5°.
β-*Carbethoxyl*: m.p. 5°.
β-1-*Naphthalenesulphonyl*: m.p. 152°.
Salicylate: m.p. 128°.
Picrate: m.p. 184° decomp.

Stieglitz, McKee, *Ber.*, 1900, **33**, 1517.
Bruce, *J. Am. Chem. Soc.*, 1904, **26**, 422.
Basterfield, Powell, *Chem. Abstracts*, 1930, **24**, 1356.

1-Methylisovaleraldehyde (*Methylisopropylacetaldehyde*)

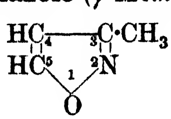
CH$_3$
(CH$_3$)$_2$CH·CH·CHO

$C_6H_{12}O$ MW, 100

Semicarbazone: cryst. from C_6H_6–pet. ether. M.p. 129–30°. $[\alpha]_D^{14}$ – 52·2° in EtOH.
2 : 4-*Dinitrophenylhydrazone*: plates from ligroin. M.p. 124–5°.

Guiteras, Nakamiya, Inhoffen, *Ann.*, 1932, **494**, 118.

1-Methylisovaleric Acid.
1 : 2-Dimethylbutyric Acid, *q.v.*
Methylisovalerophenone.
See Isobutyl tolyl Ketone.
3-Methylisoxazole (*γ-Methylisoxazole*)



C_4H_5ON MW, 83

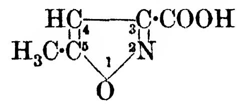
B.p. 118°. D_4^{20} 1·022. n_{He}^{20} 1·435.

Auwers, *Ber.*, 1924, **57**, 463.
Claisen, *Ber.*, 1909, **42**, 65.

5-Methylisoxazole (*α-Methylisoxazole*).
B.p. 122°. D_4^{20} 1·023. n_{He}^{20} 1·439. Easily decomp. by alkalis.
$B_2,PtCl_4$: yellow cryst. from EtOH.Aq. M.p. 210–12°.
Methiodide: cryst. M.p. 125–6°.

See previous references and also
Claisen, *Ber.*, 1911, **44**, 1161.

5-Methylisoxazole-3-carboxylic Acid



$C_5H_5O_3N$ MW, 127

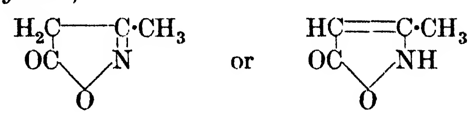
Prisms or plates from H_2O. M.p. 176° (172–3°). Sol. hot H_2O, EtOH. Spar. sol. Et_2O, $CHCl_3$.
Me ester: $C_6H_7O_3N$. MW, 141. Cryst. from C_6H_6. M.p. 98–9°.
Hydrazide: cryst. from C_6H_6. M.p. 131–2°.

Freri, *Gazz. chim. ital.*, 1932, **62**, 461.
Wolff, Herold, *Ann.*, 1901, **317**, 19.

3-Methylisoxazole-5-carboxylic Acid.
Cryst. M.p. 211°.

Claisen, *Ber.*, 1909, **42**, 60.

3-Methylisoxazolone (2-*Oximinobutyric acid anhydride*)



$C_4H_5O_2N$ MW, 99

Needles from H_2O. M.p. 169–70° decomp. Sol. hot H_2O, MeOH, EtOH, hot $CHCl_3$. Spar. sol. C_6H_6, CS_2, pet. ether.
N-*Me*: $C_5H_7O_2N$. MW, 113. Cryst. M.p. 74°.
N-*Et*: $C_6H_9O_2N$. MW, 127. Prisms. M.p. 90–1°.
Isonitroso deriv.: leaflets from H_2O. M.p. 159°.
Phenylhydrazone: yellow cryst. from C_6H_6. M.p. 192° decomp.
p-*Hydroxyphenylhydrazone*: m.p. 219–20° decomp.
o-*Tolylhydrazone*: m.p. 154–5°.
p-*Tolylhydrazone*: m.p. 202°.

1-*Naphthylhydrazone*: m.p. 168–70°.
2-*Naphthylhydrazone*: m.p. 200°.

Uhlenhuth, *Ann.*, 1897, **296**, 46.
Bouveault, Wahl, *Ber.*, 1905, **38**, 2066.
Schiff, Viciani, *Ber.*, 1897, **30**, 1162.

1-Methylitaconic Acid.
See Ethylidene-succinic Acid.

3-Methylitaconic Acid (1-*Butylene*-2 : 3-*dicarboxylic acid*, 1-*methyl*-2-*methylene-succinic acid*)

$$\begin{array}{l} CH_2\colon C\cdot COOH \\ CH_3\cdot CH\cdot COOH \end{array}$$

$C_6H_8O_4$ MW, 144

Prisms from H_2O. M.p. 151–2° (150–1°). Very sol. H_2O, EtOH. Spar. sol. $CHCl_3$. Insol. C_6H_6, CS_2, ligroin. Acetyl chloride ⟶ anhydride.

Anhydride: $C_6H_6O_3$. MW, 126. Plates from CS_2. M.p. 62–3°.

Molinari, *Ber.*, 1900, **33**, 1417.
Fittig, Kettner, *Ann.*, 1899, **304**, 166.

Methylketene

$$CH_3\cdot CH\colon CO$$

C_3H_4O MW, 56

Known only in Et_2O sol. Aniline ⟶ propionanilide.

Di-Et acetal: 1 : 1-diethoxypropylene. $C_7H_{14}O_2$. MW, 130. B.p. 78–81°. D_4^{18} 0·8002. n_D^{18} 1·3673.

Scheibler, Marhenkel, Nikolić, *Ann.*, 1927, **458**, 21.
Staudinger, Klever, *Ber.*, 1908, **41**, 906.

Methylketol.
See Hydroxyacetone.

1-Methyl-lauric Acid (1-*Methyldodecylic acid*)

$$CH_3\cdot[CH_2]_9\cdot CH(CH_3)\cdot COOH$$

$C_{13}H_{27}O_2$ MW, 215

d-.

B.p. 153°/1 mm. $[\alpha]_D^{25}$ + 8·47°. After neutralisation shows no rotation.

l-.

$[\alpha]_D^{25}$ − 6·38° in Et_2O.

Chloride: $C_{13}H_{26}OCl$. MW, 233·5. B.p. 118–25°/0·5 mm. $[\alpha]_D^{25}$ − 3·5° in Et_2O.

Amide: $C_{13}H_{28}ON$. MW, 214. Cryst. from 50% EtOH. M.p. 77° $[\alpha]_D^{25}$ − 3·01° in 95% EtOH.

Nitrile: $C_{13}H_{26}N$. MW, 196. B.p. 108–10°/0·5 mm. $[\alpha]_D^{25}$ − 10·87° in Et_2O.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 590.

N-Methyl-leucine (1-*Methylaminoisobutylacetic acid*, 1-*methylaminoisocaproic acid*)

$$(CH_3)_2CH\cdot CH_2\cdot CH(NH\cdot CH_3)\cdot COOH$$

$C_7H_{15}O_2N$ MW, 145

l-.

Cryst. from Me_2CO.Aq. Sublimes without melting. $[\alpha]_D^{21}$ − 20·76° in H_2O. Sol. 22·5 parts H_2O at 25°. Spar. sol. EtOH.

dl-.

Needles from EtOH.Aq. Sublimes without melting.

Friedmann, *Chem. Zentr.*, 1908, I, 971.
Fischer, v. Mechel, *Ber.*, 1916, **49**, 1358.

1-Methyl-levulinic Acid.
See 2-Acetoisobutyric Acid.

2-Methyl-levulinic Acid.
See 2-Acetobutyric Acid.

4-Methyl-levulinic Acid.
See 3-Keto-*n*-caproic Acid.

Methylmaleic Acid.
See Citraconic Acid.

1-Methylmalic Acid.
See Citramalic Acid.

2-Methylmalic Acid.
See 2-Hydroxy-1-methylsuccinic Acid.

Methylmalonic Acid (*Ethane*-1 : 1-*dicarboxylic acid*, *isosuccinic acid*)

$$CH_3\cdot CH\begin{cases} COOH \\ COOH \end{cases}$$

$C_4H_6O_4$ MW, 118

Needles from AcOEt–pet. ether or prisms from Et_2O–C_6H_6. M.p. 135° (120°). Sol. EtOH, Et_2O, AcOEt. Spar. sol. H_2O, C_6H_6. Heat of comb. C_v 362·5 Cal. $k = 8\cdot 7 \times 10^{-4}$ at 25°. Heat ⟶ propionic acid.

Mono-Me ester: $C_5H_8O_4$. MW, 132. B.p. 131°/16 mm. *Anilide*: $C_{11}H_{13}O_3N$. MW, 207. Cryst. from Et_2O. M.p. 83–6°.

Di-Me ester: $C_6H_{10}O_4$. MW, 146. B.p. 178°. D_4^{20} 1·095. n_D^{20} 1·414.

Mono-Et ester: $C_6H_{10}O_4$. MW, 146. B.p. 144°/18 mm. D_{21}^{21} 1·1129. $k = 3\cdot 87 \times 10^{-4}$ at 25°. *Chloride*: $C_6H_9O_3Cl$. MW, 164·5. B.p. 100°/45 mm. *Amide*: $C_6H_{11}O_3N$. MW, 145. Needles from CS_2. M.p. 72°. Sol. H_2O, EtOH, C_6H_6, CS_2. *Anilide*: $C_{12}H_{15}O_3N$. MW, 221. Cryst. M.p. 173–4°. p-*Toluidide*: $C_{13}H_{17}O_3N$. MW, 235. Plates. M.p. 85–7°.

Di-Et ester: $C_8H_{14}O_4$. MW, 174. B.p. 201·2–201·4°. D_4^{20} 1·018. $n_D^{18\cdot 7}$ 1·41369.

Dichloride: $C_4H_4O_2Cl_2$. MW, 155. B.p. 75°/50 mm.

Diamide: $C_4H_8O_2N_2$. MW, 116. Cryst. from H_2O. M.p. 206°. Insol. Et_2O.

Mononitrile: *see* 1-Cyanopropionic Acid.

Dinitrile: 1 : 1-dicyanoethane. $C_4H_4N_2$. MW, 80. Needles. M.p. 26°. B.p. 197–8°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. H_2O, CS_2.

Dihydrazide: cryst. from EtOH.Aq. M.p. 179°.

Monoanilide: $C_{10}H_{11}O_3N$. MW, 193. Leaflets from H_2O. M.p. 166° (180°).

Dianilide: $C_{16}H_{16}O_2N_2$. MW, 268. Leaflets from EtOH. M.p. 182° (214°).

Mono-p-*toluidide*: $C_{11}H_{13}O_3N$. MW, 207. Needles. M.p. 145° decomp.

Di-p-*toluidide*: $C_{18}H_{20}O_2N_2$. MW, 296. Needles. M.p. 227–8° (245°).

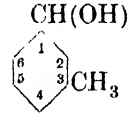
Meyer, Bock, *Ann.*, 1906, **347**, 94.
Steele, *J. Am. Chem. Soc.*, 1931, **53**, 286.
Franchimont, Klobbie, *Rec. trav. chim.*, 1889, **8**, 285.
Marguery, *Bull. soc. chim.*, 1905, **33**, 542.
Michael, *J. prakt. Chem.*, 1906, **72**, 551.
Auwers, *Ber.*, 1913, **46**, 509.
Comanducci, Lobello, *Gazz. chim. ital.*, 1905, **35**, ii, 311.

α-Methylmandelic Acid.

Atrolactinic Acid, *q.v.*

***m*-Methylmandelic Acid** (m-*Tolylglycollic acid*, α-*hydroxy*-m-*tolylacetic acid*)

CH(OH)·COOH



$C_9H_{10}O_3$ MW, 166

Leaflets from C_6H_6. M.p. 84°. Sol. H_2O, Et_2O, $CHCl_3$. Spar. sol. C_6H_6. Insol. ligroin.

Bornemann, *Ber.*, 1884, **17**, 1469.

***p*-Methylmandelic Acid** (p-*Tolylglycollic acid*, α-*hydroxy*-p-*tolylacetic acid*).

Plates from H_2O. M.p. 145–6°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. H_2O. Insol. ligroin.

Me ester: $C_{10}H_{12}O_3$. MW, 180. Cryst. from pet. ether. M.p. 48–50°. Very sol. most org. solvents.

Et ester: $C_{11}H_{14}O_3$. MW, 194. Needles from Et_2O. M.p. 77°. B.p. 155–8°.

Claus, Kroseberg, *Ber.*, 1887, **20**, 2050.
Auwers, *Ber.*, 1916, **49**, 2405.
Tiffeneau, Levy, *Bull. soc. chim.*, 1931, **49**, 1752.

Methylmannoside.

See under Mannose.

Methylmenthone.

See Homomenthone.

Methyl 3-*p*-menthyl Ether.

See under Menthol.

Methyl Mercaptan (*Methane-thiol*, *methyl thioalcohol*, *mercaptomethane*)

$CH_3{\cdot}SH$

CH_4S MW, 48

Gas with nauseating odour. M.p. − 123°. B.p. 5·8–6·2°. D_4^0 0·8948, D_4^{25} 0·8599. Heat of comb. C_p 298·8 Cal. Forms cryst. hydrate.

Arndt, Milde, Eckert, *Ber.*, 1921, **54**, 2238.
Ellis, Reid, *J. Am. Chem. Soc.*, 1932, **54**, 1677.
Klason, *Ber.*, 1887, **20**, 3409.

3-Methylmercapto-1-aminobutyric Acid.

See Methionine.

4-Methylmercaptobutylamine.

See Methyl 4-aminobutyl sulphide.

2-Methylmercaptopropylamine.

See Methyl 1-aminoisopropyl sulphide.

3-Methylmercaptopropylamine.

See Methyl 3-aminopropyl sulphide.

Methylmesaconic Acid.

See Ethylfumaric Acid.

Methyl methacrylate.

See Methyl 1-methylacrylate.

Methyl *p*-methoxybenzyl Ketone.

See Anisylacetone.

Methyl *p*-methoxyphenyl Diketone.

See Acetylanisoyl.

Methyl methoxyphenyl Ketone.

See under Hydroxyacetophenone.

Methyl methoxyphenyl sulphide.

See under Thiocatechol *and* Thiohydroquinone.

Methyl *p*-methoxystyryl Ketone.

See Anisylideneacetone.

Methyl 1-methylacrylate (*Methyl methacrylate*)

$$CH_2{:}\overset{CH_3}{C}{\cdot}CO{\cdot}OCH_3$$

$C_5H_8O_2$ MW, 100

B.p. 100–101°. Polymerises on exposure to light or heat in presence of O ⟶ resinous products.

I.C.I., F.P., 745,085, (*Chem. Abstracts*, 1933, **29**, 4363); E.P., 410,208, (*Chem. Zentr.*, 1934, II, 3182).

Methyl 3 : 4-methylenedioxyphenylethyl Ketone.

See Piperonylacetone.

2-Methyl-6-methyleneoctadiene-2 : 7.

See Myrcene.

2-Methyl-6-methylene-1-octenol-8.
See Isogeraniol.

1-Methyl-2-methylene-succinic Acid.
See 3-Methylitaconic Acid.

Methyl β-methylstyryl Ketone (*Methyl* 1-*benzylidene-ethyl ketone*, 3-*keto*-2-*methyl*-1-*phenyl-butylene*, 2-*methyl*-1-*phenyl*-1-*butenone*-3, 1-*methyl*-1-*benzylidene-acetone*, β-*methyl*-β-*acetostyrene*)

$$C_6H_5{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CO{\cdot}CH_3$$

$C_{11}H_{12}O$ MW, 160

Colourless needles. M.p. 38–9°. B.p. 130°/12 mm. D_4^{18} 1·0274, D_4^{40} 1·0072. n_D^{18} 1·5743. n_D^{40} 1·572.

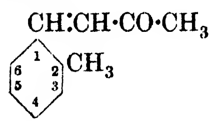
Oxime: prisms. M.p. 104°.

Phenylhydrazone: m.p. 105°.

Semicarbazone: exists in two phototropic forms. (i) M.p. 173°. (ii) M.p. 204°.

Auwers, *Ber.*, 1912, **45**, 2774.
Harries, Müller, *Ber.*, 1902, **35**, 968.
Gheorghiu, Arwentiew, *Chem. Abstracts*, 1932, **26**, 4804.

Methyl o-methylstyryl Ketone (o-*Methyl-benzylideneacetone*, 1-o-*tolyl*-1-*butenone*-3, o-*methyl*-β-*acetostyrene*)



$C_{11}H_{12}O$ MW, 160

M.p. 0°. B.p. 136–8°/10 mm.

Meerwein, *Ann.*, 1908, **358**, 89.

Methyl p-methylstyryl Ketone (p-*Methyl-benzylideneacetone*, 1-p-*tolyl*-1-*butenone*-3, p-*methyl*-β-*acetostyrene*).

Plates from ligroin. M.p. 34–5°. B.p. 277–8°, 155–6°/15 mm. (142–5°/15 mm.). Sol. EtOH, Et_2O.

Oxime: leaflets from EtOH. M.p. 126°.

Azine: yellow needles from $PhNO_2$. M.p. 190°.

Phenylhydrazone: needles from EtOH. M.p. 154° (138°).

Semicarbazone: needles from EtOH. M.p. 202°. Turns yellow on exposure to light.

Hanzlik, Bianchi, *Ber.*, 1899, **32**, 2282.
Gattermann, *Ann.*, 1906, **347**, 361.

Methyl methylthienyl Ketone.
See Acetomethylthienone.

2-Methylmuconic Acid (*Isoprene*-1 : 4-*dicarboxylic acid*, 2-*methyl*-1 : 3-*butadiene*-1 : 4-*dicarboxylic acid*)

$$HOOC{\cdot}CH{:}CH{\cdot}\overset{CH_3}{C}{:}CH{\cdot}COOH$$

$C_7H_8O_4$ MW, 156

Trans:

Cryst. powder from H_2O. M.p. 235° (231°) decomp.

Mono-Me ester: $C_8H_{10}O_4$. MW, 170. M.p. 126°.

Di-Me ester: $C_9H_{12}O_4$. MW, 184. B.p. 145°/9 mm.

Di-Et ester: $C_{11}H_{16}O_4$. MW, 212. B.p. 175°/10 mm.

Cis:

Cryst. powder from EtOH. M.p. 170–1°. Spar. sol. H_2O, EtOH, Et_2O, C_6H_6.

Mono-Me ester: needles from C_6H_6. M.p. 125°. Sol. EtOH, Et_2O. Spar. sol. H_2O, C_6H_6. *Amide*: $C_8H_{11}O_3N$. MW, 169. Prisms from MeOH. M.p. 161–2°.

Di-Me ester: needles from pet. ether. M.p. 38°. B.p. 142–3°/16 mm. D_4^{20} 1·115. Sol. most org. solvents. Spar. sol. H_2O.

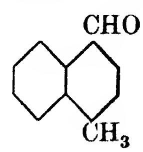
Di-Et ester: b.p. 163–4°/19 mm. D_4^{20} 1·056. n_a^{17} 1·495.

Diamide: $C_7H_{10}O_2N_2$. MW, 154. Needles from MeOH. M.p. 213–14°.

Rinkes, *Rec. trav. chim.*, 1929, **48**, 603, 1093.
Stephen, Weizmann, *J. Chem. Soc.*, 1913, **103**, 276.
Pauly, Will, *Ann.*, 1918, **416**, 7, 19.
Auwers, *J. prakt. Chem.*, 1923, **105**, 383.

Methylnaphthafuran.
See Methylbenzcoumarone.

4-Methyl-1-naphthaldehyde



$C_{12}H_{10}O$ MW, 170

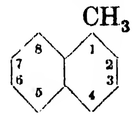
Cryst. from pet. ether. M.p. 33·5–34°. B.p. 174–6°/13 mm.

Semicarbazone: plates from EtOH. M.p. 237° (228°).

Azine: light yellow cryst. from EtOH. M.p. 136–7°.

Ziegler, Tiemann, *Ber.*, 1922, **55**, 3410.

1-Methylnaphthalene (α-*Methylnaphthalene*)



$C_{11}H_{10}$ MW, 142

Oil. F.p. — 22°. B.p. 241°, 110°/12 mm. Sol. EtOH, Et_2O. $D^{11\cdot5}$ 1·0287, D^{19} 1·0005. Volatile in steam.

Picrate : orange-red cryst. from EtOH. M.p. 141–2°.

Darzens, Lévy, *Compt. rend.*, 1934, **199**, 1131.
Darzens, *Compt. rend.*, 1926, **183**, 748.
I.G., D.R.P., 509,149, (*Chem. Abstracts*, 1931, **25**, 711).

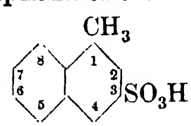
2-Methylnaphthalene (β-*Methylnaphthalene*). Found in low-temp. tar. Cryst. M.p. 37–8° (32°). B.p. 240–2°/760 mm., 110–12°/16 mm.

Picrate : yellow cryst. from EtOH. M.p. 115–16°.

$C_{11}H_{10},C_6H_3(NO_2)_3$-1 : 3 : 5 : yellow needles. M.p. 123°.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1314.

1-Methylnaphthalene-3-sulphonic Acid



$C_{11}H_{10}O_3S$ MW, 222

Chloride : $C_{11}H_9O_2SCl$. MW, 240·5. Cryst. from Et_2O. M.p. 124–5°.

Amide : $C_{11}H_{11}O_2NS$. MW, 221. Cryst. from EtOH. M.p. 143–4°.

Veselý, Štursa, *Chem. Zentr.*, 1931, II, 996.

1-Methylnaphthalene-4-sulphonic Acid.

Chloride : cryst. from Et_2O. M.p. 81° (78–80°). Sol. 2 parts boiling Et_2O.

Amide : needles from EtOH. M.p. 177° (174°).

Steiger, *Helv. Chim. Acta*, 1930, **13**, 177.
Veselý, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.

1-Methylnaphthalene-5-sulphonic Acid. Plates. M.p. 115°.

Amide : cryst. from EtOH. M.p. 176–8°.

Veselý, Štursa, *Chem. Zentr.*, 1931, II, 996.

1-Methylnaphthalene-6-sulphonic Acid.

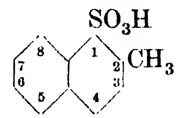
Chloride : needles from ligroin. M.p. 120–2°.

Amide : plates from boiling H_2O or EtOH.Aq. M.p. 188–9°.

Anilide : plates from boiling H_2O. M.p. 248–50°.

Dziewoński, Waszkowski, *Chem. Zentr.*, 1930, I, 1934.
Dziewoński, Otto, *Brit. Chem. Abstracts*, 1935, A, 1116.

2-Methylnaphthalene-1-sulphonic Acid



$C_{11}H_{10}O_3S$ MW, 222

Chloride : $C_{11}H_9O_2SCl$. MW, 240·5. Needles from Et_2O. M.p. 83–5°.

Amide : $C_{11}H_{11}O_2NS$. MW, 221. Cryst. from EtOH. M.p. 124°.

Veselý, Páč, *Chem. Zentr.*, 1930, II, 1547.

2-Methylnaphthalene-6-sulphonic Acid.

Et ester : $C_{13}H_{14}O_3S$. MW, 250. Plates from H_2O. M.p. 79–80°.

Chloride : cryst. from ligroin. M.p. 97–8°. Sol. Et_2O, C_6H_6. Spar. sol. ligroin.

Amide : plates from H_2O. M.p. 205–6°. Sol. EtOH, Et_2O, alkalis. Spar. sol. hot H_2O.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, **58**, 1212.

2-Methylnaphthalene-8-sulphonic Acid.

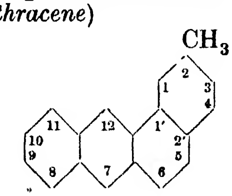
Chloride : needles from Et_2O. M.p. 96°.

Amide : plates. M.p. 195–6°.

Anilide : needles. M.p. 162–4°.

Veselý, Páč, *Chem. Zentr.*, 1930, II, 1548.

2-Methylnaphthanthracene (2-*Methyl-1′ : 2′-benzanthracene*)



$C_{19}H_{14}$ MW, 242

Cryst. from EtOH. M.p. 149–50°.

Picrate : m.p. 180°.

Cook, *J. Chem. Soc.*, 1932, 471.

3-Methylnaphthanthracene (3-*Methyl-1′ : 2′-benzanthracene*).

Cryst. from EtOH. M.p. 160°.

Picrate : m.p. 144–5°.

See above reference.

5-Methylnaphthanthracene (*5-Methyl-1′ : 2′-benzanthracene*).

Plates from C_6H_6–pet. ether. M.p. 153–4°. Sol. EtOH, AcOH, C_6H_6, Py, pet. ether.

Cook, *J. Chem. Soc.*, 1930, 1093.

6-Methylnaphthanthracene (*6-Methyl-1′ : 2′-benzanthracene*).

Needles from EtOH. M.p. 107°.

Picrate: needles from EtOH. M.p. 119°.

Fieser, Peters, *J. Am. Chem. Soc.*, 1932, **54**, 3750.

9-Methylnaphthanthracene (*9-Methyl-1′ : 2′-benzanthracene*).

Cryst. from EtOH. M.p. 150·5–151·5°.

Picrate: m.p. 152–3°.

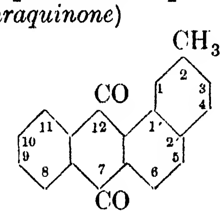
Cook, *J. Chem. Soc.*, 1932, 470.

10-Methylnaphthanthracene (*10-Methyl-1′ : 2′-benzanthracene*).

Cryst. from C_6H_6. M.p. 182°.

See previous reference.

2-Methylnaphthanthraquinone (*2-Methyl-1′ : 2′-benzanthraquinone*)



$C_{19}H_{12}O_2$ MW, 272

Orange needles from methyl ethyl ketone. M.p. 189–90°.

Cook, *J. Chem. Soc.*, 1932, 471.
Fieser, Peters, *J. Am. Chem. Soc.*, 1932, **54**, 3749.

3-Methylnaphthanthraquinone (*3-Methyl-1′ : 2′-benzanthraquinone*).

Orange needles from methyl ethyl ketone. M.p. 168°.

See previous references.

4-Methylnaphthanthraquinone (*4-Methyl-1′ : 2′-benzanthraquinone*).

Light brown needles. M.p. 215–16°. Dirty green col. in H_2SO_4. Ox. ⟶ anthraquinone-1 : 2-dicarboxylic acid.

Scholl, Seer, Zinke, *Monatsh.*, 1921, **41**, 583.

6-Methylnaphthanthraquinone (*6-Methyl-1′ : 2′-benzanthraquinone*).

Yellow needles from AcOH. M.p. 167°.

Fieser, Peters, *J. Am. Chem. Soc.*, 1932, **54**, 3750.

8-Methylnaphthanthraquinone (*8-Methyl-1′ : 2′-benzanthraquinone*).

Orange yellow needles from AcOH. M.p. 174°.

Cook, *J. Chem. Soc.*, 1933, 1596.

9-Methylnaphthanthraquinone (*9-Methyl-1′ : 2′-benzanthraquinone*).

Orange needles. M.p. 174°.

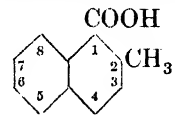
Cook, *J. Chem. Soc.*, 1932, 470.

10-Methylnaphthanthraquinone (*10-Methyl-1′ : 2′-benzanthraquinone*).

Orange needles from AcOH. M.p. 167°.

Cook, *J. Chem. Soc.*, 1932, 471.

2-Methyl-1-naphthoic Acid



$C_{12}H_{10}O_2$ MW, 186

Prisms from AcOH.Aq. M.p. 126–7°.

Me ester: $C_{13}H_{12}O_2$. MW, 200. B.p. 168–70°/15 mm.

Et ester: $C_{14}H_{14}O_2$. MW, 214. B.p. 180–3°/15 mm.

l-*Menthyl ester*: cryst. from EtOH. M.p. 139·5°.

Chloride: $C_{12}H_9OCl$. MW, 204·5. B.p. 170–2°/20 mm.

Amide: $C_{12}H_{11}ON$. MW, 185. Cryst. from C_6H_6. M.p. 143°.

Anilide: cryst. from MeOH. M.p. 167–8°.

Mayer, Sieglitz, *Ber.*, 1922, **55**, 1851.
Rule, Spence, Bretscher, *J. Chem. Soc.*, 1929, 2522.

4-Methyl-1-naphthoic Acid.

Cryst. from AcOH. M.p. 175° (165°).

Me ester: b.p. 192–4°/12 mm.

Et ester: b.p. 203°/12 mm.

Chloride: b.p. 150–60°/12 mm.

Amide: needles from C_6H_6. M.p. 193°.

Anilide: cryst. from C_6H_6. M.p. 179°.

Hydrazide: needles from EtOH. M.p. 154°.

I.G., E.P., 333,667, (*Chem. Abstracts*, 1931, **25**, 603).
I.G., D.R.P., 558,471, (*Chem. Abstracts*, 1933, **27**, 310).
See also first reference above.

6-Methyl-1-naphthoic Acid.

Needles from H_2O. M.p. 150–2°. Very sol. EtOH, Et_2O, $CHCl_3$, Me_2CO. Sol. hot C_6H_6, hot toluene. Spar. sol. ligroin.

Me ester: light yellow oil. B.p. 183–7°/30 mm.
Et ester: yellow oil. B.p. 203–5°/30 mm.

Weissgerber, Kruber, *Ber.*, 1919, **52**, 352, 628.

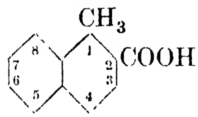
7-Methyl-1-naphthoic Acid.
Needles from ligroin. M.p. 147°.

Dziewoński, Brand, *Chem. Zentr.*, 1933, II, 2390.

8-Methyl-1-naphthoic Acid.
Prisms or needles from pet. ether. M.p. about 130–1°. Sol. EtOH, C_6H_6. Spar. sol. pet. ether.

Errara, Ajon, *Gazz. chim. ital.*, 1914, **44**, ii, 97.

1-Methyl-2-naphthoic Acid



$C_{12}H_{10}O_2$ MW, 186

Needles from C_6H_6. M.p. 178°.
Et ester: $C_{14}H_{14}O_2$. MW, 214. Cryst. M.p. 27–8°. B.p. 190°/20 mm., 184°/13 mm. D_4^{20} 1·113. n_D^{20} 1·595.

Auwers, Möller, *J. prakt. Chem.*, 1925, **109**, 148.
Mayer, Schnecko, *Ber.*, 1923, **56**, 1410.

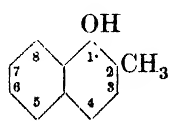
4-Methyl-2-naphthoic Acid.
Cryst. M.p. 198–9°.
Me ester: $C_{13}H_{12}O_2$. MW, 200. Cryst. M.p. 39°. B.p. 188°/15 mm.

Darzens, *Compt. rend.*, 1926, **183**, 748.

6-Methyl-2-naphthoic Acid.
Cryst. from MeOH or AcOH.Aq. M.p. 228–30° (225–7°).
Me ester: needles from MeOH. M.p. 116–17°.

Haworth, Letsky, Mavin, *J. Chem. Soc.*, 1932, 1788.
Dziewoński, Brand, *Chem. Zentr.*, 1933, II, 2390.

2-Methyl-1-naphthol (1-*Hydroxy*-2-*methylnaphthalene*)



$C_{11}H_{10}O$ MW, 158

Needles from pet. ether. M.p. 64–5°. Sol. usual org. solvents. Turns red in air. Conc. $H_2SO_4 \longrightarrow$ green sol. $\longrightarrow$ pink on dilution.

Lesser, *Ann.*, 1913, **402**, 42.
Veselý, Páč, *Chem. Zentr.*, 1930, II, 1548.

4-Methyl-1-naphthol (4-*Hydroxy*-1-*methylnaphthalene*).
Needles from C_6H_6–pet. ether. M.p. 84–5°. Sol. H_2O, most org. solvents.
Benzoyl: prisms from pet. ether. M.p. 81–2°.

Steiger, *Helv. Chim. Acta*, 1930, **13**, 180.

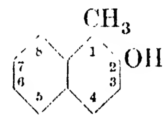
5-Methyl-1-naphthol (5-*Hydroxy*-1-*methylnaphthalene*).
Needles from pet. ether. M.p. 97–8°.
Benzoyl: plates. M.p. 77–8°.

Veselý, Štursa, *Chem. Zentr.*, 1931, II, 996.

7-Methyl-1-naphthol (8-*Hydroxy*-2-*methylnaphthalene*).
Needles from pet. ether. M.p. 109–11°. B.p. 158–9°/12 mm.

Veselý, Páč, *Chem. Zentr.*, 1930, II, 1548.
Krollpfeiffer, Schäfer, *Ber.*, 1923, **56**, 625.

1-Methyl-2-naphthol (2-*Hydroxy*-1-*methylnaphthalene*)



$C_{11}H_{10}O$ MW, 158

Needles from H_2O or C_6H_6–ligroin. M.p. 112° (110°). Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, AcOH. Less sol. hot H_2O, ligroin. Sublimes. Distils undecomp. Conc. $H_2SO_4 \longrightarrow$ reddish-yellow col. Sol. alkalis with blue fluor.
Me ether: $C_{12}H_{12}O$. MW, 172. Plates from MeOH. M.p. 41–2° (39°). B.p. 162–3°/20 mm.
Et ether: $C_{13}H_{14}O$. MW, 186. Plates from EtOH. M.p. 52° (50°).
Acetyl: prisms from pet. ether. M.p. 66°.
Benzoyl: needles from EtOH. M.p. 117°.
Picrate: red needles from EtOH or C_6H_6. M.p. 163–4° (162–3°).

Betti, Mundici, *Gazz. chim. ital.*, 1905, **36**, ii, 657.
Fries, Hubner, *Ber.*, 1906, **39**, 442.
M.L.B., D.R.P., 161,450, (*Chem. Zentr.*, 1905, II, 183).
Dziewoński, Dragan, Marchówna, *Chem. Zentr.*, 1935, I, 2529.

3-Methyl-2-naphthol (3-*Hydroxy*-2-*methylnaphthalene*).
Cryst. from xylene. M.p. 155–6°. B.p. 176°/20 mm.

Veselý, Štursa, *Chem. Zentr.*, 1934, I, 3589.

4-Methyl-2-naphthol (3-*Hydroxy*-1-*methylnaphthalene*).

Needles. M.p. 81–2°.

Benzoyl: m.p. 117–18°.

Veselý, Štursa, *Chem. Zentr.*, 1931, II, 996.

5-Methyl-2-naphthol (6-*Hydroxy*-1-*methylnaphthalene*).

Cryst. from ligroin or boiling H_2O. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O.

Benzoyl: needles from EtOH.Aq. M.p. 107–8°

Dziewoński, Waszkowski, *Chem. Zentr.*, 1930, I, 1934.

Dziewoński, Otto, *Brit. Chem. Abstracts*, 1935, A, 1116.

6-Methyl-2-naphthol (6-*Hydroxy*-2-*methylnaphthalene*).

Cryst. from ligroin. M.p. 128–9°. Very sol. EtOH, Et_2O. Sol. ligroin. Spar. sol. boiling H_2O. Heat with $FeCl_3 \longrightarrow$ olive green col. KOH + $CHCl_3 \longrightarrow$ blue col. $\longrightarrow$ green.

Me ether: $C_{12}H_{12}O$. MW, 172. Plates from EtOH.Aq. M.p. 78–9°. Very sol. EtOH, most org. solvents.

Benzoyl: needles from EtOH. M.p. 128–9°. Sol. boiling EtOH, and most org. solvents.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, **58**, 1214.

8-Methyl-2-naphthol (7-*Hydroxy*-1-*methylnaphthalene*).

Needles from H_2O. M.p. 70–1° (69–70°). B.p. 176°/10 mm. (178–80°/15 mm.).

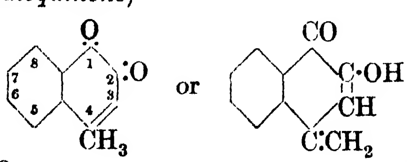
Me ether: plates from pet. ether. M.p. 47–8°. B.p. 159–61°/15 mm., 152–3°/10 mm.

Benzoyl: plates from Et_2O, prisms from pet. ether. M.p. 88–90°.

Veselý, Štursa, *Chem. Zentr.*, 1933, II, 378.

Haworth, Sheldrick, *J. Chem. Soc.*, 1934, 1951.

4-Methyl-1 : 2-naphthoquinone (4-*Methyl*-β-*naphthoquinone*)



$C_{11}H_8O_2$ MW, 172

Needles from AcOH. M.p. about 248–50° decomp. Blue sols in alkalis.

Me ether: $C_{12}H_{10}O_2$. MW, 186. Yellow needles from EtOH. M.p. 184–5°. *Phenylhydrazone*: m.p. about 254–7° decomp.

Acetyl: yellow needles from AcOEt. M.p. 212–13° decomp. *Phenylhydrazone*: m.p. about 278–81° decomp.

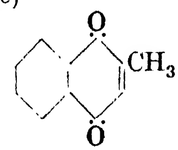
Dean, Nierenstein, *J. Chem. Soc.*, 1916, **109**, 593.

6-Methyl-1 : 2-naphthoquinone (6-*Methyl*-β-*naphthoquinone*).

Orange-yellow needles from ligroin. M.p. 131–2°.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, **58**, 1215.

2-Methyl-1 : 4-naphthoquinone (2-*Methyl*-α-*naphthoquinone*)



$C_{11}H_8O_2$ MW, 172

Yellow needles from EtOH or pet. ether. M.p. 106° (104°). Sol. C_6H_6, Et_2O. Mod. sol. EtOH, AcOH. Spar. sol. H_2O, pet. ether. Conc. $H_2SO_4 \longrightarrow$ red sol. Decomp. by NaOH. Volatile in steam.

Dioxime: m.p. 166–8°.

Fries, Lohmann, *Ber.*, 1921, **54**, 2918.

Madinaveitia, de Buruaga, *Chem. Abstracts*, 1930, **24**, 359.

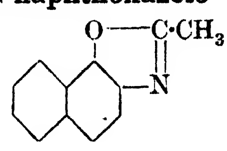
5-Methyl-1 : 4-naphthoquinone (5-*Methyl*-α-*naphthoquinone*).

Needles from pet. ether. M.p. 121–2° (102–3°). Sol. most org. solvents.

Herzenberg, Ruhemann, *Ber.*, 1927, **60**, 897.

Veselý, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 612.

2-Methyl-α-naphthoxazole



$C_{12}H_9ON$ MW, 183

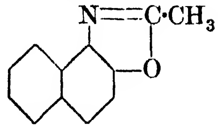
M.p. 36–7°. B.p. 178–201°/18–20 mm.

Methiodide: cryst. from EtOH. M.p. 202° decomp.

Ethiodide: cryst. from EtOH. M.p. 215° decomp.

Fischer, Hamer, *J. Chem. Soc.*, 1934, 963.

2-Methyl-β-naphthoxazole

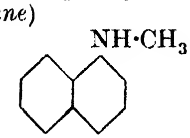


$C_{12}H_9ON$ MW, 183

M.p. 27°. B.p. 158–60°/14 mm.
B,HCl: m.p. 177°.
Methiodide: cryst. from EtOH. M.p. 212–13° decomp.
Ethiodide: cryst. from EtOH. M.p. 202–3° decomp.

See previous reference.

N-Methyl-1-naphthylamine (*α-Methylaminonaphthalene*)

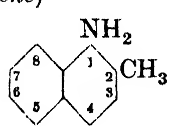


$C_{11}H_{11}N$ MW, 157

Oil. B.p. 293–6°, 175–6°/16 mm. Sol. EtOH, Et_2O, CS_2. Darkens in air. Sol. in Et_2O shows blue fluor. Alc. $FeCl_3$ ⟶ dark violet col.
B_2,H_2PtCl_6: yellowish-green cryst. + $2H_2O$. Decomp. at 105–10°.
Acetyl: cryst. M.p. 93–4°.
p-*Toluenesulphonyl*: prisms from EtOH. M.p. 163–4°.

v. Braun, Heider, Müller, *Ber.*, 1918, **51**, 281.
Rodionow, Vvedenskij, *Bull. soc. chim.*, 1929, **45**, 121.

2-Methyl-1-naphthylamine (*1-Amino-2-methylnaphthalene*)



$C_{11}H_{11}N$ MW, 157

Needles from pet. ether. M.p. 32°. Sol. most org. solvents. Spar. sol. H_2O.
B,HCl: needles. Decomp. above 230°. Sol. EtOH. Spar. sol. H_2O.
Acetyl: needles from C_6H_6. M.p. 188°.
Benzoyl: plates from toluene. M.p. 180°.

Lesser, *Ann.*, 1913, **402**, 38.

3-Methyl-1-naphthylamine (*4-Amino-2-methylnaphthalene*).
Cryst. from pet. ether. M.p. 51–2°.
Acetyl: needles from Me_2CO. M.p. 175–6°.
Benzoyl: cryst. from EtOH. M.p. 188–9°.

Veselý, Kapp, *Chem. Zentr.*, 1924, II, 2750.

4-Methyl-1-naphthylamine (*4-Amino-1-methylnaphthalene*).
Needles from pet. ether. M.p. 51–2°. Sol. usual org. solvents. Mod. sol. pet. ether. Spar. sol. H_2O. $FeCl_3$ ⟶ green col.
B,HCl: needles. M.p. 233–4°. Sol. EtOH. Spar. sol. H_2O.
Acetyl: needles from EtOH. M.p. 166–7°. Spar. sol. EtOH.
Benzoyl: needles from AcOH. M.p. 238–9°. Sol. $CHCl_3$. Mod. sol. AcOH. Spar. sol. EtOH, C_6H_6.

Lesser, *Ann.*, 1913, **402**, 18.

5-Methyl-1-naphthylamine (*5-Amino-1-methylnaphthalene*).
Cryst. M.p. 77–8°.
Acetyl: m.p. 194–5°.
Benzoyl: m.p. 173–4°.

Veselý, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.

6-Methyl-1-naphthylamine (*5-Amino-2-methylnaphthalene*).
Violet needles from pet. ether. M.p. 90°.
Acetyl: needles from EtOH. M.p. 160–1°.

Veselý, Páč, *Chem. Zentr.*, 1930, II, 1548.

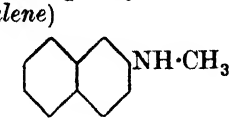
7-Methyl-1-naphthylamine (*8-Amino-2-methylnaphthalene*).
Needles from pet. ether. M.p. 58–9°. Turns brownish-violet in air.
Acetyl: needles from EtOH. M.p. 182–3°.
Benzoyl: needles from EtOH. M.p. 204°.

Veselý, Medvedeva, *Chem. Zentr.*, 1931, II, 3473.
Dziewoński, Brand, *Chem. Zentr.*, 1933, I, 775.
See also previous reference.

8-Methyl-1-naphthylamine (*8-Amino-1-methylnaphthalene*).
Cryst. M.p. 67–8°.
Acetyl: m.p. 183–4°.
Benzoyl: m.p. 195–6°.

Veselý, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 612.

N-Methyl-2-naphthylamine (*β-Methylaminonaphthalene*)



$C_{11}H_{11}N$ MW, 157

Oil. B.p. 317°/766 mm., 207°/60 mm., 165–70°/12 mm. Darkens in air.

B,HCl: cryst. from EtOH–Et_2O. M.p. 182–3°.

Acetyl: prisms from pet. ether. M.p. 50–1°.

Benzoyl: needles from pet. ether. M.p. 84°.

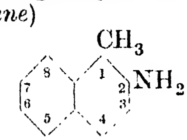
p-*Toluenesulphonyl*: needles from EtOH. M.p. 77–8° (73°).

N-*Nitroso*: needles. M.p. 88°.

Picrate: yellow needles from EtOH. M.p. 145°.

Pschorr, Karo, *Ber.*, 1906, **39**, 3141.
Morgan, Evens, *J. Chem. Soc.*, 1919, **115**, 1141.

1-Methyl-2-naphthylamine (2-*Amino*-1-*methylnaphthalene*)



$C_{11}H_{11}N$ MW, 157

Needles from pet. ether. M.p. 51° (49–50°). Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, AcOH. Mod. sol. pet. ether. Spar. sol. hot H_2O.

Acetyl: needles from C_6H_6. M.p. 188–9°.

Benzoyl: m.p. 222°.

Fries, Hübner, *Ber.*, 1906, **39**, 444.
Veselý, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.

3-Methyl-2-naphthylamine (3-*Amino*-2-*methylnaphthalene*).

Cryst. from pet. ether. M.p. 135–135·5°.

Acetyl: cryst. from EtOH. M.p. 181–2°.

Benzoyl: cryst. from EtOH. M.p. 189–90°.

Veselý, Štursa, *Chem. Zentr.*, 1934, I, 3589.

4-Methyl-2-naphthylamine (3-*Amino*-1-*methylnaphthalene*).

Cryst. M.p. 68°.

Acetyl: m.p. 172–3°.

Benzoyl: m.p. 194–5°.

Veselý, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.

5-Methyl-2-naphthylamine (6-*Amino*-1-*methylnaphthalene*).

Cryst. M.p. 63–4°.

Acetyl: m.p. 123–4°.

Benzoyl: m.p. 155–6°.

See previous reference.

6-Methyl-2-naphthylamine (6-*Amino*-2-*methylnaphthalene*).

Leaflets from hot H_2O. M.p. 129–30°. Sol. most org. solvents, min. acids. Turns pink in air.

Acetyl: plates from EtOH.Aq. or ligroin. M.p. 160° (155–6°). Very sol. most org. solvents.

Dziewoński, Schoenówna, Waldmann, *Ber.*, 1925, **58**, 1216.
Dziewoński, Brand, *Chem. Zentr.*, 1933, I, 775.

7-Methyl-2-naphthylamine (7-*Amino*-2-*methylnaphthalene*).

Yellowish-brown cryst. from EtOH. M.p. 105°.

Acetyl: cryst. M.p. 152°.

Veselý, Páč, *Chem. Zentr.*, 1930, II, 1548.

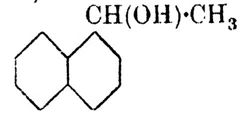
8-Methyl-2-naphthylamine (7-*Amino*-1-*methylnaphthalene*).

Needles from MeOH. M.p. 85–6°.

Acetyl: plates from C_6H_6. M.p. 158·5–160° (157–8°).

Veselý, Štursa, *Chem. Zentr.*, 1933, II, 378.

Methyl-1-naphthylcarbinol (α-*Hydroxy*-1-*ethylnaphthalene*)



$C_{12}H_{12}O$ MW, 172

l-.

Needles. M.p. 47°. B.p. 166°/11 mm. $[\alpha]_D^{19}$ − 9·79°.

Acetyl: $[\alpha]_D^{20}$ − 32·28°.

Acid phthalate: oil. $[\alpha]_D^{20}$ +43·7° in $CHCl_3$, + 69·7° in EtOH. *Brucine salt*: needles. M.p. 176°. $[\alpha]_D^{20}$ + 53·4° in EtOH. *Strychnine salt*: prisms from EtOH. M.p. 191°. $[\alpha]_D^{20}$ + 11·3° in $CHCl_3$.

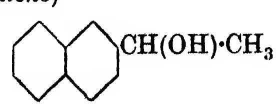
dl-.

Needles from pet. ether. M.p. 66°. B.p. 178°/15 mm.

Acid phthalate: cryst. from C_6H_6. M.p. 131–2°.

Pickard, Kenyon, *J. Chem. Soc.*, 1914, **105**, 1126.

Methyl-2-naphthylcarbinol (α-*Hydroxy*-2-*ethylnaphthalene*)

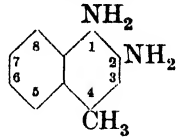


$C_{12}H_{12}O$ MW, 172

Orange needles. M.p. 67·5–8°. B.p. 178–88°.

Sontag, *Compt. rend.*, 1933, **197**, 1130.

4-Methyl-1 : 2-naphthylenediamine (3 : 4-*Diamino*-1-*methylnaphthalene*)



$C_{11}H_{12}N_2$ MW, 172

Needles from ligroin. M.p. 91–2°. B.p. 187–95°/14 mm. Sol. usual solvents.

1 : 2-N-*Diacetyl* : prisms from EtOH. M.p. 261°. Sol. AcOH. Less sol. EtOH.

Veselý, Štursa, Olejníček, Rein, *Chem. Abstracts*, 1930, **24**, 611.
Lesser, *Ann.*, 1913, **402**, 27.

5-Methyl-1 : 2-naphthylenediamine (5 : 6-*Diamino*-1-*methylnaphthalene*).

Cryst. M.p. 151–2°.

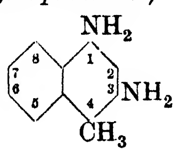
See first reference above.

7-Methyl-1 : 2-naphthylenediamine (7 : 8-*Diamino*-2-*methylnaphthalene*).

Yellow needles from pet. ether. M.p. 80–1°.

Veselý, Páč, *Chem. Zentr.*, 1930, II, 1548.

4-Methyl-1 : 3-naphthylenediamine (2 : 4-*Diamino*-1-*methylnaphthalene*)



$C_{11}H_{12}N_2$ MW, 172

Yellow cryst. from C_6H_6–pet. ether. M.p. 93° (63°). Darkens in air.

1 : 3-N-*Diacetyl* : plates from EtOH. M.p. 303°.

Thompson, *J. Chem. Soc.*, 1932, 1830.

5-Methyl-1 : 3-naphthylenediamine (5 : 7-*Diamino*-1-*methylnaphthalene*).

Plates from H_2O. M.p. 123°. Turns brown in air.

1 : 3-N-*Diacetyl* : needles from AcOH. M.p. 275°.

Atkinson, Thorpe, *J. Chem. Soc.*, 1907, **91**, 1702.

6-Methyl-1 : 3-naphthylenediamine (5 : 7-*Diamino*-2-*methylnaphthalene*).

Plates from H_2O. M.p. 137°.

1 : 3-N-*Diacetyl* : needles from AcOH. M.p. 256°.

See previous reference.

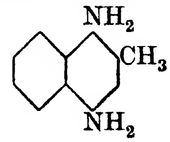
7-Methyl-1 : 3-naphthylenediamine (6 : 8-*Diamino*-2-*methylnaphthalene*).

Plates from H_2O. M.p. 119°.

1 : 3-N-*Diacetyl* : prisms from AcOH. M.p. 263°.

See previous reference.

2-Methyl-1 : 4-naphthylenediamine (1 : 4-*Diamino*-2-*methylnaphthalene*)

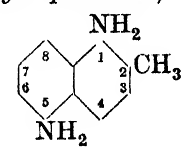


$C_{11}H_{12}N_2$ MW, 172

Yellow cryst. from pet. ether. M.p. 111–13°.

Veselý, Kapp, *Chem. Zentr.*, 1924, II, 2751.

2-Methyl-1 : 5-naphthylenediamine (1 : 5-*Diamino*-2-*methylnaphthalene*)



$C_{11}H_{12}N_2$ MW, 172

Reddish-yellow needles. M.p. 136° (125–8° decomp.). Sol. H_2O, pet. ether.

B,2HI : m.p. 238–40° decomp.

B,H_2SO_4 : m.p. 255° decomp.

1 : 5-N-*Diacetyl* : needles. M.p. 202°.

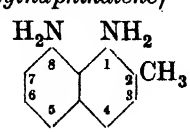
Giral, *Chem. Zentr.*, 1934, II, 940.
See also previous reference.

4-Methyl-1 : 5-naphthylenediamine (4 : 8-*Diamino*-1-*methylnaphthalene*).

1 : 5-N-*Diacetyl* : prisms from EtOH. M.p. 320–3°.

Thompson, *J. Chem. Soc.*, 1932, 2313.

2-Methyl-1 : 8-naphthylenediamine (1 : 8-*Diamino*-2-*methylnaphthalene*)



$C_{11}H_{12}N_2$ MW, 172

Red cryst. from pet. ether. M.p. 63°. B.p. 213–14°/21 mm.

B,2HI : m.p. 215–20° decomp.

B,H_2SO_4 : m.p. 197°.

1 : 8-N-*Diacetyl* : m.p. 136°.

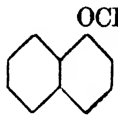
Giral, *Chem. Zentr.*, 1934, II, 940.

4-Methyl-1 : 8-naphthylenediamine (4 : 5-*Diamino*-1-*methylnaphthalene*).

Pale pink needles from pet. ether. M.p. 64°.
B,2HCl : needles. M.p. 260°.

Thompson, *J. Chem. Soc.*, 1932, **2313**.

Methyl 1-naphthyl Ether (α-*Methoxynaphthalene*)

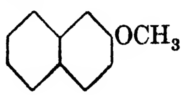


$C_{11}H_{10}O$ MW, 158

Oil. B.p. 265–6° (258°). Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, CS_2. Insol. H_2O. $D_4^{13.9}$ 1·09636, $D_4^{34.5}$ 1·07931. $n_D^{13.9}$ 1·62322, $n_D^{34.5}$ 1·61341. Volatile in steam.
$C_{11}H_{10}O,C_6H_3(NO_2)_3$-1 : 3 : 5 : yellow needles. M.p. 137–8°.

Sabatier, Mailhe, *Compt. rend.*, 1910, **151**, 361.
Staedel, *Ann.*, 1883, **217**, 42.
Gattermann, *Ann.*, 1888, **244**, 72.

Methyl 2-naphthyl Ether (β-*Methoxynaphthalene*, *Nerolin*)

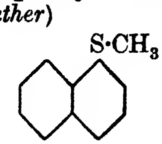


$C_{11}H_{10}O$ MW, 158

Plates from Et_2O. M.p. 72°. B.p. 274°. Sol. Et_2O, C_6H_6, $CHCl_3$. Less sol. CS_2. Spar. sol. MeOH, EtOH. Volatile in steam. Used in perfumery.
$C_{11}H_{10}O,C_6H_3(NO_2)_3$-1 : 3 : 5 : yellow needles. M.p. 93·5°.

See previous references and also
Hiers, Hager, *Organic Syntheses*, Collective Vol. I, 51.
Voss, Blanke, *Ann.*, 1931, **485**, 279.

Methyl naphthyl Ketone.
See Acetonaphthone.
α-Methylnaphthylmethylamine.
See Naphthyl-ethylamine.
Methyl 1-naphthyl sulphide (1-*Thionaphthol methyl ether*)

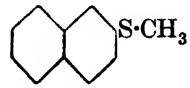


$C_{11}H_{10}S$ MW, 174

B.p. 166–8°/20 mm.

Taboury, *Bull. soc. chim.*, 1904, **31**, 1187.

Methyl 2-naphthyl sulphide (2-*Thionaphthol methyl ether*)

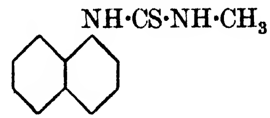


$C_{11}H_{10}S$ MW, 174

Plates from AcOH. M.p. 63–4°. Insol. H_2O. Volatile in steam.

Kehrmann, Sava, *Ber.*, 1912, **45**, 2898.

***sym*.-Methyl-1-naphthylthiourea**

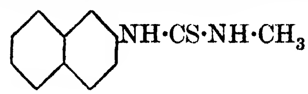


$C_{12}H_{12}N_2S$ MW, 216

Plates from EtOH. M.p. 191–2° (198°).

Suter, Moffett, *J. Am. Chem. Soc.*, 1933, **55**, 2498.
Dyson, Hunter, Morris, *J. Chem. Soc.*, 1932, 2283.

***sym*.-Methyl-2-naphthylthiourea**

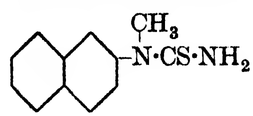


$C_{12}H_{12}N_2S$ MW, 216

Prisms from EtOH. M.p. 130°.

Hunter, Jones, *J. Chem. Soc.*, 1930, 946.

***unsym*.-Methyl-2-naphthylthiourea**

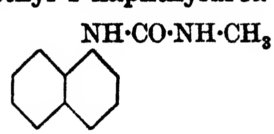


$C_{12}H_{12}N_2S$ MW, 216

Cryst. from AcOEt. M.p. 170°.

See previous reference.

***sym*.-Methyl-1-naphthylurea**



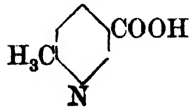
$C_{12}H_{12}ON_2$ MW, 200

Cryst. from ligroin. M.p. 196–7°.

French, Wirtel, *J. Am. Chem. Soc.*, 1926, **48**, 1737.

4-Methylnicotinic Acid.
See Homonicotinic Acid.

6-Methylnicotinic Acid (*6-Methylpyridine-3-carboxylic acid, α-picoline-5-carboxylic acid*)



$C_7H_7O_2N$ MW, 137

Cryst. from Me_2CO. M.p. 207–8°.
Me ester: $C_8H_9O_2N$. MW, 151. Cryst. M.p. 32°.
Et ester: $C_9H_{11}O_2N$. MW, 165. B.p. 222–4° decomp., about 130°/15 mm.
Amide: $C_7H_8ON_2$. MW, 136. Needles from H_2O. M.p. 194°.
Anilide: $C_{13}H_{12}ON_2$. MW, 212. Needles from EtOH.Aq. M.p. 134–7°.
Nitrile: $C_7H_6N_2$. MW, 118. Cryst. from pet. ether. M.p. 84–5°. B.p. 216–17°/750 mm. Sol. usual org. solvents. Volatile in steam. *B,HCl*: m.p. 210°. Sol. H_2O, EtOH.
Hydrazide: plates from EtOH. M.p. 133–5°. *Benzylidene deriv.*: needles from EtOH. M.p. 184–5°.
o-*Chlorobenzylidene deriv.*: needles from EtOH. M.p. 183–4°.

Graf, *J. prakt. Chem.*, 1932, **133**, 21.
Räth, Schiffmann, *Ann.*, 1931, **487**, 128.

Methylnitramine (*Nitraminomethane, N-nitromethylamine*)

$CH_3{\cdot}NH{\cdot}NO_2$

$CH_4O_2N_2$ MW, 76

Plates from Et_2O. M.p. 38°. Very sol. cold H_2O, EtOH, C_6H_6, $CHCl_3$. Less sol. Et_2O. Spar. sol. pet. ether. $D_4^{48.6}$ 1·2433. $n_D^{48.6}$ 1·46162. Reacts acid. $k = 7{\cdot}2 \times 10^{-7}$ at 25°.
K salt: needles. M.p. 220°. Explodes on heating.

Diels, Paquin, *Ber.*, 1913, **46**, 2013.

Methyl nitrate

$CH_3{\cdot}O{\cdot}NO_2$

CH_3O_3N MW, 77

B.p. 65°. D^5 1·2322, D^{15} 1·2167, D^{25} 1·2032. Vapour explodes on heating.

Delépine, *Bull. soc. chim.*, 1895, **13**, 1044.

Methyl nitrite

$CH_3{\cdot}O{\cdot}NO$

CH_3O_2N MW, 61

B.p. − 12°. D^{15} (liq.) 0·991.

Berteni, *Gazz. chim. ital.*, 1882, **12**, 438.

Methylnitrolic Acid (*Nitromethane oxime, nitroformaldoxime, nitro-oximino-methane, nitro-isonitroso-methane*)

$O_2N{\cdot}CH{:}N{\cdot}OH$

$CH_2O_3N_2$ MW, 90

Needles from Et_2O or Et_2O–pet. ether. M.p. 68° decomp. Sol. H_2O, EtOH, Et_2O. Alkalis ⟶ red sol. Decomp. on heating.

v. Meyer, Constam, *Ann.*, 1882, **214**, 334.
Wieland, *Ber.*, 1909, **42**, 808.

2-Methylnonane (*Isodecane*)

$CH_3{\cdot}[CH_2]_6{\cdot}CH(CH_3){\cdot}CH_3$

$C_{10}H_{22}$ MW, 142

B.p. 150–60°.

Wurtz, *Jahresber. Fortschr. Chem.*, 1855, 575.

3-Methylnonane

$CH_3{\cdot}[CH_2]_5{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CH_3$

$C_{10}H_{22}$ MW, 142

B.p. 165–166·5°/751 mm. D_4^{20} 0·7354. n_D^{20} 1·4126.

Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 356.

4-Methylnonane

$CH_3{\cdot}[CH_2]_4{\cdot}CH(CH_3){\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$

$C_{10}H_{22}$ MW, 142

l-.
B.p. 76°/30 mm. D_4^{27} 0·726. $[\alpha]_D^{27}$ − 2·21°.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 23.

5-Methylnonane

$CH_3{\cdot}[CH_2]_3{\cdot}CH(CH_3){\cdot}[CH_2]_3{\cdot}CH_3$

$C_{10}H_{22}$ MW, 142

B.p. 164–6°/755 mm. D_4^{20} 0·7319. n_D^{20} 1·4116.

Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 357.

Methylnonanol-1.
See Methylnonyl Alcohol.
2-Methylnonanol-3.
See Isopropyl-*n*-hexylcarbinol.
2-Methylnonanol-4.
See Isobutyl-*n*-amylcarbinol.
4-Methylnonanol-4.
See Methylpropylamylcarbinol.

5-Methylnonanol-5.
See Methyldibutylcarbinol.
2-Methylnonanone-3.
See Isopropyl *n*-hexyl Ketone.
2-Methylnonanone-4.
See Isobutyl *n*-amyl Ketone.
3-Methylnonanone-2 (unsym.-*Methylhexylacetone*, 2-*aceto-octane*)

$$CH_3\cdot[CH_2]_5\cdot\overset{CH_3}{CH}\cdot CO\cdot CH_3$$

$C_{10}H_{20}O$ MW, 156

B.p. 100–3°/26 mm.

Darzens, *Compt. rend.*, 1905, **141**, 767.

4-Methylnonanone-2 (2-*Acetonylheptane*)

$$CH_3\cdot[CH_2]_4\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CO\cdot CH_3$$

$C_{10}H_{20}O$ MW, 156

B.p. 196–8°.

Venable, *Ber.*, 1880, **13**, 1651.

4-Methylnonanone-3 (2-*Propionylheptane*)

$$CH_3\cdot[CH_2]_4\cdot\overset{CH_3}{CH}\cdot CO\cdot CH_2\cdot CH_3$$

$C_{10}H_{20}O$ MW, 156

B.p. 191–3°/728 mm.

Karrer *et al.*, *Helv. Chim. Acta*, 1930, **13**, 1298.

4-Methylnonanone-6 (2-*Methyl*-1-*butyrylpentane*, 1-*butyrylisohexane*)

$$CH_3\cdot[CH_2]_2\cdot CO\cdot CH_2\cdot\overset{CH_3}{CH}\cdot[CH_2]_2\cdot CH_3$$

$C_{10}H_{20}O$ MW, 156

B.p. 192–3°/715 mm.

See previous reference.

2-Methylnonene-2-dione-6 : 8.
See Acetylmethylheptenone.
4-Methyl-3-nonenone-6.
See under Homomesitones.
4-Methyl-4-nonenone-6.
See under Homomesitones.
Methylnonoic Acid.
See Methylpelargonic Acid.
Methylnonylacetylene (2-*Dodecine*)

$$CH_3\cdot[CH_2]_8\cdot C\vdots C\cdot CH_3$$

$C_{12}H_{22}$ MW, 166

F.p. − 9°. B.p. 105°/15 mm. D_4^0 0·8030, D_4^{15} 0·7917, $D_4^{32\cdot5}$ 0·7788.

Krafft, *Ber.*, 1884, **17**, 1372.
Krafft, Ruter, *Ber.*, 1892, **25**, 2250.

2-Methylnonyl Alcohol (2-*Methylnonanol*-1)

$$CH_3\cdot[CH_2]_6\cdot\overset{CH_3}{CH}\cdot CH_2OH$$

$C_{10}H_{22}O$ MW, 158

d-.
B.p. 80–2°/0·4 mm. $[\alpha]_D^{25}$ + 3·64°.
dl-.
B.p. 221–3°. D^0 0·8457, D^{15} 0·8333.

Guerbet, *Compt. rend.*, 1902, **135**, 174.
Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 571.

3-Methylnonyl Alcohol (3-*Methylnonanol*-1)

$$CH_3\cdot[CH_2]_5\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH_2OH$$

$C_{10}H_{22}O$ MW, 158

d-.
B.p. 122°/24 mm. D_4^{23} 0·837. n_D^{25} 1·4348. $[\alpha]_D^{23}$ + 0·43°.
dl-.
B.p. 111–16°/14 mm., 103–103·5°/9 mm. D_4^0 0·856, D_4^{20} 0·8342. n_D^{20} 1·4361.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.
Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 351.
Bouveault, Blanc, D.R.P., 164,294, (*Chem. Zentr.*, 1905, II, 1700).

4-Methylnonyl Alcohol (4-*Methylnonanol*-1)

$$CH_3\cdot[CH_2]_4\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH_2\cdot CH_2OH$$

$C_{10}H_{22}O$ MW, 158

l-.
B.p. 120°/17 mm. D_4^{27} 0·826. n_D^{25} 1·4364. $[\alpha]_D^{27}$ − 1·45°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 100.

5-Methylnonyl Alcohol (5-*Methylnonanol*-1)

$$CH_3\cdot[CH_2]_3\cdot\overset{CH_3}{CH}\cdot[CH_2]_2\cdot CH_2\cdot CH_2OH$$

$C_{10}H_{22}O$ MW, 158

B.p. 125°/25 mm. D_4^{24} 0·831.

Levene, Marker, *J. Biol. Chem.*, 1933, **103**, 299.

Methylnonylcarbinol (*Undecanol*-2)

$$CH_3\cdot[CH_2]_8\cdot CH(OH)\cdot CH_3$$

$C_{11}H_{24}O$ MW, 172

d-.
M.p. 12°. B.p. 128°/20 mm. D_4^{20} 0·8270.

n_D^{20} 1·4369. $[\alpha]_D^{18}$ + 8·18°, $[\alpha]_D^{20}$ + 10·29° in C_6H_6, + 8·11° in EtOH.

Acetyl: b.p. 84°/15 mm. D_4^{19} 0·8606, D_4^{55} 0·8309. n_D^{20} 1·4141. $[\alpha]_D^{20}$ + 6·84°.

Propionyl: b.p. 150°/24 mm. D_4^{20} 0·8574. n_D^{20} 1·4277. $[\alpha]_D^{20}$ + 5·15°.

Butyryl: b.p. 156°/20 mm. D_4^{17} 0·8585. n_D^{20} 1·4295. $[\alpha]_D^{20}$ + 7·31°.

Valeryl: b.p. 133°/6 mm. D_4^{16} 0·8577. n_D^{20} 1·4312. $[\alpha]_D^{20}$ + 7·46°.

Caproyl: b.p. 135°/4 mm. D_4^{20} 0·8570. n_D^{20} 1·4334. $[\alpha]_D^{20}$ + 7·37°.

Heptylyl: b.p. 143°/3 mm. D_4^{20} 0·8559. n_D^{20} 1·4350. $[\alpha]_D^{20}$ + 1·17°.

Pelargonyl: b.p. 168°/4 mm. D_4^{20} 0·8572. n_D^{20} 1·4389. $[\alpha]_D^{20}$ + 6·81°.

Lauryl: b.p. 199°/6 mm. D_4^{16} 0·8585. n_D^{20} 1·4440. $[\alpha]_D^{20}$ + 6·19°.

Myristyl: b.p. 200°/2 mm. D_4^{14} 0·8593. n_D^{20} 1·4453. $[\alpha]_D^{20}$ + 5·72°.

Benzoyl: b.p. 159°/3·5 mm. $D_4^{18·5}$ 0·9531. n_D^{20} 1·4899. $[\alpha]_D^{20}$ + 27·55°.

1-*Naphthoyl*: b.p. 205°/2·5 mm. D_4^{16} 1·0067. n_D^{20} 1·5405. $[\alpha]_D^{0}$ − 1·57°.

2-*Naphthoyl*: b.p. 206°/2·5 mm. D_4^{21} 0·9898. n_D^{20} 1·5376. $[\alpha]_D^{20}$ + 50·03°.

Acid phthalate: m.p. 31–2°. $[\alpha]_D$ + 37·3° in $CHCl_3$, + 44·3° in EtOH. *Brucine salt*: m.p. 113°. $[\alpha]_D$ − 5·2° in EtOH. *Strychnine salt*: m.p. 144–5°. $[\alpha]_D$ − 17·1° in $CHCl_3$.

l-.

B.p. 231–3°.

dl-.

B.p. 228–9°, 119°/12 mm. D^{18} 0·8263. Insol. H_2O.

Pickard, Kenyon, *J. Chem. Soc.*, 1914, **105**, 850.
Power, Lees, *J. Chem. Soc.*, 1902, **101**, 1593.

Methyl nonyl Ketone (*Undecanone*-2)

$CH_3·[CH_2]_8·CO·CH_3$

$C_{11}H_{22}O$ MW, 170

Found in palm kernel oil and soya bean oil. Oil. F.p. 15°. B.p. 228°, 105–6°/12 mm. $D_4^{17·3}$ 0·8295. $n_D^{17·3}$ 1·43002.

Oxime: prisms. M.p. 44–5°. Sol. EtOH, Et_2O, $CHCl_3$, pet. ether. Insol. H_2O.

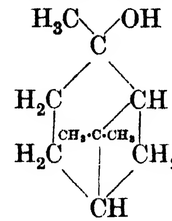
Semicarbazone: cryst. from EtOH. M.p. 122–3°.

p-*Nitrophenylhydrazone*: m.p. 90–1°.

2 : 4-*Dinitrophenylhydrazone*: orange-yellow cryst. M.p. 63°.

Le Gac, *Chem. Abstracts*, 1930, **24**, 3989.
Haller, Lassieur, *Compt. rend.*, 1910, **151**, 698.

Methylnopinol (*Pinenehydrate*)



$C_{10}H_{18}O$ MW, 154

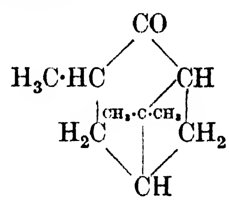
Exists in two stereoisomeric forms.

(i) Needles from MeOH.Aq. M.p. 58–9°. B.p. 240–5°. $[\alpha]_D^{18}$ − 4·99° in Et_2O. Very volatile.

(ii) Needles from 50% MeOH. M.p. **79°**. B.p. 204–5°/721 mm., 93–5°/13 mm. $[\alpha]_D$ − 24·39° in Et_2O. Very sol. org. solvents.

Lipp, *Ber.*, 1923, **56**, 2104.
Wallach, *Ann.*, 1907, **356**, 239.

Methylnopinone



$C_{10}H_{16}O$ MW, 152

B.p. 215–16°. Volatile in steam, EtOH, and Et_2O vapours.

Semicarbazone: cryst. from MeOH. M.p. 179–80°.

Kötz, Lemien, *J. prakt. Chem.*, 1914, **90**, 316.

Methyl octadecyl Ketone (*Eicosanone*-2)

$CH_3·[CH_2]_{17}·CO·CH_3$

$C_{20}H_{40}O$ MW, 296

Cryst. M.p. 58°. Mod. sol. EtOH, Et_2O, Me_2CO.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.

7-Methyloctadiene-2 : 4 (1-*Methyl*-4-*iso*-*butylbutadiene*-1 : 3)

$$CH_3·\overset{CH_3}{CH}·CH_2·CH{:}CH·CH{:}CH·CH_3$$

C_9H_{16} MW, 124

B.p. 149°. D^0 0·7653, D_4^{18} 0·7521. n_D^{18} 1·4543.

Reif, *Ber.*, 1908, **41**, 2745.

4-Methyloctadiene-3 : 5 (2-*Methyl*-1 : 4-*diethylbutadiene*-1 : 3)

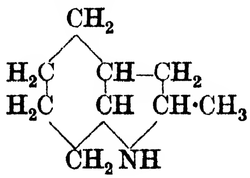
$CH_3 \cdot CH_2 \cdot CH{:}CH \cdot C(CH_3){:}CH \cdot CH_2 \cdot CH_3$

C_9H_{16} MW, 124

B.p. 148–51°. D_4^{25} 0·7640. n_D^{25} 1·46285.

Bjelouss, *Ber.*, 1912, **45**, 626.

2-Methyloctahydroindole



$C_9H_{17}N$ MW, 139

B.p. 187·5–188°. D_4^{25} 0·9103. n_D^{25} 1·4732.

B,HBr : needles from Me_2CO–Et_2O. M.p. 148–9°.

B,HAuCl₄ : m.p. 118°.

N-*Benzenesulphonyl* : m.p. 125°.

Picrate : m.p. 178–9° decomp.

Methiodide : m.p. 223–4° decomp.

Fujise, *Chem. Abstracts*, 1929, **23**, 144.

3-Methyloctane

$CH_3 \cdot [CH_2]_3 \cdot CH_2 \cdot CH(CH_3) \cdot CH_2 \cdot CH_3$

C_9H_{20} MW, 128

d-.

B.p. 142·4–143·4°. D^{17} 0·7206. $[\alpha]_D^{17}$ + 9·38°.

l-.

B.p. 143°. D_4^{27} 0·714. n_D^{25} 1·4052. $[\alpha]_D^{27}$ − 8·5°.

Chardin, Sikorsky, *Chem. Zentr.*, 1908, I, 2143.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 102.

4-Methyloctane

$CH_3 \cdot [CH_2]_3 \cdot CH(CH_3) \cdot CH_2 \cdot CH_2 \cdot CH_3$

C_9H_{20} MW, 128

l-.

B.p. 141°. D_4^{19} 0·717. $[\alpha]_D^{19}$ − 1·06°.

dl-.

B.p. 141·7–141·9°/771 mm. D_{15}^{15} 0·7320. n_D^{25} 1·4027.

See last reference above and also

Clarke, *J. Am. Chem. Soc.*, 1912, **34**, 683.

Methyloctanol-1.
See Methyl-*n*-octyl Alcohol.

Methyloctanol-2.
See Methyl-*sec.*-*n*-octyl Alcohol.

2-Methyloctanol-3.
See Isopropyl-*n*-amylcarbinol.

2-Methyloctanol-5.
See Propylisoamylcarbinol.

3-Methyloctanol-3.
See Methylethyl-*n*-amylcarbinol.

4-Methyloctanol-3

$CH_3 \cdot [CH_2]_3 \cdot CH(CH_3) \cdot CH(OH) \cdot CH_2 \cdot CH_3$

$C_9H_{20}O$ MW, 144

B.p. 132–3°/20 mm. D_{25}^{25} 0·8462. $n_D^{21.5}$ 1·4278.

Green, *J. Am. Chem. Soc.*, 1934, **56**, 1167.

4-Methyloctanol-4.
See Methylpropylbutylcarbinol.

4-Methyloctanol-5

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CH(OH) \cdot CH(CH_3) \cdot CH_2 \cdot CH_2 \cdot CH_3$

$C_9H_{20}O$ MW, 144

B.p. 74–6°/9 mm. D_4^{25} 0·8156. n_D^{25} 1·42616.

Bjelouss, *Ber.*, 1912, **45**, 628.

2-Methyloctanone-3.
See Isopropyl *n*-amyl Ketone.

2-Methyloctanone-5.
See Propyl isoamyl Ketone.

2-Methyloctanone-6 (*Ethyl isohexyl ketone*)

$CH_3 \cdot CH_2 \cdot CO \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH(CH_3) \cdot CH_3$

$C_9H_{18}O$ MW, 142

B.p. 180–5°. D^{20} 0·8353. n_D 1·47477.

Semicarbazone : m.p. 187–8°.

Thoms, Kahre, *Arch. Pharm.*, 1925, **263**, 241.

3-Methyloctanone-2 (2-*Acetoheptane*)

$CH_3 \cdot [CH_2]_4 \cdot CH(CH_3) \cdot CO \cdot CH_3$

$C_9H_{18}O$ MW, 142

B.p. 64–5°/18 mm. D_4^{27} 0·832. n_D^{27} 1·424.

Powell, Murray, Baldwin, *J. Am. Chem. Soc.*, 1933, **55**, 1153.

3-Methyloctanone-4 (sec.-n-*Butyl* n-*amyl ketone*)

$CH_3 \cdot [CH_2]_4 \cdot CO \cdot CH(CH_3) \cdot CH_2 \cdot CH_3$

$C_9H_{18}O$ MW, 142

B.p. 174°. D^{14} 0·829. n_D^{14} 1·4200.

Semicarbazone : m.p. 88–90°.

Vavon, Ivanoff, *Compt. rend.*, 1923, **177**, 453.

4-Methyloctanone-2 (2-*Acetonylhexane*)

$CH_3\cdot[CH_2]_3\cdot CH(CH_3)\cdot CH_2\cdot CO\cdot CH_3$

$C_9H_{18}O$ MW, 142

B.p. 184°/769 mm. D_{15}^{15} 0·8319.
Semicarbazone: needles from pet. ether. M.p. 75°.

Lees, *J. Chem. Soc.*, 1902, **81**, 1595.

2-Methyl-1-octene (2-*Hexylpropylene*)

$CH_3\cdot[CH_2]_5\cdot C(CH_3){:}CH_2$

C_9H_{18} MW, 126

Oil. B.p. 141·5–143°.

Freund, Schönfeld, *Ber.*, 1891, **24**, 3359.

3-Methyl-2-octene (2-n-*Amyl-2-butylene*)

$CH_3\cdot[CH_2]_4\cdot C(CH_3){:}CH\cdot CH_3$

C_9H_{18} MW, 126

B.p. 143–5°/734 mm. D_4^{25} 0·7409. n_D^{20} 1·4247.

Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, **55**, 409.

4-Methyl-1-octenol-4 (*Methylbutylallylcarbinol*)

$CH_3\cdot CH_2\cdot CH_2\cdot CH_2\cdot C(CH_3)(OH)\cdot CH_2\cdot CH{:}CH_2$

$C_9H_{18}O$ MW, 142

B.p. 176–8°/744·7 mm. D_0^{20} 0·84412, D_{20}^{20} 0·84497. n_a 1·43990. Heat of comb. C_p 1378·7 Cal.

Taliew, *Chem. Zentr.*, 1901, I, 997.

6-Methyl-2-octenol-8 (3-*Methyl*-6-*octenol*-1, *norcitronellol*)

$HO\cdot CH_2\cdot CH_2\cdot CH(CH_3)\cdot[CH_2]_2\cdot CH{:}CH\cdot CH_3$

$C_9H_{18}O$ MW, 142

B.p. 109–11°/20 mm. D_4^{20} 0·8674. n_D^{20} 1·4560.

v. Braun, Gossel, *Ber.*, 1924, **57**, 380.

7-Methyl-2-octenol-4 (*Isoamylpropenylcarbinol*)

$CH_3\cdot CH(CH_3)\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot CH{:}CH\cdot CH_3$

$C_9H_{18}O$ MW, 142

B.p. 85°/12 mm. $D_4^{14·5}$ 0·8402. $n_D^{14·5}$ 1·44448.

Auwers, Westermann, *Ber.*, 1921, **54**, 2996.

4-Methyl-3-octenol-5

$CH_3\cdot CH_2\cdot CH_2\cdot CH(OH)\cdot C(CH_3){:}CH\cdot CH_2\cdot CH_3$

$C_9H_{18}O$ MW, 142

B.p. 89°/16 mm., 79–81°/10 mm. $D_4^{19·5}$ 0·8495, D_4^{25} 0·8468. $n_D^{19·5}$ 1·44838, n_D^{25} 1·44456.
Acetyl: b.p. 87–9°/14 mm.

See previous reference and also Bjelouss, *Ber.*, 1912, **45**, 625.

7-Methyl-1-octenone-5 (*Isobutyl γ-butenyl ketone, isopropylallylacetone*)

$CH_3\cdot CH(CH_3)\cdot CH_2\cdot CO\cdot CH_2\cdot CH_2\cdot CH{:}CH_2$

$C_9H_{16}O$ MW, 140

B.p. 62–3°/14 mm. D_4^{12} 0·8361. $n_D^{12·5}$ 1·4288.
Semicarbazone: needles. M.p. 101–2°.

Helferich, Keiner, *Ber.*, 1924, **57**, 1619.

2-Methyl-3-octenone-5 (*Ethylisobutylideneacetone, 4-butyrylisopentene*)

$CH_3\cdot CH_2\cdot CH_2\cdot CO\cdot CH{:}CH\cdot CH(CH_3)\cdot CH_3$

$C_9H_{16}O$ MW, 140

B.p. 68–78°/24 mm. D^{12} 0·9011. n_D 1·47477.
Semicarbazone: m.p. 187–8°.

Thoms, Kahre, *Arch. Pharm.*, 1925, **263**, 241.

2-Methyl-3-octenone-6 (1-*Propionyl-2-isohexene*)

$CH_3\cdot CH_2\cdot CO\cdot CH_2\cdot CH{:}CH\cdot CH(CH_3)\cdot CH_3$

$C_9H_{16}O$ MW, 140

B.p. 73–7°/19 mm. D^{19} 0·8628. n_D 1·44533.
Semicarbazone: m.p. 131–2°.

See previous reference.

Methyl 1-octenyl Ketone

$CH_3\cdot[CH_2]_5\cdot CH{:}CH\cdot CO\cdot CH_3$

$C_{10}H_{18}O$ MW, 154

B.p. 101·5–102·5°/15·3 mm.
Semicarbazone: cryst. + H_2O from EtOH.Aq. M.p. 110–11°.

Murakami, *Chem. Abstracts*, 1930, **24**, 2426.

Methyloctylacetylene (2-*Undecine*)

$CH_3\cdot[CH_2]_7\cdot C{:}C\cdot CH_3$

$C_{11}H_{20}$ MW, 152

B.p. 199–201°, 81·5°/10·5 mm. $KMnO_4 \longrightarrow$ acetic and pelargonic acids.

Thoms, Mannich, *Ber.*, 1903, **36**, 2546.

2-Methyl-n-octyl Alcohol (2-*Methyl-octanol*-1)

$CH_3\cdot[CH_2]_5\cdot CH(CH_3)\cdot CH_2OH$

$C_9H_{20}O$ MW, 144

B.p. 98–9°/16 mm. D_4^0 0·8418.

Bouveault, Blanc, *Bull. soc. chim.*, 1904, **31**, 748.

3-Methyl-n-octyl Alcohol (3-*Methyl-octanol*-1)

$CH_3\cdot[CH_2]_4\cdot CH(CH_3)\cdot CH_2\cdot CH_2OH$

$C_9H_{20}O$ MW, 144

l-.

B.p. 110°/25 mm. D_4^{24} 0·827. n_D^{25} 1·4328. $[\alpha]_D^{24}$ − 3·74°.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.

4-Methyl-n-octyl Alcohol (4-*Methyl-octanol*-1)

$CH_3\cdot[CH_2]_3\cdot CH(CH_3)\cdot CH_2\cdot CH_2\cdot CH_2OH$

$C_9H_{20}O$ MW, 144

l-.

B.p. 106°/17 mm. $D_4^{27.5}$ 0·820. n_D^{25} 1·4335. $[\alpha]_D^{27.5}$ − 0·45°.

See previous reference.

5-Methyl-n-octyl Alcohol (5-*Methyl-octanol*-1)

$CH_3\cdot CH_2\cdot CH_2\cdot CH(CH_3)\cdot[CH_2]_3\cdot CH_2OH$

$C_9H_{20}O$ MW, 144

l-.

B.p. 110°/25 mm. D_4^{24} 0·828.

Levene, Marker, *J. Biol. Chem.*, 1933, **103**, 299.

6-Methyl-n-octyl Alcohol (6-*Methyl-octanol*-1)

$CH_3\cdot CH_2\cdot CH(CH_3)\cdot[CH_2]_4\cdot CH_2OH$

$C_9H_{20}O$ MW, 144

d-.

B.p. 100°/20 mm. D_4^{24} 0·828.

See previous reference.

7-Methyl-n-octyl Alcohol (7-*Methyl-octanol*-1)

$CH_3\cdot CH(CH_3)\cdot[CH_2]_5\cdot CH_2OH$

$C_9H_{20}O$ MW, 144

B.p. 206°/761 mm. D^{25} 0·8260.

Phenylurethane: m.p. 66·4°.

Levene, Allen, *J. Biol. Chem.*, 916, **27**, 448.

2-Methyl-sec.-n-octyl Alcohol (2-*Methyl-octanol*-2, *dimethylhexylcarbinol*)

$CH_3\cdot[CH_2]_5\cdot C(CH_3)(OH)\cdot CH_3$

$C_9H_{20}O$ MW, 144

B.p. 79–80°/12 mm. D^{19} 0·823. n_D^{19} 1·4299.

Kirrmann, *Compt. rend.*, 1927, **184**, 1463.

3-Methyl-sec.-n-octyl Alcohol (3-*Methyl-octanol*-2)

$CH_3\cdot[CH_2]_4\cdot CH(CH_3)\cdot CH(OH)\cdot CH_3$

$C_9H_{20}O$ MW, 144

B.p. 75°/15 mm. D_4^{27} 0·831. n_D^{27} 1·437.

Powell, Murray, Baldwin, *J. Am. Chem. Soc.*, 1933, **55**, 1153.

Methyloctylcarbinol (*Decanol*-2, sec.-n-*decyl alcohol*)

$CH_3\cdot[CH_2]_7\cdot CH(OH)\cdot CH_3$

$C_{10}H_{12}O$ MW, 148

d-.

B.p. 210°, 110–11°/11 mm. D_4^{20} 0·8250. n_D^{20} 1·4344. $[\alpha]_D^{17}$ + 8·74°, $[\alpha]_D^{20}$ + 11·46° in C_6H_6, + 8·89° in EtOH.

Acetyl: b.p. 115°/15 mm. D_4^{20} 0·8597. n_D^{20} 1·4223. $[\alpha]_D^{20}$ + 5·64°.

Lauryl: b.p. 190°/4 mm. D_4^{15} 0·8598. n_D^{20} 1·4426. $[\alpha]_D^{20}$ + 6·41°.

1-*Naphthoyl*: b.p. 195°/2·5 mm. D_4^{16} 1·0067. n_D^{20} 1·5405. $[\alpha]_D^0$ − 1·57°.

Acid phthalate: m.p. 38–9°. $[\alpha]_D$ + 39·0° in $CHCl_3$, + 45·2° in EtOH. *Brucine salt*: m.p. 136–8°. $[\alpha]_D$ − 6·0° in EtOH. *Strychnine salt*: m.p. 136–7°. $[\alpha]_D$ − 18·4° in $CHCl_3$.

dl-.

B.p. 210–11°.

1-*Naphthylurethane*: cryst. from EtOH. M.p. 69°.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 55; 1914, **105**, 852.

Methyl octyl Ether

$CH_3\cdot[CH_2]_7\cdot O\cdot CH_3$

$C_9H_{20}O$ MW, 144

B.p. 158°, 75°/20 mm. D_0^5 0·802.

Bouveault, Blanc, *Bull. soc. chim.*, 1904, **31**, 673.

Cerchez, *Bull. soc. chim.*, 1928, **43**, 762.

Methyl octyl Ketone (*Decanone*-2, 2-*keto-decane*)

$CH_3\cdot[CH_2]_7\cdot CO\cdot CH_3$

$C_{10}H_{20}O$ MW, 156

Found in oil of rue. Needles. M.p. 14° (2·5°). B.p. 209°/750 mm., 95–7°/12 mm. D_4^{22} 0·8230. n_D^{22} 1·4263.

Semicarbazone: plates from EtOH. M.p. 126° (121°).

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.
Ruzicka, Brugger, *Helv. Chim. Acta*, 1926, **9**, 397.
Murakami, *Chem. Abstracts*, 1930, **24**, 2426.
Rupe, Willi, *Helv. Chim. Acta*, 1932, **15**, 845.

Methylolacetamide.
See *N*-Hydroxymethylacetamide.

Methylolurea (*Hydroxymethylurea*)

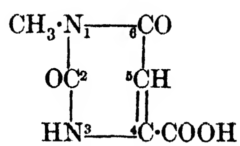
$NH_2\cdot CO\cdot NH\cdot CH_2OH$

$C_2H_6O_2N_2$ MW, 90

Prisms from EtOH. M.p. 111°. Very sol. cold H_2O. Sol. MeOH. Insol. Et_2O.

Einhorn, Hamburger, *Ber.*, 1908, **41**, 27.
Dixon, *J. Chem. Soc.*, 1918, **113**, 246.

1-Methylorotic Acid (1-*Methyluracil*-4-*carboxylic acid*)



$C_6H_6O_4N_2$ MW, 170

Cryst. M.p. 310°.

Me ester: $C_7H_8O_4N_2$. MW, 184. Prisms from H_2O. M.p. 140–1°.

Et ester: $C_8H_{10}O_4N_2$. MW, 198. Prisms from H_2O. M.p. 139·5°. Sol. H_2O, EtOH, AcOH. Spar. sol. C_6H_6.

Bachstez, *Ber.*, 1931, **64**, 2687.

3-Methylorotic Acid (3-*Methyluracil*-4-*carboxylic acid*).
Cryst. M.p. 250°.

See previous reference.

Methyloxalacetic Acid.
See 1-Oxalopropionic Acid.

***N*-Methyloxamethane.**
See under Methyloxamic Acid.

Methyloxamic Acid (*Oxalic methylamide*)

$CO\cdot NH\cdot CH_3$
$COOH$

$C_3H_5O_3N$ MW, 103

Cryst. from H_2O or EtOH. M.p. 145–6°. Sublimes. Volatile in steam.

Me ester: $C_4H_7O_3N$. MW, 117. Prisms from MeOH. M.p. 85°. Sol. H_2O, MeOH. Spar. sol. Et_2O.

Et ester: *N*-methyloxamethane. $C_5H_9O_3N$. MW, 131. Plates. M.p. 24°. B.p. 242–3°. Sol. H_2O, EtOH, Et_2O.

Amide: *N*-methyloxamide. $C_3H_6O_2N_2$. MW, 102. Needles from EtOH.Aq. M.p. 231–2°. Spar. sol. hot H_2O, EtOH, Et_2O. Sublimes.

Hantzsch, *Ber.*, 1884, **17**, 2919.
Whiteley, *J. Chem. Soc.*, 1903, **83**, 19.
Tierie, *Rec. trav. chim.*, 1933, **52**, 357.

***N*-Methyloxamide.**
See under Methyloxamic Acid.

***N*-Methyloxanilic Acid** (*Methylphenyloxamic acid, oxalomethylaniline*)

CH_3
$C_6H_5\cdot N\cdot CO\cdot COOH$

$C_9H_9O_3N$ MW, 179

Prisms + H_2O from H_2O. M.p. 82–83·5°, anhyd. 120° decomp.

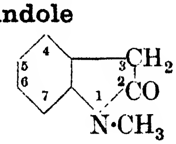
Me ester: $C_{10}H_{11}O_3N$. MW, 193. Yellow liq. B.p. 170–5°/13 mm. Insol. pet. ether.

Chloride: $C_9H_8O_2NCl$. MW, 197·5. Cryst. M.p. 30°.

Anilide: cryst. from EtOH. M.p. 106°.

Guareschi, *Ber.*, 1893, **26**, *Ref.*, 93.
Lander, *J. Chem. Soc.*, 1904, **85**, 988.

1-Methyloxindole



C_9H_9ON MW, 147

Needles from H_2O or ligroin. M.p. 89°. Sol. H_2O, EtOH, Et_2O, Me_2CO, C_6H_6.

Colman, *Ann.*, 1888, **248**, 120.
Hinsberg, Rosenzweig, *Ber.*, 1894, **27**, 3257.
Stollé, D.R.P., 335,763, (*Chem. Zentr.*, 1921, II, 1065).

3-Methyloxindole.
See Atroxindole.

5-Methyloxindole.
Needles from C_6H_6. M.p. 168°.

Stollé *et al.*, *J. prakt. Chem.*, 1930, **128**, 1.

7-Methyloxindole.

Needles from C_6H_6. M.p. about 200°. Sol. EtOH. Mod. sol. hot H_2O, Et_2O, C_6H_6.

See previous reference.

1-Methylpalmitic Acid

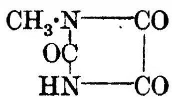
$$CH_3\cdot[CH_2]_{13}\cdot\overset{CH_3}{CH}\cdot COOH$$

$C_{17}H_{34}O_2$ MW, 270

M.p. 54° (45·5–47·5°). B.p. 174–7°/1–2 mm.

Greer, Adams, *J. Am. Chem. Soc.*, 1930, **52**, 2542.

Methylparabanic Acid (*Oxalylmethylurea*)



$C_4H_4O_3N_2$ MW, 128

Plates from H_2O. M.p. 153–4°. Very sol. EtOH, MeOH. Sol. H_2O, AcOEt. Spar. sol. Et_2O, $CHCl_3$, C_6H_6. Insol. pet. ether.

N-Acetyl: cryst. from AcOH. M.p. 183–5°.

Biltz, Topp, *Ber.*, 1913, **46**, 1393.

1-Methylpelargonic Acid (*1-Methylnonoic acid*)

$$CH_3\cdot[CH_2]_6\cdot\overset{CH_3}{CH}\cdot COOH$$

$C_{10}H_{20}O_2$ MW, 172

d-.

B.p. 145–7°/4 mm. $[\alpha]_D^{25}$ + 8·34°.

Chloride: $C_{10}H_{19}OCl$. MW, 190·5. B.p. 73–4°/1 mm. $[\alpha]_D^{25}$ + 4·89°.

Amide: $C_{10}H_{21}ON$. MW, 171. Cryst. from 50% EtOH. M.p. 78°. $[\alpha]_D^{25}$ +7·07° in 95% EtOH.

Nitrile: $C_{10}H_{19}N$. MW, 153. B.p. 85–94°/7 mm. $[\alpha]_D^{25}$ + 13·61°.

l-.

B.p. 115°/1 mm. D_4^{23} 0·895. $[\alpha]_D^{25}$ — 8·72° in Et_2O. n_D^{25} 1·4312.

Et ester: $C_{12}H_{24}O_2$. MW, 200. $[\alpha]_D^{25}$ — 8·60°.

dl-.

B.p. 261–5°. D^0 0·9127.

Amide: needles from EtOH. M.p. 76°.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 571.

Levene, Marker, *J. Biol. Chem.*, 1932, **98**, 1.

Guerbet, *Compt. rend.*, 1902, **135**, 174.

2-Methylpelargonic Acid (*2-Methylnonoic acid*)

$$CH_3\cdot[CH_2]_5\cdot\overset{CH_3}{CH}\cdot CH_2\cdot COOH$$

$C_{10}H_{20}O_2$ MW, 172

d-.

B.p. 133°/8 mm. D_4^{26} 0·899. n_D^{25} 1·4339. $[\alpha]_D^{20}$ + 0·78°.

Et ester: $C_{12}H_{24}O_2$. MW, 200. B.p. 135°/36 mm. D_4^{25} 0·862. n_D^{25} 1·4232

dl-.

B.p. 147–8°/12 mm. D_4^{20} 0·9012. n_D^{20} 1·4342.

Et ester: b.p. 115°/13 mm. D_4^{20} 0·8653. n_D^{2} 1·4240.

Levene, Taylor, *J. Biol. Chem.*, 1922, **54**, 351.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77.

3-Methylpelargonic Acid (*3-Methylnonoic acid*)

$$CH_3\cdot[CH_2]_4\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH_2\cdot COOH$$

$C_{10}H_{20}O_2$ MW, 172

l-.

B.p. 156°/22 mm. D_4^{25} 0·871. $[\alpha]_D^{25}$ — 0·59°.

Et ester: $C_{12}H_{24}O_2$. MW, 200. B.p. 120°/22 mm. D_4^{25} 0·862. $[\alpha]_D^{25}$ — 0·12°.

Levene, Marker, *J. Biol. Chem.*, 1932, **95**, 153.

4-Methylpelargonic Acid (*4-Methylnonoic acid*)

$$CH_3\cdot[CH_2]_3\cdot\overset{CH_3}{CH}\cdot[CH_2]_3\cdot COOH$$

$C_{10}H_{20}O_2$ MW, 172

l-.

B.p. 149°/22 mm. D_4^{25} 0·871. $[\alpha]_D^{25}$ — 1·33°.

Et ester: $C_{12}H_{24}O_2$. MW, 200. B.p. 125°/25 mm. D_4^{24} 0·862. $[M]_D^{24}$ — 2·84°.

Levene, Marker, *J. Biol. Chem.*, 1933, **103**, 304.

7-Methylpelargonic Acid (*7-Methylnonoic acid, isocapric acid*)

$$CH_3\cdot\overset{CH_3}{CH}\cdot[CH_2]_6\cdot COOH$$

$C_{10}H_{20}O_2$ MW, 172

B.p. 155·6°. Solid at room temp.

Levene, Allen, *J. Biol. Chem.*, 1916, **27**, 462.

6-Methylpentadecanol-6 (*Methylamylnonylcarbinol*)

$$CH_3\cdot[CH_2]_7\cdot CH_2\cdot\overset{CH_3}{C}(OH)\cdot[CH_2]_4\cdot CH_3$$

$C_{16}H_{34}O$ MW, 242

B.p. 199–200°/50 mm. D_4^{25} 0·8316. n_D^{25} 1·4446.

Davies, Dixon, Jones, *J. Chem. Soc.*, 1930, 470.

7-Methylpentadecanol-9 (*Hexyl-2-methyl-octyl-carbinol*)

$$CH_3{\cdot}[CH_2]_5{\cdot}CH(OH){\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}[CH_2]_5{\cdot}CH_3$$

$C_{16}H_{34}O$ MW, 242

B.p. 180°/18 mm. D^{15} 0·8351.

Guerbet, *Bull. soc. chim.*, 1912, **11**, 282.

7-Methylpentadecanone-9 (*Hexyl 2-methyl-octyl ketone, 2-methyl-1-heptylyloctane*)

$$CH_3{\cdot}[CH_2]_5{\cdot}CO{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}[CH_2]_5{\cdot}CH_3$$

$C_{16}H_{32}O$ MW, 240

B.p. 172–4°/21 mm. D_0^0 0·846.
Semicarbazone: cryst. M.p. 195–7°.

Guerbet, *Bull. soc. chim.*, 1910, **7**, 633.

Methylpentadecylcarbinol.
See Heptadecanol-2.

14-Methylpentadecylic Acid.
See Isopalmitic Acid.

Methylpentadecyl Ketone (*Heptadecanone-2*)

$$CH_3{\cdot}[CH_2]_{14}{\cdot}CO{\cdot}CH_3$$

$C_{17}H_{34}O$ MW, 254

Cryst. M.p. 48°. B.p. 319–20°, 246°/110 mm. D_{48}^{48} 0·8140. Very sol. $CHCl_3$, Et_2O, C_6H_6. Sol. Me_2CO, pet. ether. Spar. sol. EtOH.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 109T.

4-Methyl-1 : 2-pentadiene (*Isopropylallene, isobutylidene-ethylene*)

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}CH{:}C{:}CH_2$$

C_6H_{10} MW, 82

B.p. 70°. D_4^{22} 0·7061. n_D^{22} 1·4232.

Bouis, *Ann. chim.*, 1928, **9**, 432.

2-Methyl-1 ; 3-pentadiene (*1 : 3-Dimethyl-1 : 3-butadiene, 2-propenylpropylene*)

$$CH_3{\cdot}CH{:}CH{\cdot}\overset{CH_3}{C}{:}CH_2$$

C_6H_{10} MW, 82

B.p. 75·9–76°/765 mm. D_4^{25} 0·7141. n_D^{25} 1·4466.

Farmer, Warren, *J. Chem. Soc.*, 1931, 3225.

3-Methyl-1 : 3-pentadiene (*1 : 2-Dimethyl-1 : 3-butadiene, 3-propylidene-1-butylene, 2-vinyl-2-butylene*)

$$CH_3{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH{:}CH_2$$

C_6H_{10} MW, 82

B.p. 78–78·3°. D_4^{25} 0·7250. n_D^{25} 1·4494.

Farmer, Warren, *J. Chem. Soc.*, 1931, 3225.

4-Methyl-1 : 3-pentadiene (*1-Vinylisobutylene, 1 : 1-dimethyl-1 : 3-butadiene, 3-isopropylidenepropylene*)

$$CH_3{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH{:}CH_2$$

C_6H_{10} MW, 82

B.p. 76·4–76·9°/758·4 mm. D_4^{20} 0·7183. n_D^{20} 1·4525.

See previous reference.

Methyl - 1 : 3 - pentadiene - 1 - carboxylic Acid.
See Methylsorbic Acid.

Methyl 1 : 3-pentadienyl Ketone.
See 2 : 4-Heptadienone-6.

Methylpentamethylene-arsine.
See 1-Methylarsepidine.

Methyl-pentamethylene-glutaric Acid.
See Methylcyclohexane-diacetic Acid.

1-Methylpentamethylene Glycol.
See Hexandiol-1 : 5.

2-Methylpentandione-3 : 4.
See Acetylisobutyryl.

3-Methylpentandione-2 : 4.
See Methylacetylacetone.

2-Methylpentane.
See Isohexane.

3 - Methylpentane (*Methyldiethylmethane, 1 : 1-diethylethane*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH_3$$

C_6H_{14} MW, 86

B.p. 63·2°. D_0^0 0·6820, D_{15}^{15} 0·6687. n_D^{15} 1·37929.

Risseghem, *Bull. soc. chim. Belg.*, 1921, **30**, 14.

Methylpentane-1 : 5-dicarboxylic Acid.
See Methylpimelic Acid.

2-Methylpentane-1 : 3-dicarboxylic Acid.
See 2-Methyl-3-ethylglutaric Acid.

2-Methylpentane-3 : 5-dicarboxylic Acid.
See 1-Isopropylglutaric Acid.

2-Methylpentane-4 : 4-dicarboxylic Acid.
See Methylisobutylmalonic Acid.

2-Methylpentane-5 : 5-dicarboxylic Acid.
See Isoamylmalonic Acid.

1-Methylpentanol-1.
See Methyl-*n*-butylcarbinol.

2-Methylpentanol-1.
See 2-Methyl-*n*-amyl Alcohol.

2-Methylpentanol-2.
See Dimethylpropylcarbinol.

2-Methylpentanol-3.
See Ethylisopropylcarbinol.

2-Methylpentanol-4.
See Methylisobutylcarbinol.

3-Methylpentanol-1.
See 3-Methyl-*n*-amyl Alcohol.

3-Methylpentanol-2.
See Methyl-*sec.*-*n*-butylcarbinol.

3-Methylpentanol-3.
See Methyldiethylcarbinol.

4-Methylpentanol-1.
See Isohexyl Alcohol.

2-Methyl-2-pentanolone-4.
See Diacetone Alcohol.

2-Methylpentanone-3.
See Ethyl isopropyl Ketone.

2-Methylpentanone-4.
See Methyl isobutyl Ketone.

3-Methylpentanone-2.
See Methyl *sec.*-*n*-butyl Ketone.

1-Methyl-1-pentenal.
See 1-Methyl-2-ethylacrolein.

2-Methyl-1-pentene (1-*Methyl*-1-*propylethylene*, 2-*propylpropylene*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH_2$$

C_6H_{12} MW, 84

B.p. 61·5–62°. D_4^{20} 0·6817. n_D^{20} 1·3921.

Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, **54**, 754.

3-Methyl-1-pentene (sec.-n-*Butylethylene*, 3-*ethyl*-1-*butylene*, 2-*vinylbutane*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH{:}CH_2$$

B.p. 53·6–54°. D_4^{20} 0·6700. n_D^{20} 1·3835.

See previous reference.

4-Methyl-1-pentene (*Isobutylethylene*, *isohexene*-1, 3-*isopropylpropylene*)

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}CH{:}CH_2$$

C_6H_{12} MW, 84

B.p. 53·6–53·9°. D_4^{20} 0·6646. n_D^{20} 1·3825.

See previous reference.

2-Methyl-2-pentene (1 : 1-*Dimethyl*-2-*ethylethylene*, 1-*isopropylidenepropane*, 2-*propylidenepropane*, *isohexene*-3)

$$CH_3{\cdot}CH_2{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_3$$

C_6H_{12} MW, 84

B.p. 67·2–67·5°. D_4^{20} 0·6904. n_D^{20} 1·4005.

Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, **54**, 754.

3-Methyl-2-pentene (1 : 2-*Dimethyl*-1-*ethylethylene*, 2-*ethylidenebutane*, 2-*ethyl*-2-*butylene*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_3$$

C_6H_{12} MW, 84

B.p. 67·6–68·2°. D_4^{20} 0·6956. n_D^{20} 1·4002.

See previous reference.

4-Methyl-2-pentene (1-*Methyl*-2-*isopropylethylene*, 1-*ethylideneisobutane*, 1-*isopropylpropylene*, *isohexene*-2)

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}CH{:}CH{\cdot}CH_3$$

C_6H_{12} MW, 84

B.p. 57·7–58·5°. D_4^{20} 0·6709. n_D^{20} 1·38885.

See previous reference.

2-Methyl-1-pentene-1 : 3-dicarboxylic Acid.
See 2-Methyl-3-ethylglutaconic Acid.

2-Methyl-1-pentenic Acid.
See 2-Methyl-2-ethylacrylic Acid.

3-Methyl-1-pentenol-3 (*Methylethylvinylcarbinol*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{C}(OH){\cdot}CH{:}CH_2$$

$C_6H_{12}O$ MW, 100

B.p. 114–16°.

Bayer, D.R.P., 288,271, (*Chem. Zentr.*, 1915, II, 1223).

4-Methyl-1-pentenol-4.
See Dimethylallylcarbinol.

2-Methyl-2-pentenol-1 (2-*Propylidenepropyl alcohol*)

$$CH_3{\cdot}CH_2{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_2OH$$

$C_6H_{12}O$ MW, 100

B.p. 166–9°.

Skita, *Ber.*, 1915, **48**, 1491.

2-Methyl-2-pentenol-4 (*Isopropylideneisopropyl alcohol*)

$$CH_3{\cdot}CH(OH){\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_3$$

$C_6H_{12}O$ MW, 100

B.p. 130°, 65°/38 mm.
Et ether: $C_8H_{16}O$. MW, 128. B.p. 124–6°. D_0^0 0·8084.

Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 994.
Ipatjew, *J. prakt. Chem.*, 1899, **59**, 536.

2-Methyl-2-pentenol-5 (*3-Isopropylidene-propyl alcohol*)

$$HO{\cdot}CH_2{\cdot}CH_2{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH_3$$

$C_6H_{12}O$ MW, 100

B.p. 157–8°/771 mm. D_{20}^{20} 0·8615. n_D 1·44416.
Et ether: $C_8H_{16}O$. MW, 128. B.p. 142·5°/766 mm. D_0^{20} 0·7975. n_D^{20} 1·4182.

Van Aevde, *Rec. trav. chim.*, 1909, **28**, 172.
Kishner, Klawikordow, *Chem. Zentr.*, 1911, II, 363.

3-Methyl-2-pentenol-4

$$CH_3{\cdot}CH(OH){\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_3$$

$C_6H_{12}O$ MW, 100

B.p. 139–41°, 84–6°/88 mm. D_0^0 0·8793. $n_D^{17\cdot5}$ 1·4428.

Abelmann, *Ber.*, 1910, **43**, 1579.

4-Methyl-2-pentenol-1 (*3-Isopropylallyl alcohol*)

$$CH_3{\cdot}\overset{CH_3}{CH}{\cdot}CH{:}CH{\cdot}CH_2OH$$

$C_6H_{12}O$ MW, 100

B.p. 158–60°. D_0^{16} 0·8490. n_D^{16} 1·4403.
Acetyl: b.p. 171–3°. D_4^{18} 0·8976. n_D^{18} 1·4282.

Bouis, *Ann. chim.*, 1928, **9**, 402.

4-Methyl-2-pentenol-4.
See Dimethylpropenylcarbinol.

2-Methyl-1-pentenone-3 (*Ethyl isopropenyl ketone, 2-propionylpropylene*)

$$CH_3{\cdot}CH_2{\cdot}CO{\cdot}\overset{CH_3}{C}{:}CH_2$$

$C_6H_{10}O$ MW, 98

B.p. 117–19°.
Semicarbazone: leaflets. M.p. 158–9°.

Mannich, *Arch. Pharm.*, 1917, **255**, 269.

2-Methyl-1-pentenone-4 (*Isopropenylacetone, 3-acetoisobutylene*)

$$CH_3{\cdot}CO{\cdot}CH_2{\cdot}\overset{CH_3}{C}{:}CH_2$$

$C_6H_{10}O$ MW, 98

B.p. 135–45° decomp.
Semicarbazone: cryst. M.p. 192°.

v. Braun, *Ann.*, 1912, **386**, 303.

2-Methyl-2-pentenone-4.
See Mesityl oxide.

3-Methyl-2-pentenone-4 (*2-Aceto-2-butylene*)

$$CH_3{\cdot}CO{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH_3$$

$C_6H_{10}O$ MW, 98

B.p. 138°.
Oxime: needles. M.p. 75–6°.
Semicarbazone: needles. M.p. 201°.

Hinkel, Ayling, Dippy, Angel, *J. Chem. Soc.*, 1931, 818.

Methyl-4-pentenylcarbinol.
See 1-Heptenol-6.

1-Methyl-2-β-pentenylcyclopentenone-3.
See Jasmone.

Methyl 1-pentenyl Ketone.
See 3-Heptenone-2.

Methyl 2-pentenyl Ketone.
See 3-Heptenone-6.

Methyl 3-pentenyl Ketone.
See 2-Heptenone-6.

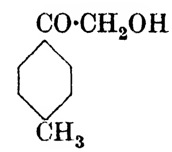
Methyl 4-pentenyl Ketone.
See 1-Heptenone-6.

4-Methylpentine-1.
See Isobutylacetylene.

4-Methylpentine-2.
See Methylisopropylacetylene.

***N*-Methylphenacetin.**
See under N-Methyl-*p*-phenetidine.

***p*-Methylphenacyl Alcohol** (*ω-Hydroxy-4-methylacetophenone, hydroxymethyl* p-*tolyl ketone,* p-*toluylcarbinol*)



$C_9H_{10}O_2$ MW, 150

Yellow prisms from pet. ether. M.p. 89–90°.
Et ether: $C_{11}H_{14}O_2$. MW, 178. B.p. 135°/10 mm. *Oxime*: m.p. 57°. *Phenylhydrazone*: m.p. 80°.
Phenyl ether: $C_{15}H_{14}O_2$. MW, 226. Needles. M.p. 73–5°. B.p. 210–15°/12 mm. *Oxime*: m.p. 96°.
Acetyl: needles. M.p. 84°.
Semicarbazone: needles from MeOH. M.p. 165°.

Auwers, *Ber.*, 1906, **39**, 3761.
Stoermer, Atenstädt, *Ber.*, 1902, **35**, 3564.
Blaise, Picard, *Compt. rend.*, 1911, **152**, 269.

N-Methylphenacylamine (*ω-Methylamino-acetophenone*)

$C_6H_5 \cdot CO \cdot CH_2 \cdot NH \cdot CH_3$

$C_9H_{11}ON$ MW, 149

Yellow oil. Salts reduce Fehling's.

B,HCl: plates. M.p. 219° decomp. Spar. sol. hot EtOH.

B,HBr: plates. M.p. 203°. Sol. H_2O, EtOH.

Acetyl: needles from ligroin. M.p. 156°.

B,HAuCl₄: cryst. M.p. 134°.

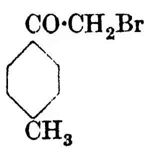
B_2,H_2PtCl_6: cryst. M.p. 206° decomp. Mod. sol. H_2O.

p-*Toluenesulphonyl*: needles + H_2O. M.p. 88°, anhyd. 133–4°.

Picrate: cryst. M.p. 145–6° (136°).

Almström, *Ann.*, 1915, **409**, 300.
Gabriel, *Ber.*, 1914, **47**, 1338.

p-Methylphenacyl bromide (*Bromomethyl* p-*tolyl ketone*)



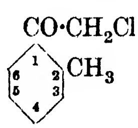
C_9H_9OBr MW, 213

Plates from EtOH. M.p. 51°. Very sol. EtOH, Et_2O.

Verley, *Bull. soc. chim.*, 1897, **17**, 909.

Methylphenacylcarbinol.
See γ-Hydroxybutyrophenone.

o-Methylphenacyl chloride (*Chloromethyl* o-*tolyl ketone*)



C_9H_9OCl MW, 168·5

B.p. 129–30°/11 mm. Strongly lachrymatory.

Semicarbazone: cryst. M.p. 103–5°.

Austin, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 656.

p-Methylphenacyl chloride (*Chloromethyl* p-*tolyl ketone*).

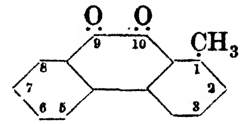
Needles from EtOH. M.p. 57–8°. Very sol. EtOH, Et_2O.

Auwers, *Ber.*, 1906, **39**, 3761.

Methyl phenacyl Ether.
See under Phenacyl Alcohol.

Methyl phenacyl Ketone.
See Benzoylacetone.

1-Methylphenanthraquinone



$C_{15}H_{10}O_2$ MW, 222

Cryst. M.p. 191°.

Quinoxaline: m.p. 177°.

Haworth, *J. Chem. Soc.*, 1932, 1130.

2-Methylphenanthraquinone.

Orange plates from EtOH. M.p. 147–8°.

Quinoxaline: yellow needles from EtOH. M.p. 186–8°.

Haworth, *J. Chem. Soc.*, 1932, 1133.

3-Methylphenanthraquinone

Orange plates from EtOH. M.p. 205–6°.

Quinoxaline: yellow needles from AcOH. M.p. 207–8°.

See previous reference.

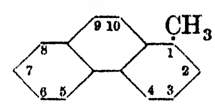
4-Methylphenanthraquinone.

Orange plates from EtOH. M.p. 187°.

Quinoxaline: pale yellow needles from EtOH. M.p. 178°.

Haworth, *J. Chem. Soc.*, 1932, 1131

1-Methylphenanthrene



$C_{15}H_{12}$ MW, 192

Plates from EtOH.Aq. M.p. 123°.

Picrate: yellow needles from EtOH. M.p. 139°.

Pschorr, *Ber.*, 1906, **39**, 3111.

2-Methylphenanthrene.

Needles from EtOH.Aq. M.p. 55–6°. Alc. sol. shows blue fluor.

Picrate: yellow needles from EtOH. M.p. 118–19°.

Haworth, *J. Chem. Soc.*, 1932, 1133.

3-Methylphenanthrene.

Prisms or needles from EtOH. M.p. 62–3°.

Picrate: yellow needles from EtOH. M.p. 137–8°.

Haworth, *J. Chem. Soc.*, 1932, 1132.

4-Methylphenanthrene.

Plates from 95% EtOH. M.p. 49–50°. B.p. 175–85°/10 mm.

Picrate: cryst. from EtOH. M.p. 140–1°.

Styphnate: orange needles from EtOH. M.p. 135°.

Haworth, *J. Chem. Soc.*, 1932, 1131.

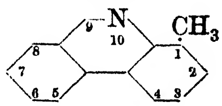
9-Methylphenanthrene.

Cryst. from EtOH.Aq. M.p. 90–1°.

Picrate: cryst. from EtOH. M.p. 152–3°.

Windaus, Jensen, Schramme, *Ber.*, 1924, **57**, 1877.

1-Methylphenanthridine



$C_{14}H_{11}N$ MW, 193

Cryst. M.p. 70°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, ligroin. Insol. H_2O. Aq. sols. of salts show blue fluor.

B,HAuCl₄ : yellow needles from dil. HCl. M.p. 196–200°.

B,HgCl₂ : yellow needles from HCl. M.p. 196°.

B₂,H₂PtCl₆ : pale yellow needles $+2H_2O$ from dil. HCl. Does not melt below 275°.

Methiodide: brownish-yellow needles from EtOH. M.p. 187° decomp. Sol. H_2O, EtOH. Spar. sol. Et_2O.

Pictet, Erlich, *Ann.*, 1891, **266**, 160.

3-Methylphenanthridine.

Needles from EtOH.Aq. M.p. 131°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, ligroin. Spar. sol. H_2O. Sols show blue fluor.

B,HAuCl₄ : pale yellow needles from dil. HCl. M.p. 210° decomp. Insol. H_2O.

B,HgCl₂ : golden-yellow needles from dil. HCl. M.p. 215°.

Picrate: yellow needles from EtOH. M.p. 202°.

Methiodide: brown needles from EtOH. M.p. 180° decomp.

See previous reference.

9-Methylphenanthridine.

Needles from ligroin. M.p. 85°. B.p. above 360°. Very sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Sol. hot ligroin. Spar. sol. boiling H_2O.

B,HCl: needles from H_2O. M.p. 285°. Spar. sol. H_2O, EtOH.

B,HAuCl₄ : pale yellow needles from H_2O. M.p. 163–4° decomp.

B,HgCl₂ : needles from H_2O or EtOH. M.p. 247°.

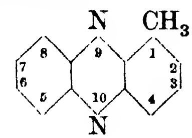
B₂,H₂PtCl₆ : needles + $2H_2O$ from dil. HCl. M.p. 272°.

Picrate: yellow needles from H_2O. M.p. 233° decomp. Spar. sol. boiling H_2O.

Methiodide: yellow needles from H_2O or EtOH. M.p. 246–7° decomp.

Morgan, Walls, *J. Chem. Soc.*, 1931, 2450.
Pictet, Hubert, *Ber.*, 1896, **29**, 1184.

1-Methylphenazine



$C_{13}H_{10}N_2$ MW, 194

Yellow needles. M.p. 108°.

Platinichloride: orange needles. Decomp. above 200°.

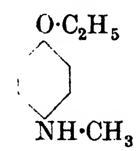
Clemo, McIlwain, *J. Chem. Soc.*, 1934, 1993.
McCombie, Scarborough, Waters, *J. Chem. Soc.*, 1928, 356.

2-Methylphenazine.

Yellow needles from pet. ether. M.p. 117°.

Clemo, McIlwain, *J. Chem. Soc.*, 1935, 741.

***N*-Methyl-*p*-phenetidine** (p-*Methylamino-phenetole*, p-*ethoxy-methylaniline*)



$C_9H_{13}ON$ MW, 151

B.p. 251°, 164°/40 mm., 102–4°/4 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O.

N-*Acetyl*: *N*-methylphenacetin, *N*-methyl-*p*-acet-phenetidide. $C_{11}H_{15}O_2N$. MW, 193. Cryst. from EtOH or Et_2O. M.p. 41°. B.p. 295–305°.

N-*Nitroso*: plates from EtOH. M.p. 47–8°.

Picrate: cryst. M.p. 168°.

Wedekind, Fröhlich, *Ber.*, 1907, **40**, 1003.
Brunner, Moser, *Monatsh.*, 1932, **61**, 15.
Theimer, U.S.P., 1,497,253, (*Chem. Abstracts*, 1924, **18**, 3254).

Methylphenol.

See Cresol.

Methylphenylacetic Acid.

See Hydratropic Acid *and* Tolylacetic Acid.

Methylphenylacetylene (*Phenylallylene*)

$C_6H_5{\cdot}C{:}C{\cdot}CH_3$

C_9H_8 MW, 116

B.p. 71–4°/15 mm. (70–80°/10 mm.). D_{18}^{18} 0·944. n^{18} 1·561.

Wohl, Jaschinowski, *Ber.*, 1921, **54**, 476.
Truchet, *Ann. chim.*, 1931, **16**, 309.

Methylphenylacrolein.
See Methylcinnamaldehyde.

***N*-Methylphenyl-α-alanine.**
See α-Methylaminohydrocinnamic Acid.

2-Methyl-1-phenyl-*n*-amyl Alcohol (2-*Methyl*-1-*phenylpentanol*-1)

$$CH_3\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{CH}\cdot CH(OH)\cdot C_6H_5$$

$C_{12}H_{18}O$ MW, 178

B.p. 126–7°/12 mm. Sol. most org. solvents. Insol. H_2O.
Acetyl: b.p. 136°/13 mm.

Dumesnil, *Ann. chim.*, 1917, **8**, 81.

2-Methyl-5-phenyl-*n*-amyl Alcohol (2-*Methyl*-5-*phenylpentanol*-1)

$$C_6H_5\cdot CH_2\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{CH}\cdot CH_2OH$$

$C_{12}H_{18}O$ MW, 178

B.p. 159–60°/20 mm. D_4^{20} 0·9642.

v. Braun, Kirschbaum, *Ber.*, 1914, **47**, 266.

Methylphenylbenzylcarbinol.
See 2-Hydroxy-1 : 2-diphenylpropane.

Methylphenylbenzylidenehydrazine (*Benzaldehyde methylphenylhydrazone*)

$$C_6H_5\cdot CH{:}N\cdot \overset{CH_3}{N}\cdot C_6H_5$$

$C_{14}H_{14}N_2$ MW, 210

Yellow needles from EtOH. M.p. 104°.
Picrate: red needles. Unstable.

Ciusa, Vecchiotti, *Gazz. chim. ital.*, 1912, **42**, i, 563.

2-Methyl-2-phenylbutane.
See tert.-Amylbenzene.

2-Methyl-4-phenylbutane.
See Isoamylbenzene.

Methylphenylbutenone.
See Methyl methylstyryl Ketone.

3-Methyl-2-phenyl-*n*-butyl Alcohol.
See 2-Phenylisoamyl Alcohol.

2-Methyl-1-phenyl-*sec.*-*n*-butyl Alcohol.
See Methylethylbenzylcarbinol.

3-Methyl-2-phenyl-*sec.*-*n*-butyl Alcohol.
See Methylisopropylphenylcarbinol.

2-Methyl-1-phenyl-1-butylene.
See β-Methyl-β-ethylstyrene.

3-Methyl-1-phenyl-1-butylene (ω-*Isobutylidenetoluene*, β-*isopropylstyrene*)

$$CH_3\cdot \overset{CH_3}{CH}\cdot CH{:}CH\cdot C_6H_5$$

$C_{11}H_{14}$ MW, 146

B.p. 201–3°. D_4^0 0·9194. n_D^{18} 1·532.
Nitrosite: cryst. M.p. 120°.

Levy, Dvoleitzka-Gombinska, *Bull. soc. chim.*, 1931, **49**, 1770.

3-Methyl-2-phenyl-1-butylene (α-*Isopropylstyrene*)

$$(CH_3)_2CH\cdot \overset{C_6H_5}{C}{:}CH_2$$

$C_{11}H_{14}$ MW, 146

B.p. 191–2°/753 mm., 82°/12 mm. $D_4^{13\cdot8}$ 0·8991. $n_D^{13\cdot8}$ 1·5181.

Klages, *Ber.*, 1903, **36**, 3691.

2-Methyl-3-phenyl-2-butylene (α-*Isopropylidene-ethylbenzene*)

$$CH_3\cdot \overset{C_6H_5}{C}{:}C(CH_3)_2$$

$C_{11}H_{14}$ MW, 146

B.p. 189°, 83°/12 mm.

Blaise, Courtot, *Bull. soc. chim.*, 1902, **35**, 587.

2-Methyl-4-phenyl-2-butylene (β-*Isopropylidene-ethylbenzene*)

$$C_6H_5\cdot CH_2\cdot CH{:}\overset{CH_3}{C}\cdot CH_3$$

$C_{11}H_{14}$ MW, 146

B.p. 205°, 92°/15 mm. $D_4^{18\cdot3}$ 0·891. $n_D^{18\cdot3}$ 1·5125.

Klages, *Ber.*, 1904, **37**, 2315.

1-Methyl-1-phenylbutyric Acid (*Methylethylphenylacetic acid*, 1-*ethyl*-1-*phenylpropionic acid*)

$$CH_3\cdot CH_2\cdot \overset{CH_3}{\underset{C_6H_5}{C}}\cdot COOH$$

$C_{11}H_{14}O_2$ MW, 178

M.p. 60°. Very sol. most org. solvents.
Me ester: $C_{12}H_{16}O_2$. MW, 192. B.p. 120°/16 mm.
Et ester: $C_{13}H_{18}O_2$. MW, 206. B.p. 124–5°/14 mm.
Amide: $C_{11}H_{15}ON$. MW, 177. Cryst. M.p. 119°.
Nitrile: $C_{11}H_{13}N$. MW, 159. B.p. 239°, 119–20°/15 mm.

Blondeau, *Compt. rend.*, 1922, **174**, 1424.

1-Methyl-2-phenylbutyric Acid (1 : 2-*Dimethyl-2-phenylpropionic acid*)

$$CH_3\cdot CH\cdot \underset{CH_3}{\overset{C_6H_5}{C}}H\cdot COOH$$

$C_{11}H_{14}O_2$ MW, 178

Prisms from pet. ether. M.p. 137–8°.

Rupe, Steiger, Fiedler, *Ber.*, 1914, **47**, 72.

1-Methyl-3-phenylbutyric Acid

$$C_6H_5\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{C}H\cdot COOH$$

$C_{11}H_{14}O_2$ MW, 178

B.p. 180°/19 mm., 167°/11 mm.

Et ester: $C_{13}H_{18}O_2$. MW, 206. B.p. 143–4°/17 mm.

Chloride: $C_{11}H_{13}OCl$. MW, 196·5. B.p. 125°/12 mm.

Braun, Kirschbaum, *Ber.*, 1914, **47**, 264.
Schroeter, Lichtenstadt, Irinei, *Ber.*, 1918, **51**, 1599.

4-Methyl-2-phenylbutyrolactone.

See under 4-Hydroxy-2-phenyl-*n*-caproic Acid.

***N*-Methylphenylcarbamic Acid** (N-*Methylcarbanilic acid*)

$$C_6H_5\cdot \overset{CH_3}{N}\cdot COOH$$

$C_8H_9O_2N$ MW, 151

Me ester: $C_9H_{11}O_2N$. MW, 165. Cryst. from EtOH. M.p. 44°. B.p. 235°, 117–19°/16 mm. D^{19} 1·296. Sol. Et_2O, ligroin, hot conc. HCl.

Et ester: methylphenylurethane. $C_{10}H_{13}O_2N$. MW, 179. B.p. 243–4°, 127–8°/18 mm. $D_4^{17\cdot8}$ 1·07585, D_4^{20} 1·0741. $n_D^{17\cdot8}$ 1·51734, n_D^{20} 1·51558.

Phenyl ester: $C_{14}H_{13}O_2N$. MW, 227. Cryst. from EtOH. M.p. 58°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$.

p-*Tolyl ester*: $C_{15}H_{15}O_2N$. MW, 241. Needles from EtOH. M.p. 62°.

o-*Nitrophenyl ester*: $C_{14}H_{12}O_4N_2$. MW, 272. Yellow prisms from EtOH. M.p. 110°. Spar. sol. cold EtOH.

m-*Nitrophenyl ester*: cryst. from EtOH. M.p. 105°.

p-*Nitrophenyl ester*: greenish cryst. M.p. 69–70°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$.

Chloride: C_8H_8ONCl. MW, 169·5. Plates from EtOH. M.p. 88–9°. B.p. 280°. Sol. EtOH, Et_2O. Insol. H_2O.

Slosson, *Am. Chem. J.*, 1903, **29**, 300.
Schmidt, *Ber.*, 1903, **36**, 2477; *Z. physik. Chem.*, 1907, **58**, 518.
Lellmann, Benz, *Ber.*, 1891, **24**, 2108.

Methylphenylcarbinol (1-*Phenylethyl alcohol, α-methylbenzyl alcohol, α-hydroxyethylbenzene*)

$$C_6H_5\cdot CH(OH)\cdot CH_3$$

$C_8H_{10}O$ MW, 122

d-.

B.p. 98–9°/20 mm. $[\alpha]_{5461}^{19}$ + 13·02°.

Acetyl: b.p. 120°/35 mm. $[M]_D^{24}$ + 43·95°.

Acid phthalate: m.p. 81–2°. $[\alpha]_{5461}^{24}$ − 40·7° in EtOH.

l-.

B.p. 93°/14 mm. $[\alpha]_{5461}^{18}$ − 13·27°.

Et ether: $C_{10}H_{14}O$. MW, 150. Oil. B.p. 71·5°/15 mm. D_4^{20} 0·928.

Acid phthalate: m.p. 81–2°. $[\alpha]_{5461}^{20}$ + 39·8° in EtOH.

dl-.

B.p. 100°/18 mm., 90°/15 mm. D_4^{15} 1·008. n_D^{15} 1·526.

Acetyl: b.p. 222°, 105–8°/15 mm.

Et ether: b.p. 185–7°, 67–9°/11 mm.

Marshall, *J. Chem. Soc.*, 1915, **107**, 523.
Houssa, Kenyon, *J. Chem. Soc.*, 1930, 2261.
Holmberg, *Ber.*, 1912, **45**, 1002.

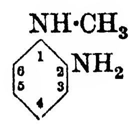
Methyl-2-phenylcinchoninic Acid.

See Methyl-2-phenylquinoline-4-carboxylic Acid.

Methyl phenyl Diketone.

See Acetylbenzoyl.

***N*-Methyl-*o*-phenylenediamine** (o-*Aminomethylaniline*)



$C_7H_{10}N_2$ MW, 122

Oil. B.p. 245–8°/736 mm. Darkens rapidly.

B,2HCl: cryst. from EtOH. M.p. 191°.

1-*Acetyl*: *o*-amino-*N*-methylacetanilide. Needles from 30% EtOH. M.p. 67–8°.

1 : 2-N-*Diacetyl*: plates from H_2O. M.p. 172°.

Fischer, *Ber.*, 1892, **25**, 2841.
Phillips, *J. Chem. Soc.*, 1929, 2824.

***N*-Methyl-*m*-phenylenediamine** (m-*Aminomethylaniline*).

B.p. 265–70°, 160–3°/10 mm.

Fischer, *Ann.*, 1895, **286**, 173.

***N*-Methyl-*p*-phenylenediamine** (p-*Aminomethylaniline*).

Leaflets. M.p. 35·5°. B.p. 257–259·5°, 152°/20 mm. Sol. H_2O, EtOH, Et_2O.

1-*Formyl*: *p*-amino-*N*-methylformanilide. Needles from pet. ether. M.p. 132°. Darkens in light and air.
1-*Acetyl*: *p*-amino-*N*-methylacetanilide. Needles from pet. ether. M.p. 63°. Turns yellow in air.

Willstätter, Pfannenstiel, *Ber.*, 1905, **38**, 2249.
Morgan, Grist, *J. Chem. Soc.*, 1918, **113**, 688.
Thiele, Wheeler, *Ber.*, 1895, **28**, 1539.

Methyl phenyl Ether.
See Anisole.

Methyl-phenylethyl-carbinol.
See 4-Phenyl-*sec*.-*n*-butyl Alcohol.

Methyl phenylethyl Ether

$C_6H_5·CH_2·CH_2·O·CH_3$

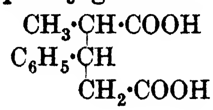
$C_9H_{12}O$ MW, 136

B.p. 190–5° (189–90°).

Müller, *Chimie et Industrie*, 1932, **27**, 881.
Hamonet, *Compt. rend.*, 1903, **138**, 814.

Methyl phenylethyl Ketone.
See Benzylacetone.

1-Methyl-2-phenylglutaric Acid



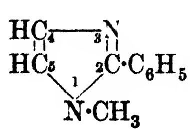
$C_{12}H_{14}O_4$ MW, 222

Prisms from H_2O or ligroin. M.p. 125°. Sol. EtOH, Et_2O, $CHCl_3$, hot C_6H_6. Insol. pet. ether.
Imide: $C_{12}H_{13}O_2N$. MW, 203. Prisms from H_2O. M.p. 144°.
Anhydride: $C_{12}H_{12}O_3$. MW, 204. M.p. 74°.

Carter, Lawrence, *Proc. Chem. Soc.*, 1900, **16**, 178.
Avery, Fossler, *Am. Chem. J.*, 1898, **20**, 516.

Methylphenylglyoxal.
See Acetylbenzoyl.

1-Methyl-2-phenylglyoxaline (1-*Methyl*-2-*phenyliminazole*)



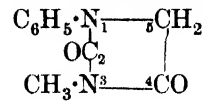
$C_{10}H_{10}N_2$ MW, 158

Oil. B.p. 175°/15 mm. Sol. most org. solvents. Insol. H_2O.
B,HCl: needles. Very sol. H_2O, EtOH.
B,HNO₃: needles. M.p. 100°.
Picrate: plates from H_2O. M.p. 133°.
Methochloride: needles from EtOH–Et_2O. M.p. 272°. Very hygroscopic. *Chloroaurate*: leaflets from dil. HCl. M.p. 134°.

Balaban, King, *J. Chem. Soc.*, 1925, **127**, 2714.

Methylphenylglyoxime.
See under Acetylbenzoyl.

3-Methyl-1-phenylhydantoin



$C_{10}H_{10}O_2N_2$ MW, 190

Cryst. from EtOH.Aq. M.p. 185°.
Acetyl deriv.: cryst. M.p. 145–6°.

Biltz, Slötta, *J. prakt. Chem.*, 1926 **113**, 265.

5-Methyl-3-phenylhydantoin.

d-.
Needles from dil. HCl. M.p. 178°. $[\alpha]_D$ – 10·04° in Me_2CO.

dl-.
Needles from EtOH.Aq. M.p. 172–3°.

West, *J. Biol. Chem.*, 1918, **34**, 190.
Mouneyrat, *Ber.*, 1900, **33**, 2394.

5-Methyl-5-phenylhydantoin.
Cryst. M.p. 197°.

Abe, *Chem. Abstracts*, 1934, **28**, 4383.

1-Methyl-2-phenylhydracrylic Acid.
See 2-Hydroxy-2-phenylisobutyric Acid.

***sym*.-Methylphenylhydrazine**

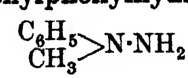
$C_6H_5·NH·NH·CH_3$

$C_7H_{10}N_2$ MW, 122

Oil. B.p. 200–1°/331 mm., 110–12°/12–15 mm. D_{15}^{15} 1·04. n_D^{15} 1·5755. Reduces Fehling's and $NH_3.AgNO_3$.
B,HCl: plates from EtOH–Et_2O. M.p. 160–1°.
B_2,H_2SO_4: plates from EtOH. M.p. 182°.
Methochloride: cryst. M.p. 187–8° decomp.
Methiodide: cryst. M.p. 126°.

Knorr, Wendel, *Ber.*, 1909, **42**, 3523.

***unsym*.-Methylphenylhydrazine**



$C_7H_{10}N_2$ MW, 122

B.p. 131°/35 mm., 106–9°/13 mm. $n_D^{21·6}$ 1·58235. Misc. with EtOH, Et_2O, $CHCl_3$, C_6H_6 in all proportions. Spar. sol. H_2O. Reduces Fehling's.

Hartmann, Roll, *Organic Syntheses*, 1933, XIII, 66.

8-Methyl-3-phenylisoquinoline

$C_{16}H_{13}N$ MW, 219

Cryst. M.p. 51°.

Hydrochloride: needles. M.p. about 236–40°. Spar. sol. cold H_2O.

Hydriodide: yellow needles. Decomp. about 270°. Spar. sol. cold H_2O.

Chromate: cryst. M.p. 164°.

$B,HAuCl_4,H_2O$: needles. M.p. 211° decomp.

Chloroplatinate: yellow needles. M.p. 221° decomp.

Picrate: cryst. M.p. 232°.

Müller, *Ber.*, 1909, **42**, 430.

Methyl phenyl Ketone.
See Acetophenone.

Methylphenylmalonic Acid (1-*Phenyliso-succinic acid ethylbenzene-αα-dicarboxylic acid*)

$$\begin{matrix}C_6H_5\\CH_3\end{matrix}>C<\begin{matrix}COOH\\COOH\end{matrix}$$

$C_{10}H_{10}O_4$ MW, 194

Cryst. M.p. 157° decomp. ⟶ hydratropic acid.

Di-Et ester: $C_{14}H_{18}O_4$. MW, 250. B.p. 165–6°/16 mm.

Dichloride: $C_{10}H_8O_2Cl_2$. MW, 231. Oil. B.p. 114–15°/12 mm. part decomp.

Dinitrile: $C_{10}H_8N_2$. MW, 156. B.p. 125–30°/16 mm.

Staudinger, Ruzicka, *Ann.*, 1911, **380**, 288.
Hessler, *J. Am. Chem. Soc.*, 1917, **39**, 73.

Methylphenylnitramine (N-*Nitro*-N-*methyl-aniline*)

$$C_6H_5{\cdot}N(CH_3){\cdot}NO_2$$

$C_7H_8O_2N_2$ MW, 152

Needles or plates from Et_2O. M.p. 38·5–39·5°. Sol. usual org. solvents. Volatile in steam.

Bamberger, *Ber.*, 1894, **27**, 366.

Methylphenylnitrosamine.
See under Methylaniline.

Methylphenyloxamic Acid.
See N-Methyloxanilic Acid.

2-Methyl-2-phenylpentanol-4

$$CH_3{\cdot}CH(OH){\cdot}CH_2{\cdot}C(CH_3)(C_6H_5){\cdot}CH_3$$

$C_{12}H_{18}O$ MW, 178

B.p. 132°/17 mm. D_{25}^{25} 0·960.

Hoffman, *J. Am. Chem. Soc.*, 1929, **51**, 2545.

2-Methyl-3-phenylpentanol-3 (*Ethylisopropylphenylcarbinol*)

$$CH_3{\cdot}CH_2{\cdot}C(C_6H_5)(OH){\cdot}CH(CH_3){\cdot}CH_3$$

$C_{12}H_{18}O$ MW, 178

B.p. 224–6° decomp., 114–16°/18 mm. (120–2°/18 mm.). $D_4^{12\cdot5}$ 0·9689. $n_D^{12\cdot5}$ 1·5155. Does not form a phenylurethane.

Apolit, *Ann. chim.*, 1924, **2**, 89.
Klages, Haehn, *Ber.*, 1904, **37**, 1724.

2-Methyl-4-phenylpentanol-3

$$CH_3{\cdot}CH(C_6H_5){\cdot}CH(OH){\cdot}CH(CH_3){\cdot}CH_3$$

$C_{12}H_{18}O$ MW, 178

B.p. 156–60°/30 mm.

Lévy, Jullien, *Bull. soc. chim.*, 1929, **45**, 945.

2-Methyl-5-phenylpentanol-2

$$C_6H_5{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)(OH){\cdot}CH_3$$

$C_{12}H_{18}O$ MW, 178

B.p. 130°/10 mm., 120°/7 mm. D_4^{25} 0·9556. n_D^{25} 1·50681.

Phenylurethane: m.p. 101·5–102·5°.

Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, **56**, 961.

2-Methyl-5-phenylpentanol-3

$$C_6H_5{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH(CH_3){\cdot}CH_3$$

$C_{12}H_{18}O$ MW, 178

B.p. 138–42°/13 mm., 130·5–131·5°/10 mm. D_4^{25} 0·9563. n_D^{25} 1·50466.

Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, **56**, 962.

3-Methyl-4-phenylpentanol-2

$$CH_3{\cdot}CH(C_6H_5){-}CH(CH_3){\cdot}CH(OH){\cdot}CH_3$$

$C_{12}H_{18}O$ MW, 178

B.p. 129–31°/11 mm.

Ruzicka, Ehmann, *Helv. Chim. Acta*, 1932, **15**, 145.

3-Methyl-5-phenylpentanol-5

$$C_6H_5\cdot CH(OH)\cdot CH_2\cdot \overset{CH_3}{\dot{C}}H\cdot CH_2\cdot CH_3$$

$C_{12}H_{18}O$ MW, 178

B.p. 163°/50 mm. D_4^{25} 0·9523. n_D^{25} 1·5059.

Davies, Dixon, Jones, *J. Chem. Soc.*, 1930, 472.

Methylphenylpentanol.

See also Isoamylphenylcarbinol, 2-Methyl-1-phenyl-*n*-amyl Alcohol, 2-Methyl-5-phenyl-*n*-amyl Alcohol, Methyl-*sec.*-*n*-butylphenylcarbinol, *and* 1-Phenylisohexyl Alcohol.

2-Methyl-2-phenylpentanone-4

$$CH_3\cdot CO\cdot CH_2\cdot \overset{C_6H_5}{\underset{CH_3}{C}}\cdot CH_3$$

$C_{12}H_{16}O$ MW, 176

Liq. with odour resembling camphor. B.p. 252°, 134°/22 mm., 120–30°/11 mm. D_{25}^{25} 0·972.

Oxime: m.p. 52–4°. B.p. 181°/27 mm.

Semicarbazone: cryst. from MeOH. M.p. 164°.

Hoffman, *J. Am. Chem. Soc.*, 1929, **51**, 2543.

Ziegler, Dersch, Wollthan, *Ann.*, 1934, **511**, 35.

2-Methyl-3-phenylpentanone-4

$$CH_3\cdot CO\cdot \overset{C_6H_5}{\dot{C}}H—\overset{CH_3}{\dot{C}}H\cdot CH_3$$

$C_{12}H_{16}O$ MW, 176

B.p. 115–18°/28 mm.

Semicarbazone: m.p. 153–4°.

Lévy, Jullien, *Bull. soc. chim.*, 1929, **45**, 948.

2-Methyl-4-phenylpentanone-3

$$CH_3\cdot \overset{C_6H_5}{\dot{C}}H\cdot CO\cdot \overset{CH_3}{\dot{C}}H\cdot CH_3$$

$C_{12}H_{16}O$ MW, 176

B.p. 256–7°.

Semicarbazone: m.p. 129–30°.

Lévy, Jullien, *Bull. soc. chim.*, 1929, **45**, 945.

3-Methyl-4-phenylpentanone-2

$$CH_3\cdot \overset{C_6H_5}{\dot{C}}H—\overset{CH_3}{\dot{C}}H\cdot CO\cdot CH_3$$

$C_{12}H_{16}O$ MW, 176

B.p. 115–17°/11 mm.

Ruzicka, Ehmann, *Helv. Chim. Acta*, 1932, **15**, 144.

3-Methyl-5-phenylpentanone-2

$$C_6H_5\cdot CH_2\cdot CH_2\cdot \overset{CH_3}{\dot{C}}H\cdot CO\cdot CH_3$$

$C_{12}H_{16}O$ MW, 176

B.p. 127–8°/8 mm.

Oxime: needles from C_6H_6. M.p. 95–6°. B.p. 154–8°/7 mm.

Semicarbazone: cryst. from EtOH. M.p. 180° (sinters at 162°).

Rupe, Hirschmann, *Helv. Chim. Acta*, 1931, **14**, 697.

Methylphenylpentanone.

See also Isobutyl benzyl Ketone *and* Isopropyl phenylethyl Ketone.

4-Methyl-1-phenyl-1-pentene (β-*Isobutylstyrene*)

$$CH_3\cdot \overset{CH_3}{\dot{C}}H\cdot CH_2\cdot CH{:}CH\cdot C_6H_5$$

$C_{12}H_{16}$ MW, 160

Liq. with pleasant odour. B.p. 107–9°/11 mm.

Reich, Wijck, Waelle, *Helv. Chim. Acta*, 1921, **4**, 244.

2-Methyl-3-phenyl-2-pentene (ββ-*Dimethyl-α-ethylstyrene*)

$$CH_3\cdot CH_2\cdot \overset{C_6H_5}{\dot{C}}{:}C(CH_3)_2$$

$C_{12}H_{16}$ MW, 160

B.p. 202–5°.

Apolit, *Ann. chim.*, 1924, **2**, 102.

2-Methyl-5-phenyl-2-pentene (1-*Phenylisohexene*-3)

$$C_6H_5\cdot CH_2\cdot CH_2\cdot CH{:}\overset{CH_3}{\dot{C}}\cdot CH_3$$

$C_{12}H_{16}$ MW, 160

B.p. 108–112°/25 mm.

Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, **56**, 961.

I.G., D.R.P., 557,514, (*Chem. Abstracts*, 1933, **27**, 514).

3-Methyl-2-phenyl-2-pentene (αβ-*Dimethyl*-β-*ethylstyrene*)

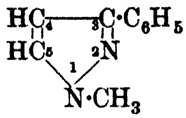
$$CH_3\cdot CH_2\cdot \overset{CH_3}{C}{:}\underset{C_6H_5}{C}\cdot CH_3$$

$C_{12}H_{16}$ MW, 160

B.p. 204–6°.

Apolit, *Ann. chim.*, 1924, **2**, 103.

1-Methyl-3-phenylpyrazole



$C_{10}H_{10}N_2$ MW, 158

M.p. 56°. B.p. 280–1°, 138–9°/12 mm. $D_4^{99\cdot6}$ 1·0232. $n_{He}^{100\cdot7}$ 1·56216.

Picrate: yellow leaflets. M.p. 132°.

Methiodide: m.p. 156–7°.

Auwers, Mausolf, *Ber.*, 1927, **60**, 1730.

1-Methyl-5-phenylpyrazole.

B.p. 118°/12 mm. D_4^{20} 1·090. n_{He}^{20} 1·5881.

Picrate: greenish-yellow needles from EtOH. M.p. 143°.

See previous reference.

3-Methyl-1-phenylpyrazole.

Needles. M.p. 37°. B.p. 255°. D_4^{20} 1·076. n_{He}^{20} 1·591. Sol. EtOH, ligroin. Weak base. Volatile in steam.

B_2,H_2PtCl_6: m.p. anhyd. 173°.

Methiodide: cryst. from EtOH. M.p. 144°. Sol. EtOH. Spar. sol. Et_2O.

Stoermer, *Ber.*, 1903, **36**, 3988.
Knorr, *Ann.*, 1894, **279**, 220 (*Footnote, Bibl.*).
Claisen, Roosen, *Ann.*, 1894, **278**, 274.

4-Methyl-1-phenylpyrazole.

Yellowish oil with aromatic odour. B.p. 264–6°. Insol. H_2O.

$B_2,H_2PtCl_6,2H_2O$: reddish-yellow needles. M.p. 159–60° decomp.

Methiodide: needles from H_2O. M.p. 160°.

Balbiano, Marchetti, *Gazz. chim. ital.*, 1893, **23**, i, 487.

5-Methyl-1-phenylpyrazole.

Oil with odour resembling quinoline. B.p. 263·5°/762 mm., 254–5°/720 mm., 144–5°/19 mm. D_4^{20} 1·086. n_{He}^{20} 1·582. Volatile in steam.

B_2,H_2PtCl_6: plates from EtOH–conc. HCl. M.p. 198–9° (171° decomp.).

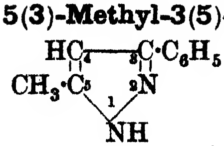
Picrate: cryst. from EtOH. M.p. 97–8°.

Methiodide: plates from EtOH. M.p. 296° (287°, 256–7°).

Ethiodide: needles. M.p. 208°.

Stoermer, *Ber.*, 1907, **40**, 484.
Claisen, *Ann.*, 1897, **295**, 315.

5(3)-Methyl-3(5)-phenylpyrazole



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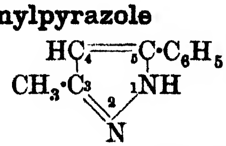


$C_{10}H_{10}N_2$ MW, 158

Prisms from pet. ether. M.p. 128°. B.p. 326–7°, 191–3°/14 mm. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Spar. sol. ligroin. Spar. volatile in steam.

B,HCl: m.p. 205°.

Picrate: prisms from MeOH. M.p. 159°.

Derivs. of 3-*Methyl*-5-*phenylpyrazole*:—

1-*Acetyl*: plates from EtOH.Aq. M.p. 45·5–46·5°.

1-*Propionyl*: prisms from EtOH.Aq. M.p. 33–4°.

1-*Butyryl*: needles from pet. ether. M.p. 34–34·5°.

1-*Benzoyl*: cryst. from pet. ether. M.p. 88–9°.

1-o-*Nitrobenzoyl*: m.p. 157–157·5°.

1-o-*Toluyl*: prisms. M.p. 63–5°.

1-m-*Toluyl*: needles. M.p. 79–80°.

1-p-*Toluyl*: decomp. at 83–5°. Very indefinite m.p.

Derivs. of 5-*Methyl*-3-*phenylpyrazole*:—

1-*Acetyl*: m.p. 41°. B.p. 158–60°/11 mm.

1-*Propionyl*: needles from EtOH. M.p. 77–78·5°.

1-*Butyryl*: needles from EtOH. M.p. 72–72·5°. B.p. 150–2°/10 mm.

1-*Benzoyl*: prisms from EtOH. M.p. 83–4°.

1-o-*Nitrobenzoyl*: m.p. 107–8°.

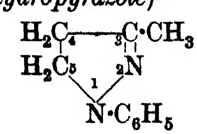
1-o-*Toluyl*: needles from pet. ether. M.p. 36·5–37·5°.

1-m-*Toluyl*: needles from MeOH. M.p. 56–7°.

1-p-*Toluyl*: needles from MeOH. M.p. 68–70°.

Auwers, Stuhlmann, *Ber.*, 1926, **59**, 1048.
Auwers, Dietrich, *J. prakt. Chem.*, 1934, **139**, 65.
For non-equivalence of positions 3 and 5 see Auwers, *Ann.*, 1934, **508**, 51.

3-Methyl-1-phenylpyrazoline (3-*Methyl*-1-*phenyl*-4 : 5-*dihydropyrazole*)



$C_{10}H_{12}N_2$ MW, 160

Needles from Et_2O or ligroin. M.p. 76–7°. B.p. 289°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. ligroin. Mod. volatile in steam.

Ach, *Ann.*, 1889, **253**, 56.
Maire, *Bull. soc. chim.*, 1908, **3**, 272.

5-Methyl-1-phenylpyrazoline.

B.p. 130–2°/18 mm. Sol. EtOH, Et_2O, CHCl. C_6H_6. Insol. HO.

Benzylidene deriv.: prisms. M.p. 140°.
Di-ethiodide: decomp. at 230°. Insol. $CHCl_3$.

Trener, *Monatsh.*, 1900, **21**, 1111.

1-Methyl-3-phenylpyrazoline.

Leaflets from pet. ether. M.p. 37°.
Hydrochloride: m.p. 162°. Sol. H_2O, EtOH. Spar. sol. Me_2CO.

Mannich, Heilner, *Ber.*, 1922, **55**, 368.

5-Methyl-3-phenylpyrazoline.

B.p. 158–9°/13 mm.
Carbanilide: m.p. 126°.
1-*Acetyl*: cryst. from pet. ether. M.p. 62–3°. B.p. 181°/11 mm. *B,HCl*: m.p. 89–91°.
1-*Nitroso*: plates from MeOH. M.p. 93·5–94°.

Freudenberg, Stoll, *Ann.*, 1924, **440**, 43.
Auwers, Heimke, *Ann.*, 1927, **458**, 212.

1-Methyl-5-phenylpyrazoline.

Yellowish oil. B.p. 137–8°/30 mm.
Picrate: yellow needles from EtOH. M.p. 125°. Spar. sol. H_2O.

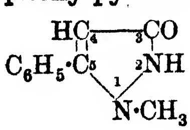
Auwers, Heimke, *Ann.*, 1927, **458**, 211.

3-Methyl-5-phenylpyrazoline.

Thick liq. B.p. 180°/32 mm., 159°/16 mm. D_0^{20} 1·0669. n_D 1·5956. Turns yellow in air.
N-*Acetyl*: cryst. from ligroin. M.p. 76°. B.p. 184°/13 mm.
N-*Benzoyl*: cryst. from MeOH. M.p. 137–8°.
N-*Benzyl*: b.p. 202–3°/11 mm.
N-*Nitroso*: yellowish needles from MeOH. M.p. 96·5–97·5°.
Phenylcarbamide: cryst. from MeOH. M.p. 135°.
Picrate: yellow needles from EtOH. M.p. 142–3°.

Freudenberg, Stoll, *Ann.*, 1924, **440**, 43.
Auwers, Heimke, *Ann.*, 1927, **458**, 214.

1-Methyl-5-phenylpyrazolone-3



$C_{10}H_{10}ON_2$ MW, 174

Cryst. from H_2O. M.p. 161°. Addn. of $NaNO_2$ to HCl sol. ⟶ greenish-yellow col.

Auwers, Mauss, *J. prakt. Chem.*, 1925, **110**, 206, 219.

4-Methyl-1-phenylpyrazolone-3.

Needles from EtOH. M.p. 210°. Sol. warm alkalis. Oxidation does not give a Pyrazole Blue reaction.

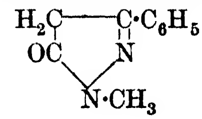
Fichter, Enzenauer, Vellenberg, *Ber.*, 1900, **33**, 494.
Stolz, *Ber.*, 1905, **38**, 3273.

5-Methyl-1-phenylpyrazolone-3.

Cryst. from EtOH. M.p. 167°. Also exists in a labile form, m.p. 157°. Sol. EtOH, $CHCl_3$, C_6H_6, dil. NaOH, min. acids.
Picrate: cryst. from EtOH. M.p. 141°.

Brunner, Moser, *Monatsh.*, 1929, **53** and **54**, 682.
Mayer, *Ber.*, 1903, **36**, 717.

1-Methyl-3-phenylpyrazolone-5

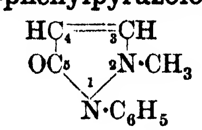


$C_{10}H_{10}ON_2$ MW, 174

Needles from EtOH. M.p. 207°. B.p. 330–40° part. decomp., 235°/68 mm. Sol. hot EtOH, hot AcOH. Very spar. sol. H_2O, Et_2O, ligroin. $FeCl_3$ ⟶ reddish-brown col. in EtOH.Aq.
B,HCl,H_2O: needles. M.p. 179°.
B_2,H_2SO_4,2H_2O: m.p. 77°, anhyd. 160°.
B,HNO_3,H_2O: leaflets. M.p. 118°.
4-*Isonitroso deriv.*: orange leaflets. M.p. 162°.

Michaelis, Dorn, *Ann.*, 1907, **352**, 163.
Auwers, Mauss, *J. prakt. Chem.*, 1925, **110**, 219.

2-Methyl-1-phenylpyrazolone-5

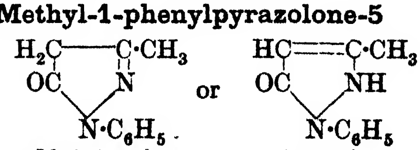


$C_{10}H_{10}ON_2$ MW, 174

M.p. 117°. $FeCl_3$.Aq. ⟶ red col.

Stolz, *Ber.*, 1895, **28**, 631.

3-Methyl-1-phenylpyrazolone-5



Methylene form or *Imino form*

$C_{10}H_{10}ON_2$ MW, 174

Prisms from H_2O. M.p. 127°. B.p. 287°/205 mm. Sol. hot EtOH. Insol. Et_2O, ligroin, cold H_2O. $FeCl_3$ ⟶ Pyrazole Blue. Very spar. volatile in steam. Forms metallic salts with Cu, Co, Ag, etc. Couples with diazo salts, the CH_2–CO– enolising. Intermediate for azo dyestuffs.

B,HCl,H₂O : prisms. M.p. 96°.

$B_2,H_2PtCl_6,4H_2O$: yellowish-red prisms. M.p. about 110°.

Ethylenediamine salt : $C_2H_8N_2,2C_{10}H_{10}ON_2$. Needles. M.p. 204°. Spar. sol. EtOH.

4-*Isonitroso deriv.* : orange needles from AcOH. M.p. 157° (151–2°).

$C_{10}H_{10}ON_2,C_6H_3(NO_2)_3$-1 : 3 : 5 : red prisms from EtOH. M.p. 92°.

N-*Me* : *see* Antipyrine.

Mitra, *J. Indian Chem. Soc.*, 1931, **8**, 474.
Bucherer, Grolée, *Ber.*, 1906, **39**, 1006.
Feist, *Ann.*, 1906, **345**, 113.
Stolz, *J. prakt. Chem.*, 1897, **55**, 164, 166.
Knorr, *Ann.*, 1887, **238**, 147.
I.G., E.P., 274,366, (*Chem. Abstracts*, 1928, **22**, 1983).

4-Methyl-1-phenylpyrazolone-5.

Needles from EtOH. M.p. 148°.

Fichter, Enzenauer, Vellenberg, *Ber.*, 1900, **33**, 498.
Stolz, *Ber.*, 1905, **38**, 3273.

4-Methyl-3-phenylpyrazolone-5.

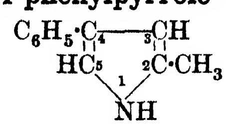
Cryst. from H_2O. M.p. 213–214·5°. Sol. EtOH, Et_2O, $CHCl_3$, xylene. Spar. sol. C_6H_6. Sol. alkalis, alkali carbonates, dil. HCl.

Auwers, Mauss, *J. prakt. Chem.*, 1925, **110**, 206, 221.

Methylphenylpyridine.

See Phenylpicoline.

2-Methyl-4-phenylpyrrole



$C_{11}H_{11}N$ MW, 157

Yellowish-green viscous liq. B.p. 175°/25 mm. Darkens on keeping in sealed tube.

Ehrenstein, *Ber.*, 1931, **64**, 1140.

2-Methyl-5-phenylpyrrole.

Leaves. M.p. 103°. Sublimes with part. decomp. Sol. EtOH, Et_2O, C_6H_6, AcOH. Sol. unchanged in hot fuming HCl and cold conc. H_2SO_4.

N-*Phenyl* : plates from C_6H_6 or ligroin. M.p. 84°. Spar. volatile in steam.

N-o-*Tolyl* : plates. M.p. 44°. B.p. 325–8°. Sol. EtOH, Et_2O, C_6H_6, ligroin.

N-p-*Tolyl* : plates from ligroin. M.p. 91°. B.p. above 350°. Sol. C_6H_6, ligroin.

N-1-*Naphthyl* : leaflets. M.p. 74°. B.p. above 360°. Sol. EtOH, C_6H_6, ligroin.

N-2-*Naphthyl* : needles from ligroin. M.p. 52°. Sol. EtOH, C_6H_6, ligroin.

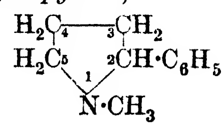
Lederer, Paal, *Ber.*, 1885, **18**, 2596.
Borsche, Fels, *Ber.*, 1906, **39**, 3884.
Paal, *Ber.*, 1885, **18**, 370.

3-Methyl-5-phenylpyrrole.

Cryst. from 25% EtOH. M.p. 152°. Sol. EtOH, Et_2O. Spar. sol. H_2O.

Piloty, Hirsch, *Ann.*, 1913, **395**, 66.

1-Methyl-2-phenylpyrrolidine (1-*Methyl-2-phenyltetrahydropyrrole*)



$C_{11}H_{15}N$ MW, 161

Oil with pleasant odour. B.p. 217·5°, 106°/20 mm. Sol. most org. solvents. Sol. 500 parts H_2O.

B_2,H_2PtCl_6 : cryst. from H_2O. M.p. 122°.

Picrate : cryst. from 95% EtOH. M.p. 146°.

Craig, *J. Am. Chem. Soc.*, 1933, **55**, 2544.

2-Methyl-1-phenylpyrrolidine (2-*Methyl-1-phenyltetrahydropyrrole*).

B.p. 136–8°/16 mm., 127·5°/13 mm. D_0^0 1·011. Turns red in air. Readily sol. most org. solvents. Insol. H_2O.

B_2,H_2PtCl_6 : orange leaflets. M.p. 135°. Decomp. by hot H_2O.

$B_2,2HCl,SnCl_2$: needles from H_2O. M.p. 107–9°.

Picrate : needles from H_2O. M.p. 110° (105°).

Methiodide : m.p. 159° decomp.

Wolff, *Ber.*, 1925, **58**, 405.

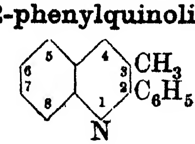
2-Methyl-4-phenylpyrrolidine (2-*Methyl-4-phenyltetrahydropyrrole*).

Very hygroscopic oil. B.p. 112°/10 mm. Turns yellow in air.

N-*Benzoyl* : prisms from Et_2O–pet. ether. M.p. 82–3°. Sol. EtOH, Et_2O. Spar. sol. ligroin.

Kohler, Drake, *J. Am. Chem. Soc.*, 1923, **45**, 2147.

3-Methyl-2-phenylquinoline



$C_{16}H_{13}N$ MW, 219

Prisms from pet. ether. M.p. 52–3° (43°). B.p. above 300°. Very sol. EtOH, Et_2O, C_6H_6, ligroin. Insol. H_2O.
Picrate: yellow leaflets from EtOH. M.p. 205°. Very spar. sol. cold EtOH.
Methiodide: yellow needles. M.p. 235°.

v. Miller, Kinkelin, *Ber.*, 1886, **19**, 527.
v. Braun, Brauns, *Ber.*, 1927, **60**, 1256.

4-Methyl-2-phenylquinoline.
See Flavoline.

6-Methyl-2-phenylquinoline.
Yellowish needles from EtOH.Aq. M.p. 69°. B.p. 270°/12 mm.
Hydrochloride: m.p. 209°.
Picrate: m.p. 208°.

Döbner, Gieseke, *Ann.*, 1887, **242**, 298.
v. Braun, Brauns, *Ber.*, 1927, **60**, 1255.

7-Methyl-2-phenylquinoline.
M.p. 100·5°.
Picrate: m.p. 192°.
Pt salt: decomp. at 243–4°.

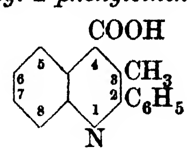
Kaku, *Journal of the Pharmaceutical Society, Japan*, 1927, No. **545**, 90.

8-Methyl-2-phenylquinoline.
Leaflets from EtOH. M.p. 49–50°.

Döbner, Gieseke, *Ann.*, 1887, **242**, 299.

2-Methyl-phenylquinoline.
See Phenylquinaldine.

3-Methyl-2-phenylquinoline-4-carboxylic Acid (3-*Methylcinchophene*, 3-*methylatophan*, 3-*methyl-2-phenylcinchoninic acid*)



$C_{17}H_{13}O_2N$ MW, 263

Powder. M.p. 299°. Spar. sol. H_2O, EtOH. Decomp. above m.p.
Me ester: $C_{18}H_{15}O_2N$. MW, 277. Prisms from Et_2O. M.p. 70–1°. Sol. usual org. solvents.
Et ester: $C_{19}H_{17}O_2N$. MW, 291. Needles from 70% EtOH. M.p. 51°. Sol. usual org. solvents.
Propyl ester: $C_{20}H_{19}O_2N$. MW, 305. Oil. *Picrate*: cryst. from MeOH. M.p. 163°. Spar. sol. EtOH.
2-*Chloroethyl ester*: $C_{19}H_{16}O_2NCl$. MW, 325·5. Prisms from Et_2O. M.p. 81°. Sol. usual org. solvents.
Amide: $C_{17}H_{14}ON_2$. MW, 262. Needles from xylene. M.p. 286°. Sol. MeOH, EtOH, propyl alcohol, isopropyl alcohol, amyl alcohol, Et_2O. Less sol. hot C_6H_6, toluene, xylene, chlorobenzene.
Diethylamide: $C_{21}H_{22}ON_2$. MW, 318. Prisms from chlorobenzene. M.p. 127°. Sol. EtOH, MeOH. Less sol. propyl alcohol, isopropyl alcohol, amyl alcohol, C_6H_6, toluene, xylene, chlorobenzene. Insol. H_2O, Et_2O, pet. ether.
Hydrazide: cryst. from 70% EtOH. M.p. 141°. Sol. MeOH, EtOH, propyl alcohol, isopropyl alcohol, amyl alcohol, $CHCl_3$. Less sol. C_6H_6, toluene, xylene, chlorobenzene. *Picrate*: prisms from EtOH. M.p. 215°.
Isopropylidene-hydrazide: needles from C_6H_6 M.p. 151°. Sol. MeOH. Less sol. EtOH. Spar. sol. Et_2O, C_6H_6, toluene, xylene, pet. ether.

John, Ottawa, *J. prakt. Chem.*, 1931, **131**, 301.

6-Methyl-2-phenylquinoline-4-carboxylic Acid (6-*Methylcinchophene*, 6-*methylatophan*, *paratophan*, 6-*methyl-2-phenylcinchoninic acid*).
Yellow needles from EtOH. M.p. 228°. Sol. EtOH, Et_2O. Insol. H_2O.
B,HCl: m.p. 254·5°.
B,HBr: m.p. 289°.
B,HI: orange-yellow cryst. M.p. 268·5°.
Me ester: cryst. from Et_2O. M.p. 85°.
Et ester: novatophan, neocinchophene, tolysin. Yellow cryst. powder. M.p. 75–6°. Sol. usual org. solvents. Insol. H_2O. Used in treatment of rheumatism. *B,HF*: m.p. 170–2°. *B,HCl*: m.p. 171°. *B,HBr*: m.p. 176°. *B,HI*: m.p. 177°.
Propyl ester: cryst. M.p. 79–80°. *B,HCl*: m.p. 148°. *B,HBr*: m.p. 170°. *B,HI*: m.p. 164°.
Butyl ester: $C_{21}H_{21}O_2N$. MW, 319. Cryst. M.p. 64–5°. *B,HCl*: m.p. 118°. *B,HBr*: m.p. 123–6°. *B,HI*: m.p. 158°.
Isobutyl ester: $C_{21}H_{21}O_2N$. MW, 319. Cryst. M.p. 74–5°.
2-*Chloroethyl ester*: needles from EtOH–Et_2O. M.p. 81°.
Allyl ester: $C_{20}H_{17}O_2N$. MW, 303. Yellow needles from ligroin. M.p. 75–6°.
Chloride: $C_{17}H_{12}ONC$ MW, 281·5. *B,HCl*: m.p. 199° decomp.
Hydrazide: cryst. M.p. 216°.
Benzylidene-hydrazide: prisms from MeOH. M.p. 234°.

Methylbenzylidene-hydrazide: needles from EtOH. M.p. 227°.

Mossler, *Chem. Zentr.*, 1913, I, 560.
Rhodehamel, Stuart, U.S.P., 1,552,568, (*Chem. Abstracts*, 1926, **20**, 424).
John, Schmit, *J. prakt. chem.*, 1931, **132**, 15.
Busch, U.S.P., 1,816,003, (*Chem. Abstracts*, 1931, **25**, 5513).

7-Methyl-2-phenylquinoline-4-carboxylic Acid (*7-Methylcinchophene*, *7-methyl-2-phenylcinchoninic acid*).

Cryst. from AcOH or EtOH.Aq. M.p. 212–14°.

Borsche, *Ber.*, 1908, **41**, 3888.

8-Methyl-2-phenylquinoline-4-carboxylic Acid (*8-Methylcinchophene*, *8-methyl-2-phenylcinchoninic acid*, *8-methylatophan*).

Yellow needles from EtOH. M.p. 245°. Sol. hot EtOH, Et_2O. Insol. H_2O.
Me ester: prisms from MeOH. M.p. 86°.
Et ester: plates from EtOH–Et_2O. M.p. 70°.
2-Chloroethyl ester: needles from MeOH–Et_2O. M.p. 84°.
Amide: needles from EtOH. M.p. 241°. Sol. many aliphatic alcohols, C_6H_6, toluene. Insol. Et_2O.
Diethylamide: needles from Et_2O. M.p. 107°. Sol. usual org. solvents.
Hydrazide: m.p. 222°.
Benzylidene-hydrazide: needles from xylene. M.p. 226°.
Methylbenzylidene-hydrazide: prisms from EtOH. M.p. 215°.

Johns, Schmit, *J. prakt. Chem.*, 1931, **132**, 15.

Methyl phenyl selenide

$C_6H_5{\cdot}Se{\cdot}CH_3$

C_7H_8Se MW, 171

Yellow oil with aromatic odour. B.p. 200–1°.

Pope, Neville, *J. Chem. Soc.*, 1902, **81**, 1553.

2-Methyl-4-phenylsemicarbazide

$C_6H_5{\cdot}NH{\cdot}CO{\cdot}N(CH_3){\cdot}NH_2$

$C_8H_{11}ON_3$ MW, 165

Cryst. M.p. 93–4°. Sol. EtOH, warm C_6H_6. Spar. sol. Et_2O.

Busch, Opfermann, Walther, *Ber.*, 1904, **37**, 2324.

Methyl phenyl sulphide.
See Thioanisole.

Methyl phenyl sulphone

$C_6H_5{\cdot}SO_2{\cdot}CH_3$

$C_7H_8O_2S$ MW, 156

Plates from H_2O. M.p. 88°. Very sol. EtOH, AcOEt, C_6H_6. Insol. cold H_2O, alkalis.

Otto, Artmann, *Ann.*, 1895, **284**, 301.
Böeseken, van Ockenburg, *Rec. trav. chim.*, 1914, **33**, 321.

***unsym*.-Methylphenylthiourea**

$C_6H_5{\cdot}N(CH_3){\cdot}CS{\cdot}NH_2$

$C_8H_{10}N_2S$ MW, 166

Plates from EtOH, prisms from H_2O. M.p. 107°. Heat with aniline ⟶ thiocarbanilide and methylaniline.

Wallach, *Ber.*, 1899, **32**, 1874.
Gebhardt, *Ber.*, 1884, **17**, 2094.

α-Methylphenyl-*p*-tolylmethane.
See 1-Phenyl-1-*p*-tolylethane.

***sym*.-Methylphenylurea**

$C_6H_5{\cdot}NH{\cdot}CO{\cdot}NH{\cdot}CH_3$

$C_8H_{10}ON_2$ MW, 150

Leaflets from H_2O, prisms from EtOH. M.p. 151–2°. Sol. hot H_2O, hot EtOH, hot C_6H_6. Very stable towards acids and alkalis. Addn. of $K_2Cr_2O_7$ to sol. in conc. H_2SO_4 ⟶ violet col.

Sonn, *Ber.*, 1914, **47**, 2442.
Scholl, Holdermann, *Ann.*, 1906, **345**, 382.

***unsym*.-Methylphenylurea**

$C_6H_5{\cdot}N(CH_3){\cdot}CO{\cdot}NH_2$

$C_8H_{10}ON_2$ MW, 150

Cryst. from C_6H_6–ligroin. M.p. 82°. Very sol. usual org. solvents except ligroin. Insol. alkalis. Sweet taste.

Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, **51**, 1800.
Thate, *Rec. trav. chim.*, 1929, **48**, 116.

Methylphenylurethane.
See under N-Methylphenylcarbamic Acid.

1-Methyl-4-phenylvaleraldehyde

$C_6H_5{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{*}{C}H(CH_3){\cdot}CHO$

$C_{12}H_{16}O$ MW, 176

B.p. 148–52°/21 mm., 110°/4 mm.
Semicarbazone: m.p. 112°.

Ramart-Lucas, Labaune, *Ann. chim.*, 1931, **16**, 294.
v. Braun, Kirschbaum, *Ber.*, 1914, **47**, 267.

2-Methyl-2-phenylvaleric Acid.
See β-Methyl-β-ethylhydrocinnamic Acid.
3-Methyl-1-phenylvaleric Acid.
See 1-Phenylisocaproic Acid.
Methylphloroglucinol.
See 2 : 4 : 6-Trihydroxytoluene.

Methylphosphine

$CH_3{\cdot}PH_2$

CH_5P MW, 48

Gas. B.p. $-14°/758{\cdot}5$ mm. Prac. insol. H_2O. Salts decomp. by H_2O.

Hofmann, *Ber.*, 1871, **4**, 605; 1873, **6**, 302.
Berthaud, *Bull. soc. chim.*, 1907, **1**, 146.

Methylphosphinic Acid

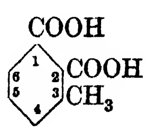
$CH_3{\cdot}PO(OH)_2$

CH_5O_3P MW, 96

Hygroscopic cryst. M.p. 105°. Sol. H_2O, EtOH, Et_2O.
Di-Me ester: $C_3H_9O_3P$. MW, 124. B.p. 181°/754 mm.
Di-Et ester: $C_5H_{13}O_3P$. MW, 152. B.p. 192–4°. D_0^0 1·0726, D_0^{23} 1·0508. Sol. H_2O.
Dichloride: CH_3OCl_2P. MW, 133. Cryst. M.p. 32°. B.p. 163°.
Di-diethylamide: $C_9H_{23}ON_2P$. MW, 206. Oil with aromatic odour. B.p. 145–8°/22 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O.
Di-dipropylamide: $C_{13}H_{31}ON_2P$. MW, 262. B.p. 176–80°/25 mm. Sol. Et_2O.

Hofmann, *Ber.*, 1872, **5**, 105; 1873, **6**, 306.
Michaelis, Kaehne, *Ber.*, 1898, **31**, 1054.

3-Methylphthalic Acid (*Toluene*-2 : 3-*dicarboxylic acid*)



$C_9H_8O_4$ MW, 180

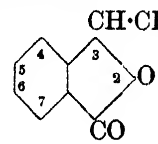
Needles from AcOEt. M.p. 157°. Spar. sol. C_6H_6, ligroin, pet. ether.
Dinitrile: 2 : 3-dicyanotoluene. $C_9H_6N_2$. MW, 142. Needles from EtOH or C_6H_6. M.p. 143°. Volatile in steam. Insol. Me_2CO, AcOEt.
1-*Me ester 2-nitrile*: $C_{10}H_9O_2N$. MW, 175. Needles from ligroin. M.p. 68–70°.
Anhydride: $C_9H_6O_3$. MW, 162. Sublimes in needles. M.p. 114–15° (109–10°).
Imide: 3-methylphthalimide. $C_9H_7O_2N$. MW, 161. M.p. 189–90°.

Mayer, Stark, *Ber.*, 1931, **64**, 2003.
Jürgens, *Ber.*, 1907, **40**, 4413.
Gabriel, Thieme, *Ber.*, 1919, **52**, 1082.

4-Methylphthalic Acid (*Toluene*-3 : 4-*dicarboxylic acid*).
Cryst. from H_2O. M.p. 152°. Very sol. H_2O, EtOH, AcOEt, Me_2CO. Spar. sol. boiling $CHCl_3$, boiling C_6H_6.
Dinitrile: 3 : 4-dicyanotoluene. Needles from H_2O. M.p. 120° (117°). Sol. EtOH, Et_2O, C_6H_6. Insol. pet. ether. Volatile in steam.
1-*Me ester 2-nitrile*: m.p. 68°. B.p. 284–90°.
Diamide: $C_9H_{10}O_2N_2$. MW, 178. Needles. M.p. 188°. Sol. H_2O.
Anhydride: needles. M.p. 92°. B.p. 295°. Very sol. EtOH, $CHCl_3$, C_6H_6.
Imide: 4-methylphthalimide. Needles from EtOH. M.p. 196°. Sol. H_2O, Me_2CO. N-p-*Tolyl*: cryst. M.p. 180°. Sol. $CHCl_3$, AcOEt, C_6H_6. Insol. H_2O.

Findeklee, *Ber.*, 1905, **38**, 3543.
Mayer, Günther, *Ber.*, 1930, **63**, 1458.

3-Methylphthalide



$C_9H_8O_2$ MW, 148

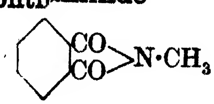
M.p. 8°. B.p. 284·5–285·5° (275–6°). Sol. EtOH, Et_2O. Spar. sol. pet. ether. Insol. H_2O, cold alkalis. Volatile in steam.

Tasman, *Rec. trav. chim*, 1927, **46**, 671.

5-Methylphthalide.
Needles from pet. ether. M.p. 119°. Sol. hot dil. NaOH.

Mayer, Schäfer, Rosenbach, *Chem. Abstracts*, 1930, **24**, 839.
Perkin, Stone, *J. Chem. Soc.*, 1925, **127**, 2285.

***N*-Methylphthalimide**

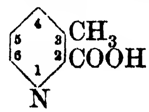


$C_9H_7O_2N$ MW, 161

Needles from EtOH.Aq. M.p. 133–4°. B.p. 285°. Sublimes in leaflets. Sol. EtOH. Prac. insol. cold H_2O.

Bülow, Deseniss, *Ber.*, 1906, **39**, 2278.
Breslauer, Pictet, *Ber.*, 1907, **40**, 3784.

3-Methylpicolinic Acid (*3-Methylpyridine-2-carboxylic acid, β-picoline-2-carboxylic acid*)



$C_7H_7O_2N$ MW, 137

Prisms from EtOH. M.p. 111°. Very sol. H_2O.

$B_2,H_2PtCl_6,2H_2O$: prisms from EtOH. M.p. 192° decomp. Sol. H_2O.

Zincke, Winzheimer, *Ann.*, 1896, **290**, 355.

6-Methylpicolinic Acid (*6-Methylpyridine-2-carboxylic acid, α-picoline-6-carboxylic acid*)

Needles. M.p. 127° (96–7°, 84–5°).

Me ester: $C_8H_9O_2N_2$. MW, 151. Needles from $CHCl_3$. M.p. 29°.

Et ester: $C_9H_{11}ON_2$. MW, 165. B.p. 245°, 133°/35 mm.

Amide: $C_7H_8ON_2$. MW, 136. Needles from H_2O. M.p. 116°.

Hydrochloride: cryst. from EtOH–Et_2O. M.p. 202·5–203·5° decomp.

Cu salt: blue cryst. + $1H_2O$. M.p. 253–5° decomp.

Meyer, *Rec. trav. chim.*, 1925, **44**, 328.
Winterfeld, Holschneider, *Ber.*, 1931, **64**, 148.
Koenigs, Happe, *Ber.*, 1903, **36**, 2908.

Methylpimanthrene.

See Homopimanthrene.

1-Methylpimelic Acid (*Hexane-1 : 5-dicarboxylic acid*)

$CH_3 \cdot CH \cdot COOH$
$[CH_2]_3$
$CH_2 \cdot COOH$

$C_8H_{14}O_4$ MW, 174

Cryst. from C_6H_6. M.p. 59°. B.p. 223–4°/15 mm. $k = 3{\cdot}15 \times 10^{-5}$ at 25°. Dist. with lime ⟶ 2-methylcyclohexanone.

Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 140°/12 mm. (132–7°/23 mm.).

Dianilide: $C_{20}H_{22}O_2N_2$. MW, 322. Needles from EtOH.Aq. M.p. 166–7°.

Einhorn, Ehret, *Ann.*, 1897, **295**, 175.
Dieckmann, *Ann.*, 1901, **317**, 108.

2-Methylpimelic Acid (*2-Methylpentane-1 : 5-dicarboxylic acid*)

$CH_2 \cdot COOH$
$CH_3 \cdot CH$
$[CH_2]_2$
$CH_2 \cdot COOH$

$C_8H_{14}O_4$ MW, 174

Cryst. M.p. 48–50°. Sol. EtOH, Et_2O, $CHCl_3$, C_6H_6. Insol. ligroin. Dist. with lime ⟶ 3-methylcyclohexanone.

Di-Et ester: b.p. 155–60°/25 mm.

Dianilide: cryst. from EtOH.Aq. M.p. 136°.

Einhorn, Ehret, *Ann.*, 1897, **295**, 180.

3-Methylpimelic Acid (*3-Methylpentane-1 : 5-dicarboxylic acid*)

$CH_2 \cdot COOH$
CH_2
$CH_3 \cdot CH$
CH_2
$CH_2 \cdot COOH$

$C_8H_{14}O_4$ MW, 174

Plates from H_2O. M.p. 56–7°. Sol. EtOH, Et_2O, C_6H_6. Dist. with lime ⟶ 4-methylcyclohexanone.

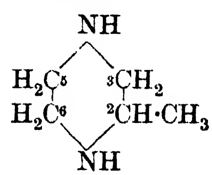
Ca salt: sol. H_2O. Insol. abs. EtOH.

Di-Et ester: yellowish oil. B.p. 160–7°/31 mm.

Dianilide: needles from EtOH.Aq. M.p. 158–9°.

Einhorn, Ehret, *Ann.*, 1897, **295**, 185.

2-Methylpiperazine



$C_5H_{12}N_2$ MW, 100

Leaflets. M.p. 62°. B.p. 155–155·5°. Sol. H_2O, EtOH, $CHCl_3$, C_6H_6.

B,2HCl: needles from EtOH. M.p. 248–9°. Very sol. H_2O.

$B,2HAuCl_4$: m.p. 220° decomp. (235°). Spar. sol. H_2O, EtOH.

Dinitroso deriv.: plates from H_2O. M.p. 71°. Sol. EtOH. Spar. sol. Et_2O.

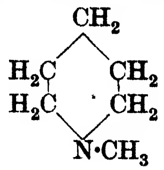
1 : 4-N-*Dibenzoyl*: leaflets from EtOH.Aq. M.p. anhyd. 146–7°. Very sol. EtOH. Spar. sol. Et_2O.

1 : 4-N-*Di-p-toluenesulphonyl*: cryst. from EtOH. M.p. 174°. Sol. Me_2CO.

Picrate: yellow plates. Decomp. at 276–8°.

Stoehr, *J. prakt. Chem.*, 1895, **51**, 472.
Esch, Marckwald, *Ber.*, 1900, **33**, 762.
Wrede, Bruch, Keil, *Z. physiol. Chem.*, 1931, **200**, 133.

***N*-Methylpiperidine** (*Methylpiperidylamine*)



$C_6H_{13}N$ MW, 99

B.p. 107°. D_4^{20} 0·820. $n_D^{21\cdot6}$ 1·4378.
B,HCl : very hygroscopic needles. M.p. 185°.
B,HBr : m.p. 182–4°.
B_2,H_2PtCl_6 : orange needles or plates from EtOH. M.p. 210–12° decomp. (194°). Sol. H_2O. Spar. sol. EtOH.
Methobromide : m.p. 175–80°.
Methiodide : prisms from EtOH. Decomp. at 334°.
Picrate : m.p. 148°.

v. Braun, Müller, Beschke, *Ber.*, 1906, **39**, 4351.
Haase, Wolffenstein, *Ber.*, 1904, **37**, 3233.
Eschweiler, *Ber.*, 1905, **38**, 881.

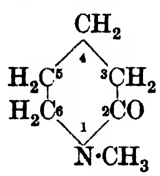
Methylpiperidine.
See Pipecoline.

***N*-Methylpiperidine-carboxylic Acid.**
See under Hexahydronicotinic Acid *and* Hexahydropicolinic Acid.

***N*-Methylpiperidine-2 : 6-diacetic Acid.**
See Lobelinic Acid.

***N* - Methylpiperidine - 2 : 6 - dicarboxylic Acid.**
See Scopolinic Acid.

***N*-Methyl-2-piperidone**



$C_6H_{11}ON$ MW, 113

Hygroscopic liq. B.p. 102°/12 mm., 94–5°/9 mm. D_{25}^{25} 1·0293. n_D^{25} 1·4801. Misc. with H_2O, EtOH, Et_2O. 20% HCl at 160° ⟶ 4-methylaminovaleric acid.
B,HCl : cryst. from EtOH–Et_2O. M.p. 104°.
$B,HgCl_2,H_2O$: needles from H_2O. M.p. 119–20°.

Prill, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 1241.
Räth, *Ann.*, 1931, **489**, 113.

3-Methyl-2-piperidone.
Hygroscopic cryst. from ligroin. M.p. 53·5–55°. B.p. 249–50°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. cold ligroin.

Aschan, *Ber.*, 1891, **24**, 2445.

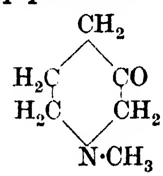
4-Methyl-2-piperidone.
M.p. 87°. B.p. 147–8°/15 mm.
B,HCl : m.p. 148–9°.

Wallach, *Ann.*, 1900, **312**, 184.

6-Methyl-2-piperidone.
Leaflets from AcOEt. M.p. 84°. Sol. H_2O, EtOH, Et_2O.

Bunzel, *Ber.*, 1889, **22**, 1056.

***N*-Methyl-3-piperidone**

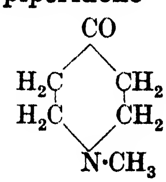


$C_6H_{11}ON$ MW, 113

B.p. 63–4°/13 mm. D_{25}^{25} 0·9684. n_D^{25} 1·4559.
B,HCl : m.p. 110–11°.

Prill, McElvain, *J. Am. Chem. Soc*, 1933, **55**, 1241.

***N*-Methyl-4-piperidone**



$C_6H_{11}ON$ MW, 113

B.p. 56–8°/11 mm. D_{25}^{25} 0·9725. n_D^{25} 1·4580.
B,HCl : m.p. 94–5°.

See previous reference.

Methylpiperidylamine.
See N-Methylpiperidine.

Methylpiperidyl-ethylene.
See Methylvinylpiperidine.

***N*-Methylproline.**
See Hygric Acid.

2-Methylpropane-1 : 3-diol.
See 2-Methylglutaraldehyde.

2 - Methylpropane - 1 : 2 : 3 - tricarboxylic Acid.
See 2-Methyltricarballylic Acid.

1-Methylpropargyl Alcohol (1-*Butinol*-3, 1-*hydroxyethylacetylene*)

HC⋮C·CH(OH)·CH_3

C_4H_6O MW, 70

Lachrymatory oil. B.p. 106·5–107·5°. D^{20} 0·8858. n_D^{20} 1·4265.

Lespieau, *Bull. soc. chim.*, 1926, **39**, 993.
Hess, Munderloh, *Ber.*, 1918, **51**, 383.

3-Methylpropargyl Alcohol (*2-Butinol*-1, *methyl-hydroxymethyl-acetylene*)

$CH_3{\cdot}C{\vdots}C{\cdot}CH_2OH$

C_4H_6O MW, 70

B.p. 141–3°, 52–3°/14 mm. D^{21} 0·958. n_D^{21} 1·453.

Acetyl: b.p. 156–8°. D^{20} 0·995. n_D^{20} 1·434.

Me ether: C_5H_8O. MW, 84. B.p. 100–1°. D^{21} 0·854. n_D^{21} 1·423.

Yvon, *Compt. rend.*, 1925, **180**, 748.

Methylpropargylamine

$HC{\vdots}C{\cdot}CH_2{\cdot}NH{\cdot}CH_3$

C_4H_7N MW, 69

Liq. with ammoniacal odour.

B,HI: needles. M.p. 83°.

Acid oxalate: needles from EtOH. M.p. 141°. Spar. sol. EtOH.

Paal, Hermann, *Ber.*, 1889, **22**, 3083.

Methylpropargylaniline

$C_6H_5{\cdot}N(CH_3){\cdot}CH_2{\cdot}C{\vdots}CH$

$C_{10}H_{11}N$ MW, 145

B.p. 108–10°/13 mm.

Hydrochloride: needles from EtOH–Et_2O. M.p. 142°.

Methiodide: cryst. from EtOH. M.p. 130–2°.

v. Braun, Fussgänger, Kühn, *Ann.*, 1925, **445**, 206.

Methyl propargyl Ether

$HC{\vdots}C{\cdot}CH_2{\cdot}O{\cdot}CH_3$

C_4H_6O MW, 70

B.p. 61–2°. $D^{12 \cdot 5}$ 0·83. Heat of comb. (vapour) C_p 603·83 Cal. $NH_3.AgNO_3 \longrightarrow$ lemon-yellow ppt.

Liebermann, *Ann.*, 1865, **135**, 287.
Henry, *Ber.*, 1872, **5**, 455.

Methylpropenylacetic Acid.
See 1-Methyl-2-ethylidenepropionic Acid.

Methylpropenylacrylic Acid.
See 1-Methylsorbic Acid *and* 2-Methylsorbic Acid.

α-Methylpropenylbenzene.
See 2-Phenyl-2-butylene.

Methylpropenylcarbinol (*2-Pentenol*-4)

$CH_3{\cdot}CH{:}CH{\cdot}CH(OH){\cdot}CH_3$

$C_5H_{10}O$ MW, 86

B.p. 122°, 79–80°/150 mm., 64°/62 mm. $D_4^{17 \cdot 95}$ 0·8382. n_D^{20} 1·4277.

Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 663.
Baudrenghien, *Chem. Abstracts*, 1929, **23**, 4196.
Auwers, Westermann, *Ber.*, 1921, **54**, 2996.

Methyl propenyl Ketone.
See Ethylideneacetone.

Methylpropenylphenol.
See Propenylcresol.

Methylpropiolic Acid.
See Tetrolic Acid.

Methyl propionate

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}OCH_3$

$C_4H_8O_2$ MW, 88

B.p. 79·7°. D_4^0 0·93871, D_4^{20} 0·9151, $D_4^{78 \cdot 5}$ 0·84225. $n_D^{18 \cdot 9}$ 1·37697. Heat of comb. C_p 553·95 Cal. Crit. temp. 257·4°.

M.L.B., D.R.P., 315,021, (*Chem. Zentr.*, 1919, IV, 1104).
Young, Thomas, *J. Chem. Soc.*, 1893, **63**, 1219.
Přibram, Handl, *Monatsh.*, 1881, **2**, 681.

***unsym.*-Methylpropionylacetone** (*3-Methylhexandione*-2 : 4, *3-propionylbutanone*, unsym.-*acetylpropionylethane*, *2 : 4-diketo-3-methylhexane*)

$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CH(CH_3){\cdot}CO{\cdot}CH_3$

$C_7H_{12}O_2$ MW, 128

Oil. B.p. 179–80°/730 mm., 85–7°/9–11 mm. Alc. $FeCl_3 \longrightarrow$ intense bluish-purple col.

Cu salt: greenish-grey needles from C_6H_6. M.p. 175–7° decomp.

Morgan, Drew, Ackermann, *J. Chem. Soc.*, 1924, **125**, 745.

Methylpropiophenone.
See Ethyl tolyl Ketone.

Methylpropylacetaldehyde.
See 1-Methylvaleraldehyde.

Methylpropylacetic Acid.
See 1-Methylvaleric Acid.

***unsym.*-Methylpropylacetone.**
See 3-Methylhexanone-2.

Methylpropylacetylcarbinol.
See 3-Methyl-3-hexanolone-2.

Methylpropylacetylene.
See 2-Hexine.

1-Methyl-2-propylacrylic Acid.
See 1-Methyl-1-hexenic Acid.

2-Methyl-2-propylacrylic Acid.
See 2-Methyl-1-hexenic Acid.

3-Methyl-1-propyladipic Acid (2-*Methylheptane*-1 : 4-*dicarboxylic acid*)

$$\begin{array}{l} CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{\cdot}COOH \\ \qquad\qquad\quad\;\; | \\ \qquad\qquad\quad CH_2 \\ \qquad\qquad\quad\;\; | \\ \qquad\quad CH_3{\cdot}CH \\ \qquad\qquad\quad\;\; | \\ \qquad\qquad\quad CH_2{\cdot}COOH \end{array}$$

$C_{10}H_{18}O_4$ MW, 202

M.p. 110°. $[\alpha]_D$ + 27·53° in EtOH. Spar. sol. H_2O, Et_2O.

Haller, Desfontaines, *Compt. rend.*, 1905, **140**, 1206.

Methylpropylallylcarbinol.
See 4-Methyl-1-heptenol-4.

Methylpropylamine

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CH_3$$

$C_4H_{11}N$ MW, 73

Liq. with fishy odour. B.p. 62–4°. D^{17} 0·7204.

B,HCl : deliquescent plates from Et_2O. M.p. 140°.

N-*Nitroso* : methylpropylnitrosamine. $C_4H_{10}ON_2$. MW, 102. B.p. 175°.

B,$(COOH)_2$: plates. M.p. 155°.

B_2,H_2PtCl_6 : m.p. 200–2° decomp. Sol. H_2O. Spar. sol. EtOH.

$B,HAuCl_4$: yellow needles.

Picrate : needles. M.p. 43°. Sol. H_2O, EtOH, Me_2CO.

Graymore, *J. Chem. Soc.*, 1931, 1494.
Stoermer, v. Lepel, *Ber.*, 1896, **29**, 2113.

Methylpropylamylcarbinol (4 - *Methylnonanol*-4)

$$\begin{array}{c} \qquad CH_3 \\ \qquad | \\ CH_3{\cdot}[CH_2]_4{\cdot}C(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH_3 \end{array}$$

$C_{10}H_{22}O$ MW, 158

B.p. 92–3°/15 mm. n_D^{20} 1·4338. D_4^{25} 0·8245.

Whitmore, Williams, *J. Am. Chem. Soc.*, 1933, **55**, 408.

Methylpropylaniline

$$C_6H_5{\cdot}N{<}\begin{array}{l}CH_3\\CH_2{\cdot}CH_2{\cdot}CH_3\end{array}$$

$C_{10}H_{15}N$ MW, 149

Yellowish oil. B.p. 225° (212°).

B,HCl : m.p. 106°.

Picrate : yellow cryst. from EtOH. M.p. 109° (103–4°).

Stoermer, v. Lepel, *Ber.*, 1896, **29**, 2112.

Methylpropylbenzene.
See Propyltoluene.

Methylpropylbenzoic Acid.
See Propyltoluic Acid.

Methylpropylbutylcarbinol (4 - *Methyloctanol*-4)

$$\begin{array}{c} \qquad CH_3 \\ \qquad | \\ CH_3{\cdot}[CH_2]_3{\cdot}C(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH_3 \end{array}$$

$C_9H_{20}O$ MW, 144

Oil. B.p. 178–9°/732 mm., 78·5–79·5°/15 mm., 56·2–56·4°/4 mm. D_4^{20} 0·8267. n_D^{20} 1·4327.

Whitmore, Woodburn, *J. Am. Chem. Soc.*, 1933, **55**, 363.

1-Methyl-1-propylbutyric Acid.
See 3-Methylhexane-3-carboxylic Acid.

Methylpropylcarbinol (sec.-n-*Amyl alcohol*, 2-*pentanol*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3$$

$C_5H_{12}O$ MW, 88

d-.

B.p. 118·5–119·5°. D_4^{20} 0·8103. n_D^{20} 1·4053. $[\alpha]_D^{19}$ + 13·86° ($[\alpha]_D^{20}$ + 7·65°).

Acetyl : b.p. 130–1°. D_4^{18} 0·8692. D_4^{91} 0·7916. n_D^{20} 1·3960. $[\alpha]_D^{20}$ + 17·16°.

Acid phthalate : m.p. 34°. $[\alpha]_D$ + 36·94° in $CHCl_3$.

Laurate : b.p. 153°/5 mm. D_4^{16} 0·8615, D_4^{134} 0·7795. n_D^{20} 1·4344. $[\alpha]_D^{20}$ + 10·44°.

1-*Naphthylurethane* : m.p: 88–91°. $[\alpha]_D^{20}$ + 13·3° in EtOH.

l-.

B.p. 116–20°. $[\alpha]_D^{20}$ − 9·06°.

1-*Naphthylurethane* : cryst. from EtOH.Aq. M.p. 71–3°. $[\alpha]_D^{20}$ − 2·8° in EtOH.

dl-.

B.p. 118·9°. D_4^{20} 0·8303, D_4^{25} 0·80528. n_D^{20} 1·4127, n_D^{25} 1·4041. Sol. 6 vols. H_2O. Gives iodoform reaction.

Acetyl : b.p. 133·5°.

Allophanate : m.p. 154°.

Al deriv. : $Al(OC_5H_{11})_3$. B.p. 210-12°/8 mm.

Acid phthalate : m.p. 60–1°.

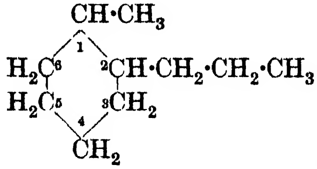
1-*Naphthylurethane* : cryst. from ligroin. M.p. 76° (74·5°).

p-*Xenylurethane* : m.p. 94·5°.

1-*Nitroanthraquinone-2-carboxylate* : m.p. 136–7°.

Wood, Scarf, *J. Soc. Chem. Ind.*, 1923, **42**, 15T.
Brunel, *J. Am. Chem. Soc.*, 1923, **45**, 1337.
Levene, Haller, Walti, *J. Biol. Chem.*, 1927, **72**, 591.
Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 65.
Skita, *Ber.*, 1915, **48**, 1497.

1-Methyl-2-propylcyclohexane (2-*Propylhexahydrotoluene*)



$C_{10}H_{20}$ MW, 140

B.p. 175·5–176°/755·5 mm., 56°/13 mm. D_4^{19} 0·8130. n_D^{19} 1·4468.

Kuhn, Deutsch, *Ber.*, 1932, **65**, 47.
Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, **55**, 3332.

1-Methyl-3-propylcyclohexane (3-*Propylhexahydrotoluene*).

B.p. 164–5° (171–3°). D_4^{21} 0·7895. n_D^{20} 1·4377.

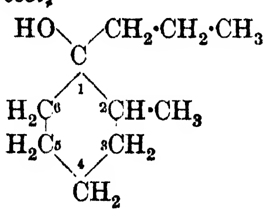
See second reference above and also
Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1085.

1-Methyl-4-propylcyclohexane (4-*Propylhexahydrotoluene*).

B.p. 174·3–177·1°. D_{20}^{20} 0·798. n_D^{20} 1·4393.

Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, **55**, 3332.

2-Methyl-1-propylcyclohexanol (2-*Propylhexahydro*-o-*cresol*)



$C_{10}H_{20}O$ MW, 156

Liq. with camphor-like odour. B.p. 97–8°/34 mm. D^{20} 0·919. n_D^{20} 1·48.

Acetyl: b.p. 107–10°/30 mm. D^{20} 0·956. n_D^{20} 1·469.

Murat, *Ann. chim. phys.*, 1909, **16**, 117.

3-Methyl-1-propylcyclohexanol (3-*Propylhexahydro*-m-*cresol*).

B.p. 198–200°, 96–8°/20 mm. D_4^{24} 0·8903. n_D^{24} 1·4566.

Acetyl: b.p. 108–10°/20 mm. D^{20} 0·9248. n_D 1·454.

Phenylurethane: m.p. 112°.

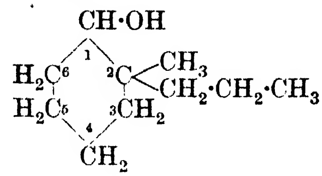
Mailhe, Murat, *Bull. soc. chim.*, 1910, **7**, 1085.

4-Methyl-1-propylcyclohexanol (4-*Propylhexahydro*-p-*cresol*).

Liq. with odour resembling camphor. B.p. 97°/20 mm.

Sabatier, Mailhe, *Ann. chim.*, 1907, **10**, 560.

2-Methyl-2-propylcyclohexanol (1-*Propylhexahydro*-o-*cresol*)



$C_{10}H_{20}O$ MW, 156

B.p. 115°/25 mm. D_4^{25} 0·9146. n_D^{24} 1·46880. Forms an oily phenylurethane.

Cornubert, *Ann. chim.*, 1921, **16**, 203.

4-Methyl-2-propylcyclohexanol (3-*Propylhexahydro*-p-*cresol*).

Liq. with odour resembling menthol. B.p. 112°/18 mm. $D_4^{24.2}$ 0·8944. n_D^{24} 1·46060.

Phenylurethane: m.p. 115°.

Cornubert, *Ann. chim.*, 1921, **16**, 206.

5-Methyl-2-propylcyclohexanol (4-*Propylhexahydro*-m-*cresol*).

l-.

B.p. 113°/23 mm., 102–4°/15 mm. D_4^{19} 0·8976. $[\alpha]_D$ − 18° 12′.

Acetyl: b.p. 227–30°.

dl-.

Liq. with odour resembling menthol. B.p. 107–8°/17 mm. D_4^{25} 0·8944. n_D^{24} 1·45981. Forms an oily phenylurethane.

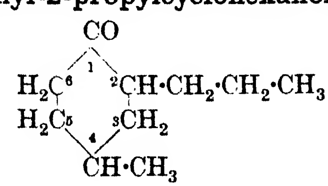
Cornubert, *Ann. chim.*, 1921, **16**, 205.

6-Methyl-2-propylcyclohexanol (3-*Propylhexahydro*-o-*cresol*).

Liq. with odour resembling menthol. B.p. 115°/25 mm. Forms an oily phenylurethane.

Cornubert, *Compt. rend.*, 1914, **159**, 78.

4-Methyl-2-propylcyclohexanone



$C_{10}H_{18}O$ MW, 154

Liq. with odour resembling menthone. B.p. 217°/750 mm., 98°/12 mm. D_4^{24} 0·8914. n_D^{24} 1·45018.

Oxime: needles. M.p. 80–1°.

Cornubert, *Ann. chim.*, 1921, **16**, 193.

5-Methyl-2-propylcyclohexanone.

d-.

Liq. with odour resembling menthone. B.p. 217–21°, 97–8°/18 mm. D_4^{15} 0·8994. $[\alpha]_D$ + 3° 21′.

Semicarbazone: m.p. 158°.

dl-.

B.p. 215–17°, 97°/12 mm. D_4^{24} 0·8944. n_D^{19} 1·4523.

Oxime: m.p. 87–8°.

Semicarbazone: m.p. 149–52°.

Cornubert, *Ann. chim.*, 1921, **16**, 191.

6-Methyl-2-propylcyclohexanone.

Liq. with odour resembling menthone. B.p. 213·5°.

Oxime: plates. M.p. 70°.

Cornubert, *Compt. rend.*, 1914, **159**, 77.

Methyl propyl Diketone.

See Acetylbutyryl.

2-Methylpropylene.

See Isobutylene.

2-Methylpropylenediamine.

See Isobutylenediamine.

Methyl propyl Ether

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_3$

$C_4H_{10}O$ MW, 74

B.p. 39°. D_4^{13} 0·7356. $n_D^{14\cdot3}$ 1·36019.

Michael, Wilson, *Ber.*, 1906, **39**, 2573.

Bennett, Philip, *J. Chem. Soc.*, 1928, 1931.

Methylpropylethylene.

See 2-Hexene *and* 2-Methyl-1-pentene.

1-Methyl-2-propylethylene Glycol.

See Hexandiol-2 : 3.

1-Methyl-3-propylglutaric Acid.

See Heptane-2 : 4-dicarboxylic Acid.

1-Methyl-3-propylglycerol.

See Heptantriol-2 : 3 : 4.

Methylpropylglyoxal.

See Acetylbutyryl.

Methylpropylglyoxime.

See under Acetylbutyryl.

1-Methyl-1-propylideneacetone.

See 3-Methyl-3-hexenone-2.

1-Methylpropylidene-malonic Acid.

See 2-Methyl-1-butylene-1 : 1-dicarboxylic Acid.

Methylpropylisobutylcarbinol.

2 : 4-Dimethylheptanol-4, *q.v.*

Methylpropylisopropylcarbinol.

See 2 : 3-Dimethylhexanol-3.

Methylpropylisopropylmethane.

See 2 : 3-Dimethyl-*n*-hexane.

Methylpropylketazine.

See under Methyl propyl Ketone.

Methyl propyl Ketone (*2-Ketopentane, 2-pentanone*)

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}CH_3$

$C_5H_{10}O$ MW, 86

B.p. 102°. D_{15}^{15} 0·81236, D_{25}^{25} 0·80435, D_4^{20} 0·8089. $n_D^{20\cdot2}$ 1·38946. Heat of comb. (liq.) C_p 740·6 Cal., C_v 739·5 Cal.; (vapour) C_p 754·19 Cal. H(+ Ni) at 130–50° ⟶ methylpropylcarbinol.

Oxime: b.p. 167°. $D_{4\,vac.}^{20}$ 0·9095. n_D^{20} 1·4450.

Semicarbazone: m.p. 110°.

Azine: methylpropylketazine. B.p. 198–200°, 95°/12 mm. D^{24} 0·8330.

Phenylhydrazone: b.p. 153°/12 mm.

p-*Nitrophenylhydrazone*: m.p. 117°.

2 : 4 - *Dinitrophenylhydrazone*: yellowish-orange cryst. M.p. 141°.

Di-Et acetal: b.p. 57·4°/185 mm. D^{20} 0·8409.

Wagner, Saytzeff, *Ann.*, 1875, **179**, 322.

Meerwein, *Ann.*, 1913, **398**, 249.

Senderens, *Ann. chim.*, 1913, **28**, 301.

I.G., E.P., 318,124, (*Chem. Abstracts*, 1930, **24**, 2140).

Commercial Solvents Corp., U.S.P., 1,757,830, (*Chem. Abstracts*, 1930, **24**, 3247).

Methylpropylmalonic Acid (*Pentane-2 : 2-dicarboxylic acid*)

$CH_3{\cdot}CH_2{\cdot}CH_2 \diagdown C \diagup COOH$ / $CH_3 \diagup \quad \diagdown COOH$

$C_7H_{12}O_4$ MW, 160

Cryst. from C_6H_6. M.p. 106–7° (96°). Sol. H_2O, Et_2O, $CHCl_3$. $k = 2{\cdot}12 \times 10^{-3}$ at 25°.

Di-Me ester: $C_9H_{16}O_4$. MW, 188. B.p. 206–9°, 101°/20 mm. D_4^{23} 1·0250. n_D 1·42445.

Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 220–3°.

Diamide: $C_7H_{14}O_2N_2$. MW, 158. Cryst. from H_2O. M.p. 182°.

Et ester-nitrile: $C_9H_{15}O_2N$. MW, 169. B.p. 216–22°.

Meyer, *Monatsh.*, 1906, **27**, 1092.

Stiassny, *Monatsh.*, 1891, **12**, 593.

Vogel, *J. Chem. Soc.*, 1934, 337, 340.

Methylpropylnitrosamine.

See under Methylpropylamine.

Methylpropylnonylcarbinol.

See 4-Methyltridecanol-4.

Methylpropylphenylcarbinol (*2-Hydroxy-2-phenylpentane, 2-phenylpentanol-2, 2-phenyl-*sec.-n-*amyl alcohol*)

$C_6H_5{\cdot}C(CH_3)(OH){\cdot}CH_2{\cdot}CH_2{\cdot}CH_3$

$C_{11}H_{16}O$ MW, 164

Oil. B.p. 216°, 112–13°/14 mm. $D_4^{21\cdot5}$ 0·9723.

Klages, *Ber.*, 1902, **35**, 2643.

N-Methyl-2-propylpiperidine.
See N-Methylconiine.

Methyl propyl selenide

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}Se{\cdot}CH_3$

$C_4H_{10}Se$ MW, 137

B.p. 114°. $D_4^{20\cdot4}$ 1·2445. $n_D^{20\cdot4}$ 1·48121.

Tschugaeff, *Ber.*, 1909, **42**, 52.

1-Methyl-2-propylsuccinic Acid (*Hexane-2 : 3-dicarboxylic acid*)

$CH_3{\cdot}CH{\cdot}COOH$
$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH{\cdot}COOH$

$C_8H_{14}O_4$ MW, 174

Trans :
Needles. M.p. 158–60° (156–7°). Sol. EtOH, Et_2O, hot H_2O. Spar. sol. $CHCl_3$. Insol. C_6H_6. $k = 3{\cdot}35 \times 10^{-4}$.
Anilic acid : m.p. 166–7°.

Cis :
Cryst. from C_6H_6. M.p. 92–3°. Sol. cold H_2O. $k = 2{\cdot}71 \times 10^{-4}$.
Anilic acid : m.p. 82–4°.

Bone, Sprankling, *J. Chem. Soc.*, 1900, **77**, 1302.
Küster, Haas, *Ann.*, 1906, **346**, 21.

***sym*.-Methylpropylthiourea**

$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CS{\cdot}NH{\cdot}CH_3$

$C_5H_{12}N_2S$ MW, 132

Leaflets from EtOH.Aq. M.p. 79°. Sol. EtOH, Et_2O, $CHCl_3$, Me_2CO, CS_2, C_6H_6. Spar. sol. cold H_2O. Insol. ligroin.

Hecht, *Ber.*, 1890, **23**, 284.

***unsym*.-Methylpropylurea**

CH_3
$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}N{\cdot}CO{\cdot}NH_2$

$C_5H_{12}ON_2$ MW, 116

Cryst. from C_6H_6. M.p. 95°. Sol. H_2O, EtOH, $CHCl_3$, hot C_6H_6. Spar. sol. Et_2O, ligroin.

Stoermer, v. Lepel, *Ber.*, 1896, **29**, 2114.

1-Methyl-1-propyl-*n*-valeric Acid (*4-Methylheptane-4-carboxylic acid, methyldipropylacetic acid, 1 : 1-dipropylpropionic acid*)

CH_3
$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}C{\cdot}COOH$
C_3H_7

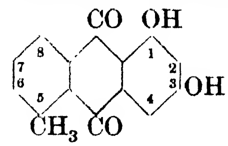
$C_9H_{18}O_2$ MW, 158

Leaflets. M.p. 44°. B.p. 118–22°/14 mm.

Meerwein, *Ann.*, 1919, **419**, 141.

2-Methylpurpuroxanthin.
See Rubiadin.

5-Methylpurpuroxanthin (*5-Methylxanthopurpurin, 5 : 7-dihydroxy-1-methylanthraquinone*)



$C_{15}H_{10}O_4$ MW, 254

Yellowish-brown needles from chlorobenzene. M.p. 285–6°.
Diacetyl : yellow needles from AcOH. M.p. 165–6°.

Mayer, Stark, *Ber.*, 1931, **64**, 2004, 2008.

6-Methylpurpuroxanthin (*6-Methylxanthopurpurin, 5:7-dihydroxy-2-methylanthraquinone*).
Present in small amount in root bark of *Morinda umbellata*. Yellow needles from cumene. M.p. 269° (267°). Sol. EtOH, AcOH. Spar. sol. Et_2O, C_6H_6. Sublimes in leaflets. Dist. with Zn dust ⟶ 2-methylanthracene.
Diacetyl : yellow needles from EtOH. M.p. 165–7°.

Mitter, Goswami, *J. Indian Chem. Soc.*, 1931, **8**, 688.
Perkin, Hummel, *J. Chem. Soc.*, 1894, **65**, 863.

7-Methylpurpuroxanthin (*7-Methylxanthopurpurin, 6 : 8-dihydroxy-2-methylanthraquinone*).
Yellow needles from AcOH. M.p. 297°. Conc. H_2SO_4 ⟶ blood-red sol. Alkalis or NH_4OH ⟶ cherry-red sol.

Mayer, Günther, *Ber.*, 1930, **63**, 1463.

8-Methylpurpuroxanthin (*8-Methylxanthopurpurin, 6 : 8-dihydroxy-1-methylanthraquinone*).
Orange prisms from Et_2O. M.p. 246°. Sol. EtOH, Et_2O. Sol. alkalis with red col.
Diacetyl : needles from EtOH. M.p. 195°.

Schunck, Marchlewski, *J. Chem. Soc.*, 1896, **69**, 70.

***N*-Methylputrescine** (*N-Methyltetramethylenediamine*)

$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}NH{\cdot}CH_3$

$C_5H_{14}N_2$ MW, 102

Chloroaurate : m.p. 192°.
Chloroplatinate : decomp. at 230·5°.
Mercurichloride : m.p. 149°.
Dipicrate : m.p. 229–230·5°.

Picrolonate: decomp. at 254–5°.
NN′-*Dibenzoyl*: m.p. 115·5°.

Dudley, Thorpe, *Biochem. J.*, 1925, **19**, 845.

2-Methylputrescine (*2-Methyltetramethylenediamine, 1 : 4-diamino-2-methylbutane, 1 : 4-diaminoisopentane*)

$$H_2N{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}NH_2$$

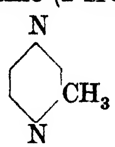
$C_5H_{14}N_2$ MW, 102

d-.
B.p. 170°. Fumes in air.
B,2HCl: cryst. from MeOH–Et_2O. M.p. 173°. $[\alpha]_D^{22}$ + 5·58° in H_2O.
B,H_2PtCl_6: orange-yellow leaflets. Decomp. at 200°. Spar. sol. cold H_2O.
Dibenzoyl: cryst. from 96% EtOH. M.p. 154°. $[\alpha]_D^{16}$ + 1·19° in Py.
Picrate: yellow needles. Decomp. at about 180°.

dl-.
B.p. 172–3°. D_4^{20} 0·8836. $k = 5{\cdot}4 \times 10^{-4}$ at 25°. Fumes strongly in air.
B,2HCl: needles from abs. EtOH. M.p. 144–5°.
B,2$HAuCl_4$: prisms. M.p. anhyd. 191°.
Picrate: needles. Decomp. at 150–60°.

v. Braun, Jostes, *Ber.*, 1926, **59**, 1093.
Euler, *Ber.*, 1895, **28**, 2954.
Bayer, D.R.P., 216,808, (*Chem. Zentr.*, 1910, I, 311).

2-Methylpyrazine (*2-Methyl-1 : 4-diazine*)

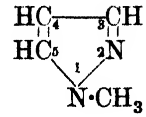


$C_5H_6N_2$ MW, 94

B.p. 136–7° (135°). D_4^{20} 1·0290. Misc. with H_2O, EtOH, Et_2O. Na + EtOH ⟶ 2-methylpiperazine.
B,2$HgCl_2$: needles from HCl. Decomp. at 194–5°.
B,$HAuCl_4$: yellow leaflets from HCl. M.p. 122–3° (rapid heat.), 180° (slow heat.). Cold H_2O ⟶ HCl + B,$AuCl_3$.
B,$AuCl_3$: yellow needles. M.p. 145–6°.
Picrate: yellow prisms from EtOH. M.p. 133°.
Methiodide: leaflets and needles from EtOH. M.p. 129–30°. Very sol. H_2O.

Brandes, Stöhr, *J. prakt. Chem.*, 1896, **54**, 490.
Stöhr, *J. prakt. Chem.*, 1895, **51**, 463.

1-Methylpyrazole

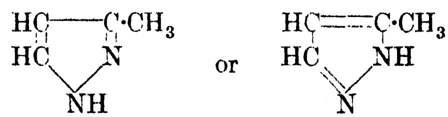


$C_4H_6N_2$ MW, 82

Oil with odour resembling pyridine. B.p. 127°. $D_4^{13\cdot7}$ 0·9929. $n_{He}^{13\cdot7}$ 1·47873.
B_2,H_2PtCl_6: orange prisms. M.p. 196–8° decomp.
Picrate: yellow needles from EtOH. M.p. 148°.
Methiodide: prisms from EtOH. M.p. 190°.

Knorr, *Ber.*, 1895, **28**, 716.
Auwers, Koolhaas, *Ann.*, 1924, **437**, 48.

3(5)-Methylpyrazole



$C_4H_6N_2$ MW, 82

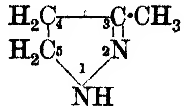
B.p. 204–5°/730 mm. $D_4^{16\cdot3}$ 1·0203. $n_{He}^{16\cdot3}$ 1·49717. Misc. with H_2O, EtOH, Et_2O. Slowly volatile in steam.
N-*Acetyl*: prisms. M.p. 29–30°. B.p. 70–1°/10 mm.
N-*Benzoyl*: b.p. 155–7°/14 mm.
N-o-*Nitrobenzoyl*: needles from EtOH. M.p. 120°.
B_2,H_2PtCl_6,$2H_2O$: m.p. 181° decomp. Sol. H_2O.
B_2,$PtCl_4$: yellow needles. M.p. 253° decomp.
B_2,$AgNO_3$: plates. M.p. 121°.
B_2,3$HgCl_2$: needles. M.p. 165–8°.
Picrate: needles. M.p. 144°. Very sol. H_2O.

Knorr, Macdonald, *Ann.*, 1894, **279**, 217, 225.
Auwers, Daniel, *J. prakt. Chem.*, 1925, **110**, 256.
Auwers, Koolhaas, *Ann.*, 1924, **437**, 48.

4-Methylpyrazole.
Oil. B.p. 204–5°/730 mm., 95°/13 mm. D_4^{20} 1·015. n_{He}^{20} 1·4920.
1-o-*Nitrobenzoyl*: needles from EtOH. M.p. 107°. B.p. 209–11°/15 mm. Sol. EtOH. Mod. sol. C_6H_6. Spar. sol. Et_2O.
Picrate: needles from H_2O. M.p. 142°.

Auwers, Cauer, *J. prakt. Chem.*, 1930, **126**, 166.

3-Methyl-2-pyrazoline (3-*Methyl*-4 : 5-*dihydropyrazole*)



$C_4H_8N_2$ MW, 84

B.p. 56°/15 mm.
Picrate : m.p. 153°.
Phenylurea : plates. M.p. 109°.

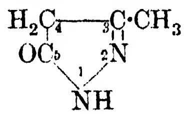
Freudenberg, Stoll, *Ann.*, 1924, **440**, 44.

5-Methyl-2-pyrazoline (5-*Methyl*-4 : 5-*dihydropyrazole*).

B.p. 180° decomp., 73°/55 mm. Misc. with H_2O, EtOH, Et_2O, $CHCl_3$.
N-*Benzoyl* : m.p. 156°.
Picrate : cryst. from EtOH. M.p. 126°.
Phenylurea : cryst. from MeOH. M.p. 127°.
Maleic acid salt : needles. M.p. 134°.

See above reference.

3-Methylpyrazolone-5



$C_4H_6ON_2$ MW, 98

Prisms from H_2O. M.p. 215° (219°). Sublimes in leaflets. Spar. sol. hot EtOH.
N-*Acetyl* : needles. M.p. 140°. Insol. Et_2O, C_6H_6.
4-*Isonitroso* : yellow needles. M.p. 194°. Sol. H_2O, EtOH.

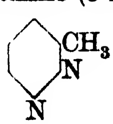
Thiele, Strange, *Ann.*, 1894, **283**, 30.

4-Methylpyrazolone-5.

Prisms from H_2O. M.p. 226–7°. Sol. H_2O, EtOH. Spar. sol. Et_2O. Insol. C_6H_6.

Auwers, Bähr, *J. prakt. Chem.*, 1927, **116**, 81 (*Footnote*).

3-Methylpyridazine (3-*Methyl*-1 : 2-*diazine*)



$C_5H_6N_2$ MW, 94

Oil. B.p. 214·5°. Misc. with H_2O. D_{26}^{26} 1·0486. Difficultly volatile in steam. Rapidly turns brown. Hygroscopic.
Picrate : needles. M.p. 143–4°.

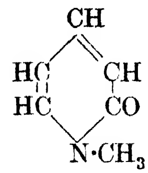
Poppenberg, *Ber.*, 1901, **34**, 3265.

Methylpyridine.
See Picoline.

Methylpyridine-2-carboxylic Acid.
See Methylpicolinic Acid.

Methylpyridine-3-carboxylic Acid.
See Methylnicotinic Acid *and* Homonicotinic Acid.

***N*-Methyl-α-pyridone**

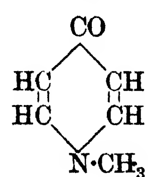


C_6H_7ON MW, 109

Liq. with aromatic odour. B.p. 250°/740 mm., 130°/14·5 mm., 126°/12·5 mm., 121°/10 mm. Solidifies in ice-salt freezing mixture. Strong base. Sol. H_2O, EtOH, Et_2O, $CHCl_3$, C_6H_6. Turns greenish-yellow in light.
B,HCl : needles. M.p. 166°. Sol. H_2O. In light or with $FeCl_3$ ⟶ reddish col.
B,HBr : prisms. M.p. 174°.
B_2,H_2PtCl_6 : m.p. 141°.
Hydroquinone add. comp. : $B_2,C_6H_6O_2$. Prisms from EtOH. M.p. 118°.
p-*Nitrophenol add. comp.* : m.p. 62°.
Picrate : yellow needles from EtOH. M.p. 145°.
Picrolonate : yellow needles from EtOH. M.p. 120°.
Styphnate : yellow needles from EtOH. M.p. 162°.

Fischer, Chur, *J. prakt. Chem.*, 1916, **93**, 363.

***N*-Methyl-γ-pyridone**



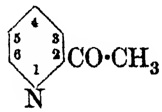
C_6H_7ON MW, 109

Hygroscopic cryst. M.p. 92–4°. B.p. 230–3°/13 mm.
B_2,H_2PtCl_6 : m.p. anhyd. 176° decomp.
$HgCl_2$ double salt : m.p. 177–80° decomp.

Tschitschibabin, Ossetrowa, *Ber.*, 1925, **58**, 1711.

Methylpyridylamine.
See Methylaminopyridine.

Methyl 2-pyridyl Ketone (2-*Acetylpyridine*, 2-*acetopyridine*)



C_7H_7ON MW, 121

B.p. 192° (188–9°). Sol. EtOH, Et_2O, acids. Turns yellow in air. Volatile in steam.

B,HCl : m.p. 183–5° decomp.

B,HNO_3 : m.p. 125° decomp.

Oxime : prisms from EtOH. M.p. 121°.

Phenylhydrazone : yellow cryst. from EtOH. M.p. 155°.

B,H_2PtCl_6 : yellowish-red prisms. M.p. 220°.

Picrate : yellow needles from EtOH. M.p. 131°.

Methiodide : m.p. 161°.

Ethiodide : m.p. 205°.

Pinner, *Ber.*, 1901, **34**, 4240.
Engler, Rosumoff, *Ber.*, 1891, **24**, 2527.

Methyl 3-pyridyl Ketone (3-*Acetylpyridine*, 3-*acetopyridine*).

B.p. 220°. Sol. H_2O, EtOH, Et_2O, acids. Turns yellow in air. Volatile in steam.

B,HCl : m.p. 80° decomp.

Oxime : cryst. from C_6H_6. M.p. 113°.

Phenylhydrazone : needles from EtOH. M.p. 137°.

B,$HgCl_2$: needles from H_2O. M.p. 158°.

Binz, Räth, *Ann.*, 1931, **486**, 106.
La Forge, *J. Am. Chem. Soc.*, 1928, **50**, 2480.

Methyl 4-pyridyl Ketone (4-*Acetylpyridine*, 4-*acetopyridine*).

Oil. B.p. 212–14°. Very sol. EtOH, Et_2O, acids. Insol. H_2O.

B_2,H_2PtCl_6 : leaflets. M.p. 205°.

B,$HgCl_2$: needles from EtOH. M.p. 183–4°.

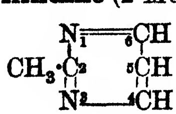
Oxime : needles from EtOH. M.p. 142°.

Phenylhydrazone : yellow needles from EtOH. M.p. 150°.

Picrate : leaflets. M.p. 129–30°.

Pinner, *Ber.*, 1901, **34**, 4250.

2-Methylpyrimidine (2-*Methyl*-1 : 3-*diazine*)



$C_5H_6N_2$ MW, 94

M.p. − 5°. B.p. 138°/758 mm. Misc. with H_2O.

Picrate : yellow needles. M.p. 106–7° (sinters at 97°).

Gabriel, *Ber.*, 1904, **37**, 3642.

4-Methylpyrimidine (4-*Methyl*-1 : 3-*diazine*).

Oil. B.p. 141·5–142°/762 mm. $D^{16}_{15\cdot9}$ 1·031. Misc. with H_2O. Na + EtOH ⟶ 1 : 3-diaminobutane.

B,2$HgCl_2$: needles. M.p. 198°.

B,$AuCl_3$: needles. M.p. about 115°.

Picrate : plates or needles. M.p. 131–4°.

Gabriel, Colman, *Ber.*, 1899, **32**, 1534.

5-Methylpyrimidine (5-*Methyl*-1 : 3-*diazine*).

Needles or plates. M.p. 30·5°. B.p. 151·5°/735 mm. Misc. with H_2O.

B,$AuCl_3$: m.p. 209°.

$HgCl_2$ double salt : m.p. 246°.

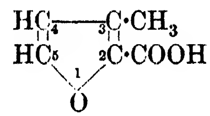
Picrate : m.p. 141°.

Gerngross, *Ber.*, 1905, **38**, 3396.

Methylpyrogallol.

See Trihydroxytoluene.

3-Methylpyromucic Acid (3-*Methylfuran-2-carboxylic acid, elsholtzic acid, 3-methyl-α-furoic acid*)



$C_6H_6O_3$ MW, 126

Needles from H_2O. M.p. 134°. Sublimes.

Me ester : $C_7H_8O_3$. MW, 140. Plates. M.p. 36–8°.

Et ester : $C_8H_{10}O_3$. MW, 154. Plates. M.p. 47–8°. B.p. 205°.

Chloride : $C_6H_5O_2Cl$. MW, 144·5. M.p. 21–2°. B.p. 192°.

Amide : $C_6H_7O_2N$. MW, 125. Plates. M.p. 90–90·5°.

Anilide : $C_{12}H_{11}O_2N$. MW, 201. Cryst. M.p. 91°.

Asahina *et al.*, *Chem. Zentr.*, 1924, II, 1694.
Reichstein, Zschokke, Goerg, *Helv. Chim. Acta*, 1931, **14**, 1277.

4-Methylpyromucic Acid (4-*Methylfuran 2-carboxylic acid, 4-methyl-α-furoic acid*).

Needles from C_6H_6–pet. ether. M.p. 131–2°. Acid to Congo Red. $FeCl_3$ ⟶ orange ppt.

Nitrile : C_6H_5ON. MW, 107. Oil. B.p. 57–8°/12 mm.

Reichstein, Zschokke, *Helv. Chim. Acta*, 1931, **14**, 1275.

5-Methylpyromucic Acid (*5-Methylfuran-2-carboxylic acid, 5-methyl-α-furoic acid*).

Plates or needles from H_2O. M.p. 108–9°. Very sol. hot H_2O. Sol. EtOH, Et_2O, $CHCl_3$. Spar. sol. C_6H_6. Insol. CS_2. Sublimes easily.

Et ester : $C_8H_{10}O_3$. MW, 154. B.p. 213–14°/766 mm.

Me ester : $C_7H_8O_3$. MW, 140. B.p. 98°/15 mm.

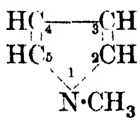
Chloride : $C_6H_5O_2Cl$. MW, 144·5. Needles. M.p. 28°. B.p. 202°/756 mm., 93–4°/18 mm.

Amide : $C_6H_7O_2N$. MW, 125. Prisms from H_2O. M.p. 131°. Sol. EtOH, C_6H_6. Spar. sol. cold ligroin.

Hydrazide : m.p. 61–2°.

Hill, Sawyer, *Am. Chem. J.*, 1898, **20**, 171.

N-Methylpyrrole



C_5H_7N MW, 81

B.p. 112–13° (114–15°/747·5 mm.). D_4^{15} 0·9145. n_D^{17} 1·48985.

$HgCl_2$ double salt : decomp. at 120–30°.

Pictet, Steinmann, *Ber.*, 1904, **37**, 2792.

2-Methylpyrrole (*α-Homopyrrole*).

B.p. 148° (144·5–145·5°).

N-*Acetyl* : b.p. 197°. Insol. H_2O.

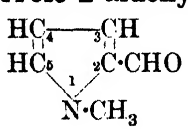
Fischer, Beller, Stern, *Ber.*, 1928, **61**, 1078.
Pictet, Steinmann, *Ber.*, 1904, **37**, 2792.

3-Methylpyrrole (*β-Homopyrrole*).

B.p. 142–3°/742·7 mm., 45°/11 mm.

Pictet, Steinmann, *Ber.*, 1904, **37**, 2793.
Piloty, Hirsch, *Ann.*, 1913, **395**, 71.

N-Methylpyrrole-2-aldehyde



C_6H_7ON MW, 109

Oil with odour resembling benzaldehyde. B.p. 72–4°/12 mm. Rapidly turns yellow, then purple, finally deep red. Stable to alkalis. Min. acids ⟶ coloured tarry products.

Semicarbazone : cryst. from EtOH. M.p. 207–8°.

Phenylhydrazone : m.p. 127–8°.

Azine : yellow needles. M.p. 120°.

Reichstein, *Helv. Chim. Acta*, 1930, **13**, 352.

3-Methylpyrrole-2-aldehyde.

Cryst. M.p. 95° (92°).

Phenylhydrazone : yellowish plates from EtOH. M.p. 124°.

Azine : yellow needles from EtOH.Aq. M.p. 201°.

Fischer, Siedel, d'Ennequin, *Ann.*, 1933, **500**, 194.

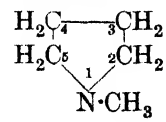
5-Methylpyrrole-2-aldehyde.

Cryst. from pet. ether. M.p. 70°.

Oxime : needles from EtOH. M.p. 153°.

Fischer, Beyer, Zaucker, *Ann.*, 1931, **486**, 68.

N-Methylpyrrolidine



$C_5H_{11}N$ MW, 85

B.p. 78–80°. Misc. with H_2O. Volatile in Et_2O vapour.

B_2,H_2PtCl_6 : m.p. 233°.

$B,HAuCl_4$: yellow needles and leaflets. M.p. 218°.

Picrate : yellow plates from EtOH. M.p. 221°.

Wibaut, *Rec. trav. chim.*, 1925, **44**, 1101.

2-Methylpyrrolidine.

B.p. 95·5–96·5°/744 mm. D_{20}^{20} 0·84.

B_2,H_2PtCl_6,H_2O : yellow cryst. from EtOH–Et_2O. M.p. 172–3°, anhyd. decomp. at 206–7° (rapid heat.).

$B,HAuCl_4$: m.p. 184° (158–161°). Sol. EtOH.

Oxalate : m.p. 178–9° decomp.

N-*Me* : *see* 1 : 2-Dimethylpyrrolidine.

de Jong, Wibaut, *Rec. trav. chim.*, 1930, **49**, 242.
v. Braun, *Ber.*, 1910, **43**, 2870.

3-Methylpyrrolidine.

Liq. with odour resembling piperidine. B.p. 103–5°. D_4^0 0·8654. Fumes strongly in air.

B_2,H_2PtCl_6 : prisms. Decomp. at 194°.

$B,HAuCl_4$: plates. M.p. 176°. Sol. H_2O.

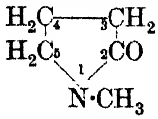
Picrate : cryst. from EtOH. M.p. 106°.

Späth, Breusch, *Monatsh.*, 1928, **50**, 352.
Späth, Prokopp, *Ber.*, 1924, **57**, 478.

N-Methylpyrrolidine-2-carboxylic Acid.

See Hygric Acid.

N-Methyl-2-pyrrolidone



C_5H_9ON MW, 99

B.p. 202°, 94–6°/20 mm., 84–5°/14 mm. D^{25}_{25} 1·0260. n^{25}_D 1·4666. Volatile in steam.

Hydrochloride: m.p. 79–81°.

Craig, *J. Am. Chem. Soc.*, 1933, **55**, 297.
Prill, McElvain, *ibid.*, 1241.

4-Methyl-2-pyrrolidone (2-*Methylbutyrolactam*).

B.p. 116°/15 mm.

Sircar, *J. Indian Chem. Soc.*, 1928, **5**, 553.

5-Methyl-2-pyrrolidone.

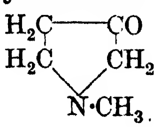
Deliquescent cryst. M.p. 37°. Very sol. H_2O, EtOH, Et_2O, C_6H_6, warm ligroin. Heat with alkali ⟶ 3-aminovaleric acid.

B,HCl: needles from Et_2O. M.p. 110°.

N-*Acetyl*: b.p. 224–6°. Misc. with EtOH, Et_2O, C_6H_6. Mod. sol. H_2O.

Tafel, *Ber.*, 1889, **22**, 1862.

N-Methyl-3-pyrrolidone



C_5H_9ON MW, 99

B.p. 46–7°/18 mm. D^{25}_{25} 0·9675. n^{25}_D 1·4431.

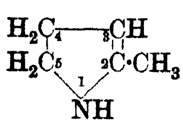
B,HCl: m.p. 62–3°.

Prill, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 1241.

N-Methyl-2-pyrrolidone-5-acetic Acid.

See Ecgoninic Acid.

2-Methyl-2-pyrroline (2-*Methyl*-4 : 5-*dihydropyrrole*)



C_5H_9N MW, 83

Liq. with odour resembling pyridine. B.p. 95–7°, 50–1°/110–16 mm., 42–5°/95–100 mm. D^{22} 0·8995. Very sol. H_2O, EtOH, Et_2O. Sn + HCl ⟶ 2-methylpyrrolidine.

B,HAuCl₄: yellow needles from EtOH. M.p. about 157° decomp. Sol. EtOH, hot H_2O.

B_2,H_2PtCl_6: cryst. from EtOH. M.p. about 200° decomp. Very sol. H_2O.

N-*Me*: 1 : 2-dimethyl-2-pyrroline. B.p. 52–3°/90 mm. D^{22} 0·9333. *B,HI*: plates from EtOH. M.p. about 260° decomp. *$B,HAuCl_4$*: needles. M.p. 159°. *B_2,H_2PtCl_6*: cryst. from EtOH. M.p. 172–3° decomp.

Picrate: cryst. from EtOH. M.p. 120–1°.

Gabriel, *Ber.*, 1909, **42**, 1240, 1246.
Hielscher, *Ber.*, 1898, **31**, 277.

4-Methyl-2-pyrroline (4-*Methyl*-4 : 5-*dihydropyrrole*).

Present in small quantities in the fruit of *Piper nigrum*.

$B,HAuCl_4$: yellow leaflets from dil. HCl. M.p. 182°. Sol. H_2O.

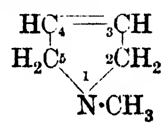
B_2,H_2PtCl_6: orange prisms. M.p. 203°.

Picrate: m.p. 216–17°.

Picrolonate: yellow cryst. from H_2O. M.p. 217°.

Pictet, Court, *Ber.*, 1907, **40**, 3777.
Pictet, Pictet, *Helv. Chim. Acta*, 1927, **10**, 594.

1-Methyl-3-pyrroline



C_5H_9N MW, 83

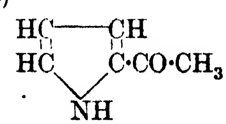
Present in tobacco leaves. Oil with ammoniacal odour. B.p. 79–80°. Misc. with H_2O.

$B,HAuCl_4$: yellow leaflets from dil. HCl. M.p. 190–1°.

Picrolonate: yellow prisms from H_2O. M.p. 222°.

Pictet, Court, *Ber.*, 1907, **40**, 3773.
Ciamician, Magnaghi, *Ber.*, 1885, **18**, 726.

Methyl 2-pyrryl Ketone (2-*Acetopyrrole*, 2-*acetylpyrrole*)



C_6H_7ON MW, 109

Cryst. from H_2O. M.p. 90°. B.p. 220°. Sol. H_2O, EtOH, Et_2O. Volatile in steam.

Oxime: needles from H_2O. M.p. 145–6°.

Semicarbazone: needles from H_2O. M.p. 190°.

Phenylhydrazone: m.p. 146°.

Azine: cryst. M.p. 212–13°.

de Jong, *Rec. trav. chim.*, 1929, **48**, 1029.
Oddo, *Ber.*, 1910, **43**, 1014.

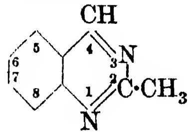
2-Methylpyruvic Acid.

See 1-Ketobutyric Acid.

Methylquinaldine.
See 2 : 3-, 2 : 4-, 2 : 6-, 2 : 7-, *and* 2 : 8-Dimethylquinolines.

Methylquinaldinic Acid.
See Methylquinoline-2-carboxylic Acid.

2-Methylquinazoline



$C_9H_8N_2$ MW, 144

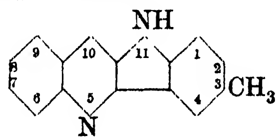
Needles from pet. ether. M.p. 41–2° (35·5°). B.p. 247·5–248°/768·5 mm., 237–9°/722 mm. Sol. EtOH, Et_2O. Less sol. H_2O.

Bogert, Nabenhauer, *J. Am. Chem. Soc.*, 1924, **46**, 1933.

4-Methylquinazoline.
Pale yellow prisms. M.p. 36–7°. B.p. about 260°.
Picrate: yellowish-green flakes from EtOH. M.p. 183·5°.

See previous reference.

3-Methylquindoline

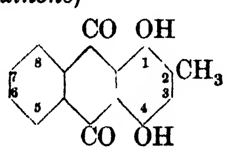


$C_{16}H_{12}N_2$ MW, 232

Needles from EtOH. M.p. 251°.
Acetyl: needles from EtOH. M.p. 164–5°.

Grandmougin, *Compt. rend.*, 1922, **174**, 1175.

2-Methylquinizarin (1 : 4-*Dihydroxy*-2-*methylanthraquinone*)



$C_{15}H_{10}O_4$ MW, 254

Red needles. M.p. 177° (160°). Sol. C_6H_6, toluene, ligroin, with yellow col. Red sol. in hot AcOH. Sol. EtOH, Et_2O, with orange col. and green fluor. NaOH ⟶ bluish-violet sol. Sublimes.
Diacetyl: light yellow needles. M.p. 149–149·5°.

Ullmann, Schmidt, *Ber.*, 1919, **52**, 2110.
Keimatsu, Hirano, *Chem. Abstracts*, 1932, **26**, 982, 1601.
B.D.C., E.P., 176,925, (*Chem. Abstracts*, 1922, **16**, 3095).

5-Methylquinizarin (5 : 8-*Dihydroxy*-1-*methylanthraquinone*).
Red needles from AcOH. M.p. 238–238·5° (232°). Conc. H_2SO_4 ⟶ red sol.
Diacetyl: yellow needles from Ac_2O. M.p. 224° (217°).

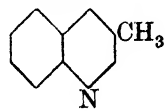
Mayer, Stark, *Ber.*, 1931, **64**, 2007.
Kuroda, *Chem. Abstracts*, 1919, **13**, 714.

6-Methylquinizarin (5 : 8-*Dihydroxy*-2-*methylanthraquinone*).
Red needles from EtOH. M.p. 177° (165°). Sol. Me_2CO, C_6H_6, AcOH. Spar. sol. EtOH, Et_2O. Spar. sol. NaOH with violet col. Conc. H_2SO_4 ⟶ red sol.
Diacetyl: yellow plates from EtOH. M.p. 204°. Sol. C_6H_6.

v. Niementowski, *Ber.*, 1900, **33**, 1634.
I.G., D.R.P., 544,522, (*Chem. Abstracts*, 1932, **26**, 3522).

2-Methylquinoline.
See Quinaldine.

3-Methylquinoline (β-*Methylquinoline*)



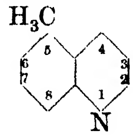
$C_{10}H_9N$ MW, 143

Prisms. M.p. 16–17° (10–14°). B.p. 252°/735 mm. D_4^{20} 1·0673. n_D^{20} 1·6171. Sol. dil. min. acids. Insol. alkalis. Volatile in steam.
B,HAuCl$_4$: orange needles. M.p. 145°. Spar. sol. cold H_2O.
B$_2$,H$_2$PtCl$_6$: orange needles + $2H_2O$. M.p. 249°.
B,AgNO$_3$: plates from EtOH. M.p. 180°.
Dichromate: red prisms from H_2O. M.p. 134°.
Picrate: yellow needles. M.p. 187°.
Methiodide: yellow needles from EtOH. M.p. 221°.
Ethiodide: yellow plates from EtOH. M.p. 220° decomp.
Isoamyliodide: yellow plates from EtOH. M.p. 215°.

Wislicenus, Elvert, *Ber.*, 1909, **42**, 1145.
Doebner, v. Miller, *Ber.*, 1885, **18**, 1642.
Willimott, Simpson, *J. Chem. Soc.*, 1926, 2809.

4-Methylquinoline.
See Lepidine.

5-Methylquinoline (ana-*Methylquinoline*)



$C_{10}H_9N$ MW, 143

B.p. 253–5°/735 mm. Misc. with EtOH, Et_2O. Spar. sol. H_2O.

Picrate: light yellow plates from EtOH. M.p. 210–13°. Spar. sol. H_2O, EtOH.

Methiodide: yellow needles. M.p. 105°.

v. Jakubowski, *Ber.*, 1910, **43**, 3030.

6-Methylquinoline (p-*Toluquinoline*).

F.p. − 22°. B.p. 257·4–258·6°/745 mm., 148°/27 mm. D_4^{20} 1·0654. n_D^{20} 1·6157. $k = 1·8 \times 10^{-9}$ at 25°.

B_2,$ZnCl_2$: prisms from EtOH. M.p. 229°.

Picrate: yellow powder. M.p. 229°. Spar. sol. EtOH, Et_2O, C_6H_6.

Methiodide: yellow needles from EtOH. M.p. 214–16°.

Chlorostannate: m.p. 248°.

Druce, *Chem. News*, 1919, **119**, 271.
Skraup, *Monatsh.*, 1881, **2**, 158.

7-Methylquinoline (m-*Toluquinoline*).

F.p. 39°. B.p. 251·5–252·5°, 144°/18 mm. D_4^{20} 1·0609. $n_D^{20\cdot8}$ 1·6149. $k = 1·8 \times 10^{-9}$ at 25°.

B_2,H_2PtCl_6: orange-yellow prisms + $2H_2O$. M.p. 223–4°.

Picrate: cryst. from EtOH. M.p. 237°.

See first reference above and also
Skita, Brunner, *Monatsh.*, 1886, **7**, 140.

8-Methylquinoline (o-*Toluquinoline*).

B.p. 247·3–248·3°/751·3 mm., 143°/34 mm. Misc. with EtOH, Et_2O. Spar. sol. H_2O. $D_4^{20\cdot8}$ 1·0722. $n_D^{20\cdot8}$ 1·6162. $k = 1·1 \times 10^{-9}$ at 25°.

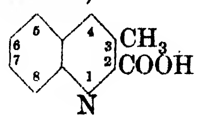
Picrate: yellow plates from EtOH. M.p. 200°. Spar. sol. EtOH. Almost insol. Et_2O, C_6H_6.

Methonitrate: cryst. M.p. about 72°. Very sol. H_2O.

Knueppel, *Ber.*, 1896, **29**, 705.
Druce, *Chem. News*, 1918, **117**, 346.

2-Methylquinoline-carboxylic Acid.
See Quinaldine-carboxylic Acid.

3-Methylquinoline-2-carboxylic Acid (3-*Methylquinaldinic acid*)



$C_{11}H_9O_2N$ MW, 187

Needles or prisms from EtOH–Et_2O. M.p. 144° (142°). Loses CO_2 at 160°. Sublimes at 110°.

Doebner, v. Miller, *Ber.*, 1885, **18**, 1641.
Henze, *Ber.*, 1934, **67**, 753.

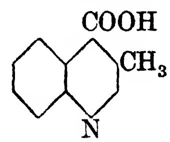
4-Methylquinoline-2-carboxylic Acid (*Lepidine-3-carboxylic acid*, 4-*methylquinaldinic acid*).

Yellow cryst. powder + $1\frac{1}{2}H_2O$ from H_2O. M.p. anhyd. 153–4°.

B_2,H_2PtCl_6: yellowish-red cryst. from H_2O. M.p. 210–12° decomp.

Koenigs, Mengel, *Ber.*, 1904, **37**, 1327.

3-Methylquinoline-4-carboxylic Acid (3-*Methylcinchoninic acid*)



$C_{11}H_9O_2N$ MW, 187

Plates from H_2O. M.p. 254°. Sol. EtOH. Spar. sol. Me_2CO. Insol. Et_2O, C_6H_6, ligroin.

Me ester: $C_{12}H_{11}O_2N$. MW, 201. Needles from MeOH. M.p. 77°. Sol. MeOH, EtOH. Insol. Et_2O, C_6H_6.

Et ester: $C_{13}H_{13}O_2N$. MW, 215. *B_2,H_2PtCl_6*: orange plates from H_2O. M.p. 224–5°. *Picrate*: light yellow needles from EtOH. M.p. 175–6°.

Chloride: $C_{11}H_8ONCl$. MW, 205·5. Needles. M.p. 175°.

Amide: $C_{11}H_{10}ON_2$. MW, 186. Cryst. from EtOH. M.p. 229–30°.

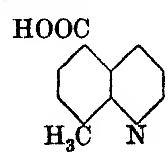
Anilide: $C_{17}H_{14}ON_2$. MW, 262. Needles from EtOH.Aq. M.p. 238–9°.

B,HCl: needles. M.p. 240–1°.

Picrate: yellow needles from EtOH. M.p. 222–3°.

v. Miller, *Ber.*, 1890, **23**, 2257.
Meyer, *Monatsh.*, 1906, **27**, 31.
Ornstein, *Ber.*, 1907, **40**, 1088.

8-Methylquinoline-5-carboxylic Acid

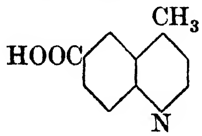


$C_{11}H_9O_2N$ MW, 187

Powder. M.p. 286°. CaO ⟶ 8-methyl-quinoline.

Lellmann, Alt, *Ann.*, 1887, **237**, 310.

4-Methylquinoline-6-carboxylic Acid (*Lepidine-6-carboxylic acid*)

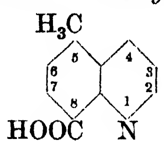


$C_{11}H_9O_2N$ MW, 187

Needles from H_2O. M.p. 250–70° decomp.

v. Miller, *Ber.*, 1890, **23**, 2265.

5-Methylquinoline-8-carboxylic Acid (ana-*Methylquinoline-o-carboxylic acid*)



$C_{11}H_9O_2N$ MW, 187

Needles from H_2O. M.p. 173–4°. Sol. hot H_2O, EtOH, Et_2O, alkalis, min. acids. Insol. cold AcOH.Aq.

Picrate: yellow needles from EtOH. M.p. 205–7°.

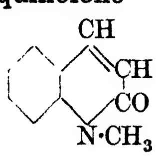
v. Jakubowski, *Ber.*, 1910, **43**, 3029.

6-Methylquinoline-8-carboxylic Acid.

Needles from EtOH. M.p. 169°.

Chakravarti, Venkatasubban, *Chem. Zentr.*, 1934, I, 1329.

***N*-Methyl-α-quinolone**



$C_{10}H_9ON$ MW, 159

Needles from ligroin. M.p. 74°. B.p. 324°/728 mm. Sol. EtOH, Me_2CO, $CHCl_3$. Less sol. H_2O, ligroin.

B,HCl: m.p. 112°.

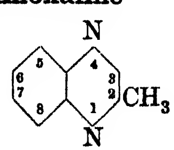
B,HgCl₂: prisms. M.p. 189°.

Mills, Wishart, *J. Chem. Soc.*, 1920, **117**, 585.

***N*-Methyl-γ-quinolone.**

See Echinopsine.

2-Methylquinoxaline



$C_9H_8N_2$ MW, 144

B.p. 245–7°. Misc. with H_2O. Reacts neutral.

B,HAuCl₄: light yellow plates. M.p. 135° decomp.

B₂,H₂PtCl₆: yellow needles from HCl. Does not melt below 250°.

Picrate: yellow cryst. M.p. 215°.

Böttcher, *Ber.*, 1913, **46**, 3085.

6-Methylquinoxaline (*Toluquinoxaline*).

B.p. 245°. D_4^{20} 1·1164. Misc. with H_2O, EtOH, Et_2O, C_6H_6.

Oxalate: needles from H_2O. M.p. 135–6°. Spar. sol. cold H_2O. Decomp. on warming.

Ethiodide: yellowish-red cryst. M.p. 176° decomp. Sol. H_2O.

Hinsberg, *Ann.*, 1887, **237**, 336.

Methylresorcinol.

See 2:4- *and* 2:6-Dihydroxytoluenes *and* Orcinol.

Methylrhamnoside.

See under Rhamnose.

4-Methylrhodim.

See 4-Methyl-2-thiazolone.

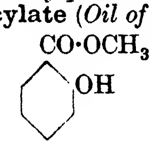
Methylriboside.

See under Ribose.

Methylsalicylaldehyde.

See 3-Hydroxy-*o*-toluic Aldehyde, 2-Hydroxy-*m*-toluic Aldehyde, 4-Hydroxy-*m*-toluic Aldehyde, *and* 3-Hydroxy-*p*-toluic Aldehyde.

Methyl salicylate (*Oil of wintergreen*)



$C_8H_8O_3$ MW, 152

Found in some species of *Polygala*. F.p. − 8·6°. B.p. 223·3°/760 mm., 101°/12 mm. $D_4^{18.5}$ 1·1851, D_4^{25} 1·1787. $n_D^{18.1}$ 1·538. $FeCl_3 \longrightarrow$ deep red col. Widely used as perfumery and flavouring material.

Me ether: *see under* *o*-Methoxybenzoic Acid.

Et ether: *see under* *o*-Ethoxybenzoic Acid.

β-Bromoethyl ether: $C_{10}H_{11}O_3Br$. MW, 259. Plates from EtOH. M.p. 37·5–38°. B.p. 186–8°/20 mm. Sol. usual solvents.

Propyl ether: $C_{11}H_{14}O_3$. MW, 194. B.p. 157–63°/45 mm.

Isopropyl ether: $C_{11}H_{14}O_3$. MW, 194. B.p. 250°, 140–5°/16 mm. D^{20} 1·062.

Isoamyl ether: $C_{13}H_{18}O_3$. MW, 222. B.p. 160–4°/14 mm.

Allyl ether: $C_{11}H_{12}O_3$. MW, 192. B.p. 245°, 163°/20 mm., 143°/12 mm. D^{15} 1·118.

Phenyl ether: $C_{14}H_{12}O_3$. MW, 228. B.p. 312°. Bitter taste.

Benzyl ether: $C_{15}H_{14}O_3$. MW, 242. Prisms. M.p. 46–7°. B.p. 215–17°/15 mm.

p-*Nitrobenzyl ether*: m.p. 128·2°.

Acetyl: *see under* Acetylsalicylic Acid.

Chloroacetyl: cryst. M.p. 62°. B.p. 195–200°/30 mm.

Benzoyl: prisms from EtOH or Et_2O–AcOEt. M.p. 92°. B.p. 270–80°/120 mm. Antitherapeutic and antipyretic.

Phenylacetyl: cryst. M.p. about 50°. B.p. 166–8°/2 mm.

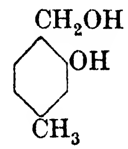
Glucoside: *see* Gaultherin.

Tijmstra, *Ber.*, 1905, **38**, 1377.
Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1742.
Montsanto Chemical Co., U.S.P., 1,945,177, (*Chem. Abstracts*, 1934, **28**, 2365).

Methylsalicylic Acid.

See 3-Hydroxy-*o*-toluic Acid, 2-Hydroxy-*m*-toluic Acid, 4-Hydroxy-*m*-toluic Acid, *and* 3-Hydroxy-*p*-toluic Acid.

4-Methylsaligenin (2-*Hydroxy*-4-*methylbenzyl alcohol*)



$C_8H_{10}O_2$ MW, 138

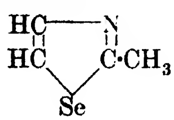
Cryst. from EtOH. M.p. 108°. B.p. 160°.

Megson, Drummond, *J. Soc. Chem. Ind.*, 1930, **49**, 251T.

5-Methylsaligenin.

See Homosaligenin.

2-Methylselenazole



C_4H_5NSe MW, 146

B.p. 32–4°/20 mm.

Kodak-Pathé, F.P., 757,767, (*Chem. Abstracts*, 1934, **28**, 3246).

1-Methylsemicarbazide

$H_2N·CO·NH·NH·CH_3$

$C_2H_7ON_3$ MW, 89

Leaflets from C_6H_6. M.p. 91·5°. Reduces $NH_3.AgNO_3$ and boiling Fehling's.

Oxalate: needles from EtOH.Aq. M.p. 171° decomp. Sol. H_2O. Spar. sol. EtOH.

Forster, Saville, *J. Chem. Soc.*, 1920, **117**, 759.

2-Methylsemicarbazide

$H_2N·CO·N(CH_3)·NH_2$

$C_2H_7ON_3$ MW, 89

Needles from C_6H_6. M.p. 113°. Sol. H_2O, EtOH. Spar. sol. Et_2O, C_6H_6, $CHCl_3$.

Oxalate: prisms from H_2O. M.p. 155° decomp. Spar. sol. EtOH.

v. Brüning, *Ann.*, 1889, **253**, 11.
Young, Oates, *J. Chem. Soc.*, 1901, **79**, 661.

4-Methylsemicarbazide

$CH_3·NH·CO·NH·NH_2$

$C_2H_7ON_3$ MW, 89

Cryst. M.p. 118° (112°). Sol. H_2O, EtOH. Mod. sol. $CHCl_3$. Spar. sol. Et_2O. Reduces Fehling's.

Backer, *Rec. trav. chim.*, 1915, **34**, 194.

5-Methylsemioxamazide

$CH_3·NH·CO·CO·NH·NH_2$

$C_3H_7O_2N_3$ MW, 117

Needles from EtOH.Aq. M.p. 197°. Very sol. H_2O. Slightly sweet taste. Reduces cold $NH_3.AgNO_3$.

Tierie, *Rec. trav. chim.*, 1933, **52**, 357.

N-Methylskatole.

1 : 3-Dimethylindole, *q.v.*

1-Methylsorbic Acid (2 : 4-*Hexadiene*-2-*carboxylic acid*, 1-*methyl*-2-*propenylacrylic acid*)

$$CH_3·CH{:}CH·CH{:}\overset{CH_3}{C}·COOH$$

$C_7H_{10}O_2$ MW, 126

Needles. M.p. 100–1° (90–2°). Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O, pet. ether.

Et ester: $C_9H_{14}O_2$. MW, 154. Oil. B.p. 207°, about 100°/15 mm. $D_4^{16.5}$ 0·9501, D_4^{20} 0·947. n_{He} 1 49907.

Auwers, Heyna, *Ann.*, 1923, **434**, 157.

2-Methylsorbic Acid (2-*Methyl*-2-*propenylacrylic acid*, 2-*propenylcrotonic acid*, 2-*methyl*-1 : 3-*pentadiene*-1-*carboxylic acid*)

$$CH_3·CH{:}CH·\overset{CH_3}{C}{:}CH·COOH$$

$C_7H_{10}O_2$ MW, 126

Acid exists in two forms.

(i) Needles or plates from EtOH. M.p. 120°.

(ii) Cryst. from EtOH.Aq. M.p. 98–9° (74–6°). Very sol. org. solvents.

Me ester: $C_8H_{12}O_2$. MW, 140. B.p. 80–4°/12 mm. D_4^{18} 0·967. n_D^{18} 1·5010.

Et ester: $C_9H_{14}O_2$. MW, 154. B.p. 102–4°/17–18 mm.
Chloride: C_7H_9OCl. MW, 144·5. B.p. 94–5°/15 mm.
Amide: $C_7H_{11}ON$. MW, 125. Prisms from C_6H_6. M.p. 147–8°.
Anilide: needles from EtOH. M.p. 134–5°.

Kuhn, Hoffer, *Ber.*, 1932, **65**, 655.
Burton, Ingold, *J. Chem. Soc.*, 1929, 2028.

3-Methylsorbic Acid (3-*Methyl*-1 : 3-*pentadiene*-1-*carboxylic acid*, 3-*methyl*-3-*ethylidenecrotonic acid*)

$$CH_3{\cdot}CH{:}\overset{CH_3}{C}{\cdot}CH{:}CH{\cdot}COOH$$

$C_7H_{10}O_2$ MW, 126

Needles from EtOH.Aq. M.p. 94–5°. Sol. EtOH, Et_2O, C_6H_6. Spar. sol. H_2O, pet. ether.
Et ester: $C_9H_{14}O_2$. MW, 154. Oil. B.p. 98–9°/12 mm. $D_4^{15·6}$ 0·9499, D_4^{20} 0·946. n_{He} 1·50087.

Auwers, Heyna, *Ann.*, 1923, **434**, 162.

4-Methylsorbic Acid (4-*Methyl*-1 : 3-*pentadiene*-1-*carboxylic acid*, 3-*isopropylidenecrotonic acid*)

$$CH_3{\cdot}\overset{CH_3}{C}{:}CH{\cdot}CH{:}CH{\cdot}COOH$$

$C_7H_{10}O_2$ MW, 126

Acid exists in two forms.
(i) Needles from pet. ether. M.p. 109–10°. Sol. MeOH, EtOH, Me_2CO, AcOH, AcOEt. Spar. sol. H_2O, C_6H_6.
(ii) M.p. 17°. B.p. 123–4°/9 mm. Misc. with MeOH, EtOH, Et_2O, AcOH, Me_2CO, pet. ether. Spar. sol. H_2O.

Et ester: $C_9H_{14}O_2$. MW, 154. B.p. 82–3°/9 mm.

Fischer, Löwenberg, *Ann.*, 1932, **494**, 280.

1-Methylstearic Acid

$$CH_3{\cdot}[CH_2]_{15}{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

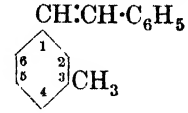
$C_{19}H_{38}O_2$ MW, 298

Powder from EtOH or pet. ether. M.p. 58°.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1927, **46**, 152T.

Methylstilbazole.
See Methylstyrylpyridine.
α-Methylstilbene.
See 1 : 2-Diphenylpropylene.

3-Methylstilbene (1-*Phenyl*-2-m-*tolylethylene*)



$C_{15}H_{14}$ MW, 194

Cryst. from EtOH. M.p. 52·5–53·5°. B.p. 206–7°/30 mm. Very sol. C_6H_6, ligroin. Sol. AcOH, Et_2O. Mod. sol. cold MeOH.

Auwers, Frühling, *Ann.*, 1921, **422**, 221.

4-Methylstilbene (1-*Phenyl*-2-p-*tolylethylene*).
Plates with blue fluor. M.p. 120° (117°). Sol. Et_2O, C_6H_6, $CHCl_3$. Less sol. EtOH. Distils undecomp.

Klages, Tetzner, *Ber.*, 1902, **35**, 3967.
Späth, *Monatsh.*, 1914, **35**, 469.

α-Methylstyrene (*Isopropenylbenzene*, 1-*methyl*-1-*phenylethylene*, 2-*phenylpropylene*)

$$C_6H_5{\cdot}\overset{CH_3}{C}{:}CH_2$$

C_9H_{10} MW, 118

B.p. 161–2°, 54·5–55°/14 mm. $D_4^{17·4}$ 0·9134. $n_D^{17·4}$ 1·5384. Heat of comb. C_v 1,203·1 Cal.

Sabetay, *Bull. soc. chim.*, 1930, **47**, 614.
Harries, *Ann.*, 1912, **390**, 265.
I.G., E.P., 682,569, (*Chem. Abstracts*, 1930, **24**, 4523).

β-Methylstyrene (*Propenylbenzene*, 1-*methyl*-2-*phenylethylene*, 1-*phenylpropylene*)

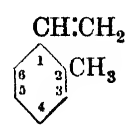
$$C_6H_5{\cdot}CH{:}CH{\cdot}CH_3$$

C_9H_{10} MW, 118

B.p. 176–7°. D^0 0·935. n_D^{16} 1·5903.
Nitrosite: m.p. 133°.

Lévy, Dvoleitzka-Gombinska, *Bull. soc. chim.*, 1931, **49**, 1765.

o-Methylstyrene (o-*Tolylethylene*, 2-*vinyltoluene*)



C_9H_{10} MW, 118

Oil. B.p. 169°/752 mm., 55·4°/12 mm. $D_4^{14·1}$ 0·9155. $n_D^{14·1}$ 1·549. Polymerises on heating.

Auwers, *Ann.*, 1917, **413**, 295.

m-Methylstyrene (m-*Tolylethylene*, 3-*vinyltoluene*).

B.p. 164°, 61–2°/18 mm. Solidifies on standing.

Titley, *J. Chem. Soc.*, 1926, 517.
Müller, *Ber.*, 1887, **20**, 1215.

p-Methylstyrene (p-*Tolylethylene*, 4-*vinyltoluene*).

B.p. 170–5°, 77–9°/33 mm., 59–60°/12 mm. $D_4^{16\cdot4}$ 0·9003. $n_D^{16\cdot4}$ 1·5446.

See previous references and also
Auwers, *Ber.*, 1912, **45**, 2777.
Gauthier, Gauthier, *Bull. soc. chim.*, 1933, **53**, 323.

α-Methylstyryl bromide.

See β-Bromo-α-methylstyrene.

Methylstyrylcarbinol (γ-*Hydroxy*-α-*butenylbenzene*, 1-*phenyl*-1-*butenol*-3)

$C_6H_5·CH:CH·CH(OH)·CH_3$

$C_{10}H_{12}O$ MW, 148

Thick oil. B.p. 144°/21 mm., 131°/12 mm. D_4^{22} 1·0134.

Klages, *Ber.*, 1906, **39**, 2591.

Methyl styryl Ether

$C_6H_5·CH:CH·O·CH_3$

$C_9H_{10}O$ MW, 134

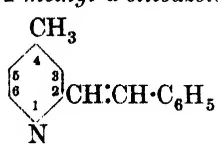
B.p. 210–13°, 102–3°/16 mm., 99°/13 mm. $D_0^{15\cdot5}$ 1·001, $D_4^{23\cdot3}$ 0·9894. $n_D^{15\cdot5}$ 1·5647, $n_D^{24\cdot3}$ 1·5620.

Moureu, *Bull. soc. chim.*, 1904, **31**, 527.
Auwers, *Ber.*, 1911, **44**, 3519.
Ley, *Ber.*, 1918, **51**, 1818.

Methyl styryl Ketone.

See Benzylideneacetone.

4-Methyl-2-styrylpyridine (2-*Benzylidene*-2 : 4-*lutidine*, 4-*methyl*-α-*stilbazole*)



$C_{14}H_{13}N$ MW, 195

Yellow oily liq. B.p. 321–6° part. decomp. D_4^0 1·0717. Sol. EtOH, Et_2O, $CHCl_3$, CS_2. Insol. H_2O.

B,HI: yellow needles from EtOH. M.p. 210–11°.
B,HAuCl$_4$: yellow needles. M.p. 141–2°.
B$_2$,H$_2$PtCl$_6$: yellow needles. M.p. 183°.
Picrate: yellow needles. M.p. 192–3°.

Bachér, *Ber.*, 1888, **21**, 3072.

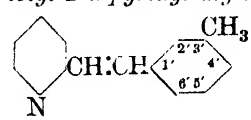
6-Methyl-2-styrylpyridine (2-*Benzylidene*-2 : 6-*lutidine*, 6-*methyl*-α-*stilbazole*).

Pearly leaflets from EtOH.Aq. M.p. 123°. Sol. EtOH, Et_2O, AcOH, Me_2CO, C_6H_6. Spar. volatile in steam.

B,HCl: pale yellow needles + H_2O. M.p. anhyd. 221° decomp.
B,HAuCl$_4$: reddish needles. M.p. 211°. Spar. sol. H_2O, EtOH.
B,HCl,HgCl$_2$: needles. M.p. 185°. Sol. boiling H_2O, EtOH.
Picrate: golden needles. M.p. 217–19° decomp. Sol. H_2O, EtOH.

Schuster, *Ber.*, 1892, **25**, 2399.

3′-Methyl-2-styrylpyridine (3′-*Methyl*-α-*stilbazole*, 1-m-*tolyl*-2-α-*pyridylethylene*)



$C_{14}H_{13}N$ MW, 195

Oil. B.p. 220°/45 mm. Sol. usual org. solvents. Insol. H_2O.

B,HAuCl$_4$: needles. M.p. 135–6°.
B$_2$,H$_2$PtCl$_6$: m.p. 186–7°.
Picrate: m.p. 214–15°.

Freund, *Ber.*, 1906, **39**, 2836.

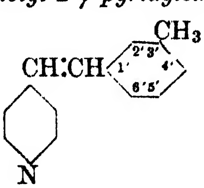
4′-Methyl-2-styrylpyridine (4′-*Methyl*-α *stilbazole*, 1-p-*tolyl*-2-α-*pyridylethylene*).

Needles from EtOH.Aq. M.p. 87° (82°). Sol. EtOH, Et_2O, Me_2CO, $CHCl_3$, CS_2. Insol. H_2O.

B,HCl: pale yellow needles + H_2O. M.p. 190–1°. Sol. EtOH, H_2O. Insol. Et_2O.
B,HCl,HgCl$_2$: yellow needles. M.p. 225° decomp. Sol. H_2O, EtOH. Insol. Et_2O.
B,HNO$_3$: yellow cryst. M.p. 147°.
B$_2$,H$_2$PtCl$_6$: yellow cryst. M.p. 194–5° decomp.
Picrate: yellow needles. M.p. 193–4°. Sol. H_2O, EtOH, Et_2O.

Dierig, *Ber.*, 1902, **35**, 2774.
Shaw, Wagstaff, *J. Chem. Soc.*, 1933, 78.

3′-Methyl-4-styrylpyridine (3′-*Methyl*-γ-*stilbazole*, 1-m-*tolyl*-2-γ-*pyridylethylene*)



$C_{14}H_{13}N$ MW, 195

Oil. B.p. 220–5°/about 35 mm. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, CS_2. Insol. H_2O.

B,HAuCl$_4$: m.p. 166–8°.
B$_2$,H$_2$PtCl$_6$: m.p. 194–5°.

Picrate : yellow cryst. from EtOH.Aq. M.p. 194–6°.

Freund, *Ber.*, 1906, **39**, 2834.

4′-Methyl-4-styrylpyridine (*4′-Methyl-γ-stilbazole*, 1-p-*tolyl*-2-*γ-pyridylethylene*).

Cryst. from EtOH.Aq. M.p. 101–2°. Sol. EtOH, Et_2O, amyl alcohol.

B,HCl : yellow cryst. M.p. 120°. Very sol. H_2O, EtOH.

B,HBr : yellow needles. M.p. 176–7°.

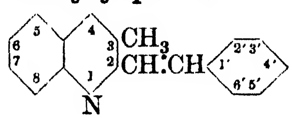
$B,HAuCl_4$: reddish-brown needles. M.p. 191° decomp.

$B,HCl,HgCl_2$: pale yellow needles. M.p. 208°.

B_2,H_2PtCl_6 : pale yellow cryst. + $2H_2O$. Decomp. at 193°.

Düring, *Ber.*, 1905, **38**, 164.

3-Methyl-2-styrylquinoline



$C_{18}H_{15}N$ MW, 245

Cryst. from pet. ether. M.p. 102°.

Bennett, Willis, *J. Chem. Soc.*, 1928, 1973.

4-Methyl-2-styrylquinoline.

Prisms from EtOH. M.p. 120–1°.

B,HCl : cryst. + $2H_2O$. M.p. 221–2°.

Picrate : yellow needles from EtOH. Decomp. at 233–9°.

Fischer, Scheibe, *J. prakt. Chem.*, 1920, **100**, 93.

6-Methyl-2-styrylquinoline.

Prisms from EtOH. M.p. 137°. Sol. Me_2CO, $CHCl_3$. Spar. sol. Et_2O. Insol. H_2O, C_6H_6, ligroin.

B,HCl : greenish-yellow needles from EtOH.HCl. M.p. 243°.

$B,HAuCl_4$: yellow needles from EtOH. M.p. 215°.

B_2,H_2PtCl_6 : yellow powder. Decomp. at 279°.

$B,HCl,HgCl_2$: greenish-yellow prisms. M.p. 223°.

Picrate : yellow needles. M.p. 234°.

Gasda, *Ber.*, 1905, **38**, 3700.

8-Methyl-2-styrylquinoline.

Plates from EtOH. M.p. 72°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, AcOH, ligroin.

B,HCl : yellow needles. M.p. 113°. Sol. EtOH, hot dil. HCl.

B_2,H_2PtCl_6 : yellow plates. M.p. 229–30°.

$B_2,2HCl,AuCl_3$: reddish-yellow cryst. from EtOH.HCl. M.p. 214°.

$B_2,2HCl,HgCl_2$: yellow plates from dil. HCl. M.p. 244°.

Hoffmann, *Ber.*, 1905, **38**, 3709.

4′-Methyl-2-styrylquinoline (2-[p-*Methylstyryl*]-*quinoline*).

Pale yellow needles from EtOH. Sol. Et_2O, CS_2. Spar. sol. cold EtOH. Insol. H_2O.

B,HCl : pale yellow needles from dil. HCl. M.p. 218°.

v. Grabski, *Ber.*, 1902, **35**, 1957.

3-Methylsuberic Acid (*3-Methylhexane-1 : 6-dicarboxylic acid*)

$$HOOC\cdot CH_2\cdot[CH_2]_2\cdot\overset{CH_3}{CH}\cdot CH_2\cdot CH_2\cdot COOH$$

$C_9H_{16}O_4$ MW, 188

Cryst. from H_2O. M.p. 81°.

Ruzicka, Steiger, *Helv. Chim. Acta*, 1927, **10**, 688.

Methylsuccindialdehyde (*Pyrotartaraldehyde*)

$$\begin{array}{l} CH_3\cdot CH\cdot CHO \\ \quad\quad\;\; CH_2\cdot CHO \end{array}$$

$C_5H_8O_2$ MW, 100

Free aldehyde not known.

Dioxime : needles from boiling AcOEt. M.p. 160°. Spar. sol. org. solvents. Sol. caustic alkalis, but not carbonates. Heat with 30% KOH ⟶ methylsuccinic acid.

Oddo, Mameli, *Gazz. chim. ital.*, 1914, **44**, ii, 166.

Methylsuccinic Acid (*Pyrotartaric acid*)

$$\begin{array}{l} CH_3\cdot CH\cdot \overset{\alpha}{C}OOH \\ \quad\quad\;\; CH_2\cdot \underset{\beta}{C}OOH \end{array}$$

$C_5H_8O_4$ MW, 132

d-.

Cryst. from Et_2O–C_6H_6. M.p. 115°. $[\alpha]_D^{22}$ + 9·89° in H_2O.

Quinine salt : m.p. 169–71°. 4·2 parts sol. 100 parts EtOH.

Acid strychnine salt : m.p. 186°.

Anhydride : *see* Methylsuccinic Anhydride.

l-.

Cryst. from Et_2O–C_6H_6. M.p. about 102°. $[\alpha]_D^{20}$ − 7·9° in H_2O.

dl-.

Prisms. M.p. 115° (112°). Sol. 1·5 parts H_2O at 20°. Sol. EtOH, Et_2O. 0·35 parts sol. 100

parts cold $CHCl_3$. Heat of comb. C_v 390·3 Cal. k (first) = $8·6 \times 10^{-5}$ at 25° : (second) = $2·3 \times 10^{-6}$ at 25°. Heat at 200° ⟶ anhydride.

Mono-Me ester: $C_6H_{10}O_4$. MW, 146. B.p. 153–153·5°/20 mm., 140°/11 mm. Sol. H_2O, usual org. solvents. $D_4^{20·7}$ 1·1436. $n_D^{20·7}$ 1·43230.

Di-Me ester: $C_7H_{12}O_4$. MW, 160. Oil. F.p. about − 80°. B.p. 197°/722 mm., 101°/22 mm. D^{19} 1·0692. n_D^{16} 1·42042.

Mono-Et ester: $C_7H_{12}O_4$. MW, 160. Thick oil. B.p. 160–1°/22 mm. $D_4^{20·2}$ 1·0982. $n_D^{20·2}$ 1·43121.

Me-Et ester: $C_8H_{14}O_4$. MW, 174. Oil. B.p. 198–9°/754·1 mm., 101–2°/20 mm. $D_4^{21·9}$ 1·0123. $n_D^{19·1}$ 1·41952.

Di-Et ester: $C_9H_{16}O_4$. MW, 188. F.p. about − 80°. B.p. 218°/759 mm., 125°/33 mm. $D_4^{19·1}$ 1·0123. $n_D^{19·1}$ 1·41984.

Di-active-*amyl ester*: $C_{15}H_{28}O_4$. MW, 272. B.p. 172°/18 mm. $D_{4\,vac.}^{20}$ 0·9529. n_D^{20} 1·4352. $[\alpha]_D^{20}$ + 3·67°.

Phenacyl ester: cryst. from EtOH. M.p. 101·5°.

Mono-l-*bornyl ester*: cryst. from EtOH. M.p. 73°. $[\alpha]_D^{16}$ − 34° in EtOH.

Dimenthyl ester: $D_4^{11·8}$ 0·978. $[\alpha]_D^{11·8}$ − 71·6°.

Anhydride: *see* Methylsuccinic Anhydride.

β-*Et ester*-α-*nitrile*: $C_7H_{11}O_2N$. MW, 141. B.p. 105–6°/14 mm.

Dinitrile: propylene cyanide, 1 : 2-dicyanopropane. $C_5H_6N_2$. MW, 94. Prisms. M.p. 12°. B.p. 252–4°, 130–40°/20 mm.

Diamide: $C_5H_{10}O_2N_2$. MW, 130. Cryst. M.p. 225°. Very sol. hot H_2O. Sol. 50 parts H_2O at 15°. Insol. org. solvents.

Monoanilide: exists in two forms. (i) Needles from AcOEt. M.p. 159°. Very sol. EtOH. 0·09 parts sol. 100 parts H_2O, 0·05 parts sol. 100 parts $CHCl_3$. Decomp. on warming with H_2O. (ii) Needles from $CHCl_3$. M.p. 123°. Very sol. EtOH, AcOEt. Sol. boiling $CHCl_3$. Mod. sol. hot C_6H_6. 1·6 parts sol. 100 parts $CHCl_3$ at 16°, 1·2 parts sol. 100 parts H_2O at 15°. Insol. pet. ether. Decomp. on warming with H_2O. Above m.p. ⟶ anil.

Dianilide: needles from EtOH. M.p. 200°. Very sol. EtOH. Spar. sol. $CHCl_3$. Insol. H_2O, C_6H_6.

Mono-p-*toluidide*: needles from EtOH. M.p. 164°. Sol. EtOH, Et_2O. Spar. sol. C_6H_6.

Mono-p-*bromoanilide*: cryst. from $CHCl_3$. M.p. 165° (158–158·5°). Sol. EtOH, Et_2O. Spar. sol. H_2O, C_6H_6, $CHCl_3$.

Mono-1-*naphthalide*: needles from EtOH. M.p. 160–1°.

Mono-2-*naphthalide*: plates from EtOH. M.p. 154·5°. Sol. EtOH, Et_2O. Spar. sol. C_6H_6.

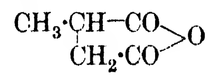
Di-1-*naphthalide*: needles from EtOH. M.p. 243–4°.

Anil: needles from H_2O. M.p. 109–10°. Sol. EtOH, C_6H_6, $CHCl_3$, AcOEt. Sol. 40 parts boiling H_2O. Spar. sol. cold H_2O.

p-*Tolylimide*: needles from ligroin. M.p. 109–10°.

Morrell, *J. Chem. Soc.*, 1914, **105, 1736,** 2703.
Boettinger, *Chem.-Ztg.*, 1895, **19**, 2081.
Auwers, Mayer, *Ann.*, 1899, **309**, 327.
Bruhl, *J. prakt. Chem.*, 1893, **47**, 276.
Bourgoin, *Ann. chim. phys.*, 1877, **12**, 419.
v. Braun, Jostes, *Ber.*, 1926, **59**, 1444.

Methylsuccinic Anhydride (*Pyrotartaric anhydride*)



$C_5H_6O_3$ MW, 114

d-.

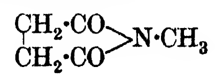
Cryst. from EtOH or AcOEt. M.p. 67–8°. Sol. EtOH, C_6H_6, Me_2CO, AcOEt. Spar. sol. pet. ether. $[\alpha]_D$ + 3·8° in C_6H_6.

dl-.

Cryst. from $CHCl_3$. M.p. 37° (32·5–34·5°). B.p. 244–8°, 150°/13 mm. $D_{6·5}^{6·5}$ 1·2458, D_{16}^{16} 1·2378, D_{25}^{25} 1·2303. Spar. sol. H_2O. Heat of comb. C_v 462·9 Cal. (solid), 464·7 Cal. (liq.).

Markownikow, *Chem. Zentr.*, 1903, II, 287.
Perkin, *J. Chem. Soc.*, 1888, **53**, 564.

N-Methylsuccinimide



$C_5H_7O_2N$ MW, 113

Needles. M.p. 66°. Alc. KOH ⟶ methylamine.

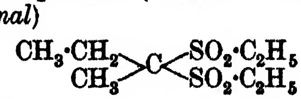
Labruto, *Gazz. chim. ital.*, 1933, **63**, 266.

Methyl sulphate.
See Dimethyl sulphate.

Methyl sulphide.
See Dimethyl sulphide.

Methyl sulphite.
See Dimethyl sulphite.

Methylsulphonal (*Butane* 2 : 2-*diethyldisulphone, trional*)



$C_8H_{18}O_4S_2$ MW, 242

Plates from H_2O. M.p. 76°. Sol. 320 parts cold H_2O. Sol. 17·5 parts EtOH, 15·57 parts

Et_2O at 15°. Bitter taste. Powerful hypnotic and narcotic.

Fromm, *Ann.*, 1889, **253**, 150.

Methyl sulphone.
See Dimethyl sulphone.

Methyltartronic Acid.
See Hydroxymethylmalonic Acid.

***N*-Methyltaurine** (2-*Methylaminoethane*-1-*sulphonic acid*)

$CH_3{\cdot}NH{\cdot}CH_2{\cdot}CH_2{\cdot}SO_3H$

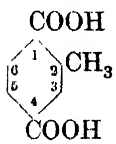
$C_3H_9O_3NS$ MW, 139

Prisms. M.p. 241–2°. Sol. H_2O. Insol. EtOH, Et_2O. Does not combine with acids or bases.

N-*Guanyl*: prisms + H_2O. M.p. 285° decomp. Spar. sol. cold H_2O. Insol. EtOH, Et_2O.

Dittrich, *J. prakt. Chem.*, 1878, **18**, 70.
I.G., D.R.P., 572,204, (*Chem. Abstracts*, 1933, **27**, 2965).
Josephson, *Biochem. Z.*, 1933, **265**, 448.

Methylterephthalic Acid (*Toluene*-2 : 5-*dicarboxylic acid*)



$C_9H_8O_4$ MW, 180

Powder from hot AcOH. M.p. 325–30°. Sublimes in needles. Mod. sol. boiling AcOH, boiling xylene. Insol. most other solvents.

1-*Me ester*: $C_{10}H_{10}O_4$. MW, 194. M.p. 135–6°. $k = 1{\cdot}56 \times 10^{-4}$ at 25°.

4-*Me ester*: m.p. 146–7°. $k = 5{\cdot}5 \times 10^{-4}$ at 25°.

Di-Me ester: $C_{11}H_{12}O_4$. MW, 208. Cryst. from MeOH. M.p. 73–4°. Very sol. C_6H_6, pet. ether. Spar. sol. cold EtOH.

Bentley, Perkin, *J. Chem. Soc.*, 1897, **71**, 177.
Wegscheider, *Monatsh.*, 1916, **37**, 230.

2-Methyltetracosane.
See Isopentacosane.

ω-Methyltetracosanol-1.
See Isopentacosyl Alcohol.

Methyl tetradecane-1 : 14-dicarboxylic Acid.
See Methylthapsic Acid.

7-Methyltetradecanone-9

$$CH_3{\cdot}[CH_2]_4{\cdot}CO{\cdot}CH_2{\cdot}\overset{CH_3}{\overset{|}{C}H}{\cdot}[CH_2]_5{\cdot}CH_3$$

$C_{15}H_{30}O$ MW, 226

B.p. 143–4°/9 mm. D_4^0 0·845.

Bouveault, Locquin, *Bull. soc. chim.*, 1904, **31**, 1159.

Methyl tetradecyl Ketone (*Hexadecanone*-2)

$CH_3{\cdot}[CH_2]_{13}{\cdot}CO{\cdot}CH_3$

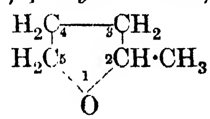
$C_{16}H_{32}O$ MW, 240

Cryst. M.p. 43°. B.p. 230–1°/100 mm.

Semicarbazone: cryst. from EtOH. M.p. 117–18°.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.
Krafft, *Ber.*, 1882, **15**, 1707.

2-Methyltetrahydrofuran (α-*Methyltetramethylene oxide*, γ-*pentylene oxide*)



$C_5H_{10}O$ MW, 86

B.p. 80°/761 mm., 77–8°/716 mm. D_0^0 0·8748, D_{15}^{21} 0·8534. n_D^{21} 1·40595. Sol. 10 parts cold H_2O. Less sol. hot H_2O. Sol. EtOH, Et_2O, $CHCl_3$.

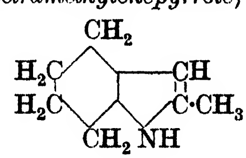
Lipp, *Ber.*, 1889, **22**, 2569.
Paul, *Bull. soc. chim.*, 1933, **53**, 417.
Zelinskiĭ, Shuĭkin, *Chem. Abstracts*, 1934, **28**, 2003.

3-Methyltetrahydrofuran.

B.p. 86–7°. Very sol. EtOH, Et_2O. Sol. H_2O. D_{20}^{20} 0·8643. n_D^{20} 1·4112.

Harries, *Ann.*, 1911, **383**, 170.

2-Methyl-4 : 5 : 6 : 7-tetrahydroindole (2-*Methyl*-4 : 5-*tetramethylenepyrrole*)



$C_9H_{13}N$ MW, 135

B.p. 222–3°/764 mm., 105°/13 mm., 103–4°/7 mm. D_4^{10} 0·9871, D_4^{30} 1·0056. Readily darkens. Gives dark red pine splinter reaction.

B_2,H_2PtCl_6: decomp. at 187–8°.

$B,HgCl_2$: m.p. 153–4°.

N-*Benzenesulphonyl*: m.p. 86–91°.

Picrate: m.p. 141°.

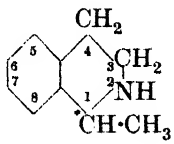
Methiodide: decomp. at 195°.

v. Braun, Bayer, Blessing, *Ber.*, 1924, **57**, 399.
Hadano, Matsuno, *Chem. Abstracts*, 1929, **23**, 1635.

3-Methyl-4 : 5 : 6 : 7-tetrahydroindole.
See Tetrahydroskatole.

***N*-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.**
See Isokairoline.

1-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline



$C_{10}H_{13}N$ MW, 147

l-.
D^{20} 1·024.
B,HCl : m.p. 213°.
Ditartrate : m.p. 92°.
dl-.
B.p. 233°/745 mm.
Picrate : m.p. 187°.

Leithe, *Monatsh.*, 1929, **53**, 956.

3-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.
B.p. 236–7°/751 mm. Sol. H_2O. Reacts alkaline.

Gabriel, Colman, *Ber.*, 1900, **33**, 992.

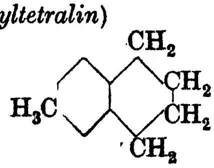
6-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.
B.p. 255–6°/758 mm., 110°/11 mm. D_4^8 1·0235.
B,HCl : needles from EtOH. M.p. 195–7°.
N-*Nitroso* : cryst. from EtOH. M.p. 98°.
Methiodide : cryst. from EtOH–Et_2O. M.p. 144–5°.
Picrate : m.p. 205°.

v. Braun, Blessing, Cahn, *Ber.*, 1924, **57**, 911.

7-Methyl-1 : 2 : 3 : 4-tetrahydroisoquinoline.
B.p. 125°/18 mm. D_4^{24} 1·0176.
B,HCl : m.p. 216°.
N-*Nitroso* : cryst. from EtOH.Aq. M.p. 87°.
N-*Benzenesulphonyl* : cryst. M.p. 154°.
Picrate : m.p. 202°.
Methiodide : m.p. 133°.

v. Braun, Wirz, *Ber.*, 1927, **60**, 106.

6-Methyl-1 : 2 : 3 : 4-tetrahydronaphthalene (6-*Methyltetralin*)

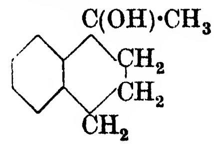


$C_{11}H_{14}$ **MW, 146**

B.p. 221°, 99–101°/13 mm.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1314.

1-Methyl-1 : 2 : 3 : 4-tetrahydro-1-naphthol (1-*Methyl*-1-*tetralol*)

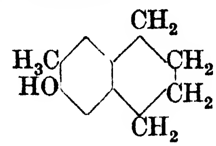


$C_{11}H_{14}O$ MW, 162

Plates from pet. ether. M.p. 88–9°.

Auwers, *Ann.*, 1918, **415**, 162.

7-Methyl-1 : 2 : 3 : 4-tetrahydro-6-naphthol (7-*Methyl*-6-*tetralol*)

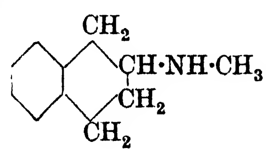


$C_{11}H_{14}O$ MW, 162

Plates from pet. ether. M.p. 88–9°.

Veselý, Štursa, *Chem. Abstracts*, 1934, **28**, 5815.

***N*-Methyl-1 : 2 : 3 : 4-tetrahydro-2-naphthylamine**

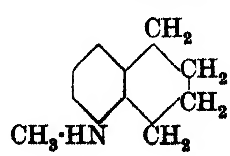


$C_{11}H_{15}N$ MW, 161

B.p. 118–119·8°/9 mm. Sol. hot H_2O, most org. solvents. D_4^0 1·037, D_4^{20} 1·024.
B,HCl : plates and needles from H_2O. M.p. 214°. Sol. EtOH. Spar. sol. cold H_2O.
N-*Acetyl* : syrup. B.p. 190–210°/17 mm. decomp. Sol. most org. solvents. Spar. sol. H_2O.
B_2,H_2PtCl_6 : plates from H_2O. M.p. 228° decomp.

Waser, *Ber.*, 1916, **49**, 1205.

***N*-Methyl-1 : 2 : 3 : 4-tetrahydro-5-naphthylamine**



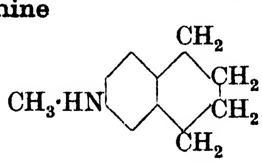
$C_{11}H_{15}N$ **MW, 161**

Pale yellow liq. B.p. 150–2°/12 mm.

Picrate : reddish-yellow cryst. M.p. 174°. Sol. EtOH.

v. Braun, Arkuszewski, Köhler, *Ber.*, 1918, **51**, 287.

N - Methyl - 1 : 2 : 3 : 4 - tetrahydro - 6 - naphthylamine



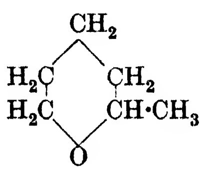
$C_{11}H_{15}N$ MW, 161

Oil. B.p. 267·5°/210 mm. Sol. most org. solvents. Spar. sol. H_2O.

Smith, *J. Chem. Soc.*, 1904, **85**, 735.

N-Methyltetrahydropapaverine.
See Laudanosine.

2 - Methyltetrahydropyran (δ - *Hexylene oxide*)

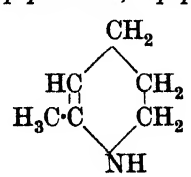


$C_6H_{12}O$ MW, 100

B.p. 104·5–106°/749 mm. Spar. sol. cold H_2O, less sol. hot. $D_4^{21\cdot1}$ 0·8537. n_D 1·4189. Reduces Fehling's but not $NH_3.AgNO_3$.

Franke, Lieben, *Monatsh.*, 1914, **35**, 1433.

6-Methyl-1 : 2 : 3 : 4-tetrahydropyridine (2-*Methyl*-Δ^2-*piperidein*, α-*pipecolein*)

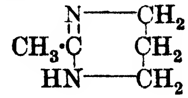


$C_6H_{11}N$ MW, 97

B.p. 131–2°/716 mm. Sol. H_2O, EtOH, Et_2O. D_0^0 0·9133. Turns brown in air.
B,HAuCl$_4$: yellow needles. M.p. 148° (144–5°) decomp. Sol. EtOH. Spar. sol. H_2O.
B$_2$,*H*$_2$*PtCl*$_6$: orange-red needles from H_2O. M.p. 193–4° (192°) decomp. Sol. H_2O. Spar. sol. EtOH.
Picrate : yellow needles from H_2O. M.p. 120–1°. Spar. sol. H_2O, EtOH, Et_2O.

Gabriel, *Ber.*, 1909, **42**, 1242.
Lipp, *Ann.*, 1896, **289**, 201.

2-Methyltetrahydropyrimidine (*Ethenyltrimethylenediamine*)



$C_5H_{10}N_2$ MW, 98

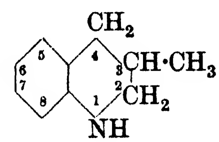
Cryst. M.p. 72–4°. B.p. 120–6°/12 mm. Sol. H_2O, EtOH, $CHCl_3$. Less sol. Et_2O, C_6H_6.
B,HNO$_3$: prisms from H_2O. M.p. 109–10°.
B$_2$,*H*$_2$*PtCl*$_6$: orange prisms from H_2O. M.p. 206–7°.
Oxalate : needles from H_2O. M.p. 119°. Hygroscopic.
Picrate : prisms from H_2O. M.p. 152°. Spar. sol. cold H_2O.

Haga, Majima, *Ber.*, 1903, **36**, 335.

N-Methyltetrahydroquinoline.
See Kairoline.

2-Methyltetrahydroquinoline.
See Tetrahydroquinaldine.

3-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline



$C_{10}H_{13}N$ MW, 147

Oil. B.p. 116–18°/10 mm.
B,HCl : m.p. 207°.
N-*Benzoyl* : cryst. from EtOH. M.p. 84°.
Picrate : m.p. 155°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, **56**, 1343.

4-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline (1 : 2 : 3 : 4-*Tetrahydrolepidine*).
B.p. 250–3°/740 mm., 130°/12 mm.
N-*Benzoyl* : cryst. from EtOH. M.p. 129°.

See previous reference and also
Knorr, Klotz, *Ber.*, 1886, **19**, 3300.

5-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline.
B,HCl : needles and leaflets. M.p. 238–40°. $K_2Cr_2O_7$ + HCl ⟶ purple-violet col. ⟶ brownish-yellow on warming.
N-*Nitroso* : prisms from EtOH. M.p. 69–70°.

Gabriel, Thieme, *Ber.*, 1919, **52**, 1087.

6-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline (1 : 2 : 3 : 4-*Tetrahydro*-p-*toluquinoline*).
Plates. M.p. 38°. B.p. 262–3°/712 mm. Sol. EtOH, C_6H_6, $CHCl_3$, ligroin. Spar. sol. H_2O.

B,HCl : needles from EtOH–Et_2O. M.p. 189°. Very sol. H_2O, EtOH. Spar. sol. cold $CHCl_3$. Insol. Et_2O, C_6H_6.
N-*Acetyl* : b.p. 302–5°/719 mm. Sol. most org. solvents. Spar. sol. H_2O.
N-*Benzoyl* : cryst. from EtOH. M.p. 78°.
N-*Nitroso* : yellow cryst. from Et_2O, EtOH or ligroin. M.p. 65°.

Bamberger, Wulz, *Ber.*, 1891, **24**, 2067.

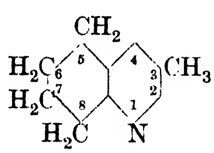
7-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline (1 : 2 : 3 : 4-*Tetrahydro*-m-*toluquinoline*).
B.p. 264°, 130–2°/12 mm.
B,HCl : cryst. from EtOH. M.p. 175°.
N-*Benzoyl* : cryst. from EtOH. M.p. 70–2°.
Picrate : m.p. 153–4°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, **56**, 1341.

8-Methyl-1 : 2 : 3 : 4-tetrahydroquinoline (1 : 2 : 3 : 4-*Tetrahydro*-o-*toluquinoline*).
Oil. B.p. 255–7°/717 mm. Sol. most org. solvents. Spar. sol. H_2O.
B,HCl : plates from EtOH. M.p. 214°. Sol. H_2O, boiling EtOH, hot $CHCl_3$. Insol. Et_2O, C_6H_6.
N-*Acetyl* : prisms. M.p. 53–4°. B.p. 297–9°/718 mm.
N-*Benzoyl* : cryst. from EtOH. M.p. 108°.
N-*Nitroso* : prisms from EtOH. M.p. 51°.
B_2,H_2PtCl_6 : m.p. 212°.
Picrate : m.p. 168°.

Bamberger, Wulz, *Ber.*, 1891, **24**, 2061.
Pincus, *Ber.*, 1892, **25**, 2805.

3-Methyl-5 : 6 : 7 : 8-tetrahydroquinoline



$C_{10}H_{13}N$ MW, 147

B.p. 126–7°/17 mm.
B_2,H_2PtCl_6 : decomp. at 219°.
Picrate : m.p. 171°.
Methiodide : m.p. 162°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, **56**, 1343.

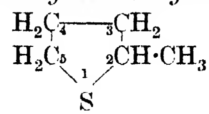
4-Methyl-5 : 6 : 7 : 8-tetrahydroquinoline (5 : 6 : 7 : 8-*Tetrahydrolepidine*).
B.p. 122°/11 mm. Spar. sol. H_2O.
B,HCl : cryst. from EtOH. M.p. 203–4°.
Picrate : m.p. 170°. Spar. sol. EtOH.
Methiodide : cryst. from EtOH. M.p. 183°.

See previous reference.

8-Methyl-5 : 6 : 7 : 8-tetrahydroquinoline.
B.p. 220–1°. D_4^{14} 1·0052. n_D^{14} 1·53643.

Yamaguchi, *Chem. Abstracts*, 1927, **21**, 2696.

2-Methyltetrahydrothiophene (*Tetrahydro-α-thiotolene, 2-methyltetramethylene sulphide*)



$C_5H_{10}S$ MW, 102

B.p. 134°, 132·5–132·6°/750 mm. D_4^{18} 0·9564. n_D^{15} 1·4886.
$B,HgCl_2$: decomp. about 150°. Spar. sol. usual solvents.
Methiodide : needles from EtOH or Me_2CO. M.p. 155° decomp. Sol. H_2O, EtOH. Spar. sol. Me_2CO. Insol. Et_2O, pet. ether. Sublimes.
Methochloroplatinate : reddish-yellow plates. M.p. 197° decomp. Spar. sol. cold H_2O.

Grischkewitsch-Trochimowski, *J. Russ. Phys.-Chem. Soc.*, 1916, **48**, 919.
v. Braun, *Ber.*, 1910, **43**, 3223.

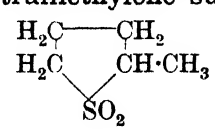
3-Methyltetrahydrothiophene (*Tetrahydro-β-thiotolene, 3-methyltetramethylene sulphide*).
B.p. 137·5–138·5°/740 mm. $D_4^{18.5}$ 0·9596. $n_D^{18.4}$ 1·4886. Sol. most org. solvents. Volatile in steam.
$B,HgCl_2$: cryst. M.p. 82–3°. Spar. sol. H_2O, hot EtOH, Et_2O.

See first reference above.

Methyltetramethylenediamine.
See Methylputrescine.

Methyltetramethylene sulphide.
See Methyltetrahydrothiophene.

2-Methyltetramethylene sulphone

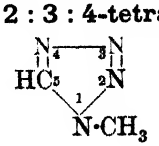


$C_5H_{10}O_2S$ MW, 134

B.p. 279–80°/758 mm. Sol. H_2O, EtOH, Et_2O. D_4^{14} 1·2070. n_D^{14} 1·4801.

Grischkewitsch-Trochimowski, *J. Russ. Phys.-Chem. Soc.*, 1916, **48**, 918.

1-Methyl-1 : 2 : 3 : 4-tetrazole

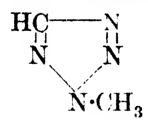


$C_2H_4N_4$ MW, 84

Prisms. M.p. 36–7°. Sol. H_2O, EtOH. Spar. sol. hot Et_2O. Hot conc. alkalis ⟶ methylamine + NH_3 + N.

Olivieri-Mandalà, *Atti accad. Lincei*, 1910, **19**, I, 228.

1-Methyl-1 : 2 : 3 : 5-tetrazole



$C_2H_4N_4$ MW, 84

B.p. 145–7°/759 mm.

Olivieri-Mandalà, Passalacqua, *Gazz. chim. ital.*, 1913, **43**, ii, 465.

3-Methyltetrolic Acid.

See Ethylpropiolic Acid.

1-Methylthapsic Acid (1-*Methyltetradecane-1 : 14-dicarboxylic acid*)

CH$_3$·CH·COOH
[CH$_2$]$_{12}$
CH$_2$·COOH

$C_{17}H_{32}O_4$ MW, 300

Cryst. from AcOEt-pet. ether. M.p. 89–90°. B.p. 223–5°/0·2 mm.

Di-Me ester: $C_{19}H_{36}O_4$. MW, 328. F.p. 19–21°. B.p. 210–13°/8 mm. D^{15} 0·9465.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, **10**, 188.

2-Methylthapsic Acid (2-*Methyltetradecane-1 : 14-dicarboxylic acid*)

CH$_2$·COOH
CH$_3$·CH
[CH$_2$]$_{11}$
CH$_2$·COOH

$C_{17}H_{32}O_4$ MW, 300

Cryst. from AcOEt. M.p. 77·2–74°. Sol. Et_2O.

Di-Me ester: $C_{19}H_{36}O_4$. MW, 328. B.p. 198–200°/3·5 mm. D^{15} 0·946.

Di-Et ester: $C_{21}H_{40}O_4$. MW, 356. B.p. 209–11°/3·5 mm. D^{15} 0·931.

See previous reference.

3-Methylthapsic Acid (3-*Methyltetradecane-1 : 14-dicarboxylic acid*)

CH$_2$·COOH
CH$_2$
CH$_3$·CH
[CH$_2$]$_{10}$
CH$_2$·COOH

$C_{17}H_{32}O_4$ MW, 300

Cryst. from AcOEt. M.p. 78–78·4°. B.p. 238–40°/1 mm.

Di-Me ester: $C_{19}H_{36}O_4$. MW, 328. F.p. 15°. B.p. 203–4°/4 mm. D^{15} 0·948.

Di-Et ester: $C_{21}H_{40}O_4$. MW, 356. B.p. 223–5°/8 mm. D^{15} 0·934.

Dinitrile: $C_{17}H_{30}N_2$. MW, 262. Plates from EtOH.Aq. M.p. 36·6–36·8°. B.p. 235–45°/8 mm.

See previous reference.

4-Methylthapsic Acid (4-*Methyltetradecane-1 : 14-dicarboxylic acid*)

CH$_2$·COOH
[CH$_2$]$_2$
CH$_3$·CH
[CH$_2$]$_9$
CH$_2$·COOH

$C_{17}H_{32}O_4$ MW, 300

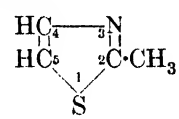
Cryst. from EtOH.Aq. M.p. 78·8–79°. B.p. 252–3°/3 mm. Sol. usual solvents.

Di-Me ester: $C_{19}H_{36}O_4$. MW, 328. B.p. 200–202°/3 mm. D^{15} 0·950.

Di-Et ester: $C_{21}H_{40}O_4$. MW, 356. B.p. 234–6°/9 mm. D^{15} 0·931.

See previous reference.

2-Methylthiazole



C_4H_5NS MW, 99

B.p. 127·5–128°. Misc. with cold H_2O.

B_2,H_2PtCl_6: plates. M.p. 199°.

B,$HgCl_2$: m.p. 154·5°.

B,HCl,$HgCl_2$: m.p. 111–12°.

Picrate: m.p. 145–6°.

Methiodide: sublimes at 298° without melting.

Hantzsch, *Ann.*, 1889, **250**, 271.

4-Methylthiazole.

B.p. 133–4°. Misc. with H_2O, EtOH, Et_2O.

B_2,H_2PtCl_6: orange-red prisms. M.p. 204° decomp. Sol. H_2O. Spar. sol. EtOH.

B,$HAuCl_4$: m.p. 184–5° decomp.

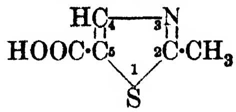
B,$HgCl_2$: m.p. 148°.

B,HCl,$HgCl_2$: m.p. 119°.

Picrate: m.p. 174°.

Arapides, *Ann.*, 1888, **249**, 24.
Popp, *Ann.*, 1889, **250**, 277.

2-Methylthiazole-5-carboxylic Acid



$C_5H_5O_2NS$ MW, 143

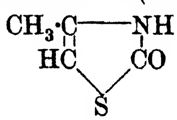
Needles or prisms from H_2O. M.p. 144–5°. Sol. cold H_2O. Less sol. EtOH. Spar. sol. Et_2O, $CHCl_3$. Insol. C_6H_6, CS_2.

Roubleff, *Ann.*, 1890, **259**, 271.

4-Methylthiazole-5-carboxylic Acid.
Prisms from H_2O. M.p. 280° decomp. Sol. EtOH. Less sol. hot H_2O, Et_2O. Spar. sol. C_6H_6, ligroin.
Me ester: $C_6H_7O_2NS$. MW, 157. Prisms from pet. ether. M.p. 74–5°.
Et ester: $C_7H_9O_2NS$. MW, 171. Prisms. M.p. 27–8°. B.p. 215–20°. Very sol. most org. solvents. Volatile in steam. *B,HCl*: needles from EtOH. M.p. 155° decomp.

Tomlinson, *J. Chem. Soc.*, 1935, 1030.

4-Methyl-2-thiazolone (*4-Methylrhodim*)



C_4H_5ONS MW, 115

Exists in two forms.
(α) Needles from H_2O. M.p. 102–3°.
N-*Me*: C_5H_7ONS. MW, 129. Prisms or plates from H_2O. M.p. 49–50°.
(β) Plates from EtOH. M.p. 183–4°. Sol. boiling EtOH. Sol. 20 parts boiling, 475 parts cold, H_2O. Sol. alkalis. Spar. sol. Et_2O.

Tcherniac, *J. Chem. Soc.*, 1919, **115**, 1075.

Methyl 2-thienyl Ketone.
See 2-Acetothienone.

ω-Methylthiobuiret (*Thioallophanic acid methylamide*)

CH_3·NH·CO·NH·CS·NH_2

$C_3H_7ON_3S$ MW, 133

Needles from H_2O. M.p. 198° (194°) decomp. Sol. hot H_2O. Intense bitter taste.

Hecht, *Ber.*, 1892, **25**, 750.
Slotta, Tschesche, *Ber.*, 1929, **62**, 137.

Methyl thiocyanate

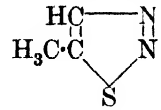
CH_3·CNS

C_2H_3NS MW, 73

F.p. − 51°. B.p. 130·5°/756 mm. D^{15} 1·0765. n_D^{15} 1·0765. Heat of comb. C_v 452·1 Cal.

Schmitz, D.R.P., 264,922, (*Chem. Zentr.*, 1913, II, 1348).

5-Methyl-1 : 2 : 3-thiodiazole

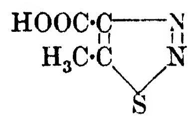


$C_3H_4N_2S$ MW, 100

B.p. 184°/755 mm., 88–9°/34 mm. Sol. EtOH, Et_2O. Sol. 8 parts H_2O at 15°. D^0 1·2363. Reacts neutral. Readily volatile in steam. Darkens on exposure to light.
B,AuCl₃: yellow needles. M.p. 145° decomp.
Methiodide: pale yellow needles from EtOH. M.p. 76–7°. Sol. H_2O.
Methochloroaurate: yellow plates from H_2O. M.p. 136–7°.
Methochloroplatinate: orange-red needles or prisms from H_2O. M.p. 212° decomp.

Wolff, Kopitzsch, Hall, *Ann.*, 1904, **333**, 15.

5-Methyl-1 : 2 : 3-thiodiazole-4-carboxylic Acid



$C_4H_4O_2N_2S$ MW, 144

Needles + H_2O from hot H_2O. M.p. 74–5°, anhyd. 113°. Decomp. at 160°. Sol. hot H_2O, EtOH. Spar. sol. Et_2O, C_6H_6, $CHCl_3$. Sol. 20 parts H_2O at 20°.
Et ester: $C_6H_8O_2N_2S$. MW, 172. Needles or plates from H_2O. M.p. 35°.

See previous reference.

S-Methylthioglycollic Acid (*Methylmercaptoacetic acid, dimethyl sulphide carboxylic acid*)

CH_3·S·CH_2·COOH

$C_3H_6O_2S$ MW, 106

B.p. 130–1°/27 mm., 107°/9·5 mm. D_{20}^{20} 1·223. n_D^{20} 1·495. $k = 1{\cdot}92 \times 10^{-4}$ at 25°.
Me ester: $C_4H_8O_2S$. MW, 120. B.p. 53–5°/11 mm.
Anilide: needles from Et_2O–ligroin. M.p. 80°. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. Spar. sol. ligroin. Insol. H_2O.
o-*Toluidide*: plates from EtOH.Aq. M.p. 65–6°.

m-*Toluidide*: needles from EtOH.Aq. M.p. 52–3°.

p-*Toluidide*: needles from EtOH.Aq. M.p. 102–3°.

p-*Anisidide*: needles from EtOH.Aq. M.p. 68°. Sol. EtOH. Insol. H_2O.

p-*Phenetidide*: needles from EtOH.Aq. M.p. 63°. Sol. EtOH. Insol. H_2O.

Larsson, *Ber.*, 1930, **63**, 1349.
Beckurts, Frerichs, *J. prakt. Chem.*, 1906, **74**, 26, 42.

S-Methylthiohydracrylic Acid (*Methyl 2-carboxyethyl sulphide, 2-methylmercaptopropionic acid*)

$CH_3{\cdot}S{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$

$C_4H_8O_2S$ MW, 120

Methobromide: needles. M.p. 115° decomp.

Methochloroplatinate: orange-red needles. M.p. 184°.

Carrara, *Gazz. chim. ital.*, 1893, **23**, i, 506.

S-Methylthiolactic Acid (*Methyl 1-carboxyethyl sulphide, 1-methylmercaptopropionic acid*)

$CH_3{\cdot}CH(S{\cdot}CH_3){\cdot}COOH$

$C_4H_8O_2S$ MW, 120

B.p. 104–104·5°/8 mm. n_D^{20} 1·4843.

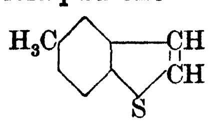
Anilide: needles from EtOH. M.p. 126°.

Methobromide: plates. M.p. 84–5° decomp.

Methochloroplatinate: prisms + $2H_2O$. M.p. 105–6°. Sol. H_2O.

Carrara, *Gazz. chim. ital.*, 1893, **23**, i, 502.
Mellander, *Chem. Zentr.*, 1935, I, 222.

5-Methylthionaphthene

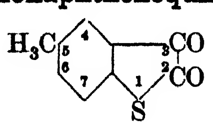


C_9H_8S MW, 148

M.p. 19–22°. B.p. 111–111·5°/12 mm. D_4^{22} 1·111. n_D^{22} 1·607.

Auwers, *Ann.*, 1915, **408**, 282.

5-Methylthionaphthenequinone



$C_9H_6O_2S$ MW, 178

Red plates from EtOH. M.p. 144°. Sol. $CHCl_3$, ligroin. Spar. sol. pet. ether. Insol. H_2O. Sol. alkalis.

2-*Oxime*: yellow needles or plates from EtOH. M.p. about 188° decomp. Sol. most solvents.

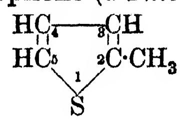
2-*Phenylhydrazone*: red needles from AcOH.Aq. M.p. 186·5°. Sol. $CHCl_3$. Mod. sol. EtOH, C_6H_6, AcOH. Conc. $H_2SO_4 \longrightarrow$ red col.

2-*Benzoylphenylhydrazone*: exists in two forms. (i) Orange-yellow needles from EtOH. M.p. 145°. (ii) Yellow cryst. from C_6H_6–pet. ether. M.p. 157°.

2-p-*Dimethylaminoanil*: green prisms from EtOH. M.p. 200°.

Pummerer, *Ber.*, 1910, **43**, 1374.
Auwers, *Ann.*, 1911, **381**, 300.
Stollé, *Ber.*, 1914, **47**, 1130; D.R.P., 291,759, (*Chem. Zentr.*, 1916, I, 1103).

2-Methylthiophene (α-*Thiotolene*)



C_5H_6S MW, 98

Found in coal tar. B.p. 112–14°.

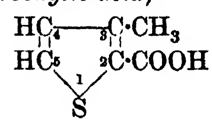
Chrzaszczewska, *Chem. Abstracts*, 1926, **20**, 1079.

3-Methylthiophene (β-*Thiotolene*).

Found in coal tar. B.p. 114°/738 mm. $D_4^{15\cdot8}$ 1·0247. n_D 1·5218.

Opolski, *Chem. Zentr.*, 1905, II, 1797.

3-Methylthiophene-2-carboxylic Acid (β-*Thiotolene-2-carboxylic acid*)



$C_6H_6O_2S$ MW, 142

Needles from H_2O or 60% EtOH. M.p. 144°. Sol. hot H_2O, EtOH, Et_2O.

Chloride: C_6H_5OClS. MW, 160·5. B.p. 218–20°.

Amide: C_6H_7ONS. MW, 141. Needles from H_2O. M.p. 122–3°.

Levi, *Ber.*, 1886, **19**, 657.

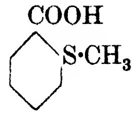
5-Methylthiophene-2-carboxylic Acid (α-*Thiotolene-5-carboxylic acid*).

Needles from H_2O. M.p. 138–9° (137°). Sublimes in needles at 120°. Sol. hot H_2O, EtOH, Et_2O. Volatile in steam.

Me ester: $C_7H_8O_2S$. MW, 156. B.p. 102°/16 mm.

See previous reference and also
Rinkes, *Rec. trav. chim.*, 1933, **52**, 546.

S-Methylthiosalicylic Acid (*o-Methylmercaptobenzoic acid*)



$C_8H_8O_2S$ MW, 168

Needles from hot H_2O. M.p. 169° (164°). Sol. most org. solvents. Spar. sol. H_2O, ligroin. Spar. volatile in steam.

Me ester: $C_9H_{10}O_2S$. MW, 182. Cryst. from EtOH.Aq. or ligroin. M.p. 66–7°. Sol. EtOH, C_6H_6, AcOH.

Nitrile: C_8H_7NS. MW, 149. Yellow needles from MeOH.Aq. M.p. 40–1°.

Wegscheider, Joachimowitz, *Monatsh.*, 1914, **35**, 1054.
Zincke, Siebert, *Ber.*, 1915, **48**, 1247.

4-Methylthiosemicarbazide

$CH_3·NH·CS·NH·NH_2$

$C_2H_7N_3S$ MW, 105

Cryst. from EtOH. M.p. 137–8°. Sol. warm H_2O, EtOH. Insol. Et_2O, C_6H_6, ligroin.

Pulvermacher, *Ber.*, 1894, **27**, 622.

Methylthiourea

$CH_3·NH·CS·NH_2$

$C_2H_6N_2S$ MW, 90

Prisms. M.p. 119°. Sol. H_2O, EtOH. Spar. sol. Et_2O.

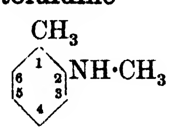
B,HI: plates. M.p. below 100°. Very sol. H_2O, EtOH.

Delépine, *Bull. soc. chim.*, 1902, **27**, 814.

Methyltoliminazole.

See Dimethylbenziminazole.

N-Methyl-o-toluidine



$C_8H_{11}N$ MW, 121

B.p. 207–8°. D^{15} 0·973.

N-β-*Bromoethyl*: b.p. 118–20°/5 mm.

N-*Acetyl*: *N*-methylacet-*o*-toluidide. $C_{10}H_{13}ON$. MW, 163. Cryst. M.p. 55–6°. B.p. 260° (250–1°).

N-*Nitroso*: b.p. 89–90°/15 mm.

Picrate: yellowish-red cryst. M.p. 90°.

Monnet, Reverdin, Noelting, *Ber.*, 1878, **11**, 2278.
v. Braun, Heider, Müller, *Ber.*, 1918, **51**, 279.

N-Methyl-m-toluidine.

B.p. 206–7°.

N-*Acetyl*: *N*-methylacet-*m*-toluidide. Cryst. M.p. 66°.

N-*Nitroso*: orange-yellow oil. B.p. 89–90°/1·0 mm.

See previous references.

N-Methyl-p-toluidine.

B.p. 209–11°/761 mm. (206–7°).

B,HCl: plates from $EtOH–Et_2O$. M.p. 119·5°. Very sol. H_2O, EtOH. Hygroscopic.

B,HI: pale yellow plates from $EtOH–Et_2O$. M.p. 134–7°.

N-*Acetyl*: *N*-methylacet-*p*-toluidide. Plates from Et_2O–EtOH. M.p. 83°. B.p. 283°. Sol. ligroin.

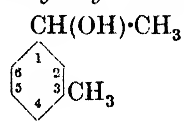
N-*Nitroso*: cryst. M.p. 52°.

Picrate: golden needles from C_6H_6. M.p. 130–2° decomp.

N-*Picryl*: red prisms. M.p. 144–5°.

Thomsen, *Ber.*, 1877, **10**, 1583.
Decker, Becker, *Ann.*, 1913, **395**, 370.
See also previous references.

Methyl-m-tolylcarbinol (*α-Hydroxy-m-ethyltoluene, 1-m-tolylethyl alcohol*)



$C_9H_{12}O$ MW, 136

Oil. B.p. 108·9–109·4°/12 mm. $D_4^{15·2}$ 0·9974. $n_D^{15·35}$ 1·526.

Auwers, *Ann.*, 1915, **408**, 242.

Methyl-p-tolylcarbinol (*α-Hydroxy-p-ethyltoluene, 1-p-tolylethyl alcohol*).

Thick oil. B.p. 219°/756 mm., 120°/19 mm. $D_4^{15·5}$ 0·9668.

Klages, Keil, *Ber.*, 1903, **36**, 1635.

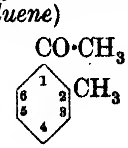
N-Methyl-tolylenediamine.

See under Tolylenediamine.

Methyl tolyl Ether.

See under Cresol.

Methyl o-tolyl Ketone (*2-Methylacetophenone, o-acetotoluene*)



$C_9H_{10}O$ MW, 134

B.p. 214°/761 mm., 108°/30 mm., 79°/5 mm. D_4^{18} 1·0201. $n_D^{12·7}$ 1·535.

Semicarbazone: cryst. from EtOH. M.p. 203° (192°).
2 : 4-*Dinitrophenylhydrazone*: yellow cryst. from EtOH. M.p. 159°.

Auwers, *Ann.*, 1915, **408**, 242.
Eijkman, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 817.

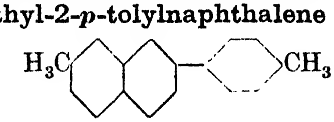
Methyl m-tolyl Ketone (3-*Methylacetophenone*, m-*acetotoluene*).
B.p. 220°/760 mm., 109°/12 mm. D_4^0 1·0165, $D_4^{15·5}$ 1·0106. n_D^{15} 1·533.
Oxime: cryst. from EtOH.Aq. M.p. 54–6°.
Semicarbazone: cryst. from EtOH. M.p. 197–8°.
2 : 4-*Dinitrophenylhydrazone*: orange-red cryst. from AcOH. M.p. 207°.

Mauthner, *J. prakt. Chem.*, 1922, **103**, 394.
See also first reference above.

Methyl p-tolyl Ketone (4-*Methylacetophenone*, p-*acetotoluene*).
Needles. M.p. 28°. B.p. 225°/736 mm., 112·5°/11 mm., 93·5°/7 mm. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$. D_4^0 1·0150, D_4^{20} 1·0051. $n_D^{17·4}$ 1·5353, n_D^{20} 1·5335.
Oxime: cryst. from pet. ether. M.p. 88°. Sol. EtOH. Spar. sol. pet. ether. Insol. H_2O.
Semicarbazone: needles or plates from EtOH. M.p. 205°.
Hydrazone: yellow cryst. from EtOH. M.p. 131–2°. Sol. EtOH, Et_2O.
Azine: cryst. M.p. 136°.
Phenylhydrazone: cryst. from EtOH. M.p. 121°.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1893.
Groggins, Nagel, U.S.P., 1,966,797, (*Chem. Abstracts*, 1934, **28**, 6469).

7-Methyl-2-p-tolylnaphthalene

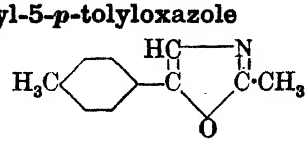


$C_{18}H_{16}$ MW, 232

Plates from pet. ether. M.p. 140–1°. Sol. C_6H_6, AcOH, hot ligroin. Mod. sol. hot EtOH, Et_2O, Me_2CO. Spar. sol. MeOH, pet. ether.

Auwers, Keil, *Ber.*, 1903, **36**, 1873, 3909.

2-Methyl-5-p-tolyloxazole

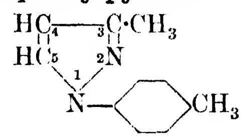


$C_{11}H_{11}ON$ MW, 173

Leaflets from CS_2–pet. ether. M.p. 58–9°. Very sol. usual org. solvents. Spar. sol. hot H_2O.
B_2,H_2PtCl_6: red prisms + $2H_2O$. M.p. 195° decomp.

Rüdenburg, *Ber.*, 1913, **46**, 3562.

3-Methyl-1-p-tolylpyrazole



$C_{11}H_{12}N_2$ MW, 172

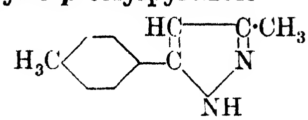
Plates. M.p. 50°.

Michaelis, Sudendorf, *Ber.*, 1900, **33**, 2618.

5-Methyl-1-p-tolylpyrazole.
Oil. B.p. 270–8°.
B_2,H_2PtCl_6: cryst. ppt. from HCl. M.p. 214° decomp.

Bülow, Schlesinger, *Ber.*, 1900, **33**, 3365.

3-Methyl-5-p-tolylpyrazole

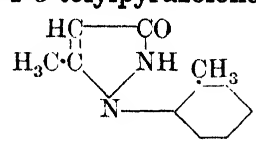


$C_{11}H_{12}N_2$ MW, 172

Needles from EtOH.Aq. M.p. 125°.

Basu, *J. Indian Chem. Soc.*, 1931, **8**, 122.

5-Methyl-1-o-tolylpyrazolone-3



$C_{11}H_{12}ON_2$ MW, 188

Prisms. M.p. 169°. Sol. hot EtOH, $CHCl_3$. Spar. sol. H_2O, Et_2O, pet. ether. Sol. acids, alkalis.
B,HCl: prisms. M.p. 190°.
N-*Benzoyl*: prisms from EtOH. M.p. 72°. Sol. Et_2O, pet. ether.
N-*Benzenesulphonyl*: needles from EtOH. M.p. 80°.
Anisylidene deriv.: powder. M.p. 295°.

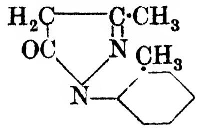
Michaelis, Behrens, *Ann.*, 1905, **338**, 312.

5-Methyl-1-p-tolylpyrazolone-3.
Needles. M.p. 196°. Sol. hot EtOH, $CHCl_3$. Spar. sol. H_2O, Et_2O. pet ether. Sol. HCl, alkalis.
B,HCl: plates. M.p. 206°.
Benzoyl: needles from EtOH. M.p. 47°.

Benzenesulphonyl: needles from EtOH. M.p. 47°.
Benzylidene: cryst. M.p. 278°.
Anisylidene: m.p. 270°.

See previous reference.

3-Methyl-1-*o*-tolylpyrazolone-5



$C_{11}H_{12}ON_2$ MW, 188

Cryst. M.p. 183°.

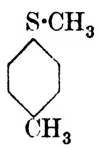
Knorr, *Ber.*, 1884, **17**, 549.

3-Methyl-1-*p*-tolylpyrazolone-5.

Cryst. M.p. 140°.

See previous reference.

Methyl *p*-tolyl sulphide (p-*Thiocresol methyl ether*)

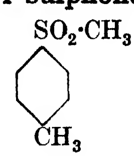


$C_8H_{10}S$ MW, 138

Oil. B.p. 209°/747 mm., 104–5°/20 mm. D_4^{16} 1·0302. n_D^{16} 1·57537.

Kehrmann, Sava, *Ber.*, 1912, **45**, 2897.
Gilman, Beaber, *J. Am. Chem. Soc.*, 1925, **47**, 1449.

Methyl *p*-tolyl sulphone

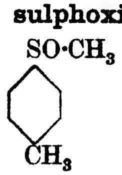


$C_8H_{10}O_2S$ MW, 170

Plates from C_6H_6–pet. ether. M.p. 89° (86–7°). Sol. Me_2CO, C_6H_6, $CHCl_3$, AcOH. Less sol. Et_2O, pet. ether.

Zincke, Frohneberg, *Ber.*, 1910, **43**, 848.

Methyl *p*-tolyl sulphoxide

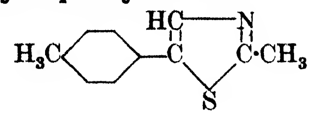


$C_8H_{10}OS$ MW, 154

Cryst. M.p. 50–4°. B.p. 168°/38 mm. Easily decomp.

See previous reference.

2-Methyl-5-*p*-tolylthiazole

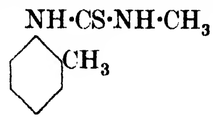


$C_{11}H_{11}NS$ MW, 189

Plates from pet. ether. M.p. 81–2°.
B,HCl: needles + H_2O. M.p. 195–6°.
B,HAuCl₄: golden-yellow needles from AcOH. M.p. 129–31°.
B₂,H₂PtCl₆: orange-yellow needles + $2H_2O$ from H_2O. M.p. 202–3° decomp.

Rüdenburg, *Ber.*, 1913, **46**, 3563.

***sym.*-Methyl-*o*-tolylthiourea**

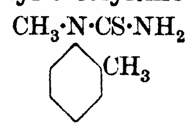


$C_9H_{12}N_2S$ MW, 180

Prisms from EtOH + 33% methylamine. M.p. 161° (152–3°). Sol. hot EtOH. Mod. sol. boiling H_2O.

Hunter, Styles, *J. Chem. Soc.*, 1928, 3024.

***unsym.*-Methyl-*o*-tolylthiourea**

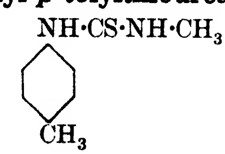


$C_9H_{12}N_2S$ MW, 180

Needles from MeOH. M.p. 107–8°.

Hunter, Styles, *J. Chem. Soc.*, 1928, 3025.

***sym.*-Methyl-*p*-tolylthiourea**

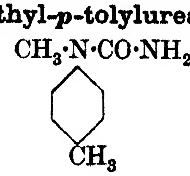


$C_9H_{12}N_2S$ MW, 180

Prisms from EtOH. M.p. 125–6°.

Dixon, *J. Chem. Soc.*, 1889, **55**, 620.

***unsym.*-Methyl-*p*-tolylurea**

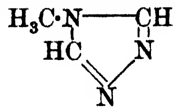


$C_9H_{12}ON_2$ MW, 164

Cryst. from C_6H_6–ligroin. M.p. 103°.

Thate, *Rec. trav. chim.*, 1929, **48**, 116.
Boehringer, Soehne, D.R.P., 367,611, (*Chem. Abstracts*, 1924, **18**, 990).

4-Methyl-1 : 2 : 4-triazole



$C_3H_5N_3$ MW, 83

Cryst. from EtOH. M.p. 90°.
B,HCl : cryst. from EtOH–Et_2O. M.p. 186°.
B.HgCl₂ : m.p. 175°.

Freund, Schwarz, *Ber.*, 1896, **29**, 2489.

1 - Methyltricarballylic Acid (*Butane-1 : 2 : 3-tricarboxylic acid*)

CH_3·CH·COOH
CH·COOH
CH_2·COOH

$C_7H_{10}O_6$ MW, 190

Cis :
Prisms from H_2O, needles from AcOEt. M.p. 139–42° (134°). Very sol. H_2O, EtOH, Et_2O, AcOEt. Insol. C_6H_6. $k = 4{\cdot}8 \times 10^{-4}$ at 25°.

Trans :
Prisms from H_2O. M.p. 185–6° (180°). Sol. H_2O, EtOH, Me_2CO, AcOEt. Spar. sol. Et_2O. Insol. C_6H_6, $CHCl_3$, ligroin. $k = 3{\cdot}2 \times 10^{-4}$ at 25°.

Tri-Et ester : $C_{13}H_{22}O_6$. MW, 274. B.p. 180–1°/24 mm.

Hope, *J. Chem. Soc.*, 1912, **101**, 901.
Auwers, Köbner, v. Meyenburg, *Ber.*, 1891, **24**, 2891.

2-Methyltricarballylic Acid (*2-Methylpropane-1 : 2 : 3-tricarboxylic acid, isobutane-1 : 2 : 3-tricarboxylic acid*)

CH_2·COOH
CH_3·C·COOH
CH_2·COOH

$C_7H_{10}O_6$ MW, 190

Cryst. from HCl. M.p. 165–6°. Sol. Me_2CO, AcOH, AcOEt, H·COOH. Insol. C_6H_6, $CHCl_3$, pet. ether.

Tri-Et ester : $C_{13}H_{22}O_6$. MW, 274. B.p. 163–4°/15 mm.

1 : 2-*Anhydride* : $C_7H_8O_5$. MW, 172. Prisms from AcOEt. M.p. 139–40°. B.p. 220–3°/15 mm. Sol. Et_2O, AcOEt. Spar. sol. $CHCl_3$. Insol. C_6H_6, pet. ether.

See previous references.

2-Methyltricosane

CH_3
CH_3·$[CH_2]_{20}$·CH·CH_3

$C_{24}H_{50}$ MW, 338

Cryst. M.p. 42°.

Landa, Riedl, *Chem. Zentr.*, 1931, **1**, 2454.

2-Methyltricosanol-2

CH_3
CH_3·$[CH_2]_{20}$·C(OH)·CH_3

$C_{24}H_{50}O$ MW, 354

Cryst. from Et_2O. M.p. 63°.

See previous reference.

2-Methyl-2-tricosene

CH_3
CH_3·$[CH_2]_{19}$·CH:C·CH_3

$C_{24}H_{48}$ MW, 336

Cryst. M.p. 41·5°.

See previous reference.

2-Methyltridecanol-3 (*Isopropyl-n-decylcarbinol*)

CH_3
CH_3·$[CH_2]_9$·CH(OH)·CH·CH_3

$C_{14}H_{30}O$ MW, 214

d-.
Needles. M.p. 20°. B.p. 164°/29 mm. D_4^{20} 0·8390. n_D^{20} 1·4460. $[\alpha]_D$ + 16·15°, + 18·34° in EtOH.

Acid phthalate : cryst. from pet. ether. M.p. 65–6°. $[\alpha]_D$ + 16·8° in EtOH, + 14·2° in $CHCl_3$.

dl-.
B.p. 274°.

Acid phthalate : cryst. from pet. ether. M.p. 58–9°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 636.

4-Methyltridecanol-4 (*Methylpropylnonylcarbinol*)

CH_3
CH_3·$[CH_2]_8$·C(OH)·CH_2·CH_2·CH_3

$C_{14}H_{30}O$ MW, 214

B.p. 140–2°/13 mm. D^{15} 0·8406.

Thoms, Ambrus, *Arch. Pharm.*, 1925, **263**, 263.

2-Methyltridecanone-3 (*Isopropyl decyl ketone*)

CH_3
CH_3·$[CH_2]_9$·CO·CH·CH_3

$C_{14}H_{28}O$ MW, 212

Plates. M.p. 47°. B.p. 266–8°/745 mm.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 629.

12-Methyltridecyl Alcohol (*Isomyristyl alcohol*)

$(CH_3)_2CH \cdot [CH_2]_{10} \cdot CH_2OH$

$C_{14}H_{30}O$ MW, 214

M.p. 10–11°. B.p. 145–50°/6 mm. D^{20}_{20} 0·8429. n^{20}_{D} 1·4437.

Fordyce, Johnson, *J. Am. Chem. Soc.*, 1933, **55**, 3372.

12-Methyltridecyl bromide (*Isomyristyl bromide, 13-bromo-2-methyltridecane*)

$(CH_3)_2CH \cdot [CH_2]_{10} \cdot CH_2Br$

$C_{14}H_{29}Br$ MW, 277

B.p. 120–2°/3 mm. D^{20}_{4} 1·0241. n^{20}_{D} 1·4598.

See previous reference.

Methyl tridecyl Ketone (*Pentadecanone*-2)

$CH_3 \cdot [CH_2]_{12} \cdot CO \cdot CH_3$

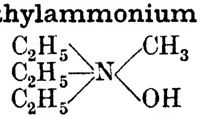
$C_{15}H_{30}O$ MW, 226

Cryst. M.p. 39°. B.p. 294°. D^{39} 0·8182.

Krafft, *Ber.*, 1879, **12**, 1669.
Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.

11-Methyltridecylic Acid.
See Isomyristic Acid.

Methyltriethylammonium hydroxide



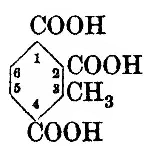
$C_7H_{19}ON$ MW, 133

Cryst. Reacts strongly alkaline. Bitter taste. Unstable. Dist. ⟶ methyldiethylamine + ethylene + H_2O.

Chloride: cryst. from EtOH.
Bromide: cryst. from EtOH.
Iodide: needles from EtOH–Et_2O. M.p. above 230°.
Iodide + I_2: bluish-violet plates. M.p. 62°.
Iodide + I_4: green plates. M.p. 16°.
Iodide + I_6: brownish-violet plates. M.p. 42°.

Hofmann, *Ann.*, 1851, **78**, 277.
Geuther, *Ann.*, 1887, **240**, 71.

3-Methyltrimellitic Acid (*Toluene*-2 : 3 : 6-*tricarboxylic acid*)



$C_{10}H_8O_6$ MW, 224

Needles from hot H_2O. M.p. about 315°. Sublimes. Dist. with CaO ⟶ toluene.

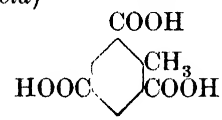
Doebner, *Ann.*, 1900, **311**, 142.

5-Methyltrimellitic Acid (*Toluene*-2 : 4 : 5-*tricarboxylic acid*)

Cryst. from HNO_3. M.p. 223° (212–16°) decomp. Very sol. H_2O, MeOH, Me_2CO, AcOH. Spar. sol. Et_2O, C_6H_6, $CHCl_3$. Insol. pet. ether.

Späth, Wessely, Kornfeld, *Ber.*, 1932, **65**, 1548.
Borsche, Niemann, *Ann.*, 1932, **499**, 72.

2-Methyltrimesic Acid (*Toluene*-2 : 4 : 6-*tricarboxylic acid*)



$C_{10}H_8O_6$ MW, 224

Needles from H_2O. Decomp. at 300°. Sol. hot H_2O, AcOH, AcOEt. Spar. sol. C_6H_6, pet. ether.

Tri-Me ester: $C_{13}H_{14}O_6$. MW, 266. Needles from MeOH or pet. ether. M.p. 107°.

Tri-Et ester: $C_{16}H_{20}O_6$. MW, 308. Needles from pet. ether. M.p. 48°. B.p. 210–20°/14 mm.

Simonsen, *J. Chem. Soc.*, 1910, **97**, 1913.

2-Methyltriphenylamine.
See Diphenyl-*o*-toluidine.

Methyltriphenylcarbinol.
See Diphenyltolylcarbinol.

Methyltriphenylguanidine.
See Diphenyltolylguanidine.

α-Methyltriphenylmethane (1 : 1 : 1-*Triphenylethane*)

$(C_6H_5)_3C \cdot CH_3$

$C_{20}H_{18}$ MW, 258

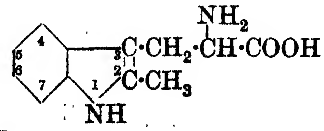
Needles from EtOH. M.p. 95°. Sol. C_6H_6, Et_2O. Spar. sol. cold EtOH, AcOH. Stable to ox. agents.

Gomberg, Cone, *Ber.*, 1906, **39**, 1466.
Kuntze-Fechner, *Ber.*, 1903, **36**, 473.

Methyltriphenylmethane.
See Diphenyltolylmethane.

***N*-Methyltryptamine.**
See 3-[ω-Methylaminoethyl]-indole.

2-Methyltryptophane



$C_{12}H_{14}O_2N_2$ MW, 218

Prisms + MeOH from MeOH–Et_2O. M.p. 263–73°. Sol. H_2O. Spar. sol. EtOH. Sweet taste.

Picrate: orange-red plates from MeOH–pet. ether. M.p. 173°.

Barger, Ewins, *Biochem. J.*, 1917, **11**, 58.

5-Methyltryptophane.

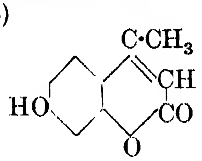
Plates from H_2O–EtOH. M.p. 259–63°. Sol. H_2O. Bitter taste.

Robson, *J. Biol. Chem.*, 1924, **62**, 512.

***N*-Methyltyrosine.**

See Surinamine.

4-Methylumbelliferone (*7-Hydroxy-4-methylcoumarin*)



$C_{10}H_8O_3$ MW, 176

Needles from EtOH. M.p. 185–6°. Sol. EtOH, AcOH. Spar. sol. hot H_2O, Et_2O, $CHCl_3$. Sol. alkalis, NH_3. Spar. sol. carbonates. Conc. $H_2SO_4 \longrightarrow$ blue fluor. Reduces warm $NH_3.AgNO_3$. Used as fluorescence indicator.

Me ether: $C_{11}H_{10}O_3$. MW, 190. Needles from EtOH. M.p. 159°. Sol. hot AcOH. Spar. sol. EtOH, Et_2O, $CHCl_3$. Insol. H_2O. Conc. $H_2SO_4 \longrightarrow$ intense blue fluor.

Acetyl: needles from EtOH or Et_2O. M.p. 150°. Sol. EtOH. Spar. sol. H_2O.

Carbethoxyl: m.p. 99–100°.

Benzoyl: needles from EtOH. M.p. 159–60°. Spar. sol. EtOH. Insol. H_2O.

o-*Chlorobenzoyl*: m.p. 155–6°.

m-*Nitrobenzoyl*: m.p. 210–11°.

p-*Nitrobenzoyl*: m.p. 143°.

Phenylacetyl: m.p. 102–3°.

Cinnamoyl: m.p. 154°.

2-*Naphthoyl*: m.p. 179–80°.

Phenylurethane: m.p. 155–6°.

Picrate: yellow needles. M.p. 108°.

v. Pechmann, Duisberg, *Ber.*, 1883, **16**, 2122.

Wittenberg, *J. prakt. Chem.*, 1881, **24**, 125.

Barger, Eaton, *J. Chem. Soc.*, 1924, **125**, 2410.

5-Methylumbelliferone.

See Homoumbelliferone.

2-Methylundecanol-5.

See Isoamylhexylcarbinol.

6-Methylundecanol-6.

See Methyldiamylcarbinol.

Methylundecylcarbinol (*Tridecanol-2*)

$$CH_3 \cdot [CH_2]_{10} \cdot CH(OH) \cdot CH_3$$

$C_{13}H_{28}O$ MW, 200

d-.

M.p. 30°. B.p. 265°, 156–7°/11 mm. $D_4^{34 \cdot 1}$ 0·8215. $[\alpha]_D^{20}$ + 7·22° (supercooled), + 8·74° in C_6H_6, + 7·37° in EtOH.

Acetyl: b.p. 162°/20 mm. $D_4^{18 \cdot 5}$ 0·8585. n_D^{20} 1·4314. $[\alpha]_D^{20}$ + 4·63°.

Lauryl: b.p. 204°/3 mm. D_4^{10} 0·8616. n_D^{20} 1·4463. $[\alpha]_D^{20}$ + 5·87°.

Acid phthalate: m.p. 26°. $[\alpha]_D$ + 35·5° in $CHCl_3$, + 41·1° in EtOH. *Brucine salt*: m.p. 120–2°. $[\alpha]_D$ − 5·7° in EtOH. *Strychnine salt*: m.p. 142–3°. $[\alpha]_D$ − 18·7° in $CHCl_3$.

dl-.

B.p. 151°/11 mm.

Acid phthalate: cryst. from pet. ether. M.p. 58–9°.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **99**, 58.

Methyl undecyl Ketone (*Tridecanone-2*)

$$CH_3 \cdot [CH_2]_{10} \cdot CO \cdot CH_3$$

$C_{13}H_{26}O$ MW, 198

Cryst. M.p. 29°. B.p. 260–5°, 195·5°/110 mm., 160°/16 mm. D^{28} 0·8229. Used as flavouring essence.

Oxime: cryst. from Et_2O–pet. ether. M.p. 56–7°. Sol. EtOH, Et_2O, $CHCl_3$. Mod. sol. Et_2O. Insol. pet. ether.

Semicarbazone: cryst. from EtOH. M.p. 126°.

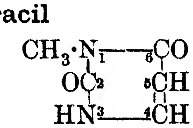
2 : 4-*Dinitrophenylhydrazone*: orange-yellow cryst. from EtOH. M.p. 69°.

Guerin, *Bull. soc. chim.*, 1903, **29**, 1128.

Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, **55**, 57.

1-Methyluracil



$C_5H_6O_2N_2$ MW 126

Prisms from EtOH.Aq. M.p. 174–5°.

Johnson, Heyl, *Am. Chem. J.*, 1907, **37**, 628.

Levene, Tipson, *J. Biol. Chem.*, 1934, **104**, 385.

3-Methyluracil.
Prisms from H_2O. M.p. 232°. Sol. alk. hydroxides, pptd. by dil. HCl.

Wheeler, Johnson, *Am. Chem. J.*, 1909, **42**, 30.

4-Methyluracil.
Needles from EtOH. M.p. about 270–80° decomp. 0·74 parts sol. 100 parts H_2O at 22°. Sol. alkalis. Spar. sol. EtOH. Insol. Et_2O.

Behrend, Roosen, *Ann.*, 1889, **251**, 238.
Thiele, Bihan, *Ann.*, 1898, **302**, 308.

5-Methyluracil.
See Thymine.

Methyluracil-4-carboxylic Acid.
See Methylorotic Acid.

Methylurea (*Methylcarbamic amide*)

$CH_3 \cdot NH \cdot CO \cdot NH_2$

$C_2H_6ON_2$ MW, 74

Prisms from H_2O or EtOH. M.p. 102°. Very sol. H_2O, EtOH. Insol. Et_2O, C_6H_6, CS_2, ligroin. Reacts neutral.
B,HCl: m.p. about 85–7°.
B,HNO$_3$: cryst. M.p. 128–32°.
Acetyl: *see sym.*-Methylacetylurea.
Dichloroacetyl: cryst. from Et_2O–ligroin. M.p. about 29–30°.
Cyanoacetyl: cryst. M.p. 41–41·5°.
Dicyanoacetyl: plates. M.p. 54–56·5°. Very sol. org. solvents.
N-*Nitroso deriv.*: plates from Et_2O. M.p. 123–4°. decomp. Sol. EtOH, Et_2O, Me_2CO. Mod. sol. C_6H_6, $CHCl_3$. Insol. cold H_2O.

Baum, *Ber.*, 1908, **41**, 528.
Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, **51**, 1797.
Werner, *J. Chem. Soc.*, 1919, **115**, 1096.

Methylurethane (*Ethyl methylaminoformate, ethyl methylcarbamate*)

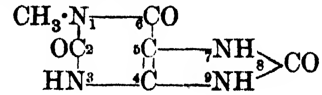
$CH_3 \cdot NH \cdot CO \cdot OC_2H_5$

$C_4H_9O_2N$ MW, 103

B.p. 170°, 80°/15 mm. D^{15} 1·035. n_D^{15} 1·421. Narcotic.
N-*Nitroso*: yellowish-red liq. B.p. 65–65·5°/13 mm. Misc. completely with EtOH, Et_2O, C_6H_6. Spar. sol. H_2O. $D_4^{19\cdot0}$ 1·1402. $n_D^{19\cdot0}$ 1·43905.

Hartman, Brethen, *Organic Syntheses*, 1932, XII, 38.
Maugin, *Ann. chim. phys.*, 1911, **22**, 322.
v. Pechmann, *Ber.*, 1895, **28**, 856.

1-Methyluric Acid



$C_6H_6O_3N_4$ MW, 182

Needles. M.p. about 400°. Sol. 2050 parts boiling H_2O. $k = 4{\cdot}7 \times 10^{-5}$ at 25°.

Prüsse, *Ann.*, 1925, **441**, 211.

3-Methyluric Acid.
Prisms + H_2O from H_2O. Does not melt below 350°. Loses H_2O of cryst. at 150°. Sol. 527 parts boiling H_2O. $k = 4{\cdot}5 \times 10^{-5}$ at 25°.

v. Loeben, *Ann.*, 1897, **298**, 184.
Biltz, Heyn, *Ann.*, 1917, **413**, 108.

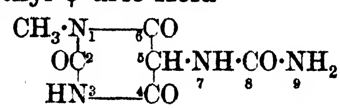
7-Methyluric Acid.
Plates from hot H_2O. Decomp. at 370–80°. Very sol. NaOH. Sol. about 80 parts boiling H_2O. $k = 1{\cdot}15 \times 10^{-4}$ at 25°.

Biltz, Marwitzky, Heyn, *Ann.*, 1921, **423**, 125.
Boehringer, Soehne, D.R.P., 105,345, (*Chem. Zentr.*, 1900, I, 270).

9-Methyluric Acid.
Plates from H_2O. M.p. about 380–400° decomp. Sol. 1830 parts boiling H_2O. $k = 2{\cdot}20 \times 10^{-4}$ at 25°.

Biltz, Heyn, *Ann.*, 1917, **413**, 96.

1-Methyl-ψ-uric Acid



$C_6H_8O_4N_4$ MW, 186

Needles from H_2O. M.p. 220° decomp. Sol. 35 parts boiling H_2O.

Fischer, Clemm, *Ber.*, 1897, **30**, 3091.

7-Methyl-ψ-uric Acid.
Cryst. + H_2O from H_2O. Sol. 23 parts boiling H_2O. Sol. K_2CO_3.Aq.

Fischer, *Ber.*, 1897, **30**, 561.

9-Methyl-ψ-uric Acid.
Needles or prisms + H_2O from H_2O. M.p. 260–1° decomp. Mod. sol. H_2O.

Biltz, Heyn, *Ann.*, 1917, **413**, 94.

Methyluvinic Acid.
See 2-Methyl-5-ethyl-β-furoic Acid.

1-Methylvaleraldehyde (2-*Methylpentanal*-1, *methylpropylacetaldehyde*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot CH(CH_3) \cdot CHO$

$C_6H_{12}O$ MW, 100

B.p. 116°. Forms cryst. bisulphite comp.

2 : 4-*Dinitrophenylhydrazone* : cryst. from AcOH. M.p. 103°.

Lieben, Zeisel, *Monatsh.*, 1883, **4**, 22.
Skita, *Ber.*, 1915, **48**, 1491.

3-Methylvaleraldehyde.

See Isocaproic Aldehyde.

1-Methylvaleric Acid (*Methylpropylacetic acid*, n-*pentane-2-carboxylic acid*)

$$CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}COOH$$

$C_6H_{12}O_2$ MW, 116

d-.

B.p. 96°/15 mm. D_4^{25} 0·908. n_D^{25} 1·4112. $[\alpha]_D^{25}$ + 5·58° in Et_2O.

Et ester : $C_8H_{16}O_2$. MW, 144. B.p. 78–80°/4 mm. $[\alpha]_D^{25}$ + 5·67° in Et_2O.

Chloride : $C_6H_{11}OCl$. MW, 134·5. B.p. 45–8°/15 mm. $[\alpha]_D^{25}$ + 4·06°.

Amide : $C_6H_{13}ON$. MW, 115. Cryst. from H_2O. M.p. 78°. $[\alpha]_D^{25}$ + 5·79° in 75% EtOH.

l-.

B.p. 96°/15 mm. D_4^{25} 0·920. n_D^{25} 1·4117. $[\alpha]_D^{25}$ — 7·08° in Et_2O.

Et ester : b.p. 78–80°/4 mm. $[\alpha]_D^{25}$ — 7·91°.

Amide : m.p. 78°. $[\alpha]_D^{25}$ — 5·79° in 75% EtOH.

Nitrile : $C_6H_{11}N$. MW, 97. B.p. 30–2°/2 mm. $[\alpha]_D^{25}$ — 13·77°.

dl-.

B.p. 192·0–193·6°/748 mm. D_4^0 0·9405, D_4^{20} 0·9230. n_D 1·4136.

Et ester : b.p. 153°/751·5 mm. D^0 0·8816, D_0^{18} 0·8670.

p-*Iodophenacyl ester* : m.p. 66°.

p-*Phenylphenacyl ester* : m.p. 46°.

Chloride : b.p. 140·0–140·8°/745 mm. D_4^0 0·9979, D_4^{20} 0·9781.

Amide : m.p. 79·6° (85°).

Anilide : m.p. 95·2°.

p-*Toluidide* : m.p. 80·5°.

Levene, Mikeska, *J. Biol. Chem.*, 1929, **84**, 571.
Hommelen, *Bull. soc. chim. Belg.*, 1933, **42**, 243.
Levene, Marker, *J. Biol. Chem.*, 1932, **98**, 1.

2-Methylvaleric Acid (2-*Methyl-2-ethylpropionic acid*, 2-*ethylbutyric acid*, sec.-n-*butylacetic acid*)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{CH}{\cdot}CH_2{\cdot}COOH$$

$C_6H_{12}O_2$ MW, 116

d-.

B.p. 197·4–198°. D^{15} 0·930. $[\alpha]_D^{26}$ + 4·01°.

Me ester : $C_7H_{14}O_2$. MW, 130. B.p. 141–2°. $D^{16·5}$ 0·8886.

Et ester : $C_8H_{16}O_2$. MW, 144. B.p. 68°/25 mm. D_4^{25} 0·864. n_D^{25} 1·4062. $[\alpha]_D^{25}$ + 3·26°.

Chloride : $C_6H_{11}OCl$. MW, 134·5. B.p. 81°/100 mm. D_4^{29} 0·957. n_D^{25} 1·4245. $[\alpha]_D^{29}$ + 5·43°.

Amide : $C_6H_{13}ON$. MW, 115. Cryst. from EtOH. M.p. 124°. Sol. EtOH, Et_2O. $[\alpha]_D^{26}$ + 2·00° in 75% EtOH.

Nitrile : $C_6H_{11}N$. MW, 97. B.p. 151·4–152·6°/743 mm., 87°/100 mm. D_4^{25} 0·811. n_D^{25} 1·4070. $[\alpha]_D^{25}$ + 3·72°.

l-.

B.p. 110°/150 mm. D_4^{26} 0·923. $[\alpha]_D^{26}$ — 2·54°.

Et ester : b.p. 68°/25 mm. D_4^{20} 0·878. $[\alpha]_D^{20}$ — 4·67°.

dl-.

F.p. — 41·6°. B.p. 197·2–197·8°. D_4^0 0·9441, D_4^{20} 0·9262. n_D^{20} 1·4159.

Et ester : b.p. 157–8°.

Phenylphenacyl ester : m.p. 47°.

Chloride : b.p. 142·5–143·0°/749 mm. D_4^0 0·9963, D_4^{20} 0·9781.

Amide : needles. M.p. 124·9°.

Anilide : m.p. 87·0°.

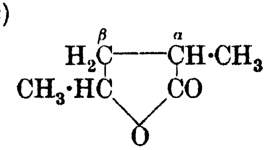
p-*Toluidide* : m.p. 74·8°.

Hommelen, *Bull. soc. chim. Belg.*, 1933, **42**, 243.
Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 77, 412.
Vliet, Marvel, Hsueh, *Organic Syntheses*, 1931, XI, 76.

3-Methylvaleric Acid.

See Isocaproic Acid.

α-Methyl-γ-valerolactone (*αγ-Dimethylbutyrolactone*)



$C_6H_{10}O_2$ MW, 114

B.p. 201°. Sol. 20–25 parts H_2O.

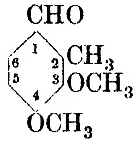
Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 820.

β-Methyl-γ-valerolactone (*βγ-Dimethylbutyrolactone*).

B.p. 213°.

Blaise, *Bull. soc. chim.*, 1903, **29**, 335.

2-Methylveratric Aldehyde (5 : 6-*Dimethoxy*-o-*toluic aldehyde*)



$C_{10}H_{12}O_3$ MW, 180

Needles from pet. ether. M.p. 52–3°. Spar. sol. pet. ether.

Oxime : needles from MeOH. M.p. 98–9°. Sol. most org. solvents. Spar. sol. H_2O, pet. ether.

Semicarbazone : plates from EtOH. M.p. 220°. Spar. sol. boiling EtOH.

Perkin, *J. Chem. Soc.*, 1916, **109**, 915.

6-Methylveratric Aldehyde (4 : 5-*Dimethoxy*-o-*toluic aldehyde*).

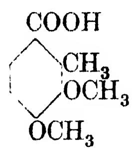
Needles from H_2O. M.p. 76°.

Oxime : cryst. from EtOH. M.p. 128°.

Semicarbazone : needles from EtOH. M.p. 218°.

Kuroda, Perkin, *J. Chem. Soc.*, 1923, **123**, 2110.

2-Methylveratric Acid (5 : 6-*Dimethoxy*-o-*toluic acid*)



$C_{10}H_{12}O_4$ MW, 196

Needles from H_2O. M.p. 177°. Spar. sol. cold H_2O.

Me ester : $C_{11}H_{14}O_4$. MW, 210. Needles from pet. ether. M.p. 46–8°. Sol. most org. solvents.

Perkin, *J. Chem. Soc.*, 1916, **109**, 920.

Methylveratrol.

See Homoveratrol *and under* 2 : 3-Dihydroxytoluene.

3-Methylvinylacetic Acid.

See 2-Ethylidenepropionic Acid.

3-Methylvinylacetylene.

See Isopropenylacetylene.

Methylvinylcarbinol (1-*Butenol*-3, 1-*vinylethyl alcohol*, 3-*hydroxy*-1-*butylene*, 1-*methylallyl alcohol*)

$CH_2{:}CH{\cdot}CH(OH){\cdot}CH_3$

C_4H_8O MW, 72

d-.

$D_4^{15.5}$ 0·8362.

Acid phthalate needles from pet. ether. M.p. 52–3°. $[\alpha]_D$ + 40·5°. *Brucine salt* : leaflets from Me_2CO. M.p. 120–2°.

l-.

Acid phthalate : cryst. from ligroin. M.p. 52–3°. $[\alpha]_D$ − 40·6° in EtOH.

dl-.

Constituent of wood spirit oil. B.p. 94–6°. Sol. H_2O. D_4^0 0·854, D_4^{22} 0·835. $n_D^{26.5}$ 1·4087.

Acetyl : b.p. 112°.

Trichloroacetyl : b.p. 74·0–74·5°/12 mm., 69·5–70·5°/9 mm. D_4^{22} 1·2990. n_D^{22} 1·4588.

p-*Nitrobenzoyl* : cryst. from EtOH. M.p. 43–4°.

Allophanate : m.p. 152°.

Acid phthalate : cryst. M.p. 5°.

Delaby, *Compt. rend.*, 1922, **175**, 967.
Baudringhien, *Bull. soc. chim. Belg.*, 1922, **31**, 160.
Claisen, Tietze, *Ber.*, 1926, **59**, 2348.
Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, **127**, 1174.

Methyl vinyl Ether

$CH_2{:}CH{\cdot}O{\cdot}CH_3$

C_3H_6O MW, 58

B.p. 12–14° (9°).

Chalmers, *Chem. Abstracts*, 1933, **27**, 701.
I.G., F.P., 724,955, (*Chem. Abstracts*, 1932, **26**, 4825).

Methyl vinyl Ketone (1-*Butenone*-3, 3-*keto*-1-*butylene*, *methyleneacetone*, *acetoethylene*)

$CH_3{\cdot}CO{\cdot}CH{:}CH_2$

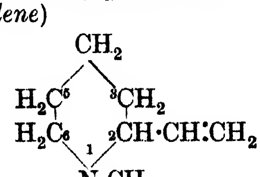
C_4H_6O MW, 70

B.p. 79–80°, 62–8°/400 mm., 33–4°/130 mm. Sol. H_2O, EtOH, MeOH, Et_2O, Me_2CO, AcOH. D_4^{20} 0·8636. n_D^{20} 1·4086. Powerful irritating odour. Polymerises on standing.

Semicarbazone : m.p. 140–1°.

Krapiwin, *Chem. Zentr.*, 1910, I, 1336.
Wohl, Prill, *Ann.*, 1924, **440**, 142.
Du Pont, F.P., 719,309, (*Chem. Abstracts*, 1932, **26**, 3265); U.S.P., 1,967,225, (*Chem. Abstracts*, 1934, **28**, 5834).

N-Methyl-2-vinylpiperidine (N-*Methyl*-2-*piperidylethylene*)



$C_8H_{15}N$ MW, 125

B.p. 60°/12 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O. Volatile in steam. Polymerises on dist. at ord. press.

B,HAuCl$_4$: cryst. from H_2O. M.p. 115–20°. Sol. warm H_2O, EtOH.

B$_2$,H$_2$PtCl$_6$: cryst. from H_2O. M.p. 188°. Spar. sol. cold H_2O, EtOH.

Heidrich, *Ber.*, 1901, **34**, 1889.

6-Methyl-2-vinylpiperidine (*6-Methyl-2-piperidylethylene*).

B.p. 150°. D_4^{15} 0·8381. Sol. EtOH, Et_2O. Spar. sol. H_2O.

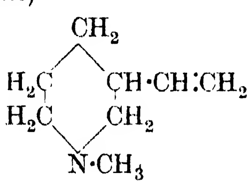
B,HCl : needles. M.p. 242·5–243°.

B$_2$,H$_2$PtCl$_6$: needles from EtOH. M.p. 176°.

Picrate : plates from EtOH. M.p. 123°.

Löffler, Remmler, *Ber.*, 1910, **43**, 2053.

N-Methyl-3-vinylpiperidine (*N-Methyl-3-piperidylethylene*)



$C_8H_{15}N$ MW, 125

B.p. 161–2°/724 mm. Sol. 30–35 parts cold H_2O.

B,HAuCl$_4$: prisms from H_2O. M.p. 58–9°. Sol. warm H_2O, cold EtOH.

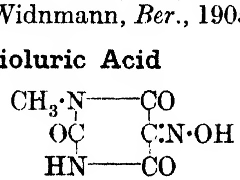
B,HCl,6HgCl$_2$: cryst. M.p. 177–8°. Sol. hot H_2O.

B$_2$,H$_2$PtCl$_6$: orange-red prisms or plates. M.p. 185–6° decomp. Spar. sol. cold H_2O.

Picrate : yellow prisms or needles. M.p. 193–4°. Spar. sol. H_2O.

Lipp, *Ann.*, 1897, **294**, 150.
Lipp, Widnmann, *Ber.*, 1905, **38**, 2481.

1-Methylvioluric Acid



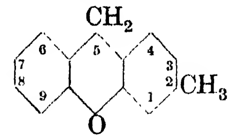
$C_5H_5O_4N_3$ MW, 171

Leaflets from H_2O. M.p. 202–3° decomp. Sol. MeOH, Me_2CO, AcOH. Less sol. EtOH, $CHCl_3$, AcOEt. Spar. sol. C_6H_6, Et_2O, ligroin.

Urea deriv. : needles from EtOH. M.p. 190° decomp. Sol. H_2O, MeOH, EtOH, AcOH. Less sol. Me_2CO, AcOEt. Spar. sol. Et_2O, C_6H_6, $CHCl_3$, ligroin.

Biltz, Hamburger, *Ber.*, 1916, **49**, 644.

2-Methylxanthene

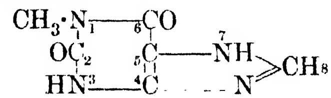


$C_{14}H_{12}O$ MW, 196

Plates from MeOH. M.p. 121°.

Borsche, Geyer, *Ber.*, 1914, **47**, 1157.

1-Methylxanthine



$C_6H_6O_2N_4$ MW, 166

Cryst. from H_2O. Sol. alkalis and dil. acids. Spar. sol. H_2O.

Engelmann, *Ber.*, 1909, **42**, 177.

3-Methylxanthine.

Needles from H_2O. Decomp. above 360°. Sol. 350 parts boiling H_2O. Very sol. dil. alkalis.

Fischer, Ach, *Ber.*, 1898, **31**, 1986.
Traube, Nithack, *Ber.*, 1906, **39**, 227.

7-Methylxanthine (*Heteroxanthine*).

Needles from H_2O. M.p. 380° decomp. Spar. sol. H_2O. Insol. EtOH, Et_2O. Sol. NH_3 and hot HCl. Not pptd. by picric acid.

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 713.

8-Methylxanthine.

Prisms or leaflets from hot H_2O. Decomp. at 292–3° (380°). Sol. about 3,300 parts hot H_2O. Sol. NH_3 and alkalis.

B,HCl : prisms from conc. HCl. Decomp. by H_2O.

Boehringer, Söhne, D.R.P., 121,224, (*Chem. Zentr.*, 1901, II, 71).
Biltz, Schmidt, *Ann.*, 1923, **431**, 86.

9-Methylxanthine.

Needles. M.p. 384° decomp. Sol. 280 parts boiling H_2O.

Boehringer, Söhne, D.R.P., 120,437, (*Chem. Zentr.*, 1901, I, 1219).

Methylxanthogenic Acid (*Methoxydithioformic acid, methylxanthic acid*)

$CH_3O{\cdot}CSSH$

$C_2H_4OS_2$ MW, 108

Not known in free state.

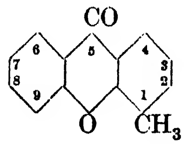
Me ester : $C_3H_6OS_2$. MW, 122. B.p. 167–8°. D_4^0 1·2030, D_4^{16} 1·1860. n_D^{16} 1·5704.

Et ester: $C_4H_8OS_2$. MW, 136. B.p. 184°. D_4^{15} 1·330. n_D^{15} 1·554.

Propyl ester: $C_5H_{10}OS_2$. MW, 150. Yellow liq. B.p. 201–3°. D_4^0 1·1074. $n_4^{16·5}$ 1·0917, $n_D^{16·5}$ 1·5405.

Delépine, *Compt. rend.*, 1910, **150**, 877.

1-Methylxanthone



$C_{14}H_{10}O_2$ MW, 210

Needles from boiling ligroin. M.p. 126°. Sol. EtOH, Et_2O, C_6H_6. Insol. H_2O. Conc. H_2SO_4 ⟶ yellow sol. with bluish-green fluor.

Ullmann, Zlokasoff, *Ber.*, 1905, **38**, 2114.

2-Methylxanthone

Needles from EtOH. M.p. 98°.

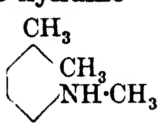
Borsche, Geyer, *Ber.*, 1914, **47**, 1158.

3-Methylxanthone.

Needles. M.p. 121°. Sol EtOH, C_6H_6, AcOH. Mod. sol. boiling ligroin. Conc. H_2SO_4 ⟶ yellow sol. with green fluor.

Ullmann, Zlokasoff, *Ber.*, 1905, **38**, 2115.

N-Methyl-*o*-3-xylidine



$C_9H_{13}N$ MW, 135

Oil. B.p. 222–3°.

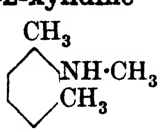
B,HCl: needles.

N-*Acetyl*: $C_{11}H_{15}ON$. MW, 177. Cryst. from ligroin. M.p. 75°. Volatile in steam.

B_2,$HAuCl_4$: yellow cryst. M.p. 173°.

Menton, *Ann.*, 1891, **263**, 317.

N-Methyl-*m*-2-xylidine



$C_9H_{13}N$ MW, 135

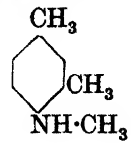
Oil. B.p. 206–7°. Volatile in steam.

N-*Acetyl*: $C_{11}H_{15}ON$. MW, 177. Plates or needles from EtO_2. M.p. 94–5°. Sol. H_2O, most org. solvents. Volatile in steam.

Friedländer, Brand, *Monatsh.*, 1898, **19**, 642.

Bamberger, Rudolf, *Ber.*, 1906, **39**, 4291.

N-Methyl-*m*-4-xylidine



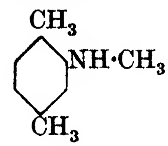
$C_9H_{13}N$ MW, 135

Oil. B.p. 220·5–221·5°/760 mm.

N-*Acetyl*: $C_{11}H_{15}ON$. MW, 177. Needles or prisms from ligroin. M.p. 65°. Very sol. most solvents. Spar. sol. ice-cold ligroin.

Pinnow, Oesterreich, *Ber.*, 1898, **31**, 2930.

N-Methyl-*p*-xylidine



$C_9H_{13}N$ MW, 135

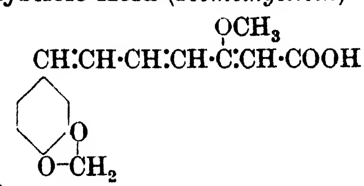
Yellow oil. B.p. 225–7°/735 mm. Readily volatile in steam.

Pflug, *Ann.*, 1889, **255**, 172.

Methyl-xyloside.

See under Xylose.

Methysticic Acid (*Isomethysticin*)



$C_{15}H_{14}O_5$ MW, 274

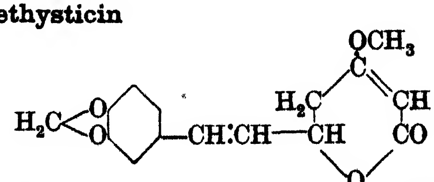
Product of action of alkalis upon methysticin. Yellow needles from Me_2CO. M.p. 191–2° decomp. (187–8°). MeOH or EtOH sol. gives no immediate col. with $FeCl_3$. Conc. H_2SO_4 ⟶ deep purple-red col.

Me ester: $C_{16}H_{16}O_5$. MW, 288. Yellow prisms from MeOH. M.p. 162–4°. HCl in MeOH ⟶ allomethysticin, m.p. 133–4°.

Borsche, Blount, *Ber.*, 1930, **63**, 2419.

Borsche, Meyer, Peitzsch, *Ber.*, 1927, **60**, 2113.

Methysticin



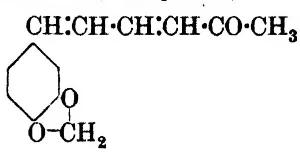
$C_{15}H_{14}O_5$ MW, 274

Constituent of resin from Kawa root (*Piper methysticum*, Linn.). Needles from MeOH, prisms from Me_2CO. M.p. 136–7°. Sol. hot EtOH, $CHCl_3$, C_6H_6. Spar. sol. hot H_2O, pet. ether, Et_2O. Insol. cold alkalis. Heat with dil. HCl ⟶ methysticone. With aq. alkalis short heat. ⟶ methysticic acid, long heat. ⟶ piperonal. KOH fusion ⟶ protocatechuic acid.

Borsche *et al.*, *Ber.*, 1929, **62**, 360; 1927, **60**, 982, 2113; 1921, **54**, 2229; 1914, **47**, 2909.
Cf. Lampé, Sandrowski, *Bull. soc. chim.*, 1930, **47**, 469.

Methysticol.
See Methysticone.

Methysticone (*Methysticol*)



$C_{13}H_{12}O_3$ MW, 216

Product of hyd. of methysticin. M.p. 89·5–90·5°.

γ-Carbomethoxyl: $C_{15}H_{14}O_5$. MW, 274. Golden-yellow needles from pet. ether. M.p. 103°.

Phenylhydrazone: yellow needles from MeOH. M.p. 155–7°.

2 : 4-*Dinitrophenylhydrazone*: reddish-brown needles from $CHCl_3$. M.p. 236–7° decomp.

Borsche *et al.*, *Ber.*, 1927, **60**, 1139, 2117; 1929, **62**, 360.

Metol.
See under *p*-Methylaminophenol.

Metoquinone

$C_{20}H_{24}O_4N_2$ MW, 356

Add. comp. of hydroquinone + 2 mols. *p*-methylaminophenol. Cryst. from H_2O. M.p. 135°. Photographic developer.

Muller, *Chem. Zentr.*, 1926, II, 1230.
Lumière, Seyewitz, *Industrie Chimique*, 1927, **14**, 217, (*Chem. Abstracts*, 1927, **21**, 3569).

Mezcaline.
See Mescaline.

Michler's Hydrol.
See Tetramethyldiaminobenzhydrol.

Michler's Ketone.
See Tetramethyldiaminobenzophenone.

Micranthine

$C_{34}H_{26}O_5N(OCH_3)(NCH_3)$

$C_{36}H_{32}O_6N_2$ MW, 588

Alkaloid from *Daphnandra micrantha*, Benth. Needles + ½$CHCl_3$ from $CHCl_3$. M.p. 196° decomp. (sinters above 190°). Spar. sol. EtOH, $CHCl_3$. Insol. H_2O, Et_2O. Fröhde's reagent ⟶ indigo to emerald-green col.

B_2,H_2SO_4: needles + $10H_2O$. Decomp. (anhyd.) at 312°. Mod. sol. hot H_2O.

Pyman, *J. Chem. Soc.*, 1914, **105**, 1679.

Microl

$C_{13}H_{18}O_2$ MW, 206

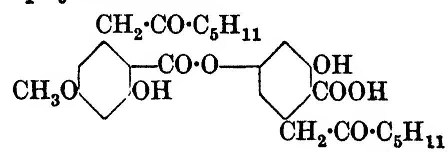
Phenol contained in the essential oil of *Phachium* or *Cinnamomum micranthum*, Hayata. B.p. 133–6°/4 mm. D_4^{30} 1·0113. n_D^{30} 1·5252. Dextrorotatory.

Phenylurethane: m.p. 101°.

1-*Naphthylurethane*: m.p. 116–17°.

Ikeda, *J. Chem. Soc. Japan*, 1930, **51**, 349, (*Chem. Abstracts*, 1931, **25**, 3438).

Microphyllinic Acid



$C_{29}H_{36}O_9$ MW, 528

Lichen acid from *Cetraria collata f. microphylla*, Müll. Arg., A. Zahlbruckner. Colourless needles from C_6H_6–pet. ether. M.p. 116°. Sol. Et_2O, Me_2CO, EtOH, C_6H_6. Insol. pet. ether. $FeCl_3$ on EtOH sol. ⟶ violet col.

Me ester: $C_{30}H_{38}O_9$. MW, 542. Needles from EtOH. M.p. 118°.

Asahina, Fuzikawa, *Ber.*, 1935, **68**, 80.

Milk sugar.
See Lactose.

Mitragynine

$C_{17}H_{22}N(OCH_3)(COOCH_3)_2$

$C_{22}H_{31}O_5N$ MW, 389

Alkaloid with local anæsthetic properties from *Mitragyna speciosa*, Korth. Amorph. M.p. 102–6°. B.p. 230–40°/5 mm.

B,HCl: leaflets from EtOH–Et_2O. M.p. 243°.

B,CH_3COOH: silky needles from AcOH–Et_2O. M.p. 142°.

B,CCl_3COOH: needles from Me_2CO–Et_2O. M.p. 157°.

Picrate: slender orange-red needles from AcOH or MeOH. M.p. 223–4°.

Field, *J. Chem. Soc.*, 1921, **119**, 887.
Raymond-Hamet, Millet, *Bull. sci. pharmacol.*, 1933, **40**, 593, (*Chem. Abstracts*, 1934, **28**, 1041).

Mitraversine

$C_{20}H_{20}O_2N_2(OCH_3)_2$

$C_{22}H_{26}O_4N_2$ MW, 382

Alkaloid from *Mitragyna diversifolia*, Hook. f. M.p. 237°. Easily sol. acids and alkalis.
B,HCl: m.p. 208–10°.

See previous references.

Mitrinermine

$C_{20}H_{22}O_2N_2(OCH_3)_2$

$C_{22}H_{28}O_4N_2$ MW, 384

Alkaloid from various species of *Mitragyna*. Cryst. from Me_2CO. M.p. 202–16°. Gives no col. with Fröhde's reagent or with H_2SO_4.

Raymond-Hamet, Millet, *Chem. Zentr.*, 1935, I, 3937; *Compt. rend.*, 1934, **199**, 587; *Compt. rend. soc. biol.*, 1934, **116**, 1337.

Mochyl Alcohol

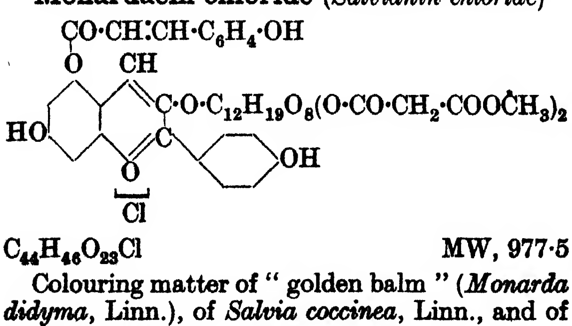
$C_{26}H_{45}{\cdot}OH$

$C_{26}H_{46}O$ MW, 374

Constituent of Japanese bird-lime. Tufts of slender prisms from EtOH. M.p. 234° (222°). Sublimes in a vacuo. Sol. Et_2O, EtOH. Insol. H_2O, pet. ether. Conc. $H_2SO_4 \longrightarrow$ red col.
Acetyl: m.p. 203°.

Yanagisawa, *Chem. Zentr.*, 1921, III, 551.
Divers, Kawakita, *J. Chem. Soc.*, 1888, **53**, 274.

Monardaein chloride (*Salvianin chloride*)

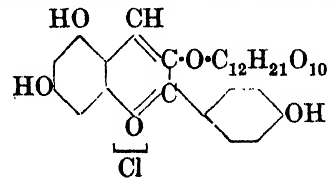


$C_{44}H_{46}O_{23}Cl$ MW, 977·5

Colouring matter of "golden balm" (*Monarda didyma*, Linn.), of *Salvia coccinea*, Linn., and of *S. splendens*, Sello. Red powder. Easily sol. MeOH $\longrightarrow$ yellowish-red col. without fluor. $[\alpha]_D$ − 374·5° in 0·1% HCl.Aq. Sol. $H_2O \longrightarrow$ scarlet sol. stable in the cold. H_2O sol. + $Na_2CO_3 \longrightarrow$ violet col. which with excess NaOH $\longrightarrow$ light brown. Sol. hot dil. HCl. Hyd. by cold $2N/KOH \longrightarrow$ *p*-hydroxycinnamic acid + monardin. Hyd. by 20% HCl for 3 minutes at 100° liberates malonic acid.

Karrer, Widmer, *Helv. Chim. Acta*, 1929, **12**, 292; 1928, **11**, 837; 1927, **10**, 67.

Monardin chloride (*Pelargonidin diglucoside*)



$C_{27}H_{31}O_{15}Cl$ MW, 630·5

Product of action of cold alkali followed by conc. HCl upon monardaein. Fine red needles. M.p. 180° decomp. $[\alpha]_D$ − 244°, $[\alpha]_{614}$ − 133°, in 0·1% HCl. Sol. $H_2O \longrightarrow$ orange-red sol. turning violet. Pptd. cryst. by 3–5% HCl. Sol. hot, spar. sol. cold MeOH. Aq. sols. + $Na_2CO_3 \longrightarrow$ violet col. which with NaOH $\longrightarrow$ light brown. Hyd. by 20% HCl $\longrightarrow$ pelargonidin + glucose.

See last reference above.

Monascin

$C_{24}H_{30}O_6$ MW, 414

Fungal pigment from *Monascus purpureus*, Went., infesting rice and other foodstuffs. Glittering yellow leaflets from EtOH. M.p. 135–40° (sinters at 130°). Stable in solid form. Readily decomp. in solution. Sol. Et_2O, conc. H_2SO_4, NaOH. Insol. H_2O. Pptd. from alc. NaOH by CO_2. Ox. $\longrightarrow$ mixture containing oxalic and butyric acids.

Saloman, Karrer, *Helv. Chim. Acta*, 1932, **15**, 18.

Monascoflavin

$C_{17}H_{22}O_4$ MW, 290

Oxidation-product of monascorubrin. Yellow rhombic plates. M.p. 145°. Sol. EtOH, C_6H_6, AcOEt, Me_2CO, AcOH. Spar. sol. Et_2O, pet. ether. Br $\longrightarrow$ dibromo-deriv., m.p. 175–83°. H (+ catalyst) $\longrightarrow$ dihydro-deriv., m.p. 120° (sinters at 110°).

Nishikawa, *Chem. Abstracts*, 1933, **27**, 1629.

Monascorubrin

$C_{22}H_{24}O_5$ MW, 368

Fungal pigment from *Monascus purpureus*, Went., grown on artificial culture-medium. Cinnabar-red needles or prisms. M.p. 136°.

Sol. Et_2O, EtOH, MeOH, C_6H_6, $CHCl_3$, Me_2CO, AcOH. Insol. H_2O, pet. ether. H (+ catalyst) ⟶ dihydro-deriv., reddish-yellow cryst., m.p. 95–6°.

See previous reference.

α-Mono-acetin (*Glycerol* 1-*acetate*)

$CH_2O\cdot CO\cdot CH_3$
$CH\cdot OH$
CH_2OH

$C_5H_{10}O_4$ MW, 134

B.p. 129–31°/3 mm., 103°/0·4 mm. D_4^{20} 1·2060. n_D^{20} 1·4157.

Mono-Me ether: $C_6H_{12}O_4$. MW, 148. B.p. 126–9°.

Di-Me ether: $C_7H_{14}O_4$. MW, 162. B.p. 100–10°/18 mm.

2 : 3-*Di*-p-*nitrobenzoyl*: m.p. 129–30°.

2-p-*Nitrobenzoyl*-3-*benzoyl*: leaves from AcOEt–pet. ether. M.p. 67–8°.

2 : 3-*Distearyl*: m.p. 55·2° (56·6°). n_D^{70} 1·44045. Sol. 0·43 gram/100 c.c. EtOH at 23°.

McElroy, King, *J. Am. Chem. Soc.*, 1934, **56**, 1191.
Schuette, Hale, *J. Am. Chem. Soc.*, 1930, **52**, 1978.
Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, **51**, 866.
Fischer, Pfähler, *Ber.*, 1920, **53**, 1606.

β-Mono-acetin (*Glycerol* 2-*acetate*)

CH_2OH
$CH\cdot O\cdot CO\cdot CH_3$
CH_2OH

$C_5H_{10}O_4$ MW, 134

Viscous oil. B.p. 177–8°/0·3 mm.

1 : 3-*Benzylidene*: m.p. 101°.

1 : 3-*Distearyl*: m.p. 62–3°. n_D^{70} 1·43970. Sol. 0·06 gram/100 c.c. EtOH at 23°.

1 : 3-*Dipalmityl*: m.p. 54°.

1 : 3-*Di*-p-*nitrobenzoyl*: needles from EtOH or Me_2CO. M.p. 161°.

1 : 3-*Disalicyloyl*: m.p. 96–7°.

Bergmann, Carter, *Z. physiol. Chem.*, 1930, **191**, 211.
Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, **51**, 866.
See also first reference above.

Monobromohydrin.
See under Glycerol.

Monobutyrin.
See under *n*-Butyric Acid.

Monocaprin.
See under Glycerol.

Monocaproin.
See under Glycerol.

Monocaprylin.
See under Glycerol.

Monochlorohydrin.
See 3-Chloropropylene Glycol *and* 2-Chlorotrimethylene Glycol.

α-Monoformin (*Glycerol* 1-*formate*)

$CH_2\cdot O\cdot COH$
$CH\cdot OH$
CH_2OH

$C_4H_8O_4$ MW, 120

Unstable. Decomp. at 150° during vac. dist.

Delaby, Dubois, *Compt. rend.*, 1928, **187**, 767.

Monoiodohydrin.
See under Glycerol.

α-Mono-isobutyrin (*Glycerol* 1-*isobutyrate*)

$CH_2O\cdot CO\cdot CH(CH_3)_2$
$CH\cdot OH$
CH_2OH

$C_7H_{14}O_4$ MW, 162

B.p. 264–6°, 158–61°/19 mm.

Guth, *Zeitschrift für Biologie*, 1903, **44**, 97.
Cf. Gilchrist, Schuette, *J. Am. Chem. Soc.*, 1931, **53**, 3480.

α-Monolaurin (*Glycerol* 1-*laurate*)

$CH_2O\cdot CO\cdot [CH_2]_{10}\cdot CH_3$
$CH\cdot OH$
CH_2OH

$C_{15}H_{30}O_4$ MW, 274

Leaflets from pet. ether–CCl_4. M.p. 63°.

2 : 3-*Dimyristyl*: m.p. 48·5°.

2 : 3-*Dipalmityl*: m.p. 54·5°.

2 : 3-*Distearyl*: m.p. 51°.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, **51**, 866.
Rewadikar, Watson, *J. Indian Inst. Sci.*, 1930, **13A**, 128.
Fischer, Bergmann, Bärwind, *Ber.*, 1920, **53**, 1600.

β-Monolaurin (*Glycerol* 2-*laurate*)

CH_2OH
$CH\cdot O\cdot CO\cdot [CH_2]_{10}\cdot CH_3$
CH_2OH

$C_{15}H_{30}O_4$ MW, 274

M.p. 51°. n_D^{70} 1·44240.

1 : 3-*Benzylidene*: m.p. 46·6°.

1 : 3-*Dipalmityl* : m.p. 64°.

Stimmel, King, *J. Am. Chem. Soc.*, 1934, **56**, 1724.
See also first reference above.

α-Monomyristin (*Glycerol* 1-*myristate*)

$CH_2O·CO·[CH_2]_{12}·CH_3$
$CH·OH$
CH_2OH

$C_{17}H_{34}O_4$ MW, 302

M.p. 70–1° (67·3°).
2 : 3-*Dilauryl* : m.p. 42·8°. n_D^{70} 1·43878. Sol. 1·21 grams/100 c.c. EtOH at 23°.
2 : 3-*Dipalmityl* : m.p. 55·5°.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, **51**, 866.
McElroy, King, *J. Am. Chem. Soc.*, 1934, **56**, 1191.
Rewadikar, Watson, *J. Indian Inst. Sci.*, 1930, **13A**, 132.

β-Monomyristin (*Glycerol* 2-*myristate*)

CH_2OH
$CH·O·CO·[CH_2]_{12}·CH_3$
CH_2OH

$C_{17}H_{34}O_4$ MW, 302

M.p. 61°. n_D^{70} 1·44420.
1 : 3-*Benzylidene* : m.p. 62°.
1 : 3-*Dilauryl* : m.p. 50·2°. n_D^{70} 1·43907. Sol. 0·25 gram/100 c.c. EtOH at 23°.
1 : 3-*Dimyristyl* : m.p. 49·5°.
1 : 3-*Dipalmityl* : m.p. 59°.
1 : 3-*Disalicyloyl* : m.p. 34–5°.

Stimmel, King, *J. Am. Chem. Soc.*, 1934, **56**, 1724.
See also first two references above.

α-Mono-olein (*Glycerol* 1-*oleate*)

$CH_2O·CO·C_{17}H_{33}$
$CH·OH$
CH_2OH

$C_{21}H_{40}O_4$ MW, 356

M.p. 35°. B.p. 238–40°/3–4 mm.

Krafft, *Ber.*, 1903, **36**, 4343.
Täufel, Künkele, *Chem. Zentr.*, 1935, I, 2971.

β-Mono-olein (*Glycerol* 2-*oleate*)

CH_2OH
$CH·O·CO·C_{17}H_{33}$
CH_2OH

$C_{21}H_{40}O_4$ MW, 356

Plates from EtOH.Aq. M.p. 26°.

Bournot, *Biochem. Z.*, 1914, **65**, 156.

α-Monopalmitin (*Glycerol* 1-*palmitate*)

$CH_2O·CO·C_{15}H_{31}$
$CH·OH$
CH_2OH

$C_{19}H_{38}O_4$ MW, 330

Plates from ligroin. M.p. 77°.

Fairbourne, Foster, *J. Chem. Soc.*, 1926, 3151.
Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, **51**, 868.

β-Monopalmitin (*Glycerol* 2-*palmitate*)

CH_2OH
$CH·O·CO·C_{15}H_{31}$
CH_2OH

$C_{19}H_{38}O_4$ MW, 330

M.p. 69°. n_D^{70} 1·44605.
1 : 3-*Benzylidene* : m.p. 63·5°.

Fairbourne, Stephens, *J. Chem. Soc.*, 1932, 1975.
Stimmel, King, *J. Am. Chem. Soc.*, 1934, **56**, 1724.

α-Monostearin (*Glycerol* 1-*stearate*)

$CH_2O·CO·C_{17}H_{35}$
$CH·OH$
CH_2OH

$C_{21}H_{42}O_4$ MW, 358

M.p. 82° (76°).

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, **51**, 866.
See also first reference above.

β-Monostearin (*Glycerol* 2-*stearate*)

CH_2OH
$CH·O·CO·C_{17}H_{35}$
CH_2OH

$C_{21}H_{42}O_4$ MW, 358

M.p. 74·4°. n_D^{70} 1·44770.
1 : 3-*Benzylidene* : m.p. 69°.

Stimmel, King, *J. Am. Chem. Soc.*, 1934, **56**, 1724.

Montanic Acid

$C_{28}H_{57}·COOH$

$C_{29}H_{58}O_2$ MW, 438

Constituent of various natural waxes. Glistening scales. M.p. 89·3° (87°). Sol. $CHCl_3$, C_6H_6, pet. ether, hot EtOH, AcOEt, hot AcOH. Insol. cold Et_2O or EtOH. Decomp. above m.p. Heat to 370° + iron filings ⟶ montanone.

Me ester: $C_{30}H_{60}O_2$. MW, 452. Scales from MeOH–pet. ether. M.p. 68·5° (66°). Sol. $CHCl_3$, C_6H_6. Insol. cold Et_2O, EtOH.
Et ester: $C_{31}H_{62}O_2$. MW, 466. Needles from EtOH. M.p. 64–5°. Very sol. cold $CHCl_3$. Sol. C_6H_6, pet. ether. Insol. cold Et_2O, EtOH.
Chloride: $C_{29}H_{57}OCl$. MW, 456·5. Leaflets from ligroin. M.p. 68°. Sol. C_6H_6, ligroin. Spar. sol. Et_2O.
Amide: $C_{29}H_{59}ON$. MW, 437. Cryst. from EtOH. M.p. 112° (109°). Spar. sol. Me_2CO, ligroin.

Stadler, *Chem. Abstracts*, 1934, **28**, 1839, 5405.
Holde, Bleyberg, *Chem. Abstracts*, 1931, **25**, 189; 1930, **24**, 5520.
Legg, Wheeler, *J. Chem. Soc.*, 1929, 2444.
Gascard, Damoy, *Compt. rend.*, 1923, **177**, 1222.
Meyerheim, *Chem. Abstracts*, 1920, **14**, 361.
Ryan *et al.*, *Chem. Abstracts*, 1914, **8**, 2962; *J. Chem. Soc.*, 1913, **104**, i, 335.
Meyer, Brod, *Monatsh.*, 1913, **34**, 1143.

Montanol (*Dimontanylcarbinol*)

$(C_{27}H_{55})_2CH{\cdot}OH$

or

$(C_{28}H_{57})_2CH{\cdot}OH$

$C_{55}H_{112}O$ ($C_{57}H_{116}O$) MW, 788 (816)

M.p. 101°.
Acetyl: m.p. 66°.

Easterfield, Taylor, *J. Chem. Soc.*, 1911, **99**, 2302.

Montanone (*Dimontanyl ketone*)

$(C_{27}H_{55})_2CO$

or

$(C_{28}H_{57})_2CO$

$C_{55}H_{110}O$ ($C_{57}H_{114}O$) MW, 786 (814)

Cryst. from AcOH. M.p. 97°.
Oxime: m.p. 82·5°.

See previous reference.

Montanyl Alcohol

$C_{29}H_{59}{\cdot}OH$

$C_{29}H_{60}O$ MW, 424

Contained in beeswax and in the wax of various plant cuticles. Rhombic plates from $CHCl_3$ or C_6H_6. M.p. 84·5°. Very sol. warm $CHCl_3$, warm C_6H_6. Spar. sol. cold solvents.
Acetyl: m.p. 68–9°.
Oxalate: m.p. 87°.
Phenylurethane: m.p. 96°.

Spies, Drake, *J. Am. Chem. Soc.*, 1932, **54**, 2935.
Legg, Wheeler, *J. Chem. Soc.*, 1929, 2444.

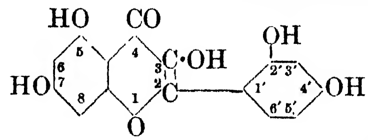
Montanyl iodide

$C_{29}H_{59}I$ MW, 534

Cryst. from Et_2O. M.p. 64·5°.

See first reference above.

Morin (3 : 5 : 7 : 2′ : 4′-*Pentahydroxyflavone*)



$C_{15}H_{10}O_7$ MW, 302

Colouring matter of old fustic (wood of *Chlorophora tinctoria*, Gaudich). Pale yellow needles + $1H_2O$ from dil. AcOH. M.p. 286–8° (sinters at 281°). Conc. $H_2SO_4 \longrightarrow$ yellow sol. with bright bluish-green fluor. EtOH sol. + $FeCl_3 \longrightarrow$ dark olive-green col.
Di-Me ether: $C_{17}H_{14}O_7$. MW, 330. Needles from EtOH. M.p. 225–7°.
Tri-Me ether: $C_{18}H_{16}O_7$. MW, 344. Needles from EtOH.Aq. M.p. 132°. Mod. sol. hot org. solvents. Very spar. sol. Et_2O, pet. ether.
2′ : 3 : 4′ : 7-*Tetra-Me ether*: $C_{19}H_{18}O_7$. MW, 358. Needles from EtOH. M.p. 131–2°.
Penta-Me ether: $C_{20}H_{20}O_7$. MW, 372. Needles from EtOH.Aq. M.p. 155–7°. *Mononitro deriv.*: m.p. 223–5°.
2′ : 3 : 4′ : 7-*Tetra-Et ether*: $C_{23}H_{26}O_7$. MW, 414. Needles from MeOH. M.p. 126–8°. 5-*Acetyl*: needles from MeOH. M.p. 121–3°.
2′ : 3 : 4′ : 7-*Tetra-acetyl*: needles. M.p. 142–5°.

Robinson, Venkataraman, *J. Chem. Soc.*, 1929, 61.
Perkin, Watson, *J. Chem. Soc.*, 1915, **107**, 198.
Benedikt, Hazura, *Monatsh.*, 1884, **5**, 167.

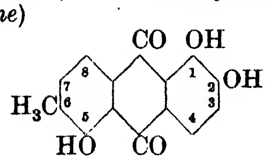
Morindin

$C_{26}H_{28}O_{14}$ MW, 564

Glucosidic colouring matter from root-bark of various species of *Morinda*. Yellow needles from EtOH.Aq. M.p. 250–1° rapid heat. (sinters at 235°), 245° slow heat. Alc. $H_2SO_4 \longrightarrow$ morindone.
Octa-acetyl: m.p. 239–40°. Very spar. sol. cold EtOH.

Mell, *Chem. Abstracts*, 1929, **23**, 709.
Simonsen, *J. Chem. Soc.*, 1918, **113**, 766.

Morindone (1 : 5 : 6-*Trihydroxy-2-methyl-anthraquinone*)



$C_{15}H_{10}O_5$ MW, 270

The aglucone from morindin. Orange-red needles. M.p. 281–2° (275°).

Triacetyl : pale yellow needles. M.p. 255–6°.

Tribenzoyl : yellow needles. M.p. 233–4° (218–19°).

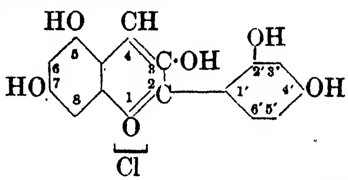
Mono-Me ether : $C_{16}H_{12}O_5$. MW, 284. Iridescent brown needles. M.p. 248°. *Diacetyl* : m.p. 245–6°.

Di-Me ether : $C_{17}H_{14}O_5$. MW, 298. Yellow needles. M.p. 139°. *Acetyl* : m.p. 185°.

Tri-Me ether : $C_{18}H_{16}O_5$. MW, 312. Yellow needles. M.p. 229°.

Battacharya, Simonsen, *J. Indian Inst. Sci.*, 1927, **10A**, 6.
Jacobson, Adams, *J. Am. Chem. Soc.*, 1925, **47**, 283.

Morinidin chloride



$C_{15}H_{11}O_6Cl$ MW, 322·5

Bright red cryst. + $1H_2O$ from EtOH.Aq.–HCl. Darkens at 100°, does not melt at 300°. Na_2CO_3.Aq. ⟶ blue col. in dil. sol., violet-blue to red-violet in conc. sol. Gives characteristic colour reactions in buffered sols. Conc. H_2SO_4 ⟶ yellow sol. with weak green fluor. The Et_2O extract after reduction with Zn dust and NaOH.Aq. ⟶ intense blue col. ⟶ brownish-green on heating.

3-*Me ether* : $C_{16}H_{13}O_6Cl$. MW, 336·5. Crimson needles from EtOH–HCl. Darkens at 200°, does not melt at 290°.

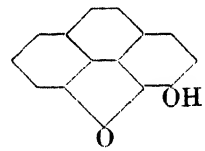
3 : 2′ : 4′-*Tri-Me ether* : $C_{18}H_{17}O_6Cl$. MW, 364·5. Brick-red needles. Darkens at 250°, does not melt at 300°. *Perchlorate* : crimson needles.

Penta-Me ether : $C_{20}H_{21}O_6Cl$. MW, 392·5. Red needles with green reflex. Decomp. at 155°. *Ferrichloride* : red needles. Decomp. at 194°.

5-*Benzoyl* : red needles from MeOH–HCl. Na_2CO_3.Aq. ⟶ bluish-violet col.

Charlesworth, Chavan, Robinson, *J. Chem. Soc.*, 1933, 372.
Gatewood, Robinson, *J. Chem. Soc.*, 1926, 1962.
Pratt, Robinson, *J. Chem. Soc.*, 1925, **127**, 1182.
Willstätter, Schmidt, *Ber.*, 1924, **57**, 1945.

Morphenol (3-*Hydroxy*-4 : 5-*phenanthrylene oxide*)



$C_{14}H_8O_2$ MW, 208

Needles from C_6H_6. M.p. 145°. Sol. EtOH, Et_2O. NaOH.Aq. ⟶ yellow col. with blue fluor. Conc. H_2SO_4 ⟶ green fluor. in cold, blue on warming. Fuse with KOH at 250° ⟶ 3 : 4 : 5-trihydroxyphenanthrene.

Me ether : $C_{15}H_{10}O_2$. MW, 222. Needles from MeOH or EtOH. M.p. 65–8°. *Picrate* : dark red needles. M.p. 120–1°.

Et ether : $C_{16}H_{12}O_2$. MW, 236. Needles from EtOH. M.p. 59°.

Acetyl : needles from EtOH–AcOH. M.p. 140°. CrO_3 in AcOH ⟶ acetate of morphenolquinone.

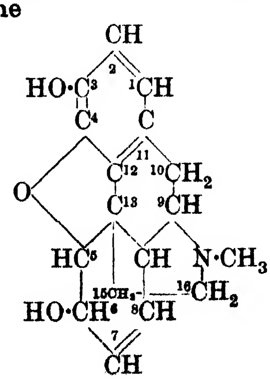
Benzoate : needles from Et_2O. M.p. 123°.

Mosettig, Meitzner, *J. Am. Chem. Soc.*, 1934, **56**, 2738.
Pschorr, Dickhäuser, *Ber.*, 1911, **44**, 2639.
Knorr, Roth, *ibid.*, 2757.
Vongerichten, *Ber.*, 1901, **34**, 2723; 1900, **33**, 358.

Morphigenin.

See 9-Hydroxy-10-aminophenanthrene.

Morphine



$C_{17}H_{19}O_3N$ MW, 285

Principal alkaloid of opium. Colourless prisms + $1H_2O$ from EtOH.Aq. M.p. anhyd.

254° (230°) decomp. Solubilities as parts of solvent to 1 part of alkaloid : piperidine 1·5; Py 5; diethylamine 12·5; aniline 15; EtOH 50 at 20°, 30 at 79°; amyl alcohol 50 at 78°; AcOEt 537; Me_2CO 780 at 15°; $CHCl_3$ 1525; H_2O 3450 at 15°, 1040 at 80°, 400 at 99°; Et_2O 5000; C_6H_6 9000. Sol. caustic alkalis. Spar. sol. NH_3. Very spar. sol. pet. ether. $[\alpha]_D^{23}$ − 130·9° in MeOH, − 70° in alk. sol. Behaves as monacid base. $k = 7{\cdot}5 \times 10^{-7}$. The salts are neutral to litmus and to Methyl Orange.

B,HCl: silky needles + $3H_2O$ from dil. HCl. M.p. 200°. Sol. 19 parts glycerol, 24 parts H_2O. Very spar. sol. EtOH. $[\alpha]_D^{18}$ − 97·9° in H_2O.

Acetate: *$B,C_2H_4O_2$*. Cryst. + $3H_2O$ from EtOH.Aq. M.p. 200° decomp. Sol. 2·25 parts H_2O at 25°. Spar. sol. $CHCl_3$. $[\alpha]_D^{15}$ − 77° in H_2O.

6-*Acetyl*: *hydrochloride*, needles from H_2O. M.p. 187°. $[\alpha]_D^{23}$ − 163° in H_2O. N-*Oxide*: m.p. 205°.

Chloroacetyl: needles from EtOH. M.p. 234° decomp.

3 : 6-*Di-chloroacetyl*: cryst. from Et_2O. M.p. 135°.

3 : 6-*Diacetyl*: *see* Heroin.

3-*Allyl ether*: m.p. 67–8°. *Hydrochloride*, $1H_2O$, m.p. 130°.

3-*Me ether*: *see* Codeine.

3 : 6-*Di-Me ether*: $C_{19}H_{23}O_3N$. MW, 313. Prisms or plates. M.p. 140–1°.

Di-Me ether methochloride: cryst. from EtOH. M.p. 208°. *Picrate*: m.p. 211–12°.

Di-Me ether methiodide: codeine Me ether methiodide. M.p. 251°.

3-*Et ether*: dionin. $C_{19}H_{23}O_3N$. MW, 313. Glittering prisms + $1H_2O$ from NH_3. M.p. 93° (119°). *B,HCl*: m.p. 123–5° (170°). *B_2,H_2SO_4*: m.p. 207°. Sol. H_2O. Spar. sol. EtOH. N-*Oxide*: needles from H_2O. M.p. 220–1°. *Styphnate*: m.p. 155°.

Methochloride: colourless prisms + $2H_2O$. M.p. 287–9°. $[\alpha]_D^{29}$ − 84·8° in H_2O.

MeO-Me ether: $C_{17}H_{18}O_2N$ ($OCH_2{\cdot}O{\cdot}CH_3$). Needles from EtOH.Aq. M.p. 94–6°. *Methiodide*: m.p. 225°.

Phenolsulphonyl: cryst. from Et_2O. M.p. 165°.

Phenylurethane: m.p. 127–30°.

Dott, *Chem. Abstracts*, 1932, **26**, 1393; 1929, **23**, 4535; 1913, **7**, 1260.
Emde, *Helv. Chim. Acta*, 1930, **13**, 1035.
Webr, *Chem. Abstracts*, 1929, **23**, 4224.
Chemnitius, *ibid.*, 2244.
Hannich, *Chem. Zentr.*, 1916, II, 820.

ψ-Morphine (*Hydroxydimorphine*)

$C_{34}H_{36}O_6N_2$ MW, 568

Dimolecular base formed by gentle oxidation of morphine by various reagents. Physiologically inactive. Three forms.

α-.

Cryst. from dil. NH_3. M.p. 276° (evacuated tube). $[\alpha]_D^{24}$ + 6·2° in *N*/HCl. Spar. sol. H_2O and org. solvents.

β-.

Cryst. from H_2O. M.p. 272° (evacuated tube). $[\alpha]_D^{25}$ − 77° in *N*/HCl. Spar. sol. H_2O and org. solvents.

γ-.

Granular cryst. + $3H_2O$ from dil. NH_3. M.p. 282–3° (evacuated tube). $[\alpha]_D^{24}$ + 44·8° in *N*/HCl. Sol. conc. NH_3, benzyl alcohol, Py. Spar. sol. aniline. Insol. H_2O and ord. org. solvents. $FeCl_3 \longrightarrow$ intense green col.

Tetra-acetyl: prisms from Et_2O. M.p. 189–91°. Very sol. EtOH. $[\alpha]_D^{26}$ + 57·5° in EtOH.

Mono-Me ether: needles. $[\alpha]_D^{23}$ − 5·6° in H_2O.

Small, Faris, *J. Am. Chem. Soc.*, 1934, **56**, 1930.
Fulton, *Chem. Abstracts*, 1934, **28**, 256.
Ball, Wolff, *J. Biol. Chem.*, 1928, **80**, 403.

Morphine N-oxide

$C_{17}H_{19}O_4N$ MW, 301

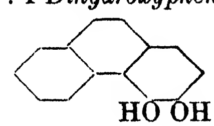
Prismatic cryst. from EtOH.Aq. M.p. 274–5°.

Nitrate: cryst. + $1\frac{1}{2}H_2O$. M.p. 208°.

Di-Me ether: $C_{19}H_{23}O_4N$. MW, 329. Needles. M.p. 253°.

Dezeine, *Chem. Zentr.*, 1921, I, 292.
Mannich, *Chem. Zentr.*, 1916, II, 820.
Freund, Speyer, *Ber.*, 1915, **48**, 499.

Morphol (3 : 4-*Dihydroxyphenanthrene*)



$C_{14}H_{10}O_2$ MW, 210

Needles from pet. ether. M.p. 143°. Sublimes in high vacuum at 130°. Ag_2O + anhyd. Na_2SO_4 in $Et_2O \longrightarrow$ 3 : 4-phenanthraquinone. Rapidly oxidised in air especially in presence of alkalis.

Mono-Me ether: $C_{15}H_{12}O_2$. MW, 224. Needles. M.p. 62–3°. *Acetyl*: m.p. 130–1° *Picrate*: dark red needles with blue reflex. M.p. 150°.

Di-Me ether: $C_{16}H_{14}O_2$. MW, 238. Cryst. from MeOH. M.p. 45°. B.p. 298–303°/112 mm. *Picrate*: m.p. 105–6°.

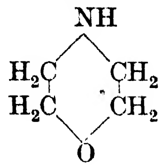
3-*Me ether*-4-*acetyl*: $C_{17}H_{14}O_3$. MW, 266. Needles from EtOH. M.p. 131°.

4-*Me ether*-3-*acetyl*: cryst. from EtOH.Aq. M.p. 93–4°.

Diacetyl: needles from Et_2O. M.p. 159°. Sublimes undecomp.

Barger, *J. Chem. Soc.*, 1918, **113**, 219.
Pschorr, Dickhäuser, *Ber.*, 1912, **45**, 1573; *Ann.*, 1910, **373**, 80.

Morpholine (*Tetrahydro*-1 : 4-*oxazine*)



C_4H_9ON MW, 87

Hygroscopic oil with ammoniacal odour and caustic alkaline properties. B.p. 128–30°. Misc. in all proportions with ord. solvents. Monacid base. Volatile in steam.

B,HCl: cryst. from HCl.Aq. M.p. 175–6°.

B,HAuCl₃: m.p. 240° decomp.

B_2,H_2PtCl_6: m.p. 210° decomp.

N-*Benzoyl*: cryst. from Et_2O. M.p. 74–5°.

N-*Me*: b.p. 116–17°/764 mm. D_4^{15} 0·9214. *B_2,H_2PtCl_6*: m.p. 199°. *Methiodide*: m.p. 246°. *Picrate*: m.p. 225°.

N-*Et*: b.p. 138–9°/763 mm. D_4^{15} 0·9166. *B_2,H_2PtCl_6*: m.p. 197–8°. *Picrate*: m.p. 189°.

N-*Benzyl*: b.p. 260°, 128–9°/13 mm. D_4^{15} 1·0340.

N-*Nitroso*: m.p. 29°. B.p. 224°/747 mm.

Picrate: m.p. 146–8°.

Picrolonate: m.p. 255° decomp.

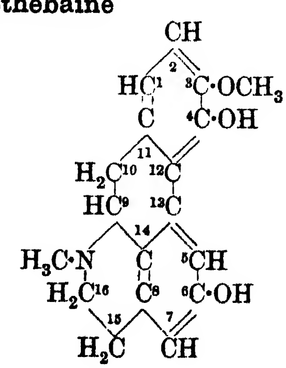
p-*Toluenesulphonamide*: m.p. 147°.

Sand, *Ber.*, 1901, **34**, 2906.
Knorr, *Ann.*, 1898, **301**, 1, 18.

Morpholquinone.

See 3 : 4-Dihydroxyphenanthraquinone.

Morphothebaine



$C_{18}H_{19}O_3N$ MW, 297

Product of action of fuming HCl on codeinone or on thebaine. Small stout needles from C_6H_6. M.p. 197–8°. Sol. alkalis. Spar. sol. H_2O, EtOH. Insol. Et_2O. $[\alpha]_D^{15}$ − 130° in EtOH. $HNO_3 \longrightarrow$ blood-red col. Fröhdes reagent $\longrightarrow$ steel-blue $\longrightarrow$ yellowish-green col.

B,HCl: $[\alpha]_D^{20}$ − 43·6° in H_2O.

Di-Me ether: $C_{20}H_{23}O_3N$. MW, 325. Oil. *B,HI*: m.p. 227° decomp. d-*Tartrate*: m.p. 205° decomp.; $[\alpha]_D^{25}$ − 74·3° in H_2O. *Methiodide*: m.p. 187°. $[\alpha]_D^{25}$ − 97·8° in EtOH. *Methosulphate*: m.p. 212°. $[\alpha]_D^{23}$ − 73·7° in H_2O.

Emde, *Helv. Chim. Acta*, 1930, **13**, 1054.
Kondo, Sanada, *Chem. Abstracts*, 1929, **23**, 2978.
Gulland, Haworth, *J. Chem. Soc.*, 1928, 2038.
Schöpf, Borkowsky, *Ann.*, 1927, **458**, 174.
Klee, *Chem. Zentr.*, 1914, II, 540.
Gadamer, *Z. angew. Chem.*, 1913, **26**, 627.
Pschorr, *Ann.*, 1910, **373**, 51, 64.

Moslene.

See $\Delta^{2,4}$-*p*-Menthadiene.

Movragenic Acid

$C_{19}H_{28}O_5$ MW, 336

Product of hyd. of the saponin of *Bassia longifolia*, Linn.

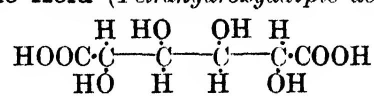
Na salt: glittering cryst. M.p. 229°. Sol. MeOH, EtOH, Me_2CO, alkalis.

Acetyl deriv.: m.p. 167°.

Benzoyl deriv.: m.p. 145°, anhyd. 155°.

Spiegel, Meyer, *Chem. Zentr.*, 1918, **I**, 1032.

Mucic Acid (*Tetrahydroxyadipic acid*)



$C_6H_{10}O_8$ MW, 210

Oxidation-product of lactose and other disaccharides. Prismatic cryst. from H_2O. M.p. 255° (rapid heat.) (225°, 208°). Mod. sol. hot H_2O. Very spar. sol. cold H_2O. Insol. EtOH. Py.Aq. at 140° $\longrightarrow$ allomucic acid.

Mono-acetyl: prisms + $\frac{1}{2}H_2O$ from H_2O. M.p. 198°.

Tetra-acetyl: cryst. + $2H_2O$ from H_2O. M.p. anhyd. 243°. *Di-Et ester*: m.p. 189°. *Dichloride*: m.p. 189° (rapid heat.). *Diamide*: m.p. 290–2° decomp.

Hydrazide: $C_6H_{14}O_6N_4$. M.p. 215° decomp.

Di-Me ester: $C_8H_{14}O_8$. MW, 238. Needles from H_2O. M.p. 165–7° decomp.

Mono-Et ester: $C_8H_{14}O_8$. MW, 238. M.p. 190° decomp.

Di-Et ester : $C_{10}H_{18}O_8$. MW, 266. Leaflets from EtOH. M.p. 163–4°.

Mono-amide : mucamic acid. $C_6H_{11}O_7N$. MW, 209. Micro-cryst. from H_2O. Decomp. at 192° (turns brown at 175°). Forms cryst. Na, NH_4, Ba, and Ca salts. *Penta-acetyl* : decomp. at 197°.

Hac, Hodina, *Bull. soc. chim.*, 1925, **37**, 1242.
Simon, Guillaumin, *Compt. rend.*, 1924, **179**, 1324.
Acree, U.S.P., 1,816,137, (*Chem. Abstracts*, 1931, **25**, 5554).
Bergmann, *Ber.*, 1921, **54**, 1362.
Müller, *Ber.*, 1914, **47**, 2654.
Posternak, *Helv. Chim. Acta*, 1929, **12**, 1181.

Mucobromic Acid (*Dibromoaldehydoacrylic acid*)

BrC·COOH
BrC·CHO

$C_4H_2O_3Br_2$ MW, 258

Rhombic cryst. from hot H_2O. M.p. 125° (120–1°). Sol. EtOH, Et_2O, boiling H_2O. Spar. sol. cold $CHCl_3$, C_6H_6.

Me ester : $C_5H_4O_3Br_2$. MW, 272. B.p. 230–4°. *Oxime* : m.p. 146–7°.

Oxime : m.p. 90° decomp.

Semicarbazone : prisms from EtOH. M.p. 215°.

Bromide : $C_4HO_2Br_3$. MW, 321. Cryst. from EtOH. M.p. 56–7°.

Amide : $C_4H_3O_2NBr_2$. MW, 257. M.p. 170° decomp.

ψ-Me ester : $C_5H_4O_3Br_2$. MW, 272. Plates from EtOH. M.p. 51°. B.p. 249–51°.

ψ-Et ester : cryst. from EtOH. M.p. 50–1°. B.p. 255–60° part. decomp.

ψ-Allyl ester : prisms. M.p. 41°.

Chavanne, *Compt. rend.*, 1911, **153**, 185.
Diels, Reinbeck, *Ber.*, 1910, **43**, 1273.
Simonis, *Ber.*, 1901, **34**, 509, 517.

Mucochloric Acid (*Dichloroaldehydoacrylic acid*)

ClC·COOH
ClC·CHO

$C_4H_2O_3Cl_2$ MW, 169

Plates from hot H_2O. M.p. 127°. Sol. boiling H_2O, EtOH, Et_2O, hot C_6H_6.

Oxime : needles + ½H_2O. M.p. 90°. *Me ester* : m.p. 135°.

Chloride : $C_4HO_2Cl_3$. MW, 187·5. B.p. 100–1°/15 mm.

Amide : $C_4H_3O_2NCl_2$. MW, 168. Prisms from H_2O. M.p. 166°.

Beattie, Heilbron, Irving, *J. Chem. Soc.*, 1932, 264.
Simonis, *Ber.*, 1901, **34**, 509, 517.
Dunlap, *Am. Chem. J.*, 1897, **19**, 641.
Hill, Cornelison, *Am. Chem. J.*, 1894, **16**, 304.

Muconic Acid (1 : 3-*Butadiene*-1 : 4-*dicarboxylic acid, erythrene*-1 : 4-*dicarboxylic acid*)

HOOC·CH:CH·CH:CH·COOH

$C_6H_6O_4$ MW, 142

Needles from H_2O. M.p. 306–7° decomp. (rapid heat.), 289° decomp. (slow heat.). Sol. hot EtOH, AcOH. Sol. 5000 parts cold H_2O.

Mono-Me ester : $C_7H_8O_4$. MW, 156. Cryst. from C_6H_6. M.p. 163°.

Di-Me ester : $C_8H_{10}O_4$. MW, 170. Two forms. (i) M.p. 158° (154°), b.p. 185°/12 mm. (ii) M.p. 75°.

Di-Et ester : $C_{10}H_{14}O_4$. MW, 198. Two forms. (i) M.p. 64° (62°), b.p. 200°/12 mm. (ii) M.p. 13°.

Diamide : $C_6H_8O_2N_2$. MW, 140. Plates from EtOH. Decomp. at 240°.

Karrer, Stoll, *Helv. Chim. Acta*, 1931, **14**, 1190.
Vogt, *Chem. Zentr.*, 1926, I, 2340.
Pankoke, *Ann.*, 1925, **441**, 188.
Farmer, *J. Chem. Soc.*, 1923, **123**, 2531.
Behrend, Heyer, *Ann.*, 1919, **418**, 294.
Stephen, Weizmann, *J. Chem. Soc.*, 1913, **103**, 275.

Mudarin.
See Mudarol.

Mudarol (*Mudarin*)

$C_{30}H_{47}O(OH)$

$C_{30}H_{48}O_2$ MW, 440

Alcohol occurring as isovaleric ester in the root-bark of *Calotropis gigantea*, Dryand. Hexagonal plates from EtOH–Et_2O. M.p. 176°. Spar. sol. EtOH. CrO_3 in AcOH ⟶ mudaric acid, m.p. 225°.

Acetyl deriv. : $C_{32}H_{50}O_3$. MW, 482. Needles. M.p. 195–6°.

Isovaleric ester : $C_{35}H_{56}O_3$. MW, 524. Cryst. from EtOH. M.p. 140°. $[\alpha]_D^{23}$ + 128° in Et_2O.

Hill, Sirkar, *J. Chem. Soc.*, 1915, **107**, 1437.

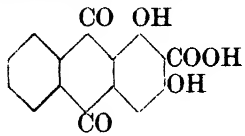
Multiflorin (*Kaempferol rhamnoside*)

$C_{27}H_{30}O_{14}$ MW, 578

Glucoside contained in *Rosa multiflora*, Thunb. M.p. 147–70°.
Penta-acetyl : m.p. 115–30°.

Kondo *et al.*, *Chem. Abstracts*, 1930, **24**, 1386.

Munjistin (1 : 3-*Dihydroxyanthraquinone*-2-*carboxylic acid*, *purpuroxanthin*-2-*carboxylic acid*)

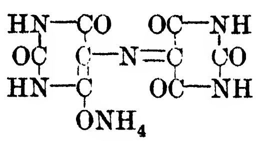


$C_{15}H_8O_6$ MW, 284

Occurs in *Rubia munjista*, Roxb. and in *Rubia sikkimensis*, Kurz. Golden-yellow needles from AcOH. M.p. 229–30°. Sublimes. Decomp. above m.p. ⟶ purpuroxanthin. Sol. hot AcOH (green fluor.), hot EtOH, Et_2O, $CHCl_3$, C_6H_6. Conc. H_2SO_4 ⟶ intense yellow col. NaOH.Aq. ⟶ carmine-red sol. Hot conc. KOH.Aq. ⟶ purpurin. Br in AcOH ⟶ 2 : 4-dibromopurpuroxanthin.

Mitter, Biswas, *Ber.*, 1932, **65**, 622.

Murexide



$C_8H_8O_6N_6$ MW, 284

Ammonium salt of purpuric acid (the free acid cannot be isolated) formed by action of HNO_3.Aq. upon various purine derivs. Reddish cryst. with green lustre from H_2O saturated with NH_4Cl. Deep purple sol. in H_2O. KOH.Aq. ⟶ deep blue col.

Mantzsch, Robison, *Ber.*, 1910, **43**, 92.
de Coninck, *Compt. rend. soc. biol.*, 1914, **75**, 558.

Muscarine

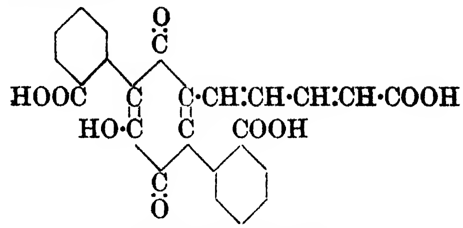
$CH_3 \cdot CH_2 \cdot CH(OH) \cdot CH(N(CH_3)_3 \cdot OH) \cdot CHO$

$C_8H_{19}O_3N$ MW, 177

Main toxic constituent of "fly fungus," *Amanita muscaria*, Linn. Unstable in acid sol., stable to alkalis. $[\alpha]_D^{20}$ + 1·57° in H_2O. Sols give aldehyde reactions. Hofmann degradation ⟶ $(CH_3)_3N$ + 1 : 2-dihydroxyvaleric acid.
Benzoyl deriv. : B_2,H_2PtCl_6, yellow cryst. from HCl.Aq. M.p. 256–7° decomp.

Kögl, Duisberg, Erxleben, *Ann.*, 1931, **489**, 156 (*Bibl.*).

Muscarufin



Suggested structure

$C_{25}H_{16}O_9$ MW, 460

Pigment from "fly fungus," *Amanita muscaria*, Linn. Orange-red needles + $1H_2O$ from EtOH.Aq. M.p. anhyd. 275·5°. Sol. EtOH. Mod. sol. hot AcOH. Insol. Et_2O, $CHCl_3$, C_6H_6. Optically inactive. Conc. H_2SO_4 ⟶ purple-red col. Zn dust in Ac_2O + AcONa ⟶ triacetyl-leucomuscarufin, needles, m.p. 184°. Zn dust dist. ⟶ 1 : 4-diphenylbenzene, m.p. 205°.
Mono-acetyl deriv. : m.p. 197°.

Kögl, Erxleben, *Ann.*, 1930, **479**, 11.

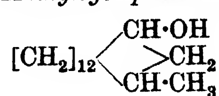
Muscene (3-*Methylcyclopentadecylene*)

$C_{16}H_{30}$ MW, 222

Product of elimination of H_2O from muscol. B.p. 120°/1 mm. $[\alpha]_D^{20}$ − 8·8°.

Ruzicka, *Helv. Chim. Acta*, 1926, **7**, 722.

Muscol (3-*Methylcyclopentadecanol*)

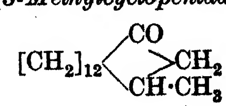


$C_{16}H_{32}O$ MW, 240

Product of reduction of natural muscone. M.p. 35°. B.p. 140°/1 mm. $[\alpha]_D^{30}$ + 14·9°.

See previous reference.

Muscone (3-*Methylcyclopentadecanone*)



$C_{16}H_{30}O$ MW, 238

l-.

Contained in natural musk. B.p. 130°/0·5 mm. D_4^{17} 0·9221. n_D^{17} 1·4802. $[\alpha]_D^{17}$ − 13·01°. Na + EtOH ⟶ muscol.
Semicarbazone : m.p. 134°.
Phenylsemicarbazone : m.p. 158–60°.

dl-.

Synthetic product. B.p. 128°/1·2 mm. D_4^{17} 0·9214. n_{He}^{17} 1·4809.

Semicarbazone : m.p. 143–4° (133·5°, 136–7°, 134·5°).

Phenylsemicarbazone : m.p. 170–1°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1934, **17**, 1308; 1926, **9**, 715.
Ziegler, Weber, *Ann.*, 1934, **512**, 164.

Mustard Gas.

See 2 : 2′-Dichlorodiethyl sulphide.

Mycol

$C_{29}H_{55}{\cdot}OH$

$C_{29}H_{56}O$ MW, 420

Alcohol occurring as esters with higher fatty acids in *Mycobacterium lacticola perrugosum*, in diphtheria, tubercle and other bacilli. Warty cryst. from EtOH. M.p. 66°. Sol. $CHCl_3$, toluene, xylene, pet. ether, Et_2O. Spar. sol. cold EtOH, MeOH.

Benzoate : m.p. 57°.

Goris, *Chem. Zentr.*, 1921, I, 580.
Bürger, *Biochem. Z.*, 1917, **78**, 164.
Tamura, *Z. physiol. Chem.*, 1913, **87**, 93, 107.

Mycose.

See Trehalose.

Mycosterol

$C_{30}H_{46}(OH)_2$

$C_{30}H_{48}O_2$ MW, 440

Constituent of various fungi. Long hexagonal cryst. from hot EtOH. M.p. 159–60°. $[\alpha]_D^{20}$ − 129·4° in $CHCl_3$. Sol. Et_2O, $CHCl_3$, hot EtOH. Insol. H_2O. Forms digitonin comp., m.p. 242°.

Ikeguchi, *J. Biol. Chem.*, 1919, **40**, 175.

Mydriasin (*Homotropine tropate*)

CH₂—CH——CH·CH₂O·CO·CH·CH₂OH
| N·CH₃ CH₂   C₆H₅
CH₂—CH——CH₂

$C_{18}H_{25}O_3N$ MW, 303

Non-crystallizable oil. Very sol. EtOH. Mod. sol. Et_2O. Insol. H_2O. Powerful mydriatic.

B_2,H_2PtCl_6 : m.p. 192° (sinters at 185°).

v. Braun, *Ber.*, 1920, **53**, 601; 1918, **51**, 242.

Myrcene (2-*Methyl*-6-*methyleneoctadiene*-2 : 7)

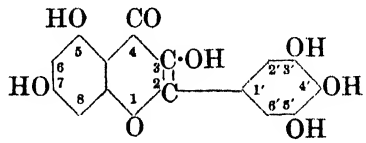
$CH_2{:}CH{\cdot}C(:CH_2){\cdot}[CH_2]_2{\cdot}CH{:}C(CH_3){\cdot}CH_3$

$C_{10}H_{16}$ MW, 136

Constituent of bay, hop, and other essential oils. B.p. 166°, 51–51·5°/8·5 mm. D_0^{15} 0·8047. n_D^{20} 1·4722. Forms add. comp. with α-naphthoquinone, m.p. 80–81·5°.

Arbusow, Abramow, *Ber.*, 1934, **67**, 1942.
Treibs, *Ber.*, 1934, **67**, 942.
Goulding, Roberts, *J. Chem. Soc.*, 1914, **105**, 2614.

Myricetin (3 : 5 : 7 : 3′ : 4′ : 5′-*Hexahydroxyflavone*)



$C_{15}H_{10}O_8$ MW, 318

Aglucone of myricitrin. Bright yellow needles from EtOH. M.p. 357–60° (blackens). Aq. alkalis ⟶ green ⟶ blue to violet col.

3 : 3′ : 4′ : 5′-*Tetra-Me ether* : $C_{19}H_{18}O_8$. MW, 374. Thin yellow plates from EtOH. M.p. 277°. *Diacetyl* : m.p. 159°.

5 : 7 : 3′ : 4′ : 5′-*Penta-Me ether* : $C_{20}H_{20}O_8$. MW, 388. Yellow needles from AcOH. M.p. 228–9°.

Hexa-acetyl : needles from EtOH. M.p. 214–16°.

Nierenstein, *Ber.*, 1928, **61**, 361.
Kalff, Robinson, *J. Chem. Soc.*, 1925, **127**, 183.
Hattori, Hayashi, *Chem. Abstracts*, 1932, **26**, 990.

Myricitrin

$C_{21}H_{20}O_{12}$ MW, 464

Glucosidic colouring matter contained in the bark of *Myrica nagi*, Thunb., and *Myrica rubra*, S. and Z. Cryst. + $2H_2O$ from EtOH.Aq. M.p. anhyd. 197–9°. Very dil. H_2SO_4 ⟶ myricetin + rhamnose.

Hattori, Hayashi, *Chem. Abstracts*, 1932, **26**, 990.
Komatsu, Nodzu, *Mem. Coll. Sci. Kyoto Imp. Univ.*, 1925, **8A**, 223, (*Chem. Abstracts*, 1925, **19**, 2840).

Myricyl Alcohol.

See Melissyl Alcohol.

Myristaldehyde.

See Myristic Aldehyde.

Myristic Acid (*Tetradecoic acid, tetradecylic acid*)

$CH_3{\cdot}[CH_2]_{12}{\cdot}COOH$

$C_{14}H_{28}O_2$ MW, 228

Occurs widespread in vegetable glycerides. Leaflets. M.p. 58° (53·8°). B.p. 250·5°/100 mm., 199°/16 mm. D_4^{54} 0·8622, D_4^{70} 0·8533. n_D^{70} 1·4268. Spar. sol. cold EtOH, Et_2O.

Me ester: $C_{15}H_{30}O_2$. MW, 242. M.p. 18·5°. B.p. 155–7°/7 mm.

Et ester: $C_{16}H_{32}O_2$. MW, 256. M.p. 12·3°. B.p. 295°, 195°/30 mm., 162·5°/9 mm., 139°/4 mm. D_4^{25} 0·8573. n_D^{20} 1·4362.

Glycerol esters: *see* Monomyristin, Trimyristin, *and under* Glycerol.

Phenyl ester: $C_{20}H_{32}O_2$. MW, 304. M.p. 36°. B.p. 230°/15 mm.

Phenacyl ester: m.p. 56°.

p-*Chlorophenacyl ester*: m.p. 90°.

p-*Bromophenacyl ester*: m.p. 81°.

p-*Tolyl ester*: $C_{21}H_{34}O_2$. MW, 318. M.p. 39°. B.p. 239·5°/15 mm.

Chloride: $C_{14}H_{27}OCl$. MW, 246·5. B.p. 174°/16 mm. (168°/15 mm.).

Anhydride: m.p. 53·4°. D_4^{70} 0·8502. n_D^{70} 1·4335.

Amide: $C_{14}H_{29}ON$. MW, 227. M.p. 105–7°.

Nitrile: $C_{14}H_{27}N$. MW, 209. M.p. 19°. B.p. 226·5°/100 mm., 169°/13 mm.

Anilide: m.p. 84° (81·5°). B.p. 113°/10 mm.

p-*Anisidide*: m.p. 101·5°. B.p. 215·5°/10 mm.

o-*Phenetidide*: m.p. 77°.

p-*Phenetidide*: m.p. 111° (108°). B.p. 228·5°/10 mm.

Vanillylamide: α-form, m.p. 82°. β-Form, m.p. 77°.

Phenylhydrazide: m.p. 108°.

2-*Naphthylhydrazide*: m.p. 139°.

Ford-Moore, Phillips, *Rec. trav. chim.*, 1934, **53**, 857.
Ruhoff, Reid, *J. Am. Chem. Soc.*, 1933, **55**, 3825.
Merckx, Verhulst, Bruylants, *Bull. soc. chim. Belg.*, 1933, **42**, 177.
Waterman, Bertram, *Rec. trav. chim.*, 1927, **46**, 699.
Verkade, Coops, *ibid.*, 528.
Beal, *Organic Syntheses*, 1926, VI, 66.
Holde, Gentner, *Ber.*, 1925, **58**, 1418.
De'Conno, *Gazz. chim. ital.*, 1917, **47**, i, 93.
Jacobson, Holmes, *J. Biol. Chem.*, 1916, **25**, 29, 55.
Levene, West, *J. Biol. Chem.*, 1914, **18**, 453.

Myristic Aldehyde (*Myristaldehyde, tetradecylaldehyde*)

$CH_3\cdot[CH_2]_{12}\cdot CHO$

$C_{14}H_{28}O$ MW, 212

Thin laminæ. M.p. 23°. B.p. 155°/10 mm. Rapidly polymerizes to white solid, m.p. 65°.

Oxime: m.p. 82·5°.

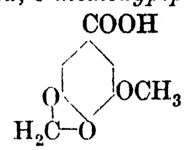
Semicarbazone: m.p. 106·5°.

p-*Nitrophenylhydrazone*: m.p. 95°.

Cyanhydrin: *see under* 1-Hydroxypentadecylic Acid.

Stephen, *J. Chem. Soc.*, 1925, **127**, 1876.

Myristicic Acid (3-*Methoxy*-4 : 5-*methylenedioxybenzoic acid, 5-methoxypiperonylic acid*)



$C_9H_8O_5$ MW, 196

Needles from MeOH. M.p. 212° (209–10°). Sol. EtOH. Spar. sol. H_2O. Conc. H_2SO_4 ⟶ yellow col. HI + P ⟶ gallic acid.

Di-Et ester: $C_{11}H_{12}O_5$. MW, 224. B.p. 193°/20 mm.

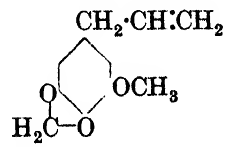
Chloride: $C_9H_7O_4NCl$. MW, 228·5. Needles from C_6H_6–pet. ether. M.p. 105°. B.p. 189–90°/20 mm.

Amide: $C_9H_9O_4N$. MW, 195. Needles + $1H_2O$ from H_2O. M.p. 184°. Sol. hot EtOH. Spar. sol. hot H_2O.

N-*Diacetylamide*: yellow needles from EtOH. M.p. 143°.

Baker, Montgomery, Smith, *J. Chem. Soc.*, 1932, 1283.
Salway, *J. Chem. Soc.*, 1909, **95**, 1161; 1911, **99**, 268.
Bignani, Testoni, *Gazz. chim. ital.*, 1900, **30**, 243.

Myristicin (3-*Methoxy*-4 : 5-*methylenedioxy*-1-*allylbenzene*)



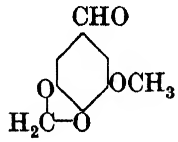
$C_{11}H_{12}O_3$ MW, 192

Constituent of dill, nutmeg, parsley, and other essential oils. B.p. 157°/21 mm., 149·5°/15 mm. D_{20}^{20} 1·1437. n_D^{20} 1·5403. Heat + Na or alc. KOH ⟶ isomyristicin (*q.v.*). Br in pet. ether ⟶ dibromomyristicin dibromide, m.p. 129°.

Nitrosite: m.p. 130° decomp.

Thoms, *Ber.*, 1903, **36**, 3446.
Power, Salway, *J. Chem. Soc.*, 1907, **91**, 2054.
Balbiano, *Ber.*, 1909, **42**, 1506.
Pickles, *J. Chem. Soc.*, 1912, **101**, 1435, 1441.

Myristicinaldehyde (3-*Methoxy*-4 : 5-*methylenedioxybenzaldehyde*, 5-*methoxypiperonal*)



$C_9H_8O_4$ MW, 180

Needles from hot H_2O. M.p. 131°.
Oxime : m.p. 159–60°.

Baker, Montgomery, Smith, *J. Chem. Soc.*, 1932, 1283.
Rügheimer, Ritter, *Ber.*, 1912, **45**, 1340.

Myristone (*Di*-n-*tridecyl ketone*, 14-*ketoheptacosane*, *heptacosanone*-14)

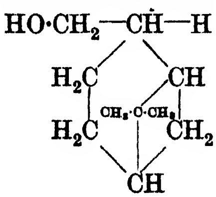
$CH_3\cdot[CH_2]_{12}\cdot CO\cdot[CH_2]_{12}\cdot CH_3$

$C_{27}H_{54}O$ MW, 394

Flakes from EtOH. M.p. 77–8°. D^{61} 0·7986. PCl_5 at 190° ⟶ 13 : 14 : 14-trichloro-*n*-heptacosane.
Oxime : plates from EtOH or AcOH. M.p. 51° (47–8°).

Gluud, *Ber.*, 1919, **52**, 1051.
Jacobson, *J. Am. Chem. Soc.*, 1911, **33**, 2048.

Myristyl Alcohol.
See Tetradecyl Alcohol.
2-Myristylisobutyric Acid.
See Lichesterylic Acid.
Myronic Acid.
See Sinigrin.
Myrtanol (Cf. *Isomyrtanol*)

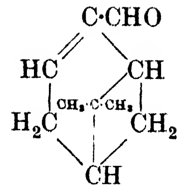


$C_{10}H_{18}O$ MW, 154

l-.
B.p. 127°/22 mm. D_0^0 0·9858. n_D^{20} 1·4898. $[\alpha]_D^{20}$ − 26·06°.
Acetyl : b.p. 128°/19 mm. D_0^0 1·0017. n_D^{20} 1·4700. $[\alpha]_D$ − 21·51°.
Acid phthalate : m.p. 109°. $[\alpha]_D$ − 15·0°.
dl-.
B.p. 122–3°/19 mm. D_0^0 0·9859. n_D^{21} 1·4894.

Dupont, Zacharewicz, *Compt. rend.*, 1934, **199**, 365 ; **198**, 1699.

Myrtenal

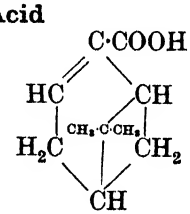


$C_{10}H_{14}O$ MW, 150

d-.
Oil with cinnamon odour. Polymerizes readily in air. B.p. 99–100°/15 mm., 92°/12·5 mm. D_{22}^{20} 0·9872. n_D^{20} 1·5030. $[\alpha]_D^{20}$ + 14·75°.
Oxime : m.p. 70·5–71·5°.
Semicarbazone : m.p. 229–30° (225°, 220–1°) decomp.
Phenylsemicarbazone : decomp. at 180°.
dl-.
D^0 0·9969. n_D^{22} 1·5036.
Oxime : m.p. 101°.
Semicarbazone : m.p. 200·5°.

Penfold, Ramage, Simonsen, *Chem. Zentr.*, 1935, I, 1066.
Dupont, Zacharewicz, Dulou, *Compt. rend.*, 1934, **198**, 1699.
Rupe, *Ann.*, 1927, **459**, 189.

Myrtenic Acid

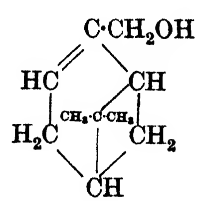


$C_{10}H_{14}O_2$ MW, 166

d-.
M.p. 53–4°.
Nitrile : $C_{10}H_{13}N$. MW, 147. B.p. 106°/12 mm. D^{20} 0·9654. n_D^{20} 1·4950. $[\alpha]_D$ + 54·89°.

Dupont, Zacharewicz, *Bull. soc. chim.*, 1935, **56**, 536.

Myrtenol



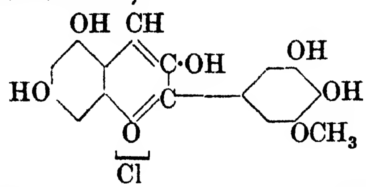
$C_{10}H_{16}O$ MW, 154

d-.
B.p. 218°/771 mm., 103–4°/11 mm. D^{20} 0·9763. n_D^{20} 1·4967. $[\alpha]_D$ + 45·45°
Benzoyl : b.p. 102·5–104°/9 mm. $[\alpha]_D$ + 45·32°.

Acid phthalate : m.p. 114–15°. $[\alpha]_D$ + 21·25° in EtOH.
Phenylurethane : m.p. 58–9°.
1-*Naphthylurethane* : m.p. 92–3°.
dl-.
D^0 0·9849. n_D^{20} 1·4963.
Acid phthalate : m.p. 120·5°.

Penfold, Ramage, Simonsen, *Chem. Zentr.*, 1935, I, 1065.
Rupe, *Ann.*, 1927, **459**, 177.
See also previous reference.

Myrtillidin chloride (*Delphinidin 5-monomethyl ether chloride*)



$C_{16}H_{13}O_7Cl$ MW, 352·5

Aglucone of myrtillin. Dark brown prisms + $1\frac{1}{2}H_2O$ from HCl.Aq.

Willstätter, Zollinger, *Ann.*, 1916, **412**, 196, 206, 227; 1915, **408**, 83.

Myrtillin chloride

$C_{22}H_{23}O_{12}Cl$ MW, 514·5

Glucoside pigment of the whortleberry. Dark bronze-brown flat prisms with metallic lustre. Cryst. + $4H_2O$ from MeOH–HCl. Sol. H_2O ⟶ red col. $FeCl_3$.Aq. ⟶ blue col., violet on dilution. Hyd. by hot HCl.Aq. ⟶ galactose + myrtillidin chloride.
Picrate : red needles. Spar. sol. H_2O.

Diemair, Hering, *Chem. Abstracts*, 1933, **27**, 1982.
See also previous reference.

DICTIONARY OF ORGANIC COMPOUNDS

1943 SUPPLEMENT TO VOLUME II

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1943 SUPPLEMENT TO VOLUME II

E

Eburicoic Acid

$C_{30}H_{48}O_3$ MW, 456

Constituent of *Formes officinalis*, Fris. M.p. 283°.

Me ester: m.p. 141°. $[\alpha]_D^{21}$ $+ 37{\cdot}2°$. *Acetyl*: m.p. 150°. $[\alpha]_D^{22}$ $+ 56{\cdot}9°$.

Acetyl: m.p. 240°. $[\alpha]_D^{17}$ $+ 80°$.

Kariyone, Kurono, *J. Pharm. Soc. Japan*, 1940, **60**, 318.

Ecgonine.

Me ester: *cinnamoyl*: *see* Cinnamoylcocaine.

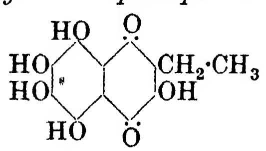
Echinenone

$C_{40}H_{58}O(\pm 2H)$ MW, 554($\pm$2)

Ketonic pigment isolated from sex glands of the sea urchin. Dark violet needles from pet. ether, C_6H_6 or MeOH. M.p. 192–3°. Absorption maxima in CS_2, 5200, 4800, 4500 Å. Possesses vitamin A activity. Ether sol. + HCl ⟶ blue col.

Lederer, *Compt. rend.*, 1935, **201**, 300.
Lederer, Moore, *Nature*, 1936, **137**, 996.

Echinochrome A (3 : 5 : 6 : 7 : 8-*Pentahydroxy-2-ethyl*-1 : 4-*naphthoquinone*)



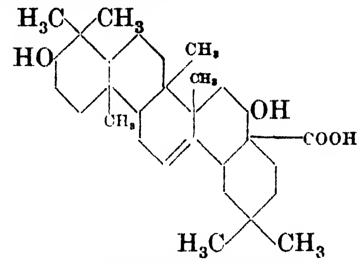
$C_{12}H_{10}O_7$ MW, 266

Pigment from mature ovaries of *Arbacia pustulosa* (sea urchin). Present as the prosthetic group of a high mol. weight complex which acts as a spermatozoa activating and agglutinating agent. Dark red needles from toluene. M.p. 220°. Sol. EtOH, Et_2O, Me_2CO. Spar. sol. $CHCl_3$. Prac. insol. pet. ether, H_2O. Sol. in dil. NaOH has bluish violet col. Absorption maxima in $CHCl_3$, 5330, 4970, 4620 Å; in C_6H_6, 5320, 4940, 4610 Å.

Tri-Me ether: red needles. M.p. 129–30°. Absorption maxima in Et_2O, 5380, 5020, 4670 Å.

Lederer, Glaser, *Compt. rend.*, 1939, **208**, 1939; 1938, **207**, 454.
Kuhn, Wallenfels, *Ber.*, 1942, **75**, 407; 1940, **73**, 458; 1939, **72**, 1407.
Wallenfels, Gauhe, *Ber.*, 1942, **75**, 413.
Wallenfels, *ibid.*, 785.

Echinocystic Acid



Suggested structure

$C_{30}H_{48}O_4$ MW, 472

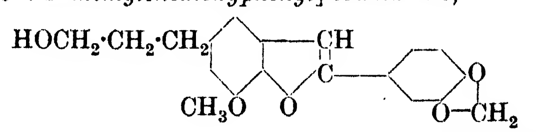
Triterpenoid sapogenin obtained by hyd. of saponin from various species of *Echinocystis*. Cryst. from EtOH, Et_2O, AcOH or CCl_4. M.p. 305–12° decomp. $[\alpha]_{5461}^{28}$ $+ 40{\cdot}6°$ in EtOH.

Me ester: m.p. 213–15°. $[\alpha]_{5461}^{28}$ $+ 37{\cdot}1°$ in EtOH.

Diacetyl: m.p. 272–5°. $[\alpha]_{5461}^{27}$ $- 14{\cdot}6°$ in $CHCl_3$.

Bergsteinsson, Noller, *J. Am. Chem. Soc.*, 1934, **56**, 1403.
White, Noller, *J. Am. Chem. Soc.*, 1939, **61**, 983.
Noller, Carson, *J. Am. Chem. Soc.*, 1941, **63**, 2238.
Bilham, Kon, Ross, *J. Chem. Soc.*, 1942, 532.

Egonol (7-*Methoxy*-5-[γ-*hydroxypropyl*]-2-[3′ : 4′-*methylenedioxyphenyl*]-*coumarone*)



$C_{19}H_{18}O_5$ MW, 326

Constituent of the unsaponifiable portion of the seed oil of *Styrax japonicum*. Plates from butyl alcohol. M.p. 117·5–118°. B.p. 228–30°/0·15 mm. $CHCl_3$ sol. + $SbCl_3$–$CHCl_3$ slowly gives blue col.

Acetyl: plates from EtOH. M.p. 107°.

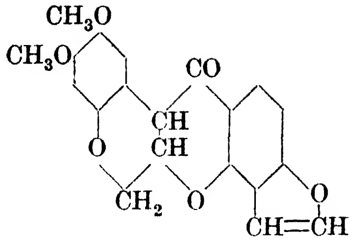
p-*Nitrophenylurethane*: yellow plates from dichloroethane. M.p. 208–9°.

Kawai, Miyoshi, *J. Chem. Soc. Japan*, 1936, **57**, 1233; *Ber.*, 1938, **71**, 1457.
Kawai, Nakamura, Sugiyama, *Proc. Imper. Acad., Tokyo*, 1939, **15**, 45.

Elaidic Acid.

Dibromide: *see* 8 : 9-Dibromostearic Acid.

Elliptone



$C_{20}H_{16}O_6$ MW, 352

l-.

Constituent of roots of *Derris elliptica*. Needles from EtOH. M.p. 160° (171–2°; affected by type of glass used). $[\alpha]_D^{20}$ − 18° in C_6H_6, + 55° in Me_2CO. AcONa in EtOH ⟶ *dl*-form.

Oxime: (α-). Needles from MeOH. M.p. 222°. (β-). Needles from MeOH. M.p. 236°.

dl-.

Needles from EtOH. M.p. 183°.

Oxime: (α-). Leaflets from MeOH. M.p. 259°. (β-). Prisms from MeOH. M.p. 261°.

Monoacetyl: prisms from EtOH. M.p. 200°.

Harper, *J. Chem. Soc.*, 1939, 1099, 1424; 1942, 587, 593.

Emicymarin

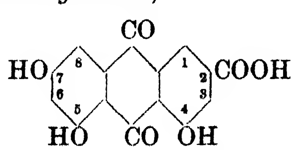
$C_{30}H_{46}O_9$ MW, 550

Cardiac glycoside from seeds of *Strophanthus Emini*. Needles or prisms + MeOH from MeOH. M.p. 207°. Spar. sol. H_2O. $[\alpha]_{5461}^{20}$ + 15·8°, $[\alpha]_D^{20}$ + 12·8°, in EtOH. Conc. H_2SO_4 ⟶ orange sol. Positive Legal reaction. MeOH–KOH ⟶ isoemicymarin, m.p. about 270°. Boiling 2% HCl ⟶ digitalose.

Diacetyl deriv.: plates from MeOH. M.p. about 278°. $[\alpha]_{5461}^{20}$ + 27·8°, $[\alpha]_D^{20}$ + 22·8°, in MeOH.

Lamb, Smith, *J. Chem. Soc.*, 1936, 442.

Emodic Acid (4 : 5 : 7-*Trihydroxyanthraquinone-2-carboxylic acid*)



$C_{15}H_8O_7$ MW, 300

Metabolic product of *Penicillium cyclopum*, Westling. Orange red needles from AcOH or EtOH. Sublimed in vacuum, m.p. 363–5°. Spar. sol. ord. org. solvents.

Me ester: $C_{16}H_{10}O_7$. MW, 314. Orange red needles from MeOH. M.p. 268–9°. *Triacetyl*: pale yellow needles from AcOH. M.p. 188°.

Et ester: $C_{17}H_{12}O_7$. MW, 328. Reddish brown micro-needles from EtOH. M.p. 252°. Sol. alkalis with violet col.

Isobutyl ester: $C_{19}H_{16}O_7$. MW, 356. Orange red needles from C_6H_6–pet. ether. M.p. 229°.

7-*Me ether*: $C_{16}H_{10}O_7$. MW, 314. Sublimes in vacuum in reddish brown needles. M.p. 300°. *Chloride*: cryst. from $SOCl_2$. M.p. 205°. *Amide*: light brown needles from Py. M.p. 292°. *Diacetyl*: greenish yellow needles from AcOH. M.p. 214–15°.

Tri-Me ether: $C_{18}H_{14}O_7$. MW, 342. Pale yellow micro-cryst. from EtOH. M.p. 270°.

Triacetyl: yellow needles or prisms from AcOH. M.p. 218–19°.

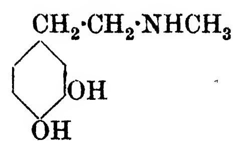
Eder, Hauser, *Helv. Chim. Acta*, 1925, **8**, 126.
Anslow, Breen, Raistrick, *Biochem. J.*, 1940, **34**, 159.

Epicentrine.
See under Domesticine.

Epi-cholestanol.
See epi-Cholestanol.

Epidicentrine.
See under Domesticine.

Epinine (4-[β-*Methylaminoethyl*]-*catechol*, N-*methyl*-2-[3 : 4-*dihydroxyphenyl*]-*ethylamine*)



$C_9H_{13}O_2N$ MW, 167

Clusters of spikes from EtOH. M.p. 188–9° corr. Exhibits hæmostatic and pressor properties.

B,HCl: prisms from H_2O. M.p. 179–80° corr.

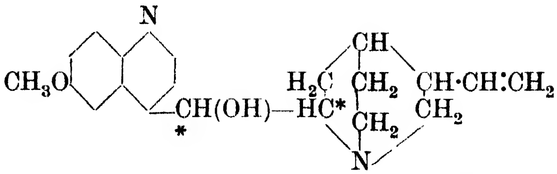
B,HBr: cryst. from EtOH. M.p. 169–71°.

B,H_2SO_4: prisms from H_2O. M.p. 289–90° corr.

B,$(COOH)_2$: hexagonal plates from H_2O. M.p. 194–5° corr.

Kindler, Hesse, *Arch. Pharm.*, 1933, **271**, 439.
Buck, *J. Am. Chem. Soc.*, 1930, **52**, 4119.
Pyman, *J. Chem. Soc.*, 1910, **97**, 272.

Epiquinidine



$C_{20}H_{24}O_2N_2$ MW, 324

Differs from quinidine in steric configuration at one of the carbon atoms marked *. Occurs in cinchona bark. Cryst. from AcOEt. M.p. 113°. $[\alpha]_D^{20}$ + 103·7° in EtOH.

B,2HCl: cryst. from EtOH. M.p. 195·7° decomp. $[\alpha]_D^{20}$ + 45·5° in EtOH.

B,HBr,H₂O: m.p. 240°.

B,HCNS: m.p. 193°. $[\alpha]_D^{20}$ + 44·5° in H_2O.

Acid tartrate: m.p. 130–5° decomp.

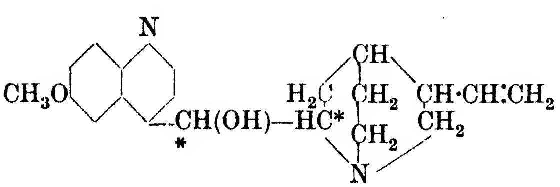
Benzoyl: m.p. 128–31°. $[\alpha]_D^{20}$ + 166°.

Dibenzoyl-d-*tartrate*: cryst. from Me_2CO or EtOH. M.p. 166–7° decomp. $[\alpha]_D^{24}$ + 1·9° in EtOH–$CHCl_3$.

Double sulphate with epiquinine: B_1, B_2, H_2SO_4,$6H_2O$: m.p. 101–3°. Decomp. at 115°. $[\alpha]_D^{20}$ + 38·5° in H_2O.

Rabe, Höter, *J. prakt. Chem.*, 1940, **154**, 66.
Rabe, Kindler, *Ber.*, 1939, **72**, 263.
Suszko, Szelag, *Chem. Abstracts*, 1937, 13, 1816.
Dirscherl, Thron, *Ann.*, 1936, **521**, 48.
Rabe, Kolbe, Hochstätter, *Ann.*, 1932, **492**, 258.

Epiquinine



$C_{20}H_{24}O_2N_2$ MW, 324

Differs from quinine in steric configuration at one of the carbon atoms marked *. Occurs in cinchona bark. Oil. $[\alpha]_D^{20}$ + 43·3° in EtOH. Blue fluor. in H_2SO_4.

B,2HCl: cryst. from Me_2CO. M.p. 196° decomp. $[\alpha]_D^{21}$ + 33·3° in EtOH.

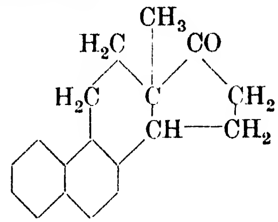
B,HBr,3H₂O: m.p. 71–7°. $[\alpha]_D^{20}$ + 32·9° in H_2O.

Dibenzoyl-d-*tartrate*: cryst. from Me_2CO. M.p. 160° decomp. $[\alpha]_D^{19}$ − 22·4° (26·3°) in EtOH.

Double sulphate with epiquinidine: see under Epiquinidine.

Rabe, Kindler, *Ber.*, 1939, **72**, 263.
Rabe, Höter, *J. prakt. Chem.*, 1940, **154**, 66.
Dirscherl, Thron, *Ann.*, 1936, **521**, 48.
Rabe, Kolbe, Hochstätter, *Ann.*, 1932, **492**, 258.

17-Equilenone



$C_{18}H_{18}O$ MW, 250

Two forms (geometrical isomers).

(1) Plates from MeOH–Me_2CO. M.p. 100–1°.

Picrate: yellow needles from EtOH. M.p. 109·5–110·5°.

(2) Plates from Me_2CO–EtOH. M.p. 188·5–189·5°. Does not form a picrate.

Bachman, Wilds, *J. Am. Chem. Soc.*, 1940, **62**, 2084.

β-Equistanol

$C_{30}H_{54}O$ ($C_{31}H_{56}O$) MW, 430 (444)

Constituent of stallion's urine. Needles from MeOH. M.p. 133°. Sol. Et_2O, Me_2CO.

Acetyl: plates. M.p. 124°.

Marker, Lawson, Rohrmann, Wittle, *J. Am. Chem. Soc.*, 1938, **60**, 1555.

Ergobasine.
See Ergometrine.

Ergobasinine.
See Ergometrinine.

Ergoclavine.
See under Ergosine.

Ergocristine

$C_{35}H_{39}O_5N_5$ MW, 609

Alkaloid from ergot (*Claviceps purpurea*). Prisms + $1Me_2CO$ from Me_2CO. M.p. 155–7° decomp. $[\alpha]_D^{20}$ (Me_2CO free) − 183° in $CHCl_3$. Powerful action on uterus. Boiling MeOH ⟶ ergocristinine.

B,HCl: tablets from EtOH–Et_2O. $[\alpha]_{5461}^{20}$ + 126·5°, $[\alpha]_D^{20}$ + 105·7°, in EtOH.

Stoll, Burckhardt, *Z. physiol. Chem.*, 1937, **250**, 1; 1938, **251**, 287.

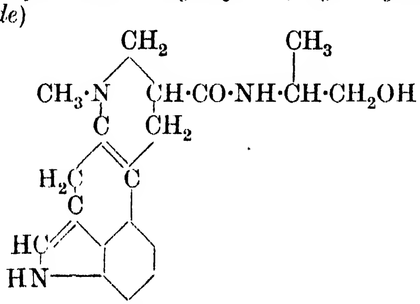
Ergocristinine

$C_{35}H_{39}O_5N_5$ MW, 609

Alkaloid of ergot (*Claviceps purpurea*). Prisms from AcOEt. M.p. 214° decomp. $[\alpha]_D^{20}$ + 366°, $[\alpha]_{5461}^{20}$ + 460°, in $CHCl_3$. Little physiological action. Boil in 1% H_3PO_4 in EtOH ⟶ ergocristine.

See previous references.

Ergometrine (*Ergobasine, ergonovine, ergotocine, ergostetrine,* d-*lysergic*-d-β-*hydroxyisopropylamide*)



Probable constitution

$C_{19}H_{23}O_2N_3$ MW, 325

Alkaloid of ergot (*Claviceps purpurea*). Needles from C_6H_6 or prisms from methyl ethyl ketone (both with solvent), m.p. 162–3° decomp. Plates + ½AcOEt from AcOEt, m.p. 130–2° decomp. Needles from Me_2CO, m.p. 212° decomp. $[\alpha]_D^{20}$ + 91° in H_2O, $[\alpha]_{5461}$ + 62·6° in EtOH. Sol. MeOH, EtOH, AcOEt, Me_2CO. Spar. sol. C_6H_6, CH_2Cl_2. Prac. insol. $CHCl_3$. Darkens in air. Absorption maximum 3160 Å. Alk. hyd. ⟶ lysergic acid + *d*-β-aminopropyl alcohol. Boil in MeOH ⟶ ergometrinine. Induces powerful rhythmic contractions in quiescent uterus.

B,HCl : needles. M.p. 245–6° decomp. $[\alpha]_D^{25}$ + 63° in H_2O.

B,HBr : needles. M.p. 236–7° decomp.

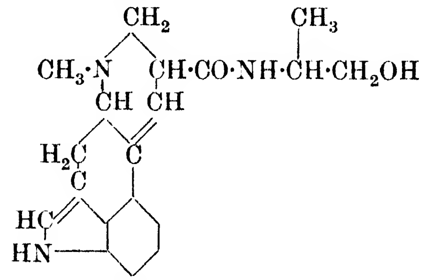
$B_2,(COOH)_2$: needles. M.p. 193° decomp. $[\alpha]_D$ + 55·4° in H_2O.

Picrate : hydrated : yellow needles, m.p. 148° decomp. Anhydrous : red prisms, decomp. at 188–9°.

l-. (*l*-Lysergic-*l*-β-hydroxyisopropylamide). Needles from C_6H_6. M.p. 159–62° (corr.) decomp. $[\alpha]_D^{20}$ − 89° in H_2O. No action on uterus.

Dudley, *Proc. Roy. Soc.*, 1935, B, **118**, 478.
Stoll, Hofmann, *Z. physiol. Chem.*, 1938, **251**, 155.
Craig, Shedlovsky, Gould, Jacobs, *J. Biol. Chem.*, 1938, **125**, 289.
Jacobs, Craig, *J. Am. Chem. Soc.*, 1938, **60**, 1701.
Thompson, *J. Am. Pharm. Assocn.*, 1935, **24**, 748.

Ergometrinine (*Ergobasinine,* d-*isolysergic*-d-β-*hydroxyisopropylamide*)



Probable constitution

$C_{19}H_{23}O_2N_3$ MW, 325

Alkaloid of ergot (*Claviceps purpurea*), isomeric with ergometrine. Prisms from Me_2CO. M.p. 195–7° decomp. $[\alpha]_{5461}^{20}$ + 520° in $CHCl_3$, + 413° in MeOH. Only slight action on uterus. Acids or alkalis ⟶ part. transformation to ergometrine.

B,HCl,H₂O : needles. M.p. 175–80° decomp.

B,HBr,H₂O : needles from Et_2O-Me_2CO.Aq. M.p. 130–90°.

B,HNO₃ : prisms from MeOH-Et_2O. M.p. 235° decomp. $[\alpha]_D^{20}$ + 28·2° in H_2O.

B,H_2SO_4 : prisms. Decomp. at 250°.

B,HClO₄ : needles. Decomp. at 225°.

l-. (*l*-Isolysergic-*l*-β-hydroxyisopropylamide). Prisms from Me_2CO. M.p. 196° (corr.) decomp. $[\alpha]_D^{20}$ − 415° in $CHCl_3$.

Smith, Timmis, *J. Chem. Soc.*, 1936, 1166, 1440.
Stoll, Hofmann, *Z. physiol. Chem.*, 1938, **251**, 155.
Craig, Shedlovsky, Gould, Jacobs, *J. Biol. Chem.*, 1938, **125**, 289.
Jacobs, Craig, *J. Am. Chem. Soc.*, 1938, **60**, 1701.

Ergonovine.

See Ergometrine.

Ergosine

$C_{30}H_{37}O_5N_5$ MW, 547

Alkaloid of ergot (*Claviceps purpurea*). Prisms from AcOEt. M.p. 228° decomp. Sol. $CHCl_3$. Mod. sol. MeOH, Me_2CO. $[\alpha]_{5461}^{20}$ − 193°, $[\alpha]_D^{20}$ − 161°, in $CHCl_3$. $[\alpha]_D^{20}$ + 16° in Me_2CO. Powerful action on uterus. Acids ⟶ ergosinine. Mol. comp. with ergosinine (ergoclavine), m.p. 200° decomp.

B,HCl: plates + $1Me_2CO$. M.p. 235° decomp.

B,HBr: needles + $1Me_2CO$. Decomp. at 230°.

B,HNO₃: needles + $1Me_2CO$. Decomp. at 215°.

Methiodide: decomp. at 215°.

Smith, Timmis, *J. Chem. Soc.*, 1937, 396.

Ergosinine

$C_{30}H_{37}O_5N_5$ MW, 547

Alkaloid of ergot (*Claviceps purpurea*), isomeric with ergosine. Prisms from EtOH, Me_2CO.Aq., C_6H_6 or AcOEt. Decomp. at 228°. Needles + ½MeOH from MeOH. M.p. 220° decomp. $[\alpha]^{20}_{5461}$ + 522°, $[\alpha]^{20}_{D}$ + 420°, in $CHCl_3$. $[\alpha]^{20}_{5461}$ + 475°, $[\alpha]^{20}_{D}$ + 380°, in Me_2CO. Weak action on uterus. Acid hyd. ⟶ leucine. Heat. with H_3PO_4 in Me_2CO–EtOH ⟶ ergosine. Mol. comp. with ergosine, *see under* ergosine.

B,HCl: decomp. at 206°.

Smith, Timmis, *J. Chem. Soc.*, 1937, 396.

Ergostetrine.
See Ergometrine.

Ergotocine.
See Ergometrine.

Erysocine

$C_{18}H_{21}O_3N$ MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Needles from Et_2O. M.p. 162°. Sol. $CHCl_3$. Mod. sol. EtOH, Et_2O. $[\alpha]_D$ + 238·1°. Weakly basic.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 1677.

Erysodine

$C_{18}H_{21}O_3N$ MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Needles from EtOH. M.p. 204–5°. Sol. $CHCl_3$. Mod. sol. EtOH, Et_2O. $[\alpha]^{27}_{D}$ + 248° in EtOH. Readily hyd. Weakly basic.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 1677.

Erysopine

$C_{17}H_{19}O_3N$ MW, 285

Alkaloid with curare-like action isolated from several species of *Erythrina*. Cryst. from EtOH. M.p. 241–2°. Spar. sol. H_2O, $CHCl_3$ and hydroxylic solvents. $[\alpha]^{25}_{D}$ + 265·2° in EtOH–glycerol. Aq. $FeCl_3$ containing drop of HCl ⟶ green col. Weak base. Unstable in alk. sol.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 1677.

Erysovine

$C_{18}H_{21}O_3N$ MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Prisms from Et_2O. M.p. 178–9°. Sol. $CHCl_3$. Mod. sol. EtOH, Et_2O. $[\alpha]_D$ + 252° in EtOH. Weak base.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 1677.

Erythraline

$C_{18}H_{19}O_3N$ MW, 297

Alkaloid with curare-like action isolated from several species of *Erythrina*. Cryst. from EtOH. M.p. 106–7°. $[\alpha]^{27}_{D}$ + 211·8° in EtOH.

B,HBr: cryst. from MeOH–Et_2O. M.p. 243°. $[\alpha]^{27}_{D}$ + 216·6° in H_2O.

B,HI: yellow cryst. from EtOH. M.p. 252–3° decomp. $[\alpha]^{31}_{D}$ + 177° in H_2O.

Methiodide: yellow cryst. from MeOH–C_6H_6. M.p. 185–7°.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 436, 1673.

Erythramine

$C_{18}H_{21}O_3N$ MW, 299

Alkaloid with curare-like action isolated from seeds of *Erythrina sandwicensis*, Deg. and *Erythrina subumbrans* (Hassk.) Merrill. Cryst. from Et_2O–pet. ether. M.p. 103–4°. B.p. 125°/3·9 × 10^{-4} mm. Sol. MeOH, EtOH, AcOEt, C_6H_6. Mod. sol. Et_2O. Prac. insol. pet. ether. Free base unstable.

B,HCl: cryst. from EtOH. M.p. 250° decomp.

B,HBr: needles from EtOH. M.p. 228°. $[\alpha]^{26}_{D}$ + 203·2° in H_2O.

B,HI: yellowish orange needles from EtOH. M.p. 249° decomp. $[\alpha]^{25}_{D}$ + 220° in H_2O.

Methiodide: yellowish plates. M.p. 96–8°. $[\alpha]^{28}_{D}$ + 176° in H_2O.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1939, **61**, 1232, 3053.

Erythratine

$C_{18}H_{21}O_4N$ MW, 315

Alkaloid with curare-like action isolated from *Erythrina glauca*, Willd. Cryst. as hemihydrate from Et_2O–pet. ether. M.p. 170°. $[\alpha]^{28}_{D}$ + 145·5° in EtOH.

B,HBr: cryst. from EtOH. M.p. 241°. $[\alpha]^{25}_{D}$ + 158·7° in H_2O.

B,HI: cryst. from EtOH. M.p. 242°. $[\alpha]_D^{25-28}$ + 109·0° in H_2O.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 436.

Erythrene.

See 1 : 3-Butadiene.

Erythroglaucin.

See under Catenarin.

Erythroidine

$C_{16}H_{19}O_3N$ MW, 273

Alkaloid with curare-like action isolated from seeds of *Erythrina americana*, Mill. M.p. 94–6°. Sol. H_2O, MeOH, EtOH, $CHCl_3$, C_6H_6. Mod. sol. Et_2O.

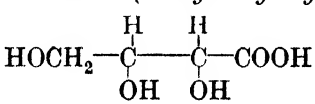
B,HCl: needles. M.p. 228–9° decomp. $[\alpha]_D^{31}$ + 109·7° in H_2O.

Folkers, Major, *J. Am. Chem. Soc.*, 1937, **59**, 1580.

Erythro-2-ketopentose.

See Adonose.

Erythronic Acid (*Trihydroxybutyric acid*)



$C_4H_8O_5$ MW, 136

Free acid readily sol. H_2O. Evaporation of aq. sol. ⟶ lactone.

dl-.

Brucine salt: cryst. M.p. 210° decomp. $[\alpha]_D^{20}$ − 33·8° in H_2O.

Butyl ester: cryst. from Et_2O. M.p. 62–4°. H(+ Pt) ⟶ erythritol.

Phenylhydrazide: cryst. from EtOH. M.p. 147·5°.

Triacetyl chloride: $C_{10}H_{16}O_7Cl$. B.p. 114–16°/2 mm.

Lactone: *dl*-erythronolactone. $C_4H_6O_4$. MW, 118. Cryst. from AcOEt. M.p. 91–2°. *Diacetyl*: cryst. from H_2O. M.p. 52·5–53°.

d-.

Brucine salt: cryst. from EtOH.Aq. M.p. 212–14°. $[\alpha]_D^{20}$ − 25·6° in H_2O.

Quinine salt: needles from EtOH. M.p. 166°. $[\alpha]_D^{20}$ − 106·9° in H_2O.

Strychnine salt: needles from H_2O or EtOH.Aq. M.p. 198–9°. $[\alpha]_D^{20}$ − 16·8° in H_2O.

Amide: $C_4H_9O_4N$. MW, 135. Needles. M.p. 91–2°. $[\alpha]_D^{25}$ + 26·2° in H_2O. *Tribenzoyl*: needles from 90% EtOH or 80% Me_2CO. M.p. 201°. $[\alpha]_D^{25}$ + 9·6° in $CHCl_3$.

Lactone: *d*-erythronolactone. M.p. 104–5°. $[\alpha]_D^{20}$ − 73·2° in H_2O. *Diacetyl*: syrup. $[\alpha]_D^{25}$ − 50·6° in 80% Me_2CO. *Dibenzoyl*: needles from 90% MeOH. M.p. 110–11°. $[\alpha]_D^{25}$ −176·9° in $CHCl_3$.

l-.

Brucine salt: prisms. Decomp. at 212°. $[\alpha]_D^{20}$ − 28·4° in H_2O.

Amide: needles. M.p. 91–2°. $[\alpha]_D^{25}$ − 26·2° in H_2O. *Tribenzoyl*: needles from 80% Me_2CO. M.p. 201°. $[\alpha]_D^{25}$ − 9·0° in $CHCl_3$.

Lactone: *l*-erythronolactone. Needles from AcOEt. M.p. 105° corr. $[\alpha]_D$ + 73·0° in H_2O. *Diacetyl*: syrup. $[\alpha]_D^{25}$ + 50·7° in 80% Me_2CO. *Dibenzoyl*: needles from 90% MeOH. M.p. 110–11°. $[\alpha]_D^{25}$ + 176·3° in $CHCl_3$.

Glattfeld, Reitz, *J. Am. Chem. Soc.*, 1940, **62**, 974.

Jelinck, Upson, *J. Am. Chem. Soc.*, 1938, **60**, 355.

Glattfeld, Forbrich, *J. Am. Chem. Soc.*, 1934, **56**, 1209.

Erythronolactone.

See under Erythronic Acid.

Eschscholtzxanthin

$C_{40}H_{54}O_2(\pm 2H)$ MW, 566 (± 2)

A xanthophyll occurring as esters in petals of *Eschscholtzia californica*. Red cryst. from Me_2CO. M.p. 185–6°. $[\alpha]_{6678}^{18}$ + 225° ± 12° in $CHCl_3$. $CHCl_3$ sol. with conc. H_2SO_4 ⟶ blue col. and with $SbCl_3$ purplish green. Unstable to heat. Absorbs oxygen from air. Absorption maxima at 4460, 4720 and 5030 Å in EtOH.

Diacetyl: cryst. from CS_2. M.p. 200–240° decomp. $[\alpha]_{6678}^{20}$ + 132° in $CHCl_3$.

Dibenzoyl: cryst. from Me_2CO–EtOH. M.p. 133°. $[\alpha]_{6678}^{20}$ − 142° in $CHCl_3$.

Di-p-*nitrobenzoyl*: cryst. from $CHCl_3$–Me_2CO. M.p. above 260°. $[\alpha]_{6678}^{20}$ − 234° in $CHCl_3$.

Strain, *J. Biol. Chem.*, 1938, **123**, 425.

Esculetin.

See Aesculetin.

Esculin.

See Aesculin.

Eseroline.

Phenylurethane: *see* Pheneserine.

Ethinylphenylcarbinol (*Acetylenylphenyl carbinol*, *α-hydroxybenzylacetylene*, *3-hydroxy-3 phenylallylene*, *1-phenylpropinol-1*)

$C_6H_5{\cdot}CH(OH){\cdot}C{\vdots}CH$

C_9H_8O MW, 132

Prisms. M.p. 22°. B.p. 114°/12 mm. D_4^{20} 1·0655. n_D^{20} 1·5508.

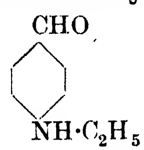
Hg comp.: needles from EtOH. M.p. 167–8°.

Acetyl: b.p. 124°/18 mm. n_D^{20} 1·5155.

Hydrogen phthaloyl: needles from petrol. M.p. 98–9°.
Phenylurethane: needles from pet. ether. M.p. 81–2°.
p-*Nitrophenylurethane*: pale yellow needles from xylene. M.p. 132°.
β-*Naphthylurethane*: needles from petrol. M.p. 120°.

Campbell, Campbell, Eby, *J. Am. Chem. Soc.*, 1938, **60**, 2882.
Lespieau, *Bull. soc. chim.*, 1920, **39**, 991.
McCallum, U.S.P. 2,125,384, (*Chem. Zentr.*, 1938, II, 3005).
Jones, McCombie, *J. Chem. Soc.*, 1942, 734.

p-Ethylaminobenzaldehyde

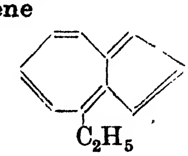


$C_9H_{11}ON$ MW, 149

Needles from C_6H_6-ligroin. M.p. 81–2°. Sol. EtOH, Et_2O, C_6H_6. Mod. sol. hot H_2O.
Oxime: yellowish needles from C_6H_6-pet. ether. M.p. 118°. Sol. EtOH, C_6H_6.
Phenylhydrazone: yellow needles. M.p. 160° to turbid liq., clears at 182°.
Anil: red needles from C_6H_6. Decomp. at 150°.

Ullmann, Frey, *Ber.*, 1904, **37**, 858.
Walter, D.R.P. 118,567, (*Chem. Zentr.*, 1901, I, 652).

Ethyl p-aminophenyl sulphide.
See under p-Aminothiophenol.
Ethylaniline.
See also Amino-ethylbenzene.
4-Ethylazulene



$C_{12}H_{12}$ MW, 156

Oil.
Picrate: black needles from EtOH. M.p. 128·5°.
sym.-*Trinitrobenzene add. comp.*: m.p. 147·5°.

St. Pfau, Plattner, *Helv. Chim. Acta*, 1936, **19**, 877.

Ethyl 3-bromopropyl Ether.
See under 3-Bromopropyl Alcohol.
2-Ethylbutane-1 : 1-dicarboxylic Acid.
*See sec.-n-*Amylmalonic Acid.

Ethyl tert.-butyl sulphide.
See under tert.-Butyl Mercaptan.
1-Ethylbutyraldehyde.
See Diethylacetaldehyde.
1-Ethylbutyric Acid.
See Diethylacetic Acid.
Ethyl-2-chloropropylcarbinol.
See 5-Chlorohexanol-3.
Ethylene dicyanide.
See Succinonitrile.
Ethylene difluoride (1 : 2-*Difluoroethane*)

$$FCH_2{\cdot}CH_2F$$

$C_2H_4F_2$ MW, 66

B.p. 10–11°. Decomposes spontaneously. $Ca(OH)_2$.Aq. slowly ⟶ ethylene glycol.

Chabrié, *Compt. rend.*, 1890, **111**, 747.
Henne, Renoll, *J. Am. Chem. Soc.*, 1936, **58**, 890.

Ethylene Diglycol.
See 2 : 2′-Dihydroxydiethyl Ether.
Ethylene Thioglycol (*Mercaptoethyl alcohol, thioethylene glycol, hydroxyethyl mercaptan, 1-hydroxy-2-mercaptoethane, thioglycol*)

$$HSCH_2{\cdot}CH_2OH$$

C_2H_6OS MW, 78

B.p. 157–8°/742 mm. (slight decomp.), 55°/13 mm. Misc. with H_2O. D_4^{20} 1·1143. n_D^{20} 1·443.
Hg comp.: silvery plates from H_2O or EtOH. M.p. 123°. Sol. Me_2CO, AcOEt.
Pb comp.: orange plates from EtOH. M.p. 110°.
S-*Me*: C_3H_8OS. MW, 92. B.p. 80·5–81°/30 mm., 68–70°/20 mm. Misc. with H_2O. D_{20}^{20} 1·0640. n_D^{20} 1·4867.
S-*Et*: $C_4H_{10}OS$. MW, 106. B.p. 182–4°.
S-n-*Butyl*: $C_6H_{14}OS$. MW, 134. B.p. 92–3°/4 mm.
S-*Isoamyl*: $C_7H_{16}OS$. MW, 148. B.p. 110–11°/10 mm. D^{16} 0·948. n_D 1·475.
S-*Phenyl*: $C_8H_{10}OS$. MW, 154. B.p. 115–16°/2 mm. D_{20}^{20} 1·1451. n_D^{20} 1·5917.
S-o-*Nitrophenyl*: $C_8H_9O_3NS$. MW, 199. Dark yellow tablets. M.p. 100°.
S-m-*Nitrophenyl*: yellow needles from pet. ether or H_2O. M.p. 42·5°.
S-p-*Nitrophenyl*: yellow cryst. from Et_2O or CS_2. M.p. 62°.
S-2 : 4-*Dinitrophenyl*: $C_8H_8O_5N_2S$. MW, 244. Yellow needles from C_6H_6. M.p. 100·5°.
Dibenzoyl: needles from EtOH. M.p. 39°.
S-*Phenylurethane*: cream cryst. from CCl_4 or C_6H_6. M.p. 59–60°.

Bennett, Berry, *J. Chem. Soc.*, 1927, 1666.
Fromm, Jörg, *Ber.*, 1925, **58**, 306.
Bennett, *J. Chem. Soc.*, 1921, **119**, 423.
Tseou, Pan, *J. Chinese Chem. Soc.*, 1939, **7**, 29.

Ethylethinylcarbinol (1-*Pentinol*-3)

$CH_3·CH_2·CH(OH)·C⋮CH$

C_5H_8O MW, 84

B.p. 125°. D^{15} 0·8926. n_D^{15} 1·4347.
3 : 5-*Dinitrobenzoyl* : needles from 95% EtOH. M.p. 91°.
Hydrogen phthaloyl : prisms. M.p. 72°.

Kreimeier, U.S.P. 2,106,181, (*Chem. Abstracts*, 1938, **32**, 2547).
McCallum, U.S.P. 2,125,384, (*Chem. Zentr.*, 1938, II, 3005).
McGrew, Adams, *J. Am. Chem. Soc.*, 1937, **59**, 1497.
Lespieau, *Ann. chim.*, 1912, **27**, 170.

1-Ethylglutaric Acid (*Pentane*-1 : 3-*dicarboxylic acid*)

$C_2H_5·CH·COOH$
CH_2
$CH_2·COOH$

$C_7H_{12}O_4$ MW, 160

dl-.
Cryst. from C_6H_6-ligroin. M.p. 60·5° B.p. 250–60°, 194–6°/30 mm., 175°/11 mm. Sol. H_2O, EtOH, Et_2O, C_6H_6. $k = 5·8 \times 10^{-5}$ at 25°.
Di-Et ester : $C_{11}H_{20}O_4$. MW, 216. B.p. 120–3°/11 mm. D_4^{22} 0·9946. n_D^{20} 1·4295.
Anhydride : $C_7H_{10}O_3$. MW, 142. B.p. 275°.
Mono-anilide : needles from EtOH.Aq. M.p. 154·5°.
Mono-p-*toluidide* : two forms. (1) M.p. 119–20°. (2) M.p. 145·5°.
Mono-β-*naphthylamide* : two forms. (1) M.p. 129·5°. (2) M.p. 142–3°.

d-.
M.p. 42°. D_4^{20} (liq.) 1·173. $[\alpha]_D^{20}$ (liq.) + 16·5°, + 9·17° (c = 3) in H_2O.
Di-Me ester : $C_9H_{16}O_4$. MW, 188. B.p. 111°/16 mm. $[\alpha]_D^{20}$ + 14·6°.
Anhydride : b.p. 147–8°/12 mm. $[\alpha]_D^{20}$ about + 23°.

Auwers, Titherley, *Ann.*, 1896, **292**, 144, 214.
Blaise, Luttringer, *Bull. soc. chim.*, 1905, **33**, 769.
Berner, Leonardsen, *Ann.*, 1939, **538**, 39.
v. Braun, Mannes, Reuter, *Ber.*, 1933, **66**, 1502.

2-Ethylglutaric Acid (*Isopentane*-1 : 2′-*dicarboxylic acid*)

$CH_2·COOH$
$C_2H_5·CH$
$CH_2·COOH$

$C_7H_{12}O_4$ MW, 160

Prisms from $CHCl_3$. M.p. 73°. Very sol. H_2O, EtOH, Et_2O.
Dinitrile : b.p. 144°/12 mm.
Anhydride : b.p. 158°/13 mm.

Day, Thorpe, *J. Chem. Soc.*, 1920, **117**, 1470.
Komnenos, *Ann.*, 1883, **218**, 167.
Blaise, Gault, *Bull. soc. chim.*, 1907, **1**, 90.

Ethyl hydroxyphenyl sulphide.
See under Thiohydroquinone *and* Thioresorcinol.

Ethylidene chloroiodide.
See 1-Chloro-1-iodoethane.

Ethylidene fluoride (1 : 1-*Difluoroethane*)

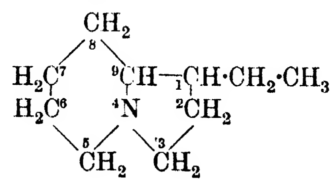
$CH_3·CHF_2$

$C_2H_4F_2$ MW, 66

B.p. − 24·7°. Quite stable and practically inert chemically and physiologically.

I.G., D.R.P. 641,878, (*Chem. Zentr.*, 1937, I, 3714).
Henne, Renoll, *J. Am. Chem. Soc.*, 1936, **58**, 890.

1-Ethylindolizidine (1-*Ethyloctahydropyrrocoline*)



$C_{10}H_{19}N$ MW, 153

B.p. 64°/11 mm.
Picrate : yellow needles from EtOH. M.p. 134°.
Picrolonate : rosettes of yellow needles. M.p. 176°.

Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1521.

2-Ethylindolizidine.
B.p. 41°/1 mm.
Picrate : yellow needles from EtOH. M.p. 149°.
Picrolonate : pale yellow needles. M.p. 161° slight decom .
Methiodide : needles from Me_2CO. M.p. 232° decomp.

See previous reference.

Ethyl-lutidine.
See Dimethylethylpyridine.

Ethyloctahydropyrrocoline.
See Ethylindolizidine.

α-Ethyl-β-phenylcinnamic Acid.
See 1 : 1-Diphenyl-1-butylene-2-carboxylic Acid.

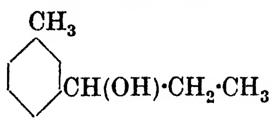
Ethyl α-piperidyl Ketone.
See Conhydrinone.

Ethylpropylacetylene.
See 3-Heptine.

5-Ethyl-2-pyrrolidone.
See under 3-Amino-*n*-caproic Acid.

***N*-Ethyl-α-quinolone.**
See under Carbostyril.

Ethyl-*m*-tolylcarbinol (*α-Hydroxy*-m-*propyltoluene*, m-[*α-hydroxypropyl*]-*toluene*)



$C_{10}H_{14}O$ MW, 150

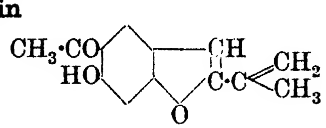
B.p. 113–14°/12 mm. $D_4^{16.4}$ 0·9833. $n_D^{16.4}$ 1·521.

Auwers, *Ann.*, 1919, **419**, 111.

Ethyl-*p*-tolylcarbinol (*α-Hydroxy*-p-*propyltoluene*, p-[*α-hydroxypropyl*]-*toluene*).
Cryst. M.p. 15°. B.p. 118–20°/23 mm. $D^{14.5}$ 0·966.
Acetyl : b.p. 130°/25 mm. D^{14} 0·989.
Phenylurethane : cryst. from pet. ether. M.p. 86–8°.

Klages, *Ber.*, 1902, **35**, 2252.

Euparin

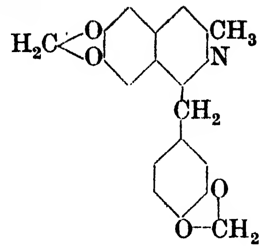


$C_{13}H_{12}O_3$ MW, 216

Constituent of roots of *Eupatorium purpureum*. Yellow prisms from ligroin. Sol. Et_2O, $CHCl_3$, C_6H_6. Spar. sol. 8% NaOH.Aq. $FeCl_3$ ⟶ green col. in EtOH. Volatile in steam. Sublimes in vacuo.
Acetyl : prisms from ligroin. M.p. 80°.
Me ether : $C_{14}H_{14}O_3$. MW, 230. Needles from EtOH.Aq. M.p. 76–7°.
Oxime : prisms from EtOH.Aq. M.p. 147–8°.
Semicarbazone : yellow prisms from AcOEt. M.p. 255°.
2 : 4-*Dinitrophenylhydrazone* : brown prisms from AcOEt. M.p. 252°.

Kamthong, Robertson, *J. Chem. Soc.*, 1939, 925, 933.

Eupaverine



$C_{19}H_{15}O_4N$ MW, 321

Colourless needles with blue fluor. from MeOH. M.p. 141°. Employed as substitute for papaverine. Salts used as antispasmodics and sedatives.
B,HCl : yellowish prisms from MeOH–Et_2O. M.p. 254·5° decomp.
Chloroaurate : decomp. at 202°.

Merck, E.P. 348,956, (*Chem. Zentr.*, 1931, II, 1196); D.R.P. 556,709, (*Chem. Zentr.*, 1932, II, 2847).
Bruckner, Krámli, *J. prakt. Chem.*, 1936, **145**, 291.

Europhene.
See 6-*tert.*-Butyl-*o*-cresol.

Evodin.
See Limonin.

F

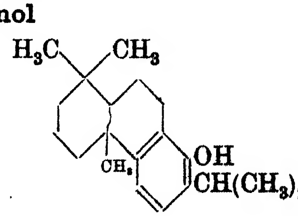
Fangchinoline. (For formula *see* Tetrandrine).

$C_{37}H_{40}O_6N_2$ MW, 608

Alkaloid isolated from the Chinese drug Han-Fang-Chi. Cryst. from EtOH or Me_2CO. M.p. 237–8°. Alc. $FeCl_3$ ⟶ bluish-green col. $[\alpha]_D^{18}$ + 255·1° in $CHCl_3$.
Mono-Me ether : Tetrandrine, *q.v.*
Et ether : needles from EtOH.Aq. M.p. 116–17°. *Picrate* : yellow prisms from Me_2CO. M.p. 242° decomp.
Picrate : cryst. from Me_2CO, m.p. 224° decomp. Cryst. from EtOH, m.p. 186° decomp.

Chuang, Hsing, Kao, Chang, *Ber.*, 1939, **72**, 519.

Ferruginol



$C_{20}H_{30}O$ MW, 286

Constituent of resin of Miro tree, *Podocarpus ferrugineus*. B.p. 175°/0·3 mm. D_4^{61} 1·008. n_D^{61} 1·5346. $[\alpha]_D^{16}$ + 40·6° in EtOH. Spar. sol. NaOH.Aq. $FeCl_3$ ⟶ green col. Se dehydrogenation ⟶ pimanthrene and a hydroxyretene.

Me ether: $C_{21}H_{32}O$. MW, 300. B.p. 166°/0·3 mm. D_4^{61} 0·9868. n_D^{61} 1·5290.

Formyl: needles from pet. ether. M.p. 96–7°.

Acetyl: needles from pet. ether. M.p. 81–2°. $[\alpha]_D^{16}$ + 60·3° in EtOH.

Benzoyl: needles from pet. ether. M.p. 154–5°.

Brandt, Neubauer, *J. Chem. Soc.*, 1939, 1031.

Ficusin.
See Psoralene.

Floribundine

$C_{18}H_{19}O_2N$ MW, 281

Alkaloid from *Papaver floribundum*. Prisms from Me_2CO. M.p. 193–5°. Sol. $CHCl_3$. Spar. sol. EtOH, Et_2O. Conc. HNO_3 ⟶ violet col. which changes to yellow. $[\alpha]_D$ − 204·3° in $CHCl_3$.

Tartrate: needles from EtOH. M.p. 181–3°.

Methiodide: cryst. from EtOH. M.p. 178–80°.

Konowalowa, Yunussoff, Orechoff, *Ber.*, 1935, **68**, 2281.

Floripavidine

$C_{21}H_{29}O_5N$ MW, 375

Alkaloid from *Papaver floribundum*. Prisms from EtOH or Me_2CO. M.p. 241–2°. Sol. $CHCl_3$. Spar. sol. Et_2O, C_6H_6. Conc. HNO_3 ⟶ violet col. which changes to yellow. $[\alpha]_D$ − 156° in MeOH.

B,HCl: cryst. M.p. 209–10°.

Methiodide: needles from EtOH. M.p. 228–30°.

Konowalowa, Yunussoff, Orechoff, *Ber.*, 1935, **68**, 2281.

Floripavine

$C_{19}H_{21}O_4N$ MW, 327

Alkaloid from *Papaver floribundum*. Needles from EtOH. M.p. 200–1°. Sol. $CHCl_3$. Spar. sol. Et_2O, C_6H_6. $[\alpha]_D$ + 90·5° in $CHCl_3$. Turns brown in light.

B,HCl: needles from EtOH. M.p. 235–6°.

Picrate: yellow needles from EtOH. M.p. 223–4°.

Methiodide: needles from EtOH. M.p. 220–1°.

Konowalowa, Yunussoff, Orechoff, *Ber.*, 1935, **68**, 2282.

Fluorobromoethylene.
See Acetylene fluorobromide.

Fluorobutane.
See Butyl fluoride.

Fluorochloroethylene.
See Acetylene fluorochloride.

ω-Fluorotoluene.
See Benzyl fluoride.

Formylacetic Acid.
See Malonaldehydic Acid.

ω-Formylacetophenone.
See Benzoylacetaldehyde.

Formylacrylic Acid.
See Maleic Semi-aldehyde.

***p*-Formylbenzophenone.**
See 4-Benzoylbenzaldehyde.

β-Formylbutyrophenone.
See 1-Benzoylbutyraldehyde.

3-Formylcamphor.
See 3-Hydroxymethylenecamphor.

7-Formylcaprylic Acid.
See Azelaic Semi-aldehyde.

***p*-Formylcinnamic Acid.**
See 4-Aldehydocinnamic Acid.

Formyldiphenylamine.
See under Diphenylamine.

Formylisobutyric Acid.
See Aldehydoisobutyric Acid.

Formylmalonic Acid.
See Aldehydomalonic Acid.

Formylpropionic Acid.
See Aldehydopropionic Acid.

β-Formylpropiophenone.
See 1-Benzoylpropionaldehyde.

Formylsuccinic Acid.
See Aldehydosuccinic Acid.

Forsythigenol

$C_{21}H_{24}O_6$ MW, 372

Occurs in *Forsythia coreana*, Nakai, as glucoside forsythin. M.p. 132·5°. $KMnO_4$ ⟶ veratric and vanillic acids.

Mono-Me ether: m.p. 124°.

Kunimine, Suzuki, *J. Pharm. Soc. Japan*, 1938, **58**, 572; 1937, **57**, 902.

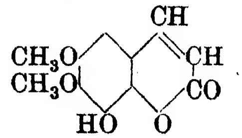
Forsythin

$C_{27}H_{34}O_{11}$ MW, 534

Constituent of *Forsythia coreana*, Nakai. Cryst. + $1\frac{1}{2}H_2O$. M.p. 181°. $[\alpha]_D^{27}$ + 46·4° in EtOH. Hyd. ⟶ forsythigenol + glucose.

See previous references.

Fraxidin (8-*Hydroxy*-6 : 7-*dimethoxycoumarin, fraxetin* 7-*methyl ether*)



$C_{11}H_{10}O_5$ MW, 222

Constituent of bark of ash. Cryst. from H_2O. M.p. 196–7°.

Späth, Jerzmanowska-Sienkiewiczowa, *Ber.*, 1938, **71**, 1831; 1937, **70**, 1019, 1672.

Freon (*Difluorodichloromethane*)

CCl_2F_2

CCl_2F_2 MW, 121

Almost odourless gas. M.p. – 155°. B.p. – 29·8°. Spar. sol. H_2O. Employed as refrigerant.

Thompson, *Ind. Eng. Chem.*, 1932, **24**, 620.

Tanetic Chem., U.S.P. 2,005,709, (*Chem. Zentr.*, 1936, I, 2630).

General Motors, U.S.P. 1,990,692, (*Chem. Zentr.*, 1935, II, 436); U.S.P. 2,013,050, (*Chem. Zentr.*, 1936, I, 2630).

Friedelin

$C_{30}H_{50}O$ MW, 426

Triterpene ketone, containing a hydrogenated pentacyclic structure, occurring in cork. Cryst. from AcOEt. M.p. 255–61°. $[\alpha]^{23}_{5461}$ – 29·4°. Fuming H_2SO_4 ⟶ red col.

Oxime: plates from AcOEt–C_6H_6. M.p. 290–4°.

p-*Nitrophenylhydrazone*: orange cryst. from C_6H_6. M.p. 277–9°.

2 : 4-*Dinitrophenylhydrazone*: orange cryst. from C_6H_6. M.p. 297–9° decomp.

Enol benzoate: leaflets from C_6H_6–AcOEt. M.p. 255–62°.

Enol phenylacetate: m.p. 244–51°.

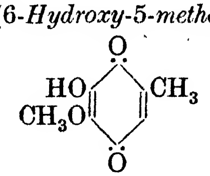
Drake, Jacobsen, *J. Am. Chem. Soc.*, 1935, **57**, 1570.

Drake, Shrader, *ibid.*, 1854.

Drake, Campbell, *J. Am. Chem. Soc.*, 1936, **58**, 1681.

Drake, Wolfe, *J. Am. Chem. Soc.*, 1940, **62**, 3018.

Fumigatin (6-*Hydroxy*-5-*methoxytoluquinone*)



$C_8H_8O_4$ MW, 168

Constituent of *Aspergillus fumigatus*, Fresenius. Maroon coloured needles from pet. ether. M.p. 116°. Sol. EtOH, Et_2O, Me_2CO, AcOEt, C_6H_6, $CHCl_3$. Spar. sol. H_2O. Sol. NaOH.Aq. to purple sol. Alc. $FeCl_3$ ⟶ purple-black col. Sublimes in vacuo.

Me ether: $C_9H_{10}O_4$. MW, 182. Red needles from pet. ether. M.p. 59°.

Acetyl: yellow needles from pet. ether. M.p. 95–6°.

Raistrick, *Chemistry and Industry*, 1938, 293.

Anslow, Raistrick, *Biochem. J.*, 1938, **32**, 687, 2288.

Funiculosin

$C_{15}H_{10}O_5$ MW, 270

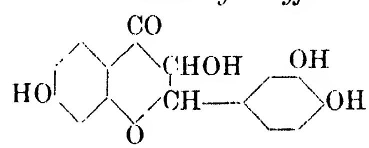
Isolated from *Penicillium funiculosum*, Thom. Dark red plates. M.p. 218°. Zn dust dist. ⟶ anthracene + naphthalene.

Triacetyl deriv.: m.p. 205°.

Tribenzoyl deriv.: m.p. 277°.

Igarasi, *Journal of the Agricultural Chemical Society Japan*, 1939, **15**, 225, (*Chem. Abstracts*, 1939, **33**, 6296).

Fustin (*Dihydrofisetin*, 7 : 3′ : 4′-*trihydroxyflavonol*, 3 : 7 : 3′ : 4′-*tetrahydroxyflavone*)



$C_{15}H_{12}O_6$ MW, 288

Constituent of *Rhus cotinus* L., *Rhus succedanea* L., and *Rhus rhodanthema*. Colourless cryst. from H_2O. M.p. 216–18°. Sol. Et_2O, C_6H_6, $CHCl_3$. Sol. alkalis to red sols. $FeCl_3$ ⟶ green col. Reduces $NH_3.AgNO_3$, and hot Fehlings.

7 : 3′ : 4′-*Tri-Me ether*: $C_{18}H_{18}O_6$. MW, 330. Needles from MeOH. M.p. 143–4°. *Acetyl*: prisms. M.p. 142–3°.

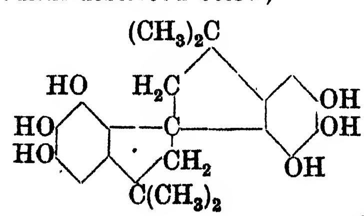
Tetra-acetyl: needles from EtOH. M.p. 150–51°.

Oyamada, *Ann.*, 1939, **538**, 44.

G

Gallacetonin

(*Note*: this name has been applied to the two compounds described below)



$C_{21}H_{24}O_6$ MW, 372

Cryst. from AcOH. Darkens at 240°. M.p. 260–5°.

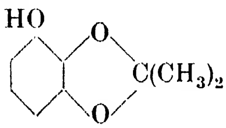
Hexa-Me ether: pale yellow needles from EtOH. M.p. 135–7°.

Hexa-acetyl: cryst. from EtOH or AcOH. M.p. 247° (rapid heat.).

Hexabenzoyl: m.p. 287–8°.

Hexabenzenesulphonyl: m.p. 213–16°.

Baker, Besly, *J. Chem. Soc.*, 1939, 199.
Wacek, Kratzl, *Oesterreichische Chemiker-Zeitung*, 1939, **42**, 286, (*Chem. Abstracts*, 1940, **34**, 1636).



$C_9H_{10}O_3$ MW, 166

Leaflets from H_2O. M.p. 89–90°. Very sol. EtOH, Et_2O, AcOH, C_6H_6. Spar. sol. ligroin. Sol. alkalis.

Acetyl: prisms from pet. ether. M.p. 47–8°.

Benzoyl: cryst. from EtOH. M.p. 78°.

Benzenesulphonyl: cryst. from EtOH. M.p. 84°.

See second reference above.

Gansil.

See Chloramine-T.

Gazaniaxanthin

$C_{40}H_{56}O$ MW, 552

Carotenoid pigment from flowers of *Gazania rigens*. Brownish red cryst. + MeOH from MeOH–pet. ether. Loses MeOH at 80° in high vacuum. Deep red rectangular cryst. from C_6H_6–MeOH (1 : 4). M.p. 136–7°. Absorption maxima at 5300, 4955, and 4630 Å in CS_2.

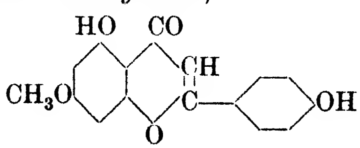
Acetyl: clusters of orange needles from C_6H_6–MeOH. M.p. 83–5°. Absorption maxima at 5300 and 4940 Å in CS_2.

Schön, *Biochem. J.*, 1938, **32**, 1566.

Genistein.

β-*Glucoside*: *see* Sophoricoside.

Genkwanin (5 : 4′-*Dihydroxy*-7-*methoxyflavone, apigenin* 7-*methyl ether*)



$C_{16}H_{12}O_5$ MW, 284

Isolated from *Daphne genkwa* and from the Chinese drug "yuen-hua." Yellow needles from MeOH. M.p. 286°.

5-*Me ether*: $C_{17}H_{14}O_5$. MW, 298. Pale yellow needles from EtOH. M.p. 298°. *Acetyl*: needles from EtOH. M.p. 220°.

4′-*Benzyl ether*: m.p. 203°.

Diacetyl: needles from EtOH. M.p. 196°.

Dibenzoyl: needles from EtOH. M.p. 207–8°.

Mahal, Venkataraman, *J. Chem. Soc.*, 1936, 569.
Tseng, *J. Pharm. Soc. Japan*, 1935, **55**, 30.
Nakano, Tseng, *J. Pharm. Soc. Japan*, 1932, **52**, 148.

Geodin

$C_{17}H_{12}O_7Cl_2$ MW, 399

Metabolic product of *Aspergillus terrens*, Thom. Pale yellow needles from $CHCl_3$–Et_2O. M.p. 235°. Sol. EtOH, AcOEt, Me_2CO, dioxan. Spar. sol. C_6H_6. Insol. H_2O, pet. ether. $[\alpha]^{20}_{5461}$ + 179° in $CHCl_3$. Alc. $FeCl_3$ ⟶ dirty green ⟶ brown col. Heat. at 260° ⟶ 2 : 6-dichloro-orcinol.

Tetra-Me ether: (of geodin + $1H_2O$) needles from MeOH. M.p. 150°.

Tetra-acetyl: (of geodin + $1H_2O$) plates from AcOH + 1% Ac_2O. M.p. 209–10°.

Calam, Clutterbuck, Oxford, Raistrick, *Biochem. J.*, 1939, **33**, 579.
Clutterbuck, Koerler, Raistrick, *Biochem. J.*, 1937, **31**, 1089.
Raistrick, Smith, *Biochem. J.*, 1936, **30**, 1315.

Germanin.

See Bayer 205.

Germerine (*Methylethylglycollic acid ester of protoveratridine*)

$C_{26}H_{36}O_3N$ $\begin{cases} (OH)_3 \\ \text{-OOC}\cdot CH(CH_3)\cdot C_2H_5 \\ \text{-OOC}\cdot C(CH_3)(OH)\cdot C_2H_5 \end{cases}$

$C_{36}H_{57}O_{11}N$ MW, 679

Alkaloid isolated from *Veratrum album*. Leaflets + $1H_2O$ from C_6H_6. M.p. 193–5° (corr.) decomp. Very sol. MeOH, $CHCl_3$. Sol. EtOH, Me_2CO, AcOEt. Spar. sol. Et_2O. $[\alpha]^{20}_D$ + 10·8° in $CHCl_3$. Very hygroscopic when anhydrous.

B,HCl: cryst. + $2H_2O$ from $CHCl_3$. M.p. 215° (corr.) decomp.

B,HBr: cryst. + $2H_2O$ from H_2O. M.p. 212–13° (corr.) decomp.

B,HSCN: plates + $1H_2O$ from EtOH.Aq. M.p. 221–3° (corr.) decomp.

Monopicrate: yellow cryst. + $1H_2O$ from Me_2CO–Et_2O. M.p. 186–7° (corr.) decomp.

Poethke, *Arch. Pharm.*, 1937, **275**, 571.

Gledigenin

$$C_{29}H_{46}\begin{cases}OH\\COOH\end{cases}$$

$C_{30}H_{48}O_3$ MW, 456

Mono-unsaturated sapogenin obtained from fruits of Chinese *Gleditsia*. Plates. M.p. 310° (corr.) decomp.

Et ester: needles. M.p. 203° corr. *Acetyl*: tablets. M.p. 184° corr.

Acetyl: rods. M.p. 264° corr.

Benzoyl: scales. M.p. 217° corr.

Bromolactone: needles. M.p. 235° (corr.) decomp.

Fujii, Matsukawa, *J. Pharm. Soc. Japan*, 1935, **55**, 1322.

Glucamine (*Pentahydroxy-1-aminohexane, pentahydroxyhexylamine*)

$HOCH_2\cdot[CHOH]_4\cdot CH_2NH_2$

$C_6H_{15}O_5N$ MW, 181

d.-

Amorphous solid from MeOH. M.p. 127–8°. Sol. H_2O. Spar. sol. EtOH. Insol. Et_2O. $[\alpha]_D^{25}$ $-$ 7·5° in H_2O. Sweet taste. Strong base. Absorbs CO_2 from air and liberates NH_3 from ammonium salts. Does not reduce Fehling's. NaOBr $\longrightarrow$ glucose. HI + red P at 130° $\longrightarrow$ 1-aminohexane. Stable to HCl at 125° or boiling conc. KOH.

B_2,H_2PtCl_6: orange yellow prisms. M.p. 116–18°.

$B_2,(COOH)_2$: plates from EtOH.Aq. M.p. about 180°.

O-*Penta-acetyl*: needles. M.p. 170°.

Hexa-acetyl: plates. M.p. 70°. B.p. 250°.

N-2 : 4-*Dinitrophenyl*: m.p. 151–2°.

N-2 : 4 : 6-*Trinitrophenyl*: yellow needles. M.p. 183°.

N-2 : 4-*Dinitronaphthyl*: orange red needles. M.p. 189°.

Flint, Salzberg, U.S.P. 2,016,962, (*Chem. Abstracts*, 1935, **29**, 8007).

Wayne, Adkins, *J. Am. Chem. Soc.*, 1940, **62**, 3314.

Roux, *Ann. chim. phys.*, 1904, **1**, 77.

α-Glucochloralose

$C_8H_{11}O_6Cl_3$ MW, 309·5

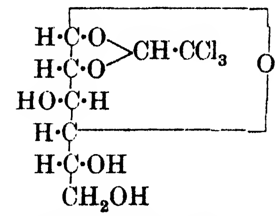
M.p. 187°.

Penta-acetyl deriv.: (1) m.p. 174°. $[\alpha]_D^{20}$ $-$ 11·5° in $CHCl_3$. (2) M.p. 151·5°. $[\alpha]_D^{20}$ + 66·2° in $CHCl_3$.

White, Hixon, *J. Am. Chem. Soc.*, 1933, **55**, 2438.

Pictet, Reichel, *Helv. Chim. Acta*, 1923, **6**, 621.

β-Glucochloralose (*Parachloralose, anhydroglucochloral*)



Suggested formula

$C_8H_{11}O_6Cl_3$ MW, 309·5

M.p. 227–9°.

Triacetyl deriv.: m.p. 108°. $[\alpha]_D^{27}$ + 22·7° in $CHCl_3$.

Penta-acetyl deriv.: m.p. 151°. $[\alpha]_D^{27}$ + 46·1° in $CHCl_3$.

Tri-Me ether: $C_{11}H_{17}O_6Cl_3$. MW, 351·5. M.p. 109°.

Hixon *et al.*, *J. Am. Chem. Soc.*, 1933, **55**, 2438; 1930, **52**, 3191; 1929, **51**, 519.

Glycerol.

Benzylidene ether: *see* Benzylidene-glycerol.

Glycylglycylalanine.

See Diglycylalanine.

Glycylglycyl-leucine.

See Diglycyl-leucine.

Glycylglycylvaline.

See Diglycylvaline.

Gmelinol

$C_{22}H_{26}O_7$ MW, 402

Constituent of the wood of *Gmelina leichhardtii* ("Colonial beech"). Plates or prisms from H_2O or EtOH. M.p. 124°. $[\alpha]_D$ + 123·3° in $CHCl_3$.

Acetyl: prisms from EtOH. M.p. 118°. B.p. 320°/3 mm.

Phenylurethane: m.p. 189°.

Birch, Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1938, **71**, 391.

Harradence, Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1940, **74**, 117.

Gramine.

See Donaxine.

Gratiolone

$C_{30}H_{48}O_3$ MW, 456

Constituent of *Herba gratiola officinalis* (Hedge myssop). Probably a triterpene hydroxy-carboxylic acid. Needles from MeOH. M.p. 311–12°. Sublimes at 240–60°/15 mm. Sol. most org. solvents except pet. ether. $[\alpha]_D^{22}$ + 5·7° in

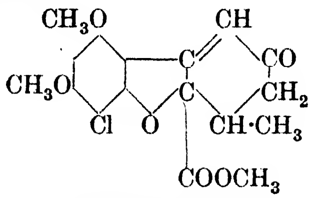
Py. $C(NO_2)_4 \longrightarrow$ yellow col. In CCl_4 absorbs $Br \longrightarrow$ bromolactone, m.p. 257°.

Me ester: m.p. 220°. $[\alpha]_D^{22}$ + 5·0° in $CHCl_3$. *Acetyl*: cryst. from MeOH. M.p. 197°.

Acetyl: needles from MeOH.Aq. M.p. 268°. $[\alpha]_D^{19}$ + 20·4° in $CHCl_3$.

Retzlaff, *Arch. Pharm.*, 1902, **240**, 561.
Maurer, Meier, Reiff, *Ber.*, 1939, **72**, 1870.

Griseofulvin



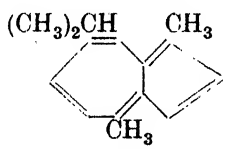
Suggested structure

$C_{17}H_{17}O_6Cl$ MW, 352·5

Metabolic product of *Penicillium griseo-fulvum* Dierck. Cryst. from EtOH. M.p. 218–19°. Spar. sol. Me_2CO, AcOEt, $CHCl_3$, C_6H_6, dioxan. Insol. H_2O. $[\alpha]_{5461}^{19}$ + 417° in Me_2CO, $[\alpha]_{5790}^{19}$ + 354° in Me_2CO.

Oxford, Raistrick, Simonart, *Biochem. J.*, 1939, **33**, 240.

Guaiazulene (1 : 4-*Dimethyl-7-isopropylazulene*)



Probable structure

$C_{15}H_{18}$ MW, 198

Bluish violet plates from EtOH. M.p. 31·5°. B.p. 167–8°/12 mm. D_4^{19} 0·9728 (supercooled liq.). Absorption maxima in Et_2O or pet. ether: 6620, 6320, 6030, 5810, 5560 Å.

Picrate: black needles from EtOH. M.p. 122–122·5°. Stable only in presence of excess picric acid.

Styphnate: black needles from MeOH. M.p. 105–6°. Stable only in presence of excess styphnic acid.

sym.-*Trinitrobenzene add. comp.*: m.p. 151–151·5°.

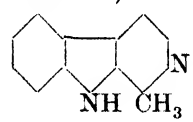
sym.-*Trinitrotoluene add. comp.*: m.p. 89°.

Ruzicka, Rudolph, *Helv. Chim. Acta*, 1926, **9**, 134.
Birrell, *J. Am. Chem. Soc.*, 1934, **56**, 1248.
Ruzicka, Haagen-Smit, *Helv. Chim. Acta*, 1931, **14**, 1104.
Pfau, Plattner, *Helv. Chim. Acta*, 1936, **19**, 871.
Plattner, Lemay, *Helv. Chim. Acta*, 1940, **23**, 897.
Perrottet, Taub, Briner, *Helv. Chim. Acta*, 1940, **23**, 1260.

Guanopterin.
See Isoguanine.

H

Harman (*Aribine, loturine, 2-methylnorharman, 2-methyl-3-carboline*)



$C_{12}H_{10}N_2$ MW, 182

Constituent of bark of Brazilian *Arariba rubra*, Mart. Cryst. from C_6H_6, EtOH, or Et_2O. M.p. 238°. Sol. EtOH, MeOH, Et_2O, Me_2CO, $CHCl_3$. Spar. sol. ligroin, hot H_2O. Sol. min. acids with bluish violet fluor. Bitter taste. Sublimes. Forms cryst. salts with min. acids.

Späth, *Monatsh.*, 1920, **41**, 401.
Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1921, **119**, 1603, 1612.
Akabori, Saito, *Ber.*, 1930, **63**, 2245.
Späth, Lederer, *ibid.*, 120.

Helenalin

$C_{15}H_{18}O_4$ MW, 262

Occurs in *Helenium autumnale*. Rods from C_6H_6. M.p. 167°. $[\alpha]_D^{20}$ − 101·9° in EtOH. Bitter taste. Sternutator, vermifuge and mod. effective fish poison.

Acetyl: cryst. from MeOH.Aq. M.p. 184°.

Methoxyacetyl: hexagonal cryst. from MeOH.Aq. M.p. 135°.

Clark, *J. Am. Chem. Soc.*, 1936, **58**, 1982.

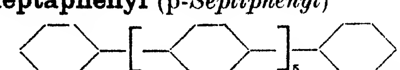
Heptadecane-1 : 1-dicarboxylic Acid.
See Cetylmalonic Acid.

Heptamethylene bromide.
See 1 : 7-Dibromoheptane.

Heptamethylene chloride.
See 1 : 7-Dichloroheptane.

Heptandial.
See Pimelic Dialdehyde.

***p*-Heptaphenyl** (p-*Septiphenyl*)



$C_{42}H_{30}$ MW, 534

M.p. 545°. Sublimes.

Busch, Weber, Mathauser, *J. prakt. Chem.*, 1936, **146**, 29.

1-Heptine (*Oenanthylidene, n-amylacetylene*)

$CH_3 \cdot [CH_2]_4 \cdot C\vdots CH$

C_7H_{12} MW, 96

F.p. below − 70°. B.p. 99–100° (108–10°), 26°/10 mm. D^{19} 0·750. n_D^{19} 1·418. Red. ⟶ *n*-heptane. $NH_3.AgNO_3$ ⟶ white ppt. $NH_3.Cu_2Cl_2$ ⟶ yellow ppt.

Moureu, André, *Ann. chim.*, 1914, **1**, 116 (*Footnote*).
Bourguel, *Ann. chim.*, 1925, **3**, 191, 325.
Bouis, *Ann. chim.*, 1928, **9**, 461.
Hill, Tyson, *J. Am. Chem. Soc.*, 1928, **50**, 172.
Chem. Fabrik Flörscheim, *Chem. Abstracts*, 1912, **6**, 2072.
Bodroux, *Compt. rend.*, 1939, **208**, 1022.
Vaughan, Hennion, Vogt, Niewland, *J. Org. Chem.*, 1937, **2**, 1.

2-Heptine (*Methylbutylacetylene*)

$CH_3 \cdot [CH_2]_3 \cdot C\vdots C \cdot CH_3$

C_7H_{12} MW, 96

B.p. 111–13°/750 mm. (111·5–112·5°). D 0·7632, D_4^{21} 0·748. n_D^{21} 1·4208. Heat with H_2O at 325° ⟶ methyl *n*-amyl ketone + ethyl *n*-butyl ketone.

Béhal, *Ann. chim.*, 1888, **15**, 427.
Desgrez, *Ann. chim.*, 1894, **3**, 234.
Gredy, *Compt. rend.*, 1933, **197**, 327.

3-Heptine (*Ethylpropylacetylene*)

$CH_3 \cdot CH_2 \cdot CH_2 \cdot C\vdots C \cdot CH_2 \cdot CH_3$

C_7H_{12} MW, 96

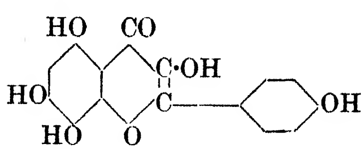
B.p. 105–6° (106–7°). D_4^{25} 0·7337. n_D 1·415. H_2SO_4 or HCl ⟶ butyrone. $HgCl_2$ ⟶ white ppt.

Lespieau, Wiemann, *Bull. soc. chim.*, 1929, **45**, 635.
Béhal, *Ann. chim.*, 1888, **75**, 415.
Faworski, *J. prakt. Chem.*, 1895, **51**, 558.
Bourguel, *Ann. chim.*, 1925, **3**, 191, 325.

1-Heptine-1-aldehyde.
See Amylpropiolic Aldehyde.

1-Heptine-1-carboxylic Acid.
See *n*-Amylpropiolic Acid.

Herbacetin (3 : 5 : 7 : 8 : 4′-*Pentahydroxyflavone*)



$C_{15}H_{10}O_7$ MW, 302

Aglucone of herbacitrin. Yellow cryst. + $1H_2O$ from EtOH.Aq. M.p. 280–3° (279–81°). $FeCl_3$ ⟶ dull green col. Conc. H_2SO_4 ⟶ yellow col. with no fluor. Deep red ppt. with lead tetra-acetate.

Penta-acetyl : needles from EtOH. M.p. 192–3° (189–91°).

3 : 5 : 8 : 4′-*Tetra-Me ether* : $C_{19}H_{18}O_7$. MW, 358. Yellow cryst. from EtOH. M.p. 269–70°.

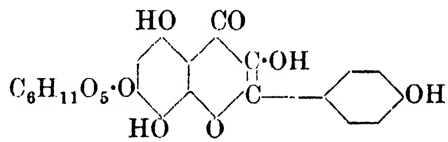
3 : 7 : 8 : 4′-*Tetra-Me ether* : yellow plates + $2H_2O$ from AcOH. M.p. anhyd. 160–2°. $FeCl_3$ ⟶ green col.

Penta-Me ether : $C_{20}H_{20}O_7$. MW, 372. Needles from MeOH.Aq. M.p. 156–8°.

7-*Glucoside* : *see* Herbacitrin.

Goldsworthy, Robinson, *J. Chem. Soc.*, 1938, 56.
Ranagaswami, Rao, Seshadri, *Proceedings of the Indian Academy of Science*, 1939, **9**A, 133, (*Chem. Abstracts*, 1939, **33**, 5396).

Herbacitrin



$C_{21}H_{20}O_{12}$ MW, 464

7-Glucoside of herbacetin. Pigment of the cotton flowers, *Gossypium herbaceum* and *G. indicum*. Yellow needles from Py.Aq. M.p. 247–9°. Red ppt. with lead tetra-acetate. $FeCl_3$ ⟶ green col.

Octa-acetyl deriv. : colourless needles from Et_2O. M.p. 214–16°.

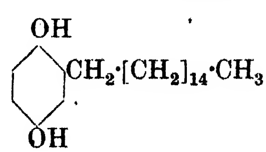
Rao, Seshadri, *Proceedings of the Indian Academy of Science*, 1939, **9**A, 365, (*Chem. Abstracts*, 1940, **34**, 107).
Neelakantam, Seshadri, *Proceedings of the Indian Academy of Science*, 1937, **5**A, 357, (*Chem. Abstracts*, 1937, **31**, 6246).

Hexadecyl Alcohol.
See Cetyl Alcohol.

Hexadecyl bromide.
See Cetyl bromide.

Hexadecyl chloride.
See Cetyl chloride.

Hexadecylhydroquinone (2 : 5-*Dihydroxyhexadecylbenzene, hexadecylquinol, cetylhydroquinone*)



$C_{22}H_{38}O_2$ MW, 334

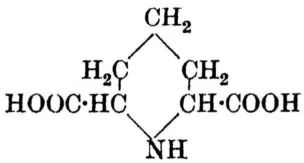
Cryst. from pet. ether. M.p. 112°. Ag_2O ⟶ hexadecylbenzoquinone, m.p. 83°.
Di-Me ether: b.p. 210°/0·5 mm.
Di-Et ether: b.p. 219°/0·1 mm.

Cook, Heilbron, Lewis, *J. Chem. Soc.*, 1942, 660.

Hexadecyl iodide.
See Cetyl iodide.

Hexahydro-*o*-aminophenol.
See 2-Aminocyclohexanol.

Hexahydrodipicolinic Acid (*Piperidine-2 : 6-dicarboxylic acid*)

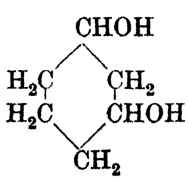


$C_7H_{11}O_4N$ MW, 173

Two forms. (1) Cryst. from H_2O. M.p. 281° decomp. Sol. H_2O. Spar. sol. EtOH. Prac. insol. Et_2O, C_6H_6. (2) Plates + $1H_2O$ from H_2O or EtOH.Aq. Anhyd. at 134°. M.p. about 258°. Spar. sol. EtOH.
Di-Et ester: $C_{11}H_{19}O_4N$. MW, 229. B.p. 155–6°/11 mm. D_4^{25} 1·0748. n_D^{25} 1·4581.
Diamide: $C_7H_{13}O_2N_3$. MW, 171. Two forms corresponding to those of the acids. (1) Prisms from H_2O. M.p. 225–6° corr. Sol. hot H_2O, EtOH. (2) Leaflets + $1H_2O$. Anhyd. at 190°. M.p. 228–9° corr.
N-*Me*: *see* Scopolinic Acid.

Singer, McElvain, *J. Am. Chem. Soc.*, 1935, **57**, 1137.
Schmidt, *Ber.*, 1916, **49**, 165.
Hess, *ibid.*, 2337.
Fischer, *Ber.*, 1901, **34**, 2545.

Hexahydroresorcinol (*Cyclohexandiol*-1 : 3, *resorcitol*)



$C_6H_{12}O_2$ MW, 116

Cis-.
Cryst. from AcOEt or Me_2CO. M.p. 86°. Sol. H_2O, EtOH. Spar. sol. Et_2O, pet. ether, C_6H_6. Heat. of comb. 7·248 cal./gm.
Dibenzoyl: cryst. from MeOH or pet. ether. M.p. 65·5°.
Di-p-nitrobenzoyl: cryst. from AcOH. M.p. 154–5°.
Di-phenylacetyl: b.p. 215–17°/1 mm. D_4^{24} 1·1235. n_D^{24} 1·5390.
Di-phenylurethane: cryst. from EtOH. M.p. 213°.
Di-α-naphthylurethane: cryst. from $PhNO_2$. M.p. 245°.
Di-l-*menthylurethane*: cryst. from EtOH. M.p. 157°. $[\alpha]_D^{17.5}$ − 64·7° in EtOH.

Trans-.
M.p. 117°. Heat. of comb. 7·232 cal./gm.
Diacetyl: b.p. 95°/0·4 mm.
Dibenzoyl: cryst. from AcOH, EtOH or pet. ether. M.p. 123·5°.
Di-p-nitrobenzoyl: cryst. from AcOH. M.p. 176·5°.
Di-phenylacetyl: needles from EtOH. M.p. 65°.

Lindermann, Baumann, *Ann.*, 1930, **477**, 78.
Rothstein, *Ann. chim.*, 1930, **14**, 474.
Coops, Dienske, Aten, *Rec. trav. chim.*, 1938, **57**, 303.

Hexahydroxyditolyl.
See Leucophenicin.

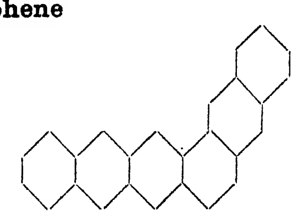
Hexamethylene bromide.
See 1 : 6-Dibromohexane.

Hexamethylene chloride.
See 1 : 6-Dichlorohexane.

Hexane-1 : 2-dicarboxylic Acid.
See *n*-Butylsuccinic Acid.

Hexane-2 : 5-dicarboxylic Acid.
See 1 : 4-Dimethyladipic Acid.

Hexaphene

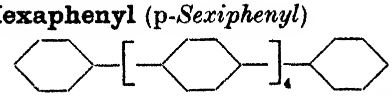


$C_{26}H_{16}$ MW, 328

Yellow plates from xylene. M.p. 308°. Yellow fluor. in light. Sol. conc. H_2SO_4 with violet ⟶ brown ⟶ olive-green col. Spar. sol. low b.p. solvents. More sol. high b.p. solvents ⟶ sols. with greenish-blue fluor.

Clar, *Ber.*, 1940, **73**, 81.
Clar, Wallenstein, Avenarius, *Ber.*, 1929, **62**, 955.

***p*-Hexaphenyl** (p-*Sexiphenyl*)

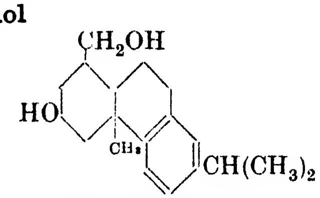


$C_{36}H_{26}$ MW, 458

Micro-plates from *o*-dichlorobenzene. M.p. 475°. Sublimes.

Pummerer, Bittner, *Ber.*, 1924, **57**, 84.
Pummerer, Seligsberger, *Ber.*, 1931, **64**, 2477.
Busch, Weber, Mathauser, *J. prakt. Chem.*, 1936, **146**, 29.

3-Hexendione-2 : 5.
See 1 : 2-Diacetoethylene.
1-Hexinol-3.
See *n*-Propylethinylcarbinol.
Hexoestrol.
See Dihydrodiethylstilboestrol.
Hexogen.
See Cyclonite.
ψ-Hexylamine.
See 1-Amino-2-ethyl-*n*-butane.
Hexyl bromide.
See Bromohexane.
Hinokinin.
See Cubebin.
Hinokiol



Suggested structure

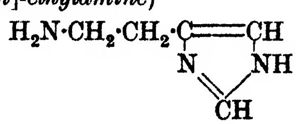
$C_{19}H_{28}O_2$ MW, 288

Constituent of Hinoki wood (*Chamecyparis obtusa*, Sieb. et Zucc.). Prisms from EtOH. M.p. 234–5°. B.p. 240–7°/5 mm. part. decomp. $[\alpha]_D^{20}$ + 74·4° in $CHCl_3$. $H_2SO_4 \longrightarrow$ purple-red col.

Me ether: $C_{20}H_{30}O_2$. MW, 302. Needles. M.p. 95–6°. $[\alpha]_D^{18}$ + 59·5° in EtOH.
Diacetyl: prisms. M.p. 143°. $[\alpha]_D^{24}$ + 70·4° in EtOH.
Dibenzoyl: prisms. M.p. 207°. $[\alpha]_D^{22}$ +93·8° in $CHCl_3$.
Di-phenylurethane: prisms. M.p. 246–7°.

Keimatsu, Ishiguro, *J. Pharm. Soc. Japan*, 1935, **55**, 186.
Yoshiki, Ishiguro, *J. Pharm. Soc. Japan*, 1933, **53**, 73.

Histamine (4-[ω-*Aminoethyl*]-*glyoxaline*, 2-[4-*iminazolyl*]-*ethylamine*)



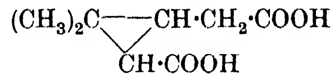
$C_5H_9N_3$ MW, 111

Constituent of ergot.

B,2HCl: prisms from EtOH. M.p. 244–6°.
B,2HBr: needles. Darkens at 265°. M.p. 284°.
ω-N-*Benzoyl*: prisms from hot H_2O. M.p. 148°.
Picrate: m.p. 160–2°.
Di-picrate: m.p. 238–42° decomp. (241°).
Picrolonate: m.p. 262–4°.

Koessler, Hanke, *J. Am. Chem. Soc.*, 1918, **40**, 1716.
Garforth, Pyman, *J. Chem. Soc.*, 1935, 489.
McHenry, *Physiological Reviews*, 1931, **11**, 371.

Homocaronic Acid (3 : 3-*Dimethyl*-2-*carboxymethylcyclopropane-carboxylic acid*)



$C_8H_{12}O_4$ MW, 172

Cis-.
Needles from H_2O. M.p. 135–6° after sintering at 120°. Sol. toluene. Spar. sol. C_6H_6, $CHCl_3$. Stable to Br in $CHCl_3$ or AcOH even on warming.
Di-phenylphenacyl ester: prisms from EtOH–Me_2CO. M.p. 147–9°.
Anhydride: b.p. 155–60°/17 mm.

Trans-.
Needles from H_2O. M.p. 191–2°. Less sol. H_2O than *cis*-form.

Owen, Simonsen, *J. Chem. Soc.*, 1933, 1226.
Simonsen, Rau, *J. Chem. Soc.*, 1923, **123**, 556.
Guha, Sankaran, *Ber.*, 1937, **70**, 1691.

Homocysteine (3-*Mercapto*-1-*aminobutyric acid*)

$$HS{\cdot}CH_2{\cdot}CH_2{\cdot}CH(NH_2){\cdot}COOH$$

$C_4H_9O_2NS$ MW, 135

Intermediate in the metabolic conversion of methionine into cysteine.

dl-.
Cryst. from H_2O–EtOH. M.p. 232–3° corr. Ox. $\longrightarrow$ homocystine.
S-*Benzyl*: cryst. M.p. 240–50° corr. N-*Formyl*: plates from Me_2CO–C_6H_6. M.p. 85–6° corr.
Thiolactone: *B,HCl*: cryst. from EtOH–Et_2O. M.p. 200–1°.

d-.
S-*Benzyl*: cryst. from H_2O. M.p. 247–52°

corr. $[\alpha]_D^{26}$ − 25° in N/HCl. $FeCl_3 \longrightarrow$ *d*-homocystine.

Riegel, Vigneaud, *J. Biol. Chem.*, 1935, **112**, 149.

Homocystine (1 : 1′-*Diamino*-3 : 3′-*disulphidobutyric acid*)

$$\begin{array}{l} S\cdot CH_2\cdot CH_2\cdot CH(NH_2)\cdot COOH \\ S\cdot CH_2\cdot CH_2\cdot CH(NH_2)\cdot COOH \end{array}$$

$C_8H_{16}O_4N_2S_2$ MW, 268

dl-.

Plates from H_2O. Decomp. at 260–5°. Reduce with Na–liq. NH_3 in presence of MeI $\longrightarrow$ *dl*-methionine. HOBr $\longrightarrow$ homocysteic acid, decomp. at 230–5°.

Dibenzoyl: cryst. from EtOH. M.p. 184–5°.

d-.

M.p. 281–4° corr. decomp. $[\alpha]_D^{26}$ − 77° in N/HCl, $[\alpha]_D^{21}$ + 16° in H_2O.

l-.

M.p. 281–4° corr. decomp. $[\alpha]_D^{26}$ + 77° in N/HCl, $[\alpha]_D^{21}$ − 16° in H_2O.

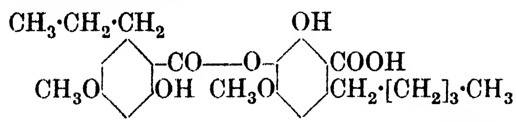
Butz, Vigneaud, *J. Biol. Chem.*, 1932, **99**, 135.

Patterson, Vigneaud, *J. Biol. Chem.*, 1935, **111**, 393; **109**, 97.

ψ-Homolycorine.

See Lycoramine.

Homosekikaic Acid



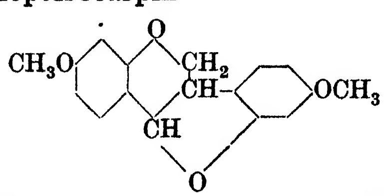
$C_{24}H_{30}O_8$ MW, 446

Occurs in the thallus of the lichen *Cladonia subpityrea*, Sandst. Plates from pet. ether. M.p. 133–4°. Alc. $FeCl_3 \longrightarrow$ violet col.

Me ester: $C_{25}H_{32}O_8$. MW, 460. M.p. 106°.

Asahina, Kusaka, *Ber.*, 1937, **70**, 1820, 1822.

Homopterocarpin



$C_{17}H_{16}O_4$ MW, 284

Colourless constituent of the "Insoluble Red" woods, *e.g.* Red sandalwood (*Pterocarpus santalinus*, Linn.), barwood (*Baphia nitida*, Lodd), etc. Needles from pet. ether. M.p. 88–9°. $[\alpha]_{5461}^{20}$ − 237° in $CHCl_3$. Sublimes at 80°/0·1 mm. Stable towards alkalis but very sensitive towards min. acids. $HNO_3 \longrightarrow$ styphnic acid.

McGookin, Robertson, Whalley, *J. Chem. Soc.*, 1940, 787.

Späth, Schläger, *Ber.*, 1940, **73**, 1.

Humulene.

See α-Caryophyllene.

Hydratropic Aldehyde (1-*Phenylpropionaldehyde*)

$$C_6H_5\cdot CH{<}^{CH_3}_{CHO}$$

$C_9H_{10}O$ MW, 134

B.p. 202–5°, 92–92·5°/12 mm. D_4^{20} 1·0089. n_D^{20} 1·5176. Forms bisulphite comp. $Ag_2O \longrightarrow$ hydratropic acid.

Oxime: b.p. 124°/7 mm.

Semicarbazone: plates from EtOH. M.p. 153–4°.

Benzoylhydrazone: needles from EtOH. M.p. 191–2°.

m-*Nitrobenzoylhydrazone*: yellow cryst. from EtOH. M.p. 156–7°.

I.G., D.R.P. 602,816, (*Chem. Abstracts*, 1935, **29**, 1438).

Claisen, *Ber.*, 1905, **38**, 705.

Tiffeneau, *Ann. chim.*, 1907, **10**, 192.

Hydroferulic Acid.

See under 3 : 4-Dihydroxyhydrocinnamic Acid.

Hydroisoferulic Acid.

See under 3 : 4-Dihydroxyhydrocinnamic Acid.

Hydroumbellic Acid.

See 2 : 4-Dihydroxyhydrocinnamic Acid.

2-Hydroxyacrylic Acid.

See Malonaldehydic Acid.

Hydroxyaminobenzonitrile.

See under Aminosalicylic Acid.

α-Hydroxy-β-aminoethylbenzene (2-*Amino*-1-*phenylethyl alcohol, aminomethylphenylcarbinol*, 2-*hydroxy*-2-*phenylethylamine*, 1-*phenylethanolamine*)

$$C_6H_5\cdot CH(OH)\cdot CH_2NH_2$$

$C_8H_{11}ON$ MW, 137

Needles from EtOH–Et_2O–pet. ether. M.p. about 40°. B.p. 160°/17 mm.

B,HCl: m.p. 176–7° (211°). O-*Benzoyl*: needles from 90% EtOH. M.p. 198°.

B,HI: plates from AcOEt. M.p. 121°.

B_2,H_2PtCl_6: yellow plates from H_2O. M.p. above 260°.

Picrate: leaflets from EtOH. M.p. 157–158·5°. O-*Benzoyl*: yellow cryst. from EtOH. M.p. 166·5–167·5°.

N-*Benzoyl*: leaflets from EtOH. M.p. 148–149·5°. O-*Acetyl*: needles from EtOH.Aq. M.p. 112–13°.

Wolfheim, *Ber.*, 1914, **47**, 1444.
Kolshorn, *Ber.*, 1940, **37**, 2482.
Rosenmund, D.R.P. 244,321, (*Chem. Zentr.*, 1912, I, 961).
Höchst, D.R.P. 193,634, (*Chem. Zentr.*, 1908, I, 430).

β-Hydroxy-α-aminoethylbenzene (2-*Amino-2-phenylethyl alcohol*, 2-*hydroxy*-1-*phenylethylamine*, 2-*phenylethanolamine*)

$$C_6H_5 \cdot CH(NH_2) \cdot CH_2OH$$

$C_8H_{11}ON$ MW, 137

Cryst. M.p. 50–60°. B.p. 261°.
B,HCl: plates from EtOH–AcOEt. M.p. 137–8°, solidifying and remelting about 148°.
O-*Benzoyl*: needles from EtOH. M.p. 154–154·5°. *B,HCl*: needles from H_2O. M.p. 205–205·5°. *Picrate*: needles. M.p. 188–9°.
O:N-*Diacetyl*: cryst. from C_6H_6. M.p. 103°. *Picrate*: prisms from H_2O. M.p. 207°.

Reihlen, Knöpfle, Sapper, *Ann.*, 1938, **534**, 268.
Gabriel, Colman, *Ber.*, 1914, **47**, 1867.

α-Hydroxy-β-aminopropylbenzene.
See Norephedrine *and* Nor-ψ-ephedrine.
Hydroxyaniline.
See Aminophenol.
4-Hydroxybenzophenone-3-carboxylic Acid.
See 5-Benzoylsalicylic Acid.
Hydroxybenzoylethyl Alcohol.
See 4-β-Dihydroxypropiophenone.
α-Hydroxybenzylacetylene.
See Ethinylphenylcarbinol.
1-Hydroxy-2-butylene.
See Crotyl Alcohol.
β-Hydroxy-γ-butyrotrimethylbetaine.
See Carnitine.
4-Hydroxy-3-chloromethylbenzoic Acid.
See α-Chloro-6-hydroxy-*m*-toluic Acid.
Hydroxyconiine.
See Conhydrine *and* ψ-Conhydrine.
Hydroxycycloheptane.
See Cycloheptanol.
2-Hydroxycyclohexanone.
See 2-Cyclohexanolone-1.
4-Hydroxycyclohexanone (4-*Cyclohexanolone*-1).
B.p. 83–5°/0·6 mm.
Acetyl: b.p. 112–14°/11 mm.
Benzoyl: m.p. 63–4°. B.p. 142°/0·02 mm. 2:4-*Dinitrophenylhydrazone*: yellow needles from EtOH–AcOEt. M.p. 161°.
Semicarbazone: m.p. 182°.
2:4-*Dinitrophenylhydrazone*: cryst. from EtOH. M.p. 176°.

Aldersley, Burkhardt, Gillam, Hindley, *J. Chem. Soc.*, 1940, 13.
Dimroth, Schmeil, Daake, *Ber.*, 1942, **75**, 321.

Hydroxycyclopentadecane.
See Cyclopentadecanol.
7-Hydroxy-2:5-diaminoacridine ethyl Ether.
Lactate: Rivanol.

Albert, Gledhill, *J. Soc. Chem. Ind.*, 1942, **61**, 159.

Hydroxydiethylaniline.
See Diethylaminophenol.
8-Hydroxy-6:7-dimethoxycoumarin.
See Fraxidin.
Hydroxydimethylhexahydrobenzoic Acid.
See Dimethylcyclohexanol-carboxylic Acid.
Hydroxydimethylol-α-picoline.
See Adermin.
Hydroxydimethylpyrimidine.
See Dimethylpyrimidone.
α-Hydroxydiphenylethane.
See Phenylbenzylcarbinol.
Hydroxydocosane.
See Docosyl Alcohol.
Hydroxydurene.
See Durenol.
ω-Hydroxyemodin methyl Ether.
See Carviolin.
***N*-[β-Hydroxyethyl]-ethylenediamine**

$$NH_2CH_2 \cdot CH_2 \cdot NH \cdot CH_2 \cdot CH_2OH$$

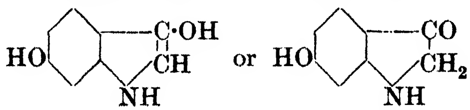
$C_4H_{12}ON_2$ MW, 104

B.p. 238–40°/752 mm. Misc. with H_2O, EtOH. Spar. sol. Et_2O.
Chloroplatinate: yellow cryst. from H_2O. Decomp. at 249°.

Knorr, Brownsdon, *Ber.*, 1902, **35**, 4470.

1-Hydroxyethyl *p*-hydroxyphenyl Ketone.
See 4-β-Dihydroxypropiophenone.
Hydroxyethyl Mercaptan.
See Ethylene Thioglycol.
Hydroxyethylnaphthalene.
See Naphthylethyl Alcohol.

6-Hydroxyindoxyl (3 : 6-*Dihydroxyindole*)



$C_8H_7O_2N$ MW, 149

Dibenzoyl deriv.: prisms from EtOH. M.p. 136–7°.

Tutin, *J. Chem. Soc.*, 1910, **97**, 2515.

2-Hydroxyisobutylamine.
See Amino-*tert.*-butyl Alcohol.

Hydroxyisocarbostyril.
See 1 : 4-Dihydroxyisoquinoline.

2-Hydroxyisopropylamine.
See 2-Aminopropyl Alcohol.

1-Hydroxy-2-mercaptoethane.
See Ethylene Thioglycol.

6-Hydroxy-7-methoxy-1 : 2 : 3 : 4-tetrahydroisoquinoline.
See Salsoline.

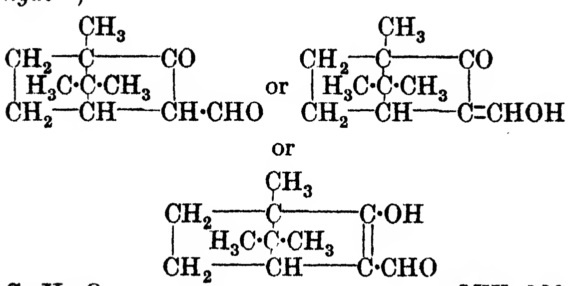
6-Hydroxy-5-methoxytoluquinone.
See Fumigatin.

***p*-[α-Hydroxy-β-methylaminoethyl]-phenol.**
See Sympathol.

3-Hydroxy-3-methyl-1-butine.
See Dimethylethinylcarbinol.

4-Hydroxymethyl-dimethylaniline.
See *p*-Dimethylaminobenzyl Alcohol.

3-Hydroxymethylenecamphor (3-*Formylcamphor*, 3-*aldehydocamphor*, "*camphoraldehyde*")



$C_{11}H_{16}O_2$ MW, 180

d-.

Plates from 30% AcOH. Prisms from pet. ether. M.p. 81–2°. B.p. 251°, 105°/11 mm. Sol. EtOH, Et_2O, C_6H_6, $CHCl_3$, CS_2, hot H_2O, dil. alkalis, aq. NH_3, alkali carbonates. $[\alpha]_D^{20}$ + 198° ⟶ + 187° in EtOH, after 20 hours. Volatile in steam. Alc. $FeCl_3$ ⟶ reddish violet col. Excess alc. $FeCl_3$ ⟶ bluish violet ⟶ blue ⟶ green col. Alk. $KMnO_4$ ⟶ camphoric acid. CrO_3–AcOH ⟶ camphorquinone.

Cu deriv.: $Cu(C_{11}H_{15}O_2)_2 + 2C_{11}H_{16}O_2$. Yellowish green needles from ligroin. M.p. 126°. $Cu(C_{11}H_{15}O_2)_2$: olive green needles. M.p. 166–7°.

Me ether: $C_{12}H_{18}O_2$. MW, 194. Prisms. M.p. 40°. B.p. 262°, 141°/12 mm.

Et ether: $C_{14}H_{20}O_2$. MW, 208. B.p. 269–70°, 147–8°/17 mm.

Phenyl ether: b.p. 214–15°/13 mm.

Benzyl ether: cryst. M.p. 45–6°. B.p. 222–4°/16 mm.

Acetyl: cryst. from pet. ether. M.p. 63–4°.

Imino comp.: $C_{11}H_{17}ON$. Plates from $CHCl_3$–pet. ether. M.p. 164–5°.

Semicarbazone: cryst. from AcOH. M.p. 217–18°.

l-.

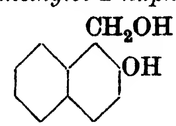
Plates from petrol. M.p. 81–2°. $[\alpha]_D^{20}$ − 195° ⟶ − 185° in EtOH, after 20 hours.

dl-.

Cryst. from pet. ether. M.p. 80–1°.

Rupe, Sieberth, Kussmaul, *Helv. Chim. Acta*, 1920, **3**, 54.
Bishop, Claisen, Sinclair, *Ann.*, 1894, **281**, 331.
Pope, Read, *J. Chem. Soc.*, 1913, **103**, 446.
Palmén, *Chem. Abstracts*, 1930, **24**, 1636.

1-Hydroxymethyl-2-naphthol (ω : 2-*Dihydroxy*-1-*methylnaphthalene*, 2-*hydroxy*-1-*naphthylcarbinol*, 1-*methylol*-2-*naphthol*)



$C_{11}H_{10}O_2$ MW, 174

Needles from $CHCl_3$. M.p. 188–9° decomp. Sol. EtOH. Alc. $FeCl_3$ ⟶ bluish green ⟶ brown col.

2-*Me ether*: $C_{12}H_{12}O_2$. MW, 188. Plates from H_2O. M.p. 100–1°.

Betti, Mundici, *Gazz. chim. ital.*, 1906, **36**, II, 659.
Jacobs, Heidelberger, *J. Biol. Chem.*, 1915, **20**, 671.
Clutterbuck, Cohen, *J. Chem. Soc.*, 1923, **123**, 2510.

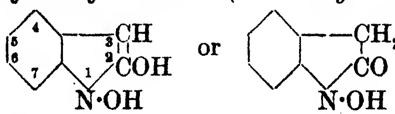
Hydroxy-methylphthalic Acid.
See Coccinic Acid.

4-Hydroxymethyl-γ-resorcylic Aldehyde.
See Barbatol.

2-Hydroxy-1-naphthylcarbinol.
See 1-Hydroxymethyl-2-naphthol.

Hydroxynaphthylenediamine.
See Diaminonaphthol.

N-Hydroxyoxindole (1 : 2-*Dihydroxyindole*)



$C_8H_7O_2N$ MW, 149

Cryst. from H_2O. Mod. sol. AcOH, Me_2CO, hot EtOH. Spar. sol. Et_2O, C_6H_6. Sol. alkalis. $FeCl_3$ ⟶ blue col.

1-*Me ether*: $C_9H_9O_2N$. MW, 163. Cryst. from H_2O. M.p. 88·5°.

1-*Acetyl*: needles from EtOH.Aq. M.p. 101°.

1-*Benzoyl*: cryst. from EtOH. M.p. 124–5°.

Reissert, *Ber.*, 1908, **41**, 3926.

3-Hydroxy-3-phenylallylene.
See Ethinylphenylcarbinol.

Hydroxyphenylethylamine.
See Hydroxyaminoethylbenzene *and* Tyramine.

Hydroxyphenyl hydroxystyryl Ketone.
See Dihydroxychalkone.

Hydroxyphenyl hydroxytolyl Ketone.
See Dihydroxy-methylbenzophenone.

1-*p*-Hydroxyphenylisopropylamine.
See Paredrine.

21-Hydroxyprogesterone.
See Deoxycorticosterone.

5-Hydroxy-2-propylpiperidine.
See ψ-Conhydrine.

Hydroxypropyl-toluene.
See Ethyltolylcarbinol, Methylxylylcarbinol, *and* Tolylpropyl Alcohol.

3-Hydroxy-γ-pyrone.
See Pyromeconic Acid.

Hydroxytetramethylbenzene.
See Durenol, Isodurenol, *and* Prehnitenol.

Hydroxythiophenetole.
See under Thiohydroquinone *and* Thioresorcinol.

Hydroxytoluidine.
See Aminocresol.

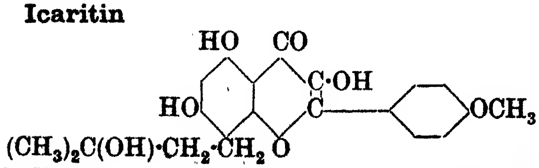
5-Hydroxy-1 : 2 : 3-trimethoxybenzene.
See Antiarol.

2-Hydroxytrimethylenediamine.
See 1 : 3-Diaminoisopropyl Alcohol.

Hydroxyundecane.
See cross references under Undecanol.

I

Icaritin



$C_{21}H_{22}O_7$ MW, 386

Occurs as glycoside icariin in *Epimedium macranthum*. Yellow needles from EtOH. M.p. 239·5°.

Di-Me ether: yellow needles. M.p. 168·5°.

Tri-Me ether: needles from EtOH. M.p. 174°.

Phenylurethane: m.p. 213–14°.

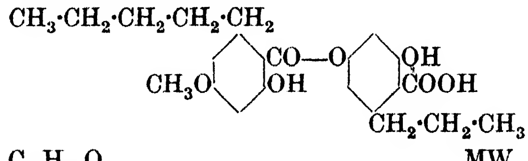
Triacetyl deriv.: needles. M.p. 210–12°.

Tetra-acetyl: needles. M.p. 145–146·5°.

Tetrabenzoyl: m.p. 184°.

Akai, Nakazawa, *J. Pharm. Soc. Japan*, 1935, **55**, 153, 788.
Akai, *ibid.*, 537.

Imbricaric Acid



$C_{23}H_{28}O_7$ MW, 416

Isolated from the lichen, *Parmelia perlata*. Needles from C_6H_6. M.p. 125–6°. Alc. $FeCl_3$ ⟶ violet col.

Me ester: *Di-Me ether*: needles from MeOH. M.p. 86–87·5°.

Asahina, Fujikawa, *Ber.*, 1935, **68**, 634.
Asahina, Yosioka, *Ber.*, 1937, **70**, 1823.

Iminazolylethylamine.
See Histamine.

2-Iminobutyronitrile.
See Diacetonitrile.

Iododecane.
See Decyl iodide.

α-Iododinitrotoluene.
See Dinitrobenzyl iodide.

Iododocosane.
See Docosyl iodide.

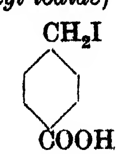
Iodododecane.
See Dodecyl iodide.

Iodohexadecane.
See Cetyl iodide.

7-Iodo-8-hydroxyquinoline-5-sulphonic Acid.
See Loretin.

4-Iodomethyl-benzoic Acid.
See ω-Iodo-*p*-toluic Acid.

ω-Iodo-*p*-toluic Acid (4-*Iodomethylbenzoic acid*, p-*carboxybenzyl iodide*)



$C_8H_7O_2I$ MW, 262

Cryst. from Me_2CO. M.p. 335°.
Nitrile : *see* *p*-Cyanobenzyl iodide.

Knoll, D.R.P. 230,172 (*Chem. Zentr.*, 1911, I, 359).

Iotone.
See 1 : 3-Di-iodoisopropyl Alcohol.

Isoacetoevernone.
See under 4 : 6-Dihydroxy-2-methylacetophenone.

***sec.*-Isoamyl bromide** (3-*Bromoisopentane, 3-bromo-2-methylbutane*)

$(CH_3)_2CH{\cdot}CHBr{\cdot}CH_3$

$C_5H_{11}Br$ MW, 151

B.p. 115·3°. n_D^{20} 1·4454. Readily isomerises.

Michael, Weiner, *J. Org. Chem.*, 1939, **4**, 531.
Walling, Kharasch, Mayo, *J. Am. Chem. Soc.*, 1939, **61**, 2693.

***sec.*-Isoamyl chloride** (3-*Chloroisopentane, 3-chloro-2-methylbutane*)

$(CH_3)_2CH{\cdot}CHCl{\cdot}CH_3$

$C_5H_{11}Cl$ MW, 106·5

B.p. 90–3°. D_{15}^{15} 0·8752.

Aschan, *Chem. Zentr.*, 1918, II, 939.

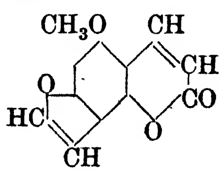
Isoandrosterone.
See trans-Androsterone.

Isoantipyrine.
See 1 : 2-Dimethyl-3-phenylpyrazolone-5.

Isoapocaffeine.
See under Caffolide.

Isoauropten.
See under Auropten.

Isobergapten



$C_{12}H_8O_4$ MW, 216

Coumarin present in roots of *Heracleum sphondylium*, Linn., and *Pimpinella saxifraga.* Cryst. from EtOH. M.p. 222° (217–19°).

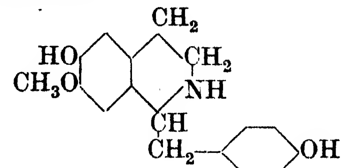
Wessely, Nadler, *Monatsh.*, 1932, **60**, 142.
Späth, Simon, *Monatsh.*, 1936, **67**, 349.
Späth, Kubiczek, *Ber.*, 1937, **70**, 1253.

Isobutyl-*active*-amylcarbinol.
See 2 : 6-Dimethyloctanol-4.

Isobutylisoamylcarbinol.
See 2 : 7-Dimethyloctanol-4.

Isocaryophyllene.
See γ-Caryophyllene.

Isococlaurine



$C_{17}H_{19}O_3N$ MW, 285

Alkaloid occurring to small extent in commercial *Radix pareiræ bravæ.* Plates from MeOH. M.p. 216–17°. MeOH sol. + $FeCl_3$ ⟶ reddish col. Gives Millon reaction. Forms spar. sol. nitrate.

B,HCl : plates + $1H_2O$ from H_2O. M.p. 175–6°. $[\alpha]_{5461}^{20}$ + 23·9° in H_2O.

King, *J. Chem. Soc.*, 1940, 744.

Isoindole.
See 2 : 5-Diphenylpyrazine.

Isolariciresinol.
See under Lariciresinol.

Isolicanic Acid.
See β-Couepic Acid.

Isolobinine

$C_{18}H_{25}O_2N$ MW, 287

Alkaloid from *Lobelia inflata*. Cryst. from Et_2O–pet. ether. M.p. 78°. CrO_3 ⟶ acetic and benzoic acids.

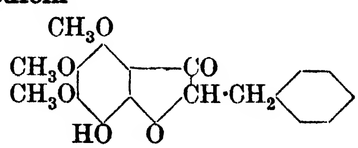
B,HCl : cryst. + $1H_2O$. M.p. 132°, anhyd. 154°. $[\alpha]_D^{20}$ − 76° in H_2O. *Oxime* : m.p. 186°.
Phosphate : m.p. 80°. Decomp. in moist air.

Thomä, *Ann.*, 1939, **540**, 99.

Isonaphthazarin.
See 2 : 3-Dihydroxy-1 : 4-naphthoquinone.

α-Isonitrosophenylacetic Acid.
See under Benzoylformic Acid.

Isopedicin



$C_{18}H_{18}O_6$ MW, 330

Colouring matter of the leaves of *Didymocarpus pedicellata.* Yellow rods and needles from AcOEt–Et_2O. M.p. 105°. Dil. alkalis ⟶ pedicin. Conc. H_2SO_4 ⟶ red col. Alc. $FeCl_3$ ⟶ red ⟶ brown col.

Sharma, Siddiqui, *J. Indian Chem. Soc.*, 1939, **16**, 1.
Salimuzzaman, Siddiqui, *J. Indian Chem. Soc.*, 1937, **12**, 703.

Isopentane-1 : 1-dicarboxylic Acid.
See sec.-Butylmalonic Acid.

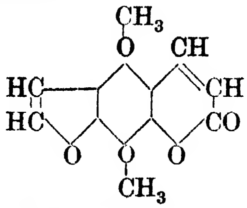
Isopentane-1 : 2′-dicarboxylic Acid.
See 2-Ethylglutaric Acid.

Isopentylamine.
See 4-Amino-2-methyl-*n*-butane.

Isopeonol.
See Isopæonol.

Isophthalic Acid.
Amide-nitrile: *see under m*-Cyanobenzoic Acid.

Isopimpinellin



Suggested structure

$C_{13}H_{10}O_5$ MW, 246

Coumarin present in roots of *Pimpinella saxifraga*, and *Heracleum sphondylium*, Linn. Yellow cryst. from MeOH. M.p. 151° (147–9°).

Wessely, Kallab, *Monatsh.*, 1932, **59**, 168.
Späth, Simon, *Monatsh.*, 1936, **67**, 350.

Isopropanolamine.
See Aminoisopropyl Alcohol.

Isopropenylcarbinol.
See 2-Methylallyl Alcohol.

Isopropenyltoluene.
See Tolylpropylene.

***p*-Isopropylbenzanilide.**
See under p-Cumidine.

4-Isopropyl-*o*-cresol.
See Carvacrol.

4-Isopropyl-*m*-cresol.
See Thymol.

Isopropylcyclopropane - 1 : 2 - dicarboxylic Acid.
See Umbellularic Acid.

Isopropylethinylcarbinol (4 - *Methyl* - 1 - *pentinol*-3)

$(CH_3)_2CH{\cdot}CH(OH){\cdot}C{\vdots}CH$

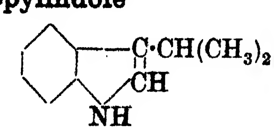
$C_6H_{10}O$ MW, 98

B.p. 131–2°. D_4^{20} 0·8779. n_D^{20} 1·43569.

Krestinski, Kelbowskaja, *Ber.*, 1931, **64**, 2371.
Krestinski, Marjin, *Ber*,, 1927, **60**, 1866.

Isopropylidene chloroiodide.
See 2-Chloro-2-iodopropane.

3-Isopropylindole



$C_{11}H_{13}N$ MW, 159

B.p. 155–60°/20 mm.
Picrate : red needles. M.p. 102–3°.

Cornforth, Robinson, *J. Chem. Soc.*, 1942, 682.

Isopropylisohexylcarbinol.
See 2 : 7-Dimethyloctanol-3.

Isopropyloctylcarbinol (2-*Methylundecanol*-3)

$$CH_3{\cdot}[CH_2]_7{\cdot}CH(OH){\cdot}\overset{\displaystyle CH_3}{\overset{|}{C}H}{\cdot}CH_3$$

$C_{12}H_{26}O$ MW, 186

d-.
B.p. 135°/26 mm. D_4^{20} 0·8327. n_D^{20} 1·4405. $[\alpha]_D^{20}$ + 18·55°, + 21·50° in EtOH.
Hydrogen phthaloyl: needles. M.p. 47–8°. $[\alpha]_D$ + 17·2° in EtOH. *Strychnine salt* : cryst. from Me_2CO. M.p. 174–5°. $[\alpha]_D$ − 19·9° in $CHCl_3$.

dl-.
B.p. 236°.
Hydrogen phthaloyl: cryst. from pet. ether. M.p. 55°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 633.

Isopropyl octyl Ketone (2-*Methylundecanone*-3)

$$CH_3{\cdot}[CH_2]_7{\cdot}CO{\cdot}\overset{\displaystyle CH_3}{\overset{|}{C}H}{\cdot}CH_3$$

$C_{12}H_{24}O$ MW, 184

B.p. 232–5°. D_4^{15} 0·8286.

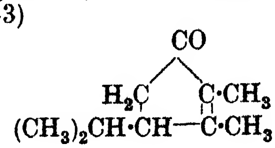
Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 629.

4-Isopropylresorcinol.
See 2 : 4-Dihydroxycumene.

Isopropyltoluene.
See Cymene.

Isopropylveratrol.
See under 3 : 4-Dihydroxycumene.

Isothujone (1 : 2-*Dimethyl*-5-*isopropylcyclopentenone*-3)



$C_{10}H_{16}O$ MW, 152

B.p. 224–8°, 89°/13 mm. n_D^{19} 1·4641. $[\alpha]_D^{18}$ + 12·72°.
Oxime : m.p. 117°.
Semicarbazone : m.p. 155–6°. $[\alpha]_D^{16}$ + 55° in MeOH.

2 : 4-*Dinitrophenylhydrazone* : dark red cryst. M.p. 137·5°. $[\alpha]_D^{16}$ + 31° in $CHCl_3$.

Short, Read, *J. Chem. Soc.*, 1939, 1040.
Guha, Kuppusami, *J. Indian Inst. Sci.*, 1939, **22A**, 249, (*Chem. Abstracts*, 1940, **34**, 3255).

J

Jacobine

$C_{18}H_{25}O_6N$ MW, 351

Alkaloid of common ragwort (*Senecio jacobeae*, Linn.) and of *S. cineraria*, D.C. Plates from EtOH. M.p. 219°. $[\alpha]_D^{17}$ − 46·3° in $CHCl_3$. Hyd. ⟶ retronecine + jaconecic acid, $C_{10}H_{16}O_6$, needles, m.p. 182°.

B,HNO₃ : plates from EtOH. M.p. 234°. $[\alpha]_D^{17}$ − 28·6° in H_2O.

Methiodide : prisms from EtOH. M.p. 255°.

Picrate : needles from EtOH. M.p. 180°.

Barger, Blackie, *J. Chem. Soc.*, 1937, 584.

Jacodine

$C_{18}H_{25}O_5N$ MW, 335

Alkaloid from *Senecio jacobeae*, Linn. Plates from AcOEt. M.p. 217°. $[\alpha]_D^{17}$ − 109·6° in $CHCl_3$. Hyd. ⟶ retronecine + an acid.

Nitrate : m.p. 215°. $[\alpha]_D^{17}$ − 77·4° in H_2O.

Picrate : needles from AcOEt. M.p. 171°.

Barger, Blackie, *J. Chem. Soc.*, 1937, 584.

Jaconine

$C_{18}H_{25}O_8N$ MW, 383

Alkaloid from *Senecio jacobeae*, Linn. Prisms + $1H_2O$ from EtOH.Aq. M.p. 146°. B.p. 180°/0·01 mm.

Barger, Blackie, *J. Chem. Soc.*, 1937, 584.

Jervine

$C_{26}H_{37}O_3N$ MW, 411

Alkaloid of white hellebore (*Veratrum grandiflorum*) and *Veratrum album*. Needles + $2H_2O$ from EtOH.Aq. M.p. 240–1°. $[\alpha]_D^{19}$ − 177·5° in EtOH.

B,HCl : prisms from EtOH. M.p. 308°.

B,CCl₃·COOH : m.p. 243–4°.

Di-p-bromobenzoyl : m.p. 280–2°.

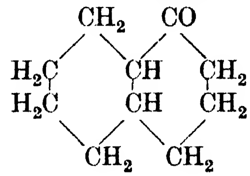
N-*Nitroso* : m.p. 246–7°.

Poethke, *Arch. Pharm.*, 1938, **276**, 170.
Saito, Suginome, Takaoka, *Bull. Chem. Soc. Japan*, 1934, **9**, 15.

K

Ketocyclopentene.
See Cyclopentenone.

1-Ketodecahydronaphthalene (α-*Decalone*)



$C_{10}H_{16}O$ MW, 152

Cis-.

M.p. 2°. B.p. 126°/20 mm. D_4^{20} 1·008. n_D^{20} 1·4936.

Oxime : deriv. of *trans*-form is obtained.

Semicarbazone : m.p. 220–21° decomp.

Trans-.

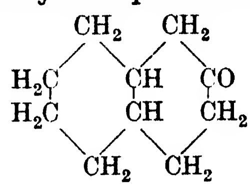
M.p. 33°. B.p. 122°/20 mm. D_4^{20} 0·986. $n_D^{21·5}$ 1·4849.

Oxime : m.p. 168°.

Semicarbazone : m.p. 229–30°.

Hückel, *Ann.*, 1925, **441**, 1.

2-Ketodecahydronaphthalene (β-*Decalone*)



$C_{10}H_{16}O$ MW, 152

Cis-.

M.p. − 14°. B.p. 247°, 128°/26 mm. D_4^{20} 1·0038. n_D^{20} 1·4926.

Oxime : b.p. 161–5°/16 mm.

Semicarbazone : m.p. 182–3° decomp.

Trans-.

M.p. 6°. B.p. 241°, 126°/30 mm., 117°/16 mm. D_4^{20} 0·975. n_D^{19} 1·4809.

Oxime : m.p. 76°.

Semicarbazone : m.p. 192–3° decomp.

Hückel, *Ann.*, 1925, **441**, 1.
Cook, Lawrence, *J. Chem. Soc.*, 1937, 824.

Ketodimethylcaproic Acid.
See 1-Butyrylisobutyric Acid *and* Dimethylacetobutyric Acid.

2-Keto-1-ethylcaproic Acid.
See 1-Butyrylbutyric Acid.

Ketohexahydrobenzoic Acid.
See Cyclohexanone-carboxylic Acid.

Ketomethylcaproic Acid.
See 1-Butyrylpropionic Acid *and* 2-Methyl-3-acetobutyric Acid.

2-Ketohexamethyleneimine.

See under 5-Amino-*n*-caproic Acid.

Kobusine

$C_{20}H_{27}O_2N$ MW, 313

Alkaloid present in *Aconitum sachalinense*, Fr. Schmidt. Prisms or plates from EtOH.Aq. M.p. 268°. $[\alpha]_D^{22}$ + 83·61° in $CHCl_3$. Conc. H_2SO_4 ⟶ yellow col.

B,HBr: cryst. + $1H_2O$. M.p. 285° decomp. $[\alpha]_D^{18}$ + 40·7° in H_2O.

B,HCl: decomp. at 300°. $[\alpha]_D^{21}$ + 41·4° in H_2O.

Perchlorate: m.p. 220° decomp.

Chloroplatinate: prisms from EtOH. Darkens at 262°.

Diacetyl: m.p. 139–40°.

Picrate: yellow cryst. M.p. 277°.

Methiodide: m.p. 287° decomp.

Suginome, Simamonti, *Ann.*, 1940, **545**, 220.

L

Lactucerin.

See under Lactucerol.

α-Lactucerol

$C_{30}H_{50}O$ MW, 426

Occurs as isovalerate in latex of *Calotropis procera* and as acetate in resin (lactucarium) of *Lactuca virosa*. Needles from EtOH. M.p. 224·5°. $[\alpha]_D^{20}$ + 97·5° in $CHCl_3$. Conc. H_2SO_4 + Ac_2O ⟶ red ⟶ violet ⟶ green col.

Acetyl: α-lactucerin. Leaflets. M.p. 252° (239–40°).

Isovaleryl: cryst. from EtOH. M.p. 181°.

Benzoyl: leaflets from MeOH–Me_2CO. M.p. 257°.

Hesse, Eilbracht, Reicheneder, *Ann.*, 1941, **546**, 233.

Bauer, Brunner, *Arch. Pharm.*, 1938, **276**, 605.

β-Lactucerol

$C_{30}H_{50}O$ MW, 426

Occurs as acetate in resin (lactucarium) of *Lactuca virosa*. Needles from Me_2CO. M.p. 178–80°. $[\alpha]_D^{20}$ + 50·8° in $CHCl_3$.

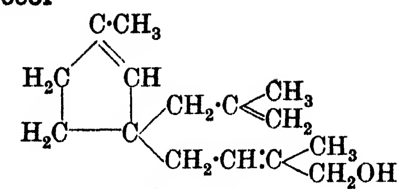
Acetyl: β-lactucerin. Needles from Me_2CO. M.p. 231–2°.

Benzoyl: leaflets from Me_2CO. M.p. 222–4°.

p-*Bromobenzoyl*: leaflets from Me_2CO. M.p. 208–10°.

Bauer, Brunner, *Arch. Pharm.*, 1938, **276**, 605.

Lanceol



Probable constitution

$C_{15}H_{24}O$ MW, 220

Sesquiterpene alcohol from oil of *Santalum lanceolatum*. B.p. 175–6°/17 mm. D_{15}^{15} 0·9474. n_D^{25} 1·5074. $[\alpha]_{5461}$ − 77·4°, $[\alpha]_{5780}$ − 67·8°.

Allophanate: needles from EtOH. M.p. 114–15°.

Bradfield, Francis, Penfold, Simonsen, *J. Chem. Soc.*, 1936, 1619.

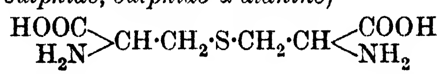
Lanigerin

$C_{17}H_{14}O_5$ MW, 298

Pigment from wax of the woolly aphis (*Erisoma lanigerum*). Orange plates from Et_2O. M.p. 274–6° decomp. Et_2O and AcOH ⟶ orange-red sols. with green fluor.

Blount, *J. Chem. Soc.*, 1936, 1034.

Lanthionine (ββ′-*Diamino*-ββ′-*dicarboxydiethyl sulphide, sulphido-α-alanine*)



$C_6H_{12}O_4N_2S$ MW, 208

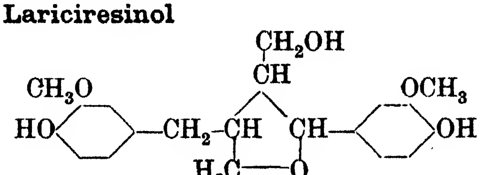
Product of hydrolysis of wool. Softens at 270°. Decomp. at 304°.

Dibenzoyl: m.p. 205–6°.

Horn, Jones, Ringel, *J. Biol. Chem.*, 1941, **138**, 141.

Vigneaud, Brown, *ibid.*, 151.

Lariciresinol



$C_{20}H_{24}O_6$ MW, 360

Constituent of the wound resin of the European larch (*Larix decidua*). Needles from MeOH. M.p. 167–8°. Alc. $FeCl_3$ ⟶ green col. H·COOH or HCl–MeOH ⟶ isolariciresinol, m.p. 112°.

Di-Me ether: prisms from Et_2O. M.p. 79–80°. $[\alpha]_D^{14}$ + 22° in Me_2CO.

Di-Et ether: prisms from MeOH. M.p. 103–4°.

Haworth, Kelly, *J. Chem. Soc.*, 1937, 384, 1645.

Haworth, Woodcock, *J. Chem. Soc.*, 1939, 1054.

Lauryl-.
See Dodecyl-.

Lentine.
See Doryl.

Lepidic Acid.
See 4-Methylquinolinic Acid.

Lepidine-sulphonic Acid.
See 4-Methylquinoline-sulphonic Acid.

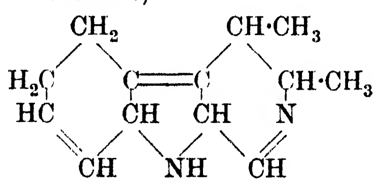
Leprotene

$C_{40}H_{54}$ MW, 534

From acid fast lepra bacteria. Copper-red needles from C_6H_6–MeOH. M.p. 198–200°. Contains 12 double bonds. Similar absorption maxima to β-carotene.

Grundmann, Takeda, *Naturwiss.*, 1937, **25**, 27.
Takeda, Ohta, *Z. physiol. Chem.*, 1941, **267**, 171; 1939, **258**, 6.

Leptocladine (4 : 5-*Dimethyl*-4 : 5 : 6 : 7-*tetrahydro*-3-*carboline*)



$C_{13}H_{18}N_2$ MW, 200

Alkaloid from *Arthrophytum leptocladum*, M. Pop. Rectangular plates. M.p. 109–10°. Sol. most org. solvents. Insol. H_2O. Gives red Ehrlich reaction.

B,HCl: needles. M.p. 234–5° decomp.

B_2,H_2PtCl_6: orange cryst. M.p. 197–8° decomp.

N-*Benzoyl*: m.p. 132–3°.

Monopicrate: two forms. (*a*) Prepared in acid sols. m.p. 94–114°. (*b*) Prepared in EtOH, m.p. 176–7°.

Dipicrate: cryst. from Me_2CO. M.p. 181–2°.

Methiodide: cryst. from MeOH. M.p. 227–8°.

Yurashevskii, *J. Gen. Chem. U.S.S.R.*, 1939, **9**, 545; 1941, **11**, 157.

Leucodrin

$C_{15}H_{16}O_8$ MW, 324

Occurs in *Leucodendron concinnum*, *L. adscendens*, and *L. Stokoei*. Prisms from H_2O. M.p. 212–212·5°. $[\alpha]_D^{17}$ − 19·2° in 40% EtOH.Aq.

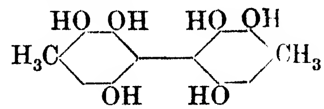
Tetra-acetyl: prisms from AcOH. M.p. 191–2°.

Mono-Me ether: $C_{16}H_{18}O_8$. MW, 338. Cryst. + H_2O. M.p. anhyd. 174–5°. $[\alpha]_D^{15}$ − 19·9° in 40% EtOH.Aq. *Monoacetyl*: needles from AcOH.Aq. M.p. 102–3°.

Tetra-Me ether: $C_{19}H_{24}O_8$. MW, 380. Prisms from EtOH. M.p. 123–4°.

Rapson, *J. Chem. Soc.*, 1938, 282; 1939, 1085; 1940, 1271.

Leucophenicin (2 : 3 : 6 : 2′ : 3′ : 6′-*Hexahydroxy*-4 : 4′-*ditolyl*)



$C_{14}H_{14}O_6$ MW, 278

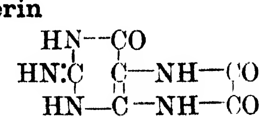
Produced by *Penicillium rubrum* grown on beer wort. Needles from H_2O. M.p. 247° decomp.

Hexa-acetyl: prisms from AcOH. M.p. 202–3°.

Tetrabenzoyl: needles from AcOEt. M.p. 212–14°. Alc. $FeCl_3$ ⟶ reddish brown col.

Posternak, *Helv. Chim. Acta*, 1938, **21**, 1332.

Leucopterin



$C_6H_5O_3N_5$ MW, 195

Wing pigment of many butterflies, *e.g. Pieris brassicae*, *Euchloe cardamines*, *Gonopteryx rhamni*, etc. Forms yellow Na and Ag salts and spar. sol. NH_4 salt. Dil. alk. sols. show blue fluor. HCl at 160–70° ⟶ NH_2·CH_2·COOH + NH_3 + CO_2 + CO. Gives murexide test but colour is different from that given by uric acid.

Purrmann, *Ann.*, 1941, **548**, 284.
Schöpf, *Naturwiss.*, 1940, **28**, 478.
Wieland, Purrmann, *Ann.*, 1940, **544**, 163, 182.
Fromherz, Kotzschmar, *Ann.*, 1938, **534**, 283.
Wieland, Kotschmar, *Ann.*, 1937, **530**, 152.
Schöpf, Becker, *Ann.*, 1936, **524**, 55, **124**; 1933, **507**, 266.
Wieland, Metzger, Schöpf, Bülow, *Ann.*, 1933, **507**, 226.

Leucotylin

$C_{30}H_{52}O_3$ MW, 460

Isolated from *Parmelia leucotyliza*, Nyl. Prisms from MeOH. M.p. 333°. Sol. Py. Mod. sol. EtOH, $CHCl_3$, C_6H_6. Spar. sol. Et_2O. $[\alpha]_D^{24}$ + 49·43° in Py. Liebermann reaction ⟶ orange red ⟶ olive green col.

Diacetyl: cryst. powder from AcOH.Aq. M.p. 240°.

Asahina, Akagi, *Ber.*, 1938, **71**, 982.

Licanic Acid.
See Couepic Acid.

Limonin (*Evodin, obaculactone, dictamnolactone, citrolimonin*)

$C_{26}H_{30}O_8$ MW, 470

Dilactone isolated from bark of *Phellodendron amurense*, Rupr., from fruit of species of *Evodia*, from *Dictamnus albus*, Linn., from pulp and seeds of Valencia orange, and from seeds of several varieties of citrus. Colourless plates from EtOH. M.p. 297–8° decomp. Sol. Me_2CO, $CHCl_3$, AcOH. Insol. H_2O, Et_2O, pet. ether. $[\alpha]_D^{20.5}$ − 129° in Me_2CO, $[\alpha]_D^{20.5}$ + 32·6° in alc. KOH (0·5*N*). Conc. $H_2SO_4 \longrightarrow$ intense reddish brown sol.

Schechter, Haller, *J. Am. Chem. Soc.*, 1940, **62**, 1307.

β-Linalolene.

See 3 : 7-Dimethyl-1 : 6-octadiene.

Linderic Acid (4-*Dodecenoic acid*, 4-*undecylene*-1-*carboxylic acid*)

$CH_3\cdot[CH_2]_5\cdot CH{:}CH\cdot[CH_2]_3\cdot COOH$

$C_{12}H_{22}O_2$ MW, 198

Constituent of oil of Tohaku nuts (*Lindera obtusiloba*). M.p. 1–1·3°. B.p. 170–2°/13 mm. D_4^{20} 0·9081. n_D^{20} 1·4529. 0·5% $KMnO_4 \longrightarrow$ dihydroxylauric acid, m.p. 102°.

p-*Bromophenacyl ester*: m.p. 47·5°.

p-*Phenylphenacyl ester*: m.p. 42·5°.

S-*Benzylthiuronium salt*: m.p. 139°.

Komori, Ueno, *Bull. Chem. Soc. Japan*, 1937, **12**, 433.

Linoleyl Alcohol (9 : 12-*Octadecadienol*-1)

$CH_3\cdot[CH_2]_4\cdot CH{:}CH\cdot CH_2\cdot CH{:}CH\cdot[CH_2]_7\cdot CH_2OH$

$C_{18}H_{34}O$ MW, 266

M.p. − 5 to − 2°. B.p. 148–50°/1 mm. D_4^{20} 0·8612. n_D^{20} 1·4782.

p-*Nitrophenylurethane*: cryst. from MeOH. M.p. 91–2°.

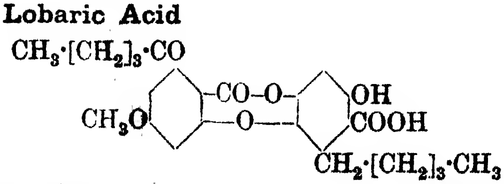
Tetrabromide: cryst. from hexane. M.p. 87·5–88°.

Kass, Miller, Burr, *J. Am. Chem. Soc.*, 1939, **61**, 482.

Kass, Burr, *J. Am. Chem. Soc.*, 1940, **62**, 1796.

Turpeinen, *J. Am. Chem. Soc.*, 1938, **60**, 56.

Lobaric Acid



$C_{25}H_{28}O_8$ MW, 456

Occurs in several of the Lichen species *Stereocaulon*. Needles from EtOH. M.p. 192°. Optically inactive. Hyd. $\longrightarrow$ acid, m.p. 183°.

Me ester: needles from MeOH. M.p. 122°.

Me ether: needles from MeOH. M.p. 102°.

Acetyl: needles from EtOH. M.p. 186°.

Oxime: needles from AcOH. M.p. 193°.

Asahina, Yasue, *Ber.*, 1936, **69**, 643.

Asahina, Nonomura, *Ber.*, 1935, **68**, 1698.

Lobinaline

$C_{28}H_{38}ON_2$ MW, 418

Alkaloid of *Lobelia cardinalis*, Linn. Cryst. from Et_2O. M.p. 94–5°. $[\alpha]_D^{24}$ + 22·3° in $CHCl_3$. Depresses blood pressure.

B,HCl: cryst. + $5H_2O$. M.p. 220°.

Manske, *Can. J. Res.*, 1938, **16B**, 445.

Longilobine

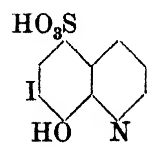
$C_{18}H_{23}O_5N$ MW, 333

Alkaloid of *Senecio longilobus*. M.p. 217–18° decomp. $[\alpha]_D^{25}$ − 79·2° in 95% EtOH. Hyd. $\longrightarrow$ retronecine + longinecic acid, $C_{10}H_{14}O_5$, m.p. 126–9°.

Methiodide: m.p. 249°.

Manske, *Can. J. Res.*, 1939, **17B**, 1.

Loretin (7-*Iodo*-8-*hydroxyquinoline*-5-*sulphonic acid*)



$C_9H_6O_4NIS$ MW, 351

Yellow plates. Decomp. about 260°. Spar. sol. H_2O, EtOH. Prac. insol. Et_2O, $CHCl_3$, C_6H_6. Disinfectant.

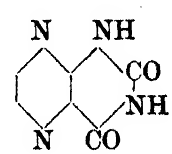
Claus, *Arch. Pharm.*, 1893, **231**, 706.

Cohn, *J. prakt. Chem.*, 1911, **83**, 503.

Loturine.

See Harman.

Lumazin



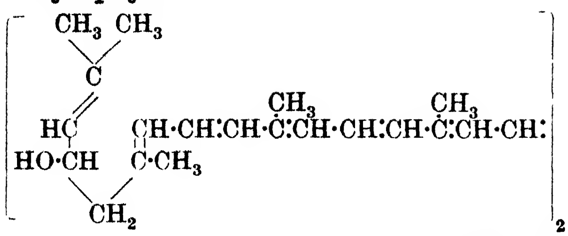
$C_6H_4O_2N_4$ MW, 164

Yellow needles from H_2O. M.p. above 350°. Bluish green fluor. in neutral aq. sol. Green fluor. in alk. sol. Blue fluor. in acid sol.

Kühling, *Ber.*, 1895, **28**, 1968.

Kuhn, Cook, *Ber.*, 1937, **70**, 761.

Lycophyll



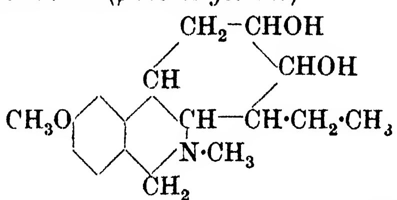
$C_{40}H_{56}O_2$ MW, 568

Accompanies lycopene in the fruits of various members of the *Solanaceae*, especially *S. dulcamara* (nightshade). Violet red needles or leaflets from C_6H_6–MeOH or C_6H_6-pet. ether. M.p. 179° corr. Absorption maxima at 5460, 5060 and 4720 Å. in CS_2.

Dipalmitate: violet red micro-needles from C_6H_6–MeOH. M.p. 76° corr.

Zechmeister, Cholnoky, *Ber.*, 1936, **69**, 422.

Lycoramine (*ψ-Homolycorine*)



$C_{17}H_{25}O_3N$ MW, 291

Alkaloid from *Lycoris radiata*. M.p. 120–1°. Sol. H_2O, EtOH, Me_2CO, $CHCl_3$. Insol. pet. ether. $[\alpha]_D^{27}$ − 98·2° in $CHCl_3$.

Perchlorate: prisms from H_2O. M.p. 138–9°.

Chloroplatinate: yellow plates + $1H_2O$ from H_2O. Decomp. at 245°.

Monoacetyl: m.p. 88°.

Diacetyl: needles from EtOH. M.p. 95°.

Picrate: m.p. 108–9°.

Methosulphate: m.p. 165–7°.

Methiodide: prisms from H_2O. Decomp. at 308°.

Kondo, Ishiwata, *Ber.*, 1937, **70**, 2427; *J. Pharm. Soc. Japan*, 1938, **58**, 1, 13.
Kondo, Tomisuura, Ishiwata, *J. Pharm. Soc. Japan*, 1932, **52**, 433.

Lycorenine

$C_{18}H_{21(23)}O_4N$ MW, 315 (317)

Alkaloid of *Lycoris radiata* Herb. Prisms from Me_2CO. M.p. 202°. $[\alpha]_D^{24}$ + 179·56° in EtOH ($[\alpha]_D^{25}$ + 125·14° in EtOH). Sol. most org. solvents except pet. ether.

B,HCl: decomp. at 146–7°.

B,H_2PtCl_6: decomp. at 210°.

B,$HAuCl_4$: decomp. at 116°.

Diacetyl: m.p. 183–4°.

Picrate: decomp. at 162°.

Kondo, Tomimura, Ishiwatari, *J. Pharm. Soc. Japan*, 1932, **52**, 51.
Kondo, Mitsuhashi, *J. Pharm. Soc. Japan*, 1934, **54**, 196.

Lycoxanthin

Formula as for lycophyll with $>CH_2$ in place of one $>CHOH$.

$C_{40}H_{56}O$ MW, 552

Accompanies lycopene in the fruits of various members of the *Solanaceae*, especially *S. dulcamara* (nightshade). Reddish brown plates from C_6H_6–MeOH. M.p. 168° corr. Absorption maxima at 5470, 5070, 4730 Å. in CS_2.

Acetyl: violet red needles from C_6H_6–MeOH. M.p. 137° corr.

Zechmeister, Cholnoky, *Ber.*, 1936, **69**, 422.

M

M & B 693.

See Sulphapyridine.

Magnolamine

$C_{20}H_{23}O_4N$ MW, 341

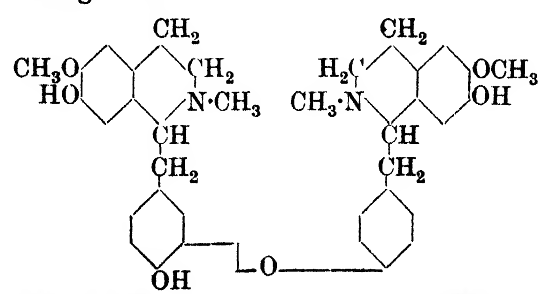
Phenolic alkaloid from *Magnolia fuscata*. Needles from C_6H_6. M.p. 117–19°. Sol. EtOH, $CHCl_3$, alkalis. $[\alpha]_D$ + 111·6° in EtOH.

Picrate: yellow micro-cryst. from EtOH. M.p. 142–5° decomp.

Picrolonate: yellow powder from EtOH. M.p. 163–4°.

Proskournina, Orechoff, *Bull. soc. chim.*, 1938, 5, 1357.

Magnoline



$C_{36}H_{40}O_6N_2$ MW, 590

Alkaloid from *Magnolia fuscata*. Micro-cryst. from C_6H_6 or EtOH. M.p. 178–9°. Spar. sol.

most org. solvents. Sol. alkalis. $[\alpha]_D$ $-9{\cdot}6°$ in Py.

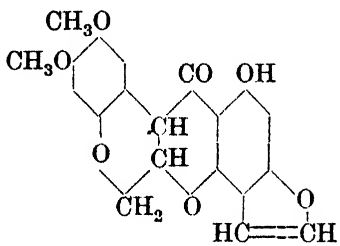
Tri-Me ether: m.p. 109–10°.

Picrate: yellow micro-cryst. powder from EtOH. M.p. 160–2° decomp.

Picrolonate: yellow micro-cryst. powder from EtOH. M.p. 190° decomp.

Proskournina, Orechoff, *Bull. soc. chim.*, 1938, 5, 1357; *J. Gen. Chem. U.S.S.R.*, 1940, 10, 707.

Malaccol



$C_{20}H_{16}O_7$ MW, 368

l-.

Occurs in *Derris malaccensis* (Kinta type). Yellow prisms or needles from $CHCl_3$–EtOH. M.p. 225°, solidifying and remelting at 244°. Spar. sol. EtOH, Me_2CO, C_6H_6. $[\alpha]_D^{18}$ $+190°$ in $CHCl_3$.

Oxime: needles from MeOH. Decomp. at 240°.

dl-.

Pale yellow needles from $CHCl_3$–EtOH. M.p. 249°.

Oxime: plates from isobutyl alcohol. Decomp. at 270°.

Harper, *J. Chem. Soc.*, 1941, 878; 1940, 309.

Maleic Semi-aldehyde (*Formylacrylic acid*)

HC·COOH
HC·CHO

$C_4H_4O_3$ MW, 100

Needles from Et_2O–C_6H_6. M.p. 55°. B.p. 145°/10 mm. slight decomp. Very sol. H_2O, EtOH, Et_2O. Spar. sol. $CHCl_3$, C_6H_6. Insol. ligroin.

Et ester: 2 : 4-*dinitrophenylhydrazone*, m.p. 290–2°.

Oxime: cryst. from Et_2O. M.p. 130–40° decomp.

Phenylhydrazone: citron yellow needles. M.p. 158–9°.

Fecht, *Ber.*, 1905, **38**, 1272.

Malonaldehydic Acid (*Formylacetic acid, aldehydoacetic acid, 2-hydroxyacrylic acid, malonic semi-aldehyde*)

$OHC{\cdot}CH_2{\cdot}COOH$
or
HO·CH:CH·COOH

$C_3H_4O_3$ MW, 88

Neither the free acid nor its methyl or ethyl esters have been isolated.

Nitrile: *see* Cyanoacetaldehyde.

Oxime: *see* Isonitrosopropionic Acid.

Semicarbazone: m.p. 116° decomp.

Me ester diethyl acetal: methyl 2 : 2-diethoxypropionate. $C_8H_{16}O_4$. MW, 176. B.p. 193°.

Et ester: *oxime*, m.p. 57–9°. *Semicarbazone*: m.p. 147–8°.

Et ester diethyl acetal: ethyl 2 : 2-diethoxypropionate. $C_9H_{18}O_4$. MW, 190. B.p. 93°/22 mm.

Rinkes, *Rec. trav. chim.*, 1927, **46**, 273.
Straus, Voss, *Ber.*, 1926, **59**, 1681.
Claisen, *Ber.*, 1903, **36**, 3666.
Wohl, Emmerich, *Ber.*, 1900, **33**, 2763.

Malonic Semi-aldehyde.

See Malonaldehydic Acid.

Malvidin chloride.

3-β-*Glucoside*: *see* Oenin chloride.

Maniladiol

$C_{30}H_{50}O_2$ MW, 442

Mono-unsaturated triterpene di-secondary glycol occurring in *Manila elĕmi* resin. Needles from MeOH.Aq. M.p. 220–1°. $[\alpha]_D^{19}$ $+68°$ in $CHCl_3$.

Diformyl: needles from EtOH. M.p. 191–2°. $[\alpha]_D^{19}$ $+84°$ in $CHCl_3$.

Diacetyl: needles from MeOH. M.p. 193–4°. $[\alpha]_D^{20}$ $+80°$ in $CHCl_3$.

Dibenzoyl: needles from EtOH. M.p. 233–4°. $[\alpha]_D^{17}$ $+63{\cdot}5°$ in $CHCl_3$.

Morice, Simpson, *J. Chem. Soc.*, 1940, 795; 1942, 198.

Marrubiin

$C_{20}H_{28}O_4$ MW, 332

Diterpene lactone from *Marrubium vulgare*. Cryst. from EtOH. M.p. 160°. B.p. 200°/15 mm. Heat with Se ⟶ 1 : 2 : 5-trimethylnaphthalene. Hyd. with alc. NaOH ⟶ marrubic acid, m.p. 205° decomp.

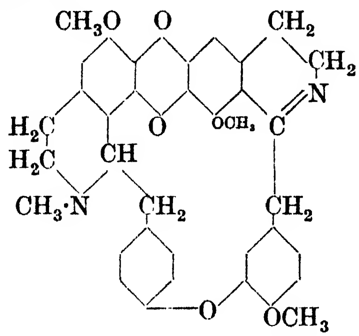
Mercier, Mercier, *Compt. rend.*, 1932, **195**, 1102.
Hollis, Richards, Robertson, *Nature*, 1939, **143**, 604.
Lawson, Eustice, *J. Chem. Soc.*, 1939, 587.

Meletin.
See Quercetin.

Menaphthyl Alcohol.
See Naphthylcarbinol.

Menaphthyl bromide.
See 1-Bromomethyl-naphthalene.

Menisarine



Probable constitution

$C_{36}H_{34}O_6N_2$ MW, 590

Alkaloid isolated from *Cocculus sarmentosus*, Diels. M.p. 208° (164°). Sol. most org. solvents except pet. ether.

B,HCl: decomp. at 279°.
B,2HBr: decomp. at 285°.
Dimethiodide: decomp. at 269–70°.

Kondo, Tomita, *J. Pharm. Soc. Japan*, 1930, **50**, 633; 1935, **55**, 637, 911.

Menisine

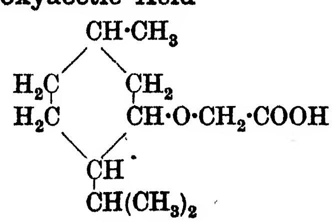
$C_{38}H_{42}O_6N_2$ MW, 622

Alkaloid from the Chinese drug, mu-fang-chi. Isomeric with tetrandrine. Needles + $1H_2O$. M.p. 127°, anhyd. 152°. $[\alpha]_D^{20}$ + 290° in $CHCl_3$. Heat at 150° ⟶ tetrandrine.

B,HCl: amorphous powder. M.p. about 260°.
Hydrogen phosphate: prisms. M.p. 280°.
Methiodide: prisms. M.p. 263° decomp.

Chon, *Chinese Journal of Physiology*, 1935, **9**, 267, (*Chem. Abstracts*, 1936, **30**, 471).

Menthoxyacetic Acid



$C_{12}H_{22}O_3$ MW, 214

l-.

Cryst. from Et_2O. M.p. 35° (53–4°). B.p. 171°/11 mm. $[\alpha]_D^{20}$ − 92·9° in MeOH. Chloride is extensively used for the resolution of organic bases.

Me ester: $C_{13}H_{24}O_3$. MW, 228. B.p. 131°/8 mm.

Propyl ester: $C_{15}H_{28}O_3$. MW, 256. B.p. 172°/26 mm. $[\alpha]_D^{20}$ − 91·5°.

Allyl ester: b.p. 182°/40 mm. $[\alpha]_D^{15}$ − 93·0°.

β-*Naphthyl ester*: cryst. from EtOH. M.p. 108–109·5°. $[\alpha]_D^{25}$ − 84·4° in Me_2CO.

Chloride: $C_{12}H_{21}O_2Cl$. MW, 232·5. B.p. 124–30°/8·5 mm. $[\alpha]_D^{13}$ − 84·8° in $CHCl_3$.

Amide: $C_{12}H_{23}O_2N$. MW, 213. Needles from petrol. M.p. 94–5°.

Propylamide: b.p. 188–9°/16 mm. $[\alpha]_D^{20}$ − 75·96°.

p-*Nitroanilide*: cryst. from EtOH. M.p. 106°. $[\alpha]_D^{25}$ − 69·0° in Me_2CO.

d-.

Cryst. M.p. 35°. B.p. 168–71°/8 mm. $[\alpha]_D^{20}$ + 94·1° in EtOH.

dl-.

B.p. 168°/9·5 mm.

Read, Grubb, *J. Soc. Chem. Ind.*, 1932, **51**, 329.
Holmes, Adams, *J. Am. Chem. Soc.*, 1934, **56**, 2093.
Frankland, O'Sullivan, *J. Chem. Soc.*, 1911, **99**, 2329.

Mepacrine.
See Atebrin.

Mercaptoaminopropionic Acid.
See Cysteine.

Mercaptoaminobutyric Acid.
See Homocysteine.

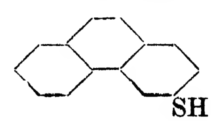
Mercaptododecane.
See Dodecyl Mercaptan.

Mercaptoethyl Alcohol.
See Ethylene Thioglycol.

Mercaptoisopentane.
See *active*-Amyl Mercaptan, *tert.*-Amyl Mercaptan, *and* Isoamyl Mercaptan.

Mercaptonaphthylamine.
See Aminothionaphthol.

3-Mercaptophenanthrene (3-*Thiolphenanthrene*)



$C_{14}H_{10}S$ MW, 210

Plates from EtOH. M.p. 112–13°. B.p. 205–10°/2 mm. Oxidised in alk. sol. by air or I ⟶ diphenanthryl-3-disulphide, m.p. 165°.

Me ether: $C_{15}H_{12}S$. MW, 224. Needles. M.p. 100°. B.p. 240°/12 mm.

Acetyl: needles from pet. ether. M.p. 93°.
Benzoyl: needles from pet. ether. M.p. 115°.

Field, *J. Chem. Soc.*, 1915, **107**, 1215.

Mercaptotoluidine.
See Aminothiocresol.
Mesityl Alcohol.
See 3 : 5-Dimethylbenzyl Alcohol.
Mesityl chloride.
See Chloromesitylene.
Mesoapocamphoric Acid.
See under Apocamphoric Acid.
Mesobenzanthrone.
See Benzanthrone.
Mesylethylamine.
See Methylsulphonylethylamine.
Mesylmethylamine.
See Methylsulphonylmethylamine.
Methane-tricarboxylic Acid.
Di-Et ester-nitrile: *see* Diethyl cyanomalonate.
7-Methoxy-5-[γ-hydroxypropyl]-2-[3′:4′-methylenedioxyphenyl]-coumarone.
See Egonol.
Methoxy-methylenedioxy-allylbenzene.
See Croweacin *and* Myristicin.
2-Methoxysafrol.
See Croweacin.
Methoxythioanisole.
See under Thiocatechol *and* Thiohydroquinone.
Methylallene.
See 1 : 2-Butadiene.
1-Methylallyl Alcohol.
See Methylvinylcarbinol.
2-Methylallyl Alcohol (*Isopropenylcarbinol*)

$$CH_2{:}C(CH_3)\cdot CH_2OH$$

C_4H_8O MW, 72

B.p. 114°. D_{20}^{20} 0·8524. n_D^{25} 1·4232. Forms azeotrope with water, b.p. 92°, containing 59·8% of the alcohol.
Formyl: b.p. 103°. n_D^{20} 1·4135.
Acetyl: b.p. 124° (120–3°). D_{20}^{20} 0·9239. n_D^{20} 1·4129.
Propionyl: b.p. 142°. D_{20}^{20} 0·9143. n_D^{20} 1·4170.
Butyryl: b.p. 161°. D_{20}^{20} 0·895. n_D^{20} 1·4230.
Isobutyryl: b.p. 152·5°.
Benzoyl: b.p. 120°/50 mm.
Cinnamoyl: b.p. 145–53°/8 mm.

Schales, *Ber.*, 1937, **70**, 119.
Ryan, Shaw, *J. Am. Chem. Soc.*, 1940, **62**, 3469.

3-Methylallyl Alcohol.
See Crotyl alcohol.
4-[β-Methylaminoethyl]-catechol.
See Epinine.

3-[ω-Methylaminoethyl]-indole.
See *N*-Methyltryptamine.
3-Methylaminopentane (N-*Methyl*-sec.-n-*amylamine*)

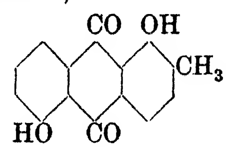
$$\begin{matrix}CH_3\cdot CH_2\\CH_3\cdot CH_2\end{matrix}\!\!>CH\cdot NHCH_3$$

$C_6H_{15}N$ MW, 101

B.p. 106–7°.
Hydrogen oxalate: m.p. 142–3°.

Skitá, Keil, Havemann, *Ber.*, 1933, **66**, 1410.

Methyl-aminophenyl-benzthiazole.
See Dehydrothiotoluidine.
2-Methylamino-1-phenylpropane.
See Pervitin.
Methyl aminotolyl sulphide.
See under Aminothiocresol.
***N*-Methyl-*sec.n*-amylamine.**
See 3-Methylaminopentane.
***N*-Methylanhalamine.**
See Anhalidine.
2-Methylanthrarufin (1 : 5-*Dihydroxy*-2-*methylanthraquinone*)

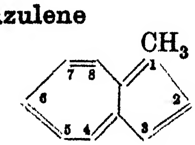


$C_{15}H_{10}O_4$ MW, 254

Orange brown needles from AcOH. M.p. 190° (187°).
Di-Me ether: $C_{17}H_{14}O_4$. MW, 282. Cryst. from AcOH. M.p. 176–7°.
Diacetyl: yellow needles from Ac_2O. M.p. 230° (220°).

Mitter, Biswas, *J. Indian Chem. Soc.*, 1928, **5**, 769.
Marriott, Robinson, *J. Chem. Soc.*, 1934, 1634.
Sibata, *J. Pharm. Soc. Japan*, 1940, **60**, 510.

1-Methylazulene



$C_{11}H_{10}$ MW, 142

Dark blue liq.
Picrate: cryst. from EtOH. M.p. 134–5°.
sym.-*Trinitrobenzene add.comp.*: black needles from EtOH. M.p. 160–61°.

Plattner, Wyss, *Helv. Chim. Acta*, **1941**, **24**, 483.

2-Methylazulene.
M.p. 47–8°.
Picrate: black needles from EtOH. M.p. 130–1°.
sym.-*Trinitrobenzene add. comp.*: dark brown needles from EtOH. M.p. 140–1°.

Plattner, Wyss, *Helv. Chim. Acta*, 1941, **24**, 483.

4-Methylazulene.
Blue oil.
Picrate: black needles from EtOH. M.p. 144°.
sym.-*Trinitrobenzene add. comp.*: black needles from EtOH. M.p. 177–8°.

Pfau, Plattner, *Helv. Chim. Acta*, 1936, **19**, 876.

5-Methylazulene.
Blue oil.
Picrate: black needles from EtOH. M.p. 110·5°.
sym.-*Trinitrobenzene add. comp.*: brownish black needles from EtOH. M.p. 151·5°.

Plattner, Roniger, *Helv. Chim. Acta*, 1942, **25**, 594.

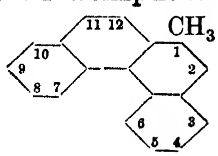
α-Methylbenzhydrol.
See 1 : 1-Diphenylethyl Alcohol.

Methylbenzoylacetic Acid.
See 1-Benzoylpropionic Acid.

1-Methyl-2-benzoylpropionic Acid.
See 2-Benzoylisobutyric Acid.

Methyl-1′ : 2′-benzphenanthrene.
See Methylchrysene.

1-Methyl-3′ : 4′-benzphenanthrene



$C_{19}H_{14}$ MW, 242

Cubes from EtOH. M.p. 77·8°. B.p. 210°/0·4 mm.
Picrate: red needles from EtOH. M.p. 112–13°.

Hewett, *J. Chem. Soc.*, 1940, 297.

2-Methyl-3′ : 4′-benzphenanthrene.
Leaflets from EtOH. M.p. 70·4–71°.
Picrate: vermilion needles from C_6H_6–EtOH. M.p. 141·8–143·2°.

Newman, Joshel, *J. Am. Chem. Soc.*, 1940, **62**, 973.
Hewett, *J. Chem. Soc.*, 1936, 599.

6-Methyl-3′ : 4′-benzphenanthrene.
Plates from EtOH. M.p. 80–1°.
Picrate: vermilion needles from MeOH. M.p. 118–118·5°.

Hewett, *J. Chem. Soc.*, 1938, 1289.

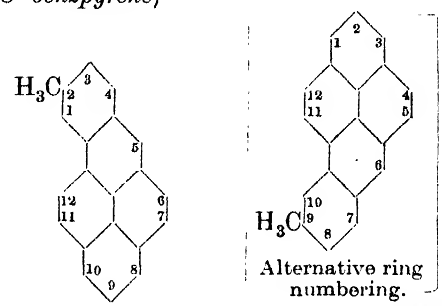
7-Methyl-3′ : 4′-benzphenanthrene.
Needles from EtOH. M.p. 54–54·5°.
Picrate: vermilion needles from EtOH. M.p. 134–134·5°.

Hewett, *J. Chem. Soc.*, 1938, 1289.

8-Methyl-3′ : 4′-benzphenanthrene.
Plates from EtOH. M.p. 65–6°.
Picrate: red needles from EtOH. M.p. 107–8°.

Hewett, *J. Chem. Soc.*, 1938, 1289.

2-Methyl-1′ : 2′-benzpyrene (9-*Methyl-7′ : 8′-benzpyrene*)



$C_{21}H_{14}$ MW, 266

Pale yellow needles from MeOH. M.p. 138–9°. Remelts at 140–140·2°.
Picrate: brown needles from C_6H_6–ligroin. M.p. 184–5°.
sym.-*Trinitrobenzene add. comp.*: red plates from C_6H_6–ligroin. M.p. 211·5–212°.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, **60**, 1664.

3-Methyl-1′ : 2′-benzpyrene (8-*Methyl-7′ : 8′-benzpyrene*).
Greenish yellow needles from EtOH–Et_2O. M.p. 147·6–148·1°.
Picrate: brownish red needles from C_6H_6 ligroin. M.p. 179·5–180°.
sym.-*Trinitrobenzene add. comp.*: red needles from C_6H_6–ligroin. M.p. 210·5–211°.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, **60**, 1665.

4-Methyl-1′ : 2′-benzpyrene (7-*Methyl-7′ : 8′-benzpyrene*).
Yellow plates. M.p. 217·5–218°.
Picrate: purple brown needles from C_6H_6. M.p. 203–4°.

Fieser, Fieser, *J. Am. Chem. Soc.*, 1935, **57**, 783.

5-Methyl-1′ : 2′-benzpyrene (*6-Methyl-7′ : 8′-benzpyrene*).

Yellow plates from Et_2O–EtOH. M.p. 215·7–216·2°.

Picrate: purple black needles from benzene–ligroin. M.p. 207–8°.

sym.-*Trinitrobenzene add. comp.*: red needles from C_6H_6–ligroin. M.p. 230–1°.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, **60**, 2547.

6-Methyl-1′ : 2′-benzpyrene (*5-Methyl-7′ : 8′-benzpyrene*).

Yellow needles from C_6H_6–ligroin. M.p. 171–171·5°.

Picrate: bronze coloured needles from C_6H_6–ligroin. M.p. 181·5–182·5°.

sym.-*Trinitrobenzene add. comp.*: red needles from C_6H_6–ligroin. M.p. 209–10°.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1938, **60**, 2547.

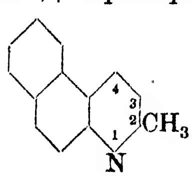
9-Methyl-1′ : 2′-benzpyrene (*2-Methyl-7′ : 8′-benzpyrene*).

Yellow needles from hexane. M.p. 146·8–148°.

sym.-*Trinitrobenzene add. comp.*: red needles from C_6H_6–ligroin. M.p. 218·5–219·5°.

Fieser, Novello, *J. Am. Chem. Soc.*, 1940, **62**, 1857.

2-Methyl-5′ : 6′-benzquinoline (*2-Methyl-β-naphthaquinoline, β-naphthaquinaldine*)



$C_{14}H_{11}N$ MW, 193

Needles from EtOH, plates from Et_2O. M.p. 82–3°. B.p. 214–15°/21 mm. Sol. EtOH, Et_2O. Spar. sol. H_2O. Spar. volatile in steam.

Picrate: needles from AcOH.Aq. M.p. 224° decomp. Spar. sol. boiling H_2O.

Methiodide: yellow needles from H_2O. M.p. 241–7° decomp. Spar. sol. H_2O, boiling EtOH.

Kozlov, *J. Gen. Chem. U.S.S.R.*, 1938, **8**, 419.
Doebner, Felber, *Ber.*, 1894, **27**, 2021.
I.G., F.P. 739,880 (*Chem. Abstracts*, 1933, **27**, 2164).

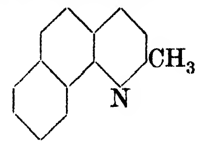
4-Methyl-5′ : 6′-benzquinoline (*4-Methyl-β-naphthaquinoline, β-naphthalepidine*).

Cryst. M.p. 91–2°. Conc. acid sol. ⟶ green fluor. ⟶ blue on dilution.

Picrate: cryst. from EtOH. M.p. 230–1°.

Knorr, *Ber.*, 1884, **17**, 544.

2-Methyl-7′ : 8′-benzquinoline (*2-Methyl-α-naphthaquinoline, α-naphthaquinaldine*)



$C_{14}H_{11}N$ MW, 193

B.p. 324–6°. D_4^{20} 1·1464. n_D^{20} 1·6738.

Picrate: m.p. 226° decomp. (186–7° decomp.).

Doebner, Miller, *Ber.*, 1884, **17**, 1711.
Kozlov, *J. Gen. Chem. U.S.S.R.*, 1938, **8**, 419.

Methylbutanol.
See active-Amyl Alcohol *and tert.*-Amyl Alcohol.

Methylbutylacetylene.
See 2-Heptine.

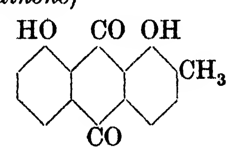
Methylbutylisobutylcarbinol.
See 2 : 4-Dimethyloctanol-4.

Methyl *tert.*-butyl sulphide.
See under tert.-Butyl Mercaptan.

2-Methyl-3-carboline.
See Harman.

Methyl-β-chloroethylaniline.
See under N-β-Chloroethylaniline.

2-Methylchrysazin (*1 : 8-Dihydroxy-2-methylanthraquinone*)



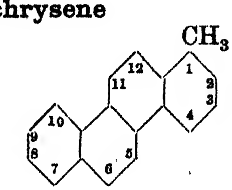
$C_{15}H_{10}O_4$ MW, 254

M.p. 175°.

Diacetyl: m.p. 205°.

Sibata, *J. Pharm. Soc. Japan*, 1940, **60**, 510.

1-Methylchrysene



$C_{19}H_{14}$ MW, 242

Leaflets from hexane, C_6H_6 or toluene. M.p. 254–5° corr. in vac. (249·5–250°).

sym.-*Trinitrobenzene add. comp.*: yellow needles from C_6H_6. M.p. 174–6°.

Bachmann, Struve, *J. Org. Chem.*, 1940, **5**, 423.
Ruzicka, Markus, *Helv. Chim. Acta*, 1940, **23**, 387.

2-Methylchrysene.
Leaflets from C_6H_6–EtOH. M.p. 224·5–225·5°.
Picrate: yellow needles from EtOH. M.p. 3–146°.

Bachmann, Struve, *J. Org. Chem.*, 1939, **4**, 460.

3-Methylchrysene.
Leaflets from C_6H_6–pet. ether. M.p. 170–170·5°.
Picrate: orange needles from EtOH. M.p. 164–164·5°.

Bachmann, Struve, *J. Org. Chem.*, 1940, **5**, 427.

4-Methylchrysene.
Highly fluor. colourless plates from C_6H_6–EtOH. M.p. 151–151·5° (149–149·5°).
Picrate: two forms. (*a*) Red needles from C_6H_6–ligroin. M.p. 135–135·5°, remelting at 137·5–138°. (*b*) Orange needles from C_6H_6–ligroin. M.p. 137·5–138°. Changes to red form on standing in contact with mother liquor.

Bachmann, Struve, *J. Org. Chem.*, 1939, **4**, 461; 1940, **5**, 428.
Fieser, Johnson, *J. Am. Chem. Soc.*, 1939, **61**, 1654.

5-Methylchrysene.
Needles from C_6H_6–EtOH. M.p. 117·2–117·8°. Brilliant bluish violet fluor. in UV. light.
Picrate: orange red needles from EtOH. M.p. 142·6–143°.
sym.-*Trinitrobenzene add. comp.*: orange needles from C_6H_6–EtOH. M.p. 172·6–173·6°.

Fieser, Joshel, *J. Am. Chem. Soc.*, 1940, **62**, 1214.
Newman, *J. Am. Chem. Soc.*, 1940, **62**, 873.

6-Methylchrysene.
Fluor. needles from AcOEt–EtOH. M.p. 161–161·4° (159–159·8°).
Picrate: orange needles from C_6H_6–EtOH. M.p. 170–170·6° (169·8–170·2°).
sym.-*Trinitrobenzene add. comp.*: yellow needles from C_6H_6–EtOH. M.p. 189·8–190·6° (188·5–189·5°).

Fieser, Joshel, Seligman, *J. Am. Chem. Soc.*, 1939, **61**, 2138.
Newman, *J. Am. Chem. Soc.*, 1938, **60**, 2950.

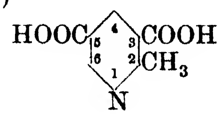
2-Methylcrotonaldehyde.
See 2 : 2-Dimethylacrolein.

Methyl cyclopentyl Ketone.
See Acetocyclopentane.

***N*-Methyl-2-[3 : 4-dihydroxyphenyl]-ethylamine.**
See Epinine.

Methyl dihydroxytolyl Ketone.
See Dihydroxymethylacetophenone.

2-Methyldinicotinic Acid (*α-Picoline-β : β′-dicarboxylic acid, 2-methylpyridine-3 : 5-dicarboxylic acid*)



$C_8H_7O_4N$ MW, 181

Needles + $1H_2O$ from H_2O. M.p. anhyd. 245–50° decomp. $KMnO_4$ ⟶ pyridine-2:3:5-tricarboxylic acid.

Weber, *Ann.*, 1887, **241**, 9.

4-Methyldinicotinic Acid.
Needles from H_2O. M.p. 282–4° decomp.; turns yellow at 250°. Mod. sol. EtOH. Spar. sol. Et_2O, $CHCl_3$.

Wolff, *Ann.*, 1902, **322**, 377.

Methyldiphenylcarbinol.
See 1 : 1-Diphenylethyl Alcohol.

Methyldiphenylitaconic Acid.
See 1 : 1-Diphenyl-1-butylene-2 : 3-dicarboxylic Acid.

Methyl dodecyl Ketone (*Tetradecanone*-2)

$CH_3\cdot[CH_2]_{11}\cdot CO\cdot CH_3$

$C_{14}H_{28}O$ MW, 212

Cryst. from EtOH.Aq. M.p. 33–4°. B.p. 205–6°/100 mm.

Majima, Nakamura, *Ber.*, 1915, **48**, 1603.
Morgan, Holmes, *J. Soc. Chem. Ind.*, 1925, **44**, 108T.

Methylenedi-2-naphthol.
See 2 : 2′-Dihydroxy-1 : 1′-dinaphthylmethane.

6 : 7-Methylenedioxycoumarin.
See Ayapin.

Methylethinylcarbinol (1-*Butinol*-3)

$CH_3\cdot CH(OH)\cdot C\vdots CH$

C_4H_6O MW, 70

B.p. 106·5–107·5°. D^{20} 0·8858. n_D^{20} 1·4265.

Kreimeier, U.S.P. 2,106,181, (*Chem. Abstracts*, 1938, **32**, 2547).
McCallum, U.S.P. 2,125,384, (*Chem. Zentr.*, 1938, II, 3005).
Lespieau, *Bull. soc. chim.*, 1926, **39**, 991.

Methylethylacetophenone.
See sec.-Butyl phenyl Ketone.

2-Methyl-3-ethylbutane.
See 2 : 3-Dimethylpentane.

2-Methyl-3-ethyl-1-butylene.
See 2 : 3-Dimethyl-1-pentene.

Methylethylethinylcarbinol (3-*Methyl*-1-*pentinol*-3)

$$CH_3{\cdot}CH_2{\cdot}\overset{CH_3}{C}(OH){\cdot}C{:}CH$$

$C_6H_{10}O$ MW, 98

B.p. 120–1°, 78°/150 mm. D_4^{20} 0·8688. n_D^{20} 1·4310.

Campbell, Campbell, Eby, *J. Am. Chem. Soc.*, 1938, **60**, 2882.
Thompson, Burr, Shaw, *J. Am. Chem. Soc.*, 1941, **63**, 186.
Coffmann, *Organic Syntheses*, XX, 41.

Methylethylisohexylcarbinol.
See 3 : 7-Dimethyloctanol-3.

Methylethylpyrrole.
N-*Me* : *see* Dimethylethylpyrrole.

Methylgentisic Acid.
See Dihydroxytoluic Acid.

2-Methylglucose methylglucoside.
See 1 : 2-Dimethylglucose.

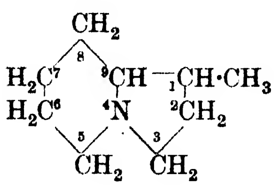
1-Methylglyceric Acid.
See 1 : 2-Dihydroxyisobutyric Acid.

3-Methylheptandione-2 : 6.
See 1 : 3-Diacetobutane.

Methyl-*p*-hydroxybenzoylcarbinol.
See 4 : β-Dihydroxypropiophenone.

Methyl-hydroxymethylnaphthalene.
See Methylnaphthylcarbinol.

1-Methylindolizidine (1-*Methyloctahydropyrrocoline*)



$C_9H_{17}N$ MW, 139

B.p. 62°/11 mm.
Picrate : lemon yellow prisms from EtOH. M.p. 191° decomp.
Picrolonate : pale brown prisms. M.p. 198° decomp.

Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1523.

2-Methylindolizidine.
B.p. 71–2°/26 mm. $D_4^{10\cdot5}$ 0·8837. n_D 1·4668.
B,HBr : cryst. M.p. 164°.
B,HAuCl₄ : prisms from EtOH.Aq. M.p. 106°.
Picrate : m.p. 161–2°.
Methiodide : m.p. 227°.

Ochiai, Tsuda, *Ber.*, 1934, **67**, 1013.

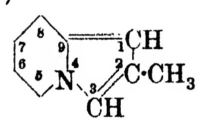
3-Methylindolizidine.
B.p. 168–9°, 81°/40 mm., 32–5°/1 mm.
B,HBr : decomp. at 292°.
B,$HAuCl_4$: cryst. from EtOH-HCl. M.p. 145–6°.
B,$HgCl_2$: m.p. 221°.
Picrate : yellow clusters. M.p. 197°.
Picrolonate : pale brown prisms. M.p. 208°.
Methiodide : plates from AcOEt. M.p. 311–12°.

Ochiai, Tsuda, *Ber.*, 1934, **67**, 1013.
Clemo, Morgan, Raper, *J. Chem. Soc.*, 1935, 1743.
Clemo, Metcalfe, Raper, *J. Chem. Soc.*, 1936, 1429.
Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1518.
Diels, Schrum, *Ann.*, 1937, **530**, 78.

5-Methylindolizidine.
B.p. 79°/15 mm.
Chloroplatinate : orange. Softens at 170°. Decomp. at 220°.
Picrate : two forms. Both in yellow needles from H_2O. M.p. 235° decomp. and 196° decomp.

Lions, Willison, *J. Proc. Roy. Soc. N.S. Wales*, 1940, **73**, 240.

2-Methylindolizine (2-*Methylpyrrocoline*, 2-*methylpyrindole*)



C_9H_9N MW, 131

Cryst. M.p. 59–60°. B.p. 95°/9 mm. Sol. most org. solvents. Very volatile in steam and in air. Gives deep blue ppt. with I in conc. $NaHCO_3$. Intense red pine splinter reaction. Fusion with oxalic acid ⟶ green mass, sol. H_2O.

Tschitschibabin, *Ber.*, 1927, **60**, 1615.
Kondo, Osawa, *J. Pharm. Soc. Japan*, 1936, **56**, 73.

3-Methylindolizine.
B.p. 230°. Sol. most org. solvents. Prac. insol. H_2O. Unstable in air. Gives intense red pine splinter reaction. Fusion with oxalic acid ⟶ violet mass, sol. H_2O.

Tschitschibabin, Stepanow, *Ber.*, 1930, **63**, 471.

Methylisopropenylbenzene.
See Tolylpropylene.

Methylisopropyl-*n*-amylcarbinol.
See 2 : 3-Dimethyloctanol-3.

2-Methyl-5-isopropylanisic Acid.
See under p-Thymotinic Acid.

Methylisopropylbutylcarbinol.
See 2 : 3-Dimethylheptanol-3.

Methylisopropylcyclohexenone.
See Carvenone *and* Menthone.

1-Methyl-4-isopropylcyclopentene.
See Apofenchene.

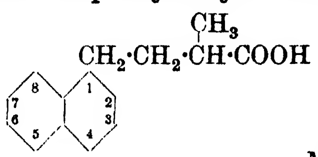
6-Methylisovanillin.
See under 4 : 5-Dihydroxy-*o*-toluic Aldehyde.

Methyl-lepidine.
See Dimethylquinoline.

Methylnaphthaquinoline.
See Methylbenzquinoline.

Methylnaphthohydroquinone.
See Dihydroxy-methylnaphthalene.

1-Methyl-3-α-naphthylbutyric Acid



$C_{15}H_{16}O_2$ MW, 228

Prisms from pet. ether–Et_2O. M.p. 90°.

Haworth, *J. Chem. Soc.*, 1932, 1132.

3-Methyl-3-α-naphthylbutyric Acid (3-α-*Naphthylvaleric acid*).
Plates from C_6H_6–pet. ether. M.p. 78–80°.

Bachmann, Edgerton, *J. Am. Chem. Soc.*, 1940, **62**, 2221.

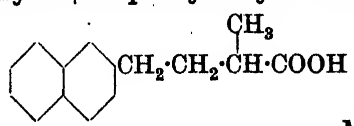
3-[5-Methyl-α-naphthyl]-butyric Acid.
Needles from MeOH. M.p. 128–9°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 458.

3-[6-Methyl-α-naphthyl]-butyric Acid.
Cryst. from Et_2O. M.p. 116–18° corr.
Me ester : b.p. 160°/2 mm.

Orcutt, Bogert, *J. Am. Chem. Soc.*, 1941, **63**, 130.

1-Methyl-3-β-naphthylbutyric Acid



$C_{15}H_{16}O_2$ MW, 228

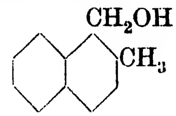
Needles from pet. ether. M.p. 85–6°.

Haworth, *J. Chem. Soc.*, 1932, 1132.

3-[6-Methyl-α-naphthyl]-butyric Acid.
Plates from MeOH. M.p. 111–12°.

Haworth, Letsky, Mavin, *J. Chem. Soc.*, 1932, 1787.

2-Methyl-1-naphthylcarbinol (2-*Methyl-1-hydroxymethylnaphthalene*)



$C_{12}H_{12}O$ MW, 172

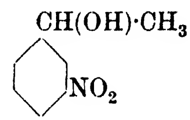
Cryst. from EtOH–C_6H_6. M.p. 136–7°.
Phenylurethane : cryst. M.p. 127–8°.

Ziegler, Tiemann, *Ber.*, 1922, **55**, 3410.

4-Methyl-1-naphthylcarbinol (4-*Methyl-1-hydroxymethylnaphthalene*).
Needles from C_6H_6. M.p. 74–5°. Sol. EtOH, Et_2O. Spar. sol. pet. ether.
Phenylurethane : needles from C_6H_6 or EtOH.Aq. M.p. 103°.

See previous reference.

Methyl-*m*-nitrophenylcarbinol (1-m-*Nitrophenylethyl alcohol,* m-*nitro-α-hydroxyethylbenzene*)



$C_8H_9O_3N$ MW, 167

Cryst. from EtOH. M.p. 62·5°.

Lund, *Ber.*, 1937, **70**, 1524.

Methyl-*p*-nitrophenylcarbinol (1-p-*Nitrophenylethyl alcohol,* p-*nitro-α-hydroxyethylbenzene*).
B.p. 158°/16 mm.
Acetyl : b.p. 161–3°/16 mm.
Phenylurethane : m.p. 205–6°.

v. Braun, Bartsch, *Ber.*, 1913, **46**, 3053.

2-Methylnonanol-2.
See Dimethylheptylcarbinol.

2-Methylnorharman.
See Harman.

Methyloctahydropyrrocoline.
See Methylindolizidine.

2-Methyloctanol-4.
See Butylisobutylcarbinol.

1-Methylol-2-naphthol.
See 1-Hydroxymethyl-2-naphthol.

3-Methylpentane-1 : 1-dicarboxylic Acid.
See active-Amylmalonic Acid.

3-Methyl-1-pentine.
See sec.n-Butylacetylene.

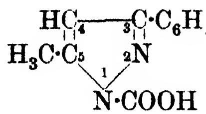
Methylpentinol.
See Methylethylethinylcarbinol *and* Isopropylethinylcarbinol.

2-Methyl-1-phenylbutanol-1.
See sec.-Butylphenylcarbinol.

Methylphenylbutyric Acid.
See Dimethylhydrocinnamic Acid.

***N*-Methyl-1-phenylisopropylamine.**
See Pervitin.

5-Methyl-3-phenylpyrazole-1-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

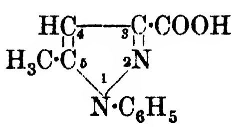
Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Prisms. M.p. 61·5–62°.
Et ester: $C_{13}H_{14}O_2N_2$. MW, 230. M.p. 73·5–74·5°. B.p. 193°/10 mm.
Chloride: $C_{11}H_9ON_2Cl$. MW, 220·5. Needles from pet. ether. M.p. 94°.
Amide: $C_{11}H_{11}ON_3$. MW, 201. Needles from H_2O. M.p. 157–8° (154–6°). Sol. EtOH, Et_2O, hot H_2O.

Auwers, Dietrich, *J. prakt. Chem.*, 1934, **139**, 65.
Auwers, Stuhlmann, *Ber.*, 1926, **59**, 1051.

3-Methyl-5-phenylpyrazole-1-carboxylic Acid.
Et ester: needles from pet. ether. M.p. 65–6°.

Auwers, Dietrich, *J. prakt. Chem.*, 1934, **139**, 65.

5-Methyl-1-phenylpyrazole-3-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

Prisms or needles from H_2O. M.p. hydrated 106°, anhyd. 136°. Sol. EtOH, Et_2O. Spar. sol. H_2O.
Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Plates. M.p. 55–6°.
Chloride: $C_{11}H_9ON_2Cl$. MW, 220·5. Needles from ligroin. M.p. 85°. B.p. 187°/40 mm., 115–45°/15 mm. Sol. EtOH, $CHCl_3$, C_6H_6. Spar. sol. Et_2O, pet. ether.
Amide: $C_{11}H_{11}ON_3$. MW, 201. Cryst. from EtOH. M.p. 146°. Very sol. H_2O.
Anilide: $C_{17}H_{15}ON_3$. MW, 277. Needles from EtOH. M.p. 138°.

Rojahn, Seitz, *Ann.*, 1924, **437**, 300.
Claisen, Roosen, *Ann.*, 1894, **278**, 278.

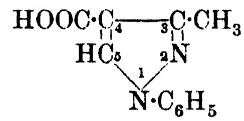
1-Methyl-4-phenylpyrazole-3-carboxylic Acid.
Leaflets from EtOH. M.p. 132°.
Me ester: cryst. from C_6H_6. M.p. 122–3°.

Auwers, Ungenach, *Ber.*, 1933, **66**, 1692.

1-Methyl-5-phenylpyrazole-3-carboxylic Acid.
Cryst. + H_2O from H_2O. M.p. 84–6°, anhyd. 143–4°. Sol. EtOH, Et_2O, hot H_2O. Spar. sol. C_6H_6.

Auwers, Mausolf, *Ber.*, 1927, **60**, 1733.

3-Methyl-1-phenylpyrazole-4-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

Needles. M.p. 194–5° (192·5–193°). Insol. H_2O. At 230° ⟶ CO_2 and 3-methyl-1-phenylpyrazole.

Bülow, *Ber.*, 1900, **33**, 3269.
Balbiano, *Gazz. chim. ital.*, 1898, **28**, i, 387.

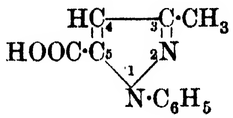
5-Methyl-1-phenylpyrazole-4-carboxylic Acid.
Leaflets and prisms from H_2O. M.p. 167–8°. Sol. EtOH, Et_2O. Very spar. sol. cold H_2O, ligroin. Rapid dist. ⟶ CO_2 + 5-methyl-1-phenylpyrazole.
Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Prisms from 80% MeOH. M.p. 71°.
Et ester: $C_{13}H_{14}O_2N_2$. MW, 230. Plates from ligroin. M.p. 55–6°.
Chloride: $C_{11}H_9ON_2Cl$. MW, 220·5. Needles from ligroin. M.p. 147°. B.p. 260–70°/25 mm.
Anhydride: $C_{22}H_{18}O_3N_4$. MW, 386. Cryst. from C_6H_6. M.p. 156°.
Anilide: cryst. from EtOH–C_6H_6. M.p. 182°.
p-*Toluidide*: needles from EtOH. M.p. 177°.
α-*Naphthalide*: needles from EtOH. M.p. 168°.
β-*Naphthalide*: needles from EtOH. M.p. 170°.

Rojahn, Fahr, *Ann.*, 1923, **434**, 263.
Claisen, *Ann.*, 1897, **295**, 313.
Dains, Brown, *J. Am. Chem. Soc.*, 1909, **31**, 1156.

3-Methyl-5-phenylpyrazole-4-carboxylic Acid.
Needles from EtOH. M.p. 260–5°.

Sjollema, *Ann.*, 1894, **279**, 251.

3-Methyl-1-phenylpyrazole-5-carboxylic Acid



$C_{11}H_{10}O_2N_2$ MW, 202

Needles from H_2O. M.p. 189–90°.

Me ester: $C_{12}H_{12}O_2N_2$. MW, 216. Needles from MeOH.Aq. M.p. 65–6°.

Chloride: $C_{11}H_9ON_2Cl$. MW, 220·5. M.p. 39–41°. B.p. 160–4°/17 mm.

Amide: $C_{11}H_{11}O_2N_3$. MW, 201. Prisms from MeOH.Aq. M.p. 181°.

Claisen, Roosen, *Ann.*, 1894, **278**, 288.
Rojahn, Seitz, *Ann.*, 1924, **437**, 304.

1-Methyl-3-phenylpyrazole-5-carboxylic Acid.

Cryst. from 33% EtOH. M.p. 183–4°. Sol. EtOH, Et_2O. Spar. sol. C_6H_6, hot H_2O.

Auwers, Ungemach, *Ber.*, 1933, **66**, 1693.

1-Methyl-4-phenylpyrazole-5-carboxylic Acid.

Cryst. from MeOH. M.p. 210–11° decomp. Sol. Me_2CO. Mod. sol. MeOH, EtOH. Spar. sol. H_2O, Et_2O, C_6H_6. Difficult to esterify.

Me ester: cryst. from pet. ether. M.p. 69°.

Et ester: $C_{13}H_{14}O_2N_2$. MW, 230. Prisms from pet. ether. M.p. 52·5–53·5°.

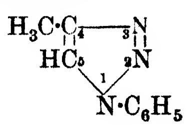
Auwers, Ungemach, *Ber.*, 1933, **66**, 1692.

4 - Methyl - 3(5) - phenylpyrazole - 5(3) - carboxylic Acid.

Yellowish brown powder + $1H_2O$ from EtOH. M.p. anhyd. 234–6° decomp. Sol. EtOH, Me_2CO. Very spar. sol. H_2O.

Auwers, Cauer, *Ann.*, 1929, **470**, 301.

4-Methyl-1-phenyl-1 : 2 : 3-triazole



$C_9H_9N_3$ MW, 159

Leaflets from ligroin. M.p. 81°.

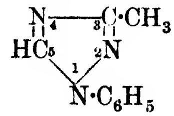
Bertho, *Ber.*, 1925, **58**, 862.

5-Methyl-1-phenyl-1 : 2 : 3-triazole.

Leaflets from pet. ether. M.p. 64°. Spar. sol. H_2O. Difficultly volatile in steam. Weak base.

Dimroth, *Ber.*, 1902, **35**, 1033.

3-Methyl-1-phenyl-1 : 2 : 4-triazole



$C_9H_9N_3$ MW, 159

Prisms from H_2O. M.p. 86·5–87°. B.p. 274°. Sol. H_2O, hot pet. ether. Difficultly volatile in steam.

Picrate: needles from EtOH. M.p. 171°.

Ethobromide: prisms from EtOH.Aq. M.p. 222–4°. Insol. Et_2O. Antipyretic.

Methiodide: plates. M.p. 185–6° part. decomp.

Ethiodide: prisms from H_2O or EtOH. M.p. 181–2°. Sol. H_2O, EtOH. Spar. sol. Et_2O. Antipyretic.

Bamberger, Frei, *Ber.*, 1902, **35**, 749.
Pellizzari, *Gazz. chim. ital.*, 1911, **41**, 33.

5-Methyl-1-phenyl-1 : 2 : 4-triazole.

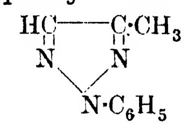
B.p. 275°.

$B_2,H_2PtCl_6,2H_2O$: yellow plates. M.p. 129° (122–4° decomp.).

Picrate: prisms from EtOH. M.p. 146°.

Pellizzari, *Gazz. chim. ital.*, 1911, **41**, 34.
Bamberger, *Ber.*, 1911, **44**, 3564.

3-Methyl-1-phenyl-1 : 2 : 5-triazole

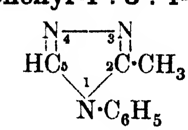


$C_9H_9N_3$ MW, 159

B.p. 242°, 149–50°/60 mm. D_4^{17} 1·1071.

Pechmann, *Ann.*, 1891, **262**, 279.

2-Methyl-1-phenyl-1 : 3 : 4-triazole



$C_9H_9N_3$ MW, 159

Plates + $1H_2O$. M.p. 68°, anhyd. 112°.

B_2,H_2PtCl_6: plates. M.p. 206°.

Picrate: cryst. from EtOH. M.p. 134°.

Pellizzari, *Gazz. chim. ital.*, 1911, **41**, 41.

1-Methyl-2-phenyl-1 : 3 : 4-triazole.

Needles from Et_2O. M.p. 112–13°. Sol. EtOH, hot H_2O, hot Et_2O, dil. acids.

Young, Oates, *J. Chem. Soc.*, 1901, **79**, 668.

2-Methyl-5-phenyl-1 : 3 : 4-triazole.

Needles from C_6H_6. M.p. 164·5°. Sol. dil. HCl.

Hydrochloride : m.p. 230°.
Picrate : m.p. 158°.

Heller *et al.*, *J. prakt. Chem.*, 1929, **120**, 62.

Methylpropenylbenzene.
See Tolylpropylene.

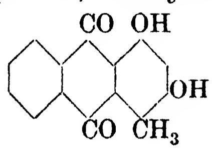
Methylpropylisoamylcarbinol.
See 4 : 7-Dimethyloctanol-4.

Methylpropylisobutylcarbinol.
See 2 : 4-Dimethylheptanol-4.

Methylprotocatechuic Acid.
See Dihydroxytoluic Acid.

Methylprotocatechuic Aldehyde.
See Dihydroxytoluic Aldehyde.

4-Methylpurpuroxanthin (1 : 3-*Dihydroxy-4-methylanthraquinone*, 4-*methylxanthopurpurin*)

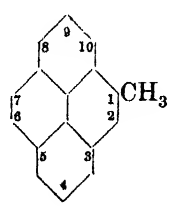


$C_{15}H_{10}O_4$ MW, 254

Orange cryst. from C_6H_6. M.p. 265–6° (251°).
Di-Me ether : $C_{17}H_{14}O_4$. MW, 282. Yellow needles from $CHCl_3$. M.p. 162°.
Diacetyl : yellow needles from AcOH. M.p. 181–2° (176·5°).

Mitter, Sen, Paul, *Chem. Abstracts*, 1928, **22**, 2562.
Stouder, Adams, *J. Am. Chem. Soc.*, 1927, **49**, 2045.

1-Methylpyrene



$C_{17}H_{12}$ MW, 216

Leaflets from EtOH. M.p. 147·5–148·5°.
Picrate : red needles from EtOH. M.p. 226–7°.

Bachmann, Edgerton, *J. Am. Chem. Soc.*, 1940, **62**, 2973.

3-Methylpyrene.
Plates from EtOH. M.p. 71–2°. Conc. H_2SO_4 ⟶ yellow sol. with green fluor.; on warming ⟶ olive green sol. with violet fluor.
Picrate : brownish red needles from C_6H_6. M.p. 211–12°.

Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, **531**, 112.

4-Methylpyrene.
Flakes from EtOH. M.p. 143–143·5°. Conc. H_2SO_4 ⟶ orange sol. with green fluor.; on warming ⟶ yellow sol. with violet fluor.

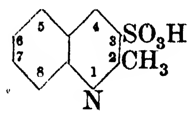
Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, **531**, 142.

Methylpyridine-dicarboxylic Acid.
See Methylcinchomeronic Acid, Uvitonic Acid, Methylquinolinic Acid *and* Methyldinicotinic Acid.

Methylpyrindole.
See Methylindolizine.

Methylpyrrocoline.
See Methylindolizine.

2-Methylquinoline-3-sulphonic Acid (*Quinaldine-3-sulphonic acid*)



$C_{10}H_9O_3NS$ MW, 223

Needles from H_2O. M.p. above 270°.
Chloride : pale yellow needles from petrol. M.p. 121°.

Besthorn, Geisselbrecht, *Ber.*, 1920, **53**, 1026.

2-Methylquinoline-4-sulphonic Acid (*Quinaldine-4-sulphonic acid*).
M.p. above 270°. Spar. sol. H_2O.

Besthorn, Geisselbrecht, *Ber.*, 1920, **53**, 1025.

2-Methylquinoline-5-sulphonic Acid (*Quinaldine-5-sulphonic acid*).
Cryst. from H_2O. KOH fusion ⟶ 5-hydroxyquinaldine. Heat Na salt + KCN ⟶ quinaldine + 5-cyanoquinaldine.

Doebner, Miller, *Ber.*, 1884, **17**, 1703.
Chem. Fabr. Schering, D.R.P. 29,819.

2-Methylquinoline-6-sulphonic Acid (*Quinaldine-6-sulphonic acid*).
Cryst. from H_2O. KOH fusion ⟶ 6-hydroxyquinaldine.

Doebner, Miller, *Ber.*, 1884, **17**, 1704.

2-Methylquinoline-8-sulphonic Acid (*Quinaldine-8-sulphonic acid*).
Prisms from H_2O. KOH fusion ⟶ 8-hydroxyquinaldine.

Doebner, Miller, *Ber.*, 1884, **17**, 1703.

4-Methylquinoline-2-sulphonic Acid (*Lepidine-2-sulphonic acid*).

M.p. above 270°. Boiling $H_2O \longrightarrow$ 2-hydroxylepidine.

Besthorn, Geisselbrecht, *Ber.*, 1920, **53**, 1024.

4-Methylquinoline-6-sulphonic Acid (*Lepidine-6-sulphonic acid*).

Needles + $1H_2O$ from H_2O. Mod. sol. EtOH. NaOH fusion $\longrightarrow$ 6-hydroxylepidine.

Busch, Koenigs, *Ber.*, 1890, **23**, 2680.

6-Methylquinoline-5-sulphonic Acid.

KOH fusion $\longrightarrow$ 5-hydroxy-6-methylquinoline.

Noelting, Trautmann, *Ber.*, 1890, **23**, 3658.
Claus, Kaufmann, *J. prakt. Chem.*, 1897, **55**, 526.

6-Methylquinoline-7-sulphonic Acid.

Needles + $1H_2O$ from H_2O. KOH fusion $\longrightarrow$ 7-hydroxy-6-methylquinoline. $CrO_3 \longrightarrow$ quinoline-6-carboxylic-7-sulphonic acid. Heat Na salt + KCN $\longrightarrow$ 7-cyano-6-methylquinoline.

Edinger, Bühler, *Ber.*, 1909, **42**, 4315.

6-Methylquinoline-8-sulphonic Acid.

Plates from H_2O. NaOH fusion $\longrightarrow$ 8-hydroxy-6-methylquinoline. $CrO_3 \longrightarrow$ quinoline-6-carboxylic-8-sulphonic acid.

Fischer, Willmack, *Ber.*, 1884, **17**, 441.

8-Methylquinoline-5-sulphonic Acid.

Needles from H_2O. NaOH fusion $\longrightarrow$ 5-hydroxy-8-methylquinoline. $CrO_3 \longrightarrow$ quinoline-8-carboxylic-5-sulphonic acid.

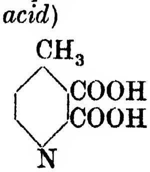
Herzfeld, *Ber.*, 1884, **17**, 904, 1550.

8-Methylquinoline-6-sulphonic Acid.

Prisms from H_2O. $CrO_3 \longrightarrow$ quinoline-8-carboxylic-6-sulphonic acid.

Herzfeld, *Ber.*, 1884, **17**, 903.

4-Methylquinolinic Acid (*γ-Picoline-2 : 3-dicarboxylic acid, lepidic acid, 4-methylpyridine-2 : 3-dicarboxylic acid*)



$C_8H_7O_4N$ MW, 181

Prisms or plates from H_2O. M.p. 186° decomp. Sol. 118 parts H_2O at 10°. Very spar. sol. EtOH, Et_2O, C_6H_6. Aq. sol. + $FeSO_4 \longrightarrow$ yellow col. Heat at 160–170° or with AcOH $\longrightarrow$ 4-methylpyridine-3-carboxylic acid. Alk. $KMnO_4 \longrightarrow$ pyridine-2 : 3 : 4-tricarboxylic acid.

Besthorn, Byvanck, *Ber.*, 1898, **31**, 801.
Hoogewerff, van Dorp, *Ber.*, 1881, **14**, 645.

Methylresacetophenone.

See Dihydroxymethylacetophenone.

Methylresorcylic Acid.

See Dihydroxytoluic Acid *and* Orsellinic Acid.

Methylresorcylic Aldehyde.

See Dihydroxytoluic Aldehyde *and* Atranol.

Methylskatole.

See Dimethylindole.

α-Methylstyryl bromide.

See 1-Bromo-2-phenylpropylene.

Methylsulphonylethylamine (*Mesylethylamine*)

$CH_3{\cdot}SO_2{\cdot}NH{\cdot}CH_2CH_3$

$C_3H_9O_2NS$ MW, 123

B.p. 106–7°/0·3 mm. D^{24} 1·191. Misc. with H_2O.

Helferich, Grünert, *Ber.*, 1940, **73**, 1131.

Methylsulphonylmethylamine (*Mesylmethylamine*)

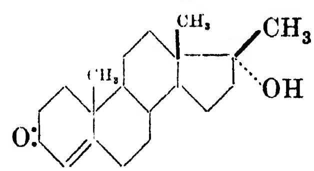
$CH_3{\cdot}SO_2{\cdot}NH{\cdot}CH_3$

$C_2H_7O_2NS$ MW, 109

B.p. 118°/0·3 mm. D^{24} 1·275. Misc. with H_2O.

Helferich, Grünert, *Ber.*, 1940, **73**, 1131.

17-Methyltestosterone



$C_{20}H_{30}O_2$ MW, 302

Needles from hexane–C_6H_6. M.p. 165–6° corr. $[\alpha]_D^{20}$ + 82° in EtOH.

Acetyl: cryst. from MeOH. M.p. 176–7° corr. $[\alpha]_D^{20}$ + 69° in EtOH. *Semicarbazone:* needles from MeOH. Decomp. at 238°.

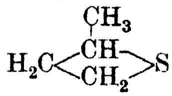
Propionyl: m.p. 146°. $[\alpha]_D^{13}$ − 74° in EtOH. *Semicarbazone:* decomp. at 230°.

Semicarbazone: decomp. at 226°.

Ruzicka, Goldberg, Rosenberg, *Helv. Chim. Acta*, 1935, **18**, 1487.
Fujii, Matsukawa, *J. Pharm. Soc. Japan*, 1935, **55**, 1333.
Kuwada, Miyasaka, *J. Pharm. Soc. Japan*, 1938, **58**, 319.
Miescher, Klarer, *Helv. Chim. Acta*, 1939, **22**, 962.
Oppenauer, *Rec. trav. chim.*, 1937, **56**, 137.

Methyl tetrahydrobenzyl Ketone.
See Cyclohexenylacetone.

2-Methyltrimethylene sulphide



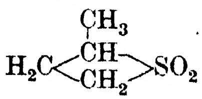
C_4H_8S MW, 88

B.p. 105·5–107·5°/747 mm. Sol. most org. solvents. Insol. H_2O. D_4^{20} 0·9571. n_D^{20} 1·4831. Volatile in steam.

B,HgCl₂ : cryst. Decomp. at 106°. Spar. sol. usual solvents.

Grischkewitsch-Trochimowski, *J. Russ. Phys.-Chem. Soc.*, 1916, **48**, 894.

2-Methyltrimethylene sulphone



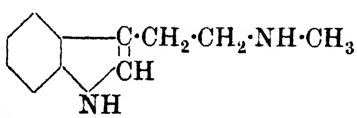
$C_4H_8O_2S$ MW, 120

B.p. 251·5—253·5° corr. Sol. H_2O, EtOH, Et_2O. $D_4^{16·5}$ 1·2174. $n_D^{16·5}$ 1·4700. Bitter taste.

See previous reference.

3-Methyltriphenylamine.
See Diphenyl-*m*-toluidine.

***N*-Methyltryptamine** (3-[ω-*Methylamino-ethyl*]-*indole*



$C_{11}H_{14}N_2$ MW, 174

Cryst. M.p. 90°.
B,HCl : m.p. 180°.
Benzoyl : needles. M.p. 117°.
m-*Chlorobenzoyl* : prisms. M.p. 153°.
p-*Nitrobenzoyl* : golden yellow plates. M.p. 134°.
Phenylcarbamyl deriv. : m.p. 153°.
Picrate : m.p. 191°.

Manske, *Chem. Abstracts*, 1932, 72, 625.

Methylundecanol.
See Isopropyloctylcarbinol *and* Dimethyl-nonylcarbinol.

2-Methylundecanone-3.
See Isopropyl octyl Ketone.

***p*-Methylvalerophenone.**
See Butyl *p*-tolyl Ketone.

Methylvinylacetylene.
See Propenylacetylene *and* Isopropenylacetylene.

Methylvinylcarbinol (1-*Methylallyl alcohol*, 1-*butenol*-3)

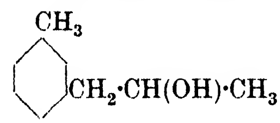
$H_2C:CH·CH(OH)·CH_3$

C_4H_8O MW, 72

B.p. 96–8° D_4^0 0·854, D_4^{20} 0·8318. n_D 1·41275.
Acetyl : b.p. 112–14°/766 mm. $n_{5461}^{15·3}$ 1·4065.
Trichloroacetyl : b.p. 69·5–70·5°/8 mm. n_{5461}^{18} 1·4639.
Hydrogen phthaloyl : *dl*-. Cryst. from ligroin. M.p. 5°. *l*-. Cryst. from ligroin. M.p. 52–3°. $[\alpha]_D$ − 40·6° in EtOH. *d*-. Cryst. from ligroin. M.p. 52–3°. $[\alpha]_D$ + 40·5° in EtOH.
p-*Nitrobenzoyl* : needles from EtOH. M.p. 43–4°.
Allophanate : m.p. 151–2°.

Delaby, *Bull. soc. chim.*, 1923, **33**, 602.
Claisen, Tietze, *Ber.*, 1926, **59**, 2348.
Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, **127**, 1174.

Methyl-*m*-xylylcarbinol (β-*Hydroxy*-m-*propyltoluene*, 1-m-*tolylisopropyl alcohol*)



$C_{10}H_{14}O$ MW, 150

B.p. 119–20°/18 mm.
Acetyl : b.p. 116–17°/20 mm.

Carré, *Bull. soc. chim.*, 1909, **5**, 487.
Auwers, Lechner, Bundesmann, *Ber.*, 1925, **58**, 47.

Mitraphyline.
See Rubradinine.

Mitraspecine

$C_{28}H_{36}O_5N_2$ MW, 480

Alkaloid from bark of *Mitragyna speciosa*, Korthals. Monoclinic platelets from EtOH. M.p. 244–5°. Sol. Me_2CO, C_6H_6. Mod. sol. Et_2O. $[\alpha]_D^{23}$ − 59·15° in $CHCl_3$.
Picrate : m.p. 136°.

Denis, *Chem. Abstracts*, 1939, **33**, 1741.

Monocrotaline

$C_{16}H_{23}O_6N$ MW, 325

Alkaloid from *Crotalaria spectabilis* and *C. retusa*. Prisms from EtOH. M.p. 197–8° corr. decomp. $[\alpha]_D^{26}$ − 54·7° in $CHCl_3$.
Hydrochloride : prisms from MeOH–Et_2O. M.p. 184° corr. decomp. $[\alpha]_D^{28}$ − 38·4° in H_2O.
Methiodide : prisms from MeOH–$CHCl_3$. M.p. 205° corr. decomp. $[\alpha]_D^{28}$ + 23·4° in MeOH.

Adams, Rogers, *J. Am. Chem. Soc.*, 1939, **61**, 2817.
Neal, Rusoff, Ahmann, *J. Am. Chem. Soc.*, 1935, **57**, 2560.

Morellin

$C_{30}H_{34}O_6$ MW, 490

Constituent of seeds of *Garcinia morella*. Yellow needles or rhombic prisms from MeOH or EtOH. M.p. 154°. Insol. H_2O, ligroin. $[\alpha]_D$ − 594° in $CHCl_3$.

Tetra-acetyl: yellow prisms from MeOH. M.p. 178–9°. $[\alpha]_D$ − 327° in $CHCl_3$.

Di-Me ether: $C_{32}H_{38}O_6$. MW, 518. Yellow prisms from MeOH. M.p. 156°. $[\alpha]_D$ − 242° in $CHCl_3$. *Dioxime*: amorphous powder from EtOH.Aq. M.p. 118°. $[\alpha]_D$ + 241° in $CHCl_3$.

Tri-Me ether: $C_{33}H_{40}O_6$. MW, 532. Microcryst. yellow powder from C_6H_6–pet. ether. M.p. 170–2°.

Dioxime: yellow powder. M.p. 148–9°.

Mononitroguanylhydrazone: yellow prisms from EtOH–AcOEt. Decomp. at 205·5°. $[\alpha]_D$ − 748° in $CHCl_3$.

Rao, *J. Chem. Soc.*, 1937, 853.

Muscadinin chloride

$C_{28}H_{33}O_{17}Cl$ MW, 676·5

Anthocyanin from Hunt muscadine grape. Coppery-brown cryst. from 0·5% HCl. M.p. 184° decomp. after sintering at 181°. Reduces Fehling's in cold. $FeCl_3 \longrightarrow$ violet col.

Brown, *J. Am. Chem. Soc.*, 1940, **62**, 2808.

Mycolic Acid

$C_{88}H_{172}O_4$ or $C_{88}H_{176}O_4$ MW, 1292 or 1296

Constituent of wax of human tubercle bacillus. Pptd from Et_2O sol. with EtOH. M.p. 54–6° corr. $[\alpha]_D^{25}$ + 1·8° in $CHCl_3$. Heat. at 300–50° $\longrightarrow$ hexacosanic acid.

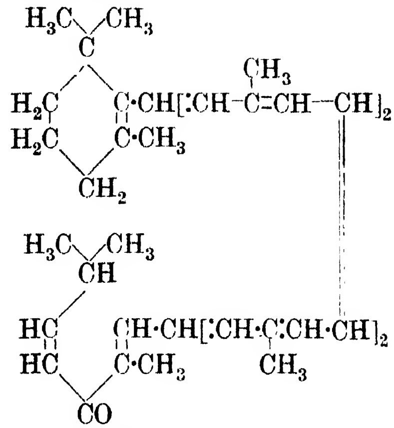
Me ester: amorphous powder. M.p. 43–5°.

Lesuk, Anderson, *J. Biol. Chem.*, 1940, **136**, 603.
Stodola, Lesuk, Anderson, *J. Biol. Chem.*, 1938, **126**, 505.

Myrystyl-.

See Tetradecyl-.

Myxoxanthin



Suggested structure

$C_{40}H_{55}O$ MW, 551

Characteristic pigment of the *Myxophyceæ*. Violet prisms from Py–MeOH. M.p. 168–9°. (Berl block, evac. tube). Sol. Et_2O, $CHCl_3$, pet. ether. Insol. MeOH. Absorption maxima: 4880 Å. in CS_2, 4730 Å. in $CHCl_3$, 4700 Å. in EtOH, 4560 Å. in ligroin.

Oxime: vermilion plates from Py–MeOH. M.p. 195–6° (Berl block, evac. tube). Broad absorption band in $CHCl_3$ with head at 4630 Å.

Heilbron, Lythgoe, *J. Chem. Soc.*, 1936, 1376.

Myxoxanthophyll

$C_{40}H_{56}O_7(\pm 2H)$ MW, 648

Carotenoid from *Oscillatoria rubrescens*. Violet needles from Me_2CO. M.p. 169–70°. Sol. EtOH, Py. Mod. sol. $CHCl_3$, Me_2CO. Insol. Et_2O, CS_2, pet. ether, C_6H_6. $[\alpha]_{Cd}$ − 255° in EtOH. Absorption maxima in $CHCl_3$: 5180, 4845, 4500 Å.

Heilbron, Lythgoe, *J. Chem. Soc.*, 1936, 1376.

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