PERFUMES, COSMETICS AND SOAPS

With Special Reference to
SYNTHETICS

By
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Volume Three

BEING A TREATISE ON MODERN COSMETICS

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AUTHOR'S PREFACE TO THE SIXTH EDITION

In recent years Cosmetic raw materials have received considerable attention by chemists in Europe and America, with the result that many new substances have made their appearance, and are now regularly used by modern manufacturers.

This has necessitated the inclusion in this work of much new matter, in particular relative to Bath Oils, Foam Baths, Brilliantine Creams, Hair Lacquers, Greaseless Hair Creams, a new type of Hair Dye, Lipstick Colours, Mascara, Eye Lotions, Skin Food, Deodorant Sticks, Complexion Milk and Powder Sticks.

I cannot impress upon chemists too strongly the importance of *simplicity of formulæ* in their experiments. Almost always a few well-chosen raw materials properly combined will give a more elegant and stable product than a long formula in which one ingredient may upset another and so spoil the balance of the finished product—the unsatisfactory result not always being apparent until after packing and despatch for sale.

Wise chemists will therefore give their experiments long shelf tests, with frequent observation, before finally approving a new formula.

W. A. Poucher

40 Piccadilly,
London, W. 1,
July, 1941.

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VOLUME III.

COSMETICS.

"Instead of propagating wallflowers, the rouge pot has nourished the roots of many a family tree, for man has oft and anon been beguiled into matrimony by a pink cheek, and he doesn't really care whether it's the result of wind and weather or of a laboratory, so long as it pleases him.

"As it serves as a worthy commodity of commerce and as an adjunct to beauty, a double function combining the useful and the ornamental, should not the make-up box receive its due and be accorded recognition as a valued member of society?"—Lilian H Foster, of New York.[1]

[1] "The American Perfumer," October, 1922, 346.

CHAPTER I.

BATH PREPARATIONS.

1. Introduction, bath crystals, suitable bases, tinting, dyestuffs, perfumes.
2. Bath tablets.
3. Reducing bath salts.
4. Bath powders.
5. Bath fluids, oils and foam baths.
6. Bath pot-pourri.
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BATH PREPARATIONS.

Bath Crystals constitute the most popular bath preparation to-day in spite of the use, in approved formulæ, of industrial methylated spirit, for the manufacture of bath cologne, etc. They are sold in elegant and expensive packs by the high-class perfumers and in an inexpensive form by the cheap stores. The principal difference between the two types is in the quality of the perfume and in the cost of the containers. There is not an enormous variation in the price of the different bases.

From the manufacturer's point of view, however, it is necessary to bear in mind the appearance and keeping properties of the finished product, and stability, melting-point, and solubility are therefore of considerable importance. The following substances are all used and their properties are set out under each heading :—

Soda Crystals (Carbonate) is one of the commonest substances employed because it dissolves very readily in hot water, 1 litre at 40° C. will dissolve 516 grams calculated as anhydrous. If the water is hard, i.e. contains

lime salts in solution, it precipitates them as calcium carbonate, softening the water thereby. This necessarily makes the water somewhat cloudy, but this need not be considered a serious disadvantage. On the other hand, a molecule of crystalline sodium carbonate contains ten waters of crystallisation which represents roughly 62 per cent of its weight. It quickly loses this water if not stored or packed under perfect conditions, and such efflorescence finally reduces the crystals to powder. This defect can be partially rectified by coating the crystals with a hygroscopic substance such as glycerine or ethylene glycol; the usual method being to dissolve a little of either of these in the dye solutions used for colouring the crystals. Another disadvantage in the use of soda crystals is that of the low melting-point, 34° C. It is not unusual to see bottles of bath crystals in a store window in the summer, when the heat of the sun has partially melted the crystals which look anything but elegant. Sodium carbonate has the composition $Na_2CO_3 . 10H_2O$ and the crystals are obtainable in various sizes—"Pea" being the most favoured. The stock should be stored in a cool place, and a damp atmosphere offers no disadvantage.

Sodium Carbonate Mono-hydrate, $Na_2CO_3 . H_2O$, has recently been marketed as crystal agglomerates of uniform and graded sizes and a very high state of purity. The salt only contains 14·5 per cent of its own weight of water of crystallisation and is therefore very stable. Its great disadvantage is that of slow solubility which materially detracts from its smart appearance when in use, especially if the bather happens to step upon the undissolved product in the bottom of the bath. The smallest crystal agglomerates overcome this disadvantage to a large extent. The crystals are easily coloured with the usual dyestuffs and present a very attractive aspect when packed.

Sodium Sesquicarbonate, $Na_2CO_3 . NaHCO_3 . 2H_2O$, occurs as fine needle-shaped crystals of high refraction. It generally constitutes the base of bath powders and water softeners. When suitably coloured and perfumed it makes

a very attractive bath salt. It possesses the advantage of extraordinary stability and ready solubility.

Sodium Perborate has 8 5 per cent of available oxygen and possesses the formula $NaBO_3 . 4H_2O$. The addition of about 10 per cent to sodium sesquicarbonate makes an effective oxygenated bath salts, the alkali decomposing the perborate in the bath with the evolution of nascent oxygen. The addition of even 1 per cent will produce novel effects.

Sodium Phosphate in crystalline form has found favour in some directions. It is a little more soluble than the carbonate—1 litre of water at 40° C. dissolving 555 grams calculated as anhydrous. It effloresces just as readily, and a molecule of the phosphate contains twelve waters of crystallisation, approximately equivalent to 60 per cent of its weight. On exposure to heat it melts at 35° C. and when dissolved in hot water the solution becomes very milky, and on using soap it is altogether unsightly and uninviting. From the point of view of compression the phosphate has certain advantages, especially when this is mixed with sodium perborate. Sodium phosphate occurs in three forms but the disodium hydrogen salt is preferred. It has the following composition, $Na_2HPO_4 12H_2O$.

Sodium Chloride in colourless, cubical crystals is used in America but has, so far, not received much attention in Europe. It is anhydrous, only very slightly hygroscopic, and when tinted, perfumed, and well packed makes a very presentable bath salt. It is easily soluble in clear solution and imparts to the skin a refreshing effect. The only disadvantage that can be claimed when large quantities are introduced into a bath is that of retarding the lathering property of soap. Sodium chloride has the composition NaCl.

Bay Salt, produced by the evaporation of sea-water, is only very occasionally used, since there is some difficulty in obtaining supplies of regular crystals of clean appearance.

Moreover, their inherent colour is a disadvantage for tinting purposes.

Borax is now very much more used than it was a few years ago. This is not owing to any greater appreciation on the part of chemists of its many properties, but rather on account of the present facility for obtaining well-graded and regular crystals which can soon be given a very elegant appearance and perfume. A molecule of borax contains ten waters of crystallisation, which represents approximately 47 per cent of its weight. This is considerably less than either carbonate or phosphate of soda and is reflected in its much greater stability in the presence of moisture, and when exposed to heat it melts only at 76° C. On the other hand, the solubility of borax is much inferior, a litre of water at 40° C. dissolving only 87 grams, but the solution is clear when it is added to a bath. Moreover, borax is only mildly alkaline and does not dry the skin to the same degree as carbonate of soda, the latter easily removing the sebaceous secretion from the skin surface. The apparent disadvantage in the solubility of borax is far outweighed by its other good points, and in consequence this is one of the best raw materials for bath crystals.

Having selected a suitable base, our next consideration is that of **Tinting**. For this operation it is necessary to make a dye solution of the requisite strength, which is applied by one of two methods :—

(*a*) By spraying on to the crystals.

(*b*) By immersing the crystals in a tank containing the dye solution.

The first operation is the easiest for small-scale productions, while the latter is quickest when large quantities have to be dealt with at a time. *Spraying* possesses the advantage of the operator being able to apply just the right amount of dye solution, when the crystals may be left to dry on trays. *Immersion* has only one disadvantage, which is, that the crystals are much wetter when removed from the bath, and by ordinary draining take a long time to dry.

This is easily overcome, however, when centrifugal apparatus is available, and very large quantities can be dealt with daily.

The question of the solvent for the dyestuff is important and both water and spirit are used, some makers preferring the one and some the other. Industrial spirit is cheap, and by immersion, very little is used each time. There is the further advantage of more rapid evaporation.

The **Dyestuffs** from which we may choose our colour are capable of giving a wide range of shades, and a list of these is available from the well-known dyestuff manufacturers catering for the cosmetic trade. The following may be taken as good examples :—

Auramine, for clear yellow shades.
Tartrazine, for lemon tints.
Acridine orange, for orange shades.
Chrysoidine, for warm tangerine tints.
Phenylene brown, for terracottas.
Methylene blues, for various blue shades.
Safranines, for pink tints.
Methyl violets, for purple shades.
Basic greens, for emerald shades.

Of these the blues and greens are not very stable, and good results are only obtainable by the use of *vat dyes*. These are added to the solution of the salt under suitable conditions, and the colour is contained *in* the crystals when formed, developing when they are dried.

A suitable aqueous dye solution for *yellow* crystals is prepared to the following formula :—

No. 2001.

2	Auramine.
50-200	Glycerine.
798	Distilled water.
1000	

Spirit Soluble dyestuffs suitable for tinting bath crystals may be chosen from the following :—

Violets.—Fast oil violet B., brilliant oil violet base, methyl violets.

Blues.—Fast oil blue B., spirit blue B., spirit induline.

Greens.—Fast oil green 2G., 6G., B. and Y., malachite green crystals.

Yellows.—Fast oil yellow 2G., G., B., auramine base, naphthol yellow S., chrysophenine, chrysoidine Y.R.

Oranges.—Brilliant oil orange base, fast oil orange, I, II.

Reds.—Safranine base, rhodamine B., fast oil pink B., 6G., cerise B.

When using these dyes it is usual to add a small percentage of ester gums or resin dissolved in the spirit. On evaporation, this leaves a very thin film on the crystal surface, and without being tacky, so fixes the colour. A suitable spirit dye solution for *pink* crystals may be prepared as follows :—

No. 2002.

3	Rhodamine B. extra.
10	Ester gum.
1000	Industrial spirit.
1013	

In the event of any difficulty, readers are strongly advised to consult the technical departments of the dyestuff manufacturers, who will be only too happy to provide suitable information.

Having dyed the crystals a suitable shade, our next consideration is that of **Perfume** which is usually sprayed on. If a spirit soluble dyestuff is used, it is easier to mix in the perfume and allow the alcohol to evaporate before the crystals are packed. This is the real test of a good bath crystal, as many of them deteriorate in the presence of an alkaline salt. Either essential oils or synthetics may be used, but they should always be mixed with a large proportion of fixative, and nothing answers this purpose better than the resinoids benzoin, olibanum, vetivert, etc. When essential oils are used, their terpeneless form is most satisfactory, and does not so readily tend to odour decomposition. For example, in **Cologne** bath crystals good results may be obtained with terpeneless petitgrain and bergamot oils, plus

some citral and terpinyl acetate, compounded with benzoin, tolu, or mastic. Such a perfume can be made as follows, and should be matured one month before use :—

No. 2003.

200	Petitgrain oil—terpeneless.
200	Bergamot oil—terpeneless.
50	Methyl anthranilate.
100	Rosemary oil—French.
10	Clary sage oil.
30	Musk ketone.
10	β-naphthyl ethyl ether.
20	Citral.
80	Terpinyl acetate.
200	Benzoin R.
100	Methyl naphthyl ketone.
1000	

Lavender perfumes may be made from the oil plus bergamot, heliotropin, artificial musk, and orris oleo-resin, as follows :—

No. 2004.

450	Lavender oil—French.
200	Bergamot oil.
75	Rosemary oil.
25	Thyme oil.
30	Patchouli oil.
20	Orris oleo-resin.
30	Borneol.
20	Oakmoss absolute—green.
50	Geranium oil—Bourbon.
40	Coumarin.
60	Musk ketone.
1000	

Verbena bouquets may be compounded from lemon-grass oil, but for "de luxe" products Grasse vervain should be employed. Olibanum makes an excellent fixator :—

No. 2005.

400	Lemon-grass oil.
10	Bromstyrole.
300	Java citronella oil.
200	Bois de rose oil.
20	Canada balsam.
20	Olibanum R.
30	Heliotropin.
20	Musk ambrette.
1000	

Violet and **Rose** perfumes may be conveniently fixed with 25 per cent of violettophyx and roseophyx respectively, while **Oriental** type odours may be compounded with from 10 to 20 per cent of the fixators described under that class, or they may be replaced with fairly large proportions of patchouli R. or vetivert R., according to the type of perfume aimed at.

Pine.—Bath salts may be perfumed with pine oil, but better results are obtained with the following :—

No. 2006.

700	Bornyl acetate.
100	Terebene.
50	Lavender oil—terpeneless.
50	Ambrette R.
50	Geranium R.
50	Styrax R.
1000	

In all cases the compounds should be diluted with alcohol or other suitable solvents before being sprayed on, as this ensures more even distribution of the perfume. The crystals, after evaporation of the perfume solvent, are ready and should be bottled *without delay*.

Bath Tablets are made by heavy machine compression of any of the above-mentioned crystals. After tinting they should be allowed to dry until a slight effloresence becomes evident, when the perfume (containing up to 25 per

cent of R.) should be sprayed on. It is advisable to mix the compound with some 50 per cent alcohol, as the presence of small quantities of water helps the effloresced portion of the crystals to act as a binding agent—this being assisted by the proportion of R. contained in the perfume. Bath tablets made in this manner disintegrate readily in hot water, but if more rapid solution is desired in cold water, traces of starch should be added before compression. This is more useful than an acid such as tartaric, as its employment makes the punches and dies sticky, which always retards efficient production. This difficulty is now surmounted by the use of adipic acid.

Reducing Bath Salts are much used nowadays and are said in many cases to be quite successful. They are not sent out perfumed and may be prepared as follows :—

No. 2007.

2	Potassium iodide.
3	Potassium bromide.
15	Potassium chloride.
300	Magnesium sulphate.
180	Sodium sulphate.
500	Sodium chloride.
1000	

Dry all the constituents thoroughly before mixing. Use one ounce in a hot bath.

Bath Powders are generally made with either dried sodium carbonate or sesquicarbonate and sometimes borax. The sesquicarbonate occurs in small crystals which do not readily give up their water. Sulphonated lorol, in powder form, is sometimes added, since it reduces the surface tension and enhances the froth. These products are generally highly perfumed, and for this purpose mixtures of essential oils and synthetics with fixators are used. The packing should be dainty and small transparent tubes of cellophane look quite attractive. Sufficient powder should be enclosed in each one for a bath. The method of manufacture is

simple with a sifting and mixing machine, as described elsewhere in this work. When this apparatus is used the perfumes are sprayed on, but if desired they may be rubbed down with some of the powder and sifted before adding to the bulk. When a dye is used to colour the preparation, it is dissolved in sufficient water and incorporated with some of the powder, and then sifted and mixed with the bulk. Some formulæ are appended :—

Violet, No. 2008.

800	Sodium sesquicarbonate.
200	Borax—powdered.
4	Methyl ionone.
1	Methyl octine carbonate.
1	Ylang-ylang oil—Bourbon.
1	Orris-resin.
3	Bergamot oil.
1	Chlorazol green G., 10 per cent.
1011	

Jasmine, No. 2009.

900	Dried sodium carbonate.
100	Sulphonated lorol.
4	Benzyl acetate.
1	Amyl cinnamic aldehyde.
1	Methyl anthranilate.
3	Linalol.
1	Methyl naphthyl ketone.
1	Chrysophenine G., 10 per cent.
1011	

Rose, No. 2010.

1000	Borax.
5	Geraniol from palmarosa oil.
1	Iso-butyl phenylacetate.
2	Phenylethyl alcohol.
1	Phenyl salicylate.
1	Patchouli oil.
1	Benzo purpurine 4 B., 10 per cent.
1011	

Bath Fluids used to be made with glycerine, ammonia, perfume, and a suitable dyestuff. The advent of liquid compounds of sulphonated lorol has made it possible to produce much more elegant and satisfactory products. The triethanolamine salt is the best but, unhappily, the most expensive. Cheaper substitutes are to be found in the sulphonated oils, such as castor and olive. Frequently glycerine, or one of the glycols, is added and sometimes industrial alcohol. The all-important consideration is perfume, which to give the desired strength on dilution in the bath must be compounded from powerfully odorous ingredients. The test of a good bath oil is the complete dispersal of the perfume and the absence of a film on the sides of the bath. The tinting of these products with fluorescine adds to their attractiveness. **Foam Baths** do not differ materially except that an additional foaming agent such as saponine is added, together with a gum such as dextrine which supports the bubble formation. Here is a good formula for a **Pine Bath Oil**:—

No. 2011.

400	Sulphonated lorol, T.A.
45	Ethylene glycol.
5	Fluorescine—10 per cent solution.
50	Terpineol.
50	Terebene.
20	Bornyl acetate.
20	Geranium—Bourbon.
10	Patchouli—Singapore.
400	Distilled water.
1000	

Mix the perfume ingredients and then add this compound to the first three already mixed substances. Shake, and when dispersed add the water without undue agitation.

The use of calgon is optional.

A small quantity added to a bath is sufficient to perfume and tint the water effectively.

Bath Pot-pourri is a novelty and is made by mixing any good pot-pourri with an equal quantity of borax crystals. The whole is placed in dainty silk bags with ribbon attached so that they can be suspended from the hot water tap of the bath. When the water is turned on, the bath and the whole atmosphere of the room becomes permeated with the fragrance of the compound, which can be repeatedly used before becoming exhausted. The presence of vetivert roots and patchouli leaves is desirable as they help the pot-pourri to retain its perfume for a much longer period. The solids should be reduced to a coarse powder and the liquids evenly distributed over the whole mixture. Formulæ follow :—

No. 2012.

500	Borax crystals—small.
50	Benzoin.
50	Geranium herb.
100	Orris root.
50	Sandalwood—rasped.
50	Patchouli leaves.
100	Vetivert roots.
100	Rose leaves.
1000	

No. 2013.

500	Borax crystals—small.
100	Lavender flowers.
150	Rose petals.
25	Cinnamon.
25	Cloves.
10	Musk extract, 3 per cent.
50	Vanilla.
50	Vetivert oil.
50	Hydroxy-citronellal.
40	Ambrone, No. 1007.
1000	

No. 2014.

300	Rose petals.
50	Rose-geranium oil.
50	Patchouli leaves.
10	Civet extract, 3 per cent.
20	Musk ambrette.
20	Iso-butyl phenylacetate.
50	Orris root powder.
500	Borax crystals—small.
1000	

Water Softeners are similar to bath powders, but rarely fetch the same price. The base generally consists of *dried* sodium carbonate, to which may be added either slaked lime or ammonium carbonate. These products are seldom tinted. Formulæ follow :—

No. 2015.

1000	Sodium carbonate—dried.
3	Heliotropin.
2	Musk xylol.
1005	

No. 2016.

800	Sodium carbonate—dried.
200	Slaked lime—in powder.
2	Rosemary oil.
3	Spike lavender oil.
1005	

No. 2017.

950	Sodium carbonate—dried.
50	Ammonium carbonate—powdered.
3	Coumarin.
1	Bergamot oil.
1	Petitgrain oil—Paraguay.
1005	

These products are made *as described* under *Bath Powders* (*which see*).

Another type of water softener is **Household Ammonia,** and this product is put to a variety of uses. It acts like a charm on the hardest water, softens it, renders it pleasant to the touch and almost dispenses with the necessity for soap. It is useful for laundry purposes, cleaning plate, and removing grease and dirt from clothing. There are two varieties, *cloudy* and *clear*. The first owes its peculiarity to the presence of a *stearate*, which should exist in minute traces only for really good products—an excess renders the preparation unsightly. This type is not very frothy, but the clear variety, being made with an *oleate*, produces a very foamy article, and while its appearance is not so elegant, it is if anything more pleasant to use. The quantity of ammonia, calculated as NH_3, is generally about 10 per cent, but can be varied to suit the purpose for which the product is intended—for laundry use the proportion may be increased. The perfume is generally obtained with the essential oils of lavender, rosemary, geranium, pine, or bergamot, and the addition of small quantities of an alkaline carbonate is desirable. Formulæ are appended illustrating both types :—

Cloudy, No. 2018.

0·1	Stearic acid—pressed.
5	Potassium carbonate.
400	Strong liquid ammonia ·880.
0·2	Rosemary oil.
0·2	Bergamot oil.
595	Distilled water
1000	

Dissolve the K_2CO_3 in boiling distilled water (200) and add the fatty acid in lumps. Heat until completely saponified and then dilute to 600 with water. Add the perfume and then the ammonia. The cloud will develop in a few hours.

Clear, No. 2019.

5	Oleic acid—purified.
5	Industrial spirit.
7	Potassium carbonate.
450	Strong liquid ammonia ·880.
2	Pine oil.
1	Rose-geranium oil—Bourbon.
530	Distilled water.
1000	

Dissolve the pot. carb. in warm water (200) and add the mixed acid and spirit. Shake until saponified, then proceed as above.

Note.—If a large quantity of oleic acid is used a cloud will develop after twenty-four hours. This is accounted for by the stearates contained in all commercial samples—*absolutely pure* oleic acid being practically unobtainable.

CHAPTER II.

DENTAL PREPARATIONS.

1. Pyorrhœa.
2. Tooth powders, bases, colours, flavours, methods of manufacture, effect on the teeth, germicidal value.
3. Acid dentifrices, alkaline, antacid, antiseptic, camphorated chalk, carbolic, charcoal, oxygenated, quinine, smokers', saponaceous, tin oxide, and tartar remover.
4. Tooth pastes, excipients, soaps, colours, bases, consistency.
5. Manufacture, filling, simple machine, formulæ.
6. Solid dentifrices.
7. Liquid dentifrices, foaming, saponaceous, non-frothy.
9. Mouth washes, glycerine thymol, myrrh and borax.

THE dentist has to deal with many disorders, and the most difficult of these is probably **Pyorrhœa alveolaris,** as the patient suffering from it will in one day swallow a large quantity of pus.

The first indication of pyorrhœa is the partial detachment of the margin of the gum, which gradually thickens. If the finger is gently pressed on this, some pus or blood-stained liquid will exude from the intervening space. If the disease is not checked the gum will gradually become detached from the tooth and may even spread as low as the socket. The infection appears to be of bacteriological origin, and among the treatments recommended by eminent authorities for its relief are :—

Painting the margin of the gums with cocaine.

Careful removal of all tartar.

Syringing of the pouches with copper sulphate solution, with or without phenol.

Brushing the teeth with a soft brush and an antiseptic mouth-wash several times a day.

Tooth Powders are made in great variety, but the list of basic substances from which they are compounded is a relatively small one. The most important bodies are :—

- Precipitated chalk—light and heavy (crystalline).
- Prepared chalk (amorphous).
- Calcium phosphate.
- Calcium sulphate.
- Orris root powder.
- Kieselguhr.
- Kaolin (china clay).
- Magnesia (oxide).
- Magnesium carbonate—heavy.
- Cuttlefish bone.
- Pumice.
- Talc.
- Bicarbonate of soda.
- Borax.
- Cream of tartar.

Light precipitated chalk is by far the most popular base, not only on account of its cheapness and bulkiness, but more particularly owing to the fact that the faces of the crystals remove any foreign matter adhering to the enamel without damaging it.

Kieselguhr and kaolin are generally employed in coloured tooth powders.

Pumice and cuttlefish bone should never be used in large proportions in any dentifrice, as their gritty nature is apt to injure the enamel. Dentists only recommend these two substances for the removal of an undue amount of tartar, and they seldom advise their *daily* use.

Cream of tartar is rarely used and then only in *acid* dentifrices.

Tooth powders are generally sent out *white*, but of the coloured kinds *pink* is the most popular. This colour is generally obtained with a dyestuff—phloxine or erythrosine for example, which is previously dissolved in water. These dyestuffs are much easier to manipulate than carmine, which requires an unusual amount of trituration, and furthermore they produce tints which are much more pleasing to

the eye. *Blue* tooth powders are occasionally met with, the object of the particular colour being presumably to whiten teeth which have become unusually yellow. Such tints are obtained with methylene blue, victoria blue, etc. (Blue dental preparations are the subject of a German patent, No. 340761, in which ultramarine is suggested as the most suitable colouring matter.) When the manufacturer has this purpose in view it is better to use a *peroxide*, such as calcium or magnesium, and avoid the tinting of the product. *Perborates* are also employed for this purpose. In order to assist the basic substance in cleaning the teeth, *soap* is often used. The choice of a good and *tasteless* material is most desirable, since the objectionable after-flavour of a bad soap is detrimental to repeat sales. Dental authorities, however, are by no means agreed as to the scientific efficacy of soap in the mouth. The question has been discussed by McClelland[1] and Evans,[2] the former favouring its use and the latter condemning it on the following grounds :—

1. It inhibits the salivary secretions.
2. It alters the reaction of the saliva.
3. It destroys the ferments of the saliva.

McClelland's main arguments for the use of soap are :—

1. Soap by virtue of its alkalinity dissolves mucin plagues.
2. Soap retards bacterial growth.
3. Acidity or alkalinity of the preparations used has no effect on the reaction of the saliva as it is secreted.
4. Soap has emulsifying and detergent effect—and is a valuable cleanser.

In spite of the pros and cons of this discussion the fact remains that dental preparations containing *some* soap become increasingly popular, and there is no doubt this popularity is due to the lubricating action of the soap when the dentifrice is being used.[3]

[1] "American Perfumer" (1923), 163.
[2] *Ibid.*, following issue.
[3] Compare also the paper by Brody, "Dental Cosmos," Vol. 67 (1925), No. 10, p. 948.

The most popular dentifrice *flavouring agent* is in Europe—peppermint; in America—wintergreen. Neither of these liquids are used alone, but are blended with other oils such as cinnamon, nutmeg, cloves, eucalyptus, pimento, thyme, lavender, rose, etc. It is always advisable to allow the oils to mature together for a month or so before use.

The *method of manufacture* of tooth powders is simple, but the necessity for mechanical mixing and sifting is essential in all large-scale production. The oils are incorporated with a part of the base which is resifted twice through a sixty-mesh tinned steel-wire sieve. This ensures perfect subdivision and distribution of the active constituents, and if the preparation is to be tinted, the colours should be added in solution at this stage. The whole is then added to the bulk and resifted and mixed twice. Sixty-mesh constitutes the desired standard of fineness.

Effect on the Teeth.—Tooth powders have been subjected to exhaustive tests by means of Bunting's tooth brushing machine, and the effects of 10,000 double strokes of the brush on the human teeth have been noted. This is equivalent to 10 strokes a day for a period of three years. The erosion effected by diluted vinegar amounted to one one-thousandth of an inch in depth. Preparations containing grit resulted not only in erosion but in a smeary appearance. Those containing coarse grits not only cut deep grooves but left a dull appearance, fine grits giving the enamel a high polish and white appearance. Jungman's tooth powder gave practically no wear of the enamel, but it produced a high polish due to the tin oxide. The formulas for the two best tooth powders known are according to Kraemer as follows :—

Blair's Formula, No. 2020.

200	Strontium oxide.
760	Calcium carbonate.
30	Soap.
10	Catechu.
1000	

Dissolve the soap in a little water and mix with a third of the chalk and dry at gentle heat. Dissolve the catechu in 50 c.c. alcohol and intimately mix with another third. Mix 2 c.c. of each wintergreen and sassafras oils with the remaining chalk and then mix and sift the whole.

Jungman's Formula, No. 2021.

150	Tin oxide.
600	Precipitated chalk.
40	Soap.
50	Sugar.
840	

Mix the oils with the sugar and proceed as above.

Germicidal Value.—This effect of dental preparations has received the attention of Ditthorn and Degner who made an investigation of the germicidal power of ten mouth washes and two tooth pastes. They came to the following conclusions :—

1. All the preparations, in the various solutions or suspensions coming into actual use and *at ordinary room temperature*, exercise no effect at all or only an insufficient sterilising one on pathogenic germs, as well as on putrefactive and fermentative organisms. Perhydrate, permanganate and thymol possessed germicidal power for certain bacteria, but had no effect on a series of micro-organisms which can enter the human body through the mouth.

2. By using warm suspensions or solutions (35° C.) individual mouth washes have a better disinfecting action for a few kinds of bacteria, but this action is not in any way sufficient for practical conditions. Perhydrate, potassium permanganate and thymol emulsion, even in warm solutions, are still ineffective against a few kinds of bacteria. In fact $KMnO_4$ acts somewhat less effectively in the warm than in cool solutions.

3. Only perhydrate and katharol were effective in checking bacterial development. In the case of the other preparations no hindrance to bacterial growth occurred.

4. In testing for the germicidal efficiency with respect to normal mouth bacteria, some of the mouth washes succeeded in decreasing these micro-organisms considerably.

5. The mouth bacteria which are pathogenic for mice (pneumococci) were not killed off or reduced sufficiently after the treatment of the mouth by any of the ten washes as to delay the death of the animals experimented upon, compared to the control animals.

6. Finely divided meat, used to simulate the oral mucous membrane, could not be protected from decay by any preparation within the period of 23 hours.

7. The mouth washes tested in this investigation, when used in the ordinary way (1 minute of rinsing), are not able to kill the majority of the germs of disease and of those causing decay of the mouth. However highly their other properties may be valued, they are not mouth disinfectants.

Acid Dentifrices may have as their base either kieselguhr or milk sugar, but cream of tartar is the active constituent. They are usually tinted :—

No. 2022.

400	Cream of tartar.
600	Kieselguhr.
0·5	Erythrosine.
10	Oil of peppermint.
1·5	Citral.
1012	

No. 2023.

300	Potassium bitartrate.
300	Milk sugar.
400	Kieselguhr.
0·2	Acid scarlet, 2 R.
7	Clove oil.
2·8	Caraway oil.
1010	

Alkaline Tooth Powder, No. 2024.

50	Sodium bicarbonate.
50	Borax.
400	Magnesium carbonate—heavy.
500	Precipitated chalk—light.
5	Eucalyptol.
5	Terpenyl acetate.
1	Soluble saccharine.
1011	

Antacid Dentifrices, No. 2025.

700	Precipitated chalk.
225	Magnesium carbonate—heavy.
75	Borax.
1	Eosine.
8	Cassia oil.
2	Rose oil.
1011	

No. 2026 (with soap).

40	Sodium bicarbonate.
60	Powdered white Castile soap.
900	Precipitated chalk—heavy.
15	Oil of peppermint.
5	Clove oil.
1	Cinnamon oil.
1021	

No. 2027 (very frothy).

150	Powdered soap.
810	Precipitated chalk—light.
30	Sodium bicarbonate.
10	Sodium chloride.
2	Thyme oil.
18	Peppermint oil—Italo-Mitcham.
3	Nutmeg oil.
2	Eugenol.
1	Saccharine 500.
1026	

Antiseptic Dentifrices are very similar to the above, with the addition of such substances as salol, phenol, boric acid, chlorate of potash, etc. :—

No. 2028.

25	Salol.
100	Powdered hard soap.
25	Boric acid.
100	Magnesium carbonate—heavy.
150	Prepared chalk.
600	Precipitated chalk.
15	Eucalyptol.
5	Anethol.
10	Phenylethyl alcohol.
1030	

No. 2029.

50	Potassium chlorate.
50	Powdered myrrh.
25	Phenol liquid.
75	Powdered orris root.
100	Powdered soap.
200	Kieselguhr.
500	Heavy precipitated chalk.
5	Caraway oil.
5	Clove oil.
10	Peppermint oil.
1020	

Add the carbolic acid to the kieselguhr and orris first, colour if desired, and then add the other ingredients.

Camphorated Chalk was at one time in great demand, but this has shown a distinct tendency to fall off in late years. The reason may be the pronouncement of one authority, who holds that while camphor whitens the teeth, it does so at the expense of cracking the enamel. In the majority of cases the following formula is adopted :—

No. 2030.

100	Camphor.
900	Precipitated chalk.
	Alcohol (a sufficient quantity).
1000	

The camphor is reduced to a fine powder by triturating it in a mortar with the spirit. The chalk is then added gradually, and the whole sifted twice—a sixty-mesh sieve is the desired standard of fineness.

In some cases magnesium carbonate, orris, or kieselguhr is added to the chalk as follows :—

No. 2031.

150	Camphor.
50	Kieselguhr—*white.*
100	Orris root powder.
700	Precipitated chalk.
q.s.	Rectified spirit.
1000	

Proceed as above.

The camphor content may be as low as 5 per cent, and as high as 20 per cent.

Carbolic Tooth Powders are made with either crystalline or liquefied carbolic acid. The latter is prepared by taking 100 grams of absolute phenol, adding 15 c.c. of distilled water, warming the two together on a water-bath, and then making the final weight 115 grams, by the addition of more water if necessary. The product should not solidify under normal conditions. The crystalline substance may also be liquefied by trituration with the flavouring oils or camphor, if it is included in the formula. Tooth powders containing fairly high percentages of phenol are liable to show signs of crystallisation after being made some time, and especially when they have been stored in too warm an atmosphere. This peculiar condition is more noticeable when the *liquefied* acid has been employed, but is prevented if rubbed down with the oils and kieselguhr

FIG. 1.—Type of machine used in the Manufacture of Tooth Powders, etc.

The various ingredients are placed in the hopper at top (with regulatable feed), which conducts them on to a specially formed circular brush, mounted in a semi-circular sieve frame.

This is covered with the mesh desired for the preparation to be treated and is so designed that foreign matter contained in the powders is automatically ejected through the overtail chute at the end of the sieve.

The sifted powders fall direct into the agitating chamber where they are evenly mixed.

The flavours may, if desired, be sprayed on to the powders by the apparatus situated on the left. This is disengaged when a flavourless powder such as Camphorated Chalk is being prepared.

The powders are discharged, while the machine is working, through an outlet at the bottom.

[*To face page* 26.

or orris before adding the chalk. Carbolic tooth powders are generally coloured pink, and a useful dyestuff for the purpose is phloxine. It is either dissolved in water and added to the base or else, as is more frequently the case, mixed with the phenol and oils. Prolonged trituration in a mortar or mill of the essentials with part of the base is desirable ; this is then added to the remainder, sifted, and mixed twice in a machine.

The most useful bases are kaolin, *heavy* precipitated chalk, and kieselguhr.

The most popular flavours are clove, rose, and wintergreen—peppermint is not often used.

Here are some formulæ :—

No. 2032.

25	Phenol absolute.
575	Kieselguhr.
400	Heavy precipitated chalk.
2	Rose otto.
8	Eugenol.
2	Phloxine or magenta crystals.
1012	

No. 2033.

40	Liquefied carbolic acid.
10	Camphor.
700	Kaolin.
150	Orris root powder.
100	Soap powder.
5	Bergamot oil.
5	Rose-geranium oil.
3	Neroli oil.
7	Clove oil.
5	Erythrosine, 3 B.
1025	

Note.—Either of these products may be sweetened if desired by the addition of suitable quantities of *soluble* saccharine, *i.e.* 1 to 2 grams in a kilo.

Charcoal Dentifrices are made with finely levigated *Carbo ligni* as follows :—

No. 2034.

400	Powdered charcoal.
100	Powdered cuttlefish bone.
200	Prepared chalk.
200	Heavy magnesium carbonate.
100	Sugar of milk.
0·5	Benzaldehyde—F.F.C.
6	Eugenol.
3·5	Citronellol.
1010	

No. 2035.

800	Finest charcoal powder.
175	Myrrh powder.
25	Quinine sulphate.
0·75	Menthol.
8	Rose-geranium oil
5	Clove oil.
5	Nutmeg oil.
1018	

No. 2036.

45	Camphor.
350	Charcoal.
5	Menthol.
600	Heavy precipitated chalk.
5	Cassia oil.
5	Cinnamon oil.
1010	

Oxygenated Tooth Powders are made with either calcium or magnesium peroxides, and sometimes with sodium perborate :—

No. 2037.

10	Calcium peroxide.
340	Kieselguhr.
600	Precipitated chalk—light.
50	Hard soap in powder.
0·5	Menthol.
4·5	Methyl salicylate.
5	Peppermint oil—Italo-Mitcham.
1010	

No. 2038.

25	Sodium perborate.
75	Castile soap powder.
300	Prepared chalk.
600	Precipitated chalk—light.
0·1	Thymol.
5	Eucalyptol.
14	Geraniol.
0·7	Saccharine 500.
1019	

Quinine Dentifrices may contain either quinine sulphate or powdered cinchona bark and sometimes both. They are often prescribed by medical men for those who are under treatment with mercury, in some form or another, and are said to prevent the loosening of the teeth. Chlorate of potash, myrrh, rhatany, and orris are also common constituents of this type of tooth powder. *Peruvian* is a pseudonym frequently adopted for these products. Here are two formulæ :—

No. 2039.

5	Quinine sulphate.
45	Powdered pumice.
900	Precipitated chalk—heavy.
50	Castile soap powder.
5	Cassia oil.
5	Rose-geranium oil.
1010	

No. 2040.

20	Cinchona powder.
50	Krameria ,,
26	Myrrh ,,
4	Quinine sulphate.
100	Potassium chlorate.
800	Chalk.
5	Peppermint oil—American.
3	Geranium oil—Bourbon.
2	Lavender oil—French.
1010	

Smokers' Tooth Powders usually contain a fair proportion of gritty substances such as pumice or cuttlefish bone. They are generally heavily perfumed and occasionally tinted *blue*. Two formulæ follow :—

No. 2041.

200	Cuttlefish bone—powdered.
700	Kieselguhr.
100	Powdered soap.
0·6	Menthol.
1	Thyme oil.
9	Clove oil.
4·4	Nutmeg oil.
2	Methylene blue.
1017	

No. 2042.

100	Powdered pumice.
100	Powdered orris.
200	Kaolin.
600	Heavy chalk.
2	Saccharine soluble.
1	Chlorazol blue, 3 B.
5	Peppermint oil—Italo-Mitcham.
5	Lavender oil—French.
9	Geranium oil—Grasse.
1	Nutmeg oil.
1023	

Saponaceous Tooth Powders when so named generally contain a large quantity of soap, and as much as 30 per cent is used by one well-known manufacturer. Lemon is a favourite flavour and well covers the slight taste of the soap :—

No. 2043.

200	Powdered Castile soap.
400	Chalk—precipitated, heavy.
400	Carbonate of magnesia.
1	Gluside 500.
1	Peppermint oil.
9	Lemon oil.
1011	

No. 2044.

150	Powdered soap.
350	Kieselguhr.
500	Chalk—precipitated, light.
5	Lavender oil—French.
5	Rose-geranium oil.
1010	

No. 2045.

180	Powdered soap (from cocoa butter).
20	Powdered borax.
200	Prepared chalk.
600	Precipitated chalk.
1·5	Saccharine.
6	Eucalyptus oil.
4	Methyl salicylate.
1	Rose otto.
1012	

Tin Oxide Dentifrices possess the peculiar property of giving an unusual gloss to the teeth. The quantity of stannic oxide used should not exceed 20 per cent, and in some cases a little pumice or cuttlefish bone is added. Two formulæ are appended :—

No. 2046 (Pink).

800	Kieselguhr.
100	Stannic oxide.
10	Phenol.
90	White Castile soap.
10	Bergamot oil.
5	Clove oil.
5	Rose-geranium oil.
1	Eosine.
1021	

No. 2047 (White).

800	Precipitated chalk—light.
25	Powdered pumice.
75	Stannic oxide.
100	Powdered soap.

No. 2047 (White) (*continued*).

1	Saccharine soluble.
5	Peppermint oil—Italo-Mitcham.
0·1	Thymol.
2	Cassia oil.
1008	

Tartar Remover Tooth Powders are said to be most efficacious when they do *not* contain a carbonate, soap, or any alkaline constituent. The active ingredient should be *sodium benzoate* since it acts as a solvent on the tartar incrustations. Here is a suitable formula :—

No. 2048.

50	Sodium benzoate.
950	Kieselguhr.
1	Erythrosine, 3 B.
1·5	Gluside 500.
4	Cassia oil.
8	Clove oil.
8	Peppermint oil—Italo-Mitcham.
1022	

Tooth Pastes may be prepared from almost any of the above-mentioned powders, but satisfactory products will only be obtainable if a suitable *excipient* is used in each case. A selection may be made from the following :—

Glycerine.
Glycerine of starch.
Glucose.
Honey (clarified).
Simple syrup.
Golden syrup (purified molasses).
Tragacanth mucilage.
Irish moss mucilage
Agar-agar.

These substances are seldom, if ever, used alone but are more generally diluted with three or four times their weight of water. In the case of the mucilages, they are added in comparatively small percentages to maintain the

colloidal balance and so prevent separation under extremes of temperature.

Dental creams have a tendency to *harden*, and this is particularly noticeable when they contain an appreciable quantity of *soap*. Four kinds may be used, and the above characteristics are most marked when powdered Castile soap is employed. The cream is then made on the soft side, and in some cases it is better to even make it *liquid*. The soap gradually dissolves in the excipient and stiffens after a few hours, when a good indication of the consistency of the paste is obtained. In this case it is desirable to add 1 *per cent of liquid paraffin* (which must be of high viscosity and have a specific gravity of at least 0·885), since this small quantity of mineral oil will act as a lubricant, and even if the cream stiffens noticeably, it will come out of the tube without undue pressure.

Another good soap is made from cocoa butter by saponifying it with soda lye, the resulting product being washed, salted out, etc., in the usual manner. It possesses no appreciable taste, and this is easily masked with the ordinary flavouring agents, of which peppermint and eucalyptus are good examples.

Soft soap is occasionally employed, and is made by saponifying olive or almond oil with potash lye. In order to prevent any reaction after the cream is made, the soap must be absolutely neutral.

Specially prepared dental soap powder is now made by the leading soap manufacturers. It is white, or creamy white, neutral and tasteless. Such a product is always to be preferred and does not occasion trouble after manufacture of the tooth paste if due precautions as to formula are taken.

The *colour* of a tooth paste depends largely upon the choice of bases. For *white* kinds chalk is good, but in many cases it has recently been replaced, either wholly or in part, by **Tricalcium Orthophosphate**, purified and in fine powder. Kieselguhr, kaolin, orris, etc., cannot be used owing to the yellowish-grey colour produced when mixed

with the excipient. They are, however, excellent bases for *pink* creams. Borax should be avoided, as there is a tendency to form boric acid in the presence of glycerine. If the base contains chalk, free CO_2 may be liberated, when the paste will become spongy. Salicylic acid is a good preservative; one in a thousand is sufficient, but great care is necessary during manufacture, otherwise a brownish cream will result (on contact with iron). The esters of hydroxy-benzoic acid are now preferred owing to their greater activity. The *consistency* of the cream is improved by the presence of some mucilaginous substance. Starch and tragacanth are good, but acacia is not used, as it ferments very rapidly. One-and-a-half to two grams of tragacanth per kilo of cream is ample. Strained Irish moss mucilage is also useful.

Manufacture.—This is a little more difficult than the production of tooth powders, and the inside of the machine and blades should be at least *tinned*, but for preference *enamelled*. The best type of modern machine is of similar construction to that illustrated facing p. 26, but there are other patterns. Dough mixers make very good pastes, but the movement of the blades should be slow. If rotation is too rapid the paste will contain a lot of air bubbles, which is a decided disadvantage, and will cause trouble while the cream is being filled into tubes.

The excipient is first mixed with the desired quantity of water, and some of it is placed in the machine. The powder bases, which have been previously sifted, are now added gradually, the right balance or consistency being maintained by the frequent addition of further quantities of excipient. The flavouring agents are added during this part of the process, as also the mucilaginous bodies, if contained in the formula. The soap is added *last*, when the cream will immediately become very soft. Mixation is continued until even distribution of all the constituents has been attained, and the product is then put through a fine sieve to remove any grit or lumps of congealed soap, etc. The cream is allowed to stand a few hours and then filled.

Filling into tubes is an operation which requires much attention on the part of the manufacturer, as if the methods are not efficient much money may be lost. There are several machines obtainable, and the usual pattern for small production is worked by hand, and consists of a hopper for the cream, a forcer manipulated with the right hand, and a cut-off operated either by the left hand, or preferably by the foot, when the left hand is free to place the tubes on the ejecter. For large-scale production there are machines which do everything but pack the closed tubes in boxes. Some of these are satisfactory, but they are generally very expensive and require much careful attention. A very simple filling apparatus can be made from a *mincing machine* if the diagram on next page be followed in detail.

A is the hopper, which may be connected with the floor above if the mixing plant is situated there, and this arrangement saves much time and money, as gravity does the work required of men when the mixing plant is on the same floor as the filling apparatus. B is the body of the mincing machine, which is not used satisfactorily as purchased. It is imperative that the worm C should fit *exactly*, and this can only be attained by tinning the inside of the mincer and then re-turning to the exact bore. The base D is clamped firmly to the table E. The pulley F is driven from a shaft above, and each machine requires a motor of about two horse-power for efficient work. The part G requires to be made so that it will screw on to the end of the mincing machine. The cream is forced through this into H, which has *one or two* exit tubes, J, on each side. The operator places the dental cream tube on J, and by pressing down the cord K with a foot appliance, forces the cut-off plate L into the box M, and the cream passes into the tube through J. When the foot is released the plate L is forced back by the spring N, and the tube may be removed from J and replaced by another one. The operation is repeated "ad lib." The stopper O may be adjusted according to the length of the cream tube and the quantity of paste desired to fill it. Its use is not imperative since a mark can be filed on J, and

the operator will release the spring when the tube passes it. P shows the position of the tube when first placed on the nozzle J, while R shows its position (on the opposite side) when filled.

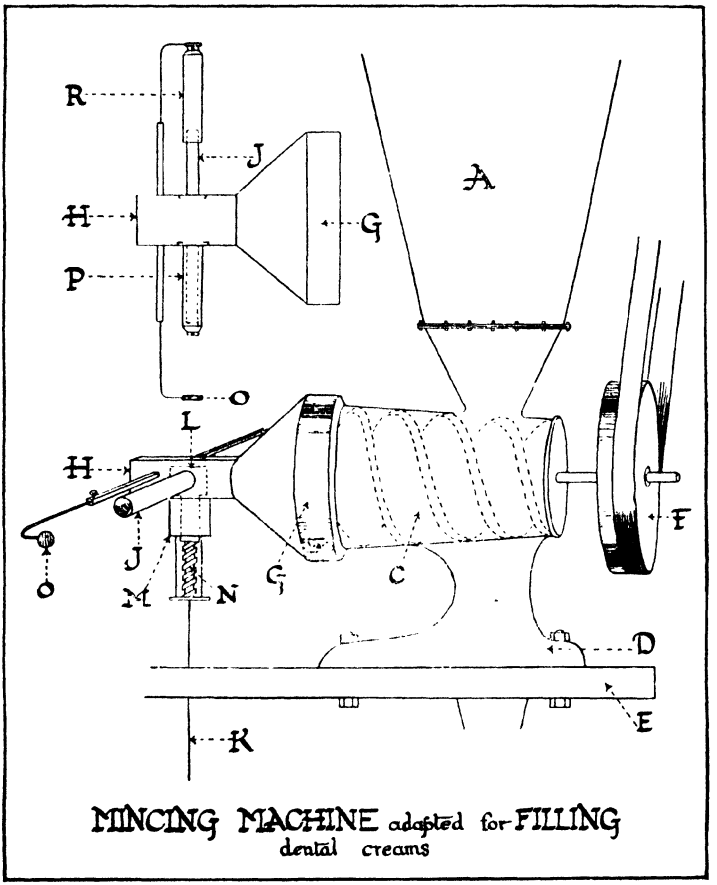


FIG. 2.

The filled tubes are now passed on to *operator No.* 2, who nips them to the desired shape, using a small device fitted to the table ; and then to *No.* 3, who makes a double

bend in the flat end of the tube with a neat little machine ; and then to *No.* 4, who places a clip in the sealed end ; *No.* 5 cleans off any adherent cream ; *No.* 6 cartons the tube ; and *No.* 7 packs these in boxes ready for dispatch !

Formulæ.

No. 2049 (White Cream).

300	Precipitated chalk—light.
400	Tricalcium orthophosphate.
0·5	Soluble saccharine.
100	Soap powder.
1	Tragacanth.
5	Peppermint oil.
1	Spearmint oil.
2	Methyl salicylate.
	Clarified honey, Glycerine and water } of each, a sufficient quantity.
1009	

No. 2050 (Pink Cream).

400	Kieselguhr.
300	Heavy chalk.
100	Powdered orris.
1	Salicylic acid.
200	Powdered soap.
9	Eucalyptol.
0·5	Menthol.
6	Eugenol.
0·75	Gluside ·500.
1	Erythrosine, 3 B.
ää q.s.	Glycerine of starch. Water.
1018	

No. 2051 (Agar Cream).

Make a solution of agar-agar by dissolving 8 grams in 1200 c.c. of hot water and evaporate on a water-bath until the volume is reduced to 700 c.c. Strain while hot and use as follows :—

No. 2051 (Agar Cream) (*continued*).

400	Agar solution.
160	Glycerine.
15	Tincture of benzoin.
7	Peppermint oil.
3	Clove oil.
0·1	Thymol.
1	Soluble saccharine.
250	Soap powder.
14	Boric acid.
150	Precipitated chalk.
1000	

Pancreatin Tooth Paste.

The use of pancreatin for the softening and aid to the removal of tartar has been found effective and without damaging the enamel in any way. I. Dorph, a well-known German lady dentist, has used the following product with considerable success :—

No. 2052.

1000	Precipitated chalk.
100	Powdered soap.
20	Pancreatin.
q.s.	Peppermint.
	Glycerine—enough to form a paste.
1120	

Solid Dentifrices are a convenient and handy form of cleansing specific for the teeth. They can be prepared by dissolving soap, preferably that made with soda lye, in a mixture of glycerine and water with the aid of heat. Any tooth powder may then be incorporated until the whole is a stiff mass. This is dried on trays, and when no more shrinkage occurs, it is cut into blocks, which are stamped out with a machine. The percentage of flavour is always higher in these products owing to the quantity of soap present. It should not be less than 2 per cent. For large-scale production it is preferable to work very much on the lines of preparing milled toilet soap. The powders are added to finest neutral soap chips, the whole damped and milled

three times. The flavour is then added and the whole milled again. The strips are passed through a plodder and stamped into suitable shapes in a press. A formula which may be modified to suit individual tastes is as follows :—

No. 2053.

250	No. 1 soap chips.
400	Heavy precipitated chalk.
100	Powdered orris root.
250	Powdered cuttlefish bone.
10	Peppermint oil—American.
7	Aniseed oil.
3	Clove oil.
50	Glycerine.
2	Saccharine soluble.
q.s.	Water.
1072	

Liquid Dentifrices and **Mouth Washes** have a comparatively small sale in Britain, and the latter are often prescribed by medical men and dentists for improving the condition of the mouth and in some cases for hardening the gums. The qualities that must be possessed by them all are :—

1. A refreshing and pleasing flavour.
2. A delicate odour.

A further division is made between those which are foaming, or saponaceous, and those which are not.

The *refreshing flavour* is obtained in nearly all cases with either menthol or oil of peppermint, although oil of spearmint is sometimes used. When oil of peppermint is employed the finest quality only must be used, and if the product will not stand the high price of English oil, then use either Australian, American, or Italo-Mitcham. Other flavourng agents used in conjunction with mint are : anethol, eugenol, eucalyptol, cinnamon, cassia, rose, pelargonium, caraway, lavender, and wintergreen.

Cinnamon, cassia, and cloves are used in very small quantities owing to the intensity of their flavour, but as the

others are pleasanter, larger proportions may be employed. Cologne oils are also useful in certain types.

Foaming properties are obtained with the use of quillaia bark, or for preference **Saponin.** If the former is employed it should be reduced to No. 10 powder, and either macerated or percolated (preferably the latter) with 30 per cent alcohol. If a colourless product is desired the tincture so obtained must be filtered through charcoal. Saponin is apt to produce a straw-coloured solution, and in consequence a similar procedure is desirable.

Saponaceous dentifrices are made with either theobroma, olive, or almond oil soaps (described under dental creams, *which see*).

The *antiseptics* employed include: salol, boric and benzoic acids, borax, phenol, and thymol.

The *colours* used include: carmine or cochineal, eosine, magenta, and saffron.

When a few drops of the product are to be added to a wineglass of water, the strength of alcohol used is fairly high. Terpeneless oils are best for "de luxe" preparations, and when milkiness is required it is obtained by the use of myrrh, benzoin, or salol. The resinous matter in the two former throw out when added to water. Sometimes liquid dentifrices are directed to be applied to the brush when these need not be used.

Foaming Dentifrices.

No. 2054 (Colourless).

15	Peppermint oil.
0·2	Thymol.
4·5	Anethol.
1·8	Eugenol.
0·5	Cinnamon oil.
0·5	Saponin.
2·5	Benzoin R.
75	Orange flower water—triple.
900	Alcohol, 90 per cent.
1000	

No. 2055 (Pink).

5	Peppermint oil—English.
5	Anise oil (from *Pimpinella A.*).
20	Phenol.
20	Boric acid.
20	Tincture of myrrh.
100	Tincture of quillaia.
50	Tincture of cochineal.
30	Tincture of vanilla.
1	Cinnamon oil.
2	Clove oil.
50	Glycerine.
100	Rose water—triple.
597	Alcohol.
1000	

Saponaceous Dentifrices.

No. 2056 (Red).

50	Cocoa butter soap.
2	Methyl salicylate.
1·5	Clove oil.
8	Peppermint oil.
3	Aniseed oil.
1	Rose-geranium oil.
0·5	Menthol.
30	Rhatany tincture.
20	Myrrh ,,
10	Salol.
100	Cinnamon water.
774	Alcohol, 90 per cent.
1000	

No. 2057 (Pink).

100	Olive oil soap.
100	Glycerine.
10	English oil of peppermint.
0·5	Oil of cassia.
1	Oil of cloves.
2·5	Oil of eucalyptus.
0·75	Vanillin.
3	Oil of aniseed (star).
0·1	Eosine or phloxine.
783	Alcohol, 80 per cent.
1000	

Non-frothy Dentifrices.

No. 2058 (similar to Odol).

40	Salol.
7·5	Peppermint oil—finest.
2	Gluside 500.
0·5	Anethol.
5	Essence of vanilla.
945	Alcohol, 90 per cent.
1000	

No. 2059 (similar to Pierre).

100	Star anise.
10	Cochineal.
900	Spirits of wine, 90 per cent.
1010	

Macerate for fourteen days, press the marc and filter. Then add :—

30	Anise oil.
10	Peppermint oil—Mitcham
0·5	Heliotropin.
q.s.	Alcohol, 90 per cent.
1050	Total

Store in the cold for six months and then filter bright.

No. 2060 (similar to Eau de Botot).

10	Anethol.
1	Eugenol.
0·5	Cinnamon oil.
0·5	Lemon oil.
3	Peppermint oil—English.
5	Tincture of cochineal.
750	Alcohol, 90 per cent.
230	Triple rose water.
1000	

Dissolve the aromatics in the alcohol and then add the rose water of commerce.

No. 2061 (Sodium Phenate).

20	Phenol.
5	Sodium hydroxide sticks.
150	Glycerine.
50	Tincture of cudbear.
250	Orange flower water—triple.
150	Rose water—triple.
50	Cinnamon water.
325	Peppermint water.
1000	

Dissolve the phenol and caustic soda in the orange flower water and add the other ingredients.

Note.—According to the chemical equation the carbolic acid is in excess—but this is the usual way of preparing the article.

Mouth Washes are used frequently when the mouth is sore or tender. The average quantity for each application is two teaspoonfuls to a wineglass of water.

No. 2062.

20	Boric acid crystals.
250	Tincture of myrrh.
30	Tincture of krameria.
1	Menthol.
100	Orange flower water.
599	Eau de Cologne.
1000	

Filter bright—if necessary—using talc.

No. 2063.

0·5	Menthol.
0·1	Thymol.
2	Anise oil.
1	Eucalyptus oil.
5	Peppermint oil—*Italo-Mitcham.*
1	Eugenol.
20	Benzoic acid.
100	Tincture of myrrh.
870·4	Alcohol.
1000	

No. 2064 (Glycerine Thymol).

0·5	Menthol.
0·2	Thymol.
1·3	Eucalyptol.
0·5	Bornyl acetate (or oil of pine).
0·3	Methyl salicylate.
0·2	Anethol.
5	Tinct. cochineal.
50	Alcohol.
58	

Mix these together and add to the following solution—

20	Borax.
10	Sodium bicarbonate.
5	Sodium benzoate.
5	Sodium salicylate.
100	Glycerine.
810	Water.
1008	Total.

The product now makes one litre.

Stand aside for twenty-four hours, stirring occasionally, and then filter, using either talc or kaolin if necessary, to obtain a perfectly bright product.

Myrrh and Borax with Cologne, No. 2065.

300	Tincture of myrrh.
20	Tincture of rhatany.
1	Neroli oil.
2	Lemon oil.
2	Bergamot oil.
0·5	Rosemary oil.
0·5	Clary sage oil.
1	Sweet orange oil.
100	Glycerine of borax.
573	Alcohol, 90 per cent.
1000	

Mix and make up to volume. For use as a mouth wash dilute one teaspoonful to a wineglassful of water.

CHAPTER III.

HAIR PREPARATIONS.

1. Bay rums.
2. Brilliantines, one and two solution, solid.
3. Lime creams, crystallised and Brilliantine Creams.
4. Non-greasy creams.
5. Hair curling applications, powder and liquid.
6. Depilatories, rhusma, powder and paste.
7. Hair fixers, solid and liquid. Hair waving and setting preparations.
8. Hair lotions and tonics, rosemary and cantharides, jaborandi, quinine, cholestrin. Friction lotions. Scurf and dandruff lotions.
9. Pomades, white and coloured.
10. Hair restorers.
11. Shampoos, powders, wet and dry, liquid, liquid dry.
12. Coco-nut oil shampoos, pine tar, henna and sulphonated lorol.
13. Rinses.
14. Hair lacquers.

Bay Rum is said to have been first made in the West Indies. It is doubtful if any reaches Britain from this source nowadays, as practically every perfumer makes his own. The solvent for the bay oil rarely consists of rum, but is more frequently industrial methylated spirit diluted with water. In order to employ this raw material it is necessary to obtain a permit from the Excise authorities, and at the time of application the formula must be disclosed. *Quassia extract* must appear among the ingredients, and should occur to the extent of at least 0·05 per cent (dry extract). The bouquet of a good bay rum is suggestive of *Eugenol*, but this natural isolate is seldom used. The oils employed contain it, however, and may be chosen from—

Bay.
Pimento.
Clove.
Cinnamon leaf.

If the manufacturer desires to use *rectified* spirit and obtain a comparatively cheap product, he is recommended to replace any of the oils given in the following formulæ by their terpeneless equivalents (for these *see* table in Volume I).

The colour of a bay rum should be the palest brownish-yellow, and this may be obtained by adding traces of burnt sugar (caramel) to the aqueous portion before mixing with the alcohol.

If rum is not used in the formula a suggestion of its presence may be obtained with acetic æther or by using mere traces of aldehyde C_7.

Here is an example made with Jamaica rum :—

No. 2066.

2	Oil of bay.
0·5	Oil of pimento.
500	Alcohol.
100	Jamaica rum.
400	Water.
q.s.	Burnt sugar.
1002	

Another simple formula without rum :—

No. 2067.

1·5	Oil of bay.
0·5	Oil of cloves.
0·5	Acetic æther.
600	Alcohol.
100	Tincture of quillaia.
300	Water.
1002	

Products having fine bouquets may be made as follows with industrial methylated spirit :—

No. 2068.

2·5	Oil of bay.
0·4	Oil of cinnamon *leaf*.
0·1	Aldehyde C_7 (10 per cent solution).
1	Quassia extract solid.
650	Industrial spirit.
350	Water.
1004	

No. 2069.

1·5	Oil of bay.
0·3	Oil of pimento.
0·2	Eugenol.
0·5	Acetic æther.
0·5	Quassia extract.
600	Industrial spirit.
400	Water.
q.s.	Burnt sugar.
1003	

Dissolve the oils in the spirit and add the acetic æther. Tint the water with the colouring matter and dissolve the quassia extract in it, using gentle heat if necessary. Cool, and then mix the two solutions. Filter bright.

Brilliantines have a large sale. There are three distinct kinds: (1) liquid—*one*-solution, (2) liquid—*two*-solution, (3) solid.

The *liquid* kinds are generally made with liquid paraffin of gravity between ·870 and ·890. If a lighter oil is used it should be pure white, show no sign of fluorescence, be odourless, and as free as possible from sulphur compounds. Such oils are obtained at a cheap rate and have a gravity averaging ·860. Other liquids which may be employed are: castor, almond, olive, and pea-nut oils, and for *non-oily* types, glycerine alone or diluted with water.

The *perfumes* are compounded from synthetics and terpeneless oils. Ordinary oils and resinous fixatives should be avoided for perfuming *paraffin*, as they are not miscible in clear solution, and in consequence require filtering, which is slow and costly, apart from the loss of perfume.

The colours indicated for *pomades* may be used.

Here are some formulæ for **One-Solution Brilliantines:—**

Violet Oil (Green), **No. 2070.**

800	Liquid paraffin 0·870.
200	Almond oil.
0·5	Chlorophyll.
3	Methyl ionone.
1	Santalwood oil.
1	Methyl heptine carbonate.
1	Irone.
2	Cananga oil—terpeneless.
2	Linalol.
1010	

Rub down the chlorophyll in a warmed mortar with the fixed oil. Allow to settle, pour off bright, and add to the paraffin. Mix in the perfumes.

Lilac Oil (White), **No. 2071.**

1000	Paraffin liquid 0·860.
5	Hydroxy-citronellal.
5	Terpineol.
2	Benzyl acetate.
1	Anisic alcohol.
1013	

White Rose Oil, No. 2072.

1000	Paraffin liquid.
8	Geraniol.
1	Benzyl acetate.
1	Patchouli oil—terpeneless.
1010	

Oil of Flowers (Golden), **No. 2073.**

500	Paraffin liquid.
500	Peach kernel oil.
5	Benzoic acid
1	Methyl anthranilate.
3	Hydroxy-citronellal.
1	Bergamot oil—terpeneless.
2	Terpineol.
2	Rhodinol.
1	Iso-eugenol.
0·1	Oil soluble, yellow base.
1015	

Mimosa (Alcoholic), **No. 2074.**

150	Castor oil.
850	Alcohol, 90 per cent.
0·01	Malachite green.
1	Para-methyl acetophenone.
2	Terpineol.
2	Hydroxy-citronellal.
5	Benzyl acetate.
2	Peru balsam.
1012	

Carnation (Red), **No. 2075.**

800	Castor oil.
200	Almond oil.
5	Iso-eugenol.
4	Terpineol.
1	Amyl salicylate.
1010	

Two-Solution or *Separable* brilliantines are made by dissolving the perfume in strong alcohol mixed with castor oil, and then placing this in a bottle which is already about three-quarters full of the basic oils (coloured). Here is an example of

MINERAL OIL TYPE.

Violet, No. 2076.

800	Liquid paraffin 0·860-0·890.
10	Castor oil.
5	Alpha ionone.
2	Ylang-ylang oil—Manila.
1	Bergamot oil.
1	Jasmin, No. 1055.
1	Heliotropin.
180	Rectified spirit.
1000	

First colour the liquid paraffin green with oil soluble chlorophyll. Stand aside and decant when bright. Dissolve the other oils and heliotropin in the alcohol and then proceed as above stated.

Here is another of

VEGETABLE OIL TYPE.

Bouquet, No. 2077.

800	Peach kernel oil.
10	Castor oil.
3	Neroli, No. 1081.
3	Jasmin, No. 1053.
1	Rose, No. 1092.
3	Ylang-ylang oil—Bourbon.
180	Rectified spirit.
1000	

Proceed as above. No added colouring matter is necessary, but some prefer to brighten the appearance by a little oil-yellow base.

Solid Brilliantines consist largely of white or yellow paraffin jelly. The makers in fact sell this type of raw material of high melting-point, which only requires perfuming, and is then ready to be run into tins or pots. If the ordinary soft paraffin is used it should be mixed with ceresine or white wax. The two favourite colours are green and yellow, and these may be obtained either with chlorophyll or gamboge, or for preference with any of the oil soluble dyestuffs. The method of manufacture is identical with that of *Pomades* (*which see*).

Here are two formulæ :—

Oriental, No. 2078.

940	Soft paraffin—yellow.
60	Beeswax.
q.s.	Oil yellow—if necessary.
1	Patchouli oil.
1	Vetivert oil.
1	Ethyl cinnamate.
1	Benzyl ,,
5	Bergamot oil.
3	Rose, No. 1092.
4	Balsam of Peru.
4	Musk ketone.
1020	

Violet, No. 2079.

900	Soft paraffin—white.
100	Ceresine—white (low melting-point).
2	Bergamot oil.
4	Ionone alpha.
1	Violet leaves absolute, 10 per cent.
2	Heliotropin.
1	Vetivert oil.
q.s.	Chlorophyll.
1010	

Lime Creams (Crystallised) are similar to the above. It is essential that all the ingredients should be devoid of colour in order that the cream when solid shall be pure white.

Here is a formula :—

No. 2080.

600	Castor oil (*bleached*).
275	Almond oil ,,
100	Cetaceum.
25	Ceresine—white.
3	Limette oil—*terpeneless*.
2	Bergamot oil ,,
1	Hydroxy-citronellal.
1006	

Melt and strain the bases—cool and add the perfume. Pour into tins or glass jars and allow to solidify slowly.

Lime Creams (Liquid) were invented by E. Rimmel, and at one time were a popular dressing for the hair. Many imitations have been put on the market, and the majority of them used to be made from lime waterand olive oil (with or without glycerine). Such preparations are not satisfactory and separate badly.

The modern prototypes made with liquid paraffin are called *Brilliantine Creams* and depend for their stability upon the saponification *in situ* of stearic acid with triethanol-amine. The addition of a glossing agent such as beeswax is desirable, and many modifications are possible by the introduction of other oils and waxes. The ultimate

viscosity does not necessarily depend upon the waxes but rather upon the gravity of the paraffin and its ratio to that of the water content

Here is a good formula :—

No. 2081.

440	White oil 0·860.
44	Stearic acid.
10	White beeswax.
5	Triethanolamine.
500	Distilled water—warm.
1	Rose patchouli compound.
1000	

Melt the solids in the white oil and add the emulsifying agent to the water. Mix, but do not agitate too violently to avoid excess of bubbles. Cool and add the perfume. Pack in wide-mouth bottles.

Non-Greasy Hair Creams are generally made with white powdered tragacanth and small quantities of glycerine. The gum is mixed with alcohol, the glycerine, oil and perfumes added, and the whole transferred to a whisking machine. The water is poured in gradually until the volume is attained and the liquid is allowed to thicken. It is then strained through muslin and bottled. The following formula will give good results :—

No. 2082.

10	Tragacanth.
5	Tincture of tolu.
50	Alcohol.
20	Glycerine.
10	Almond oil.
2	Hydroxy-citronellal.
2	Ylang-ylang oil.
5	Linalol.
1	Jasmin absolute.
895	Water.
1000	

Note.—The success of this preparation depends very largely on the *quality* of the gum used. It should be the best.

Another type of greaseless hair cream may be prepared with purified sodium alginate, the viscosity of the resultant mucilage being exactly controlled by thickening the colloidal solution with calcium citrate as follows :—

No. 2083.

14	Sodium alginate.
500	Distilled water.
30	Ethylene glycol.
4	Perfume.
1	Preservative.
1	Calcium citrate
450	Distilled water.
1000	

Dissolve the Manucol V in the water and the preservative and perfume in the glycol. Mix. Slurry the calcium salt in the remainder of the water and add to the former. Allow to stand aside for sufficient time to form a stable thickened cream.

Hair Curling Applications are sold both in solid and liquid forms. Their purpose is to saponify the natural fat of the hair so that when it dries the curl will be more permanent. They are made with the alkaline carbonates or borax, and a gum is often added.

Powder Form, No. 2084.

750	Sodium carbonate—dried.
240	Powdered acacia.
5	Musk xylol.
5	Rose-geranium oil.
1000	

Mix and direct a small dessertspoonful to be dissolved in a cupful of hot water and sprinkled on the hair before curling.

Liquid Form, No. 2085.

40	Potassium carbonate.
10	Borax.
100	Mucilage of tragacanth.
5	Coumarin.
1	Methyl acetophenone.
100	Alcohol.
744	Rose water.
1000	

Dissolve the borax and potassium carbonate in 500 c.c. of rose water, mix the other ingredients, and add.

Make up to volume.

Depilatories have been used for centuries to remove superfluous hair. Many women prefer to shave nowadays, but the depilatory possesses this advantage over the razor—it removes the hair at the neck of the hair follicle. Shaving removes it on a level with the surface of the epidermis and the growth becomes noticeable sooner.

The majority of depilatories in use to-day owe their efficacy to the presence of a sulphide of either the alkalis or alkaline earths. They rapidly convert the hair into a soft pulpy mass which can be easily scraped off the skin.

Rhusma was the name given to the first depilatory used by oriental women. It consisted of a mixture of orpiment and unslaked lime, and for use was made into a paste with water and applied to intimate parts of the body.

Orpiment is a sulphide of arsenic and is very dangerous when there is a skin abrasion. Its employment in Europe has been practically abandoned.

The sulphides of calcium, strontium, and barium are not so dangerous, providing due care is exercised on their employment. They are much more active when freshly prepared, and as this presents no great difficulty, the operation is conducted as follows: Equal parts of the sulphate and powdered charcoal are mixed intimately in a mortar and made into a paste with linseed oil. This is calcined by placing in a red-hot fire, it being removed when white-hot and allowed to cool. When cold it is powdered and is ready for use. The reaction is according to the following equation:—

$$XSO_4 + 4C = XS + 4CO.$$

The powdered sulphide is now mixed with starch and talcum or zinc oxide and packed in air-tight containers. For use it is made into a paste with water or syrup and spread on the skin so that no hair shows through the upper surface of the layer. These depilatories are rather slow to

act and generally take about 10 minutes before the hair can be completely removed. The paste, which will have dried, should be carefully scraped off with a bone spatula or washed off with soapy water. If the part shows signs of irritation or inflammation, cold cream should be applied.

To-day these products are looked upon as old fashioned, because they have been almost completely replaced by the **Depilatory Pastes** marketed in a tube and ready for use. Some owe their efficacy to sodium sulphide, one of the most active and least dangerous of the sulphides. This chemical can be purchased and is quite good if fairly fresh. If desired it may be prepared by passing sulphuretted hydrogen into a solution of sodium hydroxide until saturated. In preparing the paste the proportion of Na_2S should never exceed 5 per cent, since delicate skins are affected by irritation. Generally about 2 per cent will be found a successful medium. This is dissolved in twenty times its weight of rose water and made into a paste with calcium hydroxide to which has been added some osmo-kaolin and occasionally some sugar. If osmo-kaolin is not used, some glycerine is generally necessary to make the paste bind well. Soft soap has also been employed. This paste should be made the consistence of cream, as it will stiffen a little in the tubes. This depilatory is placed on the skin in a thin layer and removed as soon as the slightest irritation becomes noticeable—generally after about 3 minutes. It is then scraped or washed off. The principal disadvantage in the use of sodium sulphide is that of exhibiting irritant properties in many subjects and also its comparative instability. On this account strontium sulphide has received a certain amount of attention. It produces a white cream, but is not so stable as calcium sulphide. On the other hand, the latter is prone to give greenish products unless whitened by the addition of titanium dioxide. The calcium salt has the advantage in costing and is therefore preferred by large manufacturers. It is imperative that it be freshly prepared if an efficacious product is desired.

All sulphide depilatories require to be perfumed, as the

unpleasantness of the odour has to be counter-blended. For this purpose a mixture of any of the following are good :—

Spanish geranium oil, lemon oil, bergamot oil, palmarosa oil, clove oil, cassia oil, petitgrain, caraway, patchouli, santal, vetivert, geraniol, citronellol, ionone, naphthol ethers, diphenyl oxide and methane, and benzophenone. The compound should have a sharp odour, and one, moreover, that diffuses at about the same rate as the sulphide odour.

Other forms of sulphide depilatories have from time to time appeared. A patent was taken out by Zrzawy and Huettemann for one which consisted of slaking quicklime with water containing sucrose and passing sulphuretted hydrogen through the resulting solution of calcium saccharate. This method of preparation could be modified by saturating the sucrose solution first with H_2S and then stirring in the lime until a pale green or blue paste resulted. This was subsequently adjusted to contain 5 per cent of lime salt. Another process was invented by Bœttger who passed a current of hydrosulphuric acid into thick whitewash until saturated. The resulting calcium sulphydrate he mixed with half its weight of starch and glycerine of starch. This paste is alleged to take from 20 to 30 minutes to act!

Other types of depilatories have occasionally appeared. Towards the end of the nineteenth century a product was introduced on the continent of Europe which consisted of a mixture of castor and turpentine oils, alcohol and collodion, having a small percentage of iodine in solution. This was applied daily for four or five days and the film removed, leaving the skin free from hair. A modification of this appeared later when the turpentine oil was replaced by venice turpentine (a mixture of resin, turpentine, and linseed oils). The application differed in that the hairs were *pulled out* by sharply removing the film. Still another process has been advocated—that of melting together beeswax, resin, and ceresine and pouring this waxy compound on the affected part. It is allowed to set and then quickly pulled off from one end. While somewhat painful

this method has the feature of removing the hair completely by the roots.

According to some medical authorities any of the above methods are liable to cause skin trouble, especially with continuous use. The application of salts of thallium for this purpose were at one time advocated. It is, however, clear from medical reports by dermatologists, that numerous cases of more or less severe injury have been due to the external use of these materials, sometimes employed in depilatories. Under these circumstances, therefore, thallium and the salts should be left severely alone.

Hair Fixers are used principally for keeping the moustache in any desired position, and are generally sold in tubes or sticks. They are frequently compounded from pomades to which has been added beeswax or ceresine. They are coloured according to taste, and oil-soluble dyestuffs are better for the purpose than pigments.

White, No. 2086.

250	White beeswax.
10	Ceresine—white.
5	Oleo-resin orris.
500	Violet pomade.
200	Cassie „
30	Jasmin „
5	Ionone alpha.
1000	

Black, No. 2087.

200	Yellow beeswax.
50	Yellow ceresine.
250	Yellow paraffin jelly.
445	Benzoated lard.
5	Oil black.
50	Cocoa butter.
5	Hydroxy-citronellal.
1	Vetivert oil.
4	Cananga oil—terpeneless.
1010	

Melt the fats, and when an oil dye is used, add this and cool—add the perfume and mould.

Liquid Hair Fixers are merely alcoholic solutions of gum-resins, such as benzoin, colophony, sandarac, mastic, etc., suitably perfumed. They are applied to the moustache with a tooth brush, and the hair is then manipulated into any fancied form. The following formula will indicate their composition :—

No. 2088.

100	Gum benzoin—Siam.
10	Mastic.
50	Sandarac.
200	Colophony.
5	Amber liquid.
5	Jasmin synthetic.
630	Alcohol, 90 per cent.
1000	

Rub down the solids, and transfer to a bottle containing 600 c.c. of alcohol. Place the bottle in hot water, and shake occasionally until solution has been effected. Cool and filter bright. Add the perfumes and alcohol to volume.

Hair Waving Preparations have been evolved since the invention of the permanent wave by Nessler in the early part of the nineteenth century. According to his observations it is possible to stretch hair 30 per cent when dry, 60 per cent when wet and up to 100 per cent when steamed, all without rupture. The safety margin in actual practice is usually about two-thirds of these figures. Stretched moist hair will contract to its original length and the basis of the permanent wave process is to dry it before that can happen by the use of the usual apparatus. By treating the steamed hair under these conditions with alkali, the wave is made permanent for a period of about six months. Opinions vary as to the most efficient agent and also as to its strength, and each of the hairdressing specialists

has his own fancy according to his experience. Two types of alkalis are employed ; the non-volatile group containing borax, sodium and potassium carbonates and sodium bicarbonate. The volatile group consists of liquid ammonia and its salts, the main objections to their use being odour and incompatibility with dyed hair. Some operators consider the former type have the disadvantage of leaving a slight deposit on the hair ; a few prefer liquid soap. Sulphonated oils are sometimes added to either type with a milky effect. This, as also hypo and sodium pyrophosphate are used to protect the hair from possible damage during the process.

The ammonia type usually contains about 30 per cent of liquid ammonia, ·880 strength, together with 5 per cent or thereabouts of borax. So-called wave "oils" are usually an almost saturated solution of potassium carbonate.

Once the hair has been waved it is necessary to "set" it frequently during the six months period of its permanence. For this purpose, preserved, weakly alcoholic solutions of various gums and mucilages hold the field, very occasionally with the addition of traces of mild alkali. The best preservative is one or other of the esters of para hydroxy benzoic acid and this has largely replaced salicylic acid. The alcohol is used to preserve the balance between the water and gum, and indirectly to dissolve the perfume. The most favoured gum is tragacanth, followed by the cheaper substitute karaya known as Indian tragacanth. Acacia (gum arabic) has less popularity but possesses the advantage of easy solubility. The mucilages (by decoction) of quince and psyllium seeds and also of Irish moss are effective, and the latest development in this type is pectin from citrus fruits in the presence of citric acid. It is quite impossible and not desirable to lay down any hard and fast rules as to the strengths of the various setting lotions because a good deal depends upon the type of hair and the taste and experience of the hairdresser. The percentage margins are however approximately as follows :—

Methyl ester of *p*-hydroxybenzoic acid as preservative	0·05	to	0·15
Alcohol	1	to	10
Gum tragacanth in powder or flakes	0·1	to	1·5
Gum karaya	0·8	to	3
Gum arabic	0·2	to	0·5
With borax or sodium carbonate	0·5	to	2
Quince seeds	0·5	to	1·5
Psyllium seeds	0·5	to	1·5
Irish moss	1	to	2
With borax	2	to	5
Pectin	1	to	3
With citric acid	1	to	3
Perfume	0·1	to	0·5

Procedure. In the case of the tragacanth and karaya, the alcohol, preservative and perfume are mixed with the powdered gum and the water added in a continuous stream to facilitate even distribution and swelling. In the case of the quince and psyllium seeds hot decoction for 10 minutes is sufficient followed by straining and cooling. The Irish moss is infused cold[1] for a few hours after being freed from extraneous matter by washing. All the other constituents are merely dissolved or mixed as the case may be. If desired rose water or orange flower water may be used instead of a perfume compound.

Hair Lotions and Tonics are frequently the subject of a jest, as they are expected to make hair grow on the baldest heads. While they may not be a guaranteed specific, they undoubtedly have a stimulating effect upon the hair follicles, and the friction produced either by the fingers or by a fairly stiff brush is not by any means a negligible factor contributing to their efficacy.

The general concensus of medical opinion as to the cause of baldness is that the subcutaneous fat, prematurely in middle age, or naturally in old age, gets thinner and disappears. The scalp becomes more tightly attached to the skull; the hair follicles close up and vanish, and baldness sets in—usually on the top of the head, where

[1] If *hot* decoction is preferred 10 to 20 minutes is ample.

the skin is tightest. According to this theory, women are bald far more rarely than men because their hair, like a man's beard, is a secondary sex characteristic, and because their layer of subcutaneous fat is thicker than a man's, and atrophies much later in life. Among the active ingredients in this type of preparation may be mentioned the following :—

Jaborandi tincture	or	Pilocarpine.
Cantharides ,,	,,	Cantharidin.
Cinchona ,,	,,	Quinine.
Ammonia	,,	Borax.
Tartaric acid	,,	Acetic acid.

Rosemary oil
Camphor
Capsicum, preferably in the form of a tincture.
Beta naphthol.
Resorcinol.
Chloral hydrate.

Glycerine is included in the majority of formulæ. Since it is left on the scalp after the evaporation of the more volatile constituents, its inclusion is sometimes objected to, the hair having a tendency to remain greasy. The *perfume* should receive mature consideration, as when some of the above-mentioned materials are employed their odour is difficult to cover. Rosemary oil is one of the most popular perfumes, and it also possesses the advantage of being a good hair stimulant. Here are two formulæ for **Rosemary and Cantharides Hair Wash :—**

No. 2089 (Acid).

15	Acetum cantharides.
150	Alcohol.
15	Rosemary oil.
10	Bergamot oil.
5	Lavender oil.
5	Provence rose oil.
50	Glycerine.
750	Water.
1000	

No. 2090 (Alkaline).

5	Tincture of cantharidin.
50	Solution of ammonia.
75	Glycerine of borax.
10	Rosemary oil.
125	Alcohol, 90 per cent.
200	Triple rose water.
300	Triple orange flower water.
235	Water.
1000	

Dissolve the oils in the spirit and the glycerine of borax in the concentrated waters. Mix the two solutions and make up to volume with water—filter bright, using talc or kieselguhr.

Cantharides Tonics are made on the following lines :—

No. 2091.

10	Tincture of cantharides.
40	Borax.
50	Glycerine.
2	Sal volatile.
1	Ionone, 100 per cent.
5	Bergamot oil.
2	Cananga oil.
50	Alcohol.
840	Water.
1000	

No. 2092.

0·02	Cantharidin.
1	Acetic æther.
6	Acetic acid, glacial.
250	Bay rum.
50	Glycerine.
693	Water.
1000	

Dissolve the cantharidin in the acetic æther, and add to the bay rum. Then proceed as above.

Jaborandi Hair Washes may be compounded as follows :—

No. 2093.

50	Tincture of jaborandi leaves.
5	Tartaric acid.
6	Rose-geranium oil.
2	Lavender oil.
2	Bergamot oil.
50	Alcohol.
70	Glycerine.
815	Triple rose water.
1000	

Better preparations are made by using the alkaloid *Pilocarpine*, as follows :—

No. 2094.

0·5	Pilocarpine nitrate.
10	Tincture of cantharidin.
90	Alcohol.
5	Heliotropin.
3	Verbena oil.
2	Lavender oil.
50	Glycerine of borax.
840	Water.
1000	

Quinine Hair Tonics are more often made from the alkaloid than its mother substance cinchona. The hair stimulant properties of these bodies appears doubtful in spite of their comparatively large sale :—

No. 2095.

2	Quinine sulphate.
8	Tincture of cantharidin.
750	Eau de Cologne.
5	Iso-butyl salicylate.
50	Glycerine.
185	Orange flower water.
1000	

Dissolve the alkaloid in the cologne, add the tincture and the iso-butyl salicylate. Mix the glycerine with 200 c.c. of the water, and add.

No. 2096.

3	Quinine hydrochloride.
1	Pilocarpine ,,
200	Lavender water.
20	Glycerine.
776	Triple rose water.
1000	

Dissolve the alkaloidal salts in the lavender water, and proceed as above. Filter bright, if necessary.

Cholestrin Hair Tonics are being introduced largely as the result of research work carried out by Dr. R. Jaffe of Frankfurt. The primary cause of loss of hair is excessive secretion of sebum, which if not immediately treated will form a horny layer on the scalp. In due time this surrounds the placenta and the hair falls out. Treatment with sulphur preparations have in the past given fairly satisfactory results, but cholestrin now offers an even more efficient treatment owing to its metabolic connection with hair growth in the living organism. Cholestrin has the property of exciting hair growth and is not unlike the phosphatides in their function of building up cells. If on account of illness there results a cholestrin deficiency of the sebaceous glands, the growth of hair is affected with the resultant loss of hair. The treatment with cholestrin is quite opposed to the usual treatment of sebaceous alopecia. A complete removal of fat is not attempted, but fatty substance is added in the form of cholestrin with the object of retarding the excessive secretion of sebum, instead of fat removal by means of solvents, alkalis, or soaps. Dandruff disappears in a fortnight and chronic cases are brought under control in double this time. During cholestrin treatment, shampooing must be reduced to a minimum.

Cholestrin is not easily soluble and the preparation of the hair lotions containing it requires experiment. Ten grams will dissolve in approximately 1 litre of 90 per cent ethyl alcohol or 1 litre of 75 per cent iso-propyl alcohol. Solubility is increased by sodium chlorate, tetrachlorhydro-

carbons, or lecithin. The usual cholestrin content is about 5 grams per litre. Extreme temperatures should be avoided, otherwise turbidity will result.

Two suggested formulæ are appended :—

No. 2097.

5	Cholestrin.
30	Glycerine.
5	Cologne compound.
960	Alcohol, 90 per cent.
1000	

No. 2098.

5	Cholestrin.
1	Lecithin.
30	Carbon tetrachloride.
4	Lavender oil.
30	Glycerine.
50	Iso-propyl alcohol.
880	Ethyl alcohol, 90 per cent.
1000	

Friction Lotions when well massaged into the scalp with the finger tips are a useful means of promoting hair growth. A specimen type is given :—

No. 2099.

3	Quinine hydrochloride.
1	Saponin.
16	Glycerine.
10	Cologne compound.
600	Industrial spirit.
370	Distilled water.
1000	

Dissolve the quinine and saponin in the mixed liquids. Tint if desired.

Another variation may be made by the use of extract of quassia as follows :—

No. 2100.

2	Quassia extract.
30	Tincture of quillaia.
10	Glycerine.
8	Lavender compound.
550	Industrial spirit.
400	Distilled water.
1000	

Dissolve the extract of quassia in the water by the aid of gentle heat, then proceed as above. Filter.

Scurf or Dandruff is frequently due to physiological causes when a dermatologist should be consulted. This condition of the scalp can be alleviated by the use of a stimulant together with massage. As a rule it is customary to include one of the well-known antiseptics, such as salicylic acid, chlorothymol or formaldehyde, together with a cleansing agent, such as borax, saponin or sulphonated lorol. Irritants as represented by cantharides and capsicum are not uncommon in these preparations. There are two distinct types—oily and non-oily—although with the use of sulphonated oils the latter type usually predominate. Representative formulæ are as follows :—

Oily, No. 2101.

2	Salicylic acid.
90	Castor oil.
5	Lavender oil—French.
3	Bergamot oil.
900	Industrial spirit.
1000	

Mix the liquids and dissolve the acid in the mixture.

No. 2102.

10	Chloral hydrate.
90	Sulphonated castor oil.
5	Rectified pine tar.
5	Birch bud oil.
40	Glycerine.
850	Industrial spirit.
1000	

Dissolve the chloral hydrate in the mixture.

Non-oily, No. 2103.

2	Salicylic acid.
3	Beta-naphthol.
1	Saponin.
10	Borax.
1	Quinine hydrochloride.
10	Tincture cantharides.
3	Glycerine.
10	Lavender oil—M.B.
500	Industrial spirit.
460	Distilled water.
1000	

Dissolve the borax in the water, then mix the liquids and add the solids.

Pomades for the hair were at one time most popular, and consisted principally of exhausted greases from the enfleurage and maceration processes. They have a very restricted sale to-day, and are seldom made with this raw material, being more often composed of lard, fixed oils, and sometimes paraffin hydrocarbons. In many cases they are supposed to possess tonic properties for the hair, when it is usual to add traces of bodies such as *cantharidin* and *pilocarpine*. Pomades are apt to go rancid, and in order to prevent this the fats, before perfuming, are benzoinated by digestion with Siam or Sumatra benzoin, or for preference by dissolving a small quantity of *benzoic acid* in the melted greases.

As a rule these products are cheap, and therefore the quantity and quality of the perfume used is not very important. The oils of bergamot, neroli, petitgrain, verbena, lemon-grass, citronella, and clove are in common use, while the synthetics employed include terpineol, dimethyl hydroquinone, coumarin, methyl acetophenone, etc.

The *mode of preparation* is simple. The fats are melted and benzoinated. They are then strained through a piece of lint or linen to remove extraneous matter. After cooling the perfume is added, and they are then filled into pots. It is important that the temperature should not be high, or else the fats will contract at solidification, and come away

from the sides of the jar The product then assumes an unsightly appearance.

Almond Pomade, No. 2104.

400	Almond oil.
540	Benzoinated lard.
50	White wax.
5	Coumarin.
1	Methyl acetophenone.
1	Benzaldehyde.
3	Peru balsam.
1000	

Benzoin Pomade, No. 2105.

920	Lard.
10	*Siam* benzoin.
50	Japan wax.
2	Amber liquid.
3	Jasmin synthetic.
5	Rose-geranium oil.
10	Bergamot oil.
1000	

Castor Oil Pomade, No. 2106.

500	Castor oil—white.
140	Peach kernel oil—bleached.
50	White beeswax.
300	Rose pomade (genuine).
7	Rhodinol.
3	Linalyl acetate.
1000	

Cantharidin Pomade, No. 2107.

600	Lard.
5	Benzoic acid.
340	White petrolatum.
20	Ceresine—white.
0·1	Cantharidin.
20	Acetic æther or chloroform.
10	Terpineol.
2	Hydroxy-citronellal.
2	Cananga oil.
1	Iso-eugenol.
1000	

Dissolve the cantharidin in the chloroform or acetic æther and add to the cooled and strained fats. Add the perfumes and pot.

Coloured Pomades are made as described above, with the addition of either an oil-soluble dye, or in the case of *yellow* by the use of yellow soft paraffin as one of the bases, *red* by digestion of the base with alkanet, *green* by the addition of chlorophyll.

Circassian Cream (Red), No. 2108.

600	Benzoinated lard.
260	Castor oil.
40	Beeswax.
25	Alkanet root—crushed.
70	Rose pomade.
1	Benzyl acetone.
4	Balsam of Peru.
1000	

Marrow Pomade (Yellow), No. 2109.

100	Beef marrow.
200	Olive oil.
500	Paraffin jelly—yellow.
155	Benzoinated lard.
25	Yellow wax.
1	Citral.
3	Iso-eugenol.
3	Linalyl acetate.
3	Citronellol.
10	Tolu balsam.
1000	

Elder Flower Pomade (Green), No. 2110.

420	Pea-nut oil.
1	Chlorophyll.
60	Yellow beeswax.
500	Soft paraffin—yellow.
3	Linaloe oil.
7	Terpineol.
3	Bergamot oil.
5	Geraniol.
1	Oakmoss resin.
1000	

Macassar Pomade (Red), **No. 2111.**

70	Ceresine red.
300	Lard.
5	Benzoic acid.
300	Almond oil.
300	Castor oil.
10	Lanoline.
3	Lavender oil.
1	Rosemary oil.
5	Bergamot oil.
1	Pelargonium oil.
1	Musk ambrette.
4	Benzyl benzoate.
0·1	Oil red base.
1000	

Hair Restorers are made with sulphur and a lead salt. The *calcareous* form of precipitated sulphur yields the best product and may be used in conjunction with lead *acetate*. Here is a good formula :—

No. 2112.

25	Precipitated sulphur (calcareous).
30	Lead acetate.
44	Glycerine.
1	Rose, No. 1092.
0·2	Phenylacetic acid.
900	Water.
1000	

Rub down the sulphur to a smooth paste with the glycerine and add the perfumes. Dissolve the lead acetate in 500 grams of the water and gradually add to the former, stirring all the time. Make up to volume, and when bottling be sure that the insoluble portion is evenly distributed.

Other forms of applying such products consist of precipitating the sulphur in the hair follicles. This is done by rubbing into the scalp, first—a solution of sodium hyposulphite (hypo) ; second—a dilute solution of hydrochloric acid.

Shampoos, both solid and liquid, have a tremendous sale, and the comparatively recent introduction of coco-nut oil —saponified—has materially increased the demand for the liquid type. As the powder form is most common, it will be treated first.

The bases in common use are :—

Sodium sesquicarbonate.
Sodium carbonate—dried.
Borax.
Saponine.
Powdered soap.
Sulphonated lorol.

The proportion of soap varies, and it is always advisable to have other bases with it, otherwise it has a tendency to clot the hair. Saponine and sulphonated lorol are useful to increase the lather, the latter possessing the advantage, when used alone, of not precipitating the lime from hard water. The alkaline bases saponify the grease, and it is washed away while rinsing. Some makers prefer dried sodium carbonate, Na_2CO_3, while others, and these are in the majority, prefer the sesquicarbonate :

$$Na_2CO_3 . 2NaHCO_3 . 2H_2O.$$

There are a few who even use normal sodium bicarbonate, $NaHCO_3$, believing it to be more efficient and pleasant in use. The perfumes almost invariably include one of the artificial musks, and the *xylol* is most economical to use. Oils such as lavender, rosemary, and rose-geranium are much employed.

The method of manufacture of all shampoo powders is simple, especially when the machine illustrated on page 26 is used for the purpose. The perfumes are rubbed down in a mortar with one of the ingredients, preferably borax when it is used, and then the whole is sifted and mixed twice—a sixty-mesh sieve gives the desired fineness.

Some formulæ are given :—

Heliotrope, No. 2113.

200	Borax.
600	Dried carbonate of soda.
190	Powdered soap.
5	Musk xylol.
5	Heliotropin.
1000	

Violet, No. 2114.

500	Sodium sesquicarbonate.
250	Sodium biborate.
240	Soap powder.
5	Ionone alpha.
5	Violettophyx, No. 1010.
1000	

Lavender, No. 2115.

600	Sodium carbonate.
390	Soap powder.
3	Bergamot oil.
2	Musk ketone.
5	Lavender oil[1]—French.
1000	

Rosemary, No. 2116.

250	Borax.
400	Crex.
40	Saponine.
300	Castile soap powder.
3	Musk xylol.
5	Rosemary oil.
2	Bergamot oil.
1000	

Sulphonated Lorol Shampoos of the dry type are made with the sodium salts of the acid sulphates of (mainly) duodecyl alcohol, obtained by the hydrogenation of coco-nut oil or of its free fatty acids. This powder may be used alone when perfumed, but it is preferable to add a mild alkali and some powdered soap which makes a much more satisfactory product. Either henna or chamomile

[1] For cheaper kinds use lavandin or spike lavender oil.

may be incorporated if desired. Sulphonated lorol possesses the great advantage of leaving the hair in a soft and silky condition. A type formula is appended :—

No. 2117.

300	Sulphonated lorol (sodium).
300	Sodium sesquicarbonate.
390	Coco-nut oil soap (powdered).
4	Lavender oil.
3	Rosemary oil—French.
1	Geranyl acetate.
2	Musk xylene.
1000	

Sodium Bicarbonate Shampoos may be prepared by the simple admixture of this substance with soap powder suitably perfumed. There is, however, some slight risk of 5 to 10 per cent of the bicarbonate being converted to carbonate during manufacture and storage, especially in a moist atmosphere. This change can be prevented by the addition of dry disodium phosphate or dehydrated sodium sulphate. These substances further prevent the hair becoming too dry after the shampoo and secure its natural smoothness. A suitable formula is as follows :—

No. 2118.

500	Sodium bicarbonate.
200	Disodium phosphate ($5H_2O$).
290	C.N.O. soap powder.
10	Lavender compound.
1000	

Henna Shampoos are very popular since they are supposed to dye the hair very slightly :—

No. 2119.

50	Henna powder.
150	Borax.
250	Sodium carbonate.
40	Potassium „
500	Soap powder.
5	Musk xylol.
4	Amyl salicylate
1	Iso-eugenol.
1000	

In view of the fact that lawsone, the pigment present in henna, has better dyeing properties in acid solutions, darker tints are obtained with the following :—

No. 2120.

100	Henna powder.
100	Boric acid.
500	Sulphonated lorol.
250	Castile soap—powdered.
40	Saponine.
3	Musk ketone.
1	Patchouli oil.
4	Jasmine.
2	Olibanum R.
1000	

Chamomile Shampoos are of recent introduction, and are believed to darken the hair :—

No. 2121.

50	Powdered chamomile flowers.
250	Borax.
500	Sodium carbonate-dried.
15	Saponine.
180	Soap powder.
1	Oil of chamomile.
4	Amber liquid.
1000	

Dry Shampoos are made *without* soap, the above-mentioned alkaline bodies being supplemented with such materials as starch, orris, fuller's earth, etc. They are rubbed into the hair before retiring and brushed out again next morning with a stiff brush :—

No. 2122.

50	Borax.
140	Sodium sesquicarbonate.
500	Starch.
300	Orris root powder.
2	Musk ambrette.
5	Coumarin.
3	Heliotropin.
1000	

Liquid Shampoos have a great advantage over the powdered kinds, since they contain no solid matter, and are therefore easily washed from the hair.

The use of soft soap makes a simple preparation as follows :—

No. 2123.

100	Soft soap (from olive or linseed oil).
250	Alcohol.
5	Lavender oil.
2	Rosemary oil.
3	Rose-geranium oil.
50	Solution of potash, 5 per cent.
590	Water.
1000	

Dissolve the soap in the alcohol and add the oils; mix the solution of potash with 600 c.c. of water and add gradually. Make up to volume.

An improved form may be made as follows :—

No. 2124.

50	Green soft soap.
150	Alcohol.
10	Parma violet, No. 1105.
20	Saponine.
20	Liquid ammonia.
750	Water.
1000	

Proceed as above described—dissolving the saponine in the water.

It should be noted that with the exception of a very few examples, *the soft soap type has become obsolete* since liquid coco-nut oil soaps are definitely superior from all points of view.

Liquid Dry Shampoos are made on similar lines, but with a larger proportion of alcohol. They are generally tinted green :—

No. 2125.

75	Soft soap—green.
500	Industrial spirit.
5	Violet, No. 1104.
5	Strong solution of ammonia ·880.
500	Distilled water.
1085	

Dissolve the soap in the alcohol and add the perfume. Mix the ammonia with the water and gradually add to the former solution. Stand aside for one week and filter bright, using kieselguhr if necessary.

Free Alkali Type, No. 2126.

5	Borax.
10	Potassium carbonate.
2	Saponin.
4	Liquid ammonia.
8	Lavender compound, No. 1216.
1	Spirit soluble chlorophyll, 1 per cent solution.
550	Industrial spirit.
420	Distilled water.
1000	

Dissolve the solids in the mixed liquids; soap may be added if desired. 50 c.c. of the following coco-nut oil shampoo will suffice.

Here is another :—

No. 2127.

25	Liquid ammonia ·880.
400	Eau de Cologne.
275	Tincture of quillaia.
300	Alcohol.
1000	

and another :—

No. 2128.

40	Liquor ammonia fort.
20	Saponine.
940	Bay rum—industrial.
1000	

Coco-nut Oil Shampoos, frequently termed **Emulsified,** are made by saponifying *odourless* Cochin oil with potash. Sometimes other fixed oils are added, and these include, palm, pea-nut, etc., but they have a tendency to decrease the foaming properties of the product and are only used in cheaper grade articles. One thousand grams of coco-nut oil require for complete saponification about 260 grams of KOH, calculated as absolute, but since commercial samples average between 78 and 88 per cent only (x), the approximate amount (y) will be calculated thus :—

$$1000 \text{ grams C.N.O. require } \frac{260 \times 100}{x} = y.$$

This is dissolved in 1 litre of water at about 75° C. and added to the oil at the same temperature in a steam pan. The reaction may be controlled by using phenolphthalein as indicator—if the liquid remains *white,* further additions of alkali are necessary, whereas when it turns *red,* more oil should be added. The heat is continued until saponification has taken place and the product is *neutral.* It is then diluted to 5 litres with distilled water in which has been dissolved some carbonate of potash.

The formula now reads :—

No. 2129.

1000	Coco-nut oil.
y	Potassium hydroxide.
1000	Distilled water.
30	Potassium carbonate.
2970	Distilled water.
5000	

It is now perfumed with any of the stable synthetics, such as linalol, terpineol, methyl acetophenone, etc., or such oils as lavender and rosemary.

The liquid soap is left to deposit and the clear solution decanted as required.

It should be noted that some products contain sugar, chlorate of potash, and even additions of glycerine. Potash lye of known strength may be substituted for the raw material if it is a stock line. Soda lye is never used as it yields soaps which cloud rapidly.

Pine Tar Liquid Shampoos may be prepared on the same lines as the above, with the addition of about $2\frac{1}{2}$ per cent of pine tar. A formula is appended :—

No. 2130.

25	Pine tar.
225	Raw linseed oil.
100	Olive oil.
50	Industrial spirit.
y	KOH.
600	Water.
1000	

Proceed as above.

Note.—The quantity of alkali is calculated as above, excepting that the saponification values of the oils are different.

Henna Liquid Shampoo is made by first preparing an infusion of henna as follows :—

No. 2131.

100	Powdered henna leaves.
1000	Boiling water.

Infuse for half an hour and then filter bright.

100	Take of this solution.
300	Soft soap—green.
200	Alcohol.
20	Lavender oil.
1	Oakmoss resin.
379	Water.
1000	

Dissolve the soft soap in the alcohol and add the oils, henna infusion, and water to volume. Stand aside seven days and filter bright.

Sulphonated Lorol Liquid Shampoos are to-day becoming increasingly popular especially since the introduction of the triethanolamine salt which possesses the advantage of not precipitating with cold water, but remaining as a bright clear solution. The proportion employed is subject to some variation but about 30 per cent gives a satisfactory product. It may be combined with infusions of henna and chamomile when desired and perfumed to taste. The inclusion of some liquid soap is optional, but generally preferred. Formulæ for each type are suggested as follows :—

No. 2132.

300	Sulphonated lorol (triethanolamine).
95	Infusion of henna (as above).
3	Bergamot—terpeneless.
1	Rosemary—terpeneless.
1	Phenylethyl alcohol.
600	Distilled water.
1000	

Mix, shake to distribute the perfume. Stand aside a few days and then filter.

No. 2133.

200	Sulphonated lorol T.A.
200	Coco-nut oil liquid soap.
40	Industrial alcohol.
5	Lemon-grass oil.
2	Geraniol—Java.
3	Petitgrain—terpeneless.
550	Distilled water.
1000	

Dissolve the oils in the alcohol—mix the liquids and proceed as above.

Rinses are used after a shampoo and function as follows : Lemon brightens blonde hair and lightens dark hair. Henna tints dark hair and chamomile brightens ash blonde hair. Lemon rinse is sometimes sold separately but often enclosed with the shampoo in a separate packet. It consists of citric acid alone or mixed with tartaric acid

and is applied in solution. Henna and chamomile consist of the powdered drug and are boiled with water and strained before use.

Colour Rinses are mixtures of about 1 per cent of harmless dyestuffs with citric acid. They are sold in the usual range of hair tints and dissolved in water before application.

Hair Lacquers were created as a necessary part of the "upward" style of hairdressing, being sprayed on the coiffure after setting and intended to hold the waves firmly in shape without detracting in any way from the artistic finish. Lacquers should not be confused with the ordinary mucilaginous wave-setting preparations, since they do not permeate the coiffure but merely cover it with a flexible film. The obvious raw materials for such preparations are the gum resins of olfactic value in perfumery. Of these benzoin is probably the best, but latterly a few synthetic resins are being used in these preparations, notably glycol and glyceryl bori-borates. Other comparatively inodorous natural resins such as sandarac, mastic and colophony are useful. To promote flexibility a plasticiser is imperative and either castor oil or camphor is employed. Water-soluble gums and sodium alginate mucilage may also form the basis of lacquers, but they cannot be so much appreciated since they take too long to dry on the hair when compared with the alcoholic solutions of the gums.

Here is a useful formula :—

No. 2134.

100	Benzoin—Siam.
10	Myrrh.
50	Sandarac.
100	Colophony.
30	Castor oil.
10	Carnation compound.
700	Industrial alcohol.
1000	

CHAPTER IV.

HAIR DYES.

1. Those used by the ancients.
2. Walnut oil and dye.
3. Henna dyes.
4. Lead dyes.
5. Silver dyes, 3, 2, and 1 solutions.
6. Iron dyes.
7. Potassium permanganate.
8. Pyrogallic acid, plain, cobalt, cadmium, and copper.
9. Paraphenylenediamene, uses and precautions.
10. Amidol, metol, rodinol.

HAIR-TINTING is to-day such an important branch of the hairdresser's business, that the inclusion in this work of some notes on the more popular hair dyes seems desirable. Hair-tinting is, however, by no means a modern refinement of the toilet since in a crude form it was practised from earliest antiquity. It is, for instance, well known that the Egyptian women used Kohol, probably a sulphide of lead (galena), for imparting a black tint to the hair, eyebrows, and eyelashes. They also used henna for obtaining a bright auburn tint. During the Roman era, other useful plants had been discovered which were used for obtaining a wider range of hair tints. For instance, *Lysimachia* was used for imparting a blond tint, by far the most esteemed colour amongst the Romans. This plant was discovered by King Lysimachus of Thrace, a contemporary with Alexander the Great. Botanists have since identified this plant as the purple willow-herb, *Lythrum salicaria*, L. *Hypericon*, known also as *Corisson*, was used to dye the hair black. This plant is believed to be the perforated St. John's Wort, *Hypericum perforatum*, L. Other plants

yielding a black dye were *Ophyrs*, the eyebrow plant, now believed to be *Ophyrs ovata* or *bifolia*, L., and *Polemonia*, Jacob's ladder or Greek valerian, now identified as *Polemonium cæruleum*, L. This latter plant had to be boiled in oil before it could be used to impart blackness to the hair.

More recently, but before the real development of either inorganic or organic chemistry, the dyeing properties of the juice of green walnut shells was appreciated and widely utilised. This juice imparts a rich dark-brown stain to the skin but is not so easily applied to the hair. Two methods have been in practice for many years. The first is in the form of a fixed oil extract and the second as a weak alcoholic extract mordanted with alum.

Walnut Oil, No. 2135.

200	Fresh walnut shells.
1000	Olive oil.
1	Neroli oil—bigarade.
1201	

Break up the walnut shells as small as possible in a mortar and triturate with the oil until a smooth paste is obtained. Digest this mixture on a water-bath until all the water present in the walnut shells has been evaporated. Then filter and add the perfume when cool.

Walnut Dye, No. 2136.

900	Fresh walnut shells.
200	Rectified spirit.
240	Rose water.
60	Potash alum.
1400	

Dissolve the alum in the rose water and triturate the walnut shells with this solution. Run through a tincture press and then add the alcohol. Stand aside for a week and then filter.

Special Note.—*When applying hair dyes it is always imperative that all grease be removed from the hair and a good shampoo is therefore necessary. The dye is applied when the hair is nearly dry.*

Henna Dyes.—Probably the most important hair dye of vegetable origin is henna, and this is still widely employed for producing a brownish-chestnut shade. It is generally believed that henna powder alone is useless, but in a number of experiments conducted by the author this supposition was shown to be without foundation. Henna powder was made into a thin smooth paste with boiling water and brushed into the hair while hot with a small stiff brush, the comb being continually employed to ensure even distribution. Hot towels were wrapped round the head, and replaced as they cooled, for half an hour. A shampoo subsequently removed the vegetable mass and left the hair a bright chestnut shade. This took over six months to *grow out.* In the hairdressing trade it is customary to either add a little ammonia to the paste or brush into the hair a weak solution before the henna is removed. In some cases a 2 per cent solution of potassium permanganate is brushed in just before the shampoo.

Other hair dyes based upon henna are common, and varying shades of auburn are obtained according to the ingredients and quantities employed. Burnt sienna is generally added to shade the powder according to the finished tint required. It is of course washed out in the subsequent shampoo. Some formulæ are appended—

HENNA DYES.

Light Auburn, No. 2137.

860	Powdered henna.
50	Pyrogallic acid.
50	Copper sulphate.
40	Burnt sienna.
1000	

Medium Auburn, No. 2138.

830	Powdered henna.
60	Pyrogallic acid.
60	Copper sulphate.
50	Burnt sienna.
1000	

Dark Auburn, No. 2139.

800	Powdered henna.
80	Pyrogallic acid.
60	Copper sulphate.
60	Burnt sienna.
1000	

Dark Chestnut-Brown, No. 2140.

720	Powdered henna.
120	Pyrogallic acid.
80	Copper sulphate.
80	Burnt sienna.
1000	

These powders are made into a paste with hot water and applied as above.

Liquid Henna Dye, No. 2141.

250	Powdered henna leaves.
80	Powdered chamomile flowers.
2	Pyrogallic acid.
1	Citric acid.
30	Rectified spirit.
10	Glycerine.
1000	Distilled water.
1373	

Dissolve the citric acid in the water. Bring to the boil and infuse the chamomile flowers in this solution. Then add all the other ingredients except the alcohol and maintain the source of heat gently for an hour. When cold add the alcohol and filter. Apply by brushing into the hair every hour until the desired tint is obtained.

Liquid Henna Dye (so-called), No. 2142.

40	Copper chloride.
20	Pyrogallic acid.
900	Distilled water.
40	Alcohol.
1000	

Dissolve and apply as above directed.

According to the patent of Geier, onion skins added to these dyes will make it possible to obtain more uniform shades. (German Patent, 556,338.)

Lead Dyes have been used for centuries, and one of the oldest methods consisted in making a paste of the following substances and brushing it into the hair :—

No. 2143.

730	Litharge.
195	Starch.
75	Slaked lime.
1000	

The modern method of applying lead to the hair is a little more scientific and free from the risk of plumbism. The success of the application depends upon the fresh preparation of lead sulphide in clear solution. This is effected as follows :—

No. 2144.

6	Lead acetate.
12	Sodium thiosulphate.
82	Glycerine.
100	Alcohol.
800	Rose water.
1000	

Dissolve the lead acetate in 100 c.c. of rose water. Dissolve the hypo in the remaining mixed liquids. Pour the latter into the former. The precipitate at first thrown down will redissolve. Transfer to amber bottles at once. Exclude the air from the neck by adding one or two drops of ether before corking. Exposure to the air and bright light will precipitate the lead sulphide.

Silver Dyes were probably the most important group of preparations before the discovery of the organic chemicals, which will be referred to later. They are still fairly popular, and can be made to dye the hair a variety of shades from ash blond to brown and black. These different tints are obtained by increasing the proportion of silver present in the liquid, and the best preparations are undoubtably those requiring three applications. The three solutions necessary are as follows :—

Formula No. 2145.

No. 1 Solution.

20	Pyrogallic acid.
600	Distilled water.
400	Rectified spirit.
1020	

No. 2 Solution.

	Ash Blond.	Brown.	Black.
Silver nitrate .	10 grams	15 grams	30 grams
Liquid ammonia .	45 c.c.	60 c.c.	120 c.c.
Distilled water .	1000 ,,	1000 ,,	1000 ,,

No. 3 Solution.

20	Sodium hyposulphite.
1000	Distilled water.
1020	

Shampoo the hair and then apply a fairly stiff cold cream to the forehead, ears, and neck. This is a precaution which to a skilled hairdresser may not appear necessary, but the cream is easily removed and prevents any of the dye marking the skin. First brush in No. 1 solution and after a few minutes apply No. 2. Allow ten minutes to a quarter of an hour to elapse before applying No. 3, and do not wash the hair for two or three hours. This allows the silver to get well set on the hair and good results are assured.

In the case of all silver hair dyes it is as well to bear in mind the action of light, and it is therefore necessary to put up all solutions in amber or green bottles.

Two-solution dyes are very popular. They are made in a variety of ways, the silver nitrate solution always containing ammonia and sometimes copper sulphate. The developer is, however, subject to greater variations. The best mixture is of pyrogallic acid and sodium metabisulphite and is free from objectionable odour. Sodium sulphide

alone is often used but the odour brings it less favour. Two examples are appended :—

Formula No. 2146.

No. 1 Solutions.

	A.	B.
Pyrogallic acid	30 grams	—
Sodium metabisulphite	10 „	—
Sodium sulphide crystals	—	40 grams
Distilled water	1000 c.c.	1000 c.c.

No. 2 Solutions.

	A.	B.
Silver nitrate	20 grams	30 grams
Copper sulphate	—	0·2 „
Liquid ammonia	q.s. to redissolve ppt.	120 c.c.
Distilled water	1000 c.c.	1000 „

Increase or reduce the quantity of silver according to the tint desired.

Pack No. 2 solution twice the size of No. 1. Brush the hair with No. 2 solution immediately after No. 1 has been applied. Allow a few hours before shampooing.

One-solution dyes may be prepared as follows :—

No. 2147.

	A.	B.	C.
Silver nitrate	30 grams	50 grams	40 grams
Copper sulphate	—	2·5 „	—
Nickel sulphate	0·2 gram	—	—
Lead acetate	—	—	10 grams
Liquid ammonia	q.s.	q.s.	q.s.
Distilled water	1000 c.c.	1000 c.c.	1000 c.c.

These dyes are much slower in their action and may require two or three applications.

Iron Dyes are quite harmless, and depend upon the deposition of ferrous gallate on the hair as follows :—

No. 2148.

Brush into the hair repeatedly for two or three days—

1·2	Ferrous sulphate.
64	Glycerine.
1000	Distilled water.
1065	

Then apply with a brush, combing continuously—

5	Gallic acid.
5	Tannic ,,
1000	Distilled water.
1010	

Potassium Permanganate may be used alone if desired for producing a rich auburn shade as follows :—

No. 2149.

50	Potassium permanganate.
1000	Distilled water.
1050	

Brush into the hair two or three times until the desired tint is obtained. Do not shampoo until the following day.

Pyrogallic Acid, it will have been noticed, is a most important raw material in many hair dyes, and although when fresh and kept away from the light and air it occurs in fine white crystals, these readily oxidise and turn varying shades of brown according to the progressive degree of oxidation. A solution of this acid would appear therefore to make a good hair dye without any further additions, but in actual practice the development of colour is so slow that frequent applications are necessary to produce a tint of sufficient intensity. Oxidation of the acid is hastened if the solution contains alkali, and a *non-metallic* preparation can

therefore be easily produced by the use of ammonia as follows :—

No. 2150.

100	Pyrogallic acid.
50	Liquid ammonia.
250	Eau de Cologne.
700	Distilled water.
1100	

This hair dye will produce an effective brown tint. The use of *free acid* in combination with pyrogallic acid is not unusual, and both acetic and nitric have been used as follows :—

No. 2151.

50	Pyrogallic acid.
10	Acetic acid glacial.
290	Alcohol.
700	Distilled water.
1050	

This dye will give the hair a pretty chestnut shade. Pyrogallic acid in combination with *henna* but without the metallic salts given under that heading may be successfully employed. It is better, however, to make a strong infusion of henna (about 10 per cent) and use this filtered extract as follows :—

No. 2152.

80	Pyrogallic acid.
180	Henna extract.
40	Liquid ammonia.
700	Rose water.
1000	

This produces a rich auburn tint.

Pyrogallic acid has the property of *reducing metallic salts* and may therefore be used in combination with a variety of inorganic substances. A few examples are given :—

COBALT DYE, No. 2153.

No. 1 Solution.

30	Pyrogallic acid.
2	Glacial acetic acid.
1000	Distilled water.
1032	

No. 2 Solution.

30	Cobalt sulphate.
2	Copper „
1000	Distilled water.
1032	

Liquid ammonia q.s. to maintain a blue solution.

Apply No. 1 solution and then brush in No. 2. Effective auburn shades are thus obtained.

CADMIUM DYES, No. 2154.

No. 1 Solution.

	Light Golden.	Golden.	Ash Blond.
Pyrogallic acid .	10 grams	15 grams	20 grams
30 per cent alcohol	1000 c.c.	1000 c.c.	1000 c.c.

No. 2 Solution.

20	Cadmium sulphate.
1000	Distilled water.
1020	

Apply No. 1 solution and after twenty minutes brush in No. 2.

COPPER DYES, No. 2155.

30	Pyrogallic acid.
30	Copper chloride.
1	Nitric acid.
1000	Distilled water.
1061	

This dye is progressive and should be brushed in three or four times a day until the desired tint is obtained.

Another form :—

No. 2156.

No. 1 Solution.

20	Pyrogallic acid.
1	Potassium carbonate.
1000	30 per cent alcohol.
1021	

No. 2 Solution.

10	Copper sulphate.
3	Ammonium chloride.
1000	Distilled water.
1013	

Mix the solutions in equal quantity immediately before applying to the hair. The tint will develop slowly, and when the desired degree of intensity has been obtained the hair may be shampooed.

Paraphenylene Diamine[1] is to-day the most important hair dye and is widely used. It is not, however, free from all risk of subsequent skin trouble, and in consequence all applications made by hairdressers are at the customer's risk. Indeed, it is not unusual to obtain a written acknowledgment of this personal responsibility before the application is proceeded with.

For the successful application of this dye certain precautions are necessary, which may be summarised as follows :—

1. Never apply the dye immediately after the hair has been bleached with hydrogen peroxide. Leave an interval of at least two or three days.

[1] Para-toluidene diamine is also used, together with esters such as the lactate, etc. There is a possibility of these highly toxic substances being added to the poison schedule.

2. Allow ten minutes between the application of the two solutions, and maintain the activity of the dye by means of a current of warm air.

3. Shampoo the head immediately afterwards.

4. Employ only chemically pure para.

With a view to ascertaining the sensitivity of a person's skin to this organic substance it is usual to apply a very small quantity to the customer's skin before any attempt is made at a complete treatment. This is generally effected just behind the ear, and if no irritation is felt after a few hours the process may be considered safe.

Pure paraphenylene diamine occurs as white transparent crystals melting at 147° C. and is prepared by the reduction of amidoazobenzene. Its use as a hair dye depends upon its oxidation to Bandrowski base, and this is effected with either hydrogen peroxide or with a solution of potassium dichromate. The strength of the para solution will determine the ultimate colour of the hair. For instance, approximately 1 per cent will produce a blond, 2 per cent a brown, and 3 per cent a black. The "developer" usually contains about 1 per cent of bichromate or a 10 volume solution of hydrogen peroxide. These solutions are prepared thus :—

No. 2157.

No. 1 Solution.

	Blond.	Brown.	Black.
Paraphenylene diamine . .	10 grams	20 grams	30 grams
Glycerine . .	50 c.c.	50 c.c.	50 c.c.
Distilled water .	1000 ,,	1000 ,,	1000 ,,

No. 2 Solution.

12	Potassium dichromate.
2	Sodium bicarbonate.
1000	Distilled water.
1014	

When applying these solutions to the hair make sure to avoid touching the skin. Brush in No. 1 solution and after ten minutes brush in No. 2. As soon as the desired tint has developed, shampoo as directed above.

Amidol, Metol, and Rodinol are frequently used as hair dyes and are generally considered free from all risk. Amidol will not stain the skin if carefully applied and is therefore popular. Moreover, it is a *one-solution* dye and is odourless. It may be prepared as follows :—

AMIDOL HAIR DYE, No. 2158.

	Brown.	Black.
Diamidophenol hydrochloride	80 grams	150 grams
Sodium sulphite	120 „	250 „
Rectified spirit	100 c.c.	100 c.c.
Distilled water	900 „	900 „

Brush into the hair and when the desired shade has developed, shampoo.

The latest contribution to hair dye chemistry is contained in Patent Specification No. 493,855, by I.G. Farbenindustrie. This is based upon the observation that 1 : 2 : 4-trioxy-compounds of benzene or naphthalene, if desired, containing alkyl-, oxyalkyl- and alkoxy-groups as nuclear substituents, are suitable for dyeing living hair. On account of their insufficient durability they are used in the present invention in the form of their triacetyl-compounds. By the addition of an alkaline agent they can be saponified to their trioxy-compounds. These, under the influence of atmospheric oxygen, are converted on the hair into compounds resembling quinone. These products give colours ranging from blond to titian red. By shading with already known synthetics lighter and darker tints are obtained, so that by suitable mixtures all dyeings from the lightest blond to black may be produced. Oxidation may be hastened by the addition of hydrogen peroxide.

An example is given of one of these new compounds in tablet form :—

BROWN DYE, No. 2159.

150	1 : 2 : 4-triacetoxynaphthalene.
50	para-aminodiphenylamine.
50	para-aminophenol.
50	meta-toluylene diamine.
50	Starch.
50	Dextrine.
180	Calcined sodium carbonate.
420	Wetting agent.[1]
1000	

[1] Made by treating castor oil with 1-naphthol-5-sulphonic acid in the presence of sulphuric acid.

CHAPTER V.

LIPSTICKS.

1. Qualities necessary.
2. Bases.
3. Colours.
4. Perfumes and flavours.
5. Manufacture.
6. Formulæ. Indelible and orange type.
7. White lip salves, hard and soft.
8. Rose lip salves.
9. Lip jellies, white, rose, and rouge.
10. Greaseless lip rouge sticks.

Lipsticks are now a universally accepted article of make-up and vary in price very much according to the skill of the manufacturer together with the degree of elegance of the presentation of this cosmetic. There are two main types—those having a somewhat matt finish when used and the others, less appreciated for various reasons, having a slightly shiny appearance. The qualities required of all of them are 1, harmlessness; 2, easy application; 3, indelibility; 4, smooth appearance; 5, absence of grittiness; 6, unbreakability, and 7, good odour and flavour.

Harmlessness is secured by the use of the guaranteed pure dyestuffs and preferably those approved for use in foodstuffs. The technical department of the dye manufacturer will give suitable advice in this direction. Lakes must be equally innocuous. Colours struck on chalk will answer these requirements. Those containing barium and lead salts should be entirely avoided. The quantity of pigment in contact with the lips on a liberal application is approximately 0·001 gram.

Easy application is obtained by the correct combination of constituents yielding a melting-point and viscosity acceptable to the user. The temperature of the body varies between 36° and 38° C., the mouth exhibiting the higher figure. The lipstick must have a melting-point higher than this, and, moreover, sufficiently high so that it does not soften when exported to hot climates. The most appreciated melting-point is about 62° C., but from 55° to 75° represent quite satisfactory products. The choice of waxes is here of paramount importance. Viscosity is probably more significant, and no relationship necessarily exists between the two. For instance, anhydrous lanolin is very viscous and melts at 40° C., whereas cocoa butter is not viscous but melts at 32° C.; on the other hand castor oil is viscous and also liquid. All these three substances play their part in the formulation of a good lipstick, and when skilfully chosen and employed in the correct balance, eliminate that hardness so objectionable in poor quality products. They may perhaps be said to function as lubricants.

Indelibility arises from the use of dyestuffs and not from lakes, although both are necessary to obtain the majority of colours sold. In some cases the dyestuff is dissolved in a suitable solvent before incorporation in the base, while in others it is milled in dry, the colour yielding permanence when applied to the lips by reason of penetration and solution in their natural secretion.

Smooth appearance and absence of grittiness are secured in the manufacturing process by perfect milling of the pigments and bases. Paint mills of the conical or roller type yield better results than the ordinary ointment mill. Furthermore they are more expeditious in production. Homogenisers are, however, the ideal apparatus.

Unbreakability is not necessarily related to melting-point but depends more upon the ratio of length to breadth of the lipstick itself. Naturally a slender pack is more friable than one of greater girth. An important constituent here is beeswax which adds strength.

Good odour and flavour are important considerations, especially if lanolin or castor oil is one of the lipstick constituents. Rose types with peach are good while many prefer carnation with strawberry. The flavouring element is, of course, only used in minute proportions. A liberal application of lipstick would contain about 0·0001 gram of perfume. It is important to avoid constituents which may have irritant properties, and a reference to "Sting" in Volume I. will prove helpful.

The **Bases** used in lipsticks may be chosen from the following :—

Almond oil.
Carnauba wax.
Castor oil.
Ceresine, white or red.
Cetyl alcohol.
Chinese wax.
Cholestrine absorption base.
Cocoa butter.
Corps de jasmin.
Diglycol stearate.
Hard paraffin.
Hydrogenated vegetable oils.
Japan wax.
Lanolin, anhydrous.
Lard, benzoinated.
Liquid paraffin.
Montan wax.
Oleyl alcohol.
Ozokerite.
Peach kernel oil.
Soft paraffin.
Spermaceti.
Stearic acid.
Stearyl alcohol.
Triethanolamine stearate.
White beeswax.

The **Colours** are usually a mixture of acid eosine (bromo acid) or other dyestuff and carmine and/or one of the red lakes. Splendid colours are obtained with the insoluble salts of lithol red, lithol rubin or lake red. The total amount incorporated varies between 5 and 10 per cent, and this has a marked effect upon the consistency of the finished product. If it is desired to dissolve the dyestuff, one of the derivatives of ethylene glycol may be used, although castor oil or oleyl alcohol are more commonly employed. No lakes are used in the orange type.

The **Perfume** may be used up to 2 per cent, the amount depending upon personal taste and cost. The alcohols, esters, ionones and clove derivatives are favourites when blended with some of the flower oils. Peru balsam is a useful emollient. Two examples are given :—

No. 2160.

200	Rhodinol.
300	Citronellol.
300	Benzyl cinnamate.
90	Methyl ionone.
5	Vanillin.
5	Peach lactone.
100	Peru balsam.
1000	

No. 2161.

500	Eugenol.
20	Rose otto.
80	Heliotropin.
50	Ylang-ylang.
20	Orris concrete.
100	Methyl ionone.
25	Musk ketone.
5	Ethyl methyl phenyl glycidite.
200	Peru balsam.
1000	

Manufacture.—If a solvent is used for the dyestuffs, make this solution first and then mix it with any other liquid constituents. Melt the lower melting-point fats or waxes, and if these are in sufficient quantity, mill them with the pigments before adding the oil solution. Then add the latter and mill again. Finally melt the remaining waxes, mix all constituents together and mill a third time.[1] Never raise the temperature more than a few degrees above the highest melting constituent. When a sufficient number of moulds are available, run the whole batch in at once. Chill and then trim off the mass outside the moulds. Remove the lipsticks and insert them in the holders of the cases. Pass the lipstick through the flame of a spirit lamp to impart a perfect and smooth finish.

Formulæ require much experiment to produce a really satisfactory product, and while a base may be good for one combination of colours it may be less satisfactory for another. The quantities vary between fairly wide limits as follows :—

[1] A *cold* mill will crystallise the high M.P. waxes and make a satisfactory operation impossible.

Almond oil	5	to 10	per cent.
Carnauba wax	1	„ 2	„
Castor oil	1	„ 30	„
Ceresine	5	„ 30	„
Cetyl alcohol	5	„ 30	„
Chinese wax	1	„ 10	„
Cholestrine absorption base	5	„ 30	„
Cocoa butter	1	„ 5	„
Corps de jasmin	10	„ 50	„
Diglycol stearate	5	„ 20	„
Hard paraffin	1	„ 5	„
Hydrogenated oil	10	„ 30	„
Japan wax	5	„ 20	„
Lanolin, anhydrous	5	„ 10	„
Lard, benzoinated	5	„ 15	„
Liquid paraffin	1	„ 5	„
Montan wax	1	„ 5	„
Oleyl alcohol	1	„ 10	„
Ozokerite	1	„ 5	„
Peach kernel oil	5	„ 10	„
Soft paraffin	5	„ 20	„
Spermaceti	5	„ 30	„
Stearic acid	1	„ 5	„
Stearyl alcohol	5	„ 10	„
Triethanolamine stearate	1	„ 10	„
White beeswax	5	„ 30	„
Dyestuff	1	„ 3	„
Solvent	3	„ 10	„
Lake	5	„ 15	„
Perfume	0·1	„ 2	„
Ester of *p*-hydroxy benzoic acid as preservative	0·1	„ 0·2	„

Two type examples are given :—

No. 2162.

40	Castor oil.
300	Ceresine.
300	Cholestrine absorption base.
50	Cocoa butter.
100	Japan wax.
50	White beeswax.
20	Acid eosine.
50	Ethylene or diethylenglycol ether.
80	Carmine.
10	Perfume.
1000	

No. 2163.

120	Almond oil.
350	Corps de jasmin.
30	Diglycol stearate.
200	Spermaceti.
150	White beeswax.
10	Bromo acid.
50	Glycol ether.
80	Lithol red.
9	Perfume.
1	Preservative.
1000	

Orange Lipsticks may be made by omitting the lakes from either of the above formulæ. One liberal application to the lips represents approximately 0·006 gram.

White Lip Salve is made in both *hard* and *soft* forms, and as healing properties are generally desirable, lanolin is often included in the formula. Almond or peach kernel oils, cocoa butter, and spermaceti are also good for this purpose. **Hard** kinds usually have a melting-point about 45° C., and are made as follows :—

No. 2164.

250	White beeswax.
300	Spermaceti.
450	Liquid paraffin.
1000	

No. 2165.

100	Lanolin, anhydrous.
400	Liquid paraffin 0·860.
500	Cetaceum.
1000	

No. 2166.

300	White wax.
700	Peach kernel oil.
1000	

Soft kinds are more greasy when used, and may be made as follows :—

No. 2167.

100	Lanolin, anhydrous.
900	Theobroma oil.
1000	

No. 2168.

100	Spermaçeti.
100	Almond oil.
800	Cocoa butter.
1000	

No. 2169.

150	Lanolin, anhydrous.
500	Soft paraffin—white.
350	Hard paraffin.
1000	

Melt the fats on a water-bath, and when cool add the perfume. Run into moulds, which will give the desired shape to the stick. White lip salves are generally round, but may be of the flat shape adopted nowadays for rouge.

Rose Lip Salves are nothing more than the white which have been tinted, but do not contain enough pigment to colour the lips. One of the articles much used for this purpose is alkanet root—the desired tint being obtained by experiment (5 per cent is a reasonable amount). In order to obtain the colour the salve is digested on a water-bath with the cut roots for two hours and afterwards strained. The perfume is added after cooling. This method is rather wasteful since the alkanet absorbs quite an appreciable quantity of fats, and in consequence it is often desirable to use other forms of pigment. Nothing is better than an oil-soluble colour, and these are obtainable from any of the dye-makers. It is sometimes difficult to get the exact tint required, but good results may be had by mixing suitable quantities of red and violet. It would not be advisable to give figures here as the tint is a matter of personal taste.

Should any difficulty be experienced, certain of the *basic* dyestuffs may be made soluble in oil by digestion with *stearic acid* before incorporation with the base.

Lip Jellies are obtained by using finest white sheet gelatine as the solidifying agent. Advantage is taken of the fact that 2 per cent of a good quality gelatine, when dissolved in water, will set to a soft jelly—harder products being obtained by increasing the amount. Glycerine up to 75 per cent is added to prevent the lips cracking, but in coloured varieties much less than this is used. Any of the colours given under *rouges* may be employed, and the desired tint obtained by experiment. A favourite perfume is rose, but other oils such as jasmin, lavender, etc., may be used. The addition of some formaldehyde is desirable, since it preserves the product. Lip jellies are generally sold in tubes and occasionally in pots.

White, No. 2170.

750	Glycerine.
20	Gelatine.
10	Formaldehyde solution, 40 per cent.
220	Distilled water.
1000	

Rose, No. 2171.

500	Glycerine.
25	Gelatine.
2	Eosine, 1 per cent solution.
20	Formaldehyde solution.
453	Distilled water.
1000	

Rouge, No. 2172.

50	Carmine.
	Strong solution of ammonia (a sufficient quantity).
100	Glycerine.
30	Gelatine
820	Water.
1000	

Rub down the carmine in a mortar and add the fluid ammonia until dissolved—dilute with 600 c.c. of water and stand aside for a week. Pour off the clear liquid and add it to the glycerine. In the meantime dissolve the gelatine in 100 c.c. of hot water—then mix the liquids, and when cool add the perfume. This is very effective for colouring the lips.

Note.—Liquid preparations of this type are made by omitting the gelatine and formaldehyde.

Greaseless Lip Rouge Stick.—It is generally admitted that the stick form of lip colouring can be more easily applied than either the jelly or liquid (described elsewhere), but the only disadvantage attendant upon the use of this form is that the colour may come off—perhaps sooner than is desired. These drawbacks are completely overcome by the use of glyceryl borate containing a dye, but they must always be sold in close-fitting cases in order to prevent any undue moistening—the result of the hygroscopic nature of the base. The formula is as follows :—

No. 2173.

800	Glycerine.
600	Boric acid crystals.
20	Eosine scarlet, 5 per cent solution in triple rose water.
1420	

Weigh the glycerine in a tared porcelain dish and add the boric acid and dye solution (the latter will immediately turn yellowish-brown). Apply direct heat to the mixture, taking care that the temperature does not exceed 150° C., and boil until the weight is reduced to 1000 grams. Run into plated moulds *immediately*. The transparent glass-like rouge stick can be removed in about five minutes and packed as above described. For use, the lips should be moistened and the stick applied two or three times according to the tint desired (the colour of the dye assumes its normal shade in the presence of water).

CHAPTER VI.

MANICURE PREPARATIONS.

1. Preliminary treatment of hands, soft waters, softening creams.
2. Cuticle removers, nail bleach, nail creams.
3. Nail polishes, powder, liquid, and paste.
4. Wax polishes, liquid, and paste.
5. Nail enamels, solvents, and plasticisers, enamel remover.
6. Nail white and moon white.
7. Brittle nail applications.

MANICURE has been brought almost to a fine art, very largely through the enthusiasm and business acumen of our American friends. At one time the idea of *varnishing* the nails would have seemed ludicrous; to-day it is practised by most women and many men. The perfectly manicured hand is not entirely the result of the artistic application of the products which will be described in this chapter, but is more often due to the habitual care exercised in washing them and some preliminary treatment which takes effect during the hours of repose.

Preliminary Treatment.—The hands should be washed in soft and soapy water three or four times each day. The nails should never be scrubbed with a hard brush, as this has a tendency to lacerate the cuticle. If a brush must be used—employ a soft one. If the water is hard, soften it with a mixture such as the following—a tablespoonful to a basin of water is sufficient :—

No. 2174.

100	Glycerine.
30	Borax.
20	Sodium carbonate.
850	Orange flower water—triple.
1000	

Dissolve the solids in the mixed liquids.

The healthy condition of the cuticle is very necessary, and this can be maintained by the nightly application of a softening cream—loose gloves being worn to allow of complete absorption. This at the same time prevents the nails becoming brittle and ribbed. Such creams almost invariably contain soap, and preference is given to soft potash varieties. They are made as follows :—

No. 2175.

10	White beeswax.
950	Soft paraffin—white.
40	Soft soap.
5	Lavender oil.
1005	

Melt the ingredients together.

No. 2176.

160	White wax.
40	Lanolin, anhydrous.
500	Paraffin liquid ·860.
10	Borax.
50	White soft soap.
240	Water.
2	Parma violet, No. 1105.
1002	

Melt the fats and heat to 80° C., dissolve the soap and borax in the water at the same temperature, pour the latter into the former and stir, incorporate the perfume.

The first manicure operation proper consists of filing the nails in an upward direction from the sides, any imperfect edges being smoothed with an emery board.

Cuticle Remover is next applied on a small piece of cotton wool with an orange stick. It is worked round the edges and under the tips of the nails, and the dead cuticle is removed with another piece of wool. The most effective type of solution is made with caustic potash and glycerine as follows :—

No. 2177.

20	KOH, 85 per cent.
200	Glycerine.
800	Water.
1	Bergamot oil—terpeneless.
1021	

Dissolve the KOH in the glycerine and water, add the perfume, and pack in rubber-corked frosted bottles.

Another type is made by the substitution of the alkali in the above formula with trisodium phosphate. In this case no precipitation occurs. The use of ethylene diamene as a cuticle remover offers great possibilities.

Nail Bleaches are used for removing discolorations, ink stains, etc. They consist of solutions of dilute acids, salts of lemon, hydrogen peroxide, etc. Some formulæ are appended :—

No. 2178.

4	Acid hydrochloric—pure.
100	Glycerine.
900	Rose water—triple.
1004	

No. 2179.

50	Tartaric *or* citric acids.
950	Orange flower water—triple.
1000	

No. 2180.

15	Oxalic acid.
1	Phenylacetic acid.
1000	Water.
1016	

No. 2181.

10	Potassium binoxalate.
50	Lavender water.
950	Distilled „
1010	

No. 2182.

500	Hydrogen peroxide—20 vols.
100	Glycerine.
400	Rose water.
1000	

Note.—Use india-rubber corks for all the bottles in which these products are packed.

Nail Creams.—The hands are next dipped in warm water to remove any of the cuticle or bleach applications which may have been used, and then dried with a towel. Before pressing back the cuticle, a little cream is applied. A type formula is given :—

No. 2183.

400	Soft paraffin.
400	Lanolin, anhydrous.
190	Spermaceti.
10	Rhodinol.
1000	

Melt together, add the perfume and pot.

The nails are now burnished—the operation consists of rubbing them lightly across the inside of the hand, to which has previously been applied one of the following products, or of applying the polish on a chamois pad or burnisher.

Nail Polishes (Powder) are made principally from stannic oxide (putty powder), but among the other possible constituents are :—

Kaolin.
Kieselguhr.
Zinc oxide.
French chalk.
Pumice powder.
Heavy precipitated chalk.
Tin oleate.

The majority of them are tinted with either carmine or a dyestuff such as eosine (dissolved in water). The powders are triturated in a mortar and sifted.

No. 2184.

700	Tin oxide.
200	Talcum.
100	Zinc oxide.
0·1	Bengal red.
2	Hydroxy-citronellal.
1002	

No. 2185.

200	Kaolin.
300	Heavy chalk—precipitated.
500	Tin oxide.
0·1	Erythrosine.
4	Methyl naphthyl ketone.
1004	

Liquid Nail Polishes may be prepared from any of the above if desired by adding an equal quantity of water and a suspending agent, such as tragacanth, together with some glycerine. *Stannous chloride* is sometimes used, and may replace tin oxide in the following formula :—

No. 2186.

300	Stannic oxide.
300	Talcum.
100	Osmose kaolin.
2	Tragacanth.
50	Glycerine.
1	Citral.
q.s.	Water.
1000	Total.

Rub down the powders in a mortar, add the glycerine, perfume and water to volume. Colour if desired, and pass the whole through fine muslin before bottling. Shake before use.

Paste Nail Polishes may be prepared from any of the powders by the addition of *glycerine of tragacanth or starch.*

Blocks or **Sticks** are made from the powders by massing with *mucilage of tragacanth* and allowing to dry at normal temperatures—heating makes them crack.

These products are generally wrapped in tinfoil and sent out in suitable packages.

Semi-wax Polishing Sticks have now a much wider use. They may be made as follows :—

No. 2187.

500	Stannic oxide.
100	Kieselguhr.
200	Stearic acid.
100	White beeswax.
90	Linseed oil.
2	Carmine.
5	Geranium oil—French.
3	Musk ketone.
1000	

Melt the oil and waxes. Mill with the powders, add the perfume and run into moulds.

Wax Polishes are not considered to be so effective as the foregoing. They are made with white wax, ceresine, spermaceti, and soft paraffin. An example follows :—

No. 2188.

100	White beeswax.
100	Ceresine—white—high M.P.
800	Soft paraffin—white.
1000	

Melt together and fill into small pots.

Liquid Wax Polishes may be prepared as follows :—

No. 2189.

25	White wax.
50	Hard paraffin.
1000	Chloroform.
1075	

Dissolve in the cold and pack in stoppered bottles.

If any of the polish remains on the hands or under the cuticle, etc., it may be removed with soap and warm water. When dry, the nails are varnished. The most brilliant enamel is made with *benzoin;* others are made with celluloid and triacetyl cellulose.

Benzoin Nail Enamel is conveniently prepared from the resinodor as follows :—

No. 2190.

200	Benzoin R.
400	Alcohol.
400	Ether meth. ·735.
1	Methyl acetophenone.
0·2	5 per cent solution of eosine.
1001	

Mix the liquids and apply to the nails with a camel's-hair brush. Allow the first coating to dry three minutes, and then apply a second one. Dry for ten minutes, and then polish with a silk handkerchief.

A perfect result is obtained and the nails will remain brilliant for several days.

Celluloid Enamels are made by dissolving celluloid scrap or cleaned cinema films in a mixture of amyl acetate and acetone as follows :—

No. 2191.

50	Celluloid.
1	Methoxy acetophenone.
100	Absolute alcohol.
300	Amyl acetate.
600	Acetone.
0·1	Rhodamine B.
1051	

Warm slightly if necessary—the product is of a syrupy consistency.

Triacetyl Cellulose does not give such good results, as the nails are apt to show white streaks. Here is a formula :—

No. 2192.

25	Cellulose acetate.
550	Tetra chlor. ethane.
450	Acetone.
1025	

Dissolve the cellulose in the T.C.E. by allowing them to stand together in a well-closed vessel for two days. Then add the acetone and perfume with iso-eugenol 10 c.c. Colour to taste.

Nitro-cellulose is now used for the preparation of exceptionally fine nail enamels. It can be obtained in varying grades of *viscosity* damped down for safety with industrial spirit or as a solution in butyl acetate. This solvent, however, has rather a strong odour and is not generally appreciated for application to the nails. A mere solution of nitro-cellulose in solvents would not be successful because the enamel would crack. This difficulty is overcome by the addition of a suitable plasticiser of high boiling-point which keeps the cellulose, as it were, in a semi-fluid state after the evaporation of the solvents. The selection of the solvents is important. The low boiling point of acetone makes its use desirable for quick-drying enamels, but too rapid evaporation must be avoided otherwise even distribution on the nails will be impossible. This may be retarded by adding a middle boiler such as ethyl lactate. The tinting of nail enamels is not easy because many colours turn brown after exposure to the air for a few days. The eosines are poor. The safronines and carmoisines are better and not so fleeting. A suitable product may be prepared thus :—

No. 2193.

100	Nitro-cellulose.
100	Resorcinol diacetate.
200	Ethyl lactate.
600	Methyl acetone.
5	1 per cent solution of carmoisine in alcohol.
1005	

Mix the liquids and filter bright. Add the nitro-cellulose and shake frequently until dissolved. Stand aside several days until a brilliantly clear enamel results. Perfume if desired.

The use of ester gum is favoured by some as a means of increasing the lustre of the enamel—a few per cents is generally sufficient for the purpose. Other products are shellac and carnauba wax.

In order to assist the experimenter a list of the various solvents and plasticisers is appended with their boiling-points (in degrees Centigrade) :—

NAIL ENAMELS.

Solvents.

35 Ether.
46 Carbon disulphide.
50 Methyl acetone.
55 Acetone.
56 Methyl acetate.
68 Ethyl „
70 Methyl ethyl ketone.
77 Carbon tetrachloride.
78 Ethyl alcohol.
80 Iso-propyl alcohol.
80 Benzene.
92 Iso-propyl acetate.
96 Butyl formate.
99 Ethyl propionate.
110 Butyl acetate.
110 Toluene.
110 Amyl formate.
113 Butyl alcohol.
120 Amyl „
125 Amyl acetate.
126 Diethyl carbonate.
134 Ethylene glycol monomethyl ether.
135 Ethylene glycol monoethyl ether.
135 Ethyl lactate.
138 Xylene.
140 Amyl propionate.
140 Iso-amyl acetate.
145 Butyl propionate.
154 Cyclohexanone.
159 Ethylene glycol iso-propyl ether.
160 Hexalin
160 Methyl cyclohexanone.
162 Furfural.
164 Diacetone alcohol.
165 Methyl hexalin.
183 Hexalin acetate.
185 Ethyl oxalate.
185 Butyl lactate.
186 Glycol diacetate.
190 Cyclohexanone phthalate.

Plasticisers.

206 Camphor.
209 Triacetine.
212 Ethyl benzoate.
220 Cyclohexanol oxalate.
237 Butyl oxalate.

Plasticisers (*continued*).

245 Diethyl glycol.
276 Triethylene glycol.
278 Resorcinol diacetate.
292 Butyl tartrate.
295 Ethyl phthalate.
312 Butyl „
323 Benzyl benzoate.
336 Amyl phthalate.
355 Butyl stearate.
400 Butyl tartrate.
410 Triphenyl phosphate.
430 Tricresyl „
— Castor oil.

Enamel Remover may be compounded with or without castor oil. The latter type is more popular at present and prevents the nail surface and surrounding cuticle from becoming too dry. It may be prepared as follows :—

No. 2194.

30	Castor oil.
20	Bergamot oil.
150	Carbitol.
800	Acetone.
1000	

This is often described as "oil type" and sometimes the castor oil is replaced with butyl stearate.

Nail White is prepared in the form of a paste as follows :—

No. 2195.

250	Zinc oxide.
250	Barium sulphate.
5	Tragacanth.
45	Tincture of benzoin.
450	Rose water.
1000	

Place the gum and tincture in a litre bottle and shake. Run in the rose water through a funnel in one continuous stream and shake

again. Rub down the powders in a mortar and add the mucilage. Triturate until a smooth cream results. Pack in tubes. Apply a little under the nails with an orange stick.

Moon White.—This is used in an exotic hand make-up for whitening the moons and also for beneath the nail extremities. It may be prepared on the following basis :—

No. 2196.

40	Nitro cellulose.
10	Terpineol.
50	Carbitol.
50	Diacetone alcohol.
50	Elemi R—20 per cent in alcohol.
300	Absolute I.M.S.
100	Titanum dioxide.
300	Precipitated chalk—light.
900	

Mix the liquids and in them dissolve the collodion cotton. Mix and sift the powders through 200 mesh silk. Triturate and when a smooth paste has been obtained, pack in tubes.

Brittle Nails may be hardened by the application of one of the following ointments at bedtime, gloves being worn overnight :—

No. 2197.

30	Beeswax.
30	Resin.
260	Oil of mastic.
30	Alum.
40	Salt.
390	

No. 2198.

100	Lanolin.
10	Zinc oxide.
10	Calcium glycerophosphate.
0·5	Sodium arsenate.
1	Pilocarpine nitrate.
5	Ext. nux. vomica.
126	

Tint if desired with carmine.

CHAPTER VII.

ROUGES AND EYE COSMETICS.

1. Liquid.
2. Powder.
3. Compact.
4. Paste.
5. Cream—cold cream and vanishing types.
6. Kohol and mascara or eyelash cosmetic.
7. Eye shadow and eyebrow pencils.
8. Eye lotions.

THE products included in this chapter were at one time the sole prerogative of the theatre, but since they are now used by all smartly turned-out women, a more comprehensive account of their composition and manufacture seems necessary.

All types of rouge are made in numerous shades, varying from the palest of pinks to the deep bluish-reds. These colours are arrived at by using dyestuffs of the fluoresceine group or other aniline derivatives, such as carmoisine and rhodamine, lakes of various shades, including carmine and in a few cases even the oxides of iron. The choice of pigment depends upon the type being made.

Liquid Rouges are made from one or other of the dyestuffs or alternatively from carmine. Their application is not easy, and for artistic results it is advisable to wet the face before application so that even spreading results. It is preferable to make the colour weak rather than strong because finer shading can be attained. Examples follow :—

No. 2199.

2	Erythrosine (1 to 5 if desired).
98	Alcohol.
400	Glycerine.
500	Rose water.
1000	

Dissolve—chill and filter.

No. 2200.

1	Eosine.
4	Rhodamine.
95	Alcohol.
300	Carbitol.
600	Rose water.
1000	

Dissolve—chill and filter.

No. 2201.

2	Carmine.
3	Liquid ammonia.
395	Glycerine.
600	Rose water.
1000	

Dissolve the carmine in the ammonia, add the glycerine and warm to drive off any excess of alkali. Then add the rose water and stand aside for 1 month. Decant the clear liquid.

Powder Rouges are made principally from carmine and one or other of the oxides of iron, distributed in a face powder base, as follows :—

Natural, No. 2202.

30	Carmine.
100	Armenian bole.
100	Zinc oxide.
60	Magnesium stearate.
400	China clay.
300	Talc.
10	Perfume compound.
1000	

Mix and sift twice through 200 mesh silk.

Brunette, No. 2203.

970	As above, No. 2199.
20	Burnt sienna.
10	Burnt amber.
1000	

Proceed as above.

Geranium, No. 2204.

950	Rouge naturel, No. 2199.
50	Geranium lake.
1000	

Proceed as above.

If especially bright shades are desired, 0·1 per cent of eosine may be dissolved in alcohol and added before trituration.

Compact Rouges are made on the same lines as ordinary compacts described elsewhere, excepting that the pigments given under Dry Rouges are mixed in with the powder base before the addition of excipient. Such a type is as follows :—

Natural, No. 2205.

5	Carmine, No. 40.
35	Armenian bole.
130	Maize starch.
220	Precipitated chalk.
600	Talc.
10	Perfume compound.
1000	

Mix and sift twice through 200 mesh silk. Triturate with about 25 per cent of excipient as described elsewhere and compress. The colours intensify on addition of the excipient but dry lighter.

The other shades may be obtained as already described under Powder Rouges.

Paste Rouges may be prepared from any of the waxes, etc., enumerated under lipsticks. The concentration of colour is less, and since these products are not easily applied, spreading qualities must be of prime consideration. When a number of different shades are manufactured it is desirable to make a base and mill in the different pigments as required. Two suggested bases are appended :—

Base, No. 2206.

200	Japan wax.
290	Corps de jasmin.
200	Soft paraffin.
300	Liquid paraffin.
9	Perfume compound.
1	Methyl parahydroxy benzoate.
1000	

Dissolve the preservative in the perfume and add to the melted fats. If desired the pigments may be first milled with the liquid paraffin in this formula.

Base, No. 2207.

100	White beeswax.
90	Coco-nut stearine.
800	Soft paraffin.
10	Perfume compound.
1000	

Mill together—pass through linen and cool.

The colours may be chosen from any of the non-allergic dyestuffs, pigments or lakes. Milling to a very fine grain is essential. An example of a finished paste rouge follows :—

No. 2208.

100	Japan wax.
100	Coco-nut stearine.
50	Spermaceti.
650	White soft paraffin.
15	Eosine—10 per cent in carbitol.
30	Carmine, No. 40.
50	Geranium lake.
5	Perfume compound.
1000	

Melt the fats and mill in the colours. Pass through a homogeniser. Stir in the perfume and pot in a semi-liquid state.

Cream Rouges differ from the foregoing in that the bases are either of the cold cream or vanishing cream type. In the former, the use of lake colours is desirable while in the latter, these are sometimes supplemented by fluoresceine dyestuffs when it is essential they be incorporated in a comparatively non-volatile solvent such as one of the ethers of ethylene glycol. Formulæ for both types are appended :—

Cold Cream Type, No. 2209.

300	Liquid paraffin 0·860
200	Soft white paraffin.

100	White beeswax.
14	Stearic acid.
6	Triethanolamine.
10	Borax.
300	Distilled water.
65	Red lake—to taste.
5	Perfume compound.
1000	

Mill the colour with the soft paraffin until a perfectly smooth product results. Melt the other fats and waxes. Dissolve the ethanolamine and borax in hot water and stir the one into the other until emulsification is complete. Now stir in the colour base already warmed and finally the perfume.

Vanishing Cream Type, No. 2210.

150	Stearic acid.
100	Carbitol.
10	Borax.
10	Potassium hydroxide.
650	Distilled water.
8	Perfume compound.
2	Phloxine.
70	Red lake to taste.
1000	

Dissolve the dyestuff in the carbitol and with this triturate the colour. Melt the stearic acid and saponify with the hot solution of alkalis. Mix the colour base with part of the hot cream and then distribute through the remainder by stirring. If lumpy—run through a mill. Stand aside for at least 24 hours before potting.

Kohol or **Kohl** was used by the ladies of ancient Egypt for darkening their eyelashes. The principal constituent was galena, a lead ore in the form of sulphide. To-day, it is believed to be made in the East by burning together almonds, benzoin, and incense, or the safflower plant, *Carthamus tinctorius*, the soot being collected and applied either in powder form or by admixture with a liquid. Some samples appear to consist of black oxide of manganese only. Other kinds are prepared in Europe by dissolving Chinese ink in a mixture of glycerine and water—the

product being of a syrupy consistence. The following will make satisfactory articles, and dispense with the use of Chinese or Indian inks :—

No. 2211.

100	Lamp black or fine carbon black.
100	Powdered gum-acacia.
800	Rose water.
1000	

Rub down the powders together, and add the water gradually.

No. 2212.

100	Ivory black or vegetable black.
15	Tragacanth in powder
135	Alcohol, 58 o.p.
750	Orange flower water.
1000	

Place the alcohol in a bottle, add the tragacanth, and shake until evenly distributed. Pour in the orange-flower water, and shake until a creamy mucilage is obtained. Rub down the pigment and gradually add this mucilage to it. Pass through muslin and transfer to bottles, which should be securely corked at once.

Kohl in *paste* form is sometimes required, and may be prepared as follows :—

No. 2213.

400	Ivory black.
600	Soft paraffin—yellow.
1	Ambrone, No. 1007.
1001	

Rub down the ivory black in a *warmed* mortar, and add the soft paraffin, previously liquefied. Incorporate the perfume, and transfer the pomade to small elegant pots. For use, a little should be placed on a match stick and warmed. When applied to the lashes it will set.

Mascara or Eyelash Cosmetic is generally marketed in moulded bars, which when moistened with a wet brush

and applied to the lashes, darkens them, and by skilful application curls them upwards. Two colours are prepared as follows :—

No. 2214 (Black).

100	Lamp black.
900	Soap.
q.s.	Water.
1000	

No. 2215 (Brown).

100	Burnt umber.
900	Soap.
q.s.	Water.
1000	

The colour is best lixiviated with a little water and then milled in with the soap, being afterwards stamped out in moulds. In spite of the fact that when these soap compounds get into the eyes and cause tears and stinging, they are still preferred by many women. These disadvantages are largely overcome by the use of triethanolamine stearate, prepared *in situ*.

Here is a good working formula for the most popular colour—

DARK BROWN, No. 2216.

300	White beeswax.
190	Montan wax.
300	Stearic acid.
130	Triethanolamine.
20	Lamp black.
150	Burnt umber.
1000	

Melt the waxes and grind in the colours in a warm mill. Stir in the ethanolamine and pour into moulds.

Eye Shadow is prepared in a variety of subtle shades and is much used, especially with an evening make-up. The principal colours are blue, bronze, and brown. In large-scale

production it is better to keep a stock base, and the finished eye shadow should be soft enough for easy application. A shiny appearance is essential. An example follows :—

Base No. 2217.

49	White beeswax.
100	Spermaceti.
150	Cholestrine absorption base.
700	White soft paraffin.
1	Perfume.
1000	

Melt together—strain and cool.

The eye shadow is prepared from this base by milling the colours repeatedly until a smooth product results. The pigments employed are usually lakes and/or oxides of iron but in all cases these must be diffused in a white pigment such as zinc oxide or titanium dioxide. If scintillating effects are desired, it is only necessary to add a few per cents of gold bronze or powdered aluminium as the case may be. A general type formula follows :—

No. 2218.

800	Base, No. 2217.
150	Zinc oxide.
30	Lake—middle green.
20	Gold bronze.
1000	

Eyebrow Pencils are prepared in two colours, black and brown. They are generally made fairly hard, and moulded in thin pointed sticks. A formula for brown follows :—

No. 2219.

80	Burnt sienna.
100	Burnt umber.
420	Hard paraffin.
400	Soft paraffin—yellow.
1000	

Eye Lotions are sometimes sold as a beauty aid, but only the simplest preparations should be made using in all cases freshly distilled water. Two formulæ are given :—

No. 2220.

10	Boracic acid.
2	Zinc sulphate.
988	Distilled water.
1000	

No. 2221.

5	Sodium chloride.
5	Borax.
20	Glycerine.
50	Witch-hazel extract.
920	Distilled water.
1000	

CHAPTER VIII.

SHAVING PREPARATIONS.

1. Shaving creams, characteristics, raw materials, alkalis, manufacture, perfumes, superfatting, formulæ.
2. Shaving creams (brushless).
3. Shaving soap powders.
4. After-shaving lotions and creams.
5. After-shave talc.
6. Shaving blocks.
7. Razor pastes—semi-solid and solid.
8. Anti-irritant.

Shaving Creams.—During recent years the elegance and efficiency of these products have placed them in keen competition with the already well-established shaving stick. Their manufacture is, however, much more difficult, and considerable experience is necessary for successful production on a large scale, together with a close analytical control at all stages of the process. A really good shaving cream should have the following characteristics :—

1. A small quantity must give an abundant lather.

2. When applied to the face there must be no smarting or astringent effect on the skin.

3. The lather must be creamy and close without any apparent condensation after application.

4. The cream must remain soft in the tube and not go lumpy if overheated. It must be sufficiently tacky to adhere to both brush and face and yet be easily washed off the razor.

5. It must not corrode either the nozzle or the closed end of the tube.

6. The perfume must be fresh and not too lasting.

To obtain the above qualities it is absolutely essential that all raw materials be of the best and purest obtainable. At one time it was customary to saponify lard with potash lye, but this did not yield all the essential characteristics of a good cream. Lard was replaced either entirely or in part by best white neutral tallow, coco-nut oil, olive oil, pea-nut oil, or even sesame oil, and by replacing part of the potash lye with soda lye many good products were obtained. To-day, however, resource is had to the already purified and pressed stearic acid. Triple pressed has the highest melting-point, is the purest, and yields the whitest product. It is comparatively easy to calculate by analytical methods the exact amount of alkali required to produce an absolutely neutral cream. Stearic acid alone, however, does in fact, possess the disadvantage of producing a cream which has not the free lathering properties necessary. This drawback is overcome by adding some coco-nut oil, or if desired, some tallow as well. In general, four to eight times as much fatty acid is employed as free fat. When coco-nut oil alone is added to the stearic acid the ratio of about 1 to 7 should meet all requirements as to creaminess of lather. Exceptional foaming properties may be obtained by substituting part of the stearic acid with myristic acid.

A mixture of potash and soda is preferable in these creams also, but the latter is kept in low proportions and seldom exceeds 15 per cent of the total alkali. The use of alkaline carbonate is not recommended since the CO_2 evolved remains occluded in the soap and shrinkage may result. The total fatty acid in a cream varies between 35 and 50 per cent, softness being enhanced by the addition of about 5 per cent of glycerine. The latter also has the advantages of improving the wetting properties, preventing too rapid drying of the lather, making the skin more elastic, softening the beard and facilitating the transit of the razor over the face. Other wetting agents of interest are sulphonated lorol and triethanolamine stearate which at the same time enhance the creaminess of the lather. Lecithin and sodium cholate have also received some attention in this direction.

The real secret of plasticity, however, is not, as is frequently supposed, in absolute neutrality but in the presence of a few per cents of free acids—added after the saponification is completed. Alternatively this may be effected by the addition of the necessary quantity of boric acid to the nearly finished cream. Pearliness may be induced by running in a small quantity of concentrated solution of soap and thoroughly mixing.

The manufacturing process is commenced by melting and filtering the free fats and saponifying them with the soda lye and part of the potash lye in the presence of the glycerine. The remainder of the potash lye together with some water is now run in, the heat being maintained all the time. The melted stearic acid is then added in a continuous stream, the whole being stirred throughout (slow stirring is preferable). Samples are tested with alcoholic phenolphthalein and the necessary additions of acid or alkali made until absolute neutrality is obtained. The cream is now superfatted by means of either boric acid, more stearic acid, or lanolin,[1] and boiling continued until a perfectly even cream is obtained. Further examination is necessary so that the total fatty acid in the cream can be adjusted to the standard percentage. The steam is then turned off and gentle agitation continued while the cream cools. The perfume is then added and after standing aside 24 hours it is tubed by machinery. The question of perfume is important. Almond types have been popular but are now generally replaced by lavender, or geranium compounds with a backing of patchouli, vetivert, or oakmoss. Raw materials which are liable to discoloration should be avoided as also those known to have irritant properties. Essential oils are preferable to synthetics. Peppermint is often added on account of its cooling effect on the skin. Some suitable combinations are suggested :—

[1] In the event of fixed oils being used as superfatting agents it is advisable to add a preservative and so prevent rancidity. For this purpose 0·1 to 0·2 per cent of one of the esters of *p*-hydroxy benzoic acid may be used.

Ingredients.	No. 2222.	No. 2223.	No. 2224.
Geranium oil—Algerian	—	400	—
Bois de rose oil	—	100	100
Bergamot oil	350	200	100
Lavender oil	500	—	—
Vetivert oil	—	30	50
Patchouli oil	20	10	—
Ylang-ylang oil—Bourbon	15	10	50
Oakmoss absolute—colourless	5	—	—
Sandalwood oil—E.I.	40	100	200
Methyl ionone	—	—	400
Peppermint oil	20	30	10
Orris oil—concrete	5	—	25
Rose otto	5	—	5
Coumarin	30	20	10
Clary sage oil	10	—	—
Guaiac-wood oil	—	100	50
	1000	1000	1000

It is well known that in the course of time shaving creams have a habit, especially in damp atmospheres, of exuding either from the cap or the closure at the base of the tube. This is due to the hygroscopic nature of the glycerine and potash soap. Careful attention to the fitting of clips is therefore imperative and hermetically sealed tubes are an advantage.

It is impossible to overstress the value of time tests on all shaving cream experiments and much trouble is avoided thereby.

A formula for a modern shaving cream is appended :—

No. 2225.

280	Stearic acid.
40	Coco-nut oil.
30	Tallow.
300	Potash lye at 20° Baumé—about.
50	Soda lye „ „
50	Glycerine

No. 2225 (*continued*)

20	Boric acid.
20	Sulphonated lorol (sodium salt).
10	Perfume compound.
200	Distilled water—adjusted to about.
1000	

Proceed as above, making the adjustments necessary according to analytical requirements.

Some other examples are given :—

No. 2226.

300	Stearic acid.
100	Myristic acid.
50	Coco-nut oil—Cochin.
60	Glycerine.
2	Caustic soda—about.
18	Caustic potash—about.
10	Triethanolamine stearate.
10	Perfume compound.
450	Distilled water—adjusted to about.
1000	

Proceed as above by analytical control, adjusting the cream to 3 per cent free fatty acid.

No. 2227.

380	Stearic acid.
20	Olive oil.
60	Coco-nut oil.
40	Glycerine.
20	Lecithin.
16	Potassium hydroxide, 80 per cent—about.
3	Sodium hydroxide, 90 per cent—about.
1	Methyl parahydroxybenzoate.
10	Perfume compound.
450	Distilled water—adjusted to about.
1000	

Proceed as above, adjusting to2 per cent free fatty acid by analysis.

Shaving Creams (without brush).—Modifications of the ordinary vanishing cream have more recently been much advertised as shaving creams which are used without a brush, being applied to the face which is shaved cold at

once. The presence of an excess of oil, as an additional lubricant, is desirable together with some glycerine. The choice of alkali is entirely a matter of taste. To prevent the cream vanishing it is preferable to use some spermaceti, but manipulation must be carefully controlled to prevent this becoming lumpy in the finished cream. A formula is appended :—

No. 2228.

160	Stearic acid.
140	Peach kernel oil.
20	Spermaceti.
60	Glycerine.
20	Solution of ammonia.
600	Distilled water—hot.
10	Geranium oil.
9	Sandalwood oil—W.A.
1	Vetivert oil.
1020	

Directions : Place the first four ingredients and 100 grams of distilled water together on a water-bath and heat until melted. Mix the ammonia with the hot water immediately before running into the fats and stir briskly until saponification has taken place. Stir until cool and then add the perfume.

More modern types may include such substances as triethanolamine and its stearate, cetyl alcohol, sulphonated lorol, gum mucilages, cocoa butter and carbitol. An example follows :—

No. 2229.

150	Stearic acid.
60	Myristic acid.
30	Sulphonated lorol.
10	Borax.
10	Potassium hydroxide, 80 per cent.
50	Diethylene glycol monoethyl ether.
30	Cetyl alcohol.
10	Perfume compound.
650	Distilled water.
1000	

Procedure : Melt the fats. Dissolve all but the perfume in the hot distilled water. Mix the two, stirring gently all the time. When cool, add the perfume and sufficient water to weight.

If desired, replace the potash with double the quantity of triethanolamine.

Shaving Soap Powders consist of the finest powdered curd soap mixed with maize starch or orris root and suitably perfumed. These act as emollients and give a permanent lather. The perfume is added to the starch first and sifted. An example is appended :—

No. 2230.

800	Castile soap powder.
200	Maize starch.
6	Cassia oil.
1	Caraway oil.
3	Geranium oil.
1010	

After-Shaving Lotions have attained great popularity. They are intended to cool and refresh the skin, allay irritation, be mildly astringent and neutralise any alkali left on the skin after shaving. Many of them contain extract of witch-hazel together with such substances as bay rum, menthol, glycerine, carbitol, benzoin, boric acid, alum, arnica, sulphonated lorol, oxyquinoline sulphate, lecithin, tragacanth, and chloroform. Some examples are appended :—

No. 2231.

10	Peppermint oil.
50	Glycerine.
940	Bay rum.
1000	

Mix.

No. 2232.

2	Menthol.
10	Tragacanth.
50	Benzoin tincture.
40	Glycerine.
1	Cassia oil.
4	Cinnamon leaf oil.
5	Geranium oil.
888	Water.
1000	

Dissolve the menthol in the tincture of benzoin and place in a bottle. Add the tragacanth, essential oils, and glycerine and shake until an even mixture is obtained. Add the water in a continuous stream up to volume. Then shake violently. Colour pink with cochineal if desired.

Note.—To make the skin tingle more add 1 per cent of solution of formaldehyde.

No. 2233.

20	Boracic acid.
30	Carbitol.
5	Perfume compound.
45	Menthol—1 per cent in alcohol.
900	Witch hazel extract.
1000	

Dissolve the perfume compound in the solution of menthol. Dissolve the boric acid in the remaining liquids. Mix and filter. Tint a fresh colour if desired.

No. 2234.

20	Alum.
30	Glycerine.
50	Menthol—1 per cent in alcohol.
200	Orange flower water.
200	Rose water.
500	Witch-hazel extract.
1000	

Dissolve the alum in the mixed liquids.

After-Shave Creams are of the cold cream type and will be found elsewhere in this work.

After-Shave Talc is applied by the fastidious. It must be a smooth invisible powder tinted a pale sun-bronze and lightly perfumed. An example follows :—

No. 2235.

30	Boric acid.
40	Magnesium stearate.
20	Armenian bole—20 per cent in zinc oxide.
10	Perfume compound.
900	Talc.
1000	

Mix and sift.

Shaving Blocks are made of either fused boracic acid or potash alum. They yield a translucent solid.

Razor Pastes are sold semi-solid in tubes and harder in blocks. Examples of each are given. The finest powders only must be used.

No. 2236 (Semi-solid).

300	Black lead.
100	Tin oxide.
400	Lard.
200	Soft paraffin.
5	Lavender oil.
5	Rosemary oil.
1010	

No. 2237 (Solid).

400	Lard.
200	Yellow beeswax.
350	Powdered and elutriated slate.
50	Tin oxide.
10	Amyl salicylate.
1010	

Stir the mixed powders into the melted fats and pour into moulds.

Anti-Irritant for application to the skin before shaving has been patented by G. L. Regard, French patent No. 623,301. The inventor states that the friction of the razor is irritating and may produce a rash or even eczema. As a preventive he recommends a paste in stick form made as follows :—

No. 2238.

300	Olive oil.
100	Lanolin.
80	Paraffin.
200	Starch.
200	Talc.
10	Glycerine.
3	Perfume.
7	Gelatine.
100	Water.
1000	

This is rubbed on the face before the soap is worked into a lather.

CHAPTER IX.

SKIN CREAMS AND LOTIONS.

1. Introduction.
2. Cold creams, vegetable and mineral. Cold cream papers.
3. Cleansing creams and lubricating creams.
4. Blush creams, solid and liquid.
5. Vanishing creams, manufacture, alkalis, glycerine, pearliness, stability, perfume, formulation. Witch-hazel foams, peroxide creams.
6. Lanolin creams. Skin foods and cleansers. Massage creams (casein)
7. Tragacanth and benzoin creams, solid, liquid, and virginal milk. Red nose lotions.
8. Almond creams. Almond milks.
9. Glycerine and cucumber creams, cucumber juice, lait d'Iris, honey and almond cream.
10. Tissue oils. Skin toners.
11. Lotions, complexion beautifiers, astringent, enlarged pore, and buttermilk.
12. Bleaching lotions and creams, freckle applications. Peeling the skin.
13. Calamine and sunburn lotions, liquid face powder, and skin varnish.
14. Glycerine jellies, camphor ice.
15. Perspiration deodorants and deodorant sticks.
16. Mud creams. Paraffin and radium packs.
17. Insect bite preparations.
18. Hand cleaning pastes.

THE use of salves and unguents for preserving and beautifying the skin dates back to earliest antiquity, when they were generally prepared by digesting aromatic gum resins, roots, flowers, etc., with fats and oils. The first notable change in the constitution of these cosmetics appears to have been made about the second century A.D., when the Greek physician Galen (who practised in Rome) added

water to his salves, and by so doing laid the foundation of our modern *cold cream*. This is probably the only skin appl cation which has stood the tests of time successfully, and although there is little doubt that it has been much modified, the principle remains the same.

More recently other cosmetic creams have been introduced, and they have passed from *Milk of roses* to *Cucumber creams* and from these to the present day *Vanishing creams*.

There is, however, a marked difference between the latter and all the others. These exhibit distinct emollient properties, whereas vanishing creams do not. Indeed, it is doubtful if such products have any intrinsic worth other than that of a protective agent against winds and the sun. Of course their real value to my lady is as a basis for her face powder, which adheres more perfectly when this is applied and evenly rubbed into the epidermis.

A vanishing cream, therefore, cannot be said to be of much value *alone*, whereas it undoubtedly plays an important rôle in the toilet if used in conjunction with face powder.

Cold Cream is an emulsion in which the fat predominates, but the cooling effect produced when it is applied to the skin is due to the slow evaporation of the water contained. The bases in general use at one time were almond oil, lanolin, and white wax, but the oil has now been largely replaced by liquid paraffin, since it will not become rancid on keeping. Spermaceti is sometimes used instead of, or in conjunction with, white beeswax, and traces of borax are occasionally added to aid emulsification. The perfume generally used is rose—either as aqua rosæ or by the addition of otto. The method of manufacture is simple *when borax is used*, and consists of melting the wax on a water-bath, adding the oil, and warming the whole to about 80° C. The aqueous portion containing the borax is heated to this temperature and stirred in slowly. The perfume is added when cool, and the cream is potted liquid if a brilliant white surface is desired. When an emulsifying agent is *not* used, mani-

pulation is more tedious, and the cream has to be stirred for a prolonged period if good results are desired.

Vegetable Cold Creams may be made to the following formula :—

No. 2239.

550	Almond oil.
145	White wax.
10	Borax.
290	Water.
5	Rose otto.
1000	

Modifications with spermaceti may be prepared as follows :—

No. 2240.

600	Peach kernel oil.
20	Spermaceti.
150	White wax.
5	Borax.
215	Triple rose water.
5	Phenylethyl alcohol.
5	Geranium oil—French.
1000	

or *without* borax as below :—

No. 2241.

560	Almond oil.
30	Lanolin, anhydrous.
100	Spermaceti.
100	White wax.
200	Water.
10	Pelargonium oil.
1000	

The addition of *zinc oxide* makes these preparations whiter, and it must be rubbed down to a smooth cream with some of the oil before mixing with the bulk. The procedure is then as above described.

No. 2242.

560	Almond oil.
180	White wax.
20	Lanolin, anhydrous.
10	Borax.
20	Zinc oxide—finely sifted.
200	Water.
5	Rose rouge, No. 1092.
5	Rose-geranium oil.
1000	

Mineral Cold Creams may be prepared with petroleum oil of ·860 gravity as follows :—

No. 2243.

570	Paraffin liquid.
160	White wax.
50	Lanolin.
8	Borax.
200	Water.
8	Geraniol.
4	Phenylethyl alcohol.
1000	

Cold Cream Papers.—A patent has been granted (No. 250,620) to the Freshire Co. whereby a specially prepared absorbent tissue paper is treated with cold cream and sold in this condition for direct application to the skin.

Cleansing Creams differ from cold creams in that water is present in a smaller proportion or is indeed often absent, the theory being that the evaporation of water produces cold which closes the pores. Obviously for thorough cleansing the pores should remain open so that all traces of make-up, dust, etc., are completely removed. The principal attributes of this type of cream are that it must have a low viscosity and liquefy at body temperature. Formulæ for the two types are appended :—

Water Type, No. 2244.

40	Sulphonated lorol (sodium).
50	Glyceryl mono-stearate.
60	Cholestrine absorption base.
200	White soft paraffin } alter quantities to
550	Liquid paraffin, 0·860 } taste.
90	Distilled water.
10	Perfume compound.
1000	

Melt together and stir until emulsion is formed. Cool and add the perfume.

Oily Type, No. 2245.

30	Sulphonated lorol, T.A.
120	White beeswax.
50	Spermaceti.
20	Lanolin, anhydrous.
200	White soft paraffin } adjust to taste.
550	Liquid paraffin, 0·860 }
10	Perfume compound.
20	Hydrogen peroxide, 20 volumes.
1000	

Melt together and stir until cream is formed. Add the perfume and peroxide when cool.

Note.—Stabilise the peroxide by adding 0·1 per cent. of methyl para-hydroxy benzoate, otherwise after a time no available oxygen will exist in the cream.

Lubricating Creams are used mainly to impart suppleness to dry skins and to prevent scaliness. They are usually of the cold cream type but include olive oil or lanolin. Variations are made with cholestrine absorption base (odourless), cocoa butter, lecithin, cetyl alcohol, beeswax, spermaceti, etc. A type example is given.

No. 2246.

400	Olive oil.
60	Lanolin.
50	Cocoa butter.
100	White beeswax.
30	Spermaceti.
300	Liquid paraffin 0·860.

No. 2246 (*continued*).

5	Borax.
150	Distilled water—hot.
1	Methyl parahydroxy benzoate.
4	Perfume compound.
1000	

Melt the fats. Dissolve the borax in the water and mix. Stir until cool. Then add the preservative dissolved in the perfume.

Blush Creams are so called because when a little is applied to the cheeks, a delicate pinkish hue develops on exposure to the air. They are made in a similar way to cold creams, but with the addition of *alloxan* (*see* Volume I). Here is a formula:—

No. 2247.

600	Almond oil.
200	White wax.
10	Alloxan.
180	Water.
5	Bergamot oil.
2	Neroli oil.
3	Rhodinol.
1000	

Melt the wax and add the oil. Dissolve the alloxan in the water, and incorporate this with the fats in a warm mortar. Add the perfume when cool, and continue to stir until the cream becomes quite white.

Liquid blush creams are merely solutions of alloxan in dilute glycerine and rose water, as follows :—

No. 2248.

2	Alloxan.
98	Glycerine.
900	Rose water—to produce.
1000	

Dissolve.

Vanishing Creams are so called because they disappear when rubbed into the skin—that is, if they are made properly with the correct ingredients. They consist of stearic acid, partially saponified with alkali, the bulk of the

fatty acid being emulsified by the soap thus formed. The main constituent is, of course, water.

Care should be exercised when purchasing **Stearic Acid**, and only the finest quality melting about 56° C. is of any use for first-class products.

The quantity of this raw material to be used in a vanishing cream varies according to the result desired; it may be as low as 10 per cent, but should not exceed 25 per cent. For a good stable cream, about 20 per cent gives satisfactory results. The consistence of the cream does not necessarily depend upon the proportion of fatty acid present, but rather upon the amount saponified and the nature of the alkali used for this purpose. For example, a difference is observed between the results obtained with soda and potash—the former makes a harder cream, that is assuming the ratio between their molecular weights are taken into account, *i.e.*

10 of NaOH = 14 of KOH.

Again the different percentages used of the *same* alkali in two creams will give different results. This is well illustrated by reducing the quantity of KOH from 14 grams to 10 grams in the first formula given below. Instead of getting a satisfactory product a very hard cream will be produced.

The *amount of fatty acid to be saponified* will vary according to the aim of the manufacturer, and will depend upon the composition of the cream to a very large extent. *Thirty* per cent should not be exceeded for "de luxe" products, and very often *less* will be found quite satisfactory. In order to arrive at the aproximate quantity of *alkali* that will be required, the following points must be observed.

Stearic acid, $C_{17}H_{35}COOH$, has a molecular weight of 284.[1] Supposing 1 kilo of cream is being prepared containing 200 grams of fatty acid, and it is desired to saponify

[1] Commercial products are never absolutely pure and the presence of other fatty acids gives a more accurate working figure of about 270.

28 per cent of it—*i.e.* 56 grams—the quantity of alkali required will be calculated thus :—

$$\frac{\text{(molecular weight of alkali)} \times 56 \times 100}{284 \times \text{(no. of molecules as per equation)} \times (\%\ \text{purity of alkali})}$$

To take a concrete example—caustic potash reacts with stearic acid as follows :—

$$C_{17}H_{35}COOH + KOH = C_{17}H_{35}COOK + H_2O.$$

The molecular weight of KOH is 56, and commercial samples average about 80 per cent strength.

The above calculation will therefore read :—

$$\frac{56 \times 56 \times 100}{284 \times 1 \times 80} = 14 \text{ grams nearly of commercial KOH.}$$

In order to assist the operator in arriving at his experimental quantity of alkali the following table is appended. The figures are based on the assumption that 1 kilo of cream will contain 200 grams of stearic acid, and no other fatty substance such as spermaceti, cocoa butter, almond oil, lard, etc. These bodies influence the consistence of the product, and some adjustment is usually necessary. Furthermore, an important part is played by manipulation which will be referred to later :—

Commercial Alkali.	Average Percentage Strength.	Formula.	Molecular Weight.	Approximate Weight Required.
Potassium hydroxide	80	KOH	56	14 grams
,, carbonate	81	K_2CO_3	138	16 ,,
Sodium hydroxide	90	NaOH	40	8 ,,
,, carbonate crystals	98	$Na_2CO_3 10 . H_2O$	286	28 ,,
Borax crystals	98	$Na_2B_4O_7 10 . H_2O$	382	37 ,,
Liquid ammonia ·880	32(NH_3) or 66(NH_4OH)	NH_4OH	35	10 ,,
Triethanolamine	77 of Tri- 18 of Di- 5 of Mono-	$N(C_2H_4OH)_3$	Apx. 132	20 ,,

Properties of Alkalis.—It is always better to use a *hydroxide* than a carbonate, since the gas (CO_2) liberated when the latter is added to stearic acid will not all escape.

Assuming that the preparation were a thin liquid, the gas would readily come away and a perfectly clear solution would result, but since the soap and excess of fatty acid produce a viscous liquid, even while hot, it is practically impossible for the whole of the CO_2 to escape. Continuous trituration will not remove it, and after the cream has thickened and set, it will be found to be impregnated with numerous bubbles. In time these will rise to the top, and the cream will sink in consequence—a carbonate, therefore, possesses certain disadvantages.

Strong Liquid Ammonia has a tendency to discolour creams made with it. This is only observed after a time, and it is therefore not the ideal.

Borax is useful since it will produce a very white cream. The only disadvantage it possesses is that the product has a distinct tendency to grain.

Sodium and Potassium Hydroxides are both good, and the advantage is very decidedly with the use of the latter. Manipulation is facilitated and pearliness follows very closely in its train.

Triethanolamine is excellent. Production of creams is easy and capable of great variation, according to balance of this and fatty acid. Pearliness and stability are all that may be desired, and other emollients are added with facility.

Glycerine is a constituent of many soap creams, and when used it should not exceed *ten* per cent. Half that amount is generally sufficient, and in Britain a distinct preference is shown for creams *without* it. The only real objection to glycerine is that, being hygroscopic, it has a tendency to absorb moisture after application to the skin. This is observed in the form of minute globules of water which appear here and there in the powdered surface. Frequent repowdering is generally necessary when stearin creams containing glycerine are used. These objections are overcome by the use of carbitol.

Manufacture. — The methods adopted in making vanishing creams are responsible, to a very large extent,

for the appearance and texture of the resulting product. They must be standardised, and adhered to, for every batch if consistent results are to be obtained. The most general method consists of melting the stearic acid on a water-bath to a temperature of about 85° C. The water (and glycerine if any) is brought to the same degree, and the alkali dissolved. This hot alkaline solution is gradually poured into the liquefied fat, while the whole is stirred briskly. The temperature is maintained at 85° C. for about ten minutes after all the hot alkali has been added in order to ensure that it has been completely neutralised by the stearic acid which is always in excess of the molecular quantities required. The container is removed from the source of heat, and stirring continued until the cream thickens and sets. This operation is still reverted to at intervals during the next twelve hours, and the temperature of the product is not allowed to fall below 20° C. The perfume is then added and the cream transferred to pots or jars.

Other methods are :—

1. Adding small lumps of solid stearic acid to the boiling alkaline solution.

2. Placing all the ingredients, excepting perfume, together in a pan—**cold**, and heating them until saponification is completed.

The advantages or disadvantages of such *modus operandi* will be fully appreciated with practice.

Pearliness.—Much has been written regarding the satiny appearance of vanishing creams, and in order to induce it many substances and methods of manipulation have been recommended.

Among those materials which are said to produce it are : liquid paraffin, spermaceti, cocoa butter, starch, castor oil, almond oil, resin, etc., but since there are so many *degrees* of pearliness, these bodies can only truthfully be stated to yield a *shine*, and will not produce a silvery appearance approximating to that of powdered aluminium.

This peculiar effect is probably due to the crystallisation

of the stearic acid in the minutest laminæ, from which the light is reflected at any angle, and strange as the statement may appear, *it can be easily obtained without the use of direct alkali.*

The difficulty of producing this phenomenon seems to resolve itself into finding the best medium in which to emulsify the stearic acid so that it can rapidly form lustrous laminæ. In the course of experiments conducted by H. G. Tribley, in collaboration with the author, it was found that pure curd soap answered this purpose and produced a sheen within 24 hours. This was dissolved in boiling water and poured into the hot stearic acid while briskly stirring. The formula is appended :—

No. 2249.

200	Stearic acid.
50	Curd soap.
800	Water.
1050	

This cream rolls very badly and has a tendency to dry in the pot. These disadvantages may be overcome to some extent by substituting olive oil soft soap for curd soap and by using double the quantity.

A really satisfactory pearly cream may be produced, however, by using curd soap in conjunction with any approved formula. From 1 to 5 per cent yields an attractive sheen which increases in proportion to the quantity of soap used. The consistency of a cream is, of course, influenced by this addition and there is a tendency to softness. This is counter-balanced by increasing the fatty acid but not the alkali. It is usual to dissolve the soap separately in a small quantity of the prescribed amount of water and add this after the alkaline solution has been run into the stearic acid.

It has often been suggested that prolonged beating of a vanishing cream will induce a satiny appearance. This is true to some extent, but it must not be forgotten that a very fluffy product will result, and as it will necessarily

contain an undue amount of air, there will be a tendency to sink rapidly after packing.

According to the investigation of F. Atkins,[1] the pearly appearance is due to crystals of acid potassium stearate which form in the cream a few hours after manufacture. He is of the opinion that the best "catalyst" for inducing this effect is oleic acid, and thus confirms the author's work of the year 1924.[2] The use of oleic acid is open to very serious objection, however, in that it has an odour which is not appreciated, it rapidly induces rancidity with the growth of mould on the surface; and finally, it spoils the perfume. *Oleyl alcohol*, however, makes a satisfactory substitute. There is no doubt that the best modern means of producing a pearly effect is by the use of triethanolamine or its stearate.

The use of fish scale essence has been advocated by H. Janistyn,[3] but this also is open to serious objection, mainly on account of odour. The effect is, however, different from ordinary pearliness, which disappears on application, in that the pearly effect is imparted to the skin. A better and more pleasant way of obtaining this result is by adding a small percentage of powdered aluminium.

Stability.—It is generally acknowledged that since soap creams contain a large proportion of water, they are very liable, under certain conditions, to lose some of it by evaporation. It is therefore imperative that the product should be packed in an air-tight container, and the narrower the neck the better. Various devices are in use, and the best of them probably is the jar with a glass stopper pressed into a rubber ring which lies flat on the narrow neck of the container. The tightness of the joint is obtained by a screw cap fitting over the whole. When a glass stopper is not employed it is desirable that a piece of neutral board should fit over the top of the jar-neck, and the whole be coated with melted hard paraffin. All these devices, however, will be useless if the cream contains a lot of air, as

[1] "P. and E.O.R." (1934), 332.

[2] "Parfumerie Moderne" (1924), 6; "American Perfumer" (1925), 17; "Pharmaceutical Journal" (1925), 60, 441.

[3] "Deutsche Parf. Zeitung," 20, 8.

this will come to the top in time, and the cream will sink accordingly. The use of gelatine, tragacanth, and starch has been recommended to hold up such creams, and while they are useful, products which are only slightly fluffy are better without them.

Perfume is a most important consideration in the preparation of this toilet requisite, and the best creams are always highly fragrant. If it is desired to bring a vanishing cream into a series, it will often be found necessary to adjust the formula of the perfume in order to obtain the same odour. Reference has been made in another part of this work to the fact that certain bodies have a tendency to discolour white creams, and on this account raw materials, such as indole, vanillin, eugenol, and musk ambrette, should be avoided. Excellent results may be obtained with bodies such as the following : geranium, bois de rose, santalwood, bergamot, patchouli, vetivert, ylang-ylang, and lavender oils, terpineol, linalol, geraniol, citronellol, phenylethyl alcohol, cinnamic alcohol, and coumarin. Some resinoids are also good and should not be overlooked. The question of irritation is very important and the point B should not exceed 10. This matter is fully discussed in Vol. I., p. 375, 5th edition. Suitable formulæ for lilac perfumes are there given.

A pleasant and persistent perfume can be made as follows :—

No. 2250.

250	Geranium oil—Bourbon.
150	Bergamot oil.
100	Sandalwood oil—E.I.
100	Bois de rose oil.
20	Patchouli oil.
30	Ylang-ylang oil—Bourbon.
200	Phenylethyl alcohol.
10	Rose otto.
40	Iso-butyl phenylacetate.
50	Cinnamic alcohol.
40	Terpineol.
10	Coumarin.
1000	

Formulation.—From the above remarks it will be seen that the proportions in which any of the ingredients may be used are very varied, and will depend upon the type of cream aimed at by the manufacturer. The formulæ given below may therefore be adjusted to suit individual requirements—as they stand, they are workable, and will give good results :—

Potash Cream, No. 2251.

200	Stearic acid—triple pressed.
14	Potassium hydroxide—sticks.
800	Water.
40	Carbitol.
10	Perfume, No. 2245.
1064	

Dissolve the perfume in the carbitol, and beat it into the cream at 20° Centigrade. A softer cream can be obtained by decreasing the fatty acid and increasing the potash.

Potassium Carbonate Cream, No. 2252.

180	Stearic acid.
12	Potassium carbonate crystals.
50	Glycerine.
750	Water.
2	Bergamot oil.
1	Lavender oil.
1	Ylang-ylang oil.
1	Vetivert oil.
3	Geranium oil.
1000	

Maintain the temperature at least 20 *minutes*, with vigorous stirring from the commencement of saponification.

This will allow the greater part of the CO_2 to escape.

Soda Cream, No. 2253.

180	Stearic acid.
9	Caustic soda—sticks.
50	Glycerine.

750	Water.
2	Coumarin.
2	Santalwood oil.
1	Vetivert oil.
6	Methyl ionone.
1000	

Dissolve the NaOH in 360 c.c. of hot water and add to the fatty acid. Mix the glycerine with the remainder of the water at the same temperature and stir in.

Sodium Carbonate Cream, No. 2254.

150	Stearic acid.
20	Sodium carbonate crystals.
140	Glycerine.
650	Water.
30	Alcohol.
1	Methyl acetophenone.
1	Benzyl acetone.
4	Coumarin.
1	Iso-butyl salicylate.
2	Linalol.
1	Styrax R.—decolorised.
1000	

Ammonia Cream (Soft), No. 2255.

200	Stearic acid.
20	Fresh lard.
10	Strong solution of ammonia ·880.
750	Distilled water.
5	Linalol.
8	Terpineol.
2	Ylang-ylang oil.
4	Coumarin.
1	Oakmoss resin.
1000	

Add the ammonia to the hot water, stir, and pour the solution rapidly into the melted fats, triturating briskly all the time.

Borax and Soda Cream (Soapy), No. 2256.

130	Stearic acid.
58	Borax crystals.
12	Sodium carbonate crystals.
740	Water.
50	Glycerine.
9	Rose-geranium oil.
1	Patchouli oil.
1000	

Pour the melted stearin into the boiling solution of glycerine, water, borax, and soda. Continue to boil until the mixture gelatinises. Cool and add the perfume.

Ethanolamine Cream (Pearly), No. 2257.

180	Stearic acid.
20	Spermaceti.
20	Triethanolamine.
70	Carbitol.
10	Perfume compound.
700	Distilled water.
1000	

Melt the fats and heat the liquid to the same temperature. Mix and stir until cool—add the perfume.

Witch-hazel Foams are made on the same lines as vanishing creams, excepting that a proportion of the water is replaced by distilled extract of witch-hazel, which is added to the already saponified fatty acid :—

No. 2258.

180	Stearic acid.
12	Potassium hydroxide.
260	Water.
500	Distilled solution of witch-hazel.
50	Glycerine.
1002	

Perfume with rose otto if desired.

Peroxide Creams contain hydrogen peroxide at the time of manufacture, but it seems doubtful if this exists as such when they are used. The only means of securing the presence of available oxygen is by stabilising the peroxide with methyl parahydroxy benzoate.

No. 2259.

120	Stearic acid.
30	Borax.
20	Lanolin, anhydrous.
100	Glycerine.
670	Water.
50	Hydrogen peroxide—20 volumes.
6	Jasmin, No. 1055.
3	Bois de rose oil.
1	Styrax R.
1000	

Add the H_2O_2 while the cream is cooling.

Lanolin Creams make an excellent skin emollient. They generally consist of hydrous lanolin to which has been added a fixed oil and some glycerine. They should be well perfumed :—

No. 2260.

800	Lanolin, hydrous.
100	Almond oil.
80	Glycerine.
2	Benzoic acid.
5	Coumarin.
1	Musk ketone.
2	Linalol.
3	Terpineol.
2	Bergamot oil—terpeneless.
1	Cistus R.—colourless.
4	Amber liquid, No. 1006.
1000	

Melt the lanolin on a water-bath and add the oils and glycerine. Stir until of uniform consistency, and when cool add the perfumes which had been previously mixed.

These products may be filled into tubes by the apparatus described and illustrated on page 36. They are often labelled *Toilet Lanolin.*

Skin Foods, although based upon lanolin, differ from the former type in that the lanolin is usually replaced in part by paraffin jelly and oil, and a water-in-oil emulsion formed by the use of weak aqueous alkali. These products are sold under various names, such as *tissue*, *night* or *nourishing creams.*

Here is a formula :—

No. 2261.

200	Lanolin, anhydrous.
400	Paraffin jelly.
300	White oil, 0·875.
6	Lecithin.
1	Sodium carbonate crystals.
3	Orange blossom compound.
90	Distilled water—warm.
1000	

Dissolve the carbonate in the water and add to the melted fats. Stir occasionally and add the perfume when cool.

Skin Cleanser for use before face massage relies for its efficacy upon the presence of an alkaline salt which when rubbed over the skin emulsifies the grease, leaving the face perfectly clean after removal with a piece of cotton wool.

No. 2262.

49	Potassium carbonate.
100	Alcohol.
1	Solution of auramine (1 in 1000).
850	Orange flower water.
1000	

The product is also known as **Eau d'Orangeur.**

Massage Creams are of two kinds—lanolin such as the above and casein. The latter may be prepared thus :—

No. 2263.

Take

1000 Skimmed milk

and heat to 60° C. Add

100 Magnesium sulphate

in hot solution. Stand aside 1 hour and then add

10 Alum

in solution. Heat to 60° C. until precipitation is complete. Wash on linen, filter and then squeeze hard until all moisture has been removed. Beat up in a mortar and work in

20 Boric acid.
10 Cocoa butter.
1 Lemon-grass oil.
1 Geranium oil—Algerian.

Tint if desired with solution of cochineal.

Tragacanth Skin Creams are made with gum tragacanth, glycerine, and water suitably perfumed. Here is an example :—

No. 2264.

20	Powdered tragacanth—white.
50	Rectified spirit.
200	Glycerine.
720	Water.
10	Bergamot oil.
1000	

Rub down the tragacanth with the spirit and the perfume in a mortar, add the glycerine. Triturate briskly and add the water in one continuous stream. If any lumpiness occurs, stand aside overnight and then pass through muslin.

Benzoin Creams are similar to the above, and part of the alcohol is replaced with tincture of benzoin. A whiter cream results. Here is a formula :—

No. 2265.

16	Tragacanth.
10	Tincture of benzoin.
40	Alcohol.
3	Rose, No. 1091.
1	Violet, No. 1105.
100	Glycerine.
830	Water.
1000	

Proceed as above.

Liquid Benzoin Creams may be prepared in this way —using much less tragacanth—as follows :—

No. 2266.

8	Tragacanth powdered No. 1.
20	Tincture of benzoin 1 in 5.
100	Glycerine.
20	Tincture of orris.
2	Opoponax, No. 1139.
850	Water.
1000	

Proceed as above.

Virginal Milk is a similar preparation made *without* tragacanth :—

No. 2267 (Simple Form).

25	Tincture of benzoin
50	Glycerine of borax.
925	Rose water.
1000	

No. 2268 (Compound Form).

20	Tincture of benzoin.
5	Tincture of tolu.
5	Tincture of storax.
5	Tincture of ambergris, 3 per cent.
5	Tincture of musk, 3 per cent.
10	Jasmin, No. 1055.
50	Glycerine of borax.
900	Water.
1000	

Mix the tinctures with the glycerine and add the water gradually. Shake and pass through glass wool.

Red Nose Lotions are generally prepared from hydrogen peroxide and thymol as follows :—

No. 2269.

1	Thymol.
19	Eau de Cologne.
500	Hydrogen peroxide, 10 volumes.
480	Water.
1000	

Dissolve the thymol in the eau de Cologne and then mix.

Almond Creams are very fine emulsions of wax and almond oil. Some are prepared direct from sweet almonds, others are made by using the expressed oil. The former type give better results :—

No. 2270.

Take

10	Cetaceum,
10	White wax,

and melt on a water-bath. Add

15	Powdered Castile soap.

In the meantime reduce to a coarse powder

100	Blanched almonds.

Place this in a warmed mortar and add the soap and wax mixture Triturate until a smooth paste is obtained. Add to this very gradually, stirring briskly the whole time,

100	Glycerine,
500	*Warm* water.

Pass the cream so obtained through linen. Scrape off the deposit and transfer again to the mortar. Triturate it with

200	*Warm* water

and again pass the solution through linen. Discard the residue.

Gradually shake into this emulsion the following mixture :—

0·5	Salicylic acid.
0·5	Benzaldehyde.
4	Rose-geranium oil.
100	Tincture of benzoin.
1	Tragacanth.
100	Rectified spirit.

Then add sufficient water to produce 1000.

Pass the emulsion through linen again and do not use any pressure, *i.e.* avoid squeezing.

The product should be shaken at intervals and after twenty-four hours a beautiful white cream will result. The perfume can be varied if desired, but anisic aldehyde gives more pleasing results than benzaldehyde.

The presence of the rather large proportion of alcohol is desirable, as by its evaporation it produces a pleasant, cooling effect.

Almond Milk may be prepared very much on the lines of thin vanishing creams, the ratio of water being much higher. The more common emulsifying agents are glyceryl mono stearate, or triethanolamine and its stearate. Any of the usually accepted waxes may be employed, and separation on standing is almost unknown. An example follows :—

No. 2271.

48	Stearic acid.
2	Lanolin.
60	Carbitol.
5	Triethanolamine.
5	Perfume compound, No. 2266.
880	Distilled water.
1000	

Melt the fats and warm the fluids to the same temperature. Mix and stir until cool. Add the perfume compound as under for almond type.

No. 2272.

700	Benzaldehyde.
100	Santal wood.
100	Cassia.
50	Musk ketone.
50	Peru balsam.
1000	

Products having a more viscous consistency are obtained by introducing liquid paraffin of various gravities and also

by using mixed emulsifying agents. An example of a **Complexion Milk** is appended :—

No. 2273.

100	White oil, 0·870.
30	Stearic acid.
5	Lanolin, anhydrous.
3	Glyceryl monostearate.
10	Triethanolamine.
50	Ethylene glycol.
2	Rhodinol.
800	Distilled water—warm.
1000	

Melt together the oil, fats and water. Mix the glycol and ethanolamine with the water, and pour into the above. Add the perfume last, stirring occasionally until cold.

Glycerine and Cucumber Creams sometimes contain cucumber juice, but more frequently this is conspicuous by its absence. For those who wish to include it in their formula the following method of preparation is recommended :—

Take 1 kilo of cucumbers, wash them and cut them into small pieces, place these in a tincture press and squeeze out all the juice.

Heat this on a water-bath for ten minutes in order to coagulate albuminous matter. Filter and cool. Stand the container in cold water for one hour and filter again. Add sufficient alcohol 90 per cent to produce 1 litre, stand aside for three days and filter bright. This constitutes *cucumber juice*, and it can be stored without alteration for some time. If desired add 1 per cent of it to the following formula for the cream :—

No. 2274.

50	Almond oil.
10	White wax.
20	Spermaceti.
80	

Melt these together on a water-bath and add the following solution in one continuous stream, stirring briskly the whole time :—

3	Borax.
25	Curd soap.
650	Hot water.
50	Glycerine.
728	

Continue to stir this emulsion until it is cold. Then pour it on to the following mixture, agitating briskly :—

50	Tincture of orris.
1	Ionone alpha.
2	Santalwood oil.
2	Ylang-ylang oil.
0·1	Violet leaves absolute.
2	Tragacanth.
1	Salicylic acid.
58·1	

Make up to 1000 with water and pass through muslin.

This formula may also be employed for **Lait d'Iris** or for **Honey and Almond Cream** if 1 per cent of honey is added and the perfume materials substituted as below :—

No. 2275.

2	Rose otto.
1	Verbena oil.
1	Citronellol.
1	Phenylacetic acid.
5	

Milk of Roses may be made to the above formula, the only difference being that the perfume consists of Grasse rose-geranium oil.

Tissue Oils are applied to the sagging parts of the face and are absorbed by the skin during the hours of repose. They are made from a vegetable oil, with small quantities of a resin, terebene, methyl salicylate, and camphor oil suitably perfumed. An example follows :—

No. 2276.

1000	Sweet almond oil.
5	Styrax.
10	Essential oil of camphor.
5	Methyl salicylate.
5	Terebene.
10	Rose centifolia, No. 1091.
1035	

Rub down the styrax in a warm mortar and add the fixed oil. Then transfer to a bottle and add the other ingredients.

These products are sometimes called **Muscle Oils.**

Skin Toners are used for subduing florid complexions, and are prepared thus :—

No. 2277.

50	Zinc oxide.
50	Zinc carbonate.
20	Glycerine.
100	Mucilage of tragacanth.
780	Orange flower water.
1000	

Rub down the powders with the glycerine and mucilage. Add the water gradually to volume and strain.

Lotions sold as *complexion beautifiers* frequently contain small quantities of mercuric chloride. They are generally packed as opalescent or even milky solutions. The former type is prepared as follows :—

No. 2278.

2	Mercuric chloride.
5	Tincture of orris.
3	Tincture of benzoin.
100	Eau de Cologne.
890	Rose water.
1000	

Dissolve the mercuric chloride in the tinctures and eau de Cologne and then add the water.

The latter type is prepared from almonds as follows :—

No. 2279.

100	Powdered almonds.
5	Powdered soap.
600	Water.
705	

Triturate the powders with the water and strain through linen.

Add

50	Glycerine of borax.
1	Mercuric chloride.
50	Lavender water.
	Add sufficient water to produce 1000.

Dissolve the mercuric chloride in the lavender water.

Note.—These products are poisonous.

Astringent Lotions are much used after face massage and, when dabbed on, close the pores. An example is appended :—

No. 2280.

5	Potash alum.
800	Eau de Cologne.
195	Orange flower water.
1000	

Dissolve the alum in 200 c.c. of water and add to the Cologne Filter if necessary.

Other types are prepared as follows :—

No. 2281.

40	Alum.
30	Borax.
30	Glycerine.
200	Alcohol.
300	Orange flower water.
400	Rose water.
1000	

No. 2282.

12	Alum.
2	Zinc sulphate.
5	Glacial acetic acid.
30	Carbitol.
1	Menthol.
150	Alcohol.
800	Witch-hazel extract.
1000	

Skin Toning Lotions are of the foregoing astringent type but usually of a weaker nature.

Enlarged Pore Lotions are frequently ordinary alum astringent lotions as described above. Sometimes makers prefer to use extract of witch-hazel as follows :—

No. 2283.

500	Distilled extract of witch-hazel.
20	Boracic acid.
1	Menthol.
50	Glycerine.
100	Spirits of lilac (1 per cent), No. 1058.
329	Elder flower water.
1000	

Dissolve the menthol in the spirit of lilac and add to the mixed liquids. Make up to volume as directed.

Buttermilk Lotions are made with *lactic acid* as follows :—

No. 2284.

5	Lactic acid, *syrupy*.
100	Glycerine.
10	Tincture of benzoin.
10	Tincture of styrax.
1	Patchouli R.
4	Rose, No. 1090.
870	Rose water.
1000	

Dissolve the perfumes in the tinctures and add to the glycerine. Shake with 800 c.c. of water and then add the acid. Make up to volume with more rose water.

Bleaching Lotions are generally prepared with hydrogen peroxide as follows :—

No. 2285.

100	Hydrogen peroxide—10 vols.
10	Tincture of benzoin.
5	Muguet, No. 1063.
885	Rose water.
1000	

Bleaching Creams may be of the oil or vanishing type and contain either hydrogen or magnesium peroxides, acetic, citric or lactic acids, sodium perborate or bismuth subnitrate. Examples follow :—

Oily Type, No. 2286.

3	Lactic acid.
7	Citric acid.
40	Water.
40	Lanolin.
100	Cetyl alcohol.
800	White soft paraffin—very thin.
10	Rhodinol.
1000	

Dissolve the acids in the water and beat into the melted fats. Run through a homogeniser.

Vanishing Type, No. 2287.

180	Stearic acid.
14	Potassium hydroxide.
250	Carbitol.
400	Distilled water.
50	Hydrogen peroxide—20 vols.
1	Methyl parahydroxy benzoate.
100	Titanum dioxide.
5	Perfume compound.
1000	

Saponify the melted stearic acid with the alkali dissolved in the hot carbitol and water. Stir until cool, then add the peroxide and perfume. Finally incorporate the pigment and triturate until a smooth cream results.

Freckle Applications are made both as lotions and creams. The former are more generally used and contain either ammonium chloride, mercuric chloride, zinc sulphocarbolate, or potassium carbonate.

Here is a suitable formula :—

No. 2288.

10	Ammonium chloride.
40	Glycerine.
100	Alcohol.
1	Liquor carmine.
2	Mimosa, No. 1063.
2	Amber liquid, No. 1005.
845	Rose water.
1000	

Here is another :—

No. 2289.

8	Zinc sulphocarbolate.
20	Glycerine acid boric.
90	Lavender water.
12	Tincture of benzoin.
870	Water.
1000	

Tint if desired with liquor carmine.

And another :—

No. 2290.

30	Borax.
120	Potassium chlorate.
30	Alcohol.
60	Glycerine.
760	Rose water.
1000	

Peeling the skin is sometimes resorted to by the beauty specialist as a means of removing skin blemishes, such as freckles, etc. This is effected by first applying an ointment as follows :—

No. 2291.

20	Salicylic acid.
50	Resorcin.
50	Zinc oxide.
30	Maize starch.
850	White paraffin jelly.
1000	

This is applied to the face morning and night for 5 to 7 days. On bathing the skin afterwards with warm soap and water the superficial layer of skin is removed. The surface is now painted with melted paste as follows :—

No. 2292.

100	Gelatine.
400	Water.

Soak 12 hours and then heat to dissolve and add

150	Zinc oxide,

rubbed down with

300	Glycerine.
950	

Cover the surface with squares of fine gauze and then apply a second coating. After a few days the pieces of gauze become loose at the edges and are carefully peeled off leaving the new skin exposed.

Calamine and Sunburn Lotions generally contain one or more of the following :—

Zinc oxide, carbonate, hydroxide, or sulphocarbolate.
Calamine.
Glycerine.

Sometimes tinctures of benzoin or tolu are added, but some protection of the skin is afforded by the above. The powders are rubbed to a smooth paste with the glycerine and then diluted to volume. The suspension is passed through fine muslin and then bottled. Care must be taken that the insoluble powders are evenly distributed through-

out all the containers. The products are usually sent out pink, and when calamine is not used the colour should be obtained with a pigment rather than a dyestuff. Here are some formulæ :—

No. 2293.

20	Zinc oxide.
100	Calamine.
30	Zinc sulphocarbolate.
45	Tincture of orris.
50	Glycerine.
5	Violet, No. 1639.
750	Water.
1000	

No. 2294.

100	Zinc hydroxide, 25 per cent solution.
70	Zinc carbonate.
30	Corn starch.
50	Glycerine of borax.
50	Tincture of benzoin.
2	Benzyl cinnamate.
5	Heliotropin.
3	Tuberose, No. 1101.
690	Water.
1000	

Dissolve the perfumes in the tincture of benzoin. Tint the powders with Armenian bole if desired.

Note.—Zinc hydroxide is prepared from zinc sulphate by precipitating a 5 per cent solution with excess of ammonia and washing the precipitate until free from sulphates. Add an equal weight of glycerine and sufficient water to make a 25 per cent solution.

Liquid Face Powders are made on similar lines to the above, excepting that *Bismuth oxychloride* is sometimes included instead of calamine or zinc sulphocarbolate. This possesses the great disadvantage of darkening when exposed to light and air. A preference is therefore given to ordinary precipitated chalk and talc. Some starch should always be present, as it improves the effect on the skin and helps to suspend the heavier insoluble constituents.

Some formulæ are given :—

White, No. 2295.

50	Zinc oxide.
50	Precipitated chalk.
50	Corn starch.
100	Glycerine.
750	Orange flower water.
1000	

Rub down the powders, add the mixed glycerine and water gradually, and pass through fine muslin.

Naturel, No. 2296.

20	Bismuth subnitrate.
30	Talc.
50	Zinc hydroxide.
50	Corn starch.
150	Glycerine.
100	Eau de Cologne.
1·5	Armenian bole.
0·5	Burnt sienna.
600	Water.
1002	

Rub down the pigments in a mortar with the bismuth subnitrate and sift through 200 mesh silk, then proceed as above.

Note.—For other colours see *Face Powders.*

Clear Liquid Face Powders are made by dissolving phenazone in a solution of glycerine or carbitol and water. Up to 35 per cent may be used and when applied to the skin and gently massaged in, the crystals of phenazone are deposited in the pores with a very flattering peach-like effect. This product is ideal for the arms and neck and will not rub off. It is removed by the application of warm soap and water. An example is given :—

No. 2297.

300	Phenazone.
48	Carbitol.
2	Rose compound.
650	Distilled water.
1000	

Dissolve.

Skin Varnish as a vehicle or supporting layer for cosmetics, etc., has been invented by Schroder and Keil. French patent, 619,404. The process is based upon the observation that such a support can be obtained with the aspect of varnish by condensing milk to a syrupy consistency completely freed from fat (preferably by vacuum) and mixing this milk with finely sifted pure zinc oxide. There is then probably a chemical change of the oxide with the particles of milk because the mixture becomes, contrarily to what might be expected, fluid and then thickens.

The product thus obtained mixed with a little glycerine gives a somewhat pasty substance which remains perfectly uniform for long periods. When applied to the skin it forms a layer like varnish, drying quickly. It adheres to the skin without cracking or stretching, with the great advantage of not fading, though it can be easily removed with water. The patentees recommend its use by actors because it does not shine on the skin or run at high temperatures.

A white preparation may be made as follows :—

No. 2298.

750	Skimmed milk (evaporated to 250 c.c.),
add while hot	
600	Zinc oxide.
Stir and when the mixture liquefies add	
250	Glycerine.
1100	

Face powder pigments might be added to give attractively coloured products.

Glycerine Jellies are made with gelatine, but it is imperative that this should be water white and quite odourless. *Two* per cent of such a product dissolved in warm water should set to a jelly when cold, so that the consistency of any product can be based on the percentage used in comparison with this figure :—

No. 2299.

30	Gelatine.
170	Glycerine.
800	Orange flower water—triple.
1000	

Place the gelatine in 500 c.c. of water and stand overnight. Then warm until solution has been effected. Add the glycerine and the remainder of the water and run into pots.

These products may be coloured if desired. The following will make an excellent cooling application :—

No. 2300.

25	Gelatine.
500	Glycerine of borax.
10	Alcohol.
1	Menthol.
1	Phenylacetic acid.
500	Triple rose water.
1037	

Proceed as above, dissolve the perfumes in the alcohol, and add when the solution has cooled.

If desired the gelatine and rose water may be replaced by a mucilage of Irish moss suitably perfumed.

Camphor Ice contains from 10 to 25 per cent of camphor, which is added to the melted fats when they have cooled. It is then poured into moulds and the blocks wrapped in tinfoil :—

No. 2301.

150	Camphor flowers.
50	Ceresine—white.
250	Hard paraffin.
550	Soft paraffin—white.
1000	

Perspiration Deodorants.—The harmless correction of excessive and odorous perspiration is a field open to many cosmeticians who have not, perhaps, so far thought the matter worthy of their attention and investigation. The seat of this malady is usually generally believed to be only under the arms and the soles of the feet, whereas excessive perspiration in some persons is by no means confined to these body areas.

Alum in the form of a lotion is an old remedy compounded as follows :—

No. 2302.

50	Alum.
50	Glycerine.
20	Tincture of benzoin.
800	Rose water.
1000	

Dissolve the powdered alum in 800 c.c. of water, add the glycerine and benzoin gradually while shaking. Then make up to 1000 with rose water.

While alum is more or less effective it is by no means as efficacious as aluminium chloride. A lotion of this type may be compounded thus :—

No. 2303.

160	Aluminium chloride, $AlCl_3$
3	Hydrochloric acid.
7	Solution of acid magenta, 1 per cent.
230	Rose water—triple.
600	Distilled water.
1000	

If any difficulty is found in dealing with the aluminium chloride, the method described by R. H. Auch[1] will be found effective. As a check on the strength of the solution it should have a specific gravity of 1·15 at 15° C. The presence of HCl is necessary to prevent precipitation of aluminium hydroxide. The directions for use might be as follows :—

"Bathe the affected part with soap and water and when dry, *pat on the lotion.* Do not apply it immediately after using a depilatory."

The above-named author recommends the following as an improved type :—

No. 2304.

80	Aluminium chloride, $AlCl_3$.
50	Aluminium sulphate.
5	Borax.
865	Water.
1000	

[1] "American Perfumer" (1931), 33.

The advantages he claims are that its action is less harsh, while the borax neutralises any free acids to form boric acid. Furthermore the solution dries a little more rapidly.

Deodorants in the form of powder, paste and cream are not so effective as the foregoing but are merely a palliative. They contain one or other of the following : Boric, benzoic and salicylic acids ; zinc phenolsulphonate (zinc sulphocarbonate).

Deodorant Sticks are a most convenient form in which to apply the active ingredients, and should be tinted a natural shade. They should be sufficiently firm in consistency to resist hot climates—from 50° to 55° C. being a convenient melting range, and they should, moreover, rub smoothly on to the skin. Milling is essential, and the presence of Ti-tree oil as a perfume very desirable on account of its high germicidal value and complete absence of irritation and toxicity. Experiments may be started with the following :—

No. 2305.

700	White petroleum jelly.
70	Ozokerite.
30	Cetyl alcohol.
90	Zinc oxide.
50	Aluminium betanaphthol disulphonate.
50	Peru balsam.
5	Ti-tree oil.
2	Monochlor thymol.
2	Yellow ochre.
1	Armenian bole.
1000	

Mud Creams are applied to the face to freshen the epidermis, but the results are purely temporary. They dry on the face and so form a *mask*. It is probable that while being removed they bring away from the pores any deposited dust and skin debris and so cleanse the epidermis. Their great value lies in the fact that while drying on the face, the blood circulates freely below the skin and so leaves the patient with a fresh pink complexion.

Fuller's earth and bentonite make excellent bases and are made into a cream as follows :—

No. 2306.

100	Sodium perborate.
400	Bentonite.
20	Glycerine.
70	Tincture of benzoin.
10	Petitgrain oil.
400	Starch paste—thin.
1000	

or sufficient to make a soft paste.

Paraffin Packs have recently been advocated in place of mud. The melted paraffin is sprayed on and allowed to set. It is then peeled off and a clean skin is alleged to result.

Radium Packs have been used by continental beauty specialists. The radioactive substance is usually either pitch uranium, mesothorium or thorium hydroxide. A small quantity is added to the following :—

No. 2307.

850	Talcum.
50	Borax.
100	Sodium perborate.
1000	

which is then made into a paste with water and applied to the skin. Disputes as to the actual presence of radium have ended in continental courts, and the author feels therefore that such products should only be marketed after the most exhaustive research.

Insect Bite preparations.—As a preventive the following is good :—

No. 2308.

150	Lavender oil—French
150	Sassafras oil.
200	Cedarwood oil.
300	Ceylon citronella oil.
200	Spirits of camphor.
1000	

Apply a little to the exposed skin and repeat when the odour has disappeared. Cod liver oil, 1 litre, added to the above mixture has been found successful also.

As an application after the bite :—

5 per cent solution of phenol or 5 per cent solution of ammonia.

Solid Form.—A useful method of easy application is in the form of a stick, made as follows :—

No. 2309.

50	Sodium stearate.
100	Spike lavender oil.
50	Ceylon citronella oil.
50	Sassafras oil.
750	Alcohol.
1000	

Warm the stearate in some of the alcohol; add the oils dissolved in the remainder and pour into moulds.

Hand Cleaning Pastes are of varying composition, the two formulæ given representing different types :—

No. 2310.

350	Powdered glass.
100	Waterglass.
50	Powdered pumice.
500	Osmo kaolin.
1000	

Make into a paste with ethylene glycol.

No. 2311.

100	Powdered glass.
100	Kaolin.
50	Powdered pumice.
750	Kieselguhr.
1000	

Make into a paste with either trichlor ethylene or tetrachlor ethane.

CHAPTER X.

SMELLING SALTS.

1. Suitable bases.
2. Ammonia smelling salts.
3. Perfumes.
4. Anticatarrhal salts.
5. Acid smelling salts.
6. Toilet vinegars.

SMELLING salts are of two distinct kinds, *i.e.* those having an alkaline reaction and consisting of ammonia in some form or another; those having an acid reaction and consisting mainly of glacial acetic acid. The principal difficulty attendant upon the putting up of these articles is that of fluidity, and since many of them are frequently carried in the pocket or handbag, any danger of their escaping from the vessel containing them must be overcome, and will receive our first consideration. It may seem superfluous to draw attention to the necessity of a perfectly fitting stopper in the glass container, but in many cases this will eliminate most of the trouble, while at the same time it prevents the rapid evaporation and loss of the active constituent. This, therefore, is of prime importance, and a good practice consists of the application of a little soft paraffin to the stopper, which has a nasty habit of sticking, especially in the ammonia type of salt, and is overcome by this preliminary operation. The ideal type of smelling salt consists of a dry powder—at most only moistened, when any possibility of leakage is at once eliminated. Any of the inodorous and insoluble inorganic bodies may be used for this purpose; among them may be mentioned kieselguhr, calcium phosphate, kaolin, asbestos, pumice, glass, barium sulphate, etc. Others, only slightly soluble (in ammonia or acetic acid) are prunella balls (potassium nitrate), potassium sulphate crystals, etc. Pieces of sponge are often used, but

eventually they become unsightly and are not recommended. Very pretty effects are obtained by colouring the above bodies, and for this purpose many of the dyestuffs enumerated under that heading in the dictionary are useful.

Ammonia Smelling Salts are most common in Britain, and one of the most effective forms is that known as *Prestons*. It consists of intimately mixing a fairly stable ammonium salt, such as the chloride, with an alkaline carbonate, or freshly slaked lime. The ammonia is liberated slowly and the salt will last for years. Two formulæ are appended :—

No. 2312.

700	Ammonium chloride.
300	Slaked lime.
1000	

No. 2313.

600	Ammonium chloride.
400	Potassium carbonate.
1000	

Another excellent solid form is that known as ammonium monocarbonate. It is made by adding strong liquid ammonia to freshly powdered carbonate of ammonia (a mixture of bicarbonate and carbamate), and placing the wet mass in a hermetically sealed vessel until the solid monocarbonate has been formed. This is reduced to coarse powder and is then ready for perfuming :—

No. 2314.

700	Ammonium carbonate.
300	Strong solution of ammonia 0·880.
1000	

This method is not always adopted before filling the bottles—many manufacturers prefer to place the small lumps of ammonium carbonate in the vessel and then moisten with the liquid ammonia, previously perfumed and containing alcohol ; the mass eventually solidifies and is practically inexhaustible.

Other methods consist of moistening any of the above insoluble bodies with liquid ammonia, or adding it, coloured and perfumed, to glass beads, prunella balls, etc. The latter type remains liquid and requires frequent renewal, since the NH_3 is rapidly lost.

Perfumes.—The commonest form is lavender, but mixtures of rose, bergamot, cloves, cinnamon, nutmeg, and musk are useful. The oils are dissolved in alcohol and then added to the ammonia as follows :—

Lavender, No. 2315.

40	Lavender oil—French.
14	Bergamot oil.
5	Rosemary oil.
1	Musk extract, 3 per cent.
140	Alcohol, 90 per cent.
800	Strong solution of ammonia,
1000	

Lavender "de luxe," No. 2316.

60	Lavender oil—English.
5	Rose oil—Bulgarian.
40	Bergamot oil.
1	Clary sage oil.
6	Cinnamon oil.
8	Clove oil.
10	Amber liquid, No. 1005.
250	Alcohol, 90 per cent.
620	Strong solution of ammonia.
1000	

Rose, No. 2317.

35	Rose-geranium oil—Grasse.
10	Rose oil—Provence.
1	Patchouli oil.
4	Musk extract, 3 per cent.
250	Alcohol, 90 per cent.
700	Liquid ammonia ·880.
1000	

Anti-catarrhal Salts are made as above described, but contain camphor, terebene, eucalyptol, phenol, pine oil, iodine, etc. They may be prepared with ammonium carbonate as follows :—

No. 2318.

40	Terebene.
40	Camphor.
80	Phenol.
20	Eucalyptol.
20	Iodine.
700	Ammonium carbonate.
100	Liquid ammonia ·880.
1000	

Rub together in a mortar and fill loosely into bottles. Place some glass wool in the neck to prevent the contents falling out.

Acid Smelling Salts are made with glacial acetic acid 98-99 per cent, generally coloured with either Congo red or some acid dyestuff. A good method consists of filling the bottle with small pieces of *asbestos*, pouring on the perfumed and coloured acid, and then inverting the bottle to allow any excess to drain off. Kieselguhr or potassium sulphate crystals may replace asbestos, when a wad of glass wool should be placed on the top to prevent the contents falling out. Add the acid solution and drain as above. The solutions are made as follows :—

Lavender, No. 2319.

100	Camphor.
10	Cochineal in powder.
30	Lavender oil—French.
15	Bergamot oil.
5	Nutmeg oil.
840	Acid acetic glacial.
1000	

Violet, No. 2320.

50	Bergamot oil.
10	Orris oil—concrete.
70	Ionone beta.
20	Santalwood oil.
1	Naphthol green.
850	Acid acetic glacial.
1001	

Toilet Vinegars are considered to have unusually good refreshing properties and in many cases are nothing more than *Toilet Waters* to which has been added glacial acetic acid and/or acetic ether. Any perfume may be used, and some examples are appended :—

Cologne Toilet Vinegar, No. 2321.

3	Neroli oil.
3	Petitgrain oil—French.
5	Bergamot oil.
3	Lemon oil.
1	Lavender oil.
55	Acetic ether.
200	Glacial acetic acid.
730	Alcohol, 75 per cent.
1000	

Lavender, No. 2322.

6	Lavender oil—Mont Blanc.
3	Bergamot oil.
1	Clary sage oil.
390	Glacial acetic acid.
600	Alcohol, 90 per cent.
1000	

Violet, No. 2323.

18	Ionone, 100 per cent.
2	Orris oil—liquid.
5	Bergamot oil—terpeneless.
5	Santalol.
120	Acetic ether.
850	Alcohol, 80 per cent.
1000	

Millefleurs, No. 2324.

5	Lime oil.
20	Bergamot oil.
6	Clove oil.
2	Cinnamon oil.
100	Jasmin, No. 1055.
50	Rose, No. 1092.
17	Neroli, No. 1081.
25	Amber liquid, No. 1005.
15	Acetic ether.
60	Acid acetic glacial.
700	Alcohol, 90 per cent.
1000	

CHAPTER XI.

SUNBURN PREPARATIONS.[1]

1. General observations.
2. Preventives, substances used, formulation types.
3. Correctives, oil and lotion types formulæ.

THE beneficial effects of sunlight on the human organism are well known. Ultra-violet light in contact with the skin yields vitamin D which acts as a tonic and stimulant, incidentally assisting the body to ward off disease. Providing sun-bathing is not indulged in to excess, the epidermis is able to tolerate the mildest erythema without discomfort. Vivid erythema is produced after approximately one hour's exposure of the skin to the sun on a cloudless summer day, and for normal *untreated* skins, this is about the maximum period, wisely indulged in. Beyond that painful burns result and excessive periods yield blisters. A person living in a perpetually sunny climate will gradually develop sufficient melanin in the epidermis to allow of the skin's maximum tolerance, but others who indulge in sun-bathing on holidays only must treat the skin with some protective preparation if the tan is to be pleasurably produced. Since ultra-violet light is responsible for sunburn, then its prevention is only possible if a large percentage of these rays are not allowed to come in contact with the skin.

Preventives owe their efficacy to their fluorescence properties. Frequently claims are held out for various

[1] This chapter deals with the therapy of sunburn and not with sunburn make-up. These preparations will be found under their respective headings.

materials which it is very difficult to substantiate, and large manufacturers who advertise these products extensively would be well advised to satisfy themselves on this point by carrying out the tests suggested by L. Stambovsky.[1] The salts of quinine, and particularly the oleate, are generally considered to be satisfactory, although many have found the sulphate to be very efficient. Aesculin, a glucoside obtained from the inner bark of the horse-chestnut, has received a certain amount of attention, but since this substance is inclined to lose its fluorescent properties very quickly on exposure, it should be employed with caution. Salol or phenyl salicylate is used by some but its possible irritant effect on certain skin types should not be overlooked. The same observations apply to the anthranilates. Substances containing tannic acid are generally less efficient owing to their instability to light. The best of them is tormentilla which extract incidentally assists the illusion of deep sunburn. An approximate classification of preventives (and the vehicles for same) according to their efficacy is appended :—

Excellent.—Benzyl cinnamate and salicylate, menthyl and phenyl salicylates, cyclohexanol, linalyl, methyl and phenylethyl anthranilates, stilbene, 2-phenylbenzimidazole, 2-phenyl quinoline, 3-phenyl coumarin, calamine, lanolin, yellow soft paraffin.

Good.—Aesculin, quinine bisulphate and oleate, amyl salicylate, 7-methyl coumarin, oxyquinoline sulphate, sodium-2-naphthol-6-8-disulphonic acid, 2-naphthol-3-6-disulphonic acid, ethyl *p*-ammobenzoate, coco-nut oil, sulphonated olive oil, white petroleum jelly, cassia and sesame oils.

Fair.—Olive oil, turtle oil, peanut oil (arachis), liquid paraffin.

By a careful selection of the above materials it is possible to produce five types of sunburn preparations : 1, oil ; 2, oil cream ; 3, vanishing cream ; 4, lotion ; and 5, powder as follows :—

[1] "P. and E.O.R." (1935), 3.

Oil Type, No. 2325.

30	Menthyl salicylate.
2	Cassia oil.
7	Benzyl cinnamate.
450	Almond oil.
500	Peanut oil.
1	Methyl parahydroxy benzoate.
10	Oil, brown, in 1 per cent solution.
1000	

Dissolve the preservative in the aromatics and mix with the menthyl salicylate. Add to the other already mixed and coloured oils. Shake. Stand aside and pour off bright.

Oil Cream Type, No. 2326.

20	Quinine bisulphate.
200	Distilled water.
470	Lanolin.
100	Coco-nut oil.
200	Yellow jelly.
5	Cassia oil.
5	Linalyl anthranilate.
1000	

Dissolve the alkaloid in the water and beat into the warmed fats until cool. Add the perfume.

Vanishing Cream Type, No. 2327.

100	Glyceryl monostearate.
150	Stearic acid.
90	Menthyl salicylate.
50	Glycerine.
10	Geraniol.
600	Distilled water.
1000	

Add the hot water to the other already melted ingredients. Stir until cold and pot or tube at once.

This type of cream has the advantage of being invisible and will serve as the usual base for powder application.

Lotion Type, No. 2328.

15	Sodium beta-naphthol-6, 8-disulphonate.
150	Alcohol.
80	Glycerine.
750	Distilled water.
5	7-Methyl coumarin.
1000	

Dissolve the coumarin in the alcohol. Mix with the glycerine and water and then dissolve the beta-naphthol derivative.

This type is invisible in use.

Powder Type, No. 2329.

30	Quinine sulphate.
70	Zinc oxide.
100	Magnesium stearate.
200	Osmo kaolin.
600	Talc.
1000	

Mix and sift through 200 mesh silk. Tint sun-tan colour.

It should be remembered that this is a preventive and therefore differs from the ordinary sun-tan powders referred to elsewhere.

Correctives are intended to allay the skin irritation resulting from sunburn. Zinc sulphocarbolate and glycerine are much esteemed for this purpose as also carron oil, picric acid, benzoin and camphor. They may be prepared as oil or lotion types as follows :—

Oil Type, No. 2330.

40	Tincture of benzoin, 10 per cent.
500	Linseed oil.
450	Lime water.
10	Rose compound.
1000	

Shake well to form a cream.

Lotion Type, No. 2331.

30	Zinc sulphocarbolate.
20	Picric acid, 10 per cent solution.
9	Spirits of camphor.
1	Rosemary oil.
90	Glycerine.
50	Alcohol.
800	Distilled water.
1000	

Dissolve in the order named.

Sun-tan Make-up may be made by following the information given elsewhere in this work under calamine and sunburn lotions, liquid face powders, toilet powders, etc., where it is only necessary to colour the cosmetic to taste.

CHAPTER XII.

THEATRICAL REQUISITES.

1. Introduction.
2. Grease paints, general qualifications, fat base, perfume, dry base.
3. White grease paint, coloured grease paint.
4. Colours and descriptive list.
5. Flesh tints, blacks, blues, carmines, rose.
6. Theatrical face powder.
7. Theatrical cold cream.
8. Grease paint remover.
9. Wet white.
10. Gold and silver paints.
11. Luminous paints.

THE stage without make-up would be as lifeless as the photograph of a beautiful painting. The natural colouring of the artist, however beautiful, is neutralised by the actinic brilliance of the footlights, and the result would be a picture at once drab and uninteresting. This bleaching influence of the limelight is corrected by the use of grease paints, which are made in any colour from the palest of fleshes to the deepest of blues, blacks, etc.

While the question of *tint* is an important one, first consideration will be given to those other qualifications which are the hall mark of a good product. A grease paint should—

1. Spread well.
2. Not be fatty.
3. Not become unnecessarily hard on keeping.
4. Have maximum covering power.
5. Not be gritty.

The first three points will be referred to under *Fat* base and the second two under *Dry* base.

Fat Base.—The normal temperature of the blood is 37° C. and the melting-point of the fat base must therefore be above this in order that it may spread well, and yet it must not be too high or it will not answer these requirements. If, on the other hand, the melting-point is below 37° it will become fatty after application, and the result will be an unsightly mess which will necessitate the continuous use of powder. The list of materials from which the fat base may be compounded is a wide one and includes :—

(*a*) Almond or peach kernel oil and liquid paraffin.
(*b*) Soft paraffin, suet, lanolin, lard, or tallow.
(*c*) Hard paraffin, ceresine, or beeswax.

All these materials are good, with the exception of lard, suet, and tallow, which, however, are used in very cheap products. Grease paints containing them possess the disadvantage of turning rancid after some months. All theatrical paints must be sufficiently "tacky" to make the powder adhere perfectly after they are applied, and on this account either white wax or lanolin is used in most formulæ. The quantity varies according to the amount of "tack" desired, but 10 per cent of either or both should not be exceeded. The *perfume* is generally added to the fat base, and a type compound such as the following will answer the purpose :—

No. 2332.

200	Cinnamon leaf oil.
100	Lavender oil.
200	Bergamot oil.
300	Bois de rose oil.
70	Rosemary oil.
20	Patchouli oil.
10	Vetivert oil.
50	Coumarin.
20	Heliotropin.
30	Musk ketone.
1000	

The fats are melted together in an enamelled pan, strained, and the perfume added when cool. Formulæ follow :—

No. 2333.

250	Ceresine white.
50	Lanolin, anhydrous.
700	Paraffin liquid 0·860.
1000	

No. 2334.

60	White wax.
340	Peach kernel oil.
300	Soft paraffin—white.
300	Hard paraffin.
1000	

Dry Base.—There are numerous raw materials from which the dry base may be selected, and among the more important bodies possessing remarkable covering power are : Zinc oxide, titanium dioxide, bismuth subnitrate, precipitated chalk, kaolin, and kieselguhr.

The first two are excellent ; the third is expensive and not often used, excepting for *white ;* the fourth is good, but not quite so smooth as the first ; the fifth and sixth are cheap and make a very useful addition to the latter. In order to assist the "slip" French chalk is sometimes added up to about 10 per cent. The powders should be very finely ground and then passed through a sifting and mixing machine. Suitable combinations are given :—

No. 2335.

700	Zinc oxide.
100	Titanium dioxide.
100	Precipitated chalk—light.
100	Kieselguhr.
1000	

No. 2336.

750	Zinc oxide.
50	Kaolin.
200	Precipitated chalk—heavy.
1000	

No. 2337.

700	Zinc oxide.
200	Bismuth subnitrate.
100	Talc.
1000	

White Grease Paint (No. 20) is made by mixing together suitable proportions of fat and dry base. These are :—

No. 2338.

550	Dry base (containing bismuth).
450	Fat base.
1000	

Soften the fat base by the aid of gentle heat, add the powder, and then pass through a paint mill to ensure a perfectly fine product. When such machinery is not available mix the two bases in a steam pan, and pass the whole, while liquid, through muslin or, for preference, through 90 mesh silk. Run the cream into moulds, making sticks about 4 inches long, and wrap them in tinfoil, cellophane, or greaseproof paper.

Coloured Grease Paints are made by triturating the pigment or lake with the dry base, which after perfect mixation and sifting is added to the fat base, and the whole is then treated as above described. Any of the dry bases may be used, excepting where otherwise stated, as, for example, in *black*.

Colours.—Theatrical paints are made in a variety of colours, and for the sake of completeness a fairly representative list of them is given. They are sold by *number*, and this should therefore appear on the label attached to each stick :—

1. Very pale flesh (lady).
1½. Moderately pale (lady).
2. Fair complexion (youth).
2½. Medium flesh (young man).
3. Pale complexion (man 30-36).
3½. Slightly sunburnt.
4. Dark flesh (sailor).
4½. Very dark flesh (brigand).
5. Sallow (Chinese).
5½. Dark sallow.
6. Yellowish flesh (old man).
6½. Japanese.
7. Brown.
8. Armenian bole.

9. Sunburnt (Indian).
10. Light brown (opera Aïda).
11. Burnt umber (Othello).
12. Black (negro).
13. Red-brown (mulatto).
14. Chocolate (North African).
15. Brick-red (East Indian).
16. Dark brown (gipsy).
17. Joining paste—light.
18. Joining paste—dark.
19. Light chocolate.
20. White (clown).

Rose.
Dark rose.
Carmine vermilion.
„ I (light).
„ II medium).
„ III (dark).

Other colours are :—

Light, medium, and dark blue.
„ „ „ „ grey.
„ „ „ „ old red.
Citron, chrome, and orange.

Those paints required for a juvenile make-up are in greatest demand, and their tinting will in consequence be treated in detail. The names given to the other colours will be sufficient to enable the operator to quickly obtain the desired tint by experiment.

Flesh Tints, up to and including No. 3, are obtained by the use of combinations of reds with yellows. Amongst the former may be mentioned, carmine (blue red), geranium lake (neutral red), and scarlet lake (yellow red). Amongst the latter, there are cadmium sulphide, yellow and golden ochres and various yellow lakes. The colour to be aimed at is a salmon pink which looks most natural in the lime-light. A kilo of such compounded colour would be arrived at as follows :—

No. 2339.

150	Geranium lake.
850	Golden ochre.
1000	

The pigments should be levigated very finely with the dry base before incorporating the fats.

Tints No. 1, 1½, and 2 are very pale, while No. 2½ and 3 are much deeper. To every 1000 of *dry* base add of No. 2331 pigment :—

5	For No. 1.
10	„ „ 1½.
20	„ „ 2.
50	„ „ 2½.
80	„ „ 3.

Flesh Tints from 3½ upwards are made with or without the above pigments plus other lakes.

No. 3½ is a brownish-red colour for sunburnt effects, and to every 1000 of *dry* base add :—

No. 2340.

20	Crimson lake.
150	Golden ochre.
10	Burnt sienna.
180	

No. 4 is more yellow, and is tinted with :—

No. 2341.

50	Golden ochre.
130	Armenian bole.
180	

No. 5 is yellowish, and is obtained with :—

No. 2342.

150	Yellow ochre.
30	Burnt sienna.
180	

No. 6 is redder than No. 5, as follows :—

No. 2343.

150	Yellow ochre.
30	Burnt sienna.
20	Geranium lake.
200	

Blacks are obtained with either drop or lamp black, and no dry base is necessary.

Soft kinds for ordinary use are made as follows :—

No. 2344.

200	Finely ground drop black.
800	Fat base.
1000	

Hard kinds are obtained with :—

No. 2345.

180	Lamp black.
400	Hard paraffin.
420	Soft „
1000	

This is made harder, so that when melted and deftly applied to the eyelashes, it will rapidly solidify. With practice the lashes can therefore be increased to any desired length.

Blues.—There are three—light, middle, and dark—used for shading the eyes, etc. They are obtained by adding to the dry base varying proportions of either ultramarine, Chinese blue, or cobalt blue. Some of the blue lakes are good, and for violet shades mixtures of cobalt blue and mauve lake are recommended.

Carmines.—There are four : 1, 2, 3, and carmine vermilion, No. 3 being the deepest tint. This is made to the following formula :—

No. 2346.

200	Carmine No. 40, in fine powder.
100	Zinc oxide.
200	Ceresine.
500	Soft paraffin.
1000	

No. 2 is made as follows, and No. 1 can be obtained

by the further dilution of the colour with dry base. The addition of vermilion should be noted :—

No. 2347.

50	Carmine No. 40, in fine powder.
50	Scarlet lake.
100	Dry base.
250	Ceresine.
550	Soft paraffin—white.
1000	

Rose.—There are two shades, and the colour is arrived at by the use of madder lake and red lake. A formula is given for the dark shade, and the lighter one can be obtained by using half the quantity of pigments :—

No. 2348.

20	Madder lake.
20	Red „
460	Fat base.
500	Dry „
1000	

Face Powders are often made in cheaper grades for the stage, and as the grease paint is adherent, such ingredients as zinc stearate (mentioned in the chapter on Toilet Powders) are omitted.

Arrowroot, unperfumed, is sometimes employed, but such examples as follow are in more common use :—

No. 2349.

200	Kaolin.
200	Precipitated chalk—light.
300	Maize starch.
290	Zinc oxide.
10	Violet, No. 1105.
1000	

No. 2350.

300	Zinc oxide.
100	Titanium dioxide.
300	Kieselguhr.
90	Orris-root powder.
200	French chalk.
9	Rose rouge, No. 1092.
1	Patchouli oil.
1000	

No. 2351.

300	Maize starch.
500	French chalk.
190	Zinc oxide.
2	Ambrone, No. 1007.
8	Jasmin extra, No. 1053.
1000	

All the above should be passed through a sifting and mixing machine (for details *see* page 198).

Theatrical Cold Cream is generally distinct from the ordinary preparation which is described elsewhere. Lard forms a cheap base, and is sometimes supplemented by additions of cocoa butter, spermaceti, or ceresine :—

No. 2352.

1000	Benzoated lard.
5	Geranium oil—Bourbon.
1005	

No. 2353.

800	Lard.
200	Cocoa butter.
5	Lavender oil—French.
1005	

Grease Paint Remover is employed in the form of short sticks, and consists principally of cocoa butter. Other types are made as follows :—

No. 2354.

375	Ceresine.
620	Soft paraffin—white.
5	Perfume.
1000	

Melt the fats, cool, add the perfumes and mould. *Soft* kinds can be made as follows:—

No. 2355.

45	White beeswax.
150	Paraffin liquid ·860.
800	Soft paraffin—white.
5	Perfume.
1000	

Wet White is a theatrical requisite in great demand by the ladies who use it to whiten the neck and arms. It is known under several names, such as, *Blanche de Perle*, *French white*, etc. The basic ingredients are zinc oxide and the oxychloride, subnitrate or carbonate of bismuth. The liquid consists of a mixture of glycerine and water in varying proportions. The former is employed up to 30 per cent and the latter is often replaced by triple rose or other fragrant water. The addition of starch is desirable, as it helps to suspend the heavier ingredients. The powders are well mixed in a large mortar and the glycerine added. The water is gradually poured in to make the desired volume and the whole passed through muslin to remove grit, etc. The following formulæ yield good products:—

No. 2356.

50	Bismuth subnitrate.
50	Starch.
100	Zinc oxide.
150	Glycerine.
650	Rose water.
1000	

No. 2357.

75	Bismuth carbonate.
100	Zinc oxide.
25	Titanium dioxide.
300	Glycerine.
100	Alcohol.
400	Orange flower water.
1000	

No. 2358.

50	Bismuth oxychloride.
75	Zinc oxide.
25	Starch.
240	Glycerine.
10	Trèfle, No. 1098.
600	Distilled water.
1000	

The above products, after shaking, are well rubbed into the skin and allowed to dry. The result is an alabaster-like epidermis into which much life can be infused by the liberal application of a tinted powder. The pores become blocked, and it is therefore necessary to thoroughly cleanse the skin with soap and water after use. Another type of wet white is made by replacing the bismuth with either *Epsom salts* (magnesium sulphate) or *Sodium phosphate*. When applied to the skin, minute crystals are deposited in the pores, which are afterwards cleansed by hot water. Such preparations can be made as follows :—

No. 2359.

50	Magnesium sulphate.
50	Magnesium carbonate—light.
50	Zinc oxide.
100	Glycerine.
1	Peppermint oil.
750	Triple rose water.
1001	

The presence of traces of peppermint oil produces a cooling effect on the skin.

No. 2360.

100	Sodium phosphate.
100	Zinc carbonate.
100	Glycerine.
50	Lavender water.
650	Water.
1000	

Gold and **Silver Paints** are made as follows :—

No. 2361.

300	Gold bronze.
200	Ceresine.
500	Soft paraffin—white.
1000	

No. 2362.

250	Powdered aluminium.
250	Ceresine.
500	Soft paraffin—white.
1000	

Melt the fats and rub down with the powder. Pour the liquid into moulds.

Luminous Paints produce a peculiar radiance in the dark or in shadow, and curious effects are obtained when they are applied around the eyes. The lithium salt and carmine are added to neutralise the greenish phosphorescent tint of the zinc :—

No. 2363.

600	Zinc sulphide—phosphorescent.
95	Lithium carbonate.
5	Carmine.
300	Osmo kaolin.
1000	

CHAPTER XIII.

TOILET POWDERS.

1. Face powders, perfume appeal, texture characteristics, raw materials, adhesiveness, peach-like finish, usual proportions of basic substances, sifting and mixing, popular types.
2. Colouring and colours, popular shades.
3. Perfume and formulas.
4. Compacts.
5. Powder leaves, sticks and creams.
6. Talcum powders, quality specifications. Solid talcum.
7. Violet powders.
8. Zinc, starch, and boric powders.
9. Nursery powders.

Face Powders nowadays constitute the most indispensable article of my lady's toilet. She is able to find a powder of whatever quality may suit her purse, and the first thing that attracts her is perfume. This, however, is by no means the only feature which appeals to the woman of discrimination ; she is interested also in colour, texture, and perfect adherence to the skin.

Assuming, then, that the perfume makes the first sale of a face powder, will an intriguing odour produce repeat sales? No, not necessarily ; it is the appearance and finish given to the skin by the powder which induces the majority of women to buy, repeatedly, any particular make. This characteristic may almost be described as " texture " although generally ladies apply the term rather to the " fineness " of the powder—that is to say, to the dimensions of the silk sieve through which the powder passes in the course of its manufacture, thus producing fineness of subdivision and even distribution of all ingredients, including colour.

Texture, then, is a most important characteristic of a face powder, and is influenced by the following considerations :—

(1) The powder must have good covering power and so hide slight skin blemishes.

(2) It must adhere perfectly to the skin and not blow off easily while motoring.

(3) It must not be completely dissipated in a few minutes and so make repowdering continually necessary.

(4) The finish given to the skin must be matt or peach-like.

(5) Shine on and around the nose must be completely eliminated. The powder must be absorbent.

(6) There must be sufficient "slip" to enable the powder to be spread on the skin by the puff without producing a blotchy effect.

(7) The constituents of the powder must be such that a clown-like effect is impossible. The preference should be rather towards transparence.

Raw Materials.—The substances which can be used to impart all these good qualities may be divided briefly under two headings, vegetable and mineral. To the former belong the starches and lycopodium ; to the latter, Osmo-kaolin, zinc oxide and carbonate, barium sulphate and carbonate, calcium sulphate and carbonate, talcum, kieselguhr, light magnesium carbonate, titanium dioxide, the stearates of zinc and magnesium, and the salts of bismuth. Covering powder is obtained by the use of Osmo-kaolin, zinc oxide, titanium dioxide, or barium sulphate. A distinct preference is being shown to-day for Osmo-kaolin, because it is light and has the greatest grease-resisting properties, being excellent therefore for oily skins ; zinc oxide and titanium dioxide are heavy and barium sulphate still heavier. Osmo-kaolin is prepared electrolytically from china clay mined in Cornwall. When a current is passed through a suspension of the crude material in a slightly alkaline bath, the finer colloidal particles are deposited on the anode, while the coarse particles and impurities either sink to the

bottom or are deposited on the kathode. The particles of osmosised kaolin are in actual fact no larger than bacteria. Zinc oxide in smaller proportions is generally used with Osmo-kaolin, but the finest B.P. quality should be employed. Titanium dioxide has greater covering power than zinc oxide and is therefore used in smaller percentages. Barium sulphate is a great favourite in compacts, because compacts made with it do not break easily.

Adhesiveness is obtained primarily with the stearates ; zinc was used for a good many years, but magnesium is better. Both are light and fluffy products, but since the American medical profession has condemned the zinc salt as poisonous (this does not appear to have been conclusively proved), it is better to steer clear of trouble and use the magnesium salt. In addition to this particular property, the stearates, when used in small proportions, give to the powder an attractive velvety softness which cannot be obtained with any other substance. Moreover, they are "waterproof" and tend to maintain my lady's complexion in inclement weather. Complete dissipation on the skin in a short time is very noticeable in those powders which are prepared with a large proportion of talcum. Talc is used, however, in most face powders, and while many contain up to 50 per cent, this figure is, in the author's opinion, far too high. The substance varies in colour, and the whitest only should be used in the finest powders. *Micronised* talc, owing to its evenness of texture and bulk, should merit careful consideration. It is an important constituent of compact powders and rouges.

The Peach-like Finish given to the skin by face powders is obtained best by the use of rice starch. Other starches are used in cheaper powders, maize starch being often employed. As is well known, however, the particles of rice starch are much finer than those of any other cereal, and a distinct perference is, in consequence, shown for it. Rice starch is prone to absorb moisture, and should be placed in a drying oven for two or three hours before use.

FIG. 3.—FULL SIZE REPRODUCTION OF ORIGINAL TEST PLATE SHOWING THE COMPARATIVE GREASE RESISTANT PROPERTIES OF FACE POWDER CONSTITUENTS.

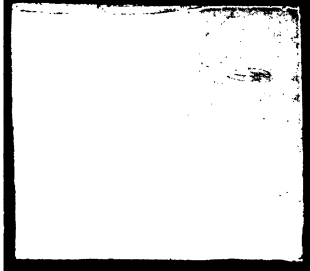
The following is an extract from a report by the author to Messrs. Thomas Morson & Sons, and explains the accompanying reproduction of the photographic plate :—

" The prevalence of greasy and perspiring skins presents a problem difficult of solution, since the methods so far in use for the practical evaluation of the different raw materials have been subject to the vagaries of women testers, and these are often biased by personal considerations.

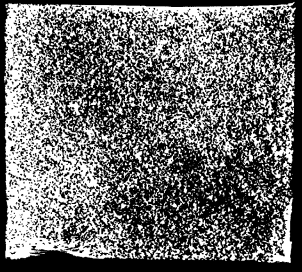
" In my last brochure the absorptive power of ' Osmo ' Kaolin was demonstrated so far as its perspiration (aqueous methylene blue test) qualities were concerned. Since its publication, however, I have been able to evolve a method of assessing the properties of ' Grease Resistance ' possessed by different raw materials, and the results further enhance the already excellent reputation of ' Osmo ' Kaolin. In the first place, I prepared an oil bearing a similarity to the sebaceous secretion of the skin. I found a mixture of Lanoline with Peach Kernel Oil answer my purpose very well. I then painted a thin film of this on highly polished black glass, and applied to equal squares of it the different raw materials with an ordinary powder puff in the same way as a lady would powder her face. Gentle warmth was applied until the testing glass reached body temperature. The results of this experiment will be apparent on referring overleaf to the full size reproduction of the original test plate showing the comparative ' Grease Resistant ' properties of ' Osmo ' Kaolin. In some cases the raw material rapidly absorbed the grease with the immediate loss of a fresh powdered appearance exactly as it would do on a woman's face. On the other hand, ' Osmo ' Kaolin almost completely resisted the grease, while Precipitated Chalk took second place."

[*Between pp.* 196–197.

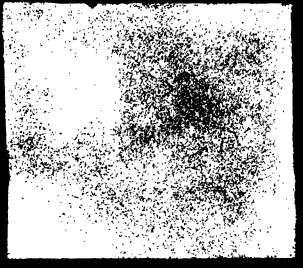
OSMO KAOLIN



TITANIUM DIOXIDE

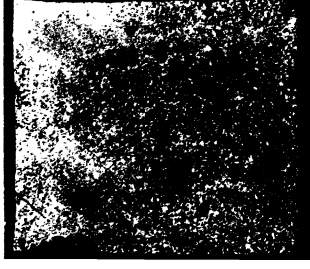


ZINC OXIDE



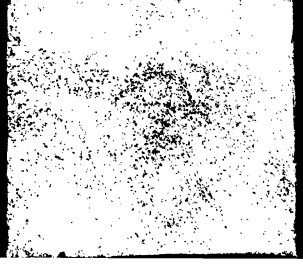
TALC

MAGNESIUM STEARATE

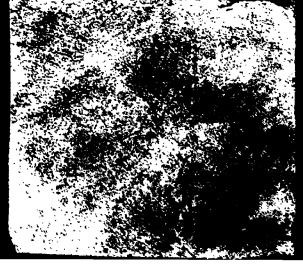


MAGNESIA

CHALK PPT



RICE STARCH



Potato starch should be avoided. The question of a shiny nose is, incidentally, closely associated with starches. This particular part of the anatomy is inclined to perspire, and powders which are absorbent more readily rectify this blemish. Rice starch is very absorbent and thus favoured for this additional reason. The objection taken to its use is centred in the belief that as starch absorbs moisture, so it swells and distends the pores. In modern types therefore it is seldom found, and the peach finish is obtained instead with precipitated chalk. Light magnesium carbonate is also beneficial. Slip during the application of a powder to the skin is imparted by the use of talc. A clown-like effect is obtained with potato starch, which should thus be avoided.

Powdered orris root is never employed nowadays owing to the cases of dermatitis traced to its use. Light precipitated chalk is an excellent constituent of face powders and to-day finds very great favour amongst manufacturers; it is fairly light and bulky, but should not be used in excess of 30 per cent, although one well-advertised brand contains double this amount. Bismuth oxychloride is not much employed, owing to its tendency to darken after application to the skin.

Finally, there are other substances, such as boric acid, borax and alum which are occasionally used for dermatological reasons. Quinine hydrobromide has also been suggested as a constituent of face powders with the idea of utilising the property possessed by the salts of quinine of absorbing the ultra-violet rays of the sun, so dangerous for the skin by their very active chemical action. To enumerate the various substances in their usual proportions :—

Osmo-kaolin	20-50 per cent.
Zinc oxide or carbonate	5-30 „
Titanium dioxide	1-5 „
Barium sulphate or carbonate	5-15 „
Rice starch	20-50 „
Light magnesium carbonate	5-10 „
Light precipitated chalk	10-30 „
Magnesium stearate	1-5 „
Talcum	10-60 „
Bismuth oxychloride	5-10 „

The Process of Sifting and Mixing is important. Several raw materials, particularly starch, chalk, and talcum, are bought in sacks, and although frequently lined, it is amazing how much extraneous matter seems to find its way inside during transit. This matter is, however, readily eliminated by means of a 120-mesh sieve, and silk is unquestionably the finest material for the purpose. Substances such as zinc oxide do not sift readily ; they clog the sieve, particularly if it is a metal one. Silk does not possess this disadvantage, and is almost universally employed. For small operations the raw materials may be brushed through twice, but for quantity production machines are indispensable. The powders are emptied into a hopper on the floor level and carried by cup-conveyor to be deposited on the end of an inclined revolving silk drum. This has a small "knocker" which prevents clogging. The extraneous matter falls from the lower end of the drum, while the fine ingredients pass through in the course of its revolutions. Below is a rapidly rotating shaft having bent arms, which ensure perfect mixing.

The principal types of face powders are now given in detail :—

Poudre de Riz of finest quality invariably contains over 50 per cent of rice starch, which should be put through a 120-mesh silk at least before being added to the other ingredients. This is necessary as rice starch is apt to contain rather large coagulations of starch grains, and the fine sifting eliminates them. Maize starch is used in both first and second-grade products, as little as 10 per cent in the former and as much as 90 per cent in the latter. The grains are similar in shape, but about three times the size of those from rice. Some talcum is generally added to give the necessary "slip". Here are some formulæ :—

No. 2364.

600	Rice starch.
200	Precipitated chalk.
100	Talcum.
50	Magnesium stearate.
50	Zinc oxide.
1000	

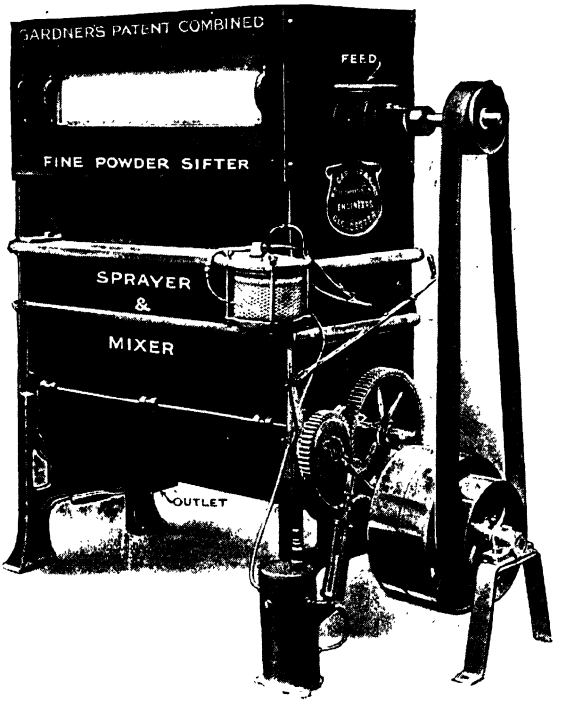


FIG. 4.—Type of machine used for the production of Face Powders, etc.

The powders are fed into the machine where indicated by means of a patent attachment, which can be adjusted either for the same or the above floor.

The powder is air-blown through a rotating cylinder of silk, the coarser particles being automatically ejected.

The sifted powders fall through the spray of perfume into the mixing chamber which is fitted with a rotating arm. This ensures perfect distribution of both perfume and colour.

The whole machine is self-contained and worked from one main driving belt.

[*To face page* 198

No. 2365.

500	Rice starch.
50	Titanium dioxide.
300	Osmo-kaolin.
100	Talc.
50	Magnesium stearate.
1000	

No. 2366.

500	Corn starch.
200	Rice „
100	China clay.
50	Precipitated chalk.
50	Bismuth subnitrate.
100	Talcum.
1000	

Mineral Powders are usually very heavy and made principally for export to hot countries. Talcum is the principal constituent, and should not contain an excess of acid soluble impurities, otherwise the perfume will immediately deteriorate. Some formulæ are appended :—

No. 2367.

400	Talcum—extra fine.
300	Light precipitated chalk.
100	Zinc oxide.
100	Barium sulphate.
100	China clay.
1000	

No. 2368.

200	Kieselguhr—extra white.
50	Bismuth oxychloride.
100	Heavy precipitated chalk.
600	French chalk.
50	Rice starch.
1000	

No. 2369.

250	Osmo-kaolin.
350	Talcum.
50	Magnesium stearate.

No. 2369 (*continued*).

150	Magnesium oxide—light.
100	Zinc oxide.
100	Calcium carbonate.
1000	

The Most Popular Powders consist of any of the above substances, judiciously combined, but all of them should contain some zinc oxide. They must be neither too heavy nor too light. Some formulæ follow :—

No. 2370.

400	Rice starch.
400	Zinc oxide.
150	French chalk.
50	Magnesium stearate.
1000	

No. 2371.

500	China clay.
50	Titanium dioxide.
200	Zinc oxide.
100	Precipitated chalk.
100	Talcum.
50	Magnesium stearate.
1000	

No. 2372.

100	Heavy precipitated chalk.
100	Magnesium carbonate.
200	Osmo-kaolin.
200	Talcum.
400	Rice starch.
1000	

No. 2373.

200	Osmo-kaolin.
250	Zinc oxide.
50	Magnesium stearate.
100	Talcum.
400	Calcium carbonate—light.
1000	

The Colouring of a Face Powder requires an artist's eye—the shades must be bright and alive, yet delicate. The colours are seldom arrived at as a matter of luck; they generally take hours of experiment with numerous tints of a given colour. A very large number of raw materials are now available and may be grouped as under :—

(1) *Vegetable Origin.*—Burnt sugar, alkanet, gamboge, saffron, cudbear, turmeric, red sanders wood, and rhatany.

(2) *Pigments.*—The brown, yellow, and red oxides of iron. Cadmium sulphide, ultramarine, cobalt green, and blue.

(3) *Dyestuffs.*—The halogen derivatives of fluorescein and their potash salts, rhodamines, auramines, tartrazines, chrysoidines, and phenylene browns.

(4) *Lakes.*—Carmine and various dyestuffs struck on chalk, barytes and other non-poisonous bases.

The Colours necessary for tinting face powder could be counted on the fingers in the days when there were only three tints, *viz.*, flesh, cream, and white. Nowadays, although *rachel* and *naturelle* constitutes the bulk of the total sales, there is a distinct demand on the part of the fastidious for shades of powder which will help to make the *tout ensemble* one harmonious picture. The word complexion is generally held to mean the intrinsic colour of the skin, but it must be remembered that in reality this colour is influenced to no inconsiderable degree by the contrast between it and the surrounding elements such as the hair, the neck, and the frock, and also the light. Even the wearing of ornaments will modify the complexion—for example, the colour of the lips appears to become redder and more noticeable when emerald ear-rings are affected, while, on the contrary, their tint is diminished if the emeralds be replaced by rubies. It therefore becomes quite apparent that minute traces of coloured face powder will modify the appearance of the skin, and in consequence it is possible for my lady to

exercise her artistic sense by the judicious choice of the tints that will enhance her personal appearance most.

In order to obtain the full range of tinted face powders a variety of colours is necessary. Wherever possible they should be selected from the raw materials enumerated above. Many of the newer shades require the use of dyestuffs, and experiment only will determine which are best adapted for the perfumer's personal taste.

When choosing a colour the chemist must bear in mind the appearance of the finished face powder in daylight, under electric light, and in contact with a perspiring skin surface. He must also remember that the ingredients of the powder have a direct influence on its final shade. For instance, a powder containing 50 per cent of rice starch will require different treatment from an entirely inorganic powder. Further, since moisture intensifies colour, a smaller percentage may be necessary in making compacts, which may be damped before compression. Manufacturers are generally rather jealous of their own particular tints, and in order to complicate the attempts of the duplicator they use a mixture of colours to obtain each finished tint rather than a single colour. A small sifting and mixing machine is generally reserved for colour blending and dilution with chalk, so that a given percentage is always used. This reduces the limit of error and facilitates uniformity of tint. Standard shades should be adopted for the whole range of coloured face powders, and before packing each should be compared in both natural and artificial light by at least two persons. Variations in colour do not lead to increased turnover.

The two most important tints of colour are *rachel* and *naturelle*, the former a creamy-yellow and the latter a creamy-pink. As a rule the pigments produce flat tints, but they make excellent bases to work on. They can be brightened considerably by the use of traces of spirit-soluble dyestuffs or lakes. Spirit-soluble colours are better than water-soluble dyes because they dry quicker and are consequently more uniform. The lakes are generally of an

intense colour, and traces only are necessary. The vegetable colours are quite useful in the form of alcoholic tinctures. Mauresque and ochre face powders are rather more difficult than the foregoing, since they require a much greater proportion of pigment. Peach is one of the newer and popular shades, and can be easily obtained after experiment with orange and pink lakes. Carmine is not much favoured in face powders owing to the rather dull shade it produces when compared with phloxine, for instance. On the other hand, it is indispensable in the preparation of rouges, either powder or compact. It is usual to blend it with such pigments as Armenian bole, Venetian red, burnt sienna, and burnt umber, when a variety of shades can be prepared. These are then diluted with talc, starch, or Osmo-Kaolin to give the desired intensity of colour.

The **Popular Colours** are now treated in detail as follows, the different tints or shades being obtained in practice if desired with the colours indicated :—

Cream or Rachel. Yellow ochre or cadmium sulphide and traces of spirit yellow or yellow lake.

Brunette. Burnt sienna and traces of eosine solution.

Naturelle. Pink lakes blended with yellow ochres or dyes, and if necessary toned down with traces of burnt sienna.

Peach. Pink lakes blended with orange or deep yellow lakes or dyestuffs. Venetian red also makes a good reddish base to work on.

Pink. Phloxine gives a delicate clean colour.

Rose. Erythrosine, or three or four times the quantity of phloxine used for pink.

Mauresque. This is one of the newer shades, and tones well with the skin of the sunburnt maiden. It sells well in summer anywhere, and particularly at the seaside. The tint is obtained with Armenian bole and burnt sienna brightened up with yellow dyestuffs.

Ochre. The shade varies from a reddish-pink to a brownish-orange, and is obtained with Armenian bole and one of the orange dyestuffs. It is used by ladies whose complexions are too pale and when there is too much contrast between the colour of the face and that of the hair. The proportion of *orange* dyestuff must be *increased* when the flesh is orange-pink in colour and *reduced* if it is quite olive.

Orange. This shade is obtained with one of the orange dyestuffs or lakes. The tint should be pinkish, and this is produced by adding some eosine (traces only). It is used by anæmic ladies possessing auburn hair.

Blue. Is used for shading the eyes, and the colour is incorporated in the form of either ultramarine or cobalt blue. In either case fairly large quantities are necessary but must be toned down to a violet shade of blue with one of the bluish-red lakes.

Mauve. May vary from a pinkish to a violet tint. It is much used for producing an unusual pallor or toning down the reddish type of complexion—in the latter case the minute traces of colour neutralise a part of the orange tint. It is also employed by blondes when there is an insufficient contrast between the colour of the face and that of the hair. If the skin is distinctly pinkish the *violet*-mauve tint will be found most useful. The various tints are produced by combining any of the blue pigments with suitable proportions of one or other of the eosine group of dyestuffs. Very pretty and delicate violet shades can be obtained with any of the mauve lakes.

It would of course be the ideal for the toilet specialist to be also a colour artist and make up the correct shade of powder to meet the individual requirements of each client. A point which should not be lost sight of is, that different types of powder require different proportions of colour to produce identical shades, and also that the tint of a compact powder usually *appears* deeper on account of its compressed nature.

Ultra-Violet Light.—A patent has recently been taken out by J. Risler, No. 328111, covering the use of cadmium

sulphide as an ingredient in face powders, etc. It is alleged that additions of this substance to the usual constituents will protect the skin against damage by ultra-violet light.

Perfume.—A face powder will never achieve large sales unless the odour is pleasing. This must not be "thin," that is to say, the odour must be "round" and have "body," and yet possess an elusive flowery freshness. The value of any particular perfume type is largely a matter of opinion, but there is at the present time a distinct inclination towards a sweet, flowery fragrance which must be persistent without becoming cloying. The strong, pungent Eastern type of perfume is seldom preferred by the lady of good breeding and taste. From the maker's point of view the perfume should be complex, and thus difficult to duplicate.

With a view to making this question quite clear, it will be best to consider two well-defined examples of perfumes suitable for face powders and the modifications in price which are possible by the choice of different raw materials. Two apt examples may be cited in rose and a light bouquet odour based upon jasmin. In the case of rose, the alcohols having basic rose odours are rhodinol, nerol, citronellol, geraniol, and linalol. Rhodinol of finest quality is obtained by fractionating Bourbon geranium oil, and the price is a standard one depending upon the market price of the raw material. Nerol is obtained in standard quality either from petitgrain oil or by synthesis from geraniol. Citronellol is obtained from citronellal by reduction and also from geranium oil. It is probably isomeric with rhodinol, but the odour has a slightly higher note. Geraniol occurs in the market in three grades—the finest from palmarosa oil, the medium grade from Java citronella oil, and the lowest grade from Ceylon citronella oil. Linalol occurs in linaloe oil and in shiu oil. The former is the superior product. In deciding which of these bases to employ, the chemist is naturally guided by the quality of his finished product. For the best results he would employ a mixture of rhodinol, nerol, citronellol, and palmarosa geraniol. For a cheaper product he would use mainly Java citronella geraniol with

touches of rhodinol and citronellol. Nerol would be quite out of the question, because it is the most expensive of the rosaceous alcohols. Another indispensable, and also comparatively inexpensive, base is phenylethyl alcohol. This would enter both expensive and cheap products. The esters of this alcohol are also very valuable, especially phenylethyl propionate, which has an odour closely associated with that of the red rose. This ester is about double the price of the alcohol, and would therefore only enter the better-grade perfume. Ionone is a very useful synthetic for imparting freshness to any rose compound. The best product is alpha ionone, which varies in odour with the skill of the manufacturer in eliminating impurities occurring in the lemon-grass oil used in its synthesis. The alternative is the so-called 100 per cent ionone, which is usually a mixture of the alpha and beta isomers, together with the residual impurities already referred to. This product would therefore go into the cheaper rose compounds. There is also a wide range of esters of the alcohols geraniol and citronellol. Geranyl acetate is not expensive, and could be used in cheaper compounds. Patchouli and vetivert oils are used in traces for giving body to some rose compounds. In both these oils there is a choice in price according to the source of the raw material. For imparting intensity of odour nonyl aldehyde in traces is much employed. The quantity used, although the product is expensive, would not preclude its employment in cheaper compounds. Ethyl cinnamate also, in traces, is useful for this purpose, and the same remarks as to price apply. To come finally to the crux of the whole matter—the natural product—there is a choice between rose otto and rose absolute, or for preference both. The price of the former is roughly double that of the latter, but it is far too high in either case to receive consideration in the cheaper product. For very cheap roses diphenyl methane or oxide may be employed to fortify the usual bases. With regard to fixation, substances which may be used in both qualities are benzoin, styrax, santal, artificial musks, benzyl iso-eugenol, and vanillin. Their prices

and the quantities used are so small as to make it needless to consider their omission. In the finest compounds it is customary to use the above-mentioned substances, but to use also the natural fixative extracts, such as musk and civet. To illustrate the above notes it will be as well to give three concrete examples capable of endless modification to suit the taste of the chemist and also the price he has to consider.

Rose Compounds.

Raw Material.	Grade I. No. 2374.	Grade II. No. 2375.	Grade III. No. 2376.
Rhodinol	100	120	—
Nerol	20	—	—
Citronellol	100	40	—
Linalol	—	50	100
Geraniol 1 (Palmarosa)	120	200	—
Geraniol 2 (Java citronella)	—	70	250
Geraniol 3 (Ceylon citronella)	—	—	100
Phenylethyl alcohol	120	300	250
Phenylethyl propionate	200	—	—
Citronellyl butyrate	1	—	—
Geranyl acetate	3	60	8
Alpha ionone	120	50	—
100 per cent ionone	—	30	80
Patchouli oil—Singapore	1	1	1
Vetivert oil—Bourbon	—	1	2
Nonyl aldehyde	1	1	1
Ethyl cinnamate	—	1	2
Rose otto	60	10	—
Rose absolute	30	—	—
Diphenyl methane	—	—	50
Sandalwood oil	—	10	30
Musk ketone	3	5	5
Vanillin	1	1	1
Benzyl benzoate	70	50	120
Musk extract, 3 per cent	20	—	—
Civet „ „	30	—	—
Total	1000	1000	1000

It should be noted that there are also many other raw materials which may be used, but which have not been mentioned above. Among these are the various geranium oils—particularly French geranium distilled over roses, eugenol, phenylacetic aldehyde, terpineol, coriander oil, etc.

When experiments are commenced upon a bouquet compound there are no definite limits as to the possible raw materials which may be used, and in consequence the creation takes upon itself a much more difficult aspect than that of the flower compound already dealt with. In the case of a jasmin bouquet, substances outside the usual straightforward jasmin compound constituents have to be tried and blended for several weeks to gauge the odour of the finished creation. The ultimate object is to produce something having a jasmin odour note, but an underlying fragrance of an intangible nature—a background of numerous flowers as it were, with the patch of jasmin flowers in the front and nearest the nose. With no price to consider, the chemist has the whole gamut of odours to experiment with regardless of cost. In a low-priced article, however, considerable reliance has to be placed on the crystalline synthetics for the background, and oils of the jasmin type, *plus* benzyl acetate as the principal odour note. For the purpose of these notes we will assume that the chemist has already available in his laboratory a good-quality artificial jasmin compound made without natural jasmin; then it can be used in both the expensive and cheap perfume. Using this as a base, the fresh flowering note may be improved and modified with bergamot and ylang-ylang oils. In the latter case there are three qualities available, the Manila, Bourbon, and the commoner cananga oil. The quality of odour, as usual, bears a direct ratio to the cost price. These oils may be further modified with the neroli oil, orange blossom absolute, rose otto, concrete orris, methyl ionone and artificial carnation. Body and fixative value may be given to these oils by the use of ambreine, heliotropin, vanillin, coumarin, artificial musks, benzoin and Peru balsam. Finally,

the jasmin flowery note is imparted by additions of natural jasmin chassis absolute. In the example below the cheaper substitutes are placed immediately below each ingredient.

Jasmin Bouquet.

Raw Material.	Grade I. No. 2377.	Grade II. No. 2378.
Jasmin, No. 1053	100	100
Bergamot oil	100	100
Ylang-ylang oil—Manila	90	—
Ylang-ylang oil—Bourbon	—	120
Neroli oil—Bigarade	10	—
French petitgrain oil	—	30
Orange blossom absolute	15	—
Rose otto	15	—
Rose, No. 1090	—	30
Rhodinol	—	70
Concrete orris oil	25	—
Beta ionone	—	5
Methyl ionone	130	—
Alpha ionone	—	100
Carnation, No. 1021	120	—
Iso-eugenol	—	100
Acetyl iso-eugenol	—	20
Ambrone, No. 1007	100	100
Heliotropin	60	60
Vanillin	10	10
Coumarin	40	40
Musk ketone	30	30
Benzoin resinoid—Siam	25	25
Peru balsam	10	10
Jasmin chassis absolute	50	—
Benzyl acetate	—	48
Amyl cinnamic aldehyde	—	2
Civet extract, 3 per cent	50	—
Ambergris extract, 3 per cent	20	—
Total	1000	1000

When using a well-blended compound in either face powders or compacts, it is best to employ about one per cent of perfume. This is first rubbed down with an

absorbent powder, such as light magnesium carbonate, and added to the other powders before sifting and mixing. In the case of compacts it is well to remember that the perfume does have a slight influence on the final colour and tends to darken it. When compacts dry out after two or three days, it will be noticed that the shade of colour is slightly lighter than when first pressed. In general, about one-quarter the weight of colours is necessary to give the same shade to a finished compact as is already standardised in the existing loose face powder.

Compact Powders command a large sale, chiefly on account of their convenience, for they can be carried in the handbag and deftly used without any danger of spoiling the dress. With the introduction of closed loose powder cases, however, a decline in compacts has become noticeable. There are three distinct processes of productions, *i.e.* damp, wet, and dry. As a rule the bases for the first type contain a fairly large percentage of talcum, but are never overloaded with starch, as this makes the compact too hard and the powder will not readily transfer to the puff. On the other hand, the presence of some starch is desirable as it has binding properties and prevents the tablet falling to powder. When starch is not employed another binding agent must be contained in the formula, and bodies such as magnesium carbonate, sugar, acacia, and tragacanth are used for the purpose. Gum resins such as benzoin, tolu, and styrax are also very valuable, and the binding agent is best prepared separately as follows :—

No. 2379.

10	Tragacanth.
25	Tincture of tolu.
5	Tincture of styrax.
1000	Distilled water.
1040	

Place the tinctures and gum in a bottle and shake. Then run in the water in a continuous stream and shake. Stand aside 24 hours and pass through muslin. This is then ready for use.

Some compact powders are made by automatic or hand compression, others by moulding. A very useful machine is obtainable for the former type, when the powder must be only slightly damp. It is compressed into shallow metal trays, which fit by means of a clip into the bottom of the case. This reduces the risk of the compact breaking, which is one of the bugbears of this class of product.

The wet type are made into a fairly damp paste, which is moulded in a glass or porcelain shallow capsule about 1¼ inches in diameter. The blocks are then dried at *normal temperature* in a current of air. If undue heat is applied they will split, and apart from this the perfume will be damaged. During the drying operation the compacts are stood on blotting paper to absorb any excess of moisture. When dry they are trimmed with a special rotating knife which gives a perfectly smooth finish to the surface. They are afterwards stuck on to pieces of glass, which are then glued into the bottom of the container—some kinds are fastened direct into the base of the box. A small puff is generally included with the package ready for sale. This wet type of compact is very much out of date, but still adhered to by certain makers.

The dry process is now used by all large manufacturers, for once the powder base has been proved satisfactory, it is easy to produce large quantities automatically by machinery. Type formulæ are as follows :—

Damp, No. 2380.

400	Talcum.
200	Zinc oxide.
100	Calcium carbonate.
200	Magnesium carbonate.
200	Maize starch.
100	Binding agent.
q.s.	Colours.
q.s.	Perfume.
1200	

Rub the powders down with the colours and pass through a 120 sieve. Transfer to a mortar and add the binding agent and perfume. When well rubbed in sieve again with 80 mesh. Then compress at once and dry in a current of warm air.

Wet, No. 2381.

400	Talcum.
100	Magnesium carbonate.
200	Prepared chalk.
100	Zinc oxide.
100	Rice starch.
100	Binding agent.
1000	

Colour and perfume as desired. Proceed as above but make into a paste with sufficient water, then mould as above directed.

Dry, No. 2382.

100	Zinc oxide.
300	Kaolin.
400	Talc.
200	Magnesium carbonate.
1000	

Colour and perfume as desired. Mix and sift, then compress.

Powder Leaves are much used as a handy application for freshening the complexion. The paper employed in their manufacture is one of the most important factors if good products are to be obtained. An unglazed absorbent tissue is best, and has often to be specially made. A standard make sometimes used is *thin superfine nature-cap.* The powder with which the paper is to be coated is mixed with water to make a thin cream.

A reasonable proportion of maize starch is usually included in the powder, and sometimes powdered acacia is added to give the preparation additional adherence to the paper. A steady flow of the liquid powder is maintained on the rollers passing over the paper, which then runs slowly over warmed cylinders, the moisture being evaporated in the process. The dried paper is cut up into squares and made into books. A small absorbent perfumed sheet is included in the package to give it the necessary fragrance. In making **Rouge Leaves**, a similar procedure is adopted, and the powder is made up of carmine and acacia. For

use, the sheets are breathed on, and the colour wiped off on cotton wool. This is then applied to the lips or cheeks as desired.

Powder Sticks are used for the more efficient covering of skin blemishes and are not unlike grease paints, excepting that the pigment content is lower when a less artificial complexion results. They should be just sufficiently stiff to resist hot climates and must of course be smooth in application. Any colour may be prepared with the pigments usually employed in face powders.

Here is a good formula :—

No. 2383.

700	White petroleum jelly.
70	Ozokerite.
30	Cetyl alcohol.
150	Zinc oxide.
40	Titanium dioxide.
5	Usual perfume compound.
5	Pigments.
1000	

Powder Creams are usually made by milling face powder with a vanishing cream base.

Talcum Powder is a toilet article having a very wide sale, especially in warmer countries, and is intended to allay any irritation of the skin, and at the same time to act as an efficient lubricant and preventive. In view of the fact that this type of powder generally contains a very large proportion of talc, some remarks regarding its standards of purity will not be out of place here :—

1. The primary physical characteristic is that of **Colour.** The best quality materials are *white,* second quality products are slightly *greyish-white,* and others, which should be avoided, are distinctly grey.

2. The next point to notice is that of "**Slip**". With the possible exception of powdered boric acid, talcum is the only substance possessing in any marked degree this peculiar characteristic. Inferior qualities never exhibit the

requisite amount of "slip," and since the lubricating action of this material is most necessary, nothing but the best should be purchased.

3. The last physical characteristic worthy of mention is that of **Lustre.** A good sample should be lustrous without exhibiting any undue amount of glitter. Unusual radiance is often due to the insufficient grinding or sifting of the powdered mineral, and such samples should find their way into the dust basket.

Talcum should never be bought on its physical appearance alone, but should be submitted to a chemical examination. This consists in estimating the percentage of *acid-soluble matter.* Absolutely pure talc is not obtainable since the mineral deposits contain varying amounts of impurities, consisting chiefly of iron. Any sample containing over 4 per cent of matter soluble in hydrochloric acid should be rejected. Much has been said regarding the comparative values of Italian and American talcs, but the author has examined numerous specimens and has found the former generally superior. The average sample has given the following figures :—

Italian talc	1 to 2	per cent soluble in HCl.
American talc	3 to 4	„ „ „

The absence of a large quantity of impurity is desirable, largely on account of its deleterious influence on the perfume, and to some extent owing to the irritation it may cause to the skin. In the former case, it will not only tend to alter the odour, but it often affects the colour of certain perfume ingredients. From these hints, the reader will readily appreciate the importance of the high degree of chemical purity required in a good talcum.

Many of the talcum powders sold are nothing more nor less than French chalk which has been suitably perfumed. Better products are obtained by adding boric acid, zinc stearate, etc., the talc content being about 80 per cent. The popular perfumes are violet, carnation, and rose. They should be added to magnesium carbonate, etc., as described

under face powders (*which see*). Some formulæ are appended :—

Violet Talcum, No. 2384.

800	Finest Italian talc.
100	Powdered boracic acid.
20	Magnesium stearate.
70	Magnesium carbonate—light.
7	Violet, No. 1105.
2	Heliotropin.
1	Musk xylene.
1000	

Carnation Talcum, No. 2385.

850	Talc.
70	Corn starch.
60	Boric acid.
10	Zinc oxide.
8	Carnation, No. 1021.
2	Ambrone, No. 1007.
1000	

Rose Talcum, No. 2386.

900	Talcum—extra super.
20	Magnesium stearate.
70	Magnesium carbonate—light.
7	Rose, No. 1091
1	Iso-butyl phenylacetate.
2	Benzoin R.
1000	

Solid Talcum may be prepared in a novel manner according to the following formula :—

No. 2387.

200	Talc.
150	Rose water.
50	Sodium stearate.
600	Alcohol.
1000	

Dissolve the stearate in warm alcohol. Triturate the talc with the rose water and add. Stir and when almost at setting-point pour into moulds.

Violet Powders consist very largely of orris-root powder, to which may be added any of the substances mentioned under face powders (*which see*). The perfume is almost invariably that of synthetic violet, which is added to fortify the inherent violet-like fragrance of the orris. Here are some formulæ :—

No. 2388.

200	Corn starch.
750	Orris-root powder.
20	Magnesium stearate.
30	Fuller's earth powder.
2	Violet, No. 1105.
1002	

No. 2389.

500	Orris-root powder.
300	French chalk.
90	Boric acid.
100	Zinc oxide.
2	Ionone alpha.
0·5	Methyl myristinate.
0·1	Methyl heptine carbonate.
2·4	Benzyl iso-eugenol.
5	Bergamot oil.
1000	

Zinc, Starch, and Boric Powders consist of mixtures of these substances, usually *unperfumed* :—

No. 2390.

100	Zinc oxide.
200	Powdered boric acid.
700	Corn starch.
1000	

No. 2391.

100	Powdered boric acid.
100	Zinc oxide.
600	Corn starch.
200	Rice „
1000	

Nursery Powders are similar to the above, but generally contain some fuller's earth and occasionally lycopodium :—

No. 2392.

90	Boric acid.
100	Fuller's earth.
200	Zinc oxide.
100	Corn starch.
200	Orris root.
200	Lycopodium.
100	French chalk.
1	Rose oil.
6	Bergamot oil.
2	Neroli oil.
1	Heliotropin.
1000	

APPENDIX

CONVERSION TABLES.

1. Measures of weight—grams into avoirdupois
2. Grams per kilo into grains per pound.
3. Grams per litre into grains, etc., per fluid ounce, pint, and gallon.
4. C.c. per litre into minims, etc., per fluid ounce, pint, and gallon.
5. Measures of capacity—c.c. into pints.
6. Conversion data.
7. Fineness of powders.

Measures of Weight.

1 gram = the weight of 1 cubic centimetre (c.c. or mill.) of water at 4° C.
1 grain = 0·0648 gram.
1 oz. (Troy) = 31·1035 grams.
1 lb. avoirdupois = 453·593 grams.

	Gram.	Grains.	Avoirdupois.		
Milligram . .	0·001	·0154			
Centigram .	0·01	·1543			
Decigram . .	0·1	1·5432			
Gram . .	1·0	15·4323	lb.	oz.	drams
Decagram .	10·0	154·3234	0	0	5·65
Hectogram .	100·0	1543·2348	0	3	8·5
Kilogram . .	1000·0	15432·3488	2	3	5

Grams per Kilo (parts per 1000).

Into Grains, etc., per Pound (7000 *grains*).

Grams per Kilo.	Per Pound	
	Oz.	Grains (avoir.).
1	0	7·0
2	0	14·0
3	0	21·0
4	0	28·0
5	0	35·0
6	0	42·0
7	0	49·0
8	0	56·0
9	0	63·0
10	0	70·0
20	0	140·0
30	0	210·0
40	0	280·0
50	0	350·0
60	0	420·0
70	1	52·5
80	1	122·5
90	1	192·5
100	1	262·5
200	3	87·5
300	4	350·0
400	6	175·0
500	8	—
600	9	262·5
700	11	87·5
800	12	350·0
900	14	175·0
1000	16	—

Grams per Litre.

Into Grains, etc., per Fluid Ounce, Pint, and Gallon.

Grams per Litre.	Grains per Fluid Oz.	Grains, etc., per Pint.		Grains, etc., per Gallon.			Grams per Litre.
		Oz.	Grains.	Lb.	Oz.	Grains.	
1	0·43	0	8·75	0	0	70·0	1
2	0·87	0	17·50	0	0	140·0	2
3	1·31	0	26·25	0	0	210·0	3
4	1·75	0	35·00	0	0	280·0	4
5	2·18	0	43·75	0	0	350·0	5
6	2·62	0	52·50	0	0	420·0	6
7	3·06	0	61·25	0	1	52·5	7
8	3·50	0	70·00	0	1	122·5	8
9	3·93	0	78·75	0	1	192·5	9
10	4·37	0	87·50	0	1	262·5	10
20	8·75	0	175·00	0	3	87·5	20
30	13·12	0	262·50	0	4	350·0	30
40	17·50	0	350·00	0	6	175·0	40
50	21·87	1	0	0	8	0	50
60	26·25	1	87·50	0	9	262·5	60
70	30·62	1	175·00	0	11	87·5	70
80	35·00	1	262·50	0	12	350·0	80
90	39·37	1	350·00	0	14	175·0	90
100	43·75	2	0	1	0	0	100
200	87·50	4	0	2	0	0	200
300	131·25	6	0	3	0	0	300
400	175·00	8	0	4	0	0	400
500	218·75	10	0	5	0	0	500
600	262·50	12	0	6	0	0	600
700	306·25	14	0	7	0	0	700
800	350·00	16	0	8	0	0	800
900	393·75	18	0	9	0	0	900
1000	437·50	20	0	10	0	0	1000

C.c. per Litre.

Into Minims, etc., per Fluid Ounce, Pint, and Gallon.

C.c. per Litre.	Per Fluid Oz.	Per Pint.		Per Gallon.			C.c. per Litre.
	Minims.	Fluid Oz.	Minims.	Pints.	Fluid Oz.	Minims.	
1	0·48	0	9·6	0	0	76·8	1
2	0·96	0	19·2	0	0	153·6	2
3	1·44	0	28·8	0	0	230·4	3
4	1·92	0	38·4	0	0	307·2	4
5	2·40	0	48·0	0	0	384·0	5
6	2·88	0	57·6	0	0	460·8	6
7	3·36	0	67·2	0	1	57·6	7
8	3·84	0	76·8	0	1	134·4	8
9	4·32	0	86·4	0	1	211·6	9
10	4·80	0	96·0	0	1	288·0	10
20	9·60	0	192·0	0	3	96·0	20
30	14·40	0	288·0	0	4	384·0	30
40	19·20	0	384·0	0	6	192·0	40
50	24·00	1	0	0	8	0	50
60	28·80	1	96·0	0	9	288·0	60
70	33·60	1	192·0	0	11	96·0	70
80	38·40	1	288·0	0	12	384·0	80
90	43·20	1	384·0	0	14	192·0	90
100	48·00	2	0	0	16	0	100
200	96·00	4	0	1	12	0	200
300	144·00	6	0	2	8	0	300
400	192·00	8	0	3	4	0	400
500	240·00	10	0	4	0	0	500
600	288·00	12	0	4	16	0	600
700	336·00	14	0	5	12	0	700
800	384·00	16	0	6	8	0	800
900	432·00	18	0	7	4	0	900
1900	480·00	20	0	8	0	0	1000

Measures of Capacity.

1 litre = 1 cubic decimetre = 35·214 fluid ounces.
1 gallon = 4·54596 litres.

	Litres.	Pints.
Millilitre (c.c. or mil.) .	0·001	0·0017
Centilitre . . .	0·01	0·0176
Decilitre . . .	0·1	0·1760
Litre	1·0	1·7607
Decalitre . . .	10·0	17·6077
Hectolitre . . .	100·0	176·0773
Kilolitre . . .	1000·0	1760·7734

Conversion Data.

Grams × 15·432 = grains.
Grains × 0·0648 = grams.
Ounces × 28·349 = grams.
Pints × 567·936 = cubic centimetres.
Gallons × 4·548 = litres.
Litres × 0·22 = gallons.

$$\frac{\text{Grains per gallon}}{0{\cdot}7} = \text{parts per 100,000.}$$

Parts per 100,000 × 0·7 = grains per gallon.

$$\text{Degrees Twaddell} = \frac{1000\ (\text{Specific Gravity}) - 1000}{5}.$$

$$\text{Specific Gravity} = \frac{(\text{Degrees Twaddell} \times 5) + 1000}{1000}.$$

Fineness of Powders.

Diameter of Particles Passing through a

No. 40 mesh sieve is less than 0·38 millimetre.
„ 50 „ „ 0·28 „
„ 60 „ „ 0·23 „
„ 80 „ „ 0·17 „
„ 100 „ „ 0·14 „
„ 120 „ „ 0·12 „
„ 150 „ „ 0·09 „
„ 200 „ „ 0·07 „

TABLE I.

Specific Gravity of Mixtures of Alcohol and Water.

Specific Gravity at 60° F. (15·5° C.).	Absolute Alcohol.		Percentage of Proof Spirit.	Specific Gravity at 60° F. (15·5° C.).	Absolute Alcohol.		Percentage of Proof Spirit.
	By Volume.	By Weight.			By Volume.	By Weight.	
1000	0·00	0·00	0·00	965	30·34	24·97	53·04
999	0·66	0·53	1·16	964	31·18	25·68	54·51
998	1·34	1·07	2·33	963	31·99	26·37	55·93
997	2·02	1·61	3·52	962	32·79	27·06	57·33
996	2·72	2·17	4·73	961	33·56	27·73	58·68
995	3·42	2·73	5·98	960	34·33	28·39	60·03
994	4·14	3·31	7·24	959	35·06	29·03	61·32
993	4·88	3·90	8·51	958	35·79	29·66	62·60
992	5·63	4·51	9·82	957	36·50	30·28	63·85
991	6·40	5·13	11·16	956	37·20	30·90	65·09
990	7·18	5·76	12·53	955	37·89	31·50	66·29
989	7·98	6·41	13·94	954	38·57	32·09	67·48
988	8·80	7·08	15·38	953	39·22	32·67	68·62
987	9·65	7·76	16·85	952	39·87	33·25	69·76
986	10·51	8·46	18·34	951	40·50	33·81	70·87
985	11·40	9·18	19·87	950	41·13	34·37	71·98
984	12·29	9·91	21·44	949	41·74	34·92	73·05
983	13·20	10·65	23·02	948	42·35	35·46	74·12
982	14·13	11·42	24·66	947	42·95	36·00	75·17
981	15·08	12·20	26·32	946	43·54	36·54	76·21
980	16·04	12·99	27·99	945	44·13	37·07	77·24
979	17·02	13·80	29·70	944	44·71	37·60	78·26
978	18·00	14·61	31·42	943	45·28	38·12	79·26
977	18·99	15·43	33·15	942	45·85	38·64	80·26
976	19·98	16·25	34·87	941	46·40	39·15	81·23
975	20·97	17·08	36·61	940	46·95	39·65	82·19
974	21·96	17·90	38·35	939	47·50	40·15	83·15
973	22·94	18·72	40·06	938	48·04	40·65	84·10
972	23·91	19·53	41·77	937	48·57	41·15	85·04
971	24·85	20·34	43·47	936	49·10	41·64	85·97
970	25·83	21·14	45·14	935	49·63	42·13	86·89
969	26·77	21·93	46·77	934	50·15	42·62	87·81
968	27·69	22·71	48·38	933	50·67	43·11	88·71
967	28·69	23·48	49·98	932	51·18	43·59	89·61
966	29·48	24·23	51·53	931	51·68	44·06	90·49

TABLE I.—*continued.*

Specific Gravity of Mixtures of Alcohol and Water.

Specific Gravity at 60° F. (15·5° C.).	Absolute Alcohol. By Volume.	Absolute Alcohol. By Weight.	Percentage of Proof Spirit.	Specific Gravity at 60° F. (15·5° C.).	Absolute Alcohol. By Volume.	Absolute Alcohol. By Weight.	Percentage of Proof Spirit.
930	52·18	44·53	91·36	897	67·08	59·37	117·54
929	52·67	45·00	92·93	896	67·50	59·80	118·26
928	53·16	45·47	93·09	895	67·92	60·23	118·98
927	53·65	45·94	93·95	894	68·33	60·66	119·70
926	54·14	46·40	94·80	893	68·74	61·09	120·42
925	54·62	46·87	95·65	892	69·14	61·52	121·14
924	55·10	47·33	96·49	891	69·55	61·95	121·85
923	55·58	47·79	97·33	890	69·95	62·38	122·56
922	56·05	48·25	98·16	889	70·35	62·81	123·27
921	56·52	48·71	98·98	888	70·75	63·24	123·97
920	56·99	49·17	99·80	887	71·15	63·67	124·06
91976	57·10	49·28	100·00	886	71·55	64·10	125·37
				885	71·95	64·53	126·07
919	57·46	49·63	100·62	884	72·34	64·96	126·77
918	57·92	50·08	101·43	883	72·24	65·39	127·46
917	58·38	50·53	102·24	882	73·13	65·81	128·14
916	58·83	50·98	103·05	881	73·52	66·24	128·82
915	59·29	51·43	103·84	880	73·91	66·66	129·50
914	59·74	51·88	104·63	879	74·30	67·09	130·18
913	60·19	52·33	105·42	878	74·68	67·51	130·86
912	60·63	52·77	106·20	877	75·06	67·93	131·53
911	61·07	53·21	106·97	876	75·44	68·35	132·19
910	61·51	53·65	107·74	875	75·82	68·77	132·86
909	61·95	54·10	108·52	874	76·19	69·19	133·53
908	62·39	54·54	109·29	873	76·57	69·62	134·19
907	62·83	54·98	110·06	872	76·94	70·04	134·84
906	63·26	55·42	110·82	871	77·32	70·46	135·50
905	63·70	55·87	111·59	870	77·69	70·88	136·16
904	64·13	56·31	112·35	869	78·06	71·30	136·81
903	64·56	56·75	113·10	868	78·43	71·72	137·46
902	64·98	57·18	113·84	867	78·80	72·14	138·10
901	65·41	57·62	114·59	866	79·17	72·55	138·74
900	65·83	58·06	115·33	865	79·53	72·97	139·38
899	66·25	58·50	116·07	864	79·89	73·39	140·02
898	66·67	58·93	116·81	863	80·25	73·81	140·65

TABLE I.—*continued.*

Specific Gravity of Mixtures of Alcohol and Water.

Specific Gravity at 60° F. (15·5° C.).	Absolute Alcohol.		Percentage of Proof Spirit.	Specific Gravity at 60° F. (15·5° C.).	Absolute Alcohol.		Percentage of Proof Spirit.
	By Volume.	By Weight.			By Volume.	By Weight.	
862	80·61	74·22	141·28	827	91·98	88·27	161·26
861	80·97	74·64	141·91	826	92·26	88·65	161·76
860	81·32	75·05	142·54	825	92·55	89·03	162·26
859	81·68	75·47	143·16	824	92·83	89·41	162·75
858	82·03	75·88	143·78	823	93·11	89·79	162·24
857	83·38	76·30	144·40	822	93·38	90·16	163·72
856	83·73	76·71	145·01	821	93·65	90·53	164·20
855	83·08	77·12	145·62	820	93·92	99·90	164·67
854	83·42	77·53	146·23	819	94·19	91·27	165·14
853	83·77	77·94	146·83	818	94·45	91·63	165·60
852	84·11	78·35	147·43	817	94·71	92·00	166·06
851	84·44	78·76	148·03	816	94·97	92·36	166·51
850	84·78	79·17	148·62	815	95·22	92·72	166·96
849	85·12	79·58	149·21	814	95·47	93·08	167·41
848	85·46	79·98	149·80	813	95·72	93·44	167·86
847	85·80	80·39	150·39	812	95·97	93·80	168·28
846	86·12	80·79	150·97	811	96·21	94·15	168·71
845	86·44	81·20	151·55	810	96·45	94·50	169·13
844	86·77	81·60	152·12	809	96·69	94·85	169·55
843	87·09	82·00	152·68	808	96·93	95·20	169·96
842	87·42	82·40	153·25	807	97·16	95·55	170·37
841	87·74	82·80	153·81	806	97·39	95·89	170·77
840	88·06	83·20	154·37	805	97·62	96·23	171·17
839	88·37	83·60	154·92	804	97·84	96·57	171·56
838	88·68	83·99	155·47	803	98·06	96·91	171·95
837	88·99	84·39	156·02	802	98·28	97·25	172·23
836	89·30	84·78	156·56	801	98·49	97·59	172·71
835	89·61	85·17	157·10	800	98·70	97·91	173·07
834	89·91	85·56	157·63	799	98·91	98·24	173·44
833	90·22	85·95	158·16	798	99·12	98·57	173·80
832	90·52	86·34	158·68	797	99·32	98·90	174·16
831	90·82	86·73	159·21	796	99·52	99·22	174·52
830	91·11	87·11	159·73	795	99·72	99·55	174·87
829	91·40	87·50	160·24	794	99·92	99·87	175·21
828	91·69	87·88	160·75	79359	100·00	100·00	175·35

TABLE II.

Dilution of Alcohol by Volume with Distilled Water.

Percentage Strength of Alcohol required by Volume.	Add to 1000 of Alcohol at								
	90.	85.	80.	75.	70.	65.	60.	55.	50.
	Per Cent by Volume.								
85	66								
80	138	69							
75	219	145	72						
70	311	231	153	77					
65	414	330	247	164	82				
60	537	445	354	265	176	88			
55	679	579	481	383	286	190	95		
50	847	739	630	524	417	313	205	104	
45	1053	933	814	695	578	461	345	229	114
40	1308	1173	1040	908	776	645	514	385	256
35	1633	1480	1329	1178	1029	880	700	583	436
30	2062	1886	1711	1535	1363	1189	1017	845	675
25	2661	2452	2243	2036	1828	1622	1417	1212	1007
20	3558	3298	3040	2783	2526	2270	2014	1760	1506
15	5053	4710	4369	4028	3689	3349	3011	2673	2336
10	8045	7537	7029	6522	6016	5511	5005	4502	2999

Examples: To convert 90 per cent to 45 per cent add to 1 litre 1053 c.c. Aqua Destil.

To convert 75 per cent to 20 per cent add to 1 litre 2783 c.c. Aqua Destil.

TABLE III.

Dilution of Alcohol by Weight with Distilled Water.

Percentage Strength of Alcohol Used.	To Produce 1000 of Alcohol at				
	50.	60.	70.	80.	90.
	Per Cent by Weight.				
96	453	555	665	783	913
95	460	564	676	796	927
94	467	573	686	808	942
93	474	582	697	820	956
92	481	590	707	832	970
91	489	599	718	845	985
90	496	609	728	858	
89	504	618	740	871	
88	511	627	752	884	
87	519	637	763	898	
86	527	646	774	912	
85	535	656	786	926	
84	543	667	798	940	
83	552	677	811	955	
82	560	687	823	969	
81	569	698	836	984	
80	578	709	849		
79	587	720	863		
78	597	732	877		
77	606	744	891		
76	616	756	905		
75	626	768	920		
74	636	781	935		
73	647	794	951		
72	658	807	967		
71	669	821	983		
70	681	835			
69	692	849			
68	705	864			
67	717	880			
66	730	896			
65	743	911			
64	756	928			
63	770	946			
62	785	963			
61	800	981			
60	815				
59	831				
58	847				
57	864				
56	881				
55	901				
54	918				
53	938				
52	958				

Examples : To make a kilo of 90 per cent by weight take

(1) 913 grams of 96 per cent alcohol and add distilled water to make 1000 grams, or

(2) 956 grams of 93 per cent.

Alcohol Table (to required weight and volume).

Showing the Strength of Alcohol (Percentage Absolute) with its Specific Gravity, also the Weight or Volume Required to make one Kilogram or one Litre of another Strength by the Addition of Distilled Water at 15·5° Centigrade or 60° Fahrenheit.

Strength of Absolute Alcohol.	Specific Gravity by		Quantity of Alcohol of Known Strength Required to Make 1000.									
			50 per Cent by		60 per Cent by		70 per Cent by		80 per Cent by		90 per Cent by	
	Weight.	Volume	Weight. Grams.	Volume. C.c.	Weight. Grams.	Volume C.c.	Weight. Grams.	Volume. C.c.	Weight. Grams.	Volume. C.c.	Weight. Grams.	Volume. C.c.
96 per cent	0·8065	0·8125	453	520	555	625	665	730	783	833	913	935
93 ,,	0·8149	0·8237	474	537	582	645	697	752	820	860	956	967
90 ,,	0·8229	0·8339	496	555	609	666	728	777	858	888		
85 ,,	0·8359	0·8496	535	588	656	705	786	823	926	941		
80 ,,	0·8484	0·8639	578	602	709	750	849	875				
75 ,,	0·8605	0·8773	626	666	768	800	920	933				
70 ,,	0·8724	0·8900	681	701	835	852						
65 ,,	0·8842	0·9021	743	769	911	923						
60 ,,	0·8958	0·9134	815	833								
55 ,,	0·9072	0·9242	901	981								

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