INCOMPATIBILITIES
IN PRESCRIPTIONS

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FOR

STUDENTS IN PHARMACY AND MEDICINE
PRACTICING PHARMACISTS
AND PHYSICIANS

BY

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PREFACE TO THE SIXTH EDITION

As has been stated in previous editions, the purpose of this book is: first, to provide, for the student of pharmacy, a compact source of information regarding possible incompatibilities, together with specific examples by which he may train himself for the problems which he will meet eventually; second, to assist pharmacists in determining the nature and causes of the incompatibilities with which they are confronted in prescription practice; third, to present to the physician, data pertinent to the success of the prescriptions which he writes.

The book is essentially divided into two parts. The first portion deals with the theoretical consideration of individual prescription items. These substances are arranged alphabetically according to their Latin titles. The reactions of the substance with other substances are discussed, the most important of these being given in large type. Emphasis in instruction may thus be given to the large type data and the smaller type material may be used for necessary reference only. To avoid undue repetition, all the incompatibilities of a substance are not always given under that substance, since a particular reaction may have been considered elsewhere with another substance which necessarily plays a leading role in the reaction.

Part II consists of a large number of typical prescriptions, illustrating various important and interesting incompatibilities, and following the presentation of the prescriptions themselves is a section devoted to criticisms and analyses of these prescriptions. The prescriptions may serve the practicing pharmacist with the answers to his current problems, and they are of particular value for training students of pharmacy in the subject of incompatibilities. For the latter purpose, the student should be made to realize the value to be derived from a conscientious consideration and study of the prescription involved. If he will study it first, purely upon a basis of his own knowledge, if he will experiment with it and attempt to determine what happens under the many possible variable conditions, he will build up a wealth of knowledge which he will be unable to obtain or retain by pursuing the alternative course of immediate reference to the criticisms of the specific prescription. The latter procedure will stunt his ambition to analyze problems and use his own initiative in solving them. Experience gained by observation and application far surpasses that obtained by simple reading. The arrangement of the prescriptions in Part II is based primarily upon the alphabetical arrangement found in Part I, where reference numbers to typical prescriptions will be found under the most important subjects discussed. Here again, one may find an important incompatibility placed and considered under another item. It is necessary therefore to refer to the index, where the effort has been made to list the reacting substances of every prescription under each of the items which is involved.

In the preparation of this edition, Part I was thoroughly revised to bring it up to date with present-day concepts and knowledge. Naturally, a large portion of this section remains fundamentally as it appeared previously, due to the fact that the data involved are essentially of a non-changeable character. Considerable revision was made in Part II, however. Approximately 150 old prescriptions were deleted. These had either reached a time when they were no longer prescribed, or they were replaced by new prescriptions which better illustrated the current trend in the particular case involved. Nearly 170 new prescriptions were added to Part II. These additions are typical of many of the incompatibilities which are to be found in current practice today. As in the last edition, there are a number of prescriptions presented for which there are no comments made. These may well be used in class instruction to check the ingenuity and application of the student. The prescriptions which were retained from the previous edition were carefully considered and additional comments added in many cases. For the most part they represented typical reactions which do not change but remain as specific examples of well-known phenomena.

Numerous unofficial substances have been added but such substances have only been included where they were considered of marked importance and where the composition of the substance was usually definitely known. Naturally many incompatibilities do occur and will continue to occur with that large group of items for which there is no generally known composition, and where the product may vary considerably from time to time. Many new organic substances are being presented daily and these for the most part are being prescribed per se, so that while there are endless possibilities of incompatibilities in such cases, the number which are actually met are comparatively few.

The table of solubilities has again been continued since so many prescription problems involve solubilities. The table has been enlarged and revised.

E. A. R.
A. B. N.

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ABBREVIATIONS OF REFERENCES

Br. P.:	British Pharmacopœia.
J. A. Ph. A.:	Journal American Pharmaceutical Association.
M. & M.:	Muir and Morley's edition of Watt's Dictionary.
M. I.:	Merck's Index.
M. R.:	Merck's Report.
N. S. D.:	National Standard Dispensatory.
N. F.:	National Formulary.
N. N. R.:	New and Non-official Remedies.
P. & J.:	Prescott and Johnson's Qualitative Chemical Analysis (McAlpine Soule).
Scoville:	Scoville's Art of Compounding.
Sohn:	Sohn's Dictionary of Active Principles of Plants.
U. S. D.:	United States Dispensatory.
U. S. P.:	United States Pharmacopœia.
Watts:	Watts' Dictionary of Chemistry.

INCOMPATIBILITIES IN PRESCRIPTIONS

PART I

INCOMPATIBILITIES

Acacia, *Gum Arabic.*—1. An aqueous solution of acacia is slightly acid to litmus. 2. The official mucilage of acacia is gelatinized by a **solution of ferric chloride, tincture of ferric chloride, solution of ferric sulfate,** or **solution of ferric subsulfate.** Alkali citrates in small proportions, alkali acetates in larger proportions, excess of hydrochloric or other acids, or dilution with water, will tend to prevent coagulation. One volume of tincture of iron with an equal volume of water will give a solution with one volume of mucilage diluted with an equal volume of water. Different samples of tincture of iron chloride vary in the amount of free acid and this causes a variation in the amount of citrate, acetate, acid, or dilution necessary to prevent gelatinization. Glycerin or syrup seems to have but little more effect in preventing coagulation than so much water. The color of the mixture of the iron salt and the mucilage is deeper red than that of the tincture alone. Gelatinized acacia will afterwards slowly dissolve if an excess of water is added. 3. **Iron citrate, iron and ammonium citrate,** or a saturated **solution of ferrous sulfate** does not gelatinize mucilage of acacia. 4. A saturated solution of **borax** forms a more or less translucent

NOTE.—At the end of the articles on many drugs and chemicals, numbers in parentheses will be found. These numbers refer to prescriptions in Part II, illustrating that particular drug or chemical. By reference to the Index of Incompatibilities other prescriptions may be found arranged under other headings.

mass with mucilage of acacia. By diluting the borax solution with an equal volume of water, and the mucilage with an equal volume of water, no coagulation takes place. The coagulation may also be prevented by adding three or four drops of glycerin or honey to one dram of the borax solution, or by acidifying the borax solution. The official syrup or a solution of glucose tends to prevent the coagulation, but is not as effective as glycerin. 5. A solution of **lead subacetate** (not the neutral lead acetate), even if quite highly diluted, will give white, opaque, gelatinous masses when mixed with mucilage of acacia. Diluting the mucilage with several volumes of water does not prevent coagulation although glycerin and syrup do to some extent. 6. Acacia consists chiefly of calcium arabate and a solution may have some of the incompatibilities of calcium salts. 7. Acacia is nearly insoluble in **alcohol.** The mucilage can be mixed with a little over one-half its volume of alcohol without permanent precipitation. If the mucilage is first diluted with water a stronger alcoholic mixture can be obtained before precipitation is permanent. The precipitate redissolves on subsequent dilution with water. 8. Mucilage of acacia is colored blue, either at once or after standing a short time, by a tincture of **guaiac** if the guaiac is fresh, but not with a guaiac that has been exposed to air and light for some time. A mucilage made from acacia tears may give the blue when one made from powdered acacia will not. This is probably due to a ferment in the tears which is destroyed by the heat necessary before powdering. Heating a mucilage of acacia to 100° C. for one hour destroys the ferment, without impairing the emulsifying powers.

9. **Solution of dialyzed iron** when mixed with mucilage of acacia forms gelatinous masses, having the color of ferric hydroxide, but does not give a translucent mass as does the tincture of iron; dilution with water or the addition of a citrate has but little effect in preventing coagulation. 10. **Sulfuric acid** converts acacia into arabic and then metarabic acid and precipitates calcium sulfate (U. S. D.). Dilute sulfuric acid converts it into a sugar on prolonged boiling (M. & M., I, 296). A strong solution of a sulfate gives a precipitate of calcium sulfate. 11. Dilute **nitric acid** converts acacia into mucic, saccharic, oxalic, and tartaric acids (U. S. D.). 12. In the presence of acacia, dilute solutions of salts of **mercury, lead,**

copper, antimony, silver, iron, or **arsenic** do not give precipitates with **hydrogen sulfide** or **alkaline sulfides,** although a coloration may be produced. 13. Acacia frequently prevents the precipitation of dilute solutions of salts of **mercury, antimony, aluminum, iron, calcium,** and some other metals by **alkali hydroxides** or **borax** and in some cases by **carbonates.** 14. Dilute solutions of **alkaloidal salts** in the presence of acacia are not precipitated by **potassium mercuric iodide** or **tannic acid.** These properties are common to many gums (M. & M., I, 296). The solution of the alkaloid must be very dilute or some precipitation will occur. 15. Acacia contains an oxydase which gives color when a 10 per cent solution of acacia is mixed with a 1 per cent solution of **phenol, naphthol, pyrogallol, cresol, thymol, guaiacol, vanillin, amidopyrine, morphine, apomorphine, physostigmine, adrenalin, tannin,** preparations of **tar,** and **other compounds.** If the solution of acacia is heated to 100° C. there will be no color reactions. (℞ 1–9.)

Acetanilidum, *Antifebrin.*—1. With **spirit of ethyl nitrite, amyl nitrite,** or a solution containing **nitrous acid**, acetanilid gives a yellow solution, becoming red on standing for some time. With a fresh or nearly neutral spirit of ethyl nitrite the yellow coloration may not be noticed for several days and the red for two weeks or more. The presence of an alkali or a little sodium bicarbonate will prevent the appearance of more than a pale yellow within a month. Probably diazo-compounds are formed. 2. A cold **solution of ferric chloride** with acetanilid gives no increase of color, but, if heated, it assumes a deep red color which fades as the solution cools. With the **tincture of iron** acetanilid gives a color more red than the tincture, acetanilid being soluble in alcohol. Excess of acid lessens the color.

3. **Iodine, bromides,** or **iodides** do not precipitate aqueous solutions of acetanilid unless they are added in very large excess. 4. **Acids** generally hydrolyze it. 5. Acetanilid is slowly decomposed by a strong solution of **potassium or sodium hydroxide,** forming aniline. 6. A mixture of acetanilid and **calomel,** either dry or with water, shows no perceptible change within a month and gives no test for a mercuric salt. 7. Rubbing acetanilid with **piperazine, phenol, pyrocatechin, resorcin,** or **thymol** produces a soft mass or liquid which is soluble in alcohol and insoluble or only partly soluble in water. 8. Heavy trituration of acetanilid with **antipyrine** or **chloral hydrate** gives a damp powder. 9. **Chloral hydrate** increases the solubility of acetanilid in water; a mixture of 10 grains of chloral hydrate with 1 grain of acetanilid will dissolve in about 5 minims of water and further

addition of water does not cause precipitation. 10. When **sodium salicylate** is mixed with acetanilid a pink powder is said to be produced, but the writer did not get much increase of color, although the paper containing the mixture became colored after a time. 11. Acetanilid is said to be readily soluble in a hot solution of **tartaric acid** from which it does not crystallize. However, the writer did not find this to be the case. (℞ 10–12.)

Acidum Acetyltannicum, *Acetannin, Tannyl Acetate, Tannigen.*—1. Acetyl tannate should not be exposed to light, heat, or moisture. 2. Solutions of **alkali hydroxides** and **carbonates** increase the solubility of it in water. Potassium or sodium hydroxide, gradually in the cold but quickly when heated, saponify it into salts of acetic and gallic acids while ammonium hydroxide produces ammonium acetate and tannate. 3. Solutions of **borax** or **sodium phosphate** dissolve acetyl tannate. The borax solution does not precipitate a solution of albumin, while the sodium phosphate solution does after a time. If the sodium phosphate solution of acetyl tannate is made alkaline with an excess of alkali or of borax, it does not precipitate albumin. 4. An aqueous solution gives a green color (not blue) with dilute **ferric chloride solution**, although a blue may be obtained with old material.

Acetophenetidinum, *Phenacetin.*—1. Acetophenetidin is decomposed by strong **acids or alkalies.** 2. Acetophenetidin conceals or destroys the fluorescence of **quinine sulfate**, especially in dilute solutions. 3. **Spirit of ethyl nitrite** slowly gives a yellow color, becoming more of a red-brown.

4. Acetophenetidin in strong aqueous solution gives, with some **oxidizing agents**, colorations varying from pink to red. These colorations are due to the presence of paraphenetidin in the acetophenetidin, or upon its formation by decomposition of the acetophenetidin (M. R., IV, 359). 5. Heating acetophenetidin with hydrochloric acid and then adding a solution of **ferric chloride** gives a red color. 6. **Salicylic acid** when triturated with acetophenetidin is said to give a pasty mass. The writer failed to get anything but a dry powder. 7. Acetophenetidin triturated with **phenol, chloral hydrate,** or **pyrocatechin** gives a liquid. 8. Acetophenetidin combines with **iodine** to form a compound known as iodophenin. (℞ 13–14.)

Acida.—1. Acids combine with **metallic oxides** and **hydroxides**, with some **metals** and with some **alkaloids** to form salts. Basic metallic salts are generally insoluble or sparingly soluble while most acid metallic salts are soluble. 2. Mineral acids and some organic acids, such as tartaric or acetic, precipitate bismuth citrate from solutions of **bismuth and ammonium**

citrate by combining with the ammonium. 3. Mineral and common organic acids precipitate potassium bitartrate from concentrated solutions of **Rochelle salt**, normal **potassium tartrate**, or double tartrates containing potassium. 4. Nitric, hydrochloric, or sulfuric acid with an aqueous solution of **tartar emetic** gives a precipitate consisting of a basic nitrate, chloride, or sulfate of antimony. The presence of tartaric acid prevents precipitation, the amount of acid necessary seeming to depend upon the amount of mineral acid used. 5. Mineral acids give a precipitate of the phosphate or of the pyrophosphate of iron when added to a solution of the **soluble phosphate** or **pyrophosphate of iron.** 6. Strong mineral acids precipitate, from concentrated solutions of **borates, salicylates,** or **benzoates**, the boric, salicylic, or benzoic acid. 7. Strong mineral acids form esters and ethers with **alcohol.** Many organic acids in the presence of mineral acids, as sulfuric or hydrochloric, form esters with alcohol. 8. Nearly all acids decompose **carbonates**, liberating carbon dioxide. 9. Acids diminish or prevent the action of **pancreatin.** 10. Many acids precipitate **albuminous substances** from aqueous solution. 11. Organic acids, except acetic, combined with an alkali, generally form compounds with the **heavy metals,** that are insoluble in water. 12. Frequently mineral acids displace organic acids and the stronger mineral acids the weaker ones. 13. **Glycyrrhizin** is precipitated from solution by many acids.

Following are some preparations containing a free acid: 14. vinegar of squill; 15. chlorinated lime; 16. citrated caffeine; 17. fluidextracts of ergot, ipecac, lobelia; 18. fluidextracts in general are acid to litmus, some sufficiently acid to liberate carbon dioxide from carbonates; 19. glycerites of tannic acid and boroglycerin; 20. solutions of arsenous acid, ammonium acetate, iron chloride, iron and ammonium acetate, subsulfate of iron, tersulfate of iron, hydrogen peroxide, magnesium citrate, potassium citrate, and zinc chloride; 21. oleate of mercury; 22. spirit of ethyl nitrite, usually; 23. syrups of citric acid, hydriodic acid, orange, calcium lactophosphate, ferrous iodide, hypophosphites, ipecac, lactucarium, and squill; 24. tinctures of iron chloride, camphorated opium, and sanguinaria; 25. ointments of boric acid, tannic acid, and mercuric nitrate. 26. Besides these there are some substances which become acid on exposure, as acetic ether, spirit of ethyl nitrite, amyl nitrite, and oil of bitter almond.

27. There are quite a number of salts that are acid in reaction and sufficiently so to give an effervescence with a carbonate. Some of the more common are: alum, bismuth subnitrate, cupric sulfate, ferric chloride, ferric phosphate, ferrous sulfate, potassium bitartrate, quinine bisulfate, quinine dihydrochloride, quinine and urea hydrochloride, zinc acetate, zinc chloride, zinc sulfate, zinc valerate, and saccharin.

Acidum Aceticum (Acetates).—1. Acetic acid decomposes nearly all **carbonates**, liberating carbon dioxide and forming acetates. 2. Soluble neutral acetates, or the free acid if it is concentrated and the solution of iron salt is weak, with solutions of **ferric salts**, give a deep red coloration. The color varies from a yellow-red to a dark red, according to the dilution, due to the formation of ferric acetate which on heating precipitates as the basic ferric acetate. The strong mineral acids in excess prevent the formation of the color. 3. Acetic acid (as well as citric acid) aids the solution of **quinine sulfate** in water, increasing the fluorescence. This solution does not precipitate on standing, but on adding potassium acetate (or an alkali salt of citric acid) the fluorescence is destroyed and, if it is a fairly strong solution of quinine, needle-shaped crystals will be formed in a few minutes. The original solution is probably a physical one of the quinine sulfate in the acetic acid, the latter being a weak acid and not ionized sufficiently to produce the insoluble quinine acetate. The potassium acetate is more readily ionized, however, and the free acetate ions immediately unite with the quinine to form the fairly insoluble quinine acetate. The precipitate may be dissolved by the further addition of acetic acid and again thrown down by adding potassium acetate, the amounts necessary in either case depending upon the initial excess of the potassium acetate or the acetic acid, respectively. Potassium acetate in sufficient amount will destroy also the fluorescence and give a precipitate with a solution of quinine bisulfate or quinine sulfate dissolved in water by the aid of sulfuric acid. The principle is probably the same as that just explained. 4. A mixture of **alcohol, sulfuric acid** and acetic acid or an acetate gives ethyl acetate, which has a fruity odor. 5. An aqueous solution of potassium acetate with **spirit of ethyl nitrite** produces an effervescence. The effervescence may be due to a "salting-out" effect by the potassium acetate throwing the volatile ethyl nitrite out of solution; salts upon which ethyl nitrite has no action cause a similar effervescence. 6. The stronger **mineral acids** transpose acetates, liberating acetic acid. 7. Some acetates, as lead, on being exposed to the **air** lose acetic acid and absorb carbon dioxide, becoming partly insoluble. 8. Nearly all normal acetates are readily soluble in water, except quinine, silver, and mercurous. The acetates, except silver and mercurous, are generally soluble in alcohol. 9. Strong acetic acid is a good solvent for resins, gum-resins, camphor, and volatile oils. [See ACIDA.] (℞ 15–17.)

Acidum Acetylsalicylicum, *Aspirin.*—1. Acetylsalicylic acid in solution in **water** or **alcohol** or even in the presence of moist air decomposes into acetic and salicylic acids. 2. It combines with **alkali hydroxides** to make acetylsalicylates which are very quickly converted into acetates and salicylates. 3. Similar reactions take place with **carbonates** and **bicarbonates**, liberating carbon dioxide. 4. It combines with **lime** or with **magnesia**, and it is claimed that the salts are somewhat stable but they undergo hydrolysis in the presence of moisture. 5. When absolutely pure it does not give a coloration with a very dilute solution of a **ferric salt**, but all commercial samples contain enough salicylic acid to give the characteristic violet color. 6. **Alkali citrates, acetates,** and **tartrates** aid the solution of aspirin in water. In such mixtures the corresponding acid is formed and this acid is only slightly ionized. Therefore there is a depletion of the "H" ion and a corresponding concentration of the acetyl salicylate ion, and in order for ionic concentration to remain constant, more of the aspirin is ionized or "dissolved." This principle is observed also in salicylic acid, benzoic acid, and in many other instances. Such solutions hydrolyze about 10 per cent in the first day, about 50 per cent in a week, and are practically all decomposed in about 3 weeks. A solution made with aspirin 1 part, potassium citrate 3 parts, water 15 to 20 parts, and then saturated with sugar is reported to hydrolyze about 35 per cent in six days and then remain permanent for a month. (J. A. Ph. A., XXI [1932], 383.) 7. **Antipyrine** gives a sticky mass at once when rubbed in a mortar, or in a few minutes if mixed on paper with a spatula. The mass soon assumes a yellow color and later changes to a crystalline mass. 8. Many items with which aspirin is prescribed in capsules, form moist masses with the aspirin. This is usually only another case of hydrolyzed aspirin, one of the ingredients bringing moisture into the picture, either absorbed or in the form of water of crystallization. **Quinine sulfate** has been an offender frequently as it has contained 8 molecules of water of crystallization, and capsules of quinine and aspirin have become soft or liquefied, but this did not occur usually until the capsules had aged for more than a year. However, the U. S. P., XI, now recognizes quinine sulfate with only 2 molecules of water and consequently less trouble will be experienced from this source than heretofore. The combination of quinine sulfate and aspirin was at first considered quite dangerous as it was claimed that a very toxic quinotoxin was formed and several cases of poisoning are said to have occurred. However, this combination is frequently prescribed without the slightest ill effect, and experiments made upon animals by one of the writers indicate that the toxicity is no greater than that of quinine. 9. A mixture of aspirin, **acetophenetidin,** and **morphine** is reported to react with moisture and heat to produce a toxic substance acting like heroin in its narcotic effect. (J. A. Ph. A., XVIII [1929], 810.)

10. In solution with **potassium iodide** aspirin very slowly liberates hydriodic acid which is oxidized by the air liberating iodine. 11. When **sodium phosphate** is rubbed with aspirin a thin mass is produced and a marked odor of acetic acid soon appears. 12. Crystallized **borax**, but not the dried, acts similarly to sodium phosphate. 13. When **lead acetate** and aspirin are triturated together a damp powder is formed and this may

change to a mass. At the same time a strong odor of acetic acid is developed. 14. **Methenamine** triturated with aspirin gives a damp powder, changing in a few days to a greenish-yellow mass with a disagreeable odor. 15. **Phenol** gives a liquid with aspirin. (℞ 18–26.)

Acidum Benzoicum (Benzoates).—1. Benzoic acid combines with the hydroxides of the **alkalies** and **calcium** to form benzoates. 2. It liberates carbon dioxide from **carbonates.** 3. Soluble benzoates precipitate nearly neutral solutions of **ferric salts** as ferric benzoate, which is flesh colored. The presence of an excess of free acid or of alkali tartrates or citrates interferes with or prevents the precipitation. 4. Sodium benzoate gives a white, sticky precipitate when it is added to a solution of **quinine bisulfate** or to a slightly acidulated solution of **quinine sulfate** if the quinine solution is not too dilute. Quinine benzoate is soluble in about 350 parts of water and more soluble in alcohol. 5. Concentrated aqueous solutions of benzoates give a crystalline precipitate of benzoic acid when dilute solutions of strong **acids** are added. Some acids in fruit syrups precipitate benzoic acid when sodium benzoate is used as a preservative. As a matter of fact, it is the benzoic acid and not the sodium benzoate which is the real preservative. 6. The solubility of the free acid in water is increased by the presence of borax, alkali citrates, sodium phosphate, or sodium sulfite. [See ACIDUM ACETYLSALICYLICUM, No. 6.] 7. Most benzoates are soluble in water and many are soluble in alcohol.

8. Sodium benzoate gives precipitates with solutions of salts of **silver, mercury,** and **lead,** the latter being somewhat soluble in an excess of lead acetate. 9. Benzoic acid is not readily attacked by **nitric** or **chromic acid.** [See ACIDA.] (℞ 27–28.)

Acidum Boricum (Borates).—1. Boric acid combines with the **hydroxides** of the **alkalies** and the **alkaline earths** to form borates. 2. It decomposes **carbonates** of the **alkalies** and of the **alkaline earths,** liberating carbon dioxide, but under certain conditions carbon dioxide may decompose borates. 3. The alkali borates, as borax, give precipitates with nearly neutral solutions of salts of several **metals,** the precipitate being more or less soluble in excess of the metallic salt or in the presence of ammonium chloride; 4. with **mercuric chloride** the precipitate is an oxide (P. & J., 442) or red-brown basic mercuric chloride (Watts, I, 641); 5. with **silver nitrate** the precipitate is silver borate (sometimes mixed with a little oxide); 6. with **lead acetate, barium chloride,** or **calcium chloride** the precipitate is a borate of the metal; 7. with **alum** the precipitate is aluminum hydroxide; 8. with **zinc sulfate** the precipitate may be chiefly a borate or a mixture of the borate with a basic compound, there being more of the borate if the solutions to be mixed are concentrated; 9. with **ferric salts** an iron hydroxide is formed (P. & J., 442) or a basic borate is formed (Watts, I, 530). 10. Very concentrated solutions of borates give a precipitate of boric acid with nearly all **mineral acids.** 11. Borax is alkaline in reaction and precipitates the free **alkaloids** from aqueous solutions of their salts. This can be prevented by first mixing a little glycerin with the borax, using approximately 1 minim of glycerin to each grain of borax. [See GLYCERIN, No. 1.] 12. **Glycerin** and borax react in the presence of water, liberating an acid which will cause effervescence with carbonates. [See GLYCERIN, No. 1.] **Glucose, mannite,** some **other forms of sugar,** and **honey** cause a similar reaction. 13. In solution borax slowly decomposes **chloral hydrate,** liberating chloroform. 14. When triturated with **alum, benzoic, gallic, salicylic,** or **tartaric acid,** borax gives a damp powder or sticky mass. Chemical reaction takes place and water of crystallization is liberated. 15. Borax coagulates mucilage of **acacia.** [See ACACIA, No. 4.] 16. Borax increases the solubility in water, of **boric, benzoic, salicylic** and **stearic acids, potassium bitartrate, oils,** and **resins.** It aids the suspension in water of oils and resins. 17. The borates, excepting those of the alkalies, are nearly insoluble in water, but are generally soluble in the presence of free boric, tartaric, or mineral acid. They are insoluble in alcohol.

18. Borax with many of the weaker **acids** forms double salts in which boric acid seems to act the part of a base. When borax and **tartaric acid** are mixed in solution in proper proportions boric acid separates; if the quantity of tartaric acid is gradually increased, the quantity of boric acid also increases up to a certain point, beyond which it decreases, acting the

part of a base (Watts, I, 648). 19. The solubility of free boric acid in water is increased by the presence of **tartaric acid, potassium tartrate, Rochelle salt, potassium citrate,** and **borax,** the salts being partially decomposed (Watts, I, 648). 20. An aqueous solution of a mixture of boric and salicylic acids gives a precipitate with solutions of **alkaloidal salts** under certain conditions. One grain of an alkaloidal salt added to an ounce of water containing 1 grain of salicylic acid and 10 grains of boric acid generally gives a precipitate. If the ounce of water contains one-half the amount of acids given above, no precipitate is formed by cocaine hydrochloride, morphine sulfate, codeine sulfate or atropine sulfate. Quinine bisulfate and strychnine sulfate give precipitates when 1 ounce of water contains 1/4 grain of salicylic and 2 1/2 grains of boric acid, but not when one-half this proportion of acids is used. 21. Boric acid may be made to combine with several acids as benzoic, citric, gallic, salicylic, tannic, and tartaric, making borobenzoic, borocitric, borogallic, borosalicylic, borotannic, and borotartaric acids. 22. The solubility of borax in water is increased by **sugar.** (℞ 29–34.)

Acidum Camphoricum.—1. Camphoric acid combines with hydroxides of the **alkalies, calcium, barium,** and **magnesium,** to form soluble salts. (℞ 35.)

Acidum Chrysophanicum.—1. Chrysophanic acid is dissolved by aqueous solutions of **alkalies,** forming a liquid which is pink when dilute and dark purplish-red when concentrated. This solution, when neutralized with acids, precipitates the yellow chrysophanic acid.

Acidum Citricum (Citrates).—1. Citric acid forms citrates with most metallic **hydroxides** or **carbonates,** with most **acetates,** with **alkaline sulfides,** and with **soap.** 2. With a strong solution of **potassium tartrate** or **Rochelle salt** citric acid forms sodium citrate and potassium bitartrate which is precipitated. 3. A strong solution of citric acid gives a precipitate with a solution of **bismuth and ammonium citrate,** but it may take several hours. 4. Soluble citrates and citric acid when heated with **lime water** give a precipitate of calcium citrate. 5. Neutral soluble citrates precipitate solutions of **lead acetate** and **silver nitrate** as citrates, both being soluble in excess of the precipitant. 6. The normal magnesium citrate is sometimes precipitated in the official **solution of magnesium citrate** when the citric acid is not present in considerable excess. 7. The insoluble citrates are transposed by the dilute **mineral acids.** 8. When a drug containing **tannin** is added to a mixture of a **ferric salt** and **an**

alkali citrate there is a darkening, but the citrate to a slight extent prevents the formation of the black tannate of iron. 9. Citric acid aids the solution of **quinine sulfate** in water and the solution is fluorescent. If an alkali citrate is now added to this, the fluorescence is destroyed and in a few minutes a crystalline precipitate forms. This may be dissolved by the further addition of citric acid or a mineral acid. [See ACIDUM ACETICUM, No. 3.] 10. The presence of an alkali citrate increases the solubility in water of some acids as **gallic, salicylic,** and **benzoic,** and of some metallic salts. 11. Potassium citrate in concentrated solution precipitates many **alkaloids** from aqueous solutions of their salts. Some of these alkaloids are quinine, morphine, strychnine, atropine, and codeine. 12. Potassium citrate dissolved in dilute **alcohol** (1 part of the salt to 6 of the solvent) causes the liquid to separate into two layers, the upper being nearly twice the volume of the lower. Potassium citrate is insoluble in alcohol and in separating takes some water with it. 13. The citrates of the alkalies are soluble in water; those of **iron, zinc, calcium,** and **copper** are moderately soluble; the **other single citrates** are nearly insoluble. Citric acid in excess converts the insoluble citrates into the more soluble acid citrates, and the alkali citrates convert them into the more soluble double citrates. 14. Syrup of lemon or of citric acid, when used as a vehicle, sometimes causes precipitation or reaction on account of citric acid. In such a case it is often admissible to use simple syrup flavored with oil of lemon.

15. Neutral or nearly neutral solutions of salts of **aluminum, iron, nickel, manganese, antimony, mercuric mercury, copper, zinc, chromium, calcium,** or **magnesium,** in the presence of the alkali citrates, are not generally precipitated by the alkali **hydroxides, carbonates, phosphates,** or by **borax.** The citrates also sometimes prevent precipitation of the metals by **oxalates** and **sulfates.** In many instances there are double compounds formed. If heat be applied precipitation may take place. [See ACIDA.] (℞ 36–41.)

Acidum Gallicum (Gallates).—1. An aqueous solution of gallic acid soon decomposes when exposed to air, giving off carbon dioxide, turning yellow, brown, and black, and depositing a black substance; this coloration is hastened by **alkali**

hydroxides and in alkaline solution the gallic acid is converted into galloflavin. 2. Gallic acid combines with **alkali hydroxides.** In mixtures of the acid and a solution of potassium or sodium hydroxide, when the acid is in excess, the color becomes green; when the alkali is in excess, the color is yellow, changing to red and brown. 3. Gallic acid gives a blue-black solution or precipitate with a solution of **ferric chloride.** With an excess of the iron the color is a green-blue to green-brown. Heat changes the blue-black color to brown, probably due to the reduction of the ferric iron to the ferrous condition, and to the conversion of gallic acid into pyrogallic or metagallic acid. 4. Gallic acid with a strong solution of a pure **ferrous salt** gives a white precipitate. On exposure to air the mixture soon becomes colored, due to the oxidation of the iron. 5. With **spirit of ethyl nitrite** gallic acid or a solution of gallic acid produces an effervescence and gives a red color. 6. Gallic acid does not precipitate solutions of alkaloids, gelatin, albumin, or starch, but a mixture of **acacia** and **gelatin** is said to be precipitated. 7. The solubility in water of the free acid is increased by borax or alkali citrates. 8. The gallates of the alkalies are soluble, but the others are nearly insoluble in water and generally insoluble in alcohol.

9. Gallic acid in excess with **ammonia water** gives a yellow color, but when the ammonia is in excess the color is red-brown. 10. It decomposes alkali **carbonates** liberating carbon dioxide and producing colorations similar to those given when added to fixed alkali hydrates. 11. With an excess of **sodium bicarbonate** a solution of gallic acid turns brown, then green, and ultimately blue, and gives a precipitate of a deep blue-green solid. 12. Gallic acid with **lime water** in excess gives a blue-white precipitate, and the liquid acquires a tint which is blue by reflected and green by transmitted light, and becomes pink with a large excess of lime water. If the acid is in excess the color is brown. 13. With a solution of **tartar emetic** it gives a precipitate of gallate of antimony; in dilute solution the precipitation is prevented by ammonium chloride. 14. Gallic acid produces a precipitate when added to a solution of **lead acetate.** 15. It reduces salts of **silver** and **gold** to the metals. 16. **Arsenic** and **iodine** with water oxidize gallic acid. (℞ 42.)

Acidum Hydriodicum (Iodides).—1. It has been accepted generally that diluted hydriodic acid, syrup of hydriodic acid, and syrup of ferrous iodide liberate iodine upon exposure to **air** and **light;** also that the brown color in the syrups is due sometimes to caramelization of the sugar and not to free iodine. In the light of recent developments these statements require some modification. All the preparations named contain hypophosphorous acid, added as a preservative to prevent the liberation of free iodine. Under normal storage conditions hydriodic acid may liberate some iodine and develop a yellow color which will be destroyed, however, if the preparation is exposed to sunlight, the sunlight helping to reduce the free iodine. When the syrups are placed in the sunlight, however, the color is markedly intensified, finally becoming almost black. This is because the color is due not primarily to iodine, but rather to the fact that the sugar in the syrup is hydrolized to dextrose and **levulose** which in turn is oxidized either by oxygen or by iodine to produce decomposition products of a dark color. The sunlight hastens this oxidation (Husa and Klotz, J. A. Ph. A., 23 [1934], 679). Ammonium iodide, calcium iodide, and zinc iodide are soon decomposed by air and light, potassium iodide much less quickly, particularly if it contains a little potassium carbonate. Many of the more common **iodides,** when added to hydriodic acid or its preparations, markedly hasten the decomposition of the hydriodic acid (J. A. Ph. A., 22 [1933], 279). 2. Solutions of iodides with dilute mineral **acids** or some organic acids liberate hydriodic acid, which is more or less quickly oxidized to iodine by the oxygen of the air. Some neutral salts, as ammonium nitrate, tend to decompose iodides. 3. Hydriodic acid and soluble iodides precipitate solutions of salts of **lead,** as the bright yellow lead iodide. This is prevented to some extent by alkali acetates. 4. They precipitate salts of **silver,** as the yellow-white silver iodide; of **mercurous mercury,** as the yellow mercurous iodide; of **mercuric mercury,** as the red mercuric iodide. 5. The alkali iodides in excess form double compounds with **lead, silver,** and **mercuric iodides.** The iodides of lead and silver are soluble only in concentrated solutions of the alkali iodides while mercuric iodide is soluble in dilute solutions. The solution of the double salt of mercuric and potassium iodide

$(KI)_2HgI_2$ is known as "Mayer's reagent," and precipitates nearly all alkaloids from their aqueous solutions. Potassium iodide given with insoluble mercury preparations makes them more soluble and active. 6. **Mercurous iodide** with an excess of potassium iodide in the presence of water is decomposed, forming metallic mercury and mercuric iodide, the latter combining with potassium iodide to form the potassium mercuric iodide. 7. **Calomel** with water and an excess of potassium iodide forms mercurous iodide and potassium chloride; the mercurous iodide is decomposed as given under No. 6. 8. Soluble iodides reduce **cupric salts** in solution and give a white precipitate of cuprous iodide; at the same time the solution turns red, owing to the liberation of iodine. 9. Soluble iodides with **ferric salts** in acid solutions reduce the ferric to ferrous iron, but give no precipitate of iron; iodine is liberated and, if all the iodide is decomposed, may be precipitated. Adding potassium iodide to tincture citrochloride of iron, little or no iodine is liberated for several days, but if a little dilute mineral acid is added iodine is liberated at once. 10. When **bismuth subnitrate** is added to syrup of hydriodic acid it is changed to a yellow substance at once which further changes to orange-red and then to dark gray. Sometimes the ultimate precipitate seems to consist of two different substances, one yellow and the other gray. When bismuth subnitrate is added to a solution of potassium iodide it assumes a yellow color in a few hours and within a day it has changed to a deep red. The color varies with the iodide formed; $BiOI$ is red; $(BiOI)_3 (Bi_2O_3)_4$ is yellow; BiI_3 is dark gray (M. & M., I, 513). Sodium bicarbonate in an amount equal to that of bismuth prevents the change. Diluted hydrochloric acid causes the coloration to take place at once. Syrup of ferrous iodide gives a yellow color at once, turning red-brown in a short time. 11. **Spirit of ethyl nitrite,** and **nitrites** in acid solution, liberate iodine from iodides and give off oxides of nitrogen. To prevent these reactions the spirit should first be neutralized by a little sodium bicarbonate. 12. **Iodates** in acid solution with iodides liberate iodine from both. Iodides sometimes contain iodates as impurities, hence the liberation on adding an acid.

13. **Arsenic compounds** in acid solution with iodides liberate iodine and become arsenous. 14. The iodides sometimes contain carbonates and would then have the incompatibilities of the carbonates. 15. The alkali iodides precipitate aqueous solutions of many **alkaloidal salts.** In some cases this is due to the formation of compounds that are less soluble in water than the original salt. When a large excess of the alkali iodide is used it may render the alkaloidal salt less soluble in the solution than it is in water. The precipitation in other cases is due to the carbonate occurring as an impurity in the iodide. The presence of alcohol prevents the precipitation to a considerable extent. The prescribing of strychnine sulfate with potassium iodide is particularly dangerous because the precipitation may not take place for some time. A solution of one-twelfth of a grain of strychnine sulfate with 5 grains of potassium iodide and 2 drams of water does not usually precipitate at once, but may do so within a few hours. 16. The lead, silver, mercurous, mercuric, and bismuth iodides are nearly insoluble in water; all others are soluble. Nearly all iodides, except lead, silver, and mercurous, are soluble in alcohol.

17. **Nitric** or **nitrohydrochloric acid** liberates iodine from iodides and, if sufficiently concentrated, oxidizes it to iodic acid. 18. **Chlorine** oxidizes iodides, forming iodine then iodic acid and in an alkaline mixture a periodate. The chlorine is changed to a chloride. 19. **Chlorates** in an acid solution of an iodide liberate iodine and then change it to iodic acid which is more toxic. Probably a similar reaction takes place in the stomach when a chlorate and an iodide are taken together. 20. A solution of potassium iodide with **arsenous acid** or **potassium arsenite** yields a precipitate of $(KI)_2(As_2O_3)_3$ which is sparingly soluble in cold water (Watts, I, 377). When 1 dram of potassium iodide is added to 1 fluid dram of the U. S. P. solution of potassium arsenite, a white precipitate forms in a few hours; if half that amount of iodide is added the precipitation may not take place for several days. 21. **Permanganates** in acid solutions liberate iodine and, if in great excess, oxidize it to iodic acid. 22. **Hydrogen peroxide** in acid solution liberates iodine from iodides, slowly in neutral mixtures. [See ACIDA.] (℞ 43–61.)

Acidum Hydrobromicum (Bromides).—1. The soluble bromides and hydrobromic acid precipitate solutions of salts of **lead,**

silver, and **mercurous mercury** as bromides. 2. An aqueous solution of an alkali bromide or of hydrobromic acid causes **calomel** to turn black and the filtrate gives a test for a mercuric salt. Probably a reaction takes place similar to the one explained under Acidum Hydriodicum, Nos. 6 and 7. 3. The alkali bromides precipitate some of the **alkaloids** from the solutions of their salts similar to the alkali iodides [see Acidum Hydriodicum, No. 15] but are not apt to do so. The presence of alcohol generally prevents this precipitation. 4. The alkali bromides sometimes contain carbonates as impurities and would then have the incompatibilities of carbonates and the solutions would be alkaline. 5. The metallic bromides are soluble in water, except lead, mercurous, silver, antimony, and bismuth. They are generally somewhat soluble in alcohol.

6. Dilute hydrobromic acid with **bismuth subnitrate** gives a mixture in which the liquid has a pale yellow color. With potassium bromide there is no apparent change. 7. Bromides with **nitric acid** give bromine. 8. **Chlorine** forms bromine and hydrochloric acid. In alkaline mixtures a bromate is formed. 9. **Chlorates** in acid solution give bromine and hydrochloric acid. .10. Bromides in acid solutions reduce **permanganates** to manganous salts and liberate bromine. 11. In concentrated aqueous mixtures alkali bromides form double soluble compounds with lead or silver bromide, which double compounds are broken up by a large amount of water. [See Acida.] (℞ 62–65.)

Acidum Hydrochloricum (Chlorides).—1. Hydrochloric acid and the soluble chlorides precipitate as chlorides solutions of salts of **lead, silver,** and **mercurous mercury.** 2. With a solution of **tartar emetic** hydrochloric acid gives a precipitate of basic chloride of antimony. 3. Hydrochloric acid with **chlorates** gives chlorine and various chlorides of oxygen. 4. Concentrated hydrochloric acid with concentrated **nitric acid** gives chlorine and oxychlorides of nitrogen. 5. Bismuth citrate is precipitated from a solution of **bismuth and ammonium citrate** when hydrochloric acid is added to it. 6. Some writers say that chlorides aid the conversion of **calomel** to mercuric chloride. [See Hydrargyri Chloridum Mite, No. 7.] 7. The normal chlorides, except lead, mercurous, and silver, are soluble in water. With the exception of chlorides of sodium, potassium, ammonium, silver, lead, and mercurous mercury, they are generally soluble in alcohol.

8. **Permanganates** liberate chlorine from hydrochloric acid and are reduced to manganous chloride. 9. **Chromates** form chromic chloride and free chlorine. 10. The soluble chlorides give hydrochloric acid when treated with **sulfuric acid.** 11. Sodium chloride decomposes **mercuric benzoate,** giving mercuric chloride and sodium benzoate (J. A. Ph. A., XVIII, 763). 12. Hydrochloric acid, being stronger than most other acids, except sulfuric and nitric, very frequently displaces other acids when they are combined with bases. 13. The soluble chlorides when added so as to make a concentrated solution with a solution of an **alkaloidal salt** may precipitate the alkaloid. 14. Hydrochloric acid added to an alcoholic solution of **myrrh** slowly gives a red to a violet color; added to an alcoholic solution of **balsam of tolu** it gives a yellow color, changing through brown to cherry red; with many **resins** a brown color is produced. [See ACIDA.] (℞ 66–67.)

Acidum Hydrocyanicum Dilutum (Cyanides).—1. The aqueous solution of hydrocyanic acid decomposes into ammonium formate, cyanic acid, and other compounds, depositing reddish-brown paracyanogen. 2. Potassium cyanide in aqueous solution is decomposed on standing, giving potassium formate and ammonia (Watts, II, 218). 3. An aqueous solution of potassium cyanide is quite strongly alkaline, and this alkalinity increases with exposure, due to the absorption of carbon dioxide and the volatilization of the hydrocyanic acid. The commercial salt generally contains some potassium cyanate (KCNO) having taken the oxygen from air. 4. Soluble cyanides decompose **mercurous compounds,** forming metallic mercury and mercuric salts. In case of **calomel** the powder is turned dark at once on account of the metallic mercury. 5. Aqueous solutions of the alkali cyanides being alkaline may precipitate **alkaloids** from solutions of their salts as the free alkaloids. 6. Cyanides of the alkalies and alkaline earths are decomposed by all **acids,** even carbonic, with the liberation of hydrocyanic acid. 7. The cyanides of the alkalies and the alkaline earths and mercuric cyanide are soluble in water; many of the others are made soluble in the presence of the alkali cyanides by forming double compounds. Excepting mercuric cyanide they are generally insoluble in alcohol.

8. Concentrated **mineral acids** with potassium cyanide produce formic acid and a salt of ammonium (Watts, II, 199). 9. Hydrocyanic acid and the soluble cyanides, except mercuric cyanide, precipitate the white silver cyanide from solutions of **silver salts**; the precipitate forms soluble double compounds with the alkali cyanides. 10. The alkali cyanides precipitate solutions of **lead salts** as white lead cyanide. 11. The alkali cyanides precipitate solutions of **copper salts** as the yellow-green copper cyanide, which is soluble in excess of the alkali cyanide. 12. Potassium cyanide with a solution of **ferrous sulfate** gives a brown precipitate of ferrous cyanide which dissolves in excess of the alkali cyanide forming potassium ferrocyanide. 13. **Nitric acid** decomposes cyanides with the evolution of nitrogen and other gases (N. S. D.). 14. Cyanides reduce **potassium permanganate** and are changed to carbon dioxide, nitric, nitrous, oxalic, and formic acids (M. & M., II, 346). 15. With a concentrated solution of **iodine** potassium cyanide forms potassium iodide and iodide of cyanogen (M. & M., II, 342). Even in dilute solutions the color of iodine is destroyed. 16. Rubbed with **potassium nitrate** or **chlorate**, potassium cyanide detonates violently. 17. If potassium cyanide and **chloral hydrate** are rubbed together reaction takes place with the evolution of a large volume of white fumes. (℞ 68–69.)

Acidum Hypophosphorosum (Hypophosphites).—1. Diluted hypophosphorous acid is oxidized to phosphorous and phosphoric acids on exposure to **air**. 2. Hypophosphorous acid and hypophosphites in acid solution are oxidized to phosphoric acid by nearly all **oxidizing agents**, and cause a reduction of these agents. 3. **Iodine** is reduced to hydriodic acid. 4. **Mercurous** and **mercuric compounds** are reduced to the metal, even in neutral and alkaline mixtures. **Calomel** is turned dark at once when mixed with potassium hypophosphite. 5. **Ferric salts** are reduced to ferrous in acid mixtures (P. & J., 489). When an alkali hypophosphite is added to a solution of ferric chloride a white precipitate of ferric hypophosphite is formed which is dissolved by adding a large excess of hydrochloric acid or an alkali citrate in considerable amount. 6. Compounds of **silver** and **gold** are reduced to the metals. 7. Hypophosphorous acid dissolves **quinine sulfate** with a blue fluorescence. Adding potassium hypophosphite to the solution destroys the fluorescence and in sufficient amount precipitates the quinine. [See

Acidum Citricum, No. 3.] 8. Hypophosphites are decomposed by nearly all **acids**. 9. Heat decomposes hypophosphites, giving off inflammable hydrogen phosphide gas. The mass remaining is often colored with a little phosphorus and the phosphite is changed to phosphate and pyrophosphate. The temperature of a water bath may cause explosion. 10. Hypophosphites when triturated with some **oxidizing agents**, as potassium chlorate, are apt to cause an explosion. 11. Hypophosphites are soluble in water, except ferric hypophosphite which is only sparingly soluble. Many are soluble in alcohol.

12. **Nitrous** or **nitric acid** with hypophosphorous acid forms nitric oxide. 13. **Chlorine** and **chlorates** are changed to hydrochloric acid or chlorides. 14. **Permanganates** are changed to manganous compounds (to manganese dioxide in alkaline mixtures). 15. **Bismuth subnitrate** with potassium hypophosphite in the presence of moisture becomes brown or black after some time, much more quickly in the presence of an acid. Bismuth is reduced to metallic bismuth in the presence of alkalies or acetic acid (P. & J., 489). 16. In the presence of hydrochloric acid **arsenic acid** is reduced to arsenous acid and then to metallic arsenic (P. & J., 489). [See Acida.] (℞ 70–76.)

Acidum Lacticum (Lactates).—1. Lactic acid displaces acetic and carbonic acids from their compounds. 2. It coagulates a solution of **albumin.** 3. **Hydriodic acid** at once reduces lactic acid to propionic acid. 4. Lactates are generally insoluble in water and alcohol but some are soluble in solutions of alkali citrates. [See Acida.]

Acidum Nitricum (Nitrates).—1. Nitric acid is a strong oxidizing agent, and in oxidizing substances it is reduced to dinitrogen tetroxide (N_2O_4), nitrous anhydride (N_2O_3), nitric oxide (NO), nitrous oxide (N_2O), nitrogen, or ammonia. 2. With concentrated **hydrochloric acid** it forms chlorine and oxychlorides of nitrogen. 3. Nitric acid reacts with **tannic acid**, giving off oxides of nitrogen. 4. With **creosote, volatile oils,** and other **organic substances** the reaction with nitric acid may be so violent as to cause explosion or ignition. 5. Nitric acid gives color reactions with many of the alkaloids. 6. Nitric acid replaces many weak acids, such as carbonic, acetic, and boric acids, when they are combined with bases. 7. Nitric acid with concentrated sulfuric acid and **glycerin** forms the explosive nitroglycerin. 8. With sulfuric acid and **cotton** or other **cellulose** it forms gun-cotton, some of the compounds being explosive. 9. Diluted nitric acid, while an oxidizing agent, is not as active as the concentrated. It may not give color reactions with some of the alkaloids. 10. Fuming nitric acid is a more active oxidizing agent than the concentrated acid. When it is mixed with **organic matter**, violent explosion or ignition is liable to take place. 11. Nitrates, particularly those of the fixed alkalies, when triturated with substances capable of being readily oxidized, are likely to explode; some of these substances are **charcoal, phosphorus, sulfur, sugar, sulfides, potassium cyanide, glycerin, alcohol,** and oils. 12. The nitrates are all soluble in water; the basic nitrates of bismuth and of mercury are insoluble. Most of the nitrates are rather sparingly soluble in alcohol.

13. Nitric acid oxidizes **hypophosphites** to phosphates; 14. **sulfides** to sulfur, and then sulfates; 15. **sulfites** to sulfates; 16. **bromides** to free bromine; 17. **iodides** to free iodine, and then to iodic acid; 18. **oxalates** to carbon dioxide; 19. **citrates** to acetic and oxalic acids and carbon dioxide; 20. **mercurous compounds** to mercuric; 21. **arsenous compounds** to arsenic; 22. **ferrous compounds** to ferric. 23. Nitric acid dissolves many metals, while it itself is partly decomposed. 24. With **carbolic acid** it forms picric acid. 25. With **salicylic acid** it forms nitrosalicylic acid. 26. With **alcohol** it acts violently, giving off red fumes, and forming aldehyde, acetic, formic, and carbonic acids. 27. **Apomorphine** with nitric acid gives a violet-red; 28. **brucine** a scarlet to blood-red; 29. **physostigmine** a yellow or red; 30. **berberine,** a dark brown-red; 31. **codeine,** a yellow; 32. **hydrastine,** an orange; 33. **morphine,** an orange-red, changing to yellow. 34. Nitric acid gives a red color with **barbaloin** and **nataloin,** but not with **socaloin.** 35. Nitric acid with **sugar** and heat forms oxalic acid. Very concentrated nitric acid in the cold with sugar forms an explosive compound. Diluted nitric acid oxidizes sugar to saccharic acid, while very dilute acid changes it to glucose. 36. Nitric acid with **silver** or **mercuric nitrates** and **strong alcohol** forms the explosive fulminate of silver or mercury. 37. Nitrates with **sulfuric acid** give nitric acid. 38. Nitric acid when dropped on the skin gives the yellow xanthoproteic acid and a similar reaction takes place with some other organic substances. [See ACIDA.] (℞ 77–78.)

Acidum Nitrohydrochloricum. 1. Unless very highly diluted, nitrohydrochloric acid gives a yellow coloration with **strychnine sulfate.** The products formed have not been determined. 2. Nitrohydrochloric acid is a very strong oxidizing agent, and is likely to cause violent reaction when mixed with **organic matter.** 3. It has the oxidizing properties of chlorine and the precipitating properties of hydrochloric acid. [See CHLORUM and ACIDUM HYDROCHLORICUM.] (℞ 79–81.)

Acidum Nitrosum (Nitrites).—1. Nitrous acid and acid solutions of nitrites, such as potassium or sodium nitrite, amyl nitrite, or ethyl nitrite (in spirit of ethyl nitrite), all act in a similar manner. Sometimes they act as oxidizing and sometimes as reducing agents. In neutral or alkaline mixtures nitrites do not generally oxidize or reduce. 2. The spirit of ethyl nitrite readily undergoes decomposition, forming alcohol, aldehyde, acetic acid, nitrous acid, nitric acid, and other products. Water tends to hasten and absolute alcohol to prevent decomposition. By neutralizing any free acid with sodium bicarbonate many incompatibilities can be avoided for a time. Sodium bicarbonate is not soluble in alcohol, consequently the spirit will not be made alkaline and any excess can be filtered out. If sodium citrate is allowed to stand in the spirit for some time, the nitrous and nitric acids seem to combine with the sodium and are not then as active oxidizing agents. 3. Ethyl nitrite in the spirit of ethyl nitrite is decomposed by **alkali hydroxides,** forming alcohol and a nitrite of the alkali. Aldehyde is often present, and the alkali gives a yellow to a brown color with this. 4. **Hypophosphites** form phosphoric acid and nitric oxide when mixed with acid solutions of nitrites. 5. **Mercurous salts** are reduced to metallic mercury. 6. **Antipyrine** with acid solutions of nitrites gives the green isonitroso-antipyrine. [See ANTIPYRINA, No. 10.] 7. **Acetanilid** gives a yellow color with acidulated solutions of nitrites. [See ACETANILIDUM, No. 1.] 8. Spirit of ethyl nitrite with **sodium salicylate** gives a brown-red color if allowed to stand for a day or two. 9. **Acetophenetidin** slowly gives a yellow color which deepens. 10. With **tannic** or **gallic acid** or preparations containing them in large amounts, nitrites in acid solution (as an old spirit of ethyl nitrite) give off gaseous compounds, consisting chiefly of oxides of nitrogen. The reaction may continue for some time, and bottles containing the mixture should not be stoppered until reaction has ceased.

11. Spirit of ethyl nitrite with a tincture of **guaiac** gives a blue color which changes to deep red in a few minutes. If the guaiac has been exposed to the light and air for some time the blue color is not produced. 12. With spirit of ethyl nitrite strong solutions of many salts give an effervescence. [See Acidum Aceticum, No. 5.] 13. Nitrites are quite soluble in water, except silver, which is only sparingly soluble.

14. **Chlorates** form peroxide of chlorine, then hydrochloric and nitric acids. 15. **Iodides** form iodine and nitric oxide. Acetates may prevent the liberation of iodine for a time, but later iodine is liberated. 16. **Ammonium bromide** is decomposed by spirit of ethyl nitrite, liberating bromine. The other bromides are not readily affected. 17. Spirit of ethyl nitrite after standing with a solution of mercuric chloride causes the formation of a white precipitate which responds to the tests for calomel. 18. **Gold chloride** is reduced to metallic gold. 19. Nitrites with **sulfuric acid** and **alcohol** form ethyl nitrite. 20. Nitrous acid changes **oleic acid** to the isomeric form elaidin. 21. With **thymol** spirit of ethyl nitrite gives a green and then a brown color, changing the thymol to nitroso-thymol. 22. Spirit of ethyl nitrite produces a yellow color with **morphine**. Morphine is converted into nitroso-morphine, pseudomorphine, and another base (M. [illegible]). 23. It gives a red color with **aloin**. 24. **Piperazine** gives [illegible]d solution with spirit of ethyl nitrite. 25. **Phenol** with [illegible] at once which begins [illegible] half hour is a deep [illegible]its a solid. [See [illegible]

[illegible] acid fumes or **nitro**[illegible] which is solid. 4. [illegible] and dioxys[illegible] decomposed by [illegible] metals such as **calcium**, **zinc**, and lead [illegible] water but soluble in oil. [See Liquor [illegible]

[illegible]—1. Oxalic acid and soluble oxalates pre[illegible] of many **metallic salts**, such as lead, silver, [illegible] and strontium. With an excess of alkali [illegible] sometimes formed. 2. Oxalic acid is quite a strong reducing agent and is oxidized to carbon dioxide by most **oxidizing agents.** 3. A **permanganate** is reduced to a manganous salt. 4. **Potassium chlorate** is reduced to potassium chloride. 5. The metallic oxalates except those of magnesium and the alkalies are generally insoluble in water.

Acidum Phosphoricum (Phosphates).—1. Free orthophosphoric acid partially precipitates solutions of **silver nitrate** and **lead acetate.** 2. With a solution of **ferric chloride** it forms the colorless ferric phosphate, which is kept in solution by the liberated hydrochloric acid. Tannic acid or preparations containing it do not give the black color when added to this solution of ferric phosphate. 3. Orthophosphoric acid does not coagulate egg **albumin** or **gelatin** (difference from metaphosphoric acid). 4. Phosphoric acid when added to a solution of **soluble phosphate** or **soluble pyrophosphate of iron** produces a white precipitate of ferric phosphate or of pyrophosphate of iron. A large excess of the free acid redissolves the precipitate. 5. The alkali phosphates precipitate neutral solutions of nearly all other common **metals.** The precipitate is a di- or tri-metallic phosphate, and excepting lead, mercurous, antimony, and b [illegible] phates, is gene[illegible]ved by phosphoric acid [illegible] metallic salts. [illegible] slightly alkaline [illegible] **alkaloids** fro[illegible]

[illegible] sodium phosp[illegible] [illegible]. [See page 28[illegible] [illegible]ept th[illegible] [illegible] [illegible]ates are so[illegible] phates are insoluble in alcohol.

10. Metaphosphoric acid prec[illegible] **trate, lead acetate, ferric chl**[illegible]**e** [illegible] calcium (difference from orth[illegible]phos[illegible] cause a precipitation when it is ad[illegible] **uble phosphate** or **pyrophosphate of i**[illegible]

solutions of **egg albumin** or **gelatin.** 13. In aqueous solutions metaphosphoric acid slowly changes to orthophosphoric acid.

14. Pyrophosphoric acid precipitates solutions of **lead acetate, ferric chloride,** and **gelatin.** 15. The pyrophosphates of the alkalies are soluble in water and precipitate solutions of salts of nearly all other **metals.** 16. Most of the pyrophosphates are soluble in solutions of alkali pyrophosphates as double salts. Alkali citrates also have a solvent effect. [See ACIDA.] (℞ 96–100.)

Acidum Salicylicum (Salicylates).—1. Salicylic acid unites with **alkali hydroxides** and with many **metallic oxides** to form salts. 2. Salicylic acid liberates carbon dioxide from **carbonates.** 3. Solutions of the salicylates in water, particularly if alkaline, become colored yellowish brown to red-brown or black. This reaction is attributed generally to oxidation, and F. Grill states that it may take place due to atmospheric **oxygen** (or to a trace of **iron**) with the formation of a quinoid structure of the phenolic group of the salicylate, **light** also affecting the color (J. A. Ph. A., XXI [1932], 765). This color effect is encountered frequently with the sodium salicylate, sodium bicarbonate combination. The addition of a small amount of sodium sulfite, sodium bisulfite, or sodium thiosulfate helps to prevent the color change. 4. Salicylic acid and soluble salicylates with dilute solutions of **ferric salts** give a blue-violet to a violet-red color, [illegible] upon the concentration. In rather acid solutions [illegible] color varies from that of the iron to brown or red. The [illegible] is destroyed by a large excess of a mineral acid or acetic [illegible] In nearly neutral solutions a precipitate of basic ferric [illegible]late is formed. 5. A solution of **potassium iodide** with [illegible]c acid becomes yellow in a short time, and after a few [illegible]t is brown and gives a test for iodine. 6. Sodium salicylate [illegible]pirit of **ethyl nitrite** gives a yellow solution which changes to [illegible]-brown in a few hours. 7. Sodium salicylate rubbed with **antipy[illegible]e** gives a powder which becomes damp and sticky. Some say that this is due to absorption of moisture from the air; other[illegible]at chemical reaction takes place. 8. Soluble salicylates with solutions of **quinine sulfate** give a white curdy precipitate of quinine salicylate which is nearly insoluble in water. Sodium salicylate with a dilute solution (1 : 1000) of quinine sulfate gives a crystalline precipitate in a few days. 9. **Mineral acids** and some **organic acids** liberate salicylic acid from solutions of the salicylates. Salicylic acid, being but slightly soluble, is precipitated from a not too dilute aqueous solution. 10. A concentrated aqueous solution of sodium salicylate (1 : 1) is a good solvent for **volatile oils, resinous substances, phenol, guaiacol, creosote, thymol, menthol,** and other bodies. More or less water can be added to these solutions without precipitation. 11. Sodium salicylate tends to prevent precipitation of some of the metallic oxides or hydroxides. 12. Salicylic acid is rendered more soluble in water by the presence of **borax.** The compound $C_{14}H_{10}NaBO_7$ is said to be formed and deposited in the form of crystals from strong solutions, and also that the liquid soon undergoes decomposition, acquiring a bitter taste (N. S. D.). 13. Salicylic acid is rendered more soluble in water by the presence of several neutral salts, such as the **citrates, acetates,** and **phosphates** of the alkalies, by **potassium nitrate,** and by **sodium sulfite.** [See Acidum Acetylsalicylicum, No. 6.] Excepting **mercuric** and **bismuth** salicylates, the salts are generally soluble in alcohol.

14. Sodium salicylate precipitates solutions of **lead acetate** and **silver nitrate** as salicylates. 15. Sodium salicylate with **copper sulfate** gives [illegible] green solution from which the copper is not precipitated in dilu[illegible] by alkali hydroxides. 16. **Lime water** gives a precipitate when m[illegible] with a concentrated solution of sodium salicylate. 17. With **bismuth nitrate** sodium salicylate in aqueous solution is said to give sever[illegible]pounds of bismuth and salicylic acid which have a color varying from [illegible] to red-orange. The coloration, according to the author's experi[illegible] not noticeable except after the lapse of considerable time, and m[illegible] be due to oxidation products of salicylic acid. 18. Concentrated [illegible] acid with salicylic acid gives nitrosalicylic acid. 19. **Potassium c[illegible]** with hydrochloric acid converts salicylic acid into tetrachloroquino[illegible] (N. S. D.). **Chlorine** forms mono- and di-chlorosalicylic acid (M. & [illegible]., III, 680). 20. A solution of **iodine** is slowly decolorized by sodiu[illegible]licylate. Iodine gives mono-, di-, and tri-iodo-salicylic acid and tri-iodo-p[illegible]l (M. & M., III, 680). 21. **Potassium permanganate** oxidizes salic[illegible] acid to formic acid and carbon dioxide. 22. A mixture varying from a damp

powder to a liquid results when salicylic acid or sodium salicylate is rubbed with **lead acetate, sodium phosphate** or **urethane.** In case of lead acetate there is a strong odor of acetic acid, indicating that acetic acid is liberated. 23. Basic magnesium salicylate is frequently precipitated from soluble salicylates and magnesium hydroxide mixtures. [See ACIDA.] (℞ 101–111.)

Acidum Stearicum (Stearates).—1. Stearic acid combines with the **alkali hydroxides** and **carbonates** to form stearates. 2. **Nitric acid** oxidizes it to succinic and other acids (M. & M., IV, 512). 3. Stearates are decomposed by **acids,** liberating stearic acid. (℞ 112.)

Acidum Sulfuricum (Sulfates).—1. Sulfuric acid transposes the **salts** of nearly all other acids. 2. Sulfuric acid and the soluble sulfates precipitate as sulfates solutions of salts of **lead, barium, calcium** (in concentrated solution), and **strontium.** The addition of potassium tartrate dissolves some of the precipitates. 3. Sulfuric acid dissolves many **metals** with the evolution of hydrogen or sulfur dioxide, depending on the concentration of the acid. 4. With **hypophosphorous acid** it forms sulfurous acid and then sulfur. 5. **Hydriodic acid** with concentrated sulfuric acid forms iodine and sulfurous acid. Diluted acid liberates hydriodic acid from iodides. 6. Concentrated sulfuric acid causes detonation with **chlorates,** with the evolution of the greenish-yellow chlorine peroxide. 7. With **alcohol** sulfuric acid forms ethylsulfuric acid and then ether. 8. **Water** precipitates the aromatics from the aromatic sulfuric acid. 9. The concentrated acid with most **organic matter** forms a black mass, owing to the extraction of the elements of water, leaving carbon. Some organic acids, many alkaloids, and some other compounds are not thus affected. 10. Diluted sulfuric acid does not cause as many decompositions as the concentrated. 11. The sulfates of lead, barium, strontium, and calcium are nearly insoluble in water; silver and mercurous sulfates are sparingly soluble; mercuric, antimony, and bismuth are soluble in acidulated water; the others are soluble in water. Sulfates are generally insoluble in alcohol. [See ACIDA.] (℞ 113–115.)

Acidum Sulfurosum (Sulfites).—1. Sulfurous acid on exposure to **air** is slowly oxidized to sulfuric acid. 2. Sulfurous acid does not usually precipitate solutions of metallic salts. The soluble sulfites—potassium, sodium, and ammonium—precipitate neutral solutions of salts of nearly all other **metals.** Sometimes sulfurous acid contains sulfuric acid which may cause reaction in certain cases. 3. Sulfites and sulfurous acid give a red color with a dilute solution of **ferric chloride.** The color is soon destroyed, because of the change of the ferric sulfite to ferrous sulfate. 4. Sulfurous acid has a bleaching effect on organic **coloring matter.** 5. Sulfites are decomposed by nearly all **acids,** except carbonic, boric, hydrocyanic, and in some instances hydrosulfuric. 6. The sulfites of the alkali metals are soluble in water; the sulfites of the alkaline earths are soluble in sulfurous acid; the others are insoluble or sparingly so. The sulfites are insoluble in alcohol.

7. **Nitric** or **nitrous acid** oxidizes sulfites to sulfates. 8. **Hypophosphites** in acid solution with sulfites form phosphoric acid and sulfur. 9. Sulfites, with **chlorine** or **chlorates** in acid solution, produce sulfuric and hydrochloric acids. 10. **Silver salts** in solution are first precipitated by sulfites and then reduced to metallic silver when warmed. 11. **Arsenic compounds** are reduced to arsenous. 12. **Permanganates** in acid solution are reduced by sulfites to manganous compounds. 13. **Mercuric** and **mercurous nitrates** are reduced to metallic mercury. **Mercuric chloride** is slowly reduced to calomel and on heating to metallic mercury; the sulfurous acid acts more quickly than the sulfites. [See ACIDA.] (℞ 116–117.)

Acidum Tannicum (Tannates).—1. An aqueous solution of tannic acid changes, forming gallic acid and probably some ellagic and carbonic acids. The change is retarded or prevented by the presence of glycerin or alcohol. The solution gets darker on standing and this is hastened by alkalies. 2. Tannic acid in dilute solutions combines with the **alkali hydroxides** and **carbonates** to form soluble tannates and these solutions soon become colored, varying from red to brown, green, or black. 3. Tannic acid precipitates as tannates solutions of salts of many of the metals, especially **lead, silver, mercury, copper, bismuth,** and **antimony.** 4. The alkali tannates give precipitates with solutions of salts of nearly all other **metals.** 5. With solutions of **ferric salts** tannic acid gives a solution or precipitate (depending on the concentration and acidity) of a dark blue-black to green-black color. The addition of enough of phosphoric acid to convert the iron into ferric phosphate prevents or destroys the color. Theoretically 48 minims of 10 per cent phosphoric acid is sufficient to convert 1 dram of the official tincture of ferric chloride into the phosphate. Practically it requires from 1½ to 2 times as much dilute acid as tincture, depending to some extent upon the amount of tannic acid, to prevent the formation of the dark tannate of iron. The addition of sodium or potassium citrate also prevents the formation of the iron tannate. 6. With purely **ferrous salts** in concentrated solution (not in dilute solution) it gives a white gelatinous precipitate, which quickly becomes blue on exposure to air. Nearly all commercial samples of ferrous salts contain some ferric salt. 7. With tannic acid and water **iodine** forms hydriodic acid, which combines with part of the tannic acid and remains in solution; the oxygen of the decomposed water combines with tannic acid and forms an insoluble compound; the solution is capable of dissolving iodine; the iodine in a liquid containing an excess of tannic acid does not give a blue color with starch (U. S. D.). 8. Tannic acid with **Fowler's solution** or a solution of **sodium arsenate** gives a nearly white precipitate which with the liquid turns to a dark dirty green within a day. 9. With **spirit of ethyl nitrite, amyl nitrite,** or **nitrous acid** tannic acid causes a decomposition and the formation of gaseous compounds some of which are oxides of nitrogen. The solution becomes deep red. 10. Tannic acid gives precipitates with solutions of **albumin, gelatin, gluten,** or **starch.** 11. It precipitates as tannates nearly all **alkaloids** from aqueous or dilute alcoholic solutions of their salts; the precipitate is generally soluble in mixtures containing over 15 to 40 per cent alcohol. The presence of some organic acids, acacia, or starch also tends to prevent the precipitation. 12. Tannic acid precipitates some **glucosides, neutral** and **bitter principles.** 13. It precipitates aqueous solutions of **antipyrine.** 14. Tannic acid slowly decomposes **iodoform** (U. S. D.). 15. All drugs containing tannic acid in large proportions will have the incompatibilities given above. Some of the drugs which contain notable quantities of tannic acid are catechu, kino, krameria, logwood, geranium, blackberry-root bark, and oak bark.

16. **Potassium hydroxide** or **carbonate** with a concentrated solution of tannic acid gives a compound which is but slightly soluble in water, but dissolves in a certain excess of alkali. 17. **Ammonium hydroxide** in its reactions resembles potassium hydroxide, but the precipitate is not nearly so great unless ammonium chloride has been previously added to the ammonia. 18. **Sodium hydroxide** gives little or no precipitate. 19. A small amount of **lime water** added to a solution of tannic acid gives a precipitate which redissolves; adding more lime water the precipitate is white and permanent, changing to light blue and then dark blue as more lime water is added; a very large excess of lime water gives a precipitate which is pinkish. 20. A strong solution of tannic acid gives precipitates with concentrated **sulfuric, hydrochloric,** or **phosphoric acids.** These precipitates are supposed to be compounds of tannic acid with the respective acids, and are soluble in pure water but not in acidulated water (U. S. D.). 21. Saturated solutions of **sodium chloride, potassium acetate,** and some other **salts** precipitate tannic acid from strong solutions. 22. Tannic acid reduces **potassium permanganate.** 23. **Solution of hydrogen peroxide** with tannic acid shows no change at first but after a few days a light brown precipitate falls. 24. Tannic acid reduces salts of **gold, silver, mercury,** and **copper.** 25. Triturated with **potassium chlorate** or other substances which yield their oxygen readily, tannic acid is likely to cause an explosion. [See ACIDA.] (℞ 118–124.)

26. *Tannismuth* or *bismuth bitannate* is nearly insoluble in water but soluble in cold caustic alkalies. In the body it is probably broken up into its constituents. 27. *Tannoform* or *tanninformaldehyde* is nearly insoluble in water, but soluble in alcohol and alkalies and has many of the incompatibilities of tannic acid. 28. *Tannopin* or hexamethylenamine tannin is insoluble in water, weak acids, chloroform, or ether, but is slowly soluble in weak alkalies. Heated with weak acids, it gives off formaldehyde; heated with sodium hydroxide, it gives off ammonia.

Acidum Tartaricum (Tartrates).—1. When tartaric acid is added in excess to a rather strong solution of **potassium hydroxide** or many of its salts, a crystalline precipitate of potassium bitartrate forms. 2. When tartaric acid is associated with **boric acid** it is not precipitated by potassium hydroxide, even on adding acetic or hydrochloric acid (U. S. D.). Boric combines with tartaric acid to make borotartaric acid which is a stronger acid than boric. 3. Tartaric acid in excess with a strong solution of **ammonia** gives a precipitate of ammonium bitartrate.

4. Potassium tartrate or Rochelle salt gives a precipitate of potassium bitartrate on adding many **acids**, the precipitate dissolving in a large excess of a mineral acid. 5. The soluble tartrates precipitate as tartrates neutral solutions of salts of most **metals.** The precipitate is generally soluble in tartaric acid or mineral acids. Many of the tartrates form soluble compounds with the alkali hydroxides, due to the formation of double tartrates. 6. Tartrates in aqueous solution have more or less solvent effect on certain salts which ordinarily are insoluble, as calcium phosphate, lead sulfate, and barium sulfate. 7. Tartrates are transposed by mineral **acids.** 8. Tartrates of the alkali bases are soluble in water. The bitartrates of potassium and ammonium are sparingly soluble. The manganous and ferric tartrates are soluble; calcium tartrate, sparingly soluble. The other tartrates are nearly insoluble. Tartrates are generally insoluble in alcohol.

9. Tartaric acid decomposes **potassium iodide**, forming a tartrate and hydriodic acid which is slowly decomposed by the air, liberating iodine. 10. Under certain conditions tartrates reduce salts of **gold, silver,** and **platinum; mercuric chloride** becomes mercurous chloride. 11. **Potassium permanganate** with an alkaline solution of a tartrate is reduced to manganese dioxide, while the tartaric acid is converted into formic acid, carbon dioxide, and water; free tartaric acid is acted upon but slowly. 12. Tartaric acid and tartrates tend to prevent the precipitation by alkali hydroxides of the oxides and hydroxides of the **metals** aluminum, antimony, bismuth, nickel, calcium, cobalt, chromium, copper, iron, lead, and zinc. [See ACIDA.]

Acidum Trichloraceticum.—1. Trichloracetic acid precipitates solutions of **albumin.** 2. It is decomposed when heated with **alkalies** and **carbonates,** forming carbon dioxide and chloroform.

Aconitina.—1. Aqueous solutions of salts of aconitine are precipitated by **alkali hydroxides,** the **carbonates** of the fixed alkalies, and by the **general alkaloidal reagents**, but not by ammonium carbonate or the bicarbonates. 2. Aconitine is decomposed by long standing or by heating with **acids, alkalies,** or **water,** forming benzoic acid, acetic acid, and aconine. 3. The colors produced by reagents are generally due to impurities rather than to aconitine. [See under ALKALOIDS.]

Acriflavina, *acriflavine base, neutral acriflavine.*—1. Acriflavine gives a neutral solution with water. 2. **Hydrochloric acid** added to a dilute solution destroys the fluorescence. 3. An aqueous solution of acriflavine gives a precipitate with **silver nitrate.** 4. **Sodium hydroxide** gives an orange precipitate with a dilute solution. 5. **Sulfuric acid** produces an orange-red precipitate in a solution of acriflavine. 6. **Mercury bichloride** precipitates a solution of acriflavine. 7. **Chlorine** produces a precipitate with acriflavine. 8. Solutions of acriflavine are decomposed in strong **light.**

Acriflavinæ Hydrochloridum.—1. Acriflavine hydrochloride has the same incompatibilities as acriflavine. 2. It also effervesces with bicarbonate solutions.

Adeps.—1. Lard oxidizes on exposure to **air** and **light**, becoming acid and rancid, and in this condition liberates iodine from potassium iodide. 2. Lard is decomposed by **alkali hydroxides** or **carbonates**, forming glycerin, and oleates, stearates, and palmitates of the alkalies. Commercial lard sometimes contains alkalies or alkaline carbonates in small amounts, and consequently has the incompatibilities of these. [See ACIDUM OLEICUM and ACIDUM STEARICUM.]

Æther.—1. In open containers, particularly in the presence of **moisture** and **light**, ether decomposes with the formation of acetic acid and organic peroxides. (℞ 125.)

Æther Aceticus.—1. Ethyl acetate in the presence of **moisture** decomposes into alcohol and acetic acid. 2. With **alkaline hydroxides** it yields alcohol and an acetate of the alkali.

Æthylhydrocupreinæ Hydrochloridum, *Optochin Hydrochloride.*—1. **Silver nitrate** produces a precipitate in an aqueous solution of æthylhydrocupreine hydrochloride. 2. A white precipitate is produced by **sodium hydroxide.**

Æthylis Aminobenzoas, *Benzocaine, Anesthesin.*—1. Prolonged heating with solutions of **alkali hydroxides** or **carbonates** decomposes ethyl aminobenzoate into alcohol and paraminobenzoic acid. 2. Dilute acids aid its solution in water. 3. An aqueous acid solution is precipitated by **iodine.** 4. It reduces a solution of **potassium permanganate.** 5. It produces a moist or liquid mass with many substances such as **camphor, menthol, resorcin,** etc. (℞ 126.)

Æthylis Bromidum.—1. Ethyl bromide is quickly decomposed by **light** and **air**, forming alcohol, hydrobromic acid, and some free bromine. The presence of 1 per cent of alcohol or 3 per cent of ether makes it more stable. 2. With **alkali hydroxides** it gives ether and potassium bromide (M. & M., 480). 3. Ethyl bromide with **ammonia** gives hydrobromide of ethylamine (Watts, II, 528).

Æthylis Carbamas, *Urethane.*—1. Urethane in the presence of **iodine** and an **alkali hydroxide** or **carbonate** produces iodoform. 2. Warming it with a solution of **potassium hydroxide** causes ammonia to be given off. With an alcoholic solution of potassium hydroxide it gives large crystals of potassium cyanate (M. & M., I, 679). 3. When rubbed with **benzoic acid, camphor,** and many other solids urethane gives a liquid or soft mass. [See page 281.]

Æthylis Iodidum.—1. Ethyl iodide or hydriodic ether on being exposed to **air** and **light** is decomposed with liberation of iodine. 2. Iodine is liberated by **chlorine, nitric acid,** and **sulfuric acid.** 3. **Silver nitrate** gives a precipitate of silver iodide (M. & M., II, 499).

Æthylmorphinæ Hydrochloridum, *Dionin.*—1. **Alkalies** and their **carbonates** precipitate the free ethylmorphine. 2. It is precipitated by most of the general **alkaloidal reagents.** 3. It is not as strong a reducing agent as morphine and does not give as many color reactions.

Albumin.—1. The coagulation of the different albumins varies. 2. Aqueous solutions of egg albumin are coagulated by **heat** and by many **mineral acids,** as **hydrochloric, nitric,** and **meta-phosphoric** (not by ortho- or pyro-phosphoric acid); 3. by salts of many heavy metals, as **mercuric chloride** (prevented to a considerable extent by the presence of ammonium or sodium chloride or hydrochloric acid), **alum, copper sulfate, silver nitrate, gold chloride,** and **ferric chloride**; 4. by some neutral salts, as **ammonium sulfate**; 5. by **solution of hydrogen peroxide**; 6. by some organic acids, as **tannic acid** and substances containing it (not by gallic acid), **lactic acid, picric acid, carbolic acid, creosote, acetic,** and **trichloracetic acids**; 7. by some organic compounds, as **alcohol** (the precipitate is redissolved by dilution with water if the albumin has not been in contact with the alcohol too long), **formaldehyde, ether, collodion, resorcin, camphor, thymol, volatile oils,** and **coniine** (not nicotine). (℞ 127.)

Albumini Tannas, *Albutannin, Tannalbin.*—1. Albumin tannate is practically insoluble in **water** or **alcohol.** 2. It is dissolved and decomposed by solutions of **alkali hydroxides** and **carbonates.** 3. The filtrate from a mixture of albumin tannate and water gives a blue color with a dilute solution of **ferric chloride.**

Alcohol.—1. Alcohol precipitates **albumin, acacia,** and many **inorganic salts** from their aqueous solutions; to precipitate the acacia the resulting mixture must contain about 30 or 40 per cent of alcohol before a permanent precipitate results. 2. **Mercuric chloride** is slowly reduced to calomel by alcohol (M. & M., I, 98). 3. **Nitric acid** with the nitrate of **mercury** or **silver**

and strong alcohol forms the explosive fulminate of mercury or silver. 4. Concentrated **mineral acids** convert alcohol into esters and ethers. 5. Alcohol combines with many **metallic salts**, acting like water of crystallization. 6. With **chloral hydrate** alcohol may form the poisonous chloral alcoholate. [See CHLORAL HYDRAS, No. 3.] 7. Alcohol sometimes contains traces of aldehyde or other impurities which are darkened by **alkali hydroxides.** 8. Many of the official alcoholic preparations give precipitates when mixed with **water**, the precipitate sometimes being the active principle and sometimes inert matter. 9. **Water** generally causes a precipitation, when mixed with alcoholic solutions of the following substances: free alkaloids, alkaloids combined with any of the general alkaloidal reagents, glucosides, neutral and bitter principles, salicylic, gallic, or benzoic acid, volatile oils, resins, camphors, oleoresins, or balsams. 10. Inorganic substances that are insoluble in water are also generally insoluble in alcohol.

11. Strong **nitric acid** acts violently on alcohol, forming nitric oxide, nitrous ether, carbon dioxide, aldehyde, acetic and formic acids (M. & M., I, 97). 12. **Chromic acid** or a **chromate** in an acid solution oxidizes alcohol to aldehyde and acetic acid. 13. **Potassium permanganate** in acid solution oxidizes it to aldehyde and acetic acid. 14. **Chlorine** is rapidly absorbed by alcohol and in sunlight may ignite the alcohol. The ultimate product is chloral alcoholate, there being a number of intermediate products, such as hydrochloric acid, aldehyde, ethyl chloride, acetic acid, chloral, etc. (M. & M., I, 97).

15. Among the many substances which alcohol generally dissolves may be mentioned acetates (except mercurous and silver), benzoates, bromides, chlorides (except potassium, sodium, ammonium, lead, silver, and mercurous), iodides (except lead, silver, and mercurous), nitrates (except potassium, lead, and bismuth), salicylates (except mercury and bismuth), deliquescent salts (except potassium carbonate), alkali hydroxides, alkali hypophosphites, phosphorus, sulfur, iodine, organic and inorganic acids, hydrocarbons and carbon derivatives, volatile oils, phenols, camphors, resins [see under RESINÆ], oleoresins, balsams, alkaloids and their salts, glucosides, and neutral principles. (℞ 128–129.)

Alkalies.—The following preparations contain an alkali hydroxide or carbonate: ammonia water, stronger ammonia water, fluidextract of senega, ammonia liniment, lime liniment, lime water, compound cresol solution, solution of lead subacetate, solution of potassium hydroxide, solution of sodium hydroxide, solution of potassium arsenite, bismuth magma, magnesia magma, aromatic spirit of ammonia, ammoniated tincture of guaiac, ammoniated tincture of valerian, syrup of rhubarb, aromatic syrup of rhubarb, and syrup of senega. [See AQUA AMMONIÆ AND LIQUOR POTASSII HYDROXIDI.]

Alkaloids.—1. Alkaloids combine with **mineral acids** and **acetic** and **citric acids** to form salts which are generally soluble in water or alcohol, but insoluble in ether, chloroform, benzol, petroleum ether, carbon bisulfide, or oils. In combination with most other **organic acids** the alkaloids form salts that are not generally soluble in water. 2. Alkaloids combined with acids and dissolved in water or very dilute alcohol are generally precipitated as free alkaloids by solutions of **alkali hydroxides** or **carbonates** and by **borax.** The last hydrolyzes in water with the formation of some sodium hydroxide, and it is probably this sodium hydroxide which causes the precipitation of the alkaloids. The addition of a small quantity of glycerin to the borax solution will usually prevent precipitation when mixed with the solution of the alkaloid. Solutions of **lead subacetate, potassium arsenite, sodium phosphate,** and **sodium arsenate** are slightly alkaline and may precipitate the free alkaloid. Practically all agents whose reaction to litmus is alkaline, whatever be their chemical function, precipitate the alkaloids from their salts. Glass containers frequently cause precipitation of alkaloids from solutions of their salts because of the solubility of the alkali in the glass. **Ammonium carbonate** and the **bicarbonates** of **potassium** and **sodium** frequently do not cause precipitation. 3. The alkaloidal salts are generally precipitated from aqueous solution, combined with the precipitant, by soluble **salicylates, benzoates, iodides, bromides,** and by the following general alkaloidal reagents: **tannic acid, picric acid, iodine** in solution of potassium iodide, **bromine** in solution of potassium bromide, **potassium mercuric iodide** (Mayer's reagent), **potassium bismuthic iodide, mercuric chloride, platinic chloride, gold chloride,** and **phosphomolybdic acid.** Infusions and tinctures of tanninbearing drugs must be observed therefore for possible precipitation of alkaloids. The presence of 20 to 50 per cent of alcohol will nearly always prevent the precipitation. 4. A solution of a mixture of **boric** and **salicylic acids** gives a precipitate with solutions of many alkaloidal salts as borosalicylates. [See Acidum Boricum, No. 20.] 5. In the presence of acacia some alkaloids are not precipitated from dilute aqueous solutions of their salts by tannic acid, potassium mercuric iodide, or sodium phosphomolybdate. **Starch** dissolved by boiling in water has a similar effect with the potassium mercuric iodide. 6. Some alkaloidal salts are thrown out of solution by the presence of considerable quantities of very **soluble salts**, e.g., strychnine hydriodide by potassium iodide. A concentrated solution of potassium citrate precipitates many alkaloidal salts. 7. Some alkaloids are strong reducing agents, most alkaloids are decomposed by **oxidizing agents.** 8. Some alkaloids are precipitated as glycyrrhizates when solutions are mixed with fluidextract of glycyrrhiza. 9. The free alkaloids are generally only sparingly soluble in water, except atropine, caffeine, codeine, nicotine, and coniine, but are generally soluble in alcohol, ether, or chloroform. A few are soluble in excess of solutions of fixed alkali hydroxides, e.g., morphine; a few are soluble in excess of ammonia water, e.g., quinine. 10. A strong solution of **chloral hydrate** dissolves morphine, quinine, and many other alkaloids. The solubility of the salts of the alkaloids is also increased. Dilution with water may cause a precipitation of the alkaloid. (℞ 130–135.)

Aloinum.—1. Concentrated solutions of aloin are slowly precipitated by a solution of **lead subacetate** (not the neutral lead acetate), more quickly if the mixture is heated. The liquid is turned brown. 2. An aqueous solution of aloin with **ferric chloride** gives a green-black to a brown-black color. 3. With solutions of **alkali hydroxides** aloin gives an orange to a red color, is readily decomposed, and rendered inert. 4. Concentrated **nitric acid** gives a red color with barbaloin (not with nataloin or socaloin), and by further action chrysammic, picric, and oxalic acids are formed. 5. **Spirit of ethyl nitrite** gives a red solution with aloin, even in the presence of a large amount of water. 6. A red color is produced more or less quickly when one-tenth of a grain of any of the following **alkaloids** in a dram of alcohol is added to a sixth of a grain of aloin in water: strychnine, quinine, morphine, cocaine, codeine, heroine, or hydrastine. Sometimes a violet tinge is produced which is slowly dissipated. The salts of these alkaloids except quinine give little or no color. The coloration may be caused by the alkalinity of these alkaloids. 7. **Silver nitrate** is reduced with solutions of aloin. (℞ 136–139.)

Alumen.—1. Alum in solution is precipitated as aluminum hydroxide by the **alkali hydroxides** and their **carbonates, borax,** and **lime water,** soluble in excess of potassium or sodium hydroxide. Citrates, tartrates, glycerin, sugar, and acacia tend to prevent precipitation. 2. The **alkali phosphates** give the insoluble aluminum phosphate. Citrates and tartrates tend to prevent precipitation. 3. With **tartaric acid** it gives a precipitate of potassium bitartrate. 4. **Tannic acid** or a preparation of it causes a slight precipitation. 5. Alum is slightly acid to litmus. 6. Adding a **soluble carbonate** to a solution of alum produces an effervescence, due to the liberation of carbon dioxide, aluminum hydroxide being precipitated. 7. Alum has the incompatibilities of the soluble sulfates. 8. The hydroxide, arsenate, borate, oxalate, and phosphate are insoluble in water. [See ACIDUM SULFURICUM.] (℞ 140–143.)

Alumini Hydroxidum.—Aluminum hydroxide, especially when freshly precipitated, removes **suspended solid matter, alkaloids,** and **coloring matter** in solution, from liquids.

Alumini Naphtholsulfonas, *Alumnol.*—1. Alumnol gives an acid solution in alcohol or water, and the dilute solution has a blue fluorescence. The fluorescence is destroyed by resorcin. 2. The aqueous solution gives a precipitate of aluminum hydroxide when an **alkali hydroxide** is added. The precipitate redissolves in an excess of a fixed alkali. 3. The **alkali carbonates** give a white precipitate. 4. With a solution of **ferric chloride** alumnol gives a deep blue color. 5. **Silver nitrate** is not precipitated at once but is slowly decomposed and precipitated as metallic silver. 6. **Nitric acid** gives a yellow to a red color. 7. It is precipitated by a solution of **albumin** or **gelatin,** the precipitate being soluble in excess of these substances. 8. Rubbed with **phenol** it gives a mass. 9. It should not be given with **reducible substances.** (℞ 144.)

Alypin.—1. An **alkali hydroxide** or **carbonate** gives a precipitate with an aqueous solution of alypin. 2. It is precipitated by many **alkaloidal reagents.** 3. Mixed with **calomel** and dampened with alcohol it gives a black color. 4. An aqueous solution with **potassium permanganate** gives a violet crystalline precipitate which turns brown on standing.

Aminopyrina, *Pyramidon.*—1. Aminopyrine has many of the incompatibilities of antipyrine. 2. A blue-violet color is produced by many **oxidizing agents** as ferric chloride, silver nitrate, nitric acid, spirit of ethyl nitrite, lead dioxide, iodine solution, and some enzymes. 3. When rubbed with **thymol, resorcin,** or some other chemicals it makes a mass or liquid. 4. Its aqueous solution is slightly alkaline to litmus.

Ammonii Carbonas.—1. Ammonium carbonate with **calomel** gives a black mixture of mercuric ammonium chloride, having the formula NH_2HgCl; with some metallic mercury (P. & J., 164). 2. With a solution of **mercuric chloride** it gives a white precipitate of ammoniated mercury, NH_2HgCl. 3. It gives no precipitate with **magnesium salts,** except in concentrated solutions. 4. The precipitate with **copper** or **silver** salts is dissolved by an excess of the carbonate. 5. Ammonium carbonate does not precipitate as many of the **alkaloids** from solutions of their salts as do the carbonates of potassium and sodium. Some of the alkaloids not precipitated are atropine, hyoscyamine (except in strong solution), nicotine, coniine, codeine, and caffeine. 6. Ammonium carbonate with **resorcin** in solution gives a red-brown solution at first which changes to deep blue in a day or two. 7. Excepting the reactions noted above, ammonium carbonate generally acts similarly to potassium or sodium carbonate. [See CARBONATES and AMMONIUM.] (℞ 145–147.)

Ammonii Chloridum.—1. An aqueous solution is decomposed by **chlorine,** forming hydrochloric acid and the explosive nitrogen chloride (M. & M., I, 202). 2. Ammonium chloride aids the solution of several salts that are more or less insoluble ordinarily, and sometimes renders other salts less soluble. [See ACIDUM HYDROCHLORICUM and AMMONIUM.]

Ammonii Iodidum.—1. Ammonium iodide very frequently contains free iodine, and it would then have the incompatibilities of iodine. [See IODUM, ACIDUM HYDRIODICUM, and AMMONIUM.]

Ammonii Valeras.—1. Ammonium valerate in concentrated aqueous solution with **mineral acids** gives an oily layer of valeric acid. [See AMMONIUM.]

Ammonium.—1. Ammonium compounds, with solutions of the **fixed alkali hydroxides** or **carbonates**, or with the **hydroxides** of **calcium**, or **strontium**, give free ammonia. 2. Some ammonium salts with **chlorine gas** give explosive nitrogen chloride. 3. Certain ammonium salts, such as the acetate, citrate, and chloride, in aqueous solution may act as solvents for otherwise insoluble compounds. 4. Some ammonium salts are easily decomposed in the air as the iodide and carbonate. 5. The bitartrate is sparingly soluble, but the other common salts are readily soluble. [See AQUA AMMONIÆ.]

Amylis Nitris.—1. Amyl nitrite is decomposed slowly by **light** and **air,** becoming acid. 2. With **potassium hydroxide** it forms potassium nitrite and amyl alcohol. 3. Its incompatibilities are about the same as those of ethyl nitrite. [See ACIDUM NITROSUM.]

Amylum.—1. Starch in aqueous solution is precipitated by **strong alcohol, tannic acid,** or **lead subacetate.** 2. **Iodine** with starch forms the blue-black iodide of starch. 3. With solutions containing over 5 per cent of an **alkali hydroxide** starch forms a soluble compound. 4. Heating with dilute **acids,** starch is changed to dextrin and then dextrose. Diastase changes it chiefly to maltose. 5. In solution starch to some extent prevents the precipitation of **alkaloids** by potassium mercuric iodide and tannic acid. (℞ 148.)

Antimonii et Potassii Tartras.—1. Tartar emetic in aqueous solution is precipitated by **hydrochloric, nitric,** or **sulfuric acid,** forming a basic chloride, nitrate, or sulfate of antimony, together with some potassium bitartrate. Tartaric acid prevents this precipitation to some extent. 2. The **alkali hydroxides** or their **carbonates,** with solutions not too dilute, give a white precipitate of antimony oxide. Citrates, tartrates, glycerin, sugar, and acacia prevent precipitation. 3. **Lime water** throws down a precipitate consisting of the mixed tartrates of calcium and antimony. 4. The salts of most **metals** being precipitated by normal tartrates are incompatible with tartar emetic. 5.

Excepting the acetate and tartrate, the salts of antimony are insoluble in water, but are soluble in strongly acid solutions.

6. Strong **alcohol** throws tartar emetic out of aqueous solution. 7. **Tannic acid** gives a precipitate of tannate of antimony. 8. **Gallic acid** precipitates concentrated solutions of tartar emetic. 9. In aqueous solution **mercuric chloride** is reduced to calomel which is precipitated. 10. Solutions of **lead acetate, silver nitrate, albumin,** and **soap** give precipitates with tartar emetic. (℞ 149.)

Antimonii Sulfidum.—1. Triturated with a strong **oxidizing agent,** as **potassium chlorate,** sulfide of antimony may cause an explosion. 2. By exposure to **air** it is partially converted into an oxide.

Antipyrina, *Analgesin, Phenazone.*—1. Antipyrine is neutral to litmus, but forms salts with **acids** by direct addition. 2. An aqueous solution with a strong solution of an **alkali hydroxide** gives a white precipitate. 3. With a solution or tincture of **ferric chloride** antipyrine gives a red color. This color is destroyed or prevented by an excess of mineral acids. With tincture of iron citrochloride the red color is not formed, but on adding a dilute mineral acid to this, it is produced at once. 4. With commercial **ferrous sulfate** it gives a red color, due to the ferric salt which is present. With a strictly ferrous salt the solution is colorless. 5. A mixture of 2 drams of antipyrine with 1 ounce of simple syrup and 1 ounce of **syrup of ferrous iodide** (free from iodine) soon gives a red liquid and after a time a red crystalline precipitate. 6. In the presence of moisture **calomel** is slowly turned dark by antipyrine, but if sodium bicarbonate is mixed with it the color is changed at once. Experiments made in the laboratory of the American Medical Association show that about one-fourth of the calomel is converted into a soluble mercuric salt. 7. An aqueous solution of antipyrine is precipitated by a solution of **mercuric chloride** if acid or by **Donovan's solution.** 8. A solution of **iodine** gives with a solution of antipyrine a red-brown precipitate which dissolves in an excess of antipyrine, forming a colorless solution. There is probably formed the colorless iodoantipyrine (iodopyrine) or the di-iodoantipyrine. If more iodine is added a permanent precipitate is formed which is soluble in alcohol.

9. An aqueous solution of antipyrine gives a precipitate with **tannic acid** or preparations containing it in considerable proportions, by **picric acid** and by most of the **general alkaloidal reagents.** [See under ALKALOIDS.] 10. **Spirit of ethyl nitrite** with antipyrine gives a green solution, and on standing green crystals are formed if the solution is concentrated. The reaction does not take place as quickly when the spirit is neutral as when it is acid, and by having a little sodium bicarbonate present the reaction may be prevented for several days or weeks. The green compound is iso-nitroso-antipyrine which has been proved to be comparatively harmless. According to investigators the amount of cyanogen evolved is so small that no danger need be apprehended. Other nitrites act similarly. 11. When antipyrine and **sodium salicylate** are rubbed together a mass or liquid is formed after a time, the length of time seeming to depend on the amount of moisture in the atmosphere. It has been suggested that the simple mixture is hygroscopic, but more probably a chemical reaction takes place. Rubbing with **salicylic acid** does not give a mass or liquid. 12. Antipyrine increases the solubility of **quinine sulfate** in water, and at the same time destroys the fluorescence and prevents the green coloration which quinine gives with bromine water followed by ammonia water. 13. The solubility of **caffeine** is said to be increased by antipyrine.

14. Antipyrine gives a green color with a solution of **copper sulfate.** 15. With a strong solution of antipyrine **lead subacetate** forms a precipitate. 16. **Alum** and **tartar emetic** are both said to be incompatible with antipyrine, but rubbing these with antipyrine or mixing aqueous solutions produces no apparent change. 17. A dilute solution of antipyrine with **nitric acid** gives a yellow color, passing into crimson on warming. 18. Antipyrine slowly reduces **potassium permanganate**, precipitating manganese dioxide. 19. Antipyrine in strong aqueous solution is precipitated by a solution of a mixture of boric and salicylic acids, the precipitate dissolving at first. 20. Antipyrine gives a liquid or soft mass when triturated with **piperazine** and some other solids. [See page 281.] 21. Crystallized **phenol** when triturated with antipyrine gives an odorless liquid called phenopyrin. On mixing aqueous solutions of these two substances a turbidity results, and an oily liquid settles to the bottom in a few hours. 22. Triturating **chloral hydrate** and antipyrine together in proper proportions forms the liquid monochloralantipyrine, from which hypnal is made. Moderately

dilute aqueous solutions of antipyrine and chloral hydrate can be mixed without separation. (℞ 150–159.)

Apomorphinæ Hydrochloridum.—1. An aqueous solution of apomorphine hydrochloride rapidly becomes green in color if the *p*H is allowed to go above 7. This can be prevented by the addition of a few drops of hydrochloric or acetic acid. If possible, its solution should be dispensed in bottles of hard glass. It is slowly decomposed in boiling water. A green solution should not be used. 2. An aqueous solution is precipitated by the **alkali hydroxides** and **carbonates** and by **lime water** as the free alkaloid, white at first, but quickly turning green or black. 3. It is precipitated by **tannic acid**, **picric acid**, and nearly all the **alkaloidal reagents**. [See ALKALOIDS.]

4. Apomorphine dissolved in **ammonia water** develops a purple color. 5. With a concentrated solution of **ferric chloride** it gives a red precipitate, turning black. 6. Concentrated **nitric acid** added to the crystals gives a red solution. 7. Apomorphine hydrochloride in aqueous solution reduces **iodates**, **permanganates**, and **silver nitrate**. (℞ 160.)

Apothesine.—1. Apothesine makes a neutral stable solution in water. 2. **Alkali hydroxides** and **carbonates** liberate the free base. 3. The precipitate with **sodium bicarbonate** dissolves in excess of the reagent. 4. Apothesine gives a white precipitate with **silver nitrate**, soluble in nitric acid. 5. It is precipitated from its aqueous solution by many **alkaloidal reagents**.

Aqua.—Water precipitates from their alcoholic solutions **oils**, many free **alkaloids** or alkaloids combined with general alkaloidal reagents, some **glucosides**, some **neutral** and **bitter principles**, **resinous** or **fatty matter**, inert **extractive matter**, and nearly all compounds which are insoluble in water.

Aqua Ammoniæ.—1. Ammonia combines with **acids** to form salts. 2. It precipitates solutions of salts of **lead**, **silver**, **mercury**, **bismuth**, **tin**, **antimony**, **copper**, **cadmium**, **iron**, **aluminum**, **chromium**, **cobalt**, **nickel**, **manganese**, and **zinc**. The precipitate is a hydroxide, except in case of silver and antimony, when it is an oxide; in case of lead, it is a basic salt; double compounds are formed in case of mercury. The precipitation many times is prevented or hindered by sugar, glycerin, acacia, citrates, tartrates, and other organic matter. 3. A solution of

corrosive sublimate is precipitated by ammonia, giving ammoniated mercury (NH_2HgCl). 4. **Calomel** is converted into a black mixture of metallic mercury and mercuric ammonium chloride (NH_2HgCl) (P. & J., 164). 5. With **chlorine** ammonia forms ammonium chloride and nitrogen. If a larger proportion of chlorine gas is used, the ammonium chloride may be decomposed, forming hydrochloric acid and nitrogen. If a still larger proportion of chlorine gas is used, the ammonium chloride may be decomposed into hydrochloric acid and explosive nitrogen chloride. 6. With **iodine** ammonium hydroxide may form under certain circumstances ammonium iodide, ammonium iodate, and water; under different circumstances, ammonium iodide and the explosive iodide of nitrogen are formed. [See IODUM, No. 2.] 7. It precipitates nearly all **alkaloids** from aqueous solutions of their salts. The precipitate is the free alkaloid, and is sometimes soluble in a large excess of ammonia. 8. Spirit of ammonia has the same incompatibilities as ammonia water, except as they are modified by the alcohol. With solutions of alkaloidal salts the ammonia liberates the alkaloids, but the alcohol has a tendency to keep them in solution. 9. Aromatic spirit of ammonia is similar to the spirit, except water causes separation of the oils.

10. **Permanganates** oxidize ammonium hydroxide to a nitrate. 11. With **phenol** ammonia gives at first a colorless solution, which slowly becomes green, then deep blue, and finally purplish-blue. 12. With **phenol** and **sodium hypochlorite** ammonia produces a deep blue color. 13. With a concentrated solution of **tartaric acid** ammonia gives a precipitate of ammonium bitartrate. 14. In concentrated solutions of **picric acid** ammonia gives a precipitate. 15. **Gallic acid** gives a yellow to a red-brown color with ammonia water. 16. **Chloral hydrate** is decomposed, giving chloroform and a formate of ammonium or chloral-ammonia. 17. Ammonia added to an alcoholic solution of **thymol** slowly gives a green color. (℞ 161–163.)

Aquæ.—The medicating or flavoring principle in some waters is thrown out of solution by dissolving certain very soluble inorganic salts in the water; e.g., camphor water gives a precipitate of camphor when a large amount of potassium bromide is dissolved in it. To prevent this, part of the flavoring water may be replaced by distilled water. (℞ 164.)

Argenti Nitras.—1. Silver nitrate is easily changed to the oxide or metallic silver by **light** and **organic matter.** 2. Silver nitrate in aqueous solution is precipitated as the gray-brown silver oxide by the **hydroxides** of **potassium, sodium,** and **ammonium**, the precipitate being soluble in ammonia water. 3. The **alkali carbonates** precipitate the yellow-white silver carbonate. 4. **Hydrochloric acid** and the soluble **chlorides** precipitate the white silver chloride. 5. The soluble **bromides, iodides, phosphates,** and **cyanides** precipitate the silver bromide, iodide, phosphate, and cyanide, the iodide and cyanide being soluble in excess of the precipitant. 6. **Borax** precipitates silver borate, sometimes mixed with a little oxide. 7. **Tannic acid** precipitates the silver tannate. 8. Silver nitrate in solution is reduced to the metallic condition by **glucose, volatile oils, aromatic waters, tartrates, creosote, formaldehyde,** and many other **organic substances**, but not generally by alkaloids. 9. Most salts of silver, except the nitrate and chlorate, are insoluble or sparingly soluble in water.

10. Soluble **arsenites** precipitate the yellow silver arsenite. 11. Soluble **arsenates** precipitate the red-brown silver arsenate. 12. **Sodium phosphate** precipitates the yellow silver phosphate. 13. **Chromates** precipitate the red-brown silver chromate. 14. **Potassium permanganate** with not too dilute solutions of silver nitrate gives a precipitate of silver permanganate. 15. It is reduced to metallic silver by metallic **zinc, copper, tin, mercury,** and **lead**; by **hypophosphites** and **sulfites**; in alkaline mixtures, by **arsenites, manganous salts, antimonous salts**; and by **ferrous sulfate.** 16. Soluble **citrates** give precipitates of silver citrate. 17. Soluble **salicylates** give precipitates of silver salicylate. 18. **Morphine salts** are precipitated by silver nitrate with a red coloration. 19. Free **cocaine** gives a black precipitate, probably of silver oxide. 20. An **alcoholic** solution of silver nitrate gradually deposits metallic silver. 21. Silver nitrate heated with **nitric acid** and **alcohol** produces the violently explosive fulminate of silver. (℞ 165–173.)

Argenti Oxidum.—1. Silver oxide readily parts with its oxygen, forming explosive mixtures with many substances. Triturated dry with **sulfur, sulfide of antimony, sulfide of arsenic, phosphorus, tannic acid, creosote,** and some other **organic substances,** it is likely to explode or cause ignition.

2. Moist silver oxide decomposes many metallic salts in solution, precipitating the metallic hydroxides, e.g., salts of **bismuth**, **copper**, **iron**, and **mercury**. 3. **Iodine** in water forms silver iodide and iodic acid. 4. **Chlorine** forms silver chloride and chlorate. 5. A strong solution of silver oxide in concentrated **ammonia** forms the explosive silver nitride (Ag_3N) on standing or by adding alcohol (M. & M., IV, 470). (℞ 174.)

Argentum Proteinicum Forte, *Strong Protein Silver, Protargol.*—1. Strong protein silver is generally slightly alkaline. It darkens on exposure and should be protected from **light**. 2. A dilute solution of **sodium chloride** gives no precipitate with a dilute solution of strong protein silver. 3. Quite dilute solutions of hydrochloric acid, sulfuric acid, lead acetate, zinc sulfate, silver nitrate, or albumin give no immediate precipitate with dilute solutions of strong protein silver. Precipitation may occur later, particularly with stronger solution. 4. **Mercuric chloride** gives a precipitate and decolorizes the solution.

5. An aqueous solution gives no precipitate with ammonia, but with considerable **potassium** or **sodium hydroxide** it gives a little precipitate. 6. **Ferric chloride** solution decolorizes the solution and gradually gives a precipitate. 7. Strong protein silver reduces **potassium permanganate.** 8. It gives precipitates with solutions of many **alkaloidal** salts. A saturated solution of boric acid has been suggested to prevent precipitation. (℞ 175–176.)

Argentum Proteinicum Mite, *Mild Protein Silver, Argyn, Argyrol, Cargentos, Silvol, Solargentum.*—1. The incompatibilities are practically the same as those of the strong protein silver, the mild perhaps being a little more readily precipitated by acids. 2. **Tannic acid** precipitates it. 3. A solution stains the skin. 4. Mixing an aqueous solution of **iodine** in potassium iodide with a solution of mild protein silver in proper proportions destroys the red color of each and gives a precipitate of silver iodide. 5. An aqueous solution of mild protein silver becomes acid and irritating in a few weeks, losing its efficiency, and therefore it should not be used. (℞ 177–179.)

Argentum Colloidale, *Collargol.*—1. Collargol is said to be colloidal silver with a small percentage of albumin and is not precipitated by boiling unless prolonged, as colloidal silver is. It is not precipitated by alkalies. 2. A saturated solution of **sodium chloride** causes precipitation, and the precipitate redissolves in water. 3. A solution or suspension of colloidal silver should not be exposed to **light** or **air**. 4. Dilute solutions are precipitated by dilute **acids**. 5. It is incompatible with the usual silver reagents, but the presence of albumin retards the precipitations.

Argonin, *Silver Casein.*—1. Argonin is slightly alkaline to litmus. The solution is opalescent, but clears on addition of sodium chloride. Argonin is soluble in solutions of alkalies and of albumin. 2. The aqueous solution gives a flocculent precipitate with **acids**; in case of acetic acid the precipitate dissolves in excess of acid. 3. It gives precipitates with solutions of **lead acetate, alum, silver nitrate, mercuric chloride, ferric chloride, copper sulfate, zinc sulfate, phenol,** and **tannic acid.** 4. The usual reagents for silver do not affect dilute solutions.

Arseni Iodidum.—1. Iodide of arsenic in aqueous solution decomposes into arsenous and hydriodic acids. Iodine is also liberated. 2. Iodide of arsenic precipitates many **alkaloids** from solutions of their salts. 3. Its incompatibilities are similar to those of the soluble iodides and of arsenous acid. [See ACIDUM HYDRIODICUM and ARSENI TRIOXIDUM.]

Arseni Pentoxidum.—1. The normal alkali arsenates, as sodium arsenate, precipitate neutral solutions of salts of nearly all other common **metals**, as arsenates. Sodium arsenate is generally alkaline, and may cause precipitation on this account. The precipitate is soluble in mineral acids and sometimes in the presence of ammonium salts. 2. In acid solutions arsenates are reduced to arsenites by **hypophosphites, sulfites,** and **iodides,** forming respectively phosphoric acid, sulfuric acid, and iodine. 3. Sodium arsenate precipitates solutions of many **alkaloidal salts,** due perhaps to the fact that the arsenate is alkaline and in some cases to the formation of an insoluble alkaloidal arsenate. 4. The arsenates of the alkali metals are soluble in water. The di- and tri-metallic salts of the other metals are insoluble in water, but soluble in the presence of most mineral acids. The arsenates are generally insoluble in alcohol. 5. **Tannic acid** with a not too dilute solution of sodium arsenate gives a yellow-brown precipitate, the precipitate and the liquid changing to a dark green within a day or two.

Arseni Trioxidum.—1. Arsenous acid combines with alkali **hydroxides** and **carbonates** to form arsenites. 2. The soluble arsenites (generally not the free acid) precipitate neutral solutions of nearly all **metallic salts,** except those of the alkalies

3. **Ferric hydroxide** or a solution of **dialyzed iron** gives an insoluble basic arsenite with a solution of an arsenite or arsenous acid. To some extent this is changed to a basic ferrous arsenate (P. & J., 200). 4. With a solution of **mercuric chloride** Fowler's solution, if excessively alkaline as in the case of the U. S. P., X, formula, gives a white precipitate, consisting of a mercurous salt, but not if Fowler's solution is first acidified. If the Fowler's solution is in large excess there will be formed a white precipitate at first and in a few hours a dark gray precipitate of metallic mercury. 5. Fowler's solution of the U. S. P., X, and previous thereto, was quite alkaline, containing an excess of potassium carbonate and was quite apt to precipitate solutions of **alkaloidal salts** and other **neutral salts.** The U. S. P., XI, Fowler's solution is barely alkaline, so that many of its former incompatibilities are now eliminated. The compound tincture of lavender has also been omitted, and this will likewise prevent precipitation of the coloring matter which occurred so frequently before. 6. Arsenous compounds are oxidized to arsenic compounds by **nitric acid, chlorine, chlorates** in acid solution, **iodine** in alkaline solution, **silver salts** in alkaline mixtures, **mercuric** or **mercurous compounds** in alkaline mixtures, **ferric compounds** in alkaline mixtures, or **permanganates.** 7. Fowler's solution on keeping is slowly oxidized to potassium arsenate which is said to be less active physiologically. 8. The solubility of arsenic trioxide is greatly increased by the presence of acids. 9. Arsenites of the alkalies are soluble in water; barium and strontium are sparingly soluble; the other metallic arsenites are insoluble. They are generally dissolved and decomposed by dilute **mineral acids.**

10. Arsenous acid is said to combine with **potassium acid tartrate** to form a double salt, analogous to tartar emetic (Watts, v, 686). 11. A solution of **potassium iodide** with arsenous acid or potassium arsenite in strong solution yields a precipitate of $(KI)_2(As_2O_3)_3$ which is sparingly soluble in water (Watts, I, 377). One dram of potassium iodide dissolved in 1 dram of Fowler's solution gives only a slight precipitate. 12. Fowler's solution gives a brown-white precipitate with **lime water.** 13. With **tannic acid,** it gives a nearly white precipitate which with the liquid turns to a dark, dirty green in less than a day. 14. Arsenous compounds are reduced to metallic arsenic by **hypophosphites** in acid mixtures. (℞ 180–184.)

Arsphenamina, *Salvarsan,* *"606."*—1. A solution of arsphenamine is acid to litmus. 2. It is quickly decomposed in **air** and should not be used after exposure to air for any length of time. The solution, likewise, should be used immediately. 3. A solution of **sodium hydroxide** added to a dilute solution of arsphenamine produces a precipitate which dissolves on further addition of the reagent. 4. **Sodium carbonate** or **bicarbonate** gives a precipitate which does not dissolve in excess of reagent.

5. Diluted **sulfuric acid** or solutions of **alkali sulfates** cause precipitation at once. 6. A solution of **ferric chloride** gives a brown to red coloration; with neo-arsphenamine it gives a violet. 7. A solution is precipitated by **potassium mercuric iodide.** 8. **Mercuric chloride** gives a heavy white precipitate; with neo-arsphenamine it gives an orange precipitate. 9. **Silver nitrate** in small amounts added to a dilute solution of arsphenamine gives a red color but no precipitate. More silver nitrate gives a precipitate.

Atropina.—1. Atropine is precipitated from concentrated aqueous solutions of its salts as the free alkaloid by **alkali hydroxides** and the **carbonates** of the **fixed alkalies** (not ammonium carbonate or the bicarbonates). 2. It is precipitated by the **general alkaloidal reagents**, except platinic chloride. [See ALKALOIDS.] 3. By continued heating with **alkali hydroxides, acids,** or **water** atropine is decomposed, forming tropine and tropic acid. (℞ 185–186.)

Auri et Sodii Chloridum.—1. An aqueous solution of gold and sodium chloride is slightly acid to litmus. 2. **Alkalies** decompose solutions of gold and sodium chloride. 3. Gold and sodium chloride precipitates many of the **alkaloids** from solutions of their salts as double compounds. The addition of sodium thiosulfate to the chloride before mixing with the alkaloidal solution tends to prevent precipitation. If one-fourth of a grain of sodium thiosulfate be dissolved in 1 dram of water and added to one-eighth of a grain of gold and sodium chloride dissolved in 1 dram of water, and this added to one-eighth of a grain of strychnine sulphate in 2 drams of water, no precipitation will take place at once or for several days. Using one-half as much water as above stated, a precipitate may be slowly formed. If one-fourth the amount of water is used precipitation will usually take place within a day. 4. **Potassium iodide** added to a solution of gold chloride (the latter being in excess) precipitates the yellow aurous iodide and liberates iodine. But if the solution of gold chloride is added to the potassium iodide solution (the latter being in excess), there is first formed a dark green solution of potassium auric iodide, then a precipitate of auric iodide which is unstable, decomposing in pure water forming aurous iodide (P. & J., 234). 5. **Alcohol** dissolves the gold chloride and leaves the sodium chloride undissolved.

6. Gold chloride combines with and precipitates **albumin.** 7. Gold chloride in solution is reduced to metallic gold by metallic **silver, mercury, copper,** and **iron**; 8. by **mercurous salts, arsenites, ferrous sulfate,** and many **organic substances**; 9. by **hypophosphorous, sulfurous, nitrous, oxalic,** and **tannic acids**: 10. by **light** and **heat.** 11. **Silver nitrate** produces a precipitate with solutions of gold and sodium chloride. (℞ 187–189.)

Balsamum Peru.—1. Peruvian balsam consists essentially of an oily and a resinous portion. The oily part mixes fairly well with olein but the resinous part does not. When Peruvian balsam is shaken with **olive** or **cottonseed oil**, the resinous part separates in a granular form and upon standing it coagulates to a nearly solid mass. 2. It also separates with **liquid petrolatum.** 3. With **castor oil** it makes a muddy-appearing mixture, but the resinous matter does not coagulate into solid particles or a mass. 4. With **benzoinated lard**, the resins separate. 5. With **petrolatum** in excess it does not separate, but it is likely to separate with small quantities of petrolatum. 6. Many typical ointment ingredients hasten the separation of the resinous portion. Among the more common ones are **sulfur, betanaphthol, salicylic acid, boric acid** and **resorcin.** The relative proportion of these added ingredients makes a difference in the final result. 7. Both **solid petroxolin** and **castor oil** have been found advantageous in overcoming the granulation of Peruvian balsam. The former is of ointment consistency and is to be preferred to castor oil which tends to soften the ointment to too great a degree. At times 25 per cent of the petroxolin will suffice and again in extreme cases it may be necessary to use both solid petroxolin and castor oil, replacing all of the original base. In many of these prescriptions, separation will take place on the ointment slab during the preparation of the prescription, but oftentimes the separation does not occur until the ointment is applied to the skin. 8. Alcohol may sometimes serve to cut the resin, but it is not satisfactory for ointments as it makes the ointment too soft, and in cases where an item like salicylic acid is present, the acid crystallizes out when the alcohol evaporates. (℞ 190–193.)

Barbitalum, *Diethylbarbituric Acid, Veronal.*—1. Barbital is quite soluble in alcohol but only soluble in about 130 parts of **water.** 2. With **alkalies** barbital forms salts which are soluble in water but are decomposed upon standing. 3. Heating with alkali hydroxides or carbonates decomposes it, liberating ammonia. 4. It darkens **calomel** slowly when moist, but immediately if sodium bicarbonate is present.

Barbitalum Solubile, *Barbital Sodium, Veronal Sodium.*—1. Sodium barbital in **aqueous solution** decomposes, precipitating diethylacetylurea which is valueless as a hypnotic. This reaction is hastened by the addition of **alkalies.** 2. **Acids** precipitate the insoluble barbital. 3. It frequently precipitates **alkaloids** from solutions of their salts.

Barium.—Barium salts in aqueous solution are precipitated by **sulfuric acid** and soluble **sulfates,** by aqueous solutions of **phosphates, tartrates, oxalates, carbonates, chromates,** or **tannates,** the precipitate being barium sulfate, phosphate, tartrate, oxalate, carbonate, chromate, or tannate.

Benzylis Benzoas.—1. Benzyl benzoate is precipitated from an alcoholic solution by **water.** For aqueous mixtures, it may be emulsified, either by itself or mixed with olive oil. (℞ 194.)

Betanaphthol.—1. Betanaphthol in aqueous solution imparts a pale green color when **ferric chloride** is added, and slowly deposits dinaphthol (M. & M., III, 460). 2. **Chlorine** or **chlorinated lime** colors a solution of betanaphthol a pale green or yellow. 3. A cold saturated aqueous solution of betanaphthol gives a faint bluish fluorescence with **ammonia.** 4. Betanaphthol is oxidized by alkaline **potassium permanganate.** 5. Betanaphthol when triturated with some solids gives a liquid or a soft mass.

Betanaphthol Salicylas, *Betol.*—1. Betol in alcoholic solution with **ferric chloride** gives a red to red-violet color. 2. Triturated with **chloral hydrate** it slowly gives a mass. 3. It is decomposed by **alkalies** into betanaphthol and a salicylate.

Bismuthi Betanaphtholas, *Orphol.*—1. Mineral **acids** partly decompose it, forming betanaphthol and the corresponding bismuth salt. 2. It is decomposed by **alkalies** into betanaphthol and a salicylate.

Bismuthi et Ammonii Citras.—1. Citrate of bismuth and ammonium in aqueous solution is precipitated as the bismuth citrate by most mineral **acids** and the stronger organic acids. 2. It is not readily precipitated by the **fixed alkali hydroxides**, but these on heating liberate ammonia. (℞ 195.)

Bismuthi et Potassii Tartras.—1. Bismuth and potassium tartrate is decomposed by dilute mineral **acids.** 2. **Cupric sulfate** produces a blue precipitate. 3. **Silver nitrate** produces a white precipitate.

Bismuthi Iodosubgallas, *Bismuth oxyiodogallate, Airol, Airoform, Airogen.* —1. **Moist air** causes the powder to become red. Mixed with **water** airol partially decomposes and turns red. Glycerin tends to prevent this. 2. It is soluble in solutions of **acids** and **alkalies** with decomposition and change of color. 3. With **calomel** it tends to form mercuric iodide. 4. No **metallic** instruments should come in contact with it as they may liberate iodine.

Bismuthi Subcarbonas.—1. Bismuth subcarbonate has many of the incompatibilities of the bismuth salts and also those of carbonates. [See CARBONATES and other bismuth salts.]

Bismuthi Subgallas, *Dermatol.*—1. Bismuth subgallate is decomposed by strong **acids** with liberation of gallic acid. 2. Alkali **hydroxides** dissolve it, giving a yellow solution which becomes red.

Bismuthi Subnitras.—1. Bismuth subnitrate is slowly hydrolyzed in **water**, forming a more basic nitrate, and liberating nitric acid. The latter is frequently the cause of annoyance in prescriptions containing carbonates or bicarbonates, the reaction usually not taking place until the prescription has been delivered. 2. It is converted into the hydroxide by solutions of the **alkali hydroxides.** 3. In the presence of water the **alkali carbonates** and **bicarbonates** convert it into a mixture of bismuthyl carbonate and a hydroxide (P. & J., 246). 4. Soluble **iodides** change bismuth subnitrate to an iodide. [See No. 10, under ACIDUM HYDRIODICUM.] 5. **Hypophosphites** give a precipitate of bismuth hypophosphite which slowly turns gray, liberating metallic bismuth. **Phosphorous acid** precipitates an insoluble white bismuth phosphite (P. & J., 246). 6. **Tannic acid** in the presence of water slowly forms the yellow tannate of bismuth. Milk of bismuth becomes gray to black in contact with the tannin in an ordinary cork. 7. **Tragacanth** with water and bismuth subnitrate gives curdy masses which stick to the sides of the bottle. These can be rubbed out in a mortar if too much water is not present. 8. Bismuth subnitrate is soluble in **glycerin**, but should not be triturated with it for fear of an explosion (Scoville, 336).

9. With a solution of **sodium salicylate** bismuth subnitrate is said to form a series of nitro-salicylates, varying in color from white to red-orange. Mixtures of these in various proportions made in the laboratory of one of the authors showed no perceptible change even on standing. (℞ 196–200.)

Bismuthi Subsalicylas.—1. Bismuth subsalicylate with a solution of a **ferric salt** gives a violet color. 2. It is decomposed by **acids** and **alkalies.**

Bromoformum.—1. Bromoform turns yellow in the light. 2. **Potassium hydroxide** converts it into a bromide and a formate of potassium. 3. With alcoholic **potash** bromoform is decomposed, producing potassium bromide, carbon monoxide, ethylene, and water. (℞ 201.)

Bromum.—1. Bromine with **alkali hydroxides** forms bromides and bromates. 2. With **sulfites** it forms sulfates and bromides. 3. With **hypophosphites** it forms phosphates and bromides. 4. Metallic **mercury** and **mercurous compounds** are oxidized to mercuric compounds. 5. **Arsenites** are converted into arsenates. 6. **Ferrous salts** are converted into ferric salts, and in alkaline mixtures into ferrates. 7. Bromine bleaches vegetable **colors.** 8. It combines with many **fixed oils** containing olein, forming addition products. 9. With oil of **turpentine** and some other **volatile oils** it is likely to react violently and may cause ignition. 10. Bromine in **water** gradually forms hydrobromic acid and oxygen (M. & M., I, 536). 11. An **alcoholic solution** is gradually decolorized, forming hydrobromic acid. 12. With **hydrogen dioxide** oxygen is evolved. 13. Bromine liberates iodine from **iodides.**

Butyl Chloral Hydras.—1. Butyl chloral hydrate (erroneously called croton chloral hydrate) gradually undergoes decomposition in aqueous solution. 2. It is decomposed with **alkalies.** 3. It liquefies or gives a soft mass when triturated dry with several solids. [See page 281.]

Butyn.—1. From aqueous solutions of butyn, **alkali hydroxides,** or **carbonates** precipitate the base as a colorless oily liquid. Its solution may even be decomposed by the alkalinity of a glass container. 2. Soluble **bicarbonates** precipitate butyn carbonate. 3. **Silver protein** preparations form precipitates with butyn solutions. 4. Aqueous solutions are precipitated by many of the general **alkaloidal reagents.**

Caffeina.—1. Caffeine does not readily combine with **dilute acids,** although it unites with concentrated acids. The salts are easily decomposed by **water, alcohol,** or **ether.** 2. Caffeine in moderately dilute solutions is not precipitated by the **alkali hydroxides** or **carbonates** or the **general alkaloidal reagents,**

but from strong solutions it is precipitated by **tannic acid, phosphomolybdic acid, silver nitrate,** and **mercuric chloride.** 3. Citrated caffeine readily dissociates in **water** producing caffeine and citric acid. The former may not dissolve and the latter may be the cause of further difficulties. Sufficient dilution with water may dissolve any crystallized caffeine. 4. The solubility of caffeine is increased by the presence of sodium salicylate, sodium benzoate, antipyrine, and potassium bromide (N. S. D.). (℞ 202.)

Calcii Creosotas, *Calcreose.*—1. Calcium creosotate effervesces with **acids** and, in a filtered aqueous solution, acids change the red color to a fluorescent orange.

Calcii Gluconas.—1. Calcium gluconate is precipitated from its aqueous solution by **alcohol.** 2. Diluted **sulfuric acid** precipitates the insoluble calcium sulfate.

Calcii Hydroxidum.—Calcium hydroxide is frequently of value in preparing external lotions where a water-in-oil emulsion is desired. It unites with part of the **oil** to form a soap, which in turn acts as the emulsifying agent, being soluble in the oil. When additional emulsifying agent is required, calcium hydroxide with **oleic acid** produces calcium oleate without altering the general nature of the prescription. [See LIQUOR CALCII HYDROXIDI.]

Calcii Hypophosphis.—1. Calcium hypophosphite in aqueous solution gradually changes to calcium phosphate. 2. Excess of **sugar** throws calcium hypophosphite out of solution. 3. The presence of hypophosphorous acid increases its solubility in water. [See CALCIUM and ACIDUM HYPOPHOSPHOROSUM.]

Calcii Phosphas.—Calcium phosphate forms soluble compounds with nearly all **acids** except those which precipitate calcium salts.

Calcium.—1. The soluble calcium salts in concentrated solutions are precipitated by the **fixed alkali hydroxides** as calcium hydroxide; 2. by soluble **sulfates** in not too dilute solutions, as sulfate; 3. by soluble **carbonates, citrates, phosphates, oxalates,** or **tartrates** as calcium carbonate, citrate, phosphate, oxalate, or tartrate.

Calx.—1. Lime exposed to air absorbs carbon dioxide and water. 2. Its solubility is greatly increased by **glycerin** or **sugar,** probably by forming loose combinations. 3. Lime decomposes most **salts,** combining with their acids. 4. It combines with **water** to form calcium hydroxide which has many of the incompatibilities of the fixed alkalies. [See CALCIUM and LIQUOR POTASSII HYDROXIDI.]

Calx Chlorinata.—1. Chlorinated lime is decomposed by **heat, light, acids,** and **carbon dioxide,** liberating chlorine. The presence of moisture accelerates the decomposition. 2. **Alkali carbonates** precipitate the insoluble calcium carbonate. 3. Mixed with **glycerin** it reacts violently, giving off white fumes and turning the mass brown. The ultimate products of the oxidation are oxalic acid and carbon dioxide. 4. With **organic substances** in a dry state chlorinated lime causes gradual decomposition with the development of heat, and may cause explosion. In a moist state with organic substances, chlorine is actively liberated. 5. A more refined calcium hypochlorite is available today and is much more permanent than the old "chlorinated lime." [See CHLORUM, CALCIUM, and ACIDUM HYDROCHLORICUM.]

Calx Sulfurata.—Sulfurated lime is decomposed by **mineral acids** and **carbon dioxide,** liberating hydrogen sulfide.

Cambogia.—1. Gamboge gives an orange-red solution with a solution of **sodium** or **potassium hydroxide** and the color caused by the latter reagent changes to yellow-brown. 2. With **ammonia water** it gives a yellow solution, changing to red and finally brown. 3. With a tincture of **iron** it gives a black-brown solution. 4. The resin forms salts with some heavy metals.

Camphora.—1. Camphor is thrown out of its aqueous solution by dissolving large amounts of **metallic salts** in the water. 2. **Water** throws camphor out of alcoholic solutions. 3. Camphor produces a liquid or soft mass when triturated with any one of many solids, the most important of which are **phenol, salol, thymol, resorcinol,** and **chloral hydrate.** [See page 281.]

4. Camphor when oxidized by **nitric acid** forms camphoric acid which is insoluble in water, and camphoronic acid which is soluble (U. S. D.). 5. **Potassium permanganate** in alkaline solution converts camphor into camphoric acid (M. & M., I, 669). 6. **Bromine** unites with it to form the crystallizable unstable dibromide of camphor, which on heating breaks up into hydrobromic acid and monobromated camphor. 7. **Chlorine** has no action on camphor, but in the presence of alcohol it forms chlorinated compounds (M. & M., I, 669). 8. Solutions of camphor in alcohol and

ether increase the solubility of **corrosive sublimate**, and the presence of this salt increases the solubility of camphor in these liquids. (℞ 203–207.)

Camphora Monobromata.—1. Monobromated camphor with **nitric acid** forms bromo-nitro-camphor and camphoric acid (N. S. D.). 2. With alcoholic **potash** it forms camphor (M. & M., 1, 670). 3. It gives a liquid or soft mass with many items, as in the case of camphor itself. [See page 281.] (℞ 208–209.)

Cannabis Indica.—1. **Water** added to an alcoholic extract of cannabis indica causes the precipitation of a large amount of resinous matter. Honey helps to prevent the precipitated resin from forming masses and sticking to the container.

Cantharidin.—1. Cantharidin combines with **alkalies**, forming soluble cantharidates. 2. It is precipitated from solutions by **neutral lead acetate, silver nitrate, mercuric chloride,** and **cupric sulfate.**

Carbo.—1. Charcoal absorbs many gases, such as **ammonia** and **hydrogen sulfide.** 2. When mixed with solutions, it absorbs and removes from solution **tannic acid**, many **alkaloids**, many **glucosides**, and a number of **bitter** and **odorous principles, coloring matter, fusel oil, iodine,** and many **metallic salts.** 3. When triturated with **oxidizing agents**, such as **potassium chlorate** or **potassium permanganate**, there is danger of an explosion. 4. The new or "activated" charcoal is considerably more active and absorbent than the ordinary wood charcoal.

Carbonates (Bicarbonates).—1. Carbonates are decomposed by all common **acids** except hydrocyanic acid, and by some **metallic acid salts**, with liberation of carbon dioxide. 2. Solutions of potassium and sodium carbonates precipitate solutions of salts of all other common metals; the precipitate is a normal carbonate in case of **silver, mercurous mercury, ferrous iron, manganese, barium, strontium,** and **calcium**; it is a hydroxide in case of **aluminum, ferric iron,** and **chromium**; it is an oxide in case of **antimony**; it is a basic carbonate in case of **lead, bismuth, copper, zinc, magnesium,** and **mercuric mercury**. Mercuric chloride is precipitated as the basic chloride. 3. The carbonates of the alkalies precipitate as free alkaloids the aqueous solutions of most **alkaloidal salts** and decompose a few of the **alkaloids.** 4. In the presence of water **bismuth subnitrate** liberates carbon dioxide from the alkali carbonates. 5. Ammonium carbonate causes reactions similar to potassium carbonate, except with **resorcin** and **salts of mercury, copper, silver,** and **alkaloids.** [See AMMONII CARBONAS.] 6. The carbonates of the alkalies are soluble in water. The other normal or basic carbonates are insoluble in water, although many are soluble in excess of carbon dioxide, forming bicarbonates. The carbonates are insoluble in alcohol.

7. The bicarbonates of the alkalies have about the same incompatibilities as the carbonates, although they do not precipitate as many of the alkaloidal or metallic salts. 8. Sodium bicarbonate with a solution of **mercuric chloride** produces an effervescence and gives a white precipitate at first which changes to a brown or purple on standing, the change taking place more quickly when the mercury is in excess. Various oxychlorides of mercury are formed (M. & M., III, 217). 9. **Heating** the alkali bicarbonates dry or in aqueous solution changes them to some extent to the normal carbonates. Agitation of aqueous solutions also produces the carbonate. (℞ 210–212.)

Carbromal, *Adalin.*—1. Carbromal dissolves in concentrated **mineral acids**, or solutions of **alkali hydroxides.** 2. Boiling with a solution of a fixed alkali hydroxide liberates ammonia.

Catechu.—1. Catechu contains a large percentage of tannic acid. [See ACIDUM TANNICUM.] 2. Catechu-tannic acid does not precipitate solutions of tartar emetic, but an aqueous solution of the acid is precipitated by **gelatin** and **albumin.** 3. Catechu-tannic acid gives a greenish-black solution or precipitate with a solution of **ferric salts.**

Cerii Oxalas.—1. Cerium oxalate with **alkali hydroxides** slowly forms the cerium hydroxide and the oxalate of the alkali. 2. It dissolves in diluted **hydrochloric acid** or diluted **sulfuric acid**, and this solution is precipitated by the alkali hydroxides or carbonates.

Chiniofon.—1. Chiniofon is composed of a complex organic acid and sodium bicarbonate. Consequently it effervesces when dissolved in **water.** 2. Its solution is decomposed upon **boiling.** 3. **Strong acids** change its yellow color to green and liberate the free acid. 4. With **ferric chloride** solution it develops a deep emerald green color. 5. **Copper sulfate** produces a dense white precipitate with solutions of chiniofon.

Chinosol, *Oxyquinolin sulfate.*—1. **Soap** and **alkali hydroxides** give a white precipitate with water solutions. 2. A solution of **ferric chloride** gives a green color. 3. **Mercuric chloride** and other metallic salts give precipitates.

Chloral Hydras.—1. Chloral hydrate in aqueous solution slowly undergoes decomposition, forming traces of hydrochloric acid. A neutral alcoholic solution remains permanently neutral (N. S. D.). 2. An aqueous solution, with **alkaline hydroxides, alkaline carbonates,** or **borax**, produces chloroform and a formate of the base. 3. With **alcohol** in the presence of **water** and certain soluble salts as potassium or sodium bromide, chloral hydrate may form chloral alcoholate, which separates as an oily liquid, dependent upon the concentration of both the alcohol and the salts. The addition of other salts or sugar also hastens the separation. Further addition of alcohol may cause the liquids to mix. 4. Chloral hydrate in concentrated aqueous solution is a good solvent for **resinous matter.** It also dissolves **morphine, quinine,** and other **alkaloids** to some extent, some **glucosides, neutral principles, volatile oils, fats,** and **coloring principles.** 5. Chloral hydrate produces a liquid or soft mass when triturated with any one of many solids such as **camphor** and **phenol.** [See page 281.] 6. It softens **oil of theobroma** when rubbed with it.

7. With **potassium cyanide** it forms dichloracetic acid (M. & M., II, 4). If chloral hydrate and potassium cyanide are rubbed together dry in a mortar, chemical reaction takes place with almost explosive violence, and a large amount of white fumes is given off, leaving a brown mass. If the two are powdered separately, and mixed lightly, the reaction is slower, but a brown mass finally results. 8. In aqueous solution with **potassium iodide** chloral hydrate slowly gives chloroform and iodine (M. & M., II, 2). 9. Chloral hydrate increases the solubility of acetanilid in water. 10. With **sodium barbital** it forms chloroform and the barbital is precipitated. (℞ 213–217.)

Chloramina-T.—1. Chloramine-T is comparatively stable if kept in the dark but in the **sunlight** it soon becomes acid, due to chlorinated sulfonic acids. 2. The stability is dependent upon its purity. In the highest obtainable degree of purity it is stable when dry, or when dissolved in water, or in a solution of sodium chloride, sodium bicarbonate, or sodium carbonate. 3. Its aqueous solution is alkaline to litmus. 4. It is compatible with soluble saccharin, sodium chloride, sodium bicarbonate, sodium carbonate, soluble starch, Rochelle salt, borax, zinc stearate, or purified talc. 5. **Boric acid** decomposes it slowly. 6. It is decomposed more or less rapidly when mixed intimately with **cane sugar, ammonium chloride, insoluble saccharin,** or **zinc oxide.** 7. It is incompatible with many **acids,** acid fumes, chemicals of an acid nature, **ammonia** fumes, **glycerin,** and **alcohol.** 8. In neutral solution chloramine-T liberates iodine from **iodides,** but not bromine from bromides unless acidified. 9. **Amino-acids** are attacked, **peptones** and **proteins** to a less extent (Chem. Abs., XVII, 2892). 10. Chloramine-T in moist state must not come in contact with **metals.** (℞ 218–219.)

Chlorates.—1. Chlorates are likely to cause an explosion when triturated dry or heated with many **organic** and other **oxidizable** substances. 2 With **hydrochloric acid** chlorates give chlorine and oxides of chlorine. [See CHLORUM.] 3. In neutral or alkaline solutions chlorates do not usually have an oxidizing effect. 4. The metallic chlorates are soluble in water and are, with the exception of potassium chlorate, generally soluble in alcohol.

5. Some of the substances which should not be triturated with chlorates are **sulfur, sulfides, sulfites, cyanides, thiosulfates, hypophosphites, nitrites, reduced iron, amorphous phosphorus, iodine, ammonium picrate, tannic acid** or substances containing it, **gallic acid, carbolic acid, oxalic acid, charcoal, sugar, honey, glycerin, starch, lycopodium, salicylic acid,** and **shellac.** 6. Chlorates with **sulfuric acid** detonate or explode, forming chlorine peroxide and a perchlorate. (℞ 220–227.)

Chlorobutanol, *Chloretone.*—1. Chlorobutanol gives a mass or liquid when triturated with an equal weight of **antipyrine, euphorin, exalgin, menthol,** or **phenol.** 2. It is decomposed by weak **acids** and **alkalies.**

Chloroformum.—1. Chloroform when pure is decomposed by **air** and **light** into chlorine, carbonyl chloride ($COCl_2$), and other products; this is prevented usually by adding a small amount of alcohol. 2. The vapors coming in contact with gas light produce irritating chlorine derivative vapors. (℞ 228–229.)

Chlorum.—1. Chlorine with a solution of a **hydroxide** of a **fixed alkali** or an **alkaline earth** forms a chloride and a chlorate. If the chlorine is added short of saturation a hypochlorite is formed. 2. With **ammonia water** chlorine gives ammonium chloride and a little nitrogen, or if the ammonia is in excess a little chlorate. If chlorine is in excess explosive nitrogen chloride may be formed. 3. With some **salts** of **ammonium** chlorine is likely to form the explosive nitrogen chloride. 4. Chlorine precipitates solutions of salts of **lead, mercurous mercury** and **silver** as chlorides. 5. Chlorine water after standing a while is changed to hydrochloric acid. 6. Chlorine is a strong oxidizing agent, and is itself reduced to a chloride by the agents which it oxidizes. It oxidizes nearly all **organic matter.** 7. Chlorine bleaches **indigo, litmus,** and other organic colors.

8. With **iodides** chlorine forms iodine and then iodic acid, and in the presence of an alkali a periodate. 9. With **bromides** it forms bromine, and in alkaline mixtures a bromate. 10. With **hypophosphites,** phosphates are formed. 11. **Sulfites** or **sulfides** are changed to sulfates. 12. **Mercurous, arsenous,** or **ferrous compounds** are changed to mercuric, arsenic, or ferric compounds in acid or alkaline mixtures. 13. With **hydrogen peroxide** oxygen is liberated. 14. **Salicylic acid** is changed to mono- and di-chloro-salicylic acid (M. & M., III, 680). 15. **Glycerin** is converted into oxalic acid and carbon dioxide. 16. Chlorine is rapidly absorbed by **alcohol.** [See ALCOHOL, No. 14.]

Chromii Trioxidum (Chromates).—1. Chromic acid combines with the **alkali hydroxides** to form yellow normal chromates and red dichromates. 2. It is reduced by **alcohol,** forming aldehyde and acetic acid. 3. Chromic acid, with **strong alcohol, glycerin, ether, hydrogen peroxide, volatile oils,** or other readily **oxidizable matter,** is likely to cause an explosion or fire. 4. Bichromates are likely to cause an explosion when triturated with **tannic acid, sugar,** or other substances that are easily oxidized. 5. The chromates of the alkalies, magnesium, calcium, and zinc are soluble in water; the others are sparingly soluble. They are nearly insoluble in **alcohol.** 6. Chromic acid, or chromates in solution with sulfuric acid, are reduced to chromic salts by **tartrates,** producing formic acid, carbon dioxide, and water; 7. by **oxalates,** forming carbon dioxide; 8. by **hypophosphites** (no action in alkaline mixtures), forming phosphoric acid; 9. by **sulfides,** liberating sulfur; 10. by **sulfites,** forming sulfuric acid; 11. by **chlorides,** liberating chlorine; 12. by **bromides,** liberating bromine; 13. by **iodides,** liberating iodine; 14. by **dilute alcohol,** forming aldehyde and acetic acid. 15. The soluble chromates and bichromates precipitate aqueous solutions of salts of **lead, silver, mercury, bismuth, manganese,** and **strontium** as chromates, generally normal, varying in color from yellow to red. 16. Potassium bichromate precipitates many alkaloids from aqueous solutions of their salts, e.g., **atropine, codeine, hydrastine, quinine, strychnine, morphine** (only in concentrated solutions, 1 : 100). The normal potassium chromate does not precipitate as many of the alkaloids as the bichromate. (℞ 231–232.)

Chrysarobinum.—1. Chrysarobin yields chrysophanic acid on oxidation. 2. It dissolves in aqueous solutions of the **alkalies** giving a red liquid with a greenish fluorescence. 3. **Lime water** gives a violet color. 4. Chrysarobin stains the skin and clothing. (℞ 233.)

Cinchona.—1. Cinchona contains a sufficient amount of tannic acid to make its preparations incompatible with many **metallic salts** and other compounds. [See ACIDUM TANNICUM.] 2. The tannic acid gives a color varying from brown to blackish-green with solutions of **ferric salts.** 3. The cinchona alkaloids in solution form compounds with the **general alkaloidal reagents,** which compounds are nearly insoluble in water but soluble in alcohol. [See ALKALOIDS and QUININA.]

Cinchophenum, *Phenylcinchoninic Acid, Atophan.*—1. Cinchophen is sparingly soluble in water. 2. It combines with **alkalies** to form soluble salts. 3. It liberates carbon dioxide slowly from **carbonates.**

Cocaina.—1. Cocaine is precipitated from aqueous solutions of its salts by the reagents that usually precipitate alkaloids. [See ALKALOIDS, Nos. 2 and 3.] 2. Cocaine is quite easily decomposed by strong **acids,** strong solutions of **alkali hydroxides,** or by **hot water,** forming methyl alcohol, benzoic acid, and ecgonine. 3. Mixed with **calomel** in the presence of moisture cocaine hydrochloride turns the mixture gray or even black, due to the reduction of some of the calomel to metallic mercury, while at the same time some mercuric chloride is formed. The **mercuric chloride** then combines with the alkaloid to form a compound insoluble in water. 4. Cocaine hydrochloride with **yellow oxide of mercury** gives a mixture that is irritating, due probably to the formation of mercury bichloride. At least a mercuric salt is formed. 5. Cocaine hydrochloride is decomposed with solutions of **silver nitrate.** (℞ 234–238.)

Codeina.—1. Codeine in aqueous solution is not precipitated by alkaline carbonates, bicarbonates, or ammonium carbonate, but is precipitated by most of the other **alkaloidal reagents.** [See ALKALOIDS, Nos. 2 and 3.] 2. Codeine in aqueous solution gives a precipitate with solutions of salts of **iron, lead, copper,** and some other **metals.** This is probably due to the fact that it is quite strongly alkaline and one of the most soluble of the alkaloids.

3. With some **ammonium salts**, as ammonium chloride, codeine liberates ammonia. 4. If codeine is added to a solution of a **morphine salt**, morphine is set free and usually precipitated. 5. **Nitric acid** gives a yellow solution with codeine. (℞ 239–241.)

Colchicina.—1. Colchicine is darkened by exposure to **light**. 2. It is precipitated from aqueous solution by most of the **general alkaloidal reagents**, unless the solution is quite weak. 3. Colchicine is readily decomposed by strong **acids** or strong solutions of **alkalies**, forming colchiceine. **Acids** generally give a yellow color. **Nitric acid** gives a blue to a violet color turning brown and then yellow (Sohn, 42). **Potassium hydroxide** gives a red color (N. S. D.). 4. Most of its salts are decomposed by **water** (M. & M., II, 234).

Collodium.—1. Collodion is gelatinized by **phenol** and by a large excess of **creosote**. Alcohol renders the mass more fluid. 2. **Water** separates the gun-cotton. 3. Tincture of **iodine** free from an iodide or hydriodic acid gives a gelatinous mass, which slowly redissolves. The presence of an iodide prevents gelatinization. [See PYROXYLINUM.] (℞ 242–244.)

Coniina.—1. Coniine becomes yellow and resinoid on keeping and gives off ammonia (U. S. D.). 2. It is not precipitated by the alkali hydroxides or carbonates, but it is by the **general alkaloidal reagents**, except platinic chloride. [See ALKALOIDS.] 3. Coniine coagulates **albumin**. 4. It precipitates solutions of salts of **aluminum, copper, zinc, manganese, iron,** and **silver**; the precipitate with silver is soluble in excess of the alkaloid (U. S. D.). 5. It forms butyric acid when treated with most **oxidizing agents**. 6. An alcoholic solution of **iodine** with coniine gives a brown precipitate, which afterwards disappears, and the liquid becomes colorless (M. & M., II, 246). 7. Vapors of coniine coming in contact with those of **hydrochloric acid** give white fumes.

Copaiba.—1. Copaiba, with the **hydroxides** of the **alkalies** or **alkaline earths**, forms saponaceous compounds in which the resin acts the part of an acid. 2. With one-sixteenth of its weight of **magnesia** which has been dampened with water, the resin of the copaiba combines slowly to form a solid mass. A similar change is produced by **calcium hydroxide**.

Creosoti Carbonas, *Creosotal.*—1. Creosote carbonate is a liquid, insoluble in **water**. It may be mixed with a fixed oil and emulsified. 2. It is decomposed by **alkalies**, liberating creosote.

Creosotum.—1. Creosote reduces some of the **inorganic salts,** such as **silver, gold,** and **copper,** to the metallic state. 2. If mixed suddenly or triturated dry with strong **oxidizing agents** it is likely to cause an explosion. 3. It precipitates solutions of **albumin** and **gum** (not gelatin) (N. S. D.). Creosote in large excess gelatinizes **collodion.** 4. Creosote with solutions of **ferric salts** gives a violet-blue color, changing to greenish-brown, and, unless in very dilute solution, a brown precipitate is formed. An alcoholic solution of creosote with an alcoholic solution of ferric chloride gives a bluish-green color.

5. Triturated with **silver oxide,** an explosion is likely to take place. 6. With concentrated **nitric acid** reddish fumes of the oxides of nitrogen are given off. With diluted nitric acid a brown resin is formed (U. S. D.). 7. Creosote gives a white precipitate with solution of **lead subacetate.** 8. Creosote dissolves a large number of **metallic salts** and reduces some of them to the metallic condition. (℞ 245–247.)

Cresol.—1. Cresol dissolves in solutions of **alkali hydroxides.** It is also soluble in strong soap solutions. 2. A dilute solution with a solution of **ferric chloride** gives a blue-violet color.

Cupri Sulfas.—1. Cupric sulfate is precipitated by the **fixed alkali hydroxides** as blue copper hydroxide, which on standing becomes basic and black. This precipitation is more or less prevented by citrates, tartrates, salicylates, sugar, milk sugar, glycerin and other organic substances. A solution of cupric sulfate and acacia is gelatinized by the alkali hydroxides. 2. **Ammonia water** precipitates the cupric hydroxide and in excess dissolves it, forming an intense blue solution. This solution dissolves cotton, filter paper, and other forms of cellulose. 3. **Ammonium carbonate,** like ammonia water, precipitates the copper and then redissolves it, forming a blue solution. 4. The **carbonates** of the **fixed alkalies** precipitate the copper as a basic carbonate of variable composition. 5. Soluble **iodides** reduce and precipitate cupric sulfate as cuprous iodide (Cu_2I_2), iodine being liberated. 6. In alkaline mixtures cupric compounds are reduced to cuprous oxide by **arsenous acid, glucose,** and many **organic** substances. 7. Cupric sulfate coagulates a solution of

albumin. 8. **Tannic acid** precipitates a solution of cupric sulfate, and with heat reduces the copper.

9. In neutral solutions the soluble **phosphates** give a blue-white precipitate of copper phosphate. 10. **Arsenites** in neutral solution give a green precipitate of copper arsenite. 11. **Sodium salicylate** with cupric sulfate in solution gives a green color, and the copper is not precipitated from dilute solution by alkalies. 12. **Antipyrine** gives a green color to a solution of cupric sulfate. (℞ 248.)

Dichloramina-T.—1. Dichloramine-T is insoluble in **water** but is soluble in chlorinated eucalyptol and in chlorcosane, a chlorinated paraffin product. 2. It gradually decomposes in contact with **air**, losing chlorine. 3. Strong mineral **acids** liberate chlorine. It reacts with most substances as **acids, alcohol, hydrogen peroxide,** and some **metals.** 4. It liberates iodine from **iodides,** and bromine from **bromides.**

Digitalis.—1. Digitalin is precipitated from solutions by **tannic acid** and **chloride of gold,** not by most of the other alkaloidal reagents (Sohn, 49). 2. With **nitric acid** digitalin gives at first a colorless solution, changing to yellow or green (Sohn, 50). 3. Digitonin is precipitated from aqueous solution by **ammonia, tannic acid,** or **lead acetate** (Sohn, 50). 4. All the principles of digitalis are quite easily decomposed by strong **acids** or **alkalies.** (℞ 249.)

Elaterinum.—1. Elaterin combines with the **alkali hydroxides** to form compounds soluble in water, from which solution acids precipitate the elaterin. 2. It is precipitated from alcoholic solution by **lead acetate** and **silver nitrate** (Watts, II, 373).

Emulsa.—1. Emulsions are broken up by substances which precipitate the emulsifying agent. 2. Some emulsions are destroyed upon the addition of **sugar** or **soluble salts,** as these tend to dehydrate the protective film and liberate free oil. 3. Soap emulsions are broken by the addition of **acids** which decompose the soap. 4. Extremes in **temperature** are apt to destroy emulsions. [See ACACIA and LIQUOR CALCII HYDROXIDI.]

Ephedrina.—1. Ephedrine base is unlike most alkaloids in that it is soluble in water as well as in alcohol and oils. 2. **Tannic acid** precipitates the base but does not precipitate solutions of the salts. 3. Alkali iodides do not cause precipitation of the salts. 4. **Silver** salts precipitate silver chloride from solutions of ephedrine hydrochloride.

Epinephrina, *Adrenalin, etc.*—1. Epinephrine is slightly soluble in water and the common solvents. 2. It is weakly alkaline and forms salts with **acids,** the salts generally being soluble in water. 3. **Alkali hydroxides** and **carbonates** precipitate it from acid solutions, the precipitate making water-soluble compounds with fixed alkali hydroxides. 4. **Air**, strong **light**, and **heat** are injurious in varying degrees, but they are particularly harmful in neutral or alkaline mixtures. Even in acid solutions, air oxidizes it, forming pink, red, and brown solutions and when it has become brown it is so inert that it should be discarded. 5. **Oxidizing agents** in general render it inert, giving a pink to red color. 6. Dilute solutions rapidly lose their strength.

7. With a solution of epinephrine hydrochloride **ferric chloride** gives an emerald-green color changing in time to cherry-red and brown. On addition of alkalies a purple and then a carmine-red color results. Strong acid prevents reaction. 8. **Silver** and **gold** salts are quickly reduced. 9. **Mercury bichloride** is reduced to calomel. 10. **Iodine** gives a vivid pink color. 11. Phenols, camphors, salts of alkalies or of common alkaloids are not particularly harmful. 12. **Formaldehyde,** even in dilute solution, will render it inert. 13. It is not generally precipitated by alkaloidal reagents. (℞ 250–253.)

Ergota.—The active principles of ergot are generally precipitated by **tannic acid, metallic salts, potassium mercuric iodide, alkalies** and some of the **general alkaloidal reagents,** and are decomposed by **heat** and **age.**

Erythritylis Tetranitras.—1. Erythrityl tetranitrate is a crystalline mass which explodes on percussion. Hence it is not generally available in its true form but is supplied in the form of tablets which should be used as such, and not admixed with other items which might cause explosions.

Eucainæ Hydrochloridum, *Betaeucaine Hydrochloride.*—1. Eucaine hydrochloride acts much like an alkaloidal salt. It is precipitated from solution by **alkali hydroxides** and **carbonates,** and by many **alkaloidal reagents.** 2. **Mercury bichloride** gives a precipitate with a strong solution of it but not with a weak one. 3. A solution can be boiled without decomposition.

Eucalyptol.—1. Eucalyptol is oxidized to cineolic acid by **potassium permanganate** (M. & M., II, 526). 2. **Iodine** in potassium iodide gives green crystals; **naphthol** and **chlorine** give addition products.

Europhen, *Isobutyl-orthocresol Iodide.*—1. **Heat** and **light** tend to liberate iodine, particularly in solution. 2. The solution in **oil** is of doubtful efficiency, since the slowly liberated iodine combines with the oil. 3. It is not advisable to prescribe it with substances that have a strong affinity for iodine, as **oxides, hydroxides, starch,** or salts of **mercury.** 4. An alcoholic solution gives a yellow, flocculent precipitate with **mercury bichloride.**

Ferri Phosphas Solubilis.—1. The soluble phosphate of iron is a complex salt, being made by mixing solutions of ferric citrate and sodium phosphate. It is perhaps a mixture of ferric phosphate and sodium citrate, or it is more probably a sodio-ferric citro-phosphate. When a dilute **mineral acid** other than metaphosphoric acid is added, the sodium citrate or the sodio-ferric citro-phosphate is broken up and the ferric phosphate is precipitated. Strong mineral acids may redissolve the precipitate. Metaphosphoric (glacial phosphoric) acid free from orthophosphoric acid does not cause precipitation. 2. In aqueous solution the soluble phosphate of iron is precipitated by **sodium** or **potassium hydroxide** as ferric hydroxide. **Ammonium hydroxide** gives a reddish color, but no precipitate. 3. **Sodium bromide** destroys the equilibrium of the solution of soluble iron phosphate, precipitating what is undoubtedly the iron phosphate. 4. Soluble phosphate of iron or its solution acquires a blackish color when exposed to **light.** [See FERRICUM and ACIDUM PHOSPHORICUM.] (℞ 254–255.)

Ferri Pyrophosphas Solubilis.—1. The soluble pyrophosphate of iron is a mixture or compound similar to the soluble phosphate of iron and reacts in the same manner as indicated for the soluble iron phosphate. [See FERRICUM, FERRI PHOSPHAS SOLUBILIS, and pyrophosphoric acid under ACIDUM PHOSPHORICUM.] (℞ 256–258.)

Ferricum.—1. Ferric salts are precipitated from their aqueous solutions by the alkali **hydroxides** and **carbonates** as the red-brown ferric hydroxide. This precipitation is more or less prevented by the presence of sugar, glycerin, ammonium salts, citrates, tartrates, and other organic compounds. 2. **Borax** with solutions of ferric salts gives an insoluble basic borate (Watts, I, 530). Sugar, glycerin, citrates, and tartrates prevent or retard precipitation. 3. Solutions of the **alkali phosphates** precipitate from neutral solutions of ferric salts the white ferric phosphate, the precipitation being prevented by citrates, tartrates, and considerable excess of free acids. 4. **Ferrocyanides** with ferric salts give the blue precipitate of ferric ferrocyanide (Prussian blue); this is prevented to some extent by citrates in neutral solutions. 5. **Ferricyanides** give a brown solution with ferric salts. 6. **Phosphoric acid** in excess decolorizes a solution of ferric chloride by forming the colorless ferric phosphate. 7. In with fixed alkali hydroxides. 4. **Air**, strong **light**, and **heat** are injurious in varying degrees, but they are particularly harmful in neutral or alkaline mixtures. Even in acid solutions, air oxidizes it, forming pink, red, and brown solutions and when it has become brown it is so inert that it should be discarded. 5. **Oxidizing agents** in general render it inert, giving a pink to red color. 6. Dilute solutions rapidly lose their strength.

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21. When the insoluble carbonates of **barium, calcium,** and **magnesium** are added to solutions of ferric salts the precipitate is chiefly ferric hydroxide, the base added combining with the acid of the ferric salt. 22. The **alkali sulfides** precipitate the black ferrous sulfide after reducing the ferric compounds to ferrous and liberating sulfur. **Hydrogen sulfide** reduces ferric to ferrous and liberates sulfur, but causes no precipitation of iron. 23. Soluble **cyanides** precipitate nearly neutral solutions of ferric salts as ferric hydroxide with evolution of hydrocyanic acid. 24. With solutions of ferric salts **sulfites** give a red solution of ferric sulfite, which changes on heating or standing to ferrous sulfate and the solution becomes nearly colorless. 25. In dilute aqueous solutions **creosote** or **guaiacol** gives with ferric chloride a violet-blue color which soon changes to green-brown. An alcoholic solution of ferric chloride with creosote gives blue-green. 26. **Acetanilid** with an alcoholic solution of ferric chloride gives a red color. With an aqueous solution it gives no color unless heated, and then the color fades on cooling. 27. **Acetophenetidin** with a tincture of ferric chloride gives a deep red solution. 28. With **pyrocatechin** a solution of ferric chloride gives a green color; 29. with **pyrogallol** it gives a red; 30. and with **resorcin,** a violet. 31. An alcoholic solution of **salol** gives a violet to red color with a tincture of iron, but when sufficient water is added the color is destroyed and the salol precipitated. 32. **Piperazine** gives a red-brown precipitate. 33. Oil of **wintergreen** gives a violet color with an alcoholic solution of ferric chloride; 34. oils of **clove, bay,** and **pimenta** give a blue to a green; 35. oil of **cinnamon** gives a brown; 36. oil of **thyme** gives a green-brown, changing to red. 37. An alcoholic solution of ferric chloride gives a dark brown-green color with **podophyllin;** 38. with **aloin** it gives a green-black to a brown-black; 39. with **benzoin,** a brown to green; 40. with

gamboge, a black-brown; 41. with **asafetida** or **storax**, a green-brown; 42. with **myrrh**, a red-brown; 43. with **guaiac**, a blue to brown; 44. with **Peruvian balsam**, a green-black; 45. with **tolu balsam**, a brown; 46. and with **shellac**, a black. 47. With a nearly neutral aqueous solution of ferric chloride **morphine** gives a blue to green solution, and with **apomorphine** it gives a red changing to a black. (℞ 259–278.)

Ferrosum.—1. Ferrous salts are quite quickly changed to basic ferric compounds on being exposed to the **air**. Sugar, glycerin, honey, and organic matter in general retard the oxidation. 2. Ferrous salts in aqueous solution are precipitated to some extent by the **alkali hydroxides** as the white ferrous hydroxide quickly changing to the ferroso-ferric hydroxide, which is of a dirty green to a black color. This precipitate ultimately oxidizes to a ferric hydroxide or oxide. Ammonium salts, soluble citrates or tartrates, sugar, glycerin, and many organic compounds dissolve the ferrous hydroxide to a slight extent or prevent the precipitation. 3. The soluble **carbonates** precipitate the ferrous carbonate, white if purely ferrous, but soon changing in the air to ferric hydroxide. 4. The soluble **phosphates** precipitate the white or bluish-white ferrous phosphate. 5. With nearly neutral solutions **borax** gives a white precipitate. 6. Ferrocyanides precipitate the light blue ferrous ferrocyanide. 7. **Ferricyanides** precipitate the dark blue ferrous ferricyanide. 8. **Arsenites** and **arsenates** give precipitates with solutions of ferrous salts (P. & J., 321). 9. **Tannic acid** with strong solutions of ferrous salts precipitates the white gelatinous ferrous tannate. This quickly oxidizes, forming the nearly black ferric tannate. Ferrous salts usually contain enough of a ferric salt to give the dark color at once. 10. The **alkaline citrates** in solution modify the astringent effects of ferrous salts, and dissolve many of the salts not soluble in water.

11. The soluble **sulfides** (not hydrogen sulfide) precipitate the black ferrous sulfide. 12. **Gallic acid** with a concentrated solution of a ferrous salt gives a white precipitate which soon turns dark, due to the oxidation of the iron and formation of the ferric gallate. 13. Ferrous salts in solution are oxidized to ferric compounds by salts of **gold** or **silver**, by **hydrogen peroxide**, **permanganates**, **nitrous** or **nitric acid**, **chlorine** or **chlorates** in

acid solution, **mercuric compounds** in alkaline mixtures, **arsenates** in alkaline mixtures, and by oxygen of the **air.**

Ferrum Reductum.—1. Reduced iron combines with acids to form salts. 2. It is oxidized by moist **air.** 3. In the presence of water it reduces to the metallic condition salts of **copper, bismuth, lead, silver, mercury,** and **antimony.** 4. Triturated dry with strong oxidizing agents, such as **potassium permanganate** or **potassium chlorate,** it is likely to cause an explosion. 5. In the presence of water reduced iron forms ferrous iodide with **iodine,** and ferrous bromide with **bromine.** 6. Reduced iron is slowly oxidized to a hydroxide by solution of **hydrogen peroxide.**

Fluidextracti.—1. Fluidextracts are generally more or less acid and liberate carbon dioxide from **carbonates.** 2. **Water** causes precipitation of inert matter and sometimes active principles. 3. Fluidextracts frequently show the incompatibilities of their active principles such as tannins, resins, gums, and alkaloids. (℞ 279.)

Fluoresceinum Solubile, *Resorcinolphthalein Sodium, Sodium Fluorescein.*—**Acids** destroy the fluorescence of solutions of soluble fluorescein.

Gelatinum.—1. Solutions of gelatin are coagulated by **tannic acid, picric acid, metaphosphoric acid, chlorine water, mercury bichloride, alcohol,** or **formaldehyde.** Aqueous solutions are not precipitated by alum, lead acetate, ferric chloride, dilute acids, or dilute alkalies. 2. **Heating** an aqueous solution of gelatin for some time renders it incapable of gelatinizing.

Glucosides.—1. Glucosides are decomposed by prolonged contact with mineral **acids, alkalies, hot water,** or **ferments.** Some glucosides may be decomposed by one of these agents, others by two or more of them. One of the products formed is glucose or some form of sugar. 2. **Tannic acid** or **lead subacetate** generally precipitates the glucosides from their aqueous solutions. 3. The glucosides are not usually precipitated by the alkali hydroxides or carbonates or general alkaloidal reagents. 4. Many of them give color reactions resembling those produced by the alkaloids.

Glycerinum.—1. Numerous explanations have been offered for the effervescence which occurs when glycerin, **sodium borate,** and sodium bicarbonate are mixed together (as in Dobell's solution). The first of these theories, which Scoville has stated "is hardly in accord with chemical principles," involves the formation of glyceryl borate and sodium metaborate, followed by the hydrolysis of the glyceryl borate to boric acid and glycerin. The boric acid then reacts with the bicarbonate, producing sodium borate and liberating carbon dioxide.

$$Na_2B_4O_7 + 2C_3H_5(OH)_3 = 2NaBO_2 + 2C_3H_5BO_3 + 3H_2O.$$
$$C_3H_5BO_3 + 3H_2O = C_3H_5(OH)_3 + H_3BO_3.$$
$$4H_3BO_3 + 2NaHCO_3 = Na_2B_4O_7 + 2CO_2 + 7H_2O.$$

The second explanation was offered by Duncan (Pharmaceutical Journal, LXXXVI, 104); he claimed that the sodium borate reacts with two molecules of glycerin to form sodium glyceryl borate and boric acid, or with four molecules of glycerin to form sodium glyceryl borate and glyceroboric acid, the latter being much stronger than boric acid and effervescing actively with carbonates.

$$Na_2B_4O_7 \cdot 10H_2O + 2C_3H_5(OH)_3 = 2NaC_3H_5OHBO_3 + 2H_3BO_3 + 9H_2O.$$
$$Na_2B_4O_7 \cdot 10H_2O + 4C_3H_5(OH)_3 = 2NaC_3H_5OHBO_3 + 2HC_3H_5OHBO_3 + 13H_2O.$$

The third explanation was offered by Bauer (J. A. Ph. A., XIX [1930], 475), who begins his theory with the hydrolysis of sodium borate to mono-sodium-dihydrogen borate and boric acid. These in turn react with glycerin to give sodium glyceroborate and glyceroboric acid respectively, the latter reacting with sodium bicarbonate. Bauer checks his theory against the official assay for boric acid. He uses one molecule of sodium borate to eight molecules of glycerin, and his formulas for sodium glyceroborate and glyceroboric acid are different from those of Duncan.

$$Na_2B_4O_7 + 5H_2O = 2NaH_2BO_3 + 2H_3BO_3.$$
$$2NaH_2BO_3 + 4C_3H_5(OH)_3 = 2[C_3H_5(OH)_2]_2BO_3Na + 4H_2O.$$
$$2H_3BO_3 + 4C_3H_5(OH)_3 = 2[C_3H_5(OH)_2]_2BO_3H + 4H_2O.$$
$$[C_3H_5(OH)_2]_2BO_3H + NaHCO_3 = [C_3H_5(OH)_2]_2BO_3Na + CO_2 + H_2O.$$

Whichever explanation is accepted, the product resulting from the mixing of glycerin and borax is incompatible with carbonates, but generally compatible with solutions of alkaloidal salts where borax alone would cause a precipitation. **Glucose, honey,** and some other organic compounds act like glycerin. 2. Strong **nitric acid** mixed with concentrated sulfuric acid converts glycerin into the explosive nitroglycerin. When glycerin is carefully treated with nitric acid, it is converted into a mixture of oxalic acid, glyceric acid, and other organic acids. Warming glycerin with dilute nitric acid may cause a violent reaction. 3. Glycerin prevents to some extent the precipitation by alkali hydroxides and carbonates of solutions of salts of **lead, copper, antimony, aluminum, chromium, iron, zinc,** and **magnesium.** 4. It dissolves most deliquescent salts and increases the solubility of many inorganic and organic salts. 5. It does not mix with most **fixed oils** to form clear solutions. 6. Glycerin is sometimes contaminated with iron from the container, and this may give a color with **phenol, tannic acid,** and other substances.

7. In dilute solutions, glycerin is decomposed by **potassium permanganate.** 8. Oxidizing agents, as **chromates, chlorinated lime, nitrohydrochloric acid, hydrogen peroxide,** or **manganese dioxide** with hydrochloric acid, convert glycerin into oxalic acid and carbon dioxide. When glycerin is rubbed with the dry **oxidizing agents** an explosion is likely to take place. Solution of hydrogen peroxide does not seem to react with glycerin under normal conditions. 9. Concentrated **sulfuric acid** with glycerin forms acrolein. 10. Glycerin may be made to combine with several organic and inorganic **acids.** 11. Glycerin unites with **alkalies** and **alkaline earths** to form compounds soluble in water, the former also soluble in alcohol, the latter not precipitated by carbon dioxide (N. S. D.). 12. Glycerin sometimes precipitates **alkaloidal salts** from their aqueous or acidulated solutions. (℞ 280.)

Glyceritum Boroglycerini.—Glycerite of boroglycerin is decomposed by **water** and the boric acid liberated may be precipitated. (℞ 281–283.)

Glycerophosphates.—1. The glycerophosphates are easily decomposed and are preferably given alone. Those of the alkalies may give no precipitate when decomposed, but those of the other metals will have the incompatibilities of the bases. 2. **Citric acid** increases the solubilities. 3. **Alkalies** decompose them, making phosphates and liberating glycerin. 4. The glycerophosphates of the heavy metals are not very soluble in **water** or **alcohol.**

Glycerylis Trinitras.—1. Nitroglycerin explodes violently on **percussion.** 2. When impure it gradually decomposes, forming glyceric, oxalic, and nitrous acids, and the gases formed may burst the container (M. & M., II, 619). 3. **Alkalies** or their **carbonates** decompose it when dissolved in alcohol, forming a nitrite, nitrate, acetate, oxalate, and formate. If spirit of nitroglycerin is spilled, a solution of potassium or sodium hydroxide should be poured on it at once.

Glycyrrhiza.—1. Mineral acids precipitate glycyrrhizin from aqueous preparations of glycyrrhiza. 2. Solutions of salts of many of the **heavy metals** give precipitates with glycyrrhiza solutions. 3. Soluble **lime salts,** as calcium hydroxide, hypophosphite, or lactate, give precipitates of calcium glycyrrhizate. 4. Glycyrrhiza solutions form insoluble compounds with many **alkaloidal salts.** (℞ 284.)

Guaiacolis Benzoas, *Benzosol.*—1. **Alkalies** split it up into guaiacol and a benzoate.

Guaiacolis Carbonas, *Duotal.*—1. Guaiacol carbonate is decomposed by **alkali hydroxides,** forming a carbonate and guaiacol. 2. With tincture of **ferric chloride** it does not give the guaiacol color. 3. Rubbed with **chloral hydrate** it slowly gives a mass.

Guaiacolis Salicylas.—1. **Alkali hydroxides** and **carbonates** break it up into guaiacol and a salicylate. 2. The alcoholic solution is colored red by **ferric chloride.**

Guaiacolum.—1. The incompatibilities of guaiacol are similar to creosote. [See CREOSOTUM.] 2. It combines with some **acids** to form crystalline compounds. 3. With **ferric chloride** it gives at first a blue color, changing to green on adding more ferric chloride. 4. It reduces a few salts, as **gold chloride** and **silver nitrate,** to the metallic condition. (℞ 285.)

Guaiacum.—1. An alcoholic solution of the fresh resin of guaiac is colored blue by **nitric acid, chlorine, potassium ferricyanide, potassium permanganate, ferric chloride, gold chloride, ozone, spirit of ethyl nitrite,** many **enzymes,** and other **oxidizing agents.** This is due to the action on the guaiaconic acid. With an excess of the oxidizing agent the color is changed to green and then red. Continued exposure to light or heat deprives the guaiac of the property of being colored blue by oxidizing agents, and causes the resin to turn green. Tincture of ferric citrochloride does not give the blue or green color that tincture of ferric chloride does. 2. It dissolves in a solution of **potassium or sodium hydroxide,** forming unstable compounds which are decomposed by diluting with water (N. S. D.). 3. Either in substance or in tincture, guaiac sometimes gives a blue color with mucilage of **acacia.** [See ACACIA, No. 8.]

Homatropina.—The incompatibilities are similar to those of atropine [See ATROPINA.]

Hydrargyri Bichloridum, *Mercuric Chloride, Corrosive Mercuric Chloride, Corrosive Sublimate.*—1. Mercury bichloride in aqueous solution is slowly and partly changed to hydrochloric acid and calomel, which change is prevented by ammonium chloride or hydrochloric acid. 2. It is precipitated by solutions of **fixed alkali hydroxides** or **lime water.** The precipitate is the orange-yellow mercuric oxide if the hydroxide is in excess, or if the mercuric salt is in excess it will be the red-brown basic chloride of mercury. The precipitation is prevented to some extent by the presence of citrates, tartrates, glycerin, sugar, and acacia, although there may form a steel-gray precipitate in a few days. 3. **Ammonium hydroxide** gives the "white precipitate," or "ammoniated mercury," mercurammonium chloride. 4. **Ammonium carbonate** acts like ammonium hydroxide. 5. **Potassium carbonate** or **sodium carbonate** precipitates solutions of mercuric chloride as the red-brown oxychloride, which by excess of the carbonate with heat is converted into the yellow mercuric oxide. Citrates, tartrates, glycerin, acacia, and sugar prevent the precipitation to some extent. 6. A solution of mercuric chloride with **sodium** or **potassium bicarbonate** gives an effervescence and a white precipitate. If the mercuric salt is in excess the precipitate turns to a purplish-red in a few hours. If the bicarbonate is in excess the precipitate remains white for some time but may change ultimately to the purplish-red. Various oxychlorides are formed (M. & M., III, 217). 7. **Borax** precipitates the red-brown basic mercuric chloride, and with glycerin previously added to the borax, the precipitate is white. 8. The soluble **iodides** precipitate solutions of mercuric chloride as mercuric iodide, first reddish-yellow, becoming red. This precipitate dissolves in excess of the soluble iodide or excess of mercuric chloride, forming complex compounds. If potassium iodide has been used in excess, the complex is approximately represented by the formula $(KI)_2HgI_2$. A solution of this double salt is known as "Mayer's reagent" and precipitates nearly all alkaloids from solutions of their salts; the presence of alcohol prevents this precipitation to some extent. 9. The soluble **bromides** precipitate from concentrated solutions of mercuric salts the white mercuric bromide, which is soluble in excess of the soluble bromide or in excess of the mercuric salt (P. & J., 169). Ordinarily no trouble is experienced in combining these. 10. Mercuric chloride combines with the **chlorides** of the alkalies to form complex compounds, which are more soluble in water than mercuric chloride. 11. **Hypophosphorous acid** and **hypophosphites** reduce mercuric chloride to mercurous chloride and finally to metallic mercury. 12. **Arsenites** in alkaline mixtures reduce mercuric chloride to calomel and then metallic mercury, and are changed to arsenates. 13. A solution of **albumin** is coagulated by mercuric chloride; this is prevented by the presence of sodium or ammonium chloride. 14. **Alcohol** slowly reduces mercuric chloride to calomel. 15. Mercuric chloride precipitates from concentrated aqueous solutions nearly all **alkaloidal salts**, some **neutral** and **bitter principles**, some **glucosides**, **antipyrine**, **piperazine**, **tannic acid**, **vegetable extractive matter**, and **gelatin**. 16. **Sugar**, **gum**, **fats**, and **resins** slowly decompose it, precipitating calomel; heat and light hasten the reaction.

17. **Hydrogen sulfide** and the **alkali sulfides** with solutions of mercuric chloride give mercuric sulfide. The precipitate first formed is white and consists of the union of mercuric chloride and mercuric sulfide; by further addition of the precipitating agent the black mercuric sulfide is formed. 18. Soluble **phosphates** precipitate from neutral solutions of mercuric chloride the white mercuric phosphate. 19. **Sulfurous acid** and soluble **sulfites** reduce mercuric chloride to mercurous chloride. 20. **Thiosulfates** added to a solution of mercuric chloride give a white precipitate, then yellow, then black. The black precipitate is sulfide of mercury. 21. Mercuric chloride is reduced by metallic **copper**, **zinc**, or **iron**, in the presence of water, to calomel, and then metallic mercury. 22. **Tartar emetic** reduces corrosive sublimate and precipitates it as calomel; in alkaline mixtures metallic mercury is formed. 23. **Ferrous compounds** in alkaline mixtures with mercuric compounds are oxidized to ferric compounds, and reduce mercuric to mercurous. 24. According to some writers, corrosive sublimate is slowly reduced to calomel by **compound syrup of sarsaparilla** or by **honey** but not by pure syrup; the precipitation is retarded by sodium chloride (U. S. D.). 25. **Camphor** increases the solubility of mercuric chloride in alcohol or ether. 26. **Methylene blue** produces a lavender precipitate with mercuric chloride solutions. 27. **Silver nitrate** causes precipitates with mercuric chloride solutions. (℞ 286–293.)

Hydrargyri Chloridum Mite, *Calomel, Mercurous Chloride.*— 1. Calomel is changed to the black mercurous oxide by a solution of the **hydroxides** of **potassium, sodium, calcium,** or **barium.** 2. Solutions of the **carbonates** of the **fixed alkalies** convert calomel into a black mass, which is probably a mixture of the basic carbonate and oxide. 3. Calomel with **ammonia water** forms a black mixture of metallic mercury and mercuric ammonium chloride, NH_2HgCl (P. & J., 164). 4. **Ammonium carbonate** acts like ammonia water. 5. The soluble **iodides** in the presence of water convert calomel into yellow mercurous iodide, which is further decomposed by an excess of the soluble iodide, forming metallic mercury and mercuric iodide. This mercuric iodide combines with the soluble iodide to form a complex (K_2HgI_4) which is soluble in water. The presence of a little metallic mercury gives a green color with mercurous iodide. The color becomes more gray or black as the proportion of metallic mercury increases and the mercurous iodide decreases. 6. Soluble **bromides** act similarly to soluble iodides. 7. At one time it was thought that **sodium, potassium,** or **ammonium chloride** converted calomel into mercuric chloride and mercury. This idea has been quite thoroughly disproved, however; at least, there is not sufficient mercuric salt formed to be at all dangerous, and many workers have claimed that there is none whatever. 8. **Hydrocyanic acid** and soluble **cyanides** in aqueous solution convert calomel into metallic mercury and mercuric cyanide and chloride. 9. **Sodium bicarbonate** with calomel is said to produce corrosive sublimate very slowly. Whether any change takes place or not, calomel is more frequently given with sodium bicarbonate than without it. 10. Calomel with **alkali sulfites** in solution separates metallic mercury, and a double sulfite of the alkali and mercury goes into solution (M. & M., III, 216). 11. Solutions of **hydrogen sulfide** or **alkali sulfides** convert calomel into the black mercurous sulfide and metallic mercury. 12. **Iodine** changes calomel into mercuric chloride and mercuric iodide in the presence of water or alcohol. 13. A mixture of **iodoform** and calomel exposed to light gives red mercuric iodide and the odor of iodoform is lost. 14. Exposed to **sunlight** calomel darkens, due to the separation of metallic mercury; mercuric chloride is also formed. 15. Calomel is said to be changed to metallic mercury and mercuric chloride by heavy **trituration.** 16. Calomel is reduced to metallic mercury by **nitrous acid, spirit of ethyl nitrite, hypophosphorous acid,** and in alkaline mixtures by **arsenites** and **tartar emetic.** 17. Mercurous chloride is oxidized to mercuric compounds by **nitric** and **nitrohydrochloric acids, chlorine, bromine, iodine, hydrogen peroxide** (slowly), and in alkaline mixtures by **silver salts.** 18. Calomel reacts with the iodine in iodine compounds like **iodoform.** 19. **Soap** is generally alkaline and darkens calomel probably forming an oxide. 20. Calomel in the presence of moisture is darkened by certain alkaloids, such as **cocaine** or **pilocarpine.** The darkening is due to the formation of metallic mercury, while at the same time some mercuric chloride is formed, which combines with the alkaloid. 21. Calomel is slowly turned dark in the presence of moisture by **antipyrine,** but at once when sodium bicarbonate is mixed with it. Metallic mercury and a mercuric compound are formed. 22. Calomel is said to be changed to metallic mercury and mercuric *chloride by* **cane sugar** *even in the absence of moisture.* Considerable time is required for the change. **Milk sugar** gives the *reaction more quickly.* ***Acacia*** *and* ***tragacanth*** *have similar* properties but in a less degree. (℞ 294–297.)

Hydrargyri Cyanidum.—Mercuric cyanide, so far as the base is concerned, has incompatibilities similar to mercuric chloride, except that aqueous solutions are not precipitated by alkali hydroxides, carbonates, chlorides, or iodides on account of the formation of soluble complex compounds. [See HYDRARGYRI BICHLORIDI and ACIDUM HYDROCYANICUM.]

Hydrargyri Iodidum Flavum, *Protoiodide of Mercury.*—1. Yellow mercurous iodide is rapidly darkened by the **light,** particularly in the presence of **moisture.** The darkening is in proportion to the decomposition into mercuric iodide and mercury. 2. With solutions of **iodides** mercurous iodide is decomposed, forming mercuric iodide and mercury. [See HYDRARGYRI CHLORIDUM MITE, No. 5.] 3. Mercurous iodide is reduced and oxidized by the same reagents that reduce and oxidize calomel. (℞ 298.)

Hydrargyri Iodidum Rubrum, *Biniodide of Mercury.*—1. With soluble **iodides** red mercuric iodide forms soluble complex compounds. 2. The incompatibilities are quite similar to those of mercury bichloride. 3. Mercuric iodide is soluble in a solution of sodium thiosulfate, potassium chloride, and many ammonium salts. (℞ 299.)

Hydrargyri Oxidum Flavum.—1. Yellow mercuric oxide combines with most **acids** to form salts. 2. With **mercuric chloride** in solution it forms the red-brown oxychloride. 3. With **potassium iodide** it forms the complex mercuric potassium iodide (K_2HgI_4) (P. & J., 163). 4. Mercuric oxide forms mercuric chloride with solutions of **alkali chlorides** (P. & J., 163). 5. It is reduced by many substances as gums, sugar, and lard. 6. **Cocaine hydrochloride** produces mercuric chloride with yellow oxide of mercury (M. I.). 7. Mercuric oxide darkens in the **light**, forming mercury and oxygen (M. & M., III, 222) or mercurous oxide (N. S. D.). (℞ 300.)

Hydrargyri Oxycyanidum.—1. Mercuric oxycyanide in water gives a white precipitate with **ammonium chloride** soluble in excess of the ammonium salt. 2. **Tannic acid** gives a yellow color and then gradually a tan-colored precipitate. 3. **Hydrogen sulfide** produces a black precipitate with an aqueous solution of the salt. 4. **Potassium iodide** yields a red precipitate, soluble in an excess of the iodide.

Hydrargyri Salicylas.—1. Mercuric salicylate is decomposed by a solution of **sodium hydroxide** or **carbonate**, giving a soluble complex compound. 2. Solutions of **chlorides, bromides** or **iodides** dissolve it. 3. Strong mineral **acids** decompose it. 4. **Hydrogen sulfide** or ammonium sulfide gives no color or precipitate. 5. A solution of **ferric chloride** gives a violet color.

Hydrargyri Succinimidum.—1. Mercuric succinimide does not precipitate albumin. 2. It is decomposed by **light.** 3. **Sodium hydroxide** produces a yellowish-white precipitate from which mercury separates upon standing. 4. **Iodides** give a yellow precipitate.

Hydrargyrum Ammoniatum.—1. White precipitate is decomposed by solutions of the **fixed alkali hydroxides** or **lime water,** liberating ammonia and forming the yellow mercuroxy-ammonium chloride (M. & M., III, 208). 2. **Water** decomposes it slowly, forming mercuroxy-ammonium chloride and ammonium chloride (M. & M., III, 208). 3. When ammoniated mercury is triturated with **iodine,** the mixture will puff up after a time from the spontaneous decomposition of the nitrogen iodide formed in it; but in the presence of alcohol the decomposition takes place suddenly and with violent explosion (N. S. D.). 4. Ammoniated mercury is dissolved by a solution of **sodium thiosulfate** in the cold, evolving ammonia; if heat is applied mercuric sulfide is formed.

Hydroquinone.—1. Hydroquinone is oxidized to quinone by **ferric chloride, chlorine,** and **dilute nitric acid** (M. & M., II, 730). 2. Strong **nitric acid** oxidizes it to oxalic acid (M. & M., II, 730). 3. An aqueous solution turns brown in the **air**, more quickly in the presence of an alkali. 4. A strong aqueous solution is precipitated by **ferric chloride**, soluble in excess of the latter (M. & M., II, 730).

Hyoscyamina.—1. Hyoscyamine is converted into atropine by **heating** to 248° F., or above its melting point, for five or six hours. 2. It is not precipitated by bicarbonates or ammonium carbonate, except from concentrated solutions. 3. It is easily decomposed by warming with **alkalies** or **water.** 4. It has about the same incompatibilities as atropine. [See ATROPINA.]

Ichthammol, *Sulfonated Bitumen, Ichthyol, Ammonium Ichthyolsulfonate, Isarol.*—1. **Acids** combine with the ammonia and precipitate the ichthyolsulfonic acid as a dark resinous mass which adheres to the sides of the vessel, unless the acid be quite dilute. 2. Alkaline **hydroxides** or **carbonates** liberate ammonia. 3. **Ferric salts** in solution with ichthammol form compounds of iron and ichthammol, while at the same time a partial oxidation of ichthammol is brought about by the ferric salt. **Ferrous salts** precipitate the sulfo-ichthyolate of iron. 4. Ichthyol gives precipitates with solutions of many **metallic salts** as ichthyolsulfonates; some of the salts that give precipitates are **alum, ammonium bromide, ammonium chloride, calcium chloride, copper sulfate, lead acetate, magnesium sulfate, potassium bromide, potassium iodide, silver nitrate, sodium chloride,** and **zinc sulfate.** 5. **Mercuric chloride** does not give a precipitate at once, but does on standing and is reduced to calomel. 6. Solid **iodine** gives a black mixture. Tincture of iodine gives no precipitate with a dilute solution, but makes it much darker. Iodine with ichthyol and petrolatum gives a blue and then a green-black color. 7. It combines with **formaldehyde** to give ichthoform. 8. With **albumin** it gives ichthyol albuminate (ichthalbin). 9. With **alkaloids** or their salts, compounds are formed of much firmer consistency than ichthammol and less soluble (M. I.). 10. **Hydrogen peroxide** destroys the odor. 11. Rubbed with **ammonium chloride** it gives a stiff mass, and some effervescence can be seen. 12. **Alcohol** gives a precipitate, but ichthammol is said to be soluble in a mixture of alcohol and ether. 13. Triturating with crystallized **phenol**, ichthammol is made thinner. (℞ 301–307.)

Infusa.—1. Infusions and decoctions generally contain some tannic acid and albuminous and extractive matters, which are precipitated by many of the metallic salts, such as **mercury bichloride, lead acetate, silver nitrate, tartar emetic** or **ferric chloride.** 2. When the tannic acid is present in considerable amount they are incompatible with **alkaloidal salts**, because of the formation of the insoluble alkaloidal tannate. 3. Many of the infusions and decoctions are decolorized by a solution of **lead subacetate** or by **aluminum hydroxide.** 4. They should not be mixed with alcoholic solutions of substances insoluble in water.

Iodates.—1. Iodates sometimes occur as impurities in iodides, and in such cases they liberate iodine when brought in contact with **acids.** 2. Iodates in solution with a dilute mineral acid are reduced to iodine by **hypophosphites, iodides, bromides, nitrites, arsenous acid, ferrous compounds,** and **morphine.**

Iodoformum.—1. Exposed to direct **sunlight**, iodoform is completely oxidized by the **air**, forming carbon dioxide, iodine, and water (M. & M., III, 33). 2. Iodoform in solution or mixed with a **fatty substance** decomposes in the light, liberating iodine, which for a time forms colorless addition compounds with the fatty substance. 3. **Tannin** slowly deodorizes and decomposes iodoform. 4. **Peruvian balsam** deodorizes it and forms a compound with it.

5. Iodoform with a solution of an **alkali hydroxide** gives an iodide and a formate. 6. **Silver nitrate** in solution decomposes iodoform, producing silver iodide, nitric acid, and carbon monoxide. Triturated dry with silver nitrate, violent reaction takes place with the possible formation of silver iodide, carbon dioxide, and nitrogen tetroxide. 7. The color of a mixture of **calomel** and iodoform is yellow, but when it is exposed to light the color changes to red, due to the formation of the red iodide of mercury. Perhaps some chloroform is also produced. 8. When gently heated with yellow

mercuric oxide iodoform is decomposed, giving carbon monoxide, formic acid, mercuric iodide, and water (M. & M., III, 33). 9. Iodoform with **hydrogen peroxide** seems not to be readily affected, but when in solution with ether, hydrogen peroxide liberates iodine. (℞ 308–311.)

Iodophthaleinum Solubile, *Tetiothalein Sodium, Tetraiodophenolphthalein Sodium.*—1. Soluble iodophthalein may absorb **carbon dioxide** from the air and liberate free phthalein. 2. **Heat** darkens it and liberates vapors of iodine. 3. **Hydrochloric acid** produces a yellow precipitate.

Iodum.—1. In aqueous solution fixed **alkali hydroxides** or **carbonates** decolorize iodine, forming soluble iodides and iodates. 2. Iodine with **ammonia water** slowly becomes colorless, forming chiefly ammonium iodide, with some ammonium iodate. There is a likelihood of there being precipitated a dark brown powder, the "iodide of nitrogen," which when dry is easily and violently explosive. Explosive compounds of nitrogen and iodine may also be formed by many other substances, and great care is necessary in handling combinations where such a reaction may occur. 3. **Hypophosphites** are changed to phosphates, and the iodine is reduced to an iodide. 4. **Thiosulfates** form sulfates and a colorless iodide. 5. Iodine with **ammoniated mercury** sometimes forms the explosive iodide of nitrogen. 6. In the presence of water iodine combines with metallic **iron** to form ferrous iodide. 7. In the presence of an alkali iodine changes **ferrous compounds** to ferric and **antimonous** to antimonic. 8. **Arsenous compounds** are changed to arsenic by iodine in the presence of an alkali. 9. **Starch** and preparations containing it are turned blue by iodine. By warming the iodized starch, the color is destroyed, but on cooling it again assumes its blue color. 10. Iodine bleaches **litmus** and other vegetable colors. 11. It combines with many of the **fixed oils** to form additive compounds. 12. It combines with many **volatile oils**, and in some cases, as with **turpentine**, it acts with almost explosive violence. 13. Tincture of iodine free from an iodide or hydriodic acid gives a gelatinous mass with **collodion**, which slowly redissolves after some hours or days. The presence of potassium iodide prevents the gelatinization. 14. In solution iodine slowly forms hydriodic acid. 15. Iodine, either in alcoholic solution or dissolved in an aqueous solution of potassium iodide, precipitates nearly all **alkaloids** from aqueous solutions of their salts. A large amount of alcohol present may prevent the precipitation. The precipitates from water are generally red-brown and amorphous. Caffeine and theobromine in dilute solutions are not precipitated by iodine.

16. **Sulfites** form sulfates and an iodide. 17. **Chlorine** forms iodic and hydrochloric acids, and in the presence of potassium hydroxide a periodate. 18. **Chlorates** in the presence of an acid form chlorides and iodic acid. 19. Iodine changes **mercurous compounds** either in acid or alkaline mixtures to mercuric compounds, and the iodine is reduced to an iodide. 20. Iodine combines directly with metallic **mercury**, forming mercurous iodide and then mercuric iodide. 21. **Nitric acid** slowly oxidizes iodine to iodic acid. 22. Iodine combines with most metals and with many non-metals, such as **chlorine, phosphorus,** or **arsenic.** 23. With iodine in a concentrated solution **potassium cyanide** forms potassium iodide and iodide of cyanogen (M. & M., II, 342). 24. Iodine reacts with **tannic acid** and water. [See ACIDUM TANNICUM No. 7.] 25. Iodine with **alcohol** heated with a fixed alkali yields iodoform. 26. **Methyl alcohol** is slowly oxidized by iodine to formaldehyde and formic acid. 27. Equal proportions of **resorcin** and iodine make a preparation soluble in water and devoid of caustic effect. (℞ 312–320.)

Lactosum.—1. Milk sugar in alkaline solution reduces salts of **copper.** 2. **Nitric acid** first inverts milk sugar and then forms mucic and saccharic acids, and if heated forms tartaric and racemic acids and finally oxalic acid. 3. Dilute **acids** invert milk sugar, forming dextrose and galactose. 4. **Chromic acid** with milk sugar yields aldehyde (M. & M., IV, 553). 5. **Alkali permanganates** oxidize milk sugar. 6. **Silver oxide** oxidizes it, forming oxalic, glycollic, and lactonic acids (M. & M., IV, 553). 7. Milk sugar with a solution of **iodine** and sodium bicarbonate yields a little iodoform (M. & M., IV, 553). 8. Triturated with **oxidizing agents,** it is likely to cause an explosion.

Liquor Acidi Arsenosi.—This solution contains free arsenous and hydrochloric acids. [See ARSENI TRIOXIDUM and ACIDUM HYDROCHLORICUM.]

Liquor Ammonii Acetatis.—Solution of ammonium acetate sometimes contains ammonium carbonate or free acetic acid. [See CARBONATES, AMMONIUM, and ACIDUM ACETICUM.]

Liquor Arseni et Hydrargyri Iodidi.—1. Donovan's solution liberates iodine on exposure to **air.** It has been suggested to keep a globule of mercury in it to prevent this change. 2. It precipitates nearly all **alkaloids** from aqueous solutions of their salts. 3. **Alkali hydroxides** precipitate the mercury as the oxide. 4. **Silver nitrate** is precipitated as silver iodide. [See HYDRARGYRI BICHLORIDUM, ARSENI TRIOXIDI, and ACIDUM HYDRIODICUM.]

Liquor Calcii Hydroxidi.—1. Lime water and **olive oil** (also cottonseed oil, etc.) when mixed together form an emulsion of the water-in-oil type. The lime unites with the oil to produce a metallic soap, calcium oleate, which is insoluble in water but soluble in the oil, reducing the surface tension of the latter and promoting, thereby, a water-in-oil emulsion. This is in contrast to an alkali soap, which is water-soluble and produces oil-in-water emulsions. Equal parts of lime water and oil produce a heavy creamy emulsion. An excess of oil makes the emulsion more permanent, while an excess of lime water jeopardizes stability, finally reaching a point where there is free water and a "broken" emulsion. Under such conditions it is probably preferable to change the emulsion type, using an emulsifying agent of the oil-in-water type, as sodium oleate, and eliminating the lime water entirely as it only confuses the issue if allowed to remain. The lime water in such mixtures can have no therapeutic effect, for the lime is neutralized in making a soap. The addition of acids and salts to prescriptions of this character is apt to destroy the soap, thus breaking the emulsion. Consequently, each prescription should be handled upon its own merits, depending upon its constituents and their relative proportions.

2. Lime water forms insoluble compounds with **tannic, tartaric, gallic, citric,** and **oxalic acids.** The compounds are generally more soluble in cold water than in hot. 3. **Heat** tends to throw the calcium hydroxide out of solution. 4. Lime water has all the incompatibilities of the fixed alkali hydroxides and of the calcium salts. 5. Lime water precipitates **ichthammol.** [See LIQUOR POTASSII HYDROXIDI and CALCIUM.] (℞ 321–328.)

Liquor Chlori Compositus.—1. Compound chlorine solution contains a little potassium chloride in addition to the chlorine. [See CHLORUM and ACIDUM HYDROCHLORICUM.]

Liquor Ferri Dialysati.—1. Many **organic acids,** the **alkali hydroxides** and **carbonates,** some **salts,** and **acacia** precipitate or gelatinize the solution of dialyzed iron. 2. It combines with **Fowler's solution,** precipitating the arsenic combined with ferric hydroxide.

Liquor Formaldehydi, *Formalin, Formaldehyde.*—1. Solution of formaldehyde slowly deposits the solid crystalline paraformaldehyde which is a condensation product and which is decomposed by high heat, changing back to formaldehyde. It is slowly oxidized to formic acid (N. S. D.). 2. Solution of formaldehyde is decomposed by **alkalies.** 3. **Ammonia** unites to form methenamine. 4. **Solution of hydrogen peroxide** or **iodine** oxidizes solution of formaldehyde to formic acid. 5. **Potassium permanganate** probably oxidizes it to formic acid and formates and the heat generated volatilizes the gas more quickly. When these two are used together in disinfecting a room it is at the expense of the formaldehyde. 6. Formaldehyde is a strong reducing agent, reducing salts of **gold** and alkaline solutions of salts of **silver** and **copper.** 7. It enters into direct combination with **albumin, casein, gelatin, agar,** and **starch.**

Liquor Hydrogenii Peroxidi, *Solution of Hydrogen Dioxide.*—1. A solution of hydrogen peroxide generally contains a free mineral acid, which has been added to aid preservation. In such a case the solution would have the incompatibilities of the acid. 2. Hydrogen peroxide slowly undergoes decomposition, liberating oxygen, and if the bottle is tightly corked a sufficient pressure may be produced to burst the bottle. Heat and sunlight increase the tendency to decompose. 3. Caustic **alkalies** decompose hydrogen peroxide, forming oxygen and water. 4. Hydrogen peroxide reduces **potassium permanganate** and is itself reduced; the products in a solution acidulated with sulfuric acid are manganous sulfate, potassium sulfate, water, and oxygen. 5. It bleaches **litmus** and most organic colors.

6. Hydrogen peroxide is a strong oxidizing agent, changing **mercurous** compounds to mercuric, **ferrous** to ferric, **arsenous** to arsenic, **hypophosphites** to phosphates, and **sulfites** to sulfates. 7. It liberates sulfur from **sulfides.** 8. With reduced **iron** and water it gives a little effervescence, and in a few hours a brown precipitate of ferric hydroxide or oxide. 9. **Chromic salts** in alkaline mixtures are oxidized to chromates. A **chromate** in the presence of an acid is reduced to a chromic salt (M. & M., II, 723). 10. **Lime water** produces a precipitate with solution of hydrogen peroxide. 11. **Iodides** are oxidized, liberating iodine. 12. Bromine is liberated from **hydrobromic acid.** 13. It reduces **gold, silver, mercuric mercury,** and **platinum** from their oxides (P. & J., 480). 14. Reaction takes place when hydrogen peroxide and **formaldehyde** are mixed, producing formic acid. If the mixture is made alkaline a brisk effervescence ensues. 15. Hydrogen peroxide slowly reacts with **alcohol.** 16. It gives a blue color with a tincture of **guaiac** if the guaiac has not been exposed to

air and light too long. 17. With **tannic** or **gallic acid** it slowly gives off some gas and colors the solution yellow brown. 18. Hydrogen peroxide oxidizes **phenol** to pyrocatechin, hydroquinone, and quinone (M. & M., III, 832). A mixture of hydrogen peroxide and phenol becomes yellow to red brown in a few hours. 19. It coagulates a solution of **albumin.** 20. Quite a number of substances decompose hydrogen peroxide into water and oxygen while they themselves are not affected. Some examples of these are **manganese dioxide, sodium sulfate, potassium bromide, potassium chloride, charcoal,** and some **organic substances** (M. & M., II, 724). 21. **Acetone** and a solution of hydrogen peroxide are said to form a white crystalline precipitate of explosive nature. (℞ 329–331.)

Liquor Plumbi Subacetatis, *Goulard's Extract.*—1. Goulard's extract is alkaline to litmus. 2. It is precipitated by nearly all **organic acids,** except formic, butyric, acetic, and lactic acids. 3. It precipitates from aqueous solutions many **alkaloids, glucosides,** and **neutral principles.** 4. It unites readily with liquid or solid **fats,** making emulsions. 5. Lead subacetate has all the incompatibilities of lead acetate.

6. It precipitates **albumin** and **soap.** 7. **Mucilage of acacia** is gelatinized by a solution of lead subacetate, but when both are diluted with water stringy masses are formed. 8. Lead subacetate precipitates concentrated solutions of **antipyrine.** 9. A solution of **phenol** gives a precipitate with it. This can be prevented by glycerin or considerable dilution with water. 10. It precipitates organic coloring matters. 11. A saturated solution of **boric acid** in excess gives a white precipitate with lead subacetate. [See PLUMBI ACETAS.] (℞ 332–339.)

Liquor Potassii Arsenitis.—1. For many years Fowler's solution was prepared with a marked excess of potassium bicarbonate. During the process of manufacture the excess of bicarbonate was changed to potassium carbonate, and consequently the solution had the incompatibilities of a carbonate as well as those of a soluble arsenite. In the formula in the U. S. P., XI, the potassium bicarbonate was greatly reduced, and consequently, since the product is no longer excessively alkaline, many of its former incompatibilities have been eliminated. Likewise, the compound spirit of lavender was eliminated, and this too eliminates other cases of incompatibilities. The prescriptions in this volume which contain Fowler's solution may therefore react differently, dependent upon the source of the Fowler's solution being used. [See CARBONATES and ARSENI TRIOXIDUM.]

Liquor Potassii Hydroxidi.—1. Solutions of potassium hydroxide and sodium hydroxide have practically the same incompatibilities. In aqueous solution they combine with **acids** to form salts. 2. Exposed to the **air** they absorb carbon dioxide. 3. In the presence of water and heat they liberate **ammonium** from its compounds. 4. They precipitate solutions of salts of nearly all other common **metals** except arsenic, and the precipitate is a hydroxide, except in case of **silver**, **mercury**, and **antimony**, in which cases it is an oxide. The precipitation is prevented or hindered with salts of **mercury**, **lead**, **copper**, **antimony**, **aluminum**, **iron**, **zinc**, and **calcium**, by the presence of sugar, glycerin, acacia, citrates, tartrates, and other organic substances. 5. **Calomel** is turned black, due to the formation of mercurous oxide. 6. The alkali hydroxides precipitate nearly all of the **alkaloids** from aqueous solution of their salts, the precipitate being the free alkaloid. In some cases the precipitate is soluble in an excess of the hydroxide. The precipitation is sometimes prevented by alcohol which is a solvent for the alkaloids. 7. They decompose some of the **alkaloids**, such as atropine, hyoscyamine, cocaine, and aconitine, when left in contact for some time, or more quickly when heated. 8. With **fats** and **fixed oils** they form glycerin and a salt (soap) of the fat acid. 9. With **resins** they form insoluble resin soaps. 10. They decompose some substances like **salol** and **oil of wintergreen.**

11. **Gallic acid** combines with the hydroxides, forming compounds that vary in color from a green to a yellow or brown. [See ACIDUM GALLICUM, Nos. 1 and 2.] 12. **Tannic acid** combines with the hydroxides, giving various colors on standing. [See ACIDUM TANNICUM, No. 2.] 13. Potassium hydroxide with a concentrated solution of **tartaric acid** gives a precipitate of cream of tartar. 14. **Chloral hydrate** is decomposed by the alkali hydroxides, giving chloroform and a formate of the base. 15. Alkali hydroxides decompose many of the **glucosides** when warmed with them. 16. They dissolve some principles, as **santonin** and **cantharidin.** [See POTASSIUM.]

Liquor Sodii Silicatis.—1. This solution is precipitated by **alcohol**, concentrated mineral **acids**, or dilute acids with heat. 2. It gelatinizes mucilage of **acacia**. 3. It is strongly alkaline. 4. It forms insoluble silicates with most **metals**.

Lithium.—1. The soluble lithium salts are precipitated from their solutions by soluble **carbonates**, the precipitate being lithium carbonate. 2. Soluble **phosphates** precipitate lithium phosphate. 3. With the exception of the carbonate and phosphate, the common lithium salts are generally soluble in water and in alcohol. (℞ 340.)

Magnesii Oxidum, *Magnesia.*—1. Magnesia combines with **acids** to form salts. 2. With fifteen times its weight of **water** it soon forms a gelatinous mass, due to the formation of magnesium hydroxide. Magnesium hydroxide is slightly soluble in water, and its action is similar to that of the fixed alkalies but weaker. 3. With sixteen times its weight of **copaiba** magnesia makes a thick or solid mass on standing, the copaiba combining to form magnesium copaivate. 4. Magnesia absorbs water and **carbon dioxide** from the air. [See MAGNESIUM and LIQUOR POTASSII HYDROXIDI.] (℞ 341–345.)

Magnesium.—Soluble salts of magnesium in concentrated aqueous solutions are precipitated: 1. by the **fixed alkali hydroxides** and **calcium hydroxide**, as magnesium hydroxide; 2. by the normal **carbonates** of the fixed alkali metals, as basic carbonate of magnesium; 3. by the alkaline **phosphates**, as magnesium phosphate; 4. by alkaline **arsenates**, as magnesium arsenate; 5. by soluble **sulfites, oxalates,** or **tartrates**, as magnesium sulfite, oxalate, or tartrate respectively; 6. by **salicylates** as a basic magnesium salicylate. 7. **Ammonium hydroxide** or **carbonate** scarcely precipitates magnesium salts, and may prevent to some extent the precipitation by the fixed alkali hydroxides and carbonates. (℞ 346.)

Manganum.—1. Salts of manganese in aqueous solution are precipitated by the fixed **alkali hydroxides** as manganous hydroxide, white but soon turning brown in the air from oxidation. **Ammonium hydroxide** in the presence of ammonium salts scarcely precipitates manganous salts. 2. The alkali **carbonates, phosphates,** or **cyanides** precipitate the manganous carbonate, phosphate, or cyanide, all of which are white when first precipitated, but darken on exposure to air. 3. Manganous salts in alkaline mixture are oxidized to manganese dioxide by **chlorine, iodine,** and **hydrogen peroxide.** 4. Manganese dioxide is a strong oxidizing agent and therefore it should not be triturated with **organic matter** or **oxidizable substances.**

Mel.—1. The presence of honey prevents the precipitation of some of the metallic salts by the alkali hydroxides. 2. Honey decomposes **borax,** with liberation of boric acid, the reaction being somewhat similar to that between glycerin and **borax.** [See GLYCERINUM, No. 1.] 3. Honey when triturated with strong oxidizing agents, such as **potassium chlorate** or **potassium permanganate**, is likely to form an explosive mixture. 4. Water, added to resinous tinctures, precipitates the resin which adheres to the bottle; honey prevents to a considerable extent the formation of sticky masses and helps to keep the resin suspended.

Menthol.—1. Menthol when triturated dry gives a liquid or soft mass with many solids. [See page 281.] 2. **Potassium permanganate** in solution decomposes menthol. 3. Adding water to an alcoholic solution of menthol causes separation of the menthol as an oily liquid which may later crystallize out. 4. Many concentrated **acids** dissolve menthol, the addition of water precipitating it again. (℞ 347.)

Merbaphenum, *Novasurol.*—1. Merbaphen in aqueous solution is alkaline. 2. **Acids** precipitate diethylbarbituric acid. 3. **Ferric chloride** produces a flesh-colored precipitate with merbaphen.

Mercurochrome, *Mercurochrome-220 Soluble.*—1. Mercurochrome is precipitated from solutions by **acids** and **acid salts.** 2. It is incompatible with **alcoholic** solutions over 50 per cent in strength. 3. It is destroyed by **reducing sugars, aldehydes, heavy metal salts, chlorine,** and most **alkaloids** and **alkaloidal salts.** 4. Solution of **chlorinated soda** destroys its color. (℞ 348–349.)

Metaphen.—1. Metaphen is insoluble in **water,** but soluble in alkali solutions. 2. Solution of metaphen as it comes prepared is an alkaline solution and therefore stable. It may be diluted with water and will then keep for only one or two days when it will precipitate. The precipitate may be redissolved by the addition of a few drops of alkali solution.

Methenamina, *Hexamethylenamine, Urotropin, Formin, Hexamine.*—1. Hot **water** decomposes it. 2. It is somewhat alkaline and combines with **acids** to make salts which are generally soluble. With an excess of an acid it is slowly broken up into formaldehyde and an ammonium salt. This takes place more rapidly if warmed. 3. Rubbed dry with **aspirin** it makes a damp powder changing to a greenish mass in a few days. 4. Rubbed with **salicylic acid** it makes a stiff mass and with **thymol** a soft mass, becoming brown.

5. It liberates ammonia from **ammonium chloride.** 6. An aqueous solution is precipitated by **mercury bichloride** or **tannic acid,** if the solution is not too dilute. 7. With **hydrogen peroxide** it is said to form a compound

in which the peroxide is added on. 8. Saturated solutions of methenamine and **antipyrine** may be mixed without precipitation, but if a small amount of hydrochloric acid is added, crystallization takes place in a few minutes. The crystallization is retarded or prevented by dilution with water. Other acids act similarly but more slowly. The same product is formed when antipyrine, ammonium chloride, and formaldehyde are mixed with water. 9. A strong solution gives no precipitate with sodium phosphate, salicylate, or benzoate. 10. It forms a crystalline compound with **resorcin.** 11. Added to an excess of **silver nitrate** in solution, a precipitate is produced. 12. A powder of methenamine and **lithium benzoate** will get sticky or liquid in a few days, apparently without decomposition. A similar result occurs when mixed with **lithium carbonate, benzoic acid, sodium benzoate, sodium salicylate,** or **salol.** 13. With **sodium carbonate** or **bicarbonate,** ammonia is liberated if methenamine has been previously treated with a mineral acid. 14. Rubbed with **antipyrine** the odor of phenol appears and the mixture liquefies, ultimately changing to a brown crystalline mass. 15. Methenamine gives a damp powder to a mass with **phenol, menthol, lead acetate,** and **potassium acetate.** 16. It gives a dry powder when rubbed with sodium citrate, magnesium sulfate, citric acid, or acetophenetidin. (℞ 350–351.)

Methylis Salicylas.—1. Methyl salicylate, or artificial oil of wintergreen, gives with a dilute solution of a **ferric salt** a deep violet color, due to the formation of ferric salicylate. 2. **Alkali hydroxides** decompose it, forming methyl alcohol and a salicylate. 3. Methyl salicylate has incompatibilities quite similar to those of the soluble salicylates. [See ACIDUM SALICYLICUM.]

Methylthioninæ Chloridum, *Methylene Blue.*—1. Methylene blue is decomposed by a strong solution of **potassium** or **sodium hydroxide,** liberating the base as a violet precipitate. 2. **Reducing agents** cause the formation of a colorless substance, which again takes up oxygen, forming methylene blue. 3. Methylene blue is precipitated from its solution by **mercury bichloride.** 4. In aqueous solutions **potassium iodide** and **potassium bichromate** precipitate the base as an iodide and a chromate.

Morphina.—1. Morphine combines with **acids** to form salts. 2. Morphine is precipitated from solutions (not too dilute) of its salts by **ammonium, potassium, sodium, calcium, magnesium,** and **barium hydroxides,** by **carbonates** of the alkalies, and by **borax.** The precipitate is soluble in a large excess of the above-mentioned fixed hydroxides, but not so readily in the carbonates. Morphine tartrate is not precipitated by fixed or volatile hydroxides. 3. The **bicarbonates** of the alkalies precipitate only a portion of the morphine from neutral solutions of its salts; tartaric acid prevents the precipitation.

4. Morphine is precipitated from solutions of its salts by **lead subacetate** (not neutral lead acetate), by **potassium chromate**, and by the **general alkaloidal reagents.** 5. **Potassium cyanide** precipitates morphine usually as the free alkaloid, due to the alkalinity of the potassium salt, although some say that morphine cyanide is precipitated. 6. **Silver nitrate** is reduced by morphine and gives a red coloration (Sohn, 67). 7. **Ferric chloride** in nearly neutral solution gives a blue coloration, changing to a dirty green. This coloration is prevented or destroyed by excess of acid or alcohol. 8. **Nitric acid** gives a red color, changing to an orange and then a light yellow. 9. **Iodates** are reduced, liberating iodine. 10. **Gold chloride** precipitates morphine; the precipitate is first yellow, then blue, and finally purple. The gold is reduced. 11. **Nitrous acid** or **spirit of ethyl nitrite** produces a yellow color with morphine. Morphine is said to be converted into nitroso-morphine, pseudomorphine, and a base $C_{17}H_{21}O_5$ (M. & M., III, 436). 12. With **chlorine** a solution of morphine gives a yellow to an orange color, and if ammonia is added it is changed to red-brown. 13. **Chlorates** oxidize morphine. 14. Morphine is oxidized by an alkaline solution of **potassium permanganate**, forming an acid. With an acid solution of potassium permanganate a green coloration is produced. 15. **Iodine** unites with morphine to form iodomorphine (Watts, III, 1052). 16. In a moderately strong aqueous solution morphine is precipitated as the free alkaloid by **codeine.** [See ALKALOIDS.] (℞ 352.)

Myrrha.—1. Tincture of myrrh gives a heavy precipitate of resinous matter when mixed with **water.** The resin adheres to the container or forms masses which can not be distributed through the liquid. The addition of honey or glucose in an amount equal to that of the tincture will cause the precipitate to remain in smaller particles which can be distributed through the liquid. 2. With tincture of myrrh **hydrochloric acid** slowly gives a red-violet color. 3. Tincture of **ferric chloride** gives a deeper red-brown color. (℞ 353.)

Neocinchophenum, *Novatophan.*—1. Neocinchophen is only sparingly soluble in water. It is insoluble in dilute alkalies.

Olea Fixa.—1. Fixed oils with solutions of **alkali hydroxides** form water-soluble oleates (soaps) of the base and glycerin. 2. With lime water and oxides of many metals, "insoluble" soaps are formed. The latter are soluble in oil, however, and frequently act as emulsifying agents in external lotions, producing water-in-oil emulsions. 3. The olein of some fixed oils with **nitric acid** or **nitrous acid gas** forms the isomeric elaidin, which is solid. 4. Fixed oils absorb and combine with **bromine** and **iodine**, forming addition products. 5. Concentrated **nitric acid** and concentrated **sulfuric acid** give various color reactions with different oils. 6. Fixed oils do not dissolve readily in **alcohol**, except castor oil and croton oil, or in **glycerin.** [See LIQUOR CALCII HYDROXIDI.] (℞ 354–356.)

Olea Volatilia.—1. Volatile oils with concentrated **sulfuric acid** generally give a yellow color, turning brown and sometimes red. 2. Concentrated **nitric acid** gives color reactions with many oils. 3. **Potassium hydroxide** saponifies the resinified portions of the oils. 4. **Ferric chloride** gives colors with some of the oils. [See FERRICUM, Nos. 34, 35, 36, and 37.] 5. **Iodine** reacts violently with some oils, particularly the hydrocarbon oils. 6. In aqueous solution the addition of very soluble salts sometimes throws the oil out of solution.

Oleum Æthereum.—1. Ethereal oil with **water** is slowly decomposed, becoming acid. 2. The sulfuric acid is not precipitated by the general precipitants of this acid because it exists in the form of sulfovinates, which are soluble.

Oleum Amygdalæ Amaræ.—1. Oil of bitter almond contains chiefly benzaldehyde with a little hydrocyanic acid; the artificial oil consists of benzaldehyde. 2. Benzaldehyde is readily oxidized by the **air** and by **oxidizing agents**, forming benzoic acid, which may crystallize so as to form a mass. Alcohol prevents this to some extent. 3. With an aqueous or alcoholic solution of **potassium hydroxide** it gives benzyl alcohol and potassium benzoate. 4. **Ammonia water** converts it into crystalline hydrobenzamid, which is again resolved by acids into ammonia and benzoic aldehyde. A mixture of ammonia and the oil turns yellow on standing. 5. **Chlorine** converts it into benzoyl chloride. 6. Benzaldehyde with **resorcin** in the presence of hydrochloric acid forms a resin; **phenol** and **pyrocatechin** act similarly (M. & M., I, 472). 7. With an aqueous solution of **sodium bisulfite** a crystalline compound is produced. (℞ 357.)

Oleum Caryophylli.—1. Oil of clove dissolved in a little alcohol gives a bright green color when a solution of **ferric chloride** is added. If the solution of ferric chloride is quite dilute, a blue color is produced, which soon changes to yellow. Clove water gives a yellow or brown solution or precipitate with a solution of ferric chloride. 2. **Iodine** dissolves quietly in the oil. 3. **Nitric acid** changes its color to a deep red, and if heat be used the oil is converted into oxalic acid (U. S. D.). 4. Strong solutions of **alkalies** dissolve it.

Oleum Cinnamomi.—1. Oil of cinnamon dissolved in alcohol gives a brown color with a solution of **ferric chloride.** Cinnamon water with solution of ferric chloride gives a brown color and a slight precipitate. 2. With a saturated solution of **sodium bisulfate** the oil solidifies to a crystalline mass. 3. **Nitric acid** slowly oxidizes it to a crystalline mass of cinnamic acid. 4. Cinnamon water gives a turbidity with a solution of **lead acetate.**

Oleum Lini.—1. Linseed oil is ignited by **fuming nitric acid.** Nitric acid of sp. gr. 1.33 turns it green and afterwards brown. 2. **Alkali hydroxides** convert it into a soft soap. 3. An alkaline solution of **potassium permanganate** converts it into sativic acid (M. & M., III, 147). 4. Exposed to **air** the oil oxidizes and ultimately becomes solid. If the oil be distributed through cotton, the heat generated by the oxidation may be sufficient to cause ignition. 5. **Iodine** and **bromine** form additive compounds.

Oleum Menthæ Piperitæ.—1. Oil of peppermint and **phenol** develop a green color when mixed together. (℞ 358.)

Oleum Terebinthinæ.—1. **Chlorine** and **bromine** react so violently that the oil is frequently ignited. 2. **Iodine** is dissolved by oil of turpentine to form a green solution, which afterwards becomes hot and gives off vapors of iodine and hydriodic acid; and when considerable quantities of iodine and turpentine oil are brought suddenly together, explosion frequently ensues. 3. The oil when exposed to **air** slowly absorbs oxygen and forms a resinous substance, which is broken up into hydrogen dioxide and camphoric acid (U. S. D.). Oil of turpentine absorbs **oxygen** and gives formic and acetic acids, carbon dioxide, ozone, and resinous bodies. (Watts, v, 921.)

4. Heated with **chlorinated lime,** oil of turpentine yields chloroform. 5. If oil of turpentine is left in contact with **water,** it gradually changes into terpin hydrate. This reaction is hastened by the presence of nitric acid, or by alcohol. 6. **Nitric acid** converts the oil into resinous matter, the violence of the reaction and the products formed depending on the strength of the acid. Some of the products formed are acetic, propionic, butyric, paratoluic, and terebic acids. 7. Oil of turpentine with a small proportion of **sulfuric acid** is partially converted into terebene. 8. Dry **hydrochloric acid gas** with oil of turpentine forms a crystalline monohydrochloride of terpene. (℞ 359–361.)

Oleum Theobromatis.—1. Cacao butter is softened by **chloral hydrate, camphor, menthol, thymol, salol,** and other substances, the degree of softness depending upon the relative amounts of added material. The mixture can be hardened to some extent by allowing it to stand, or it may be necessary to add spermaceti or white wax as a stiffening agent. (℞ 214.)

Opium.—1. A solution of opium contains many alkaloids and other substances that are generally incompatible with the inorganic **salts, general alkaloidal reagents,** and many other compounds. 2. Tincture of opium gives a violet-red color with tincture of **iron.** [See MORPHINA and ALKALOIDS.]

Orthoform.—1. An aqueous solution of orthoform gives a transient color with tincture of **ferric chloride.** 2. It dissolves in solutions of **alkalies** and **alkali carbonates** and is decomposed by them. 3. Aqueous solutions are decomposed by **boiling.** 4. With a strong solution of **mercuric chloride** it gives a yellow flocculent precipitate.

Oxidizing Agents.—Strong oxidizing agents, such as chromic, nitric, and nitrohydrochloric acids, chromates, nitrates, chlorates, and permanganates, should not be triturated with or mixed with substances that are easily oxidized, as, for instance, **sulfur, sulfides, sulfites, hypophosphites, iodine, charcoal, tannic acid, phenol, honey, sugar, glycerin, starch,** and **vegetable matter.**

Pancreatinum.—1. An aqueous solution of pancreatin is precipitated by **heat, mineral acids, metallic salts,** absolute **glycerin,** strong **alcohol,** and **tannic acid.** 2. The activity is lessened by exposure to **acids or air.**

Paraldehydum.—1. Paraldehyde with fixed **alkali hydroxides** forms aldehyde resin which resembles colophony. 2. It is a strong reducing agent and is oxidized to an acid. 3. **Chlorine** forms substitution products. 4. **Hydrocyanic acid** combines with aldehydes to form nitrites (M. & M., I, 107). 5. Paraldehyde liberates iodine from **iodides.**

Pelletierinæ Tannas.—1. Pelletierine tannate in aqueous solution is precipitated by the **alkali hydroxides,** the precipitate being soluble in an excess of the fixed alkalies. 2. It is precipitated by solutions of the soluble salts of **lead, mercury** and **zinc.** 3. It reduces salts of **gold** and **silver.** 4. **Ferric chloride** gives a blue-black color.

Pepsinum.—1. Pepsin is rendered inert by **alkaline substances** or by prolonged contact with **alcohol.** 2. **Heat** destroys the proteolytic activity of pepsin solutions. 3. Excessive **agita-**

tion also destroys it. 4. Hydrochloric acid stronger than 0.5 per cent inhibits and destroys its activity. 5. It is precipitated by **tannic acid, mercuric chloride,** and many other metallic salts. 6. Pepsin is precipitated from aqueous solutions by **bismuth subcarbonate** but not by bismuth subnitrate. (℞ 362.)

Peroxides.—1. Metallic peroxides are decomposed by **water,** liberating oxygen. In the case of sodium peroxide the solution is strongly alkaline on account of the sodium hydroxide formed. In case of the peroxides of such metals as zinc, calcium, and magnesium, the decomposition is slow and the hydroxide of the metal does not go into solution to any extent. 2. **Acids** liberate hydrogen peroxide. 3. Peroxides are strong oxidizing agents and should not be mixed with **organic** or easily **oxidizable substances.** [See LIQUOR HYDROGENII PEROXIDI.]

Petrolatum.—1. Petrolatums, both solid and liquid, take up only a small amount of water, alcohol, or glycerin. 2. They dissolve small amounts of free **alkaloids,** but not alkaloidal salts. 3. They are not affected by **alkalies, reducing** or **oxidizing agents.** (℞ 363–364.)

Phenacainæ Hydrochloridum, *Holocain Hydrochloride.*—1. An aqueous solution is precipitated by **alkali hydroxides,** by **carbonates.** The alkalinity of glass containers frequently causes precipitation, and it is suggested that solutions be prepared in porcelain utensils. 2. An aqueous solution is precipitated by **chromic acid** and by many of the **alkaloidal reagents.** 3. The addition of **sodium hypochlorite** to a solution gives a flesh color with the separation of a violet precipitate.

Phenetsal, *Salophen.*—1. Phenetsal dissolves in solutions of **potassium** or **sodium hydroxide,** but is decomposed by them, liberating salicylic acid. 2. Tincture of **ferric chloride** with an alcoholic solution gives a brown-red to violet color.

Phenobarbitalum, *Phenylethylbarbituric Acid, Luminal.*—1. Phenobarbital is practically insoluble in **water** but soluble in alcohol. 2. It is soluble in solutions of **alkali hydroxides** and **carbonates,** but such solutions decompose upon standing. 3. With **potassium sulfocyanate,** phenobarbital forms a soft mass. (℞ 365.)

Phenobarbitalum Solubile, *Sodium Phenobarbital, Sodium Luminal.*—1. **Aqueous solutions** of sodium phenobarbital hydrolyze to phenylethylacetylurea and carbon dioxide. The rate of decomposition depends largely upon temperature, a 10 per cent solution having been reported as practically permanent for two months at 1° C. while at 39° C. it decomposed to the extent of 22 per cent in one month. 2. An aqueous solution of sodium phenobarbital is alkaline to litmus. 3. **Acids** precipitate phenobarbital from a solution of the sodium phenobarbital. 4. **Alkalies,** when boiled with it, liberate ammonia. 5. **Ammonium salts** precipitate it and liberate ammonia. 6. **Chloral hydrate** precipitates it and liberates chloroform. 7. A white precipitate is formed with either **mercury bichloride** or with **silver nitrate.** (℞ 366.)

Phenol, *Carbolic Acid.*—1. Phenol is soluble in 15 parts of **water.** The addition of an equal amount of glycerin to the phenol renders it soluble in all proportions with water. 2. Phenol is **oxidized** by contact with the **air** to a quinoid structure, becoming pink or red in color. Traces of ferric iron also produce this color change. 3. Phenol combines with concentrated solutions of **fixed alkali hydroxides** to form phenolates. It does not combine with alkali carbonates, except perhaps on boiling. 4. Phenol with solution of **ferric chloride** gives no change in color, but on adding water a green is produced and further dilution gives a violet-blue color. This violet-blue color is prevented or destroyed by most mineral and organic acids, by some salts, and by many organic substances such as alcohol, ether, and glycerin. 5. Adding phenol to a solution of **lead subacetate** (not lead acetate) or to the diluted solution of lead subacetate gives a sticky precipitate, which is soluble in alcohol. Glycerin tends to prevent it; a 10 per cent solution of phenol in glycerin gives no precipitate at once with solution of lead subacetate, but a 20 per cent solution does. 6. Phenol is scarcely, if at all, attacked by **iodine** (Watts, IV, 390). Pouring a mixture of equal parts of tincture of iodine and phenol into boiling water gives a colorless solution. In alkaline solution, iodophenols are formed. 7. Phenol coagulates aqueous solutions of **albumin.** 8. It coagulates **collodion,** separating the nitrocellulose as a gelatinous mass. 9. Pure **alcohol,** and to a less extent pure **glycerin,**

neutralizes the caustic and poisonous effects of phenol. 10. Phenol softens **oil of theobroma** when rubbed with it.

11. Phenol with **ammonia water** gives a colorless solution which slowly becomes green, then deep blue, and finally purplish-blue. 12. With **ammonia water** and a solution of **chlorinated soda** it gives a deep blue. 13. **Hydrogen peroxide** oxidizes it to pyrocatechin, quinone, and hydroquinone (M. & M., III, 832). The solution slowly becomes yellow to red-brown on standing. 14. **Potassium permanganate** oxidizes it to oxalic acid and carbon dioxide (N. S. D.). 15. **Nitric acid** oxidizes it to mono-, di-, and trinitrophenol. 16. **Nitrous acid** forms nitroso-phenol. **Spirit of ethyl nitrite** with phenol gives a yellow color, changing to a red-brown in a few minutes, then to a deep brown-red; after some hours a precipitate forms. 17. Phenol with strong **sulfuric acid** forms phenolsulfonic acid. 18. An aqueous solution of phenol with **bromine water** gives a crystalline precipitate of tribromo-phenol which is not very soluble in dilute alcohol. 19. Phenol reduces salts of several of the **metals**, as **silver**, **copper**, and **mercury**. 20. **Gelatin** is coagulated when phenol is added in excess to its aqueous solution. 21. On mixing aqueous solutions of phenol and **antipyrine** an oily liquid settles to the bottom. 22. A mixture of phenol and **oil of peppermint** develops a green color. 23. Crystalline phenol gives a soft mass or a liquid when triturated with **camphor**, **menthol**, **thymol**, and a large number of other chemicals. [See page 281.] These reactions are due in some cases to the formation of new chemical compounds, and in some cases probably to the fact that phenol is hygroscopic, and also that it liquefies when warmed by trituration. (℞ 367–370.)

Phenolphthaleinum.—1. Phenolphthalein is sparingly soluble in **water** but is soluble in alcohol. 2. Aqueous solutions of **alkali hydroxides** or **carbonates** dissolve it, producing a red color. Acids reprecipitate it from solution and destroy the color. Practically everything that is alkaline gives a red. 3. **Acids** seem to have no effect on phenolphthalein. (℞ 371.)

Phenolsulfonephthaleinum, *Phenol Red.*—1. Phenol red is sparingly soluble in water. 2. Solutions of **alkali hydroxides** or **carbonates** dissolve it readily with a deep red color in concentrated solution, to a violet tint in a weak solution. The red color is changed to orange or yellow by a slight excess of acid.

Phenylis Salicylas, *Salol.*—1. Salol in alcoholic solution gives a violet color when a dilute solution of **ferric chloride** is added to it. In aqueous solution no increase of color results. 2. **Bromine water** added to an alcoholic solution of salol will cause the formation of long needle-shaped crystals, consisting of a bromo-derivative. 3. Strong solutions of **alkalies** heated with salol saponify it, forming a salicylate and phenol. 4. When salol is triturated dry with many solids a mass or liquid results. [See page

281.] 5. A mixture of salol with 10 per cent of betanaphthol melts at 34° C.; with 17 per cent antipyrine it melts at 30° C.; with 14 per cent of urethane, at 29° C.; with 55 per cent menthol, at 28° C.; with 39 per cent chloral hydrate, at 17° C.; with 34 per cent thymol, at 13° C.; with 44 per cent camphor, at 6° C.; with 7.5 per cent sulfonal, at 34° C.; with 4 per cent acetophenetidin, at 37.5° C. (M. R., XXII, 98). (℞ 372–376.)

Phloridzinum.—1. Phloridzin exposed to the air in the presence of **ammonia** acquires a purple color. 2. Heating with dilute **acids** it is decomposed, forming sugar and other compounds.

Phosphorus.—1. Phosphorus is oxidized in the **air** forming oxides of phosphorus, and may cause fire. 2. A warm solution of **potassium** or **sodium hydroxide** or **lime water** with phosphorus gives a hypophosphite and phosphorus hydride gas. 3. In the presence of water, **chlorine, bromine,** or **iodine** oxidizes phosphorus and forms phosphoric acid, and hydrochloric, hydrobromic, or hydriodic acid. 4. Phosphorus is oxidized by **nitric acid, chromic acid, old oil of turpentine,** and other substances rich in oxygen. 5. When phosphorus is triturated with **potassium chlorate, chromic oxide, lead dioxide, mercuric oxide, silver oxide, potassium bichromate, potassium nitrate, sulfur,** or **sulfides,** explosion is likely to take place. (℞ 377.)

Physostigmina, *Eserine.*—1. Physostigmine is precipitated from aqueous solutions of its salts by the **general alkaloidal reagents,** except picric acid and platinum chloride. 2. **Alkalies** give a white precipitate which immediately turns pink and dissolves in excess of the alkali, forming a pink or red solution which fades to a yellow-green. 3. Aqueous solutions of its salts soon turn red. A drop of a 10 per cent solution of hypophosphorous acid is said to prevent the change. The red color is due to the formation of rubreserine. 4. Heating a solution of a salt decomposes the physostigmine so that **heat** cannot be used for sterilization. 5. **Gold chloride** gives a blue to a violet coloration. 6. A solution of **chlorine** or **bromine** gives a red coloration. 7. **Nitric acid** gives a yellowish-red color.

Picrotoxinum.—1. Picrotoxin is soluble in solutions of acids and alkalies without combining with them.

Pilocarpinæ Hydrochloridum.—1. Pilocarpine hydrochloride in aqueous solution is precipitated by the reagents that generally precipitate alkaloids, except that it is not readily precipitated by alkali hydroxides and carbonates. 2. When this alkaloidal salt is mixed with **calomel** in the presence of moisture a darkening occurs. This is probably due to the separation of metallic mercury while at the same time some mercuric chloride is formed which combines with the alkaloid. Pilocarpine nitrate gives no black color. 3. **Potassium permanganate** oxidizes it to pyridin (M. & M., IV, 275). (℞ 378–379.)

Piperazina.—1. Piperazine is strongly alkaline and combines with **acids** to form salts. 2. With an aqueous solution of piperazine **alum** gives a white precipitate. 3. **Ferrous sulfate** gives a dark green precipitate which turns brown on standing. 4. **Ferric chloride** gives a red-brown precipitate. 5. An aqueous solution of piperazine precipitates solutions of **mercuric chloride, copper sulfate, lead acetate, zinc sulfate, potassium mercuric iodide, Donovan's solution,** tincture of **iodine,** and **picric acid.** 6. On account of its strong alkalinity piperazine gives precipitates with solutions of **alkaloidal salts** and with some **inorganic salts.** 7. **Potassium permanganate** and **silver nitrate** are reduced by piperazine. 8. **Sodium hypochlorite** solution forms a body with piperazine that explodes when heated to a temperature of 80°–85° C. (M. & M., IV, 349). 9. With **spirit of ethyl nitrite** or **nitrites** piperazine gives a yellow to a red solution. 10. **Quinine** is said to give an amorphous violet-brown body with piperazine (M. & M., IV, 349). Piperazine gives a white precipitate with a solution of quinine sulfate and destroys the fluorescence. 11. **Phenol** combines with piperazine. 12. A solution with **tannic acid** gives a green color. 13. When piperazine is triturated dry with **butyl chloral hydrate, acetanilid, antipyrine, chloral hydrate, acetophenetidin,** or **phenol,** a liquid or soft mass is formed. This is due in some instances to chemical combination and sometimes to the fact that piperazine is very hygroscopic. (℞ 380.)

Plumbi Acetas.—1. Lead acetate in aqueous solution is precipitated by the **fixed alkali hydroxides** as lead hydroxide which is soluble in excess of the alkali hydroxide. The precipitation is prevented by the presence of glycerin and sugar to some extent. 2. **Ammonium hydroxide** does not precipitate lead acetate, except from a concentrated solution. 3. The soluble **carbonates** precipitate the white basic carbonate of lead. 4. **Borax** precipitates the white lead borate. Precipitation is prevented to some extent by glycerin and sugar. 5. **Sulfuric acid** and the soluble **sulfates** precipitate the white lead sulfate. 6. **Hydrochloric acid** and the soluble **chlorides** precipitate from not too dilute solutions of lead acetate the white lead chloride. 7. The soluble **bromides** precipitate the white lead bromide. 8. The soluble **iodides** precipitate the yellow lead iodide. 9. With a solution of **opium** lead acetate forms the acetates of the alkaloids and the insoluble lead meconate and sulfate. 10. **Tannic acid** and solutions containing it precipitate the yellow-gray lead tannate.

11. **Sodium phosphate** precipitates the white lead phosphate. 12. **Alkali sulfites** precipitate the white lead sulfite. 13. Solutions of lead acetate are precipitated by neutral soluble **benzoates, citrates, tartrates,** and **salicy-**

lates. 14. Lead acetate gives a precipitate with some **coloring matters, gums, resins, neutral principles, glucosides,** and **alkaloids.** 15. Lead acetate gives a liquid or soft mass when rubbed with **alum, chloral hydrate, phenol, zinc sulfate,** and other solids. [See page 281.] (℞ 383–386.)

Potassa Sulfurata, *Liver of Sulfur.*—1. Sulfurated potash absorbs **moisture, oxygen,** and **carbon dioxide,** thereby changing the sulfide to a sulfate, its color from brown or green to gray, and its hard nature to one of a soft spongy type. 2. **Acids** and **acid salts** liberate hydrogen sulfide and precipitate sulfur. 3. **Carbon dioxide** precipitates sulfur from a solution of sulfurated potash. 4. Sulfurated potash reacts with **zinc sulfate,** forming white zinc sulfide and sulfur, the basis for a popular lotion. (℞ 387–388.)

Potassii Bitartras.—1. Cream of tartar combines with the **hydroxides** and **carbonates** of the **alkalies** to form neutral soluble salts. 2. Cream of tartar becomes more soluble in solutions of **borax** or **boric acid.** 3. It is acid in reaction, and has the incompatibilities of tartaric acid. [See ACIDUM TARTARICUM.]

Potassii Guaiacolsulfonas, *Thiocol.*—1. Potassium guaiacolsulfonate turns pink to brown on exposure to **light** and **air** (M. I.). 2. **Ferric chloride** produces a violet-blue color.

Potassii Permanganas.—1. Potassium permanganate in acid solution is reduced to the manganous condition by **nitrous acid** and **nitrites,** forming nitric acid; 2. by **hydrochloric acid** and **chlorides,** liberating chlorine; 3. by **hydrobromic acid** and **bromides,** liberating bromine; 4. by **hydriodic acid** and **iodides,** liberating iodine; 5. with solution of **hydrogen peroxide** mixed with sulfuric acid, potassium permanganate forms manganous sulfate, potassium sulfate, water, and oxygen, the oxygen coming from both the permanganate and hydrogen peroxide. 6. In dilute aqueous solution potassium permanganate is reduced by nearly all **organic matter;** in concentrated solution the reaction may be so great as to cause explosion. 7. When potassium permanganate is triturated dry with **sulfur, sulfides, reduced iron, hypophosphites, charcoal, sugar, glycerin, alcohol, tannic acid, oxalic acid, picric acid, fats, oils, gums,** and other **readily oxidizable matter,** an explosion is likely to ensue. 8. The permanganates are all soluble in water, except **silver,** which is sparingly soluble. They are insoluble in **alcohol.**

9. Potassium permanganate in acid solution is reduced to the manganous condition by **sulfites** and **hyposulfites,** forming sulfates; 10. by **mercurous**

compounds, forming mercuric compounds; 11. by **arsenites**, forming arsenates; 12. by **ferrous compounds**, forming ferric compounds; 13. by **hypophosphites**, forming phosphates; 14. by **ammonia**, forming nitrates. 15. **Tartaric acid** is converted into formic acid and carbon dioxide, more readily in a neutral or alkaline mixture (M. & M., IV, 642). 16. **Phenol** is oxidized by potassium permanganate, forming oxalic acid and carbon dioxide. 17. **Alcohol** is oxidized to aldehyde and acetic acid, the manganese dioxide and monoxide being precipitated. 18. **Glycerin** gives a precipitate similar to that produced by alcohol, and is oxidized to formic, propionic, and tartronic acids and carbon dioxide (M. & M., II, 618). (℞ 389–395.)

Potassium.—1. Potassium salts in the presence of a solution of **platinic chloride** and hydrochloric acid give a yellow precipitate of a double compound of platinum and potassium chloride. 2. Most neutral potassium salts in not too dilute aqueous solutions with **sodium bitartrate** give a precipitate of potassium bitartrate. 3. A solution of the hydroxide or carbonate of potassium with an excess of **tartaric acid** gives a precipitate of potassium bitartrate. [See LIQUOR POTASSII HYDROXIDI.]

Procainæ Hydrochloridum (erroneously called *Procaine*), *Novocain.*—1. Procaine hydrochloride in aqueous solution with **alkali hydroxides** or **carbonates** gives a precipitate of the free base, procaine, as an oily liquid which soon crystallizes. 2. **Sodium bicarbonate** does not give a precipitate. 3. A water solution gives a precipitate with many **alkaloidal reagents**, as **iodine, mercuric chloride, gold chloride, picric acid,** and **Mayer's reagent.** 4. **Potassium permanganate** is reduced by a solution of procaine hydrochloride. (℞ 396.)

Proflavina.—1. An aqueous solution of proflavine when quite dilute gives a fluorescence which is destroyed by **hydrochloric acid.** 2. An aqueous solution with **sodium hydroxide** gives a yellow precipitate. 3. It gives no precipitate with silver nitrate.

Pyrocatechin.—1. An **alkaline** solution of pyrocatechin assumes a green color, changing to brown, and finally black. 2. With a solution of **ferric chloride** it gives a green color, changed to a violet-red by ammonia. 3. With a solution of **lead acetate** it gives a white precipitate. 4. **Nitric acid** acts violently converting it into oxalic acid (M. & M., IV, 358). 5. **Ammonium carbonate** with water converts the pyrocatechin into pyrocatechuic acid (M. & M., IV, 358). 6. With a concentrated solution of pyrocatechin **lime water** gives a greenish color. 7. It reduces **silver nitrate** to metallic silver. 8. Pyrocatechin gives a mass or liquid when triturated with many solids. [See page 281.] (℞ 397.)

Pyrogallol.—1. Pyrogallic acid in aqueous solution gradually absorbs oxygen from the **air** and becomes brown-red and acid. The coloration takes place more rapidly in the presence of alkalies, changing to nearly black. 2. With **ammonia** pyrogallein is formed (M. & M., IV, 359) and the solution becomes red. 3. With a solution of **ferrous sulfate** pyrogallol gives a deep blue solution, changing to green and ultimately red. 4. With a solution of **ferric chloride** a red color is formed at once, and it is turned to violet by adding ammonia. 5. With a solution of **ferric acetate** a purple-black coloration is formed. 6. With **lead acetate** pyrogallol gives a white precipitate which turns dark on exposure. 7. With **lime water** a purple color is produced, rapidly changing to brown and black. 8. Pyrogallic acid is changed to purpurogallin by an alcoholic solution of **silver nitrate**, by an aqueous solution of **potassium permanganate**, or by an aqueous solution of **ferric chloride** in excess (M. & M., IV, 359). 9. Pyrogallol in aqueous solutions reduces salts of **silver, mercury**, and **gold**, and it is oxidized to acetic and oxalic acids. 10. Pyrogallol gives a liquid or soft mass when rubbed with **many solids.** [See page 281.] (℞ 398–399.)

Pyroxylinum.—1. Soluble gun-cotton when damp undergoes decomposition, and may ignite or cause an explosion. 2. Treated with **alkalies** in concentrated solution it is decomposed, giving up its nitric acid. 3. The nitro-cellulose is converted back to cellulose by **reducing agents** such as ferrous salts or alkali sulfides. 4. **Water** precipitates it from solutions. [See COLLODIUM.]

Quinidina.—1. Quinidine has practically the same incompatibilities as quinine. 2. Quinidine sulfate gives a precipitate with **silver nitrate.**

Quinina.—1. Quinine unites with **acids** to form salts. 2. Quinine is precipitated from aqueous solutions of its salts by all the reagents mentioned under ALKALOIDS, Nos. 2 and 3, except bromides and iodides. 3. Concentrated solutions of quinine sulfate are precipitated by **potassium iodide.** In acid solutions it is slowly precipitated by the iodine liberated from the iodide by the action of the acid and air. It is preferable to leave out the acid and use quinine bisulfate. 4. **Acetic acid, citric acid** or **hypophosphorous acid** renders quinine sulfate more soluble in water, increasing the fluorescence of the solution. Upon the addition of the corresponding alkali salt to the solution, the fluorescence is destroyed and the quinine is precipitated as an acetate, citrate, etc. [See ACIDUM ACETICUM, No. 3.] 5. Quinine is precipitated from its concentrated aqueous solutions by **benzoates** and **salicylates**, the precipitate generally being bulky. 6. According to Scoville, quinine in aqueous solution with **organic acids**, as acetic, citric, or salicylic acids, is slowly decomposed, more quickly in light, and rapidly when heated, into quinotoxin. Free mineral acids tend to prevent the change. [See ACIDUM ACETYLSALICYLICUM, No. 8.] 7. Quinine gives a blue fluorescence with nearly all **acids** that contain oxygen. 8. The fluorescence is destroyed by the **halogen acids, salts** of the **halogens, resorcin, antipyrine, acetanilid, acetophenetidin,** or **piperazine.**

9. When the alkaloid quinine is heated with solutions of **ammoniacal salts** ammonia gas is liberated. 10. Quinine sulfate is oxidized by **potassium permanganate** to pyridin tricarboxylic acid, oxalic acid, and ammonia (M. & M., IV, 375). 11. With **resorcin** a solution of quinine sulfate or bisulfate gives a precipitate. 12. Quinine salts generally coagulate the mucilage of **chondrus, linseed,** or **marshmallow.** 13. Quinine bisulfate in **sunlight** turns yellow and then brown-red. 14. When quinine sulfate is rubbed with **phenol** or **thymol** it gives a soft mass; with **chloral hydrate** it gives a damp powder or stiff mass. 15. The solubility of quinine sulfate in water is increased by the presence of certain compounds, as **ammonium chloride, potassium nitrate,** and **antipyrine.** [See ALKALOIDS.] (℞ 400–407.)

Quininæ Æthylcarbonas, *Euquinine.*—1. Euquinine is slightly soluble in water and slightly alkaline. 2. It forms crystallizable salts with **acids,** and with **sulfuric acid** the solution is fluorescent. Acids develop a bitter taste. 3. **Light** darkens it. 4. **Tannic acid** gives an insoluble tasteless tannate.

Quinine Carbonic Ester, *Aristochin.*—1. Aristochin dissolves in **acids** and gives a bluish-green fluorescence with acids containing oxygen. 2. Tincture of **iodine** added to an alcoholic solution gives a precipitate that dissolves in alcohol if too much iodine is not added. 3. It gives a deep red color with tincture of **ferric chloride.** 4. The acid solution gives precipitates with agents that precipitate quinine from its solutions. 5. It gives a mass when triturated with **menthol** or **thymol.**

Resina.—1. Pine resin when triturated with **menthol, salol, phenol,** or **urethane** makes a liquid or sticky mass.

Resinæ.—1. With aqueous solutions of **alkali hydroxides** or **carbonates** resins form resin soaps which are generally soluble in water. 2. Tincture of **ferric chloride** gives different colors with resinous substances. [See FERRICUM, Nos. 37–46.] 3. Alcoholic solutions of resins, as tincture of myrrh or benzoin, when mixed with water give precipitates that generally adhere to the bottle or agglutinate, particularly if there is a metallic salt dissolved in the water. **Honey** helps to suspend the resin and keep it from sticking. About 1 dram of honey to 7 drams of the aqueous solution makes a presentable mixture. 4. Many resins are softened by rubbing with compounds like **camphor, phenol, menthol,** or **thymol.**

5. **Nitric acid** converts them into artificial tannin (U. S. D.). 6. Concentrated **sulfuric acid** dissolves many of the resins with decomposition and gives color reactions with some. 7. **Alcohol** containing **hydrochloric acid** is colored red to violet by myrrh; yellowish-brown to green by guaiac; yellow, changing through brown to cherry-red, by benzoin or tolu balsam; greenish, changing to dingy violet, by asafetida; and brown by some other resins.

Resorcinol.—1. An aqueous solution exposed to the **air** and **light** becomes red and brown. This is to be expected as resorcin is used in preparing artificial dyes. This reaction is hastened by the presence of **alkalies. Lime water** gives a violet color changing to yellow or green. 2. **Oxidizing agents** in general give a red to a violet color.

3. With a dilute solution of **ferric chloride** resorcin gives a violet coloration. 4. With **chlorinated lime** or **soda** a solution of resorcin gives a violet coloration changing to yellow. 5. **Nitrous acid** or **spirit of ethyl nitrite** gives a dark red solution with resorcin. 6. A solution of **quinine sulfate** or **bisulphate** is precipitated by it and the fluorescence is destroyed. 7. Resorcin produces a liquid or soft mass when triturated with many solids. [See page 281.] 8. Solutions of resorcin precipitate **albumin.** (℞ 408–409.)

Saccharinum, *Gluside, Benzosulfinide.*—1. Saccharin is only sparingly soluble in water, but gives an acid reaction. 2. It combines with **alkalies** to make more soluble and consequently sweeter compounds. 3. It combines with some **metallic oxides,** as zinc and magnesium.

Salicinum.—1. Salicin is not readily precipitated by any of the common precipitants. 2. Dilute **acids** and **water** with heat change it to glucose and saligenin.

Santoninum.—1. Santonin on exposure to light turns yellow. 2. With **alkali hydroxides** in solution it forms santoninates, which are soluble in water. 3. An aqueous solution of santoninate is precipitated by **lead acetate** or **lead subacetate** as lead santoninate. It is also precipitated by **tannic acid, ferrous sulfate,** and by **acids** if the solution of santoninate is not too dilute. 4. Santonin is turned pink or red by **potassium hydroxide** in the presence of alcohol. (℞ 410.)

Sapo.—1. Aqueous solutions of soap are decomposed by some organic acids and by **mineral acids**, which combine with the base, liberating the free fat acids. 2. Aqueous solutions of **metallic salts** give precipitates of metallic oleates with soaps. If the soaps are quite strongly alkaline, the oxides or hydroxides of the metals may be precipitated. 3. Soap is frequently alkaline, and when so it makes a black mixture with **calomel**, due to the mercurous oxide formed. (℞ 411–412.)

Sodii Cacodylas.—1. Sodium cacodylate is quite alkaline and precipitates from aqueous solution many metallic and alkaloidal **salts**. 2. With **hypophosphorous acid** it gives the odor of cacodyl.

Sodii Perboras.—1. Sodium perborate is decomposed by **water**, giving hydrogen peroxide and sodium metaborate. 2. **Boric**, **citric**, or **tartaric acids** liberate oxygen. 3. It is also decomposed by **catalyzers**, **ferments**, and **animal tissues**. 4. A **temperature** of 60° C. liberates oxygen.

Sodii Thiosulfas.—1. Sodium thiosulfate (hyposulfite) in aqueous solution is decomposed by nearly all **acids**, forming sulfur and sulfurous acid. An aqueous solution of the salt slowly forms sulfur and a sulfite. 2. Sodium thiosulfate precipitates, as thiosulfates, solutions of **silver nitrate**, **lead acetate**, and **mercurous nitrate**. The precipitates are white, but turn black on standing, forming the sulfide of the metal and sulfuric acid. 3. Sodium thiosulfate with a solution of **ferric chloride** gives a dark violet color, due to ferric thiosulfate. The solution soon loses its color because the salt formed changes to ferrous sulfate. 4. Thiosulfates are generally soluble except **lead**, **silver**, **mercurous** and **barium**.

5. In acid solution sodium thiosulfate reduces **iodine** to hydriodic acid; 6. **chlorates** to chlorine and hydrochloric acid; 7. **permanganates** to manganic salts; 8. **arsenic** compounds to arsenous. 9. Sodium thiosulfate forms soluble double thiosulfates with many **metallic salts**. 10. Solutions of sodium thiosulfate dissolve **silver iodide**, **silver bromide**, **silver chloride**, **mercuric iodide**, **lead sulfate**, **lead iodide**, and other salts (Watts, v, 630). 11. With **calomel** in the presence of moisture it gives a black mixture. 12. In very dilute solutions it prevents the precipitation of some of the alkaloids by **gold chloride**. It combines with the gold to form a double thiosulfate. 13. An acidulated solution bleaches **vegetable colors** on ac-

count of its reducing properties. 14. When sodium thiosulfate is triturated with **potassium chlorate, nitrate,** or **permanganate,** or other strong **oxidizing agents,** explosion is likely to take place. 15. **Alcohol** precipitates sodium thiosulfate from an aqueous solution as an oily liquid. (℞ 413–416.)

Spiritus.—**Water** causes a separation of the volatile substance from all the official spirits except spirit of ethyl nitrite, spirit of ammonia, whisky, and brandy. They all contain alcohol, and consequently have the reactions of alcohol. (℞ 417–418.)

Stovaine.—1. An aqueous solution of stovaine is slightly acid and is precipitated by **alkaloidal reagents.** 2. It is decomposed by dilute **alkalies.** 3. A solution of it can be boiled without decomposition.

Strontium.—1. Salts of strontium in aqueous solutions are precipitated by the soluble **carbonates, phosphates,** or **oxalates** as strontium carbonate, phosphate, or oxalate. 2. The soluble **citrates, sulfates, salicylates,** or **alkali hydroxides** precipitate from concentrated solutions the strontium citrate, sulfate, salicylate, or hydroxide. (℞ 419–421.)

Strychnina.—1. Strychnine combines with **acids** to form salts. 2. Strychnine salts in aqueous solution are precipitated by the reagents mentioned under ALKALOIDS, Nos. 2 and 3. 3. In rather strong solutions of strychnine sulfate the soluble **chlorides, bromides,** and especially the **iodides** are likely to cause precipitation of the strychnine. The precipitation may not take place for several days. In explaining the cause of the trouble several factors must be taken into consideration. Frequently the commercial samples of the alkali iodides and bromides are alkaline from the carbonate which was left in to aid their keeping, and this alkali would liberate and precipitate the strychnine. The compound which potassium iodide forms with strychnine is only sparingly soluble in water, but the corresponding compounds formed with potassium chloride and bromide are more soluble. Some writers partially explain the precipitation by saying that the compounds formed are less soluble in water containing the inorganic salts than they are in water alone. Alcohol tends to prevent the precipitation. **Alkalinity** of glass containers is also a possible factor. 4. Alkaline substances like **sodium phosphate, potassium cyanide, sodium arsenate, Fowler's solution, piperazine, sodium cacodylate, sodium methylarsenate,** and **sodium glycerophosphate** will cause a precipitation when added to an aqueous solution of a strychnine salt. Precipitation can be prevented frequently by first neutralizing the salt. 5. Precipitation by **gold chloride** is prevented to some extent by adding to the gold chloride an equal weight of sodium thiosulfate. [See AURI ET SODII CHLORIDI, No. 1.]

6. **Hydrochloric acid** added to a solution of strychnine hydrochloride gives a crystalline precipitate (M. & M., IV, 517). 7. One dram of diluted **nitrohydrochloric acid** with 7 drams of water containing one-fourth of a grain of strychnine sulfate gives a yellow coloration in a few days. In stronger solutions the change takes place more quickly. 8. **Potassium permanganate** in alkaline solution with strychnine yields ammonia, oxalic acid, carbon dioxide, and another crystalline acid, but in acid solution potassium permanganate gives an amorphous acid (M. & M., IV, 517). [See ALKALOIDS.] (℞ 422–424.)

Sucrosum.—1. A solution of sugar heated with **lime, magnesia, lead monoxide,** and other metallic **oxides** and **hydroxides** forms saccharates, chemical compounds which are more or less soluble in water. 2. The presence of sugar hinders or prevents the precipitation, or dissolves the precipitate, of many metallic hydroxides or oxides which are normally formed when alkali hydroxides are added to solutions of metallic salts. The interference is most marked in cases of **lead, antimony, copper, mercuric, ferrous, ferric, aluminum, zinc, calcium,** and **magnesium salts.** 3. Sugar warmed with dilute solutions of **acids,** or heated for some time with **water,** is changed to invert sugar. 4. Sugar triturated with **potassium chlorate, permanganate,** or **bichromate,** or with other strong oxidizing agents, is likely to cause an explosion. 5. When syrup is excessively heated, it becomes yellowish to brown in color due to the caramelization of the sugar. 6. Aqueous solutions of sugar, unless saturated, are likely to ferment and develop mold growths.

7. Very strong **nitric acid** with sugar, in the cold, forms explosive nitrosaccharose. Moderately concentrated nitric acid converts sugar into saccharic and tartaric acids, and with heat into oxalic acid and carbon dioxide. 8. With concentrated **sulfuric acid** sugar is decomposed, forming carbon, while formic acid, sulfur dioxide, and other gases are given off. 9. When a concentrated solution of sugar and **potassium hydroxide** is heated, carbon dioxide, acetone, acetic, propionic, and oxalic acids are formed (M. & M.,

IV, 551). Boiled with potassium hydroxide, the liquid becomes brown, formic acid is produced, also melassic acid and glucic acid (U. S. D.). 10. Sugar combines with **sodium chloride**, forming deliquescent crystals (N. S. D.). 11. **Chlorine** or **bromine** oxidizes sugar to gluconic acid, glucose and other products. The same reaction takes place in the presence of lead or silver oxide (M. & M., IV, 551). 12. **Iodine** with potassium carbonate and sugar yields a little iodoform (M. & M., IV, 551). Iodine is converted into hydriodic acid by heating with a solution of sugar (N. S. D.). 13. Dilute **chromic acid** solution oxidizes sugar to oxalic, formic, and carbonic acids (M. & M., IV, 551). 14. **Potassium permanganate** converts sugar into oxalic, formic, and carbonic acids (M. & M., IV, 551). 15. Sugar has some reducing effect and retards oxidation by the air of some metallic salts, particularly ferrous.

Sulfonethylmethanum, *Trional.*—1. Trional when triturated with **chloral hydrate, salol, thymol,** or **urethane** gives a liquid or soft mass.

Sulfonmethanum, *Sulfonal.*—1. Sulfonal is not acted upon by alkalies, acids, or oxidizing agents. 2. It liquefies when triturated with **chloral hydrate.**

Sulfur.—1. Sulfur readily dissolves in hot aqueous solutions of **hydroxides** of **potassium, sodium,** or **calcium,** forming polysulfides and thiosulfates. 2. Triturated dry with strong **oxidizing agents,** as **potassium chlorate** or **permanganate,** explosion is likely to occur. 3. It combines with many non-metallic elements. (℞ 425–426.)

Sulfuris Iodidum.—1. Iodide of sulfur is decomposed by **alcohol, ether, volatile oils,** and solutions of **potassium hydroxide** or **iodide,** the iodide first being dissolved by these.

Terebenum.—1. Terebene on exposure to **air** and **light** resinifies and becomes acid. 2. It combines with **chlorine** and **iodine** to form additive products. 3. In many reactions it resembles oil of turpentine.

Theobromina.—1. Theobromine acts like a weak base, and also like a weak acid. 2. It combines with strong **acids** to form salts that are quite readily decomposed by water. 3. It dissolves in an excess of an **alkali hydroxide** solution. 4. From an aqueous solution, theobromine gives a crystalline precipitate with **silver nitrate, mercuric chloride,** and **gold chloride.** 5. With many of the general **alkaloidal reagents** it gives no precipitate.

Theobrominæ Sodio-Acetas, *Agurin.*—1. Agurin is readily soluble in water, but not in alcohol. The solution is strongly alkaline and the alkalinity causes many incompatibilities. 2. Adding dilute **acids** to not too dilute solutions of agurin gives a precipitate at once or on standing, and the precipitate is probably theobromine. 3. In the presence of **air** and **moisture** it absorbs **carbon dioxide** and is decomposed and precipitated. 4. A solution of **ferric chloride** with an excess of agurin gives a red-brown precipitate. 5. With solutions of **mercuric chloride, lead acetate, tartar**

emetic, or **magnesium sulfate** it may give a precipitate at once or on standing. 6. An aqueous solution darkens **calomel** at once. 7. It reduces **potassium permanganate** to some extent. 8. A dilute aqueous solution gives a gelatinous precipitate with **silver nitrate,** but the silver is not reduced on standing for several hours. 9. Excess of tincture of **iodine** causes little or no precipitation at once when added to a solution of agurin, but if the agurin is in excess the iodine is decolorized and a yellowish, gelatinous mass or thick liquid results, which slowly becomes thin again and deposits a white precipitate. 10. It precipitates many **alkaloids** from solutions of their salts. 11. Rubbed with **chloral hydrate, phenol,** or **piperazine** it gives a mass.

Theobromina cum Sodii Salicylate, *Diuretin.*—1. Theobromine with sodium salicylate in aqueous solution is strongly alkaline, and is decomposed by **acids,** even the **carbon dioxide** in the air, with precipitation of probably both theobromine and salicylic acid. The addition of some alkali prevents precipitation by carbon dioxide. 2. **Alkali carbonates** (not hydroxides), **bicarbonates, sodium phosphate,** and **borax** slowly give precipitates. 3. Diuretin in excess gives precipitates with solutions of many **metallic salts.** 4. With a solution of **ferric chloride** it gives no precipitate but a violet to red color on account of the salicylate. 5. It has the incompatibilities of a salicylate, theobromine, and an alkali.

6. It reduces salts of **silver** and **mercury. Calomel** is darkened at once by diuretin. 7. Tincture of **iodine** is decolorized at first, but added in excess it gives a precipitate. 8. It precipitates some **alkaloids** from solutions of their salts. 9. Rubbed with **piperazine** and some solids it gives a mass or liquid. [See page 281.] (℞ 428–429.)

Theophyllina cum Æthylenediamina, *Metaphyllin, Aminophyllin.*—1. Theophylline with ethylene diamine absorbs **carbon dioxide** from the **air,** liberating theophylline. 2. **Acids** precipitate the theophylline. 3. Its solution is alkaline to litmus.

Theophyllina cum Sodii Acetate, *Theocin Soluble, Theocin Sodium Acetate.*—1. Aqueous solutions of theophylline with sodium acetate are alkaline. 2. **Acetic acid** precipitates the theophylline.

Thiol.—Thiol is precipitated from its aqueous solutions by **alkali hydroxides, mineral acids,** and **metallic salts.**

Thiosinamine.—1. It is moderately soluble in water, but is decomposed by **water.** Glycerin prevents this decomposition to a limited extent.

Thymol.—1. Thymol unites with **alkalies** to form soluble salts. 2. A solution of thymol with **iodine** and potassium hydroxide gives a red amorphous precipitate of iodothymol (M. & M., IV, 715). 3. **Spirit of ethyl nitrite** gives a green and then a brown color, changing the thymol to a nitroso-thymol. 4. Thymol gives a liquid or soft mass when rubbed with **quinine sulfate, quinine hydrochloride,** and other **quinine salts, trional,** and **other solids**. [See page 281.] (℞ 430–431.)

Thymolis Iodidum, *Aristol.*—1. Aristol is decomposed by **light** and **heat**, more quickly if dissolved in ether. 2. It should not be prescribed with bodies that have a strong affinity for iodine, as **oxides, hydroxides, carbonates, starch,** or **mercury salts.** 3. **Oxidizing agents** liberate iodine.

Thyroxinum.—1. Thyroxin is sparingly soluble in water or in other common solvents. 2. An aqueous solution of an **alkali hydroxide** will dissolve it and when such a solution is saturated with sodium chloride the sodium salt of thyroxin separates.

Tragacantha.—1. Tragacanth is colored yellow by a solution of **sodium hydroxide.** 2. An aqueous mixture is thickened by **alcohol**, and by **neutral** and **basic lead acetate** (not coagulated by borax, silicates, or ferric salts). 3. With water and **bismuth subnitrate** it forms masses.

Trinitrophenol, *Picric Acid.*—1. Picric acid and picrates precipitate albumin, gelatin and most alkaloids from aqueous solutions of their salts. 2. Salts of picric acid explode when struck or strongly **heated.** 3. Picric acid is explosive when rubbed or heated with readily **oxidizable substances** such as **sulfur.** [See ACIDA.]

Urea.—Urea becomes soft or liquid when triturated with some solids. [See page 281.]

Zinci Chloridum.—Zinc chloride, like gold and mercuric chlorides, has a strong tendency to combine with **organic bases,** as strychnine, morphine, and quinine (U. S. D.). [See ZINCUM and ACIDUM HYDROCHLORICUM.]

Zinci Iodidum.—1. Commercial zinc iodide frequently does not give a clear solution with water. It is quite distinctly alkaline to litmus and may give a further precipitate when mixed with a solution of zinc chloride.

Zincum.—1. Zinc salts in aqueous solutions are precipitated by the fixed **alkali hydroxides** or **lime water** as zinc hydroxide which is soluble in excess of the alkali hydroxide. 2. Zinc salts are precipitated by soluble **carbonates, phosphates, arsenates,** or **cyanides**, as the basic carbonate, phosphate, arsenate, or cyanide. 3. **Borax** gives a precipitate of zinc borate or a mixture of the borate and hydroxide. 4. **Tannic acid** gives a precipitate with concentrated solutions of zinc salts. 5. Zinc salts coagulate **albumin.** 6. **Sulfurated potash** produces the insoluble zinc sulfide, sulfur, and potassium sulfate with zinc sulfate solution. This combination is frequently found in both lotion and ointment form, the precipitate being the desired product. (℞ 432–434.)

PART II

PRESCRIPTIONS WITH CRITICISMS

In studying the following prescriptions the student should try to make out for himself, so far as possible, wherein the trouble lies, and what he would do to prevent or remedy it, before referring to the notes. In order not to overlook any of the incompatibilities it is suggested that he find out what effect, if any, the first ingredient may have on each of the others; then the second ingredient, the third, and so on. Then, taking the prescription as a whole, he should determine the color that will be produced, the nature and color of the precipitate, how one incompatibility will be modified by another, etc. The majority of prescriptions which follow should be filled, unless in the reaction some more active or dangerous compound is formed. It must not be forgotten that a variation in the proportions of ingredients modifies the results of combination.

1

℞

Bis. subcarb.,	ʒ iij
Sod. bicarb.,	ʒ j
Syr. acaciæ,	f. ℥ j
Syr. vanillæ,	f. ʒ j
Aq. dest.,	q. s. f. ℥ iij
M.	

2

℞

Acidi borici,	ʒ j
Sodii boratis,	ʒ ij
Mucil. acaciæ,	f. ℥ iij
Aq. menth. pip.,	q. s. ad f. ℥ iv

Misce. Sig.: Teaspoonful two hours after meals.

3

℞

Olei morrhuæ,	f. ʒ iv
Acaciæ,	ʒ j
Syrupi tolutani,	f. ʒ iv
Sodii boratis,	gr. xv
Aquæ,	q. s. ad f. ℥ ij

M. S. Teaspoonful three times a day.

4

℞

Liq. plumbi subacet.,	f. ʒ ss
Muc. acaciæ,	f. ℥ j
Aq. dest.,	q. s. ad f. ℥ iv

M. Ft. lotio.

5

℞

Tr. guaiaci,	15
Mel. depurat.,	15
Pot. chloratis,	13
Syr. acaciæ,	q. s. 90

M.

6

℞

Copaiba,	f. ʒ vj
Spirit of ethyl nitrite,	f. ℥ ij
Co. tr. lavender,	f. ʒ ij
Acacia,	ʒ iv
Water,	to make f. ℥ iv

M. Tablespoonful three times daily.

7

℞

Tincturæ ferri chloridi,	f. ʒ ij
Spiritus æthylis nitritis	f. ʒ iv
Mucilaginis acaciæ,	f. ℥ j
Syrupi,	q. s. ad f. ℥ iij

M. S. Teaspoonful three times a day.

8

℞

Acid. acetylsal.,	ʒ ij
Aminopyrin.,	ʒ j
Acaciæ,	ʒ iij
Aq. dest.,	q. s. ad f. ℥ iij

M.

9

℞

Hydrarg. bichlor.,	gr. iij
Muc. acaciæ,	f. ℥ j
Aquæ,	
Liq. calc. hydrox.,	aa. f. ℥ ij

M.

10

℞

Acetanilid,	gr. xxx
Spirit of ethyl nitrite,	
Syrup,	aa. f. ℥ j

Mix and label: Teaspoonful every hour until fever subsides.

11

℞

Acetanilid,	ʒ ij
Tinct. of ferric chloride,	f. ʒ v
Water, enough to make	f. ℥ iv

Make solution with the aid of heat. Label: Teaspoonful three times a day.

12

℞

Antipyrine,	
Acetanilid,	aa. 2 Gm.
Resorcin,	3 Gm.
Water,	100 cc.

Mix. Label: Teaspoonful every hour until the fever begins to subside.

13

℞

Tincture of aconite,	♏ xx
Acetophenetidin,	gr. xl
Spirit of ethyl nitrite,	f. ʒ v
Syrup,	f. ʒ iij
Water,	f. ℥ ij

Mix and label: Teaspoonful every two hours until the fever subsides.

14

℞

Codeine sulfate,	gr. viij
Acetophenetidin,	ʒ j
Ammon. chlor.,	ʒ jss
Sodium bromide,	ʒ iv
Glycerin,	
Mucilage of acacia,	aa. f. ʒ iij
Water,	q. s. ad f. ℥ ij

Mix: Teaspoonful in water every 1, 2, 3, or 4 hours as needed.

15

℞

Liquoris ammonii acet.,	30 cc.
Tr. ferri chloridi,	15 cc.
Syrupi,	q. s. ad 60 cc.

Misce.

16

℞

Quininæ sulf.,	gr. x
Potassii acetatis,	gr. xx
Acidi sulfurici dil.,	gtt. iv
Aquæ cinnamomi,	q. s. ad f. ℥ j

M. S. Teaspoonful after meals.

17

℞

Pot. acetatis,	ʒ ss
Spiritus æth. nitrit.,	f. ʒ ij
Aquæ,	q. s. ad f. ℥ j

M. S. Take in two doses one hour apart.

18

℞

Pot. citratis,	ʒ ij
Sp. æth. nitrit.,	f. ʒ ij
Acid. acetylsal.,	gr. xlviij
Syr. pruni virg.,	f. ℥ iss
Aquæ,	q. s. ad f. ℥ iij

M.

19

℞

Acetylsalicylic acid,	ʒ iss
Potass. iodide,	gr. xxiv

Make 12 cachets. Sig.: One three times a day.

20

℞

Potass. citrate,	ʒ iij
Aspirin,	gr. lxxx
Spirit of chloroform,	f. ʒ ij
Syrup,	f. ℥ j
Peppermint water, to make	f. ℥ viij

Mix. Label: Dessertspoonful every two hours until relieved.

21

℞

Acid. acetylsal.,	ʒ j
Liq. pot. acet.,	f. ℥ iij
Acaciæ,	q. s. emuls.

M.

22

℞

Ac. acetylsal.,	1.2
Methenamin.,	1.2
Aq. dest.,	q. s. ad 60.

M.

23

℞

Aspirin,	
Aminopyrine,	aa. ʒ ss
Acacia,	
Starch,	aa. q. s.

For 10 tablets.

Make 5000 tablets.

24

℞

Aspirin,	10 Gm.
Acetophenetidin,	4 Gm.
Sodium bicarb.,	2 Gm.
Milk of magnesia,	30 cc.
Water,	q. s. 90 cc.

Mix. Label: Teaspoonful every four hours until relieved.

25

℞

Acid. acetylsal.,	ʒ j
Tr. ferr. chlor.,	f. ʒ iv
Liq. aromat. alk.,	q. s. ad f. ℥ vj

M.

26

℞

Pot. chlorat.,	ʒ j
Tr. ferr. chlor.,	f. ʒ j
Acid. acetylsal.,	ʒ j
Glycerini,	f. ℥ ss
Aq. dest.,	q. s. ad f. ℥ ij

M.

27

℞

Quinine sulfate,	gr. xv
Sodium benzoate,	gr. x
Aromat. sulfuric acid,	♏ x
Elixir,	enough to make f. ℥ j

Mix. Label: One-half teaspoonful three times a day.

28

℞

Ammonium benzoate,	ʒ ij
Citrated caffeine,	ʒ ss
Iron and quinine cit.,	ʒ ij
Water,	to make f. ℥ vj

Make a mixture. Label: Teaspoonful three times a day.

29

℞

Plumbi acetatis,	
Sodii boratis,	aa. 1 Gm.
Glycerini,	20 cc.
Aquæ,	80 cc.

M. S. Apply as directed.

30

℞

Zinci sulf.,	gr. xv
Sod. borat.,	ʒ j
Alumen.,	ʒ ss
Aq. camph.,	f. ℥ iij
Aq. dest.,	q. s. f. ℥ viij

M. Sig.: Bathe eyes.

31

℞

Fluid hydrastis colorless,	f. ℥ j
Sodium bicarbonate,	
Bismuth subnitrate,	aa. ℥ ss
Borax,	ʒ ij
Honey,	f. ℥ ss
Peppermint water,	to make f. ℥ vj

Mix. Label: Shake well. Teaspoonful before meals.

32

℞

Hydrastin. acet.,	gr. ij
Acid. boric.,	gr. x
Sod. borat.,	gr. xx
Tr. opii,	♏ xv
Aq. dest.,	q. s. f. ℥ j

M. Sig.: Use freely in eye.

33

℞

Cocaine hydrochloride,	gr. iv
Boric acid,	gr. x
Salicylic acid,	gr. j
Water,	f. ℥ j

Mix. Label: Eye water.

34

℞

Berberin. hydrochlor.,	gr. xv
Sod. boratis,	ʒ j
Aq. rosæ,	q. s. f. ℥ vj

M.

35

℞

Acid. camphor.,	ʒ ij
Alcohol.,	f. ℥ j
Muc. acaciæ,	f. ℥ iss
Syr. aurant.,	q. s. f. ℥ iij

M.

36

℞

Basham's mixture,	f. ℥ xij
Potassium citrate,	ʒ j

Mix. Label: Tablespoonful three times a day.

37

℞

Pot. citrat.,	ʒ ij
Tr. ferr. chlor.,	f. ʒ iv
Glycerin.,	f. ʒ iv
Aq. dest.,	q. s. f. ℥ iij

M. Sig.: Gargle every two hours.

38

℞

Sod. citrat.,	ʒ iv
Calc. bromid.,	ʒ iij
Syr. pruni virg.,	f. ℥ j
Aq. dest.,	q. s. ad f. ℥ iij

M.

39

℞

Sod. bromid.,	
Pot. citrat.,	aa. ʒ iv
Tr. gentian. co.,	q. s. ad f. ℥ iij

M.

40

℞

Quininæ sulf.,	℈ ij
Potassii citratis,	ʒ ij
Acidi citrici,	ʒ j
Aquæ,	q. s. ad f. ℥ vj

M.

41

℞

Pot. citrat.,	ʒ ii
Ammon. chlor.,	ʒ ss
Sod. brom.,	ʒ iss
Sod. iod.,	gr. iv
Syr. tolu.,	
Liq. ferri et ammon. acet.,	aa. q. s. f. ℥ ij

M.

42

℞

Cocaine hydrochloride,	gr. v
Gallic acid,	gr. x
Zinc oxide ointment,	ʒ iv
Petrolatum,	to make ℥ j

Mix. Label: Apply locally.

43

℞

Sod. iodid.,	ʒ iiss
Sp. glonoin.,	f. ʒ ss
Syr. aurant.,	f. ʒ iv
Aq. dest.,	q. s. f. ℥ iv

M.

44

℞

Hydrargyri bichlor.,	gr. ij
Potassii iodidi,	ʒ ij
Syrupi rhei aromatici,	f. ℥ iv
Elixiris cinchonæ,	f. ℥ iv

Misce et signa: Teaspoonful three times a day.

45

℞

Sod. nitrit.,	gr. lxxij
Sod. iod.,	ʒ iij
Sod. phenobarb.,	gr. vj
Elix. pepsin. et rennin. co.,	q. s. f. ℥ iij

M.

46

℞

Hydrargyri bichlor.,	gr. ¼
Sodii iodidi,	
Ammonii iodidi,	aa. ʒ ij
Potassii chloratis,	ʒ j
Aquæ,	f. ℥ j
Syrupi sarsaparillæ co.,	f. ℥ iv

M. S. Teaspoonful in wineglass of water after each meal.

47

℞

Acid. hydriod.,	f. ʒ iv
Codein. sulfat.,	gr. iij
Aq. dest.,	q. s. f. ℥ iij

M.

48

℞

Hydrargyri chlor. mit.,	gr. vj
Potassii iodidi,	gr. xl

M. Ft. Chart. No. x.

Signa: One powder after each meal.

49

℞

Bismuth. subnit.,	ʒ iij
Codein. sulf.,	gr. iij
Syr. acid. hydriod.,	q. s. f. ℥ iij

M.

50

℞

Tinct. ferri chlor.,	f. ℥ j
Tinct. iodi,	
Liq. pot. arsenit.,	
Ac. phosphor. dil.,	aa. f. ʒ iv
Quininæ sulf.,	ʒ j
Rhei pulv.,	℥ ss
Aquæ,	q. s. ad f. ℥ viij

Misce. Sig. Teaspoonful after meals.

51

℞

Potassii iodidi,	ʒ ij
Spiritus æth. nit.,	f. ℥ j
Tinct. ferri chloridi,	f. ʒ iss
Tinct. gentianæ co.,	f. ℥ iss
Glycerini,	f. ℥ ss
Aquæ,	q. s. ad f. ℥ iv

M. S. Teaspoonful three times a day before meals.

52

℞

Potass. chloratis,	ʒ ij
Syr. ferri iodidi,	f. ℥ ss
Quininæ sulf.,	℈ j
Ac. sulfurici dil.,	♏ xx
Aquæ,	q. s. ad f. ℥ ij

M. S. Teaspoonful after each meal.

53

℞

Liq. sodii arsenatis,	f. ʒ ij
Potassi iodidi,	gr. xl
Quininæ sulf.,	ʒ j
Acidi sulf. dil.,	f. ʒ j
Aquæ,	q. s. ad f. ℥ iij

M. S. Teaspoonful twice a day

54

℞

Fldext. aconiti,	♏ xij
Tr. bellad.,	♏ xxiv
Sp. camphor.,	♏ xxiv
Sod. bromidi,	gr. xv
Syr. acid. hydriod.,	f. ʒ v
Sp. æth. nitrit.,	f. ʒ iij
Aq. dest.,	q. s. f. ℥ iij

M.

55

℞

Potassium iodide,	ʒ ij
Glycerin,	f. ʒ j
Water,	f. ʒ j
Lard,	℥ ij

M. S. As directed.

56

℞

Magendie's solution of morphine,	f. ʒ ij
Sat. solut. potass. iodide,	f. ʒ vj

Label: Take ten drops three times a day.

57

℞

Quininæ sulfatis,	
Acidi tartarici,	
Potassii iodidi,	aa. gr. xij
Aquæ,	q. s. ad f. ℥ ij

Misce. Sig.: f. ʒ j t. i. d.

58

℞

Quininæ sulfatis,	
Potassii iodidi,	aa. gr. vij
Ac. nitrohydrochlorici,	♏ xx
Aquæ,	q. s. ad f. ℥ ij

M. S. Teaspoonful after meals.

59

℞

Quininæ sulfatis,	ʒ ss
Potassii iodidi,	ʒ j
Strychninæ sulf.,	gr. v
Tinct. cardam. co.,	
Syr. zingiber.,	aa. f. ℥ ij
Aquæ fontanæ,	q. s. ad O. ss

M. S. Take one tablespoonful night and morning.

60

℞

Potassii iodidi,	ʒ ij
Spiritus æthylis nit.,	f. ℥ j
Liq. ammonii acet.,	f. ℥ ij
Sodii citratis,	ʒ j
Aquæ,	q. s. ad f. ℥ vj

M. S. Teaspoonful three times a day.

61

℞

Liq. arseni et hydrarg. iodidi,	10 cc.
Potassii iodidi,	5 Gm.
Quininæ sulfatis,	2 Gm.
Acid sulfurici aromat.,	q. s.
Syrupi,	q. s. ad 300 cc.

M. S. 4 cc. after each meal.

62

℞

Sod. salicyl.,	ʒ v
Pot. bromidi,	ʒ iij
Acid. hydrobrom. dil.,	f. ʒ iij
Aq. dest.,	q. s. f. ℥ viij

M.

63

℞

Potassii bromidi,	gr. xv
Hydrargyri chlor. mitis,	gr. v

Misce et fiat pulvis; mitte tales No. xii.

64

℞

Strychninæ sulf.,	gr. ss
Potassii bromidi,	ʒ iij
Aquæ,	q. s. ad f. ℥ iv

Misce et signa: Teaspoonful three times a day.

65

℞

Acetophenetidin,	ʒ ss
Tinct. gelsemium,	f. ʒ ss
Citrated caffeine,	gr. xij
Sodium bromide,	ʒ ss

Mix. Make 12 capsules.

66 X

℞

Silver nitrate,	1.5 Gm.
Sodium chloride,	0.6 Gm.
Water,	200 cc.

Mix. Label: Use as an eyewash.

67 X

℞

Acidi hyd. dil.,	20 cc.
Aquæ,	100 cc.

M. Sig.: Teaspoonful in water after meals.

68

℞

Acidi hydrocyanici dil.,	♏ xxx
Sodii bicarbonatis,	℈ iv
Syrupi,	q. s. ad ℥ ij

M. S. Teaspoonful three times a day.

69

℞

Codeine,	gr. ij
Dil. phosphoric acid,	q. s.
Dil. hydrocyanic acid,	♏ xx
Tincture of iodine,	♏ x
Water, enough to make	f. ℥ iv

Mix. Label: Tablespoonful at night.

70

℞

Hydrarg. bichlor.,	gr. $\frac{1}{30}$
Liq. pot. arsenit.,	♏ iij
Pot. brom.,	gr. x
Syr. acid. hydriod.,	♏ xxx
Syr. hypophos.,	q. s. f. ʒ j
M. Ft. mist: d. t. d.	f. ℥ iij

71

℞

Calcii hypophosphitis,	ʒ j
Aquæ,	f. ℥ ij
Tinct. ferri chlor.,	f. ʒ iv
Morph. sulfatis,	gr. iv
Syrupi tolutani,	f. ℥ ij

M. S. Teaspoonful three times a day.

72

℞

Calcii hypophosphitis,	gr. xv
Hydrarg. bichlor.,	gr. ss
Syr. sarsap. co.,	f. ℥ ij

M. S. Teaspoonful two or three times a day.

73

℞

Tr. ferr. chlor.,	f. ʒ iv
Syr. hypophos.,	
Syr. aurant.,	aa. q. s. f. ℥ iv

M.

74

℞

Strych. sulf.,	gr. $\frac{1}{4}$
Bis. subnitrate,	℈ j
Pepsin,	℈ j
Dil. hydrochlor. ac.,	♏ xx
Syr. hypophosphites,	f. ℥ j
Water,	to make f. ℥ ij

Mix. Label: Teaspoonful three times a day.

75

℞

Bismuthi subnitratis,	ʒ ij
Sodii hypophosphitis,	ʒ j
Extracti nucis vomicæ,	gr. v

M. Ft. Chart. No. xxv.

76

℞

Calcii hypophosphitis,	2.5 Gm.
Ferri lactatis,	0.3 Gm.
Potassii chloratis,	4.0 Gm.

M. Ft. pil. No. xxx.

77

℞

Acidi phosphorici,	f. ʒ ij
Acidi nitrici,	f. ʒ v
Tinct. ferri chlor.,	f. ℥ ij

Mix.

78

℞

Acidi sulfurici,	f. ʒ j
Acidi nitrici,	f. ʒ j
Olei terebinthinæ,	f. ℥ ss
Alcoholis,	f. ʒ ij

M. S. Caustic.

79

℞

Acidi nitrohydrochlorici,	f. ʒ vij
Spiritus terebinthinæ,	f. ℥ j
Make emulsion,	f. ℥ iv

Sig. Teaspoonful three times a day.

80

℞

Strychnine sulf.,	gr. ss
Dil. nitrohydrochlor. acid,	f. ʒ ij
Water,	to make f. ℥ j

Mix. Label: Thirty drops after meals.

81

℞

Tinct. nucis vom.,	
Acidi nitromur.,	aa. f. ʒ ij
Elixiris cinchonæ co.,	f. ℥ iiiss

M. S. Teaspoonful in an ounce of water after meals.

82

℞

Pot. cit.,	ʒ iij
Sp. æth. nitrit.,	f. ʒ vj
Syr. pruni virg.,	f. ℥ iss
Aquæ,	q. s. f. ℥ iij

M.

83

℞

Fluidextract nux vomica,	♏ xl
Fluidextract digitalis,	f. ʒ iss
Tinct. strophanthus,	f. ℥ ss
Potassium nitrite,	ʒ viss
Elix. gent. and iron,	to make f. ℥ vj

Mix. Label: Teaspoonful three times a day.

84

℞

Antipyrin.,	gr. xxiv
Syr. ipecac.,	♏ xxx
Sp. æth. nitrit.,	f. ʒ iv
Tr. bellad.,	♏ xxx
Syr. limonis,	f. ʒ iv
Aq. dest.,	q. s. f. ℥ iij

M. Ft. sol.

85

℞

Bichloride of mercury,	gr. x
Spirit of ethyl nitrite,	
Diluted alcohol,	of each f. ℥ j

Mix. Label: Apply externally.

86

℞

Sod. salicyl.,	ʒ iv
Sp. glonoin.,	♏ xij
Sp. æth. nitrit.,	f. ℥ j
Pot. citrat.,	ʒ iv
Aq. menth. pip.,	q. s. f. ℥ iij

M. Sol.

87

℞

Syrupi scillæ,	
Syrupi ipecac.,	aa. f. ʒ j
Syrupi eriodictyi arom.,	f. ʒ ij
Potassii iodidi,	℈ j
Spiritus æthylis nit.,	f. ʒ ij
Glycerini,	f. ʒ iv
Syrupi acidi citrici,	q. s. ad f. ℥ iij

Misce. Signa: Teaspoonful when coughing.

88

℞

Fluidextracti buchu,	f. ℥ ss
Spiritus æthylis nit.,	f. ℥ j
Potassii acetatis,	ʒ ij
Syrupi,	q. s. ad f. ℥ iv

Misce et signa: Teaspoonful half hour after meals.

89

℞

Pot. iod.,	ʒ ij
Sod. nitrit.,	gr. xij
Tr. aurant.,	f. ʒ iij
Sp. æth.,	f. ʒ iij
Syr. ac. citric.,	f. ʒ iv
Aquæ dest.,	q. s. f. ℥ iij

M. Ft. sol.

90

℞

Potassii citratis,	ʒ vj
Potassii bicarbonatis,	ʒ iij
Liquoris pot. hydrox.,	f. ʒ ij
Fluidextracti buchu,	f. ʒ vj
Spiritus æthylis nitrit.,	f. ʒ iv
Syrupi limonis,	q. s. ad f. ℥ vj

M. S. Tablespoonful three times a day.

91

℞

Ext. aconit.,	gr. vj
Sod. nitrit.,	℈ ij
Quin. salicyl.,	ʒ ss
Acid. acetylsal.,	ʒ iss

M. Ft. cap. xxx.

92

℞

Resorcin,	10 Gm.
Glycerin,	15 Gm.
Spirit of ethyl nitrite,	10 cc.
Water,	35 cc.

Mix.

93

℞

Sod. iodidi,	ʒ iss
Sod. bromidi,	ʒ iij
Sod. nitritis,	gr. xxx
Liq. pot. arsenit.,	♏ xl
Aq. dest.,	f. ℥ j
Elix. pepsin. co.,	q. s. f. ℥ iv

M. Ft. sol.

94

℞

Sp. æthylis nit.,	
Tincturæ guaiaci,	aa. f. ℥ j
Tincturæ colchici,	f. ʒ iv
Syrupi,	f. ℥ iij

M.

95

℞

Mentholis,	1.5
Acidi salicylici,	3.5
Phenolphthaleini,	6.5
Ac. sodii oleatis,	6.5

M. Ft. pil. C.

96

℞

Tinct. digitalis,	f. ʒ ij
Tinct. ferri chloridi,	f. ʒ iss
Acidi phosphorici diluti,	f. ʒ j
Aquæ,	q. s. ad f. ℥ ij

M. S. Teaspoonful in some water twice a day.

97

℞

Ferri et quin. cit.,	ʒ j
Ac. phosphor. dil.,	f. ʒ j
Tinct. cardamomi co.,	f. ʒ iij
Syr. limonis,	f. ʒ ij
Aquæ,	q. s. ad f. ℥ ij

M. S. Teaspoonful twice a day.

98

℞

Quinine sulfate,	ʒ j
Strychnine sulfate,	gr. j
Phosphoric acid dil.,	f. ʒ iv
Tinct. of ferric chloride,	f. ʒ v
Aromatic elixir,	to make f. ℥ iv

Mix. Label: Take a teaspoonful after meals.

99

℞

Ac. salicyl.,	ʒ j
Sod. bicarb. (to neut.),	
Tr. ferr. chlor.,	f. ʒ ij
Elix. arom.,	f. ℥ j
Aq. dest.,	q. s. f. ℥ vj
Acid. citric.,	q. s.

M. Ft. sol. s. a.

100

℞

Sod. phos.,	℥ ij
Pot. bicarb.,	ʒ ij

Mix and label: Two teaspoonfuls at night.

101

℞

Ac. salicyl.,	ʒ j
Plumb. acet.,	gr. xl
Aq. dest.,	q. s. f. ℥ viij

M.

102

℞

Sodium salicylate,	gr. clx
Potassium bicarb.,	gr. clx
Tinct. iron chlor.,	♏ clx
Water,	to make f. ℥ viij

Mix. Label: Teaspoonful three times a day.

103

℞

Ac. salicyl.,	ʒ ij
Sol. ferr. pyrophos.,	ʒ ss
Sod. phos.,	ʒ vj
Aq. dest.,	q. s. f. ℥ iv

M. Ft. sol.

104

℞

Sod. salicyl.,	ʒ ij
Tr. ferr. chlor.,	ʒ ij
Ammon. carb.,	gr. vj
Acid. citric.,	gr. viij
Liq. ammon. cit.,	q. s. f. ℥ ij

M.

105

℞

Ac. salicylici,	gr. xx
Ac. tannici,	ʒ ss
Aluminis,	ʒ ii
Kaolini,	q. s. ℥ ii

M. Ft. pulv.

Sig.: Foot powder. Shake into stockings every morning.

106

℞

Tinct. iodi comp.,	f. ʒ ij
Acidi salicylici,	ʒ j
Glycerini,	f. ℥ iss
Aquæ,	enough to make f. ℥iv

Mix and label: Paint over the affected part several times a day.

107

℞

Pot. citrat.,	ʒ iv
Sp. æth. nit.,	f. ʒ iv
Sod. salicyl.,	ʒ iij
Glycerin,	f. ʒ iv
Liq. ammon. acet.,	q. s. f. ℥ iij

Misce.

108

℞

Sodii salicylatis,	gr. xx
Quininæ sulfatis,	gr. xx
Syrupi zingiberis,	f. ℥ ij

M. S. Teaspoonful doses.

109

℞

Sod. salicyl.,	ʒ iij
Aquæ,	f. ℥ j
Tr. gent. co.,	f. ʒ ij
Syr. acid. citric.,	q. s. f. ℥ iij

M. Ft. sol.

110

℞

Sod. salicyl.,	
Sod. bicarb.,	aa. ʒ j
Aq. menth. pip.,	q. s. ℥ ij

M. Ft. sol.

111

℞

Ac. salicyl.,	gr. xx
Alcohol,	f. ʒ iv
Hydrarg. bichlor.,	gr. $\frac{1}{4}$
Aquæ,	q. s. f. ℥ iij

M.

112

℞

Phenol.,	♏ ij
Ac. salicyl.,	gr. vj
Ac. stear.,	6.5 Gm.
Aq. ammon.,	3 cc.
Heat to drive off ammonia.	
Glycerin,	9 Gm.
Amyli,	0.35 Gm.
Aq. dest.,	30 cc.

M. S. A.

113

℞

Strychnine sulf.,	gr. j
Arsenous acid,	gr. $\frac{2}{3}$
Mass. carb. of iron,	gr. l
Sulfuric acid aromat.,	gtt. iij
Quinine sulfate,	gr. xx

Mix and divide into 20 pills.

114

℞

Rochelle salt,	ʒ iv
Elixir of vitriol,	f. ʒ ij
Camphor water,	to make f. ℥ iij

Mix and label: One ounce, to be repeated if necessary.

115

℞

Quininæ sulf.,	gr. xvj
Aquæ,	f. ʒ ij
Acidi sulfurici dil.,	q. s.
Fluidextracti glycyrrhizæ,	q. s. ad f. ℥ ij

M. et ft. mist.

116

℞

Potassii chloratis,	ʒ j
Acidi sulfurosi,	f. ʒ iv
Glycerini,	f. ʒ iij
Aquæ,	f. ℥ j

M. S.: Mix one teaspoonful with a glass of water and use as a gargle.

117

℞

Sodii hypophosphitis,	gr. xx
Acidi sulfurosi,	f. ʒ j
Aquæ cinnamomi,	q. s. ad f. ℥ ij

M. S.: Teaspoonful for vomiting.

118

℞

Infus. digitalis,	
Basham's Mixture,	aa. q. s. f. ℥ iv

M.

119

℞

Potassium chlorate,	
Boric acid,	aa. ʒ j
Tannic acid,	ʒ ss
Water,	to make f. ℥ vj

Mix. Label: Gargle.

120

℞

Ferri sulfatis,	gr. xxx
Acidi tannici,	gr. x
Syrupi,	f. ʒ j
Aquæ,	f. ℥ ij

M. S.: Teaspoonful every two hours.

121

℞

Tannic acid,	gr. x
Zinc sulfate,	gr. xxx
Bismuth subnit.,	ʒ j
Morphine muriate,	gr. vj
Sol. lead subacet.,	f. ʒ iv
Water,	to make f. ℥ iij

M. S.: Use locally 4 or 5 times daily.

122

℞

Sodium salicylate,	
Sodium benzoate,	aa. ʒ j
Tannic acid,	gr.x
Liquefied phenol,	gtt. xij
Lime water,	f. ℥ iv

Mix. Label: Teaspoonful half hour after meals.

123

℞

Quinine bisulf.,	gr. xx
Tincture of gambir co.,	f. ʒ iij
Water, enough to make	f. ℥ iij

Mix. Mark: Teaspoonful every hour.

124

℞

Tinct. myrrhæ,	f. ʒ ij
Morph. acetatis,	gr. ij
Acidi tannici,	ʒ ss
Syr. zingiberis,	f. ℥ iss

Misce et fiat sol.

Sig.: Teaspoonful at 6, 8, and 10 o'clock P. M.

125

℞

Potassium iodide,	ʒ j
Potassium bicarbonate,	ʒ ss
Ammonium chloride,	ʒ j
Spirit of ether,	f. ʒ vj
Water,	q. s. ad ℥ vj

M. S. Dessertspoonful three times a day.

126

℞

Menthol,	gr. xxx
Anæsthesine,	gr. xx
Ac. hydrochlor. dil.,	q. s. sol.
Phenol,	♏ xxx
Dobell's sol.,	q. s. f. ℥ vj

M. Ft. sol.

Sig.: Use as a gargle.

127

℞

Hydrargyri bichlor.,	gr. iij
Albuminis,	ʒ iss
Aquæ,	q. s. ad f. ℥ x

Misce et cola.

Signa: Teaspoonful three times a day.

128

℞

Methyl. salicyl.,	f. ℥ j
Camphor.,	
Menthol.,	aa. gr. xx
Tr. capsic.,	f. ʒ j
Alcohol.,	q. s. f. ℥ iv

M.

129

℞

Potassii nitratis,	
Sodii chloridi,	
Camphoræ,	aa. 3 Gm.
Tincturæ opii,	
Aquæ,	aa. 15 cc.
Alcoholis,	q. s. ad 120 cc.

M. S. Apply with friction.

130

℞

Morphine sulfate,	gr. j
Codeine sulfate,	gr. iij
Solution of arsenous and mercuric iodide,	f. ʒ ij
Distilled water,	q. s. f. ℥ ij

M.

131

℞

Menthol,	
Camphor,	
Cocaine hydrochlor.,	aa. gr. iij
Liquid petrolatum,	q. s. f. ℥ j

M.

132

℞

Atropine sulfate, Distilled water,	1:8000 solution f. ℥ j

M. Sig.: Gtt. ij with each feeding.

133

℞

Strych. sulf.,	gr. ss
Syr. pruni virg.,	f. ℥ j
Aq. destillatæ,	q. s. f. ℥ vj

M.

134

℞

Morph. sulfate,	gr. j
Flexible collodion,	f. ℥ iij

M.

135

℞

Atropine sulfate,	gr. ij
Olive oil,	f. ʒ ij

Mix.

136

℞

Aloin,	ʒ iij
Tr. nux vomica,	f. ʒ j
Tr. ginger,	f. ℥ ij
Sp. ethyl nit.,	f. ℥ ij
Water,	to make O. j

Mix. Label: give at one drench.

137

℞

Morph. sulf.,	gr. x
Aloin,	gr. iv
Aspirin,	
Acetophenet.,	aa. ʒ j
Sod. bicarb.,	ʒ ij

M. Ft. cap. xl.

138

℞

Tr. ferr. chlor.,	f. ʒ iij
Tr. cantharidis,	f. ʒ j
Tr. guaiaci ammon.,	f. ʒ iss
Tr. aloes,	f. ʒ iv
Syrup.,	q. s. f. ℥ vj

M.

139

℞

Tr. nuc. vom.,	f. ʒ iv
Aloin.,	gr. viij
Liq. pot. arsen.,	f. ʒ iss
Sod. phenobarb.,	gr. iij
Tr. card. co.,	f. ℥ ss
Mist. rhei. co.,	q. s. f. ℥ iij

M. Ft. sol.

140

℞

Sat. sol. alum.,	
10% sol. lead acetat.,	aa. f. ℥ viij

M.

141

℞

Aluminis,	gr. vj
Acidi borici,	ʒ j
Aq. rosæ.,	q. s. f. ℥ vj

M.

142

℞

Alum.,	gr. xx
Sod. borat.,	gr. xxv
Pot. brom.,	gr. xx
Glycerin.,	f. ʒ iij
Aq. menth. pip.,	f. ℥ iv

M.

143

℞

Alum.,	ʒ ij
Liq. formaldehyd.,	♏ v
Glycerin.,	f. ℥ j
Liq. aromat. alk.,	q. s. f. ℥ iij

M. Ft. sol.

144

℞

Alumnol,	
Resorcin,	aa. ʒ ij
Water,	to make f. ℥ viij

Make solution. Apply locally.

145

℞

Plumbi acetatis,	
Ammonii carbonatis,	aa. ʒ j
Aquæ rosæ,	f. ℥ viij

Fiat lotio. Signa: Apply on lint to allay irritation.

146

℞

Ammon. carb.,	ʒ ij
Ammon. chlor.,	ʒ j
Syr. scillæ,	f. ʒ j
Syr. tolu.,	
Syr. pruni virg.,	aa. f. ℥ j
Aq. dest.,	q. s. f. ℥ iv

M.

147

℞

Guaiacol,	ʒ ij
Acacia,	ʒ ij
Ammon. carbonate,	ʒ iij
Infusion digitalis,	f. ℥ iss
Water,	to make f. ℥ iij

Mix. Label: Teaspoonful four times a day.

148

℞

Ichthammol,	ʒ j
Zinc oxide,	ʒ ij
Prepared chalk,	
Starch,	
Linseed oil,	aa. ʒ iij
Lime water,	f. ʒ iv

Mix. Apply on lint to burn.

149

℞

Mercuric chloride,	gr. j
Tartar emetic,	gr. v
Syrup of squill,	f. ℥ ij

Mix and label: Half teaspoonful as directed.

150

℞

Syr. ferri iodidi,	f. ℥ j
Antipyrinæ,	ʒ j
Syrupi,	f. ℥ j

M. S. Teaspoonful as directed.

151

℞

Antipyrine,	gr. lx
Sodium salicylate,	ʒ iij
Magnesium sulfate,	℥ j
Water,	to make f. ℥ viij

Mix.

152

℞

Antipyrin.,	gr. xl
Sp. æth. nitrit.,	f. ʒ iv
Syr. tolu.,	f. ʒ vj
Aquæ dest.,	q. s. f. ℥ iij

M.

153

℞

Potassii bromidi,	gr. x
Antipyrinæ,	gr. v
Tinct. ferri chloridi,	♏ x
Spiritus chloroformi,	♏ x
Aquæ,	q. s. ad f. ʒ j

M. S.: Teaspoonful twice a day.

154

℞

Ammon. chloridi,	ʒ j
Cod. sulfatis,	gr. ij
Antipyrin.,	ʒ j
Syr. pruni virg.,	f. ℥ iss
Aq. dest.,	q. s. f. ℥ iij

M.

155

℞

Antipyrine,	gr. x
Quinine sulphate,	gr. j
Dil. sulfuric acid,	q. s.
Cinnamon water,	to make f. ℥ j

Mix. Take in two doses one hour apart.

156

℞

Sol. epinephrine (1-1000),	f. ʒ j
Antipyrine,	
Resorcin,	aa. gr. vj
Normal saline solution,	q. s. f. ℥ j

M.

157

℞

Antipyrine,	ʒ j
Borax,	ʒ iiss
Phenol,	ʒ j
Chloral hydrate,	ʒ iss
Glycerin,	f. ʒ j
Water,	to make f. ℥ viij

Mix. Label: Apply as directed.

158

℞

Fluidextracti gelsemii,	f. ʒ ss
Fluidext. can. ind.,	gtt. xviij
Chlorali hydrati,	ʒ iss
Antipyrinæ,	ʒ j
Aquæ puræ,	f. ℥ j

M. S.: One teaspoonful every four hours.

159

℞

Sodium bromide,	gr. xl
Antipyrine,	gr. xxvj
Camphor,	gr. iv
Caffeine citrate,	gr. vj
Tinct. aconite,	gtt. xij

Mix and make twelve capsules.

Label: One capsule every three or four hours.

160

℞

Apomorph. hydrochlor.,	gr. j
Liq. ammon. acet.,	f. ℥ j
Sp. æthylis. nit.,	f. ℥ ss
Vin. ipecac.,	f. ʒ ij
Aquæ,	q. s. ad f. ℥ vj

M. S.: Teaspoonful every two hours.

161

℞

Tinct. ferri chlor.,	f. ℥ ss
Glycerini,	f. ℥ iss
Aquæ ammoniæ,	f. ʒ iij
Aquæ,	q. s. ad f. ℥ iv

Mix and make a solution.

162

℞

Tincturæ aconiti,	f. ʒ j
Tincturæ iodi,	f. ʒ ij
Linimenti saponis,	
Aquæ ammoniæ,	aa. f. ℥ ij

M. S.: Embrocation.

163

℞

Tinct. digitalis,	f. ʒ ij
Sp. ammon. arom.,	f. ʒ iij
Strychninæ sulf.,	gr. ss
Elix. calisayæ,	q. s. ad f. ℥ vj

Misce.

164

℞

Potassii bromidi,	ʒ vj
Aquæ camphoræ,	f. ℥ vj

M. S. Dessertspoonful before retiring at night.

165

℞

Argent. nitrat.,	
Pot. iodidi,	aa. 1 Gm.
Acaciæ,	q. s.
Aquæ dest.,	q. s. 30 cc.

M. S. A.

Sig.: 5 gtt. in each nostril t. i. d.

166

℞

Argenti nitratis,	gr. vj
Liquoris Fowleri,	f. ʒ j
Aquæ,	q. s. ad f. ℥ iv

M. S.: Teaspoonful twice a day.

167

℞

Silver nitrate,	gr. ij
Ext. hyoscyamus,	gr. iv
Ext. opium,	gr. vj

M. Ft. pil. No. xij.

168

℞

Sodium phosphate,	ʒ ij
Silver nitrate,	gr. iv
Water,	to make f. ℥ ij

M. S.: Teaspoonful every hour between meals.

169

℞

Silver nitrate,	gr. x
Potassium permanganate,	gr. xv
Distilled water,	f. ℥ ij

Mix. Use as wash.

170

℞

Liq. epineph. hydrochlor.,	f. ʒ ij
Liq. argent. nit., 1%,	f. ʒ vj

M.

171

℞

Argentic nitrate,	gr. x
Cocaine,	gr. xij
Water, enough to make	f. ℥ j

Mix and label: Lotion.

172

℞

Solution of silver nitrate in glycerin, 10%,	10 cc.

173

℞

Argenti nitratis,	gr. v
Ext. gentianæ,	q. s.

M. Ft. pil. No. 24.

Sig.: One pill every 4 hours.

174

℞

Argenti oxidi,	gr. vj
Creosoti,	gtt. vj
Glycyrrhizæ,	q. s.

M. Make six pills.

175

℞

Zinc sulfate,	gr. xv
Morphine sulf.,	gr. v
Protargol, 2% solution,	f. ℥ iv

Mix. Label: Injection.

176

℞

Protargol,	gr. x
Cocaine hydrochlor.,	gr. vj
Water,	to make f. ʒ ij

Mix. Label: For the eye.

177

℞

Suppos. argyrol, 10%,

Ft. vj.

178

℞

Argent. prot. mit.,	8
Petrolati,	q. s. 60

M. Ung.

179

℞

Argyrol,	gr. lxxvij
Potass. iodide,	gr. xv
Iodine,	gr. xv
Water,	q. s. f. ℥ iij

Mix and make solution.

Apply as directed.

180

℞

Cupri. sulfatis,	0.2
Liq. pot. arsenit.,	5.
Tr. nuc. vom.,	5.
Tr. ferri pomat.,	35.

M.

181

℞

Liquoris potass. arsenitis,	f. ʒ j
Hydrargyri bichlor.,	gr. j
Aquæ,	f. ℥ iv

Misce et fiat sol. Sig.: Dessertspoonful three times a day.

182

℞

Sodii salicylatis,	ʒ ij
Quininæ sulf.,	gr. xxiv
Hydrargyri bichlor.,	gr. ¾
Liq. potassii arsenitis,	♏ xlviij
Elixiris aromatici,	q. s. ad f. ℥ iij

M.

183

℞

Strychninæ hydrochlor.,	gr. j
Tinct. cinchonæ,	f. ℥ j
Liq. ferri dialysati,	f. ℥ ss
Liq. potassii arsenitis,	f. ʒ ij
Syrupi,	f. ℥ iij
Aquæ,	q. s. ad f. ℥ vj

M.

184

℞

Strych. sulf.,	gr. j
Arsenous acid,	gr. j
Bichloride of mercury,	gr. j
Tinct. chlor. of iron,	f. ℥ j

Mix. Label: Ten drops after meals.

185

℞

Atropine sulfate,	gr. iss
Strychnine sulfate,	gr. iij
Salicylic acid,	gr. v
Borax,	gr. v
Water,	to make f. ℥ ij

Mix. Label: Teaspoonful twice a day.

186

℞

Morphinæ sulf.,	gr. iv
Atropinæ sulf.,	32 (1-500 gr.) tablets
Aquæ,	f. ℥ iv

M. S.: Teaspoonful every three-quarters of an hour.

187

℞

Solution of arsenic, Br. P.,	♏ cxl
Gold and sodium chloride,	gr. iss
Water,	enough to make f. ℥ j

Mix. Label: Teaspoonful after meals.

188

℞

Gold chloride,	gr. x
Menthol, cryst.,	ʒ j
Comp. tinct. of iodine,	f. ʒ v
Glycerin,	f. ʒ vj
Water,	q. s. ad f. ℥ ij

Mix and label: To be used with an atomizer.

189

℞

Auri et sodii chloridi,	gr. xij
Strychninæ sulf.,	gr. j
Atropinæ sulfatis,	gr. ¼
Fluidextracti cinchonæ,	f. ℥ iij
Aquæ,	q. s. ad f. ℥ vj

M. Ft. sol.

190

℞

Peruvian balsam,	ʒ v
Betanaphthol,	gr. xxx
Sulfur ointment,	℥ j
Petrolatum,	q. s. ad ℥ ij

M. Make oint.

191

℞

Bals. Peru.,	ʒ ij
Ol. oliv.,	q. s. f. ℥ iij

M.

192

℞

Bals. Peru.,	ʒ ss
Sulfur.,	gr. xl
Acid. salicyl.,	ʒ ss
Petrolat. alb.,	℥ ss

M. Ft. ung.

193

℞

Sulfur. sublim.,	ʒ vj
Bals. Peru.,	ʒ iv
Betanaphthol.,	ʒ ij
Adeps benz.,	
Petrolat.,	aa. q. s. ℥ iv

M. Ft. ung.

194

℞

Pot. iodidi,	ʒ j
Tr. lobeliæ,	f. ʒ ij
Benzyl. benz. (20% alcoholic solution),	f. ʒ iv
Elix. aromat.,	q. s. f. ℥ iij

M.

195

℞

Pepsini saccharati,	ʒ ij
Bismuthi et ammon. cit.,	ʒ j
Acidi hydrochlorici dil.,	gtt. xl
Aquæ,	f. ℥ ij

Misce et fiat solutio.

Sig.: Dose, one teaspoonful.

196

℞

Creosoti,	♏ xx
Bis. subnit.,	℥ j
Aq. hamamel.,	
Liq. calc. hydrox.,	aa. q. s. ℥ vj

M.

197

℞

Ext. thyroid.,	gr. ss
Calc. iodidi,	gr. iss
Bis. subnit.,	gr. xv
Sod. bicarb.,	gr. x

M. Ft. chart. j.

198

℞

Bismuthi subnitratis,	ʒ ij
Spiritus ammoniæ arom.,	f. ʒ iij
Tinct. opii,	gtt. xx
Zinci acetatis,	ʒ j
Syrupi,	q. s. ad f. ℥ iij

M. S.: Teaspoonful every three hours until relieved.

199

℞

Syrupi acidi hydriodici,	f. ℥ ij
Bismuthi subnit.,	ʒ iss

M. S.: Teaspoonful three times a day.

200

℞

Bismuth subnit.,	ʒ j
Potass. iodide,	gr. xv
Tragacanth,	
Quinine sulf.,	aa. gr. xx
Water,	to make f. ℥ iv

Mix. Label: Teaspoonful after meals.

201

℞

Bromoform.,	2.
Syrup.,	20.
Aq. foenic.,	40.

M.

202

℞

Caff. citrat.,	ʒ j
Sod. salicyl.,	ʒ j
Syr. rubi id.,	f. ℥ j
Aquæ dest.,	q. s. f. ℥ iv

M.

203

℞

Chloral hydrate,	gr. xl
Camphor,	gr. x
Syrup of ginger,	f. ℥ ij
Water,	f. ℥ iij

Mix and mark: Teaspoonful three times a day.

204

℞

Phenyl. salicyl.,	gr. xxxvj
Acetophenet.,	
Quininæ hydrochlor.,	aa. gr. xxiv
Camphor.,	gr. x
Hydrarg. chlor. mit.,	gr. iss

M. Fiat cap. No. xxiv.

205

℞

✓ Menthol,	
Camphor,	aa. gr. iij
Petrolat. liq.,	q. s. f. ℥ j

M.

206

℞

✓ Dionin.,	gr. v
Atropin. sulf.,	gr. $\frac{1}{10}$
Sp. camphoræ,	f. ʒ ij
Liq. ammon. acet.,	q. s. f. ℥ iij

M.

207

℞

Sulf. precip.,	ʒ iss
Camphor.,	
Tragacanth.,	aa. gr. xx
Liq. calc. hydrox.,	q. s. f. ℥ iv

M.

208

℞

Acetanilid,	
Salol,	aa. ʒ j
Monobromated camphor,	ʒ ss

Mix and make 40 pills.

209

℞

Camphor. monobrom.,	gr. xxiv
Eucalyptol.,	f. ʒ j
Bis. subcarb.,	ʒ j

M. Ft. cap. xxiv.

210

℞ ✓

Tinct. guaiaci ammon.,	f. ʒ ij
Mucilaginis acaciæ,	f. ʒ ij
Quininæ sulf.,	gr. viij
Ac. sulfurici dil.,	f. ʒ iv
Potassii bicarb.,	ʒ iss
Aquæ,	q. s. ad f. ℥ iv

M.

211

℞

✓ Iron and ammonium citrate,	gr. lxxx
Pot. bicarb.,	ʒ iss
Magnesium sulf.,	℥ ss
Glycerin,	f. ℥ ss
Water,	to make f. ℥ viij

Mix. Label: Dessertspoonful three times a day.

212

℞

✓ Rhubarb,	
Sodium bicarbonate,	aa. gr. xxx

Mix and make 12 pills.

213

℞

Sod. barbital.,	gr. ij
Chloral. hydratis,	gr. iij
Aquæ dest.,	q. s. f. ℥ j

M.

214

℞

Chloral. hydrat.,	gr. xx
Ol. theobromat.,	q. s.

Suppos. j

Mitte. xii.

215

℞

Potassii bromidi,	ʒ iij
Chloralis,	ʒ iv
Elixiris aromatici,	q. s. ad f. ℥ ij

M. S.: Take one teaspoonful at night.

216

℞

Chloral hydrate,	
Quinine sulfate,	aa. ʒ j
Potassium bromide,	gr. xl
Water,	to make f. ℥ ij

M. S.: Teaspoonful at night.

217

℞

Chloral hydrate,	ʒ j
Acetophenetidin,	gr. xl
Quinine sulfate,	gr. l

Mix and put into 10 capsules.

Label: Take one at night.

218

℞

Chloramine-T,	gr. xlv
Boric acid,	ʒ j
Distilled water,	q. s. ad ℥ iv

Make solution. Label: Use as mouth lotion.

219

℞

Chloramine-T,	ʒ iij
Milk sugar,	gr. xvj

Make into 10 hand-molded tablets.

Dissolve 1 tablet in 4 ounces of water to make a 1% solution.

220

℞

Pot. chlorat.,	ʒ j
Tr. ferri chlor.,	f. ʒ iv
Glycerin.,	f. ʒ iv
Ac. hydrochlor.,	f. ʒ j
Aquæ dest.,	q. s. f. ℥ iij

M. Ft. sol.

Sig.: Use as gargle.

221

℞

Pot. chlorat.,	gr. xv
Tr. ferri chloridi,	f. ʒ iv
Glycerini,	f. ʒ iv
Aquæ dest.,	q. s. ad f. ℥ iij

Sig.: ʒ j in wineglassful of water as a gargle every three hours.

222

℞

Calomel,	gr. vj
Potassium chlorate,	℈ j
Sugar, powd.,	ʒ j

Mix and make six powders.

Label: One every two hours.

223

℞

Pot. chlorat.,	gr. xxx
Aquæ,	q. s. to dissolve
Alumen.,	gr. xxx
Glycerin.,	q. s. f. ℥ j

M.

224

℞

Liquor. ferri chloridi,	f. ʒ ij
Potassii chloratis,	gr. xxx
Glycerini,	f. ℥ j

M. S.: Teaspoonful twice a day.

225

℞

Potassii chloratis,	ʒ j
Tincturæ ferri chloridi,	f. ʒ j
Phenolis,	gtt. x
Aquæ,	q. s. ad f. ℥ vj

M. S.: Use as gargle.

226

℞

Potassii citratis,	ʒ ij
Potassii chloratis,	ʒ iiss
Spiritus æth. nitrit.,	f. ℥ j
Aquæ camphoræ,	f. ℥ vj

M. S.: Dessertspoonful every two or three hours.

227

℞

Potassii chloratis,	gr. iv
Sulfuris præcip.,	gr. vj
Antimonii sulf.,	gr. j
Sacchari,	gr. x

Tere. Fiant chartulæ 2.
Signa: Insufflation.

228

℞

Sodii bicarbonatis,	ʒ ij
Sodii salicylatis,	ʒ iv
Chloroformi,	f. ʒ ss
Phenolis,	♏ x
Aquæ,	q. s. ad f. ℥ iv

M. S.: Teaspoonful one hour after meals.

229

℞

Unguentine,	℥ j
Add chloroform,	10%

M.
Sig.: Apply to burn.

230

℞

Quin. bisulf.,	1
Acid. borici,	5
Acid. lactici,	1
Mucil. chondri,	100

M.

231

℞

Chromic acid,	gr. iv
Cocaine hydrochloride,	gr. vj
Water,	f. ʒ ij

Mix. Use as caustic.

232

℞

Acidi chromici,	5 Gm.
Glycerini,	
Alcoholis,	aa. 5 cc.

M. S.: Caustic.

233

℞

Salicylic acid,	
Resorcin,	aa. ʒ ss
Chrysarobin,	ʒ j
Collodion,	to make f. ℥ iij

M. Apply as directed.

234

℞

Hydrarg. chlor. mit.,	
Cocainæ hydrochlor.,	aa. gr. j
Pepsini,	gr. iv
Aquæ,	quantitas sufficiens

M. Div. pil. No. viij.

235

℞

Cocaine hydrochlor.,	0.8 Gm.
Flexible collodion,	10.0 Gm.

Mix. Apply with camel-hair brush.

236

℞

Cocaine hydrochloride,	gr. j
Silver nitrate,	gr. j
Distilled water,	to make f. ℥ j

Mix and label: Put one drop in each eye at night.

237

℞

Camphor,	gr. iiss
Menthol,	gr. iss
Cocaine hydrochlor.,	gr. v
Liquid petrolatum,	f. ℥ iv

Mix and make solution.
Label: Spray nose and throat when needed.

238

℞

Cocaine,	gr. x
Liquid petrolatum,	f. ℥ ss

Make solution. Label: Apply as directed.

239

℞

Codeinæ,	gr. ij
Ammon. chlor.,	ʒ ss
Terpini hydrat.,	ʒ ij
Syr. pruni virg.,	f. ℥ iiss
Aquæ dest.,	q. s. f. ℥ iv

M.

240

℞

$C_{18}H_{21}NO_3$,	gr. 14
KI,	dr. 2½
$C_3H_8O_3$,	oz. 1½
H_2O,	oz. 2

M. S.: Teaspoonful every four hours.

241

℞

Morphine hydrochlor.,	gr. iss
Codeine,	gr. iij
Ammonium chloride,	gr. xx
Water, enough to make	f. ℥ ij

Mix and label: Teaspoonful every two hours for cough.

242

℞

Ext. cannab.,	gr. v
Acid. salicyl.,	ʒ j
Zinci sulfatis,	ʒ j
Pot. sulfurat.,	ʒ j
Ol. terebinth.,	ʒ ss
Cocainæ hydrochlor.,	gr. x
Collod. flex.,	f. ℥ j

M.

243

℞

Phenolis,	ʒ j
Collodii,	ʒ vij

M. Ft. sol.

Sig.: Apply with camel-hair brush.

244

℞

Tinct. of iodine,	f. ʒ ij
Collodion,	f. ʒ iij
Stronger ammonia water,	f. ʒ j

Mix. Apply with camel-hair brush.

245

℞

Creosote,	♏ ¼
Iodine,	gr. 1/25
Potass. dichromate,	gr. 1/20

Excipients, q. s. to make a three grain tablet.

246

℞

Creosote,	f. ʒ j
Glycerin,	f. ʒ ij
Syrup yerba santa,	f. ʒ ij
Simple elixir,	q. s. ad f. ℥ ij

M. S.: Teaspoonful four times a day.

247

℞

Creosot. carbonat.,	ʒ iv
Elix. digest. co.,	q. s. f. ℥ iij

M.

248

℞

Ac. salicylici,	ʒ iv
Phenolis,	ʒ ss
Thymolis,	ʒ ss
Ol. caryophyll.,	f. ʒ ss
Antimon. et pot. tart.,	gr. xx
Cupri sulf.,	gr. xv
Hydrarg. oxid. flav.,	ʒ j
Petrolat. alb.,	
Adeps lanæ hyd.,	aa. ℥ iv

M. Ft. ung.

249

℞

Fluidextracti digitalis,	f. ʒ iv
Potassii acetatis,	ʒ iij
Elixiris,	f. ℥ ij
Aquæ,	q. s. ad f. ℥ vj

Misce et signa: Teaspoonful every four hours.

250

℞

Liq. epineph. hydrochlor.,	f. ʒ j
Liq. sod. borat. co.,	q. s. f. ℥ iij

M.

251

℞

Solution adrenalin chloride,	f. ʒ j
Chloretone,	ʒ ss
Milk of magnesia,	to make f. ℥ ij

Mix. Label: One dram every two hours until relieved.

252

℞

Adrenalin inhalant,	f. ʒ ij
Menthol,	gr. x
Liq. petrolatum,	q. s. f. ℥ j

M.

253

℞

Solution adrenalin hydrochloride,	f. ʒ j
Solution silver nitrate, 1%,	f. ʒ j

Mix. Label: One drop in each eye night and morning.

254

℞

Quininæ sulf.,	ʒ j
Ferri phosphatis sol.,	ʒ ij
Strychninæ sulf.,	gr. j
Acidi phosphorici dil.,	f. ℥ ss
Syrupi zingiberis,	f. ℥ ij
Aquæ,	q. s. ad f. ℥ iv

M. S. Teaspoonful three times a day.

255

℞

Soluble ferric phosphate,	ʒ ij
Strychnine sulfate,	gr. ss
Aromatic elixir,	q. s. f. ℥ iij

M. Ft. sol.

256

℞

Ferri pyrophos. sol.,	ʒ j
Liq. pot. arsenit.,	f. ʒ iss
Chloral. hyd.,	ʒ ij
Sod. brom.,	℥ j
Aquæ menth. pip.,	q. s. f. ℥ iv

M. Sol.

257

℞

Quinine sulfate,	ʒ j
Strychnine sulfate,	gr. j
Sulfuric acid dil.,	ʒ ij
Iron pyrophosphate, sol.,	ʒ j
Syrup ginger,	to make f. ℥ vj

Mix. Teaspoonful three times a day.

258

℞

Fowler's sol.,	f. ʒ ij
Pot. acetate,	ʒ vj
Elix. iron pyrophos.,	to make f. ℥ viij

Mix. Teaspoonful after meals.

259

℞

Tr. ferr. chloridi,	f. ʒ ij
Pot. chloratis,	ʒ j
Glycerini,	f. ʒ iij
Liq. pot. citrat,	q. s. f. ℥ iij

M. Ft. sol.

260

℞

Tinct. ferri chloridi,	f. ʒ ij
Aquæ ammoniæ,	q. s. to neutralize the acid
Syrupi,	f. ℥ ij

Misce. Signa: Dessertspoonful three times a day.

261

℞

Pot. chlorat.,	gr. xxv
Tr. ferr. chlor.,	f. ʒ iss
Glycerin.,	f. ℥ ss
Liq. sod. bor. co.,	q. s. f. ℥ iv

M. Ft. sol.

Sig.: Gargle every four hours.

262

℞

Potassii acetatis,	ʒ viss
Sodii bicarbonatis,	ʒ ij
Morphinæ sulfatis,	gr. ij
Tinct. ferri chlor.,	f. ʒ j
Quininæ sulfatis,	gr. x
Aquæ dest.,	q. s. ad f. ℥ vj

M. S. Teaspoonful three times a day.

263

℞

Tr. bellad.,	f. ʒ ij
Ammon. iod.,	ʒ j
Ammon. chlor.,	ʒ ij
Aquæ camph.,	f. ℥ iiss
Syr. pruni virg.,	f. ℥ j
Tr. ferr. chlor.,	f. ʒ iij
Aquæ dest.,	q. s. f. ℥ iv

M.

264

℞

Fowler's solution,	f. ʒ j
Tinct. digitalis,	f. ʒ iij
Tinct. ferric chloride,	f. ʒ iij
Solution iron peptomanganate,	q. s. ad f. ℥ iv

Mix. Label: Teaspoonful after meals.

265

℞

Tr. ferri chlor.,	f. ʒ ij
Sod. salicyl.,	ʒ iv
Glycerin.,	f. ℥j
Aquæ,	f. ℥ iij

M.

266

℞

Sod. phosphate,	℥ ss
Tinct. ferric chloride,	f. ℥ iss
Water,	to make f. ℥ iv

Mix. Teaspoonful three times a day.

267

℞

Ferri et quinin. cit.,	2 Gm.
Potassii iodidi,	5 Gm.
Syrupi,	
Aquæ,	aa. 30 cc.

M.

268

℞

Sod. chlorat.,	gr. xx
Tr. ferri chlor.,	f. ʒ j
Mucilag. acaciæ,	f. ʒ ij
Aq. dest.,	q. s. f. ℥ ij

M.

269

℞

Tincture of iron chloride,	f. ℥ j
Diluted phosphoric acid,	f. ℥ j
Syrup of hypophosphites,	f. ℥ viij

Mix. Label: Teaspoonful after meals.

270

℞

Calcii hypophosphitis,	
Sodii hypophosphitis,	aa. ʒ ij
Liq. potassii arsenitis,	f. ʒ j
Tinct. ferri chlor.,	f. ℥ j
Ac. phosphorici dil.,	f. ʒ j
Strychninæ sulf.,	gr. j
Aquæ,	q. s. ad f. ℥ iv

M. S.: Teaspoonful three times a

271

℞

Syr. ferr. iod.,	f. ℥ j
Sod. salicyl.,	ʒ ss
Sp. æth. nit.,	f. ℥ j
Syr. pruni virg.,	q. s. f. ℥ iij

M.

272

℞

Citrated caffeine,	2.0 Gms.
Spirit of ethyl nitrite,	20.0 cc.
Basham's mixture,	100.0 cc.

Mix. Label: Dessertspoonful three times a day.

273

℞

Tinct. of iron chloride,	f. ʒ j
Sol. of arsenous acid,	f. ℥ ss
Quinine sulfate,	gr. x
Cinnamon water,	f. ℥ ij

Mix. Label: Teaspoonful three times a day.

274

℞

Ferric cacodylate,	0.65 Gm.
Sodium glycerophosphate,	1.30 Gm.
Double distilled water,	50.0 cc.

Make ten ampoules of five cc. each.

275

℞

Sod. salicylate,	ʒ ij
Glycerin,	f. ℥ ss
Tinct. of iron chlor.,	f. ʒ iss
Syrup,	f. ℥ iss
Sol. ammonium acetate,	q. s. ad f. ℥ iv

Mix. Label: Teaspoonful four times a day.

276

℞

Salol,	gr. xxx
Tincture of iron chlor.,	f. ʒ ij
Syrup, enough to make	f. ℥ iij

M. S.: Teaspoonful three times a day.

277

℞

Tinct. ferri chloridi,	f. ʒ iv
Phenolis,	ʒ j
Acidi sulfurosi,	f. ʒ iij
Aquæ,	q. s. ad f. ℥ viij

Misce et signa: Gargle.

278

℞

Liq. potassii arsenitis,	
Syrupi ferri iodidi,	aa. f. ℥ ij
Syrupi tolutani,	f. ℥ iss

M. S.: Teaspoonful three times a day.

279

℞

Sod. brom.,	gr. lxxv
Tr. lobeliæ,	♏ xlv
Fldext. grindeliæ,	f. ʒ ij
Tr. bellad.,	f. ʒ ss
Aq. menth. pip.,	q. s. f. ℥ ij

M.

280

℞

Phenolis,	3 Gm.
Sodii bicarb.,	15 Gm.
Sodii boratis,	15 Gm.
Glycerini,	35 cc.
Aquæ,	q. s. ad 1000 cc.

Misce. Sig.: Use as gargle.

281

℞

Acidi tannici,	gr. xij
Ext. belladonnæ,	gr. ij
Glycer. boroglycerini,	ʒ iij

M. Ft. suppos. No. vi.

282

℞

Glyc. boroglycerini,	℥ j
Hydrargyri bichlor.,	gr. ij
Aquæ,	q. s. ad ℥ iv

M. S.: Apply to ulcer.

283

℞

Boroglycerin, 50%,	ʒ iv
Petrolatum,	ʒ iv

Mix. Label: Apply freely.

284

℞

Fluidextract licorice,	f. ℥ j
Tinct. nux vomica,	f. ʒ iv
Tinct. cinchona,	f. ʒ iv
Water,	q. s. ad f. ℥ iij

Mix. Label: Teaspoonful after meals.

285

℞

Calcium iodide,	ʒ ij
Guaiacol,	gr. xviij
Iodine,	gr. iv
Potassium iodide,	gr. j
Water,	q. s. ad f. ℥ viij

Make 12 ampoules.

286

℞

Hydrarg. bichlor.,	gr. ij
Sod. borat.,	ʒ j
Glycerini,	f. ʒ ij
Aquæ dest.,	q. s. f. ℥ iv

M. Sol.

287

℞

Hydrargyri bichlor.,	0.5 Gm.
Ammonii carbonatis,	2.5 Gm.
Potassii iodidi,	2.5 Gm.
Aquæ,	q. s. ad 150 cc.

M. S.: Dilute with three times its volume of water and use as directed.

288

℞

Hyd. bichlor.,	gr. x
Ammon. chlor.,	gr. xx
Methylthion. chlor.,	gr. ij
Acid. citric.,	gr. xx
Aquæ dest.,	f. ℥ iv

M. Sol.

289

℞

Mercuric chloride,	gr. ij
Tinct. of iron chloride,	f. ʒ j
Quinine sulfate,	ʒ j
Diluted hydrobromic acid,	f. ℥ j
Water,	to make f. ℥ vj

Mix. Label: Teaspoonful three times a day.

290

℞

Hydrargyri bichlor.,	gr. ss
Liq. potass. arsenitis,	f. ʒ iss
Quininæ sulfatis,	gr. x
Aq. menth. piper,	q. s. ad f. ℥ j

M. S.: Half teaspoonful three times a day.

291

℞

Corrosive sublimate,	gr. j
Strychnine nitrate,	gr. $\frac{1}{8}$
Fowler's solution,	f. ʒ j
Essence of pepsin,	f. ℥ ij
Comp. syrup hypophosphites,	to make f. ℥ iv

Mix. Label: Teaspoonful in a little water after meals.

292

℞

Liquoris acidi arsenosi,	f. ʒ j
Hydrargyri bichlor.,	gr. j
Strychninæ sulfatis,	gr. j
Spiritus vini rectificati,	f. ʒ j
Aquæ,	f. ℥ j

Misce. Signa: Teaspoonful night and morning.

293

℞

Liq. ammonii acet.,	
Syrupi ferri iodidi,	aa. f. ℥ ss
Syrupi tolutani,	f. ℥ ij
Hydrarg. bichloridi,	gr. ss
Creosoti,	f. ʒ ss

M.

294

℞

Hydrarg. chlor. mit.,	gr. xviij
Pot. bromidi,	ʒ ss
Lactosi,	ʒ ss

M. Ft. chart. xij.

295

℞

Ammonii carbonatis,	ʒ j
Hydrarg. chlor. mitis,	gr. xij

M. Ft. capsulæ No. VIII.

Sig.: One every three hours.

296

℞

Calomel,	gr. xv
Lime water,	f. ℥ iv

Mix and apply as directed.

297

℞

Antipyrine,	gr. xx
Calomel,	gr. x
Sodium bicarb.,	ʒ j

Mix and make 20 powders.

298

℞

Protoiod. of mercury,	0.25
Sod. iodide,	4
Syr. of raspberry,	24
Dist. water, q. s.,	60

M. Sig.: f ʒ j three times daily.

299

℞

Mercuric iodide, red,	gr. x
Potassium iodide,	gr. x
Sodium bicarbonate,	gr. x

Color red and make 10 hand-molded tablets.

Label: Dissolve one tablet in two ounces of water and use as a wash.

300

℞

Hydrarg. oxidi flavi,	gr. ij
Cocainæ hydrochlor.,	gr. ij
Acidi borici,	gr. iv
Petrolati,	ʒ iv

Mix. Apply to the eyelid at night.

301

℞

Ichthyol,	
Zinc sulfate,	aa. ʒ ss
Glycerin,	f. ʒ ij
Water,	to make f. ℥ ij

Mix. Label: Apply as directed.

302

℞

Ichthammol,	
Zinci oxidi,	
Magnes. carb.,	aa. 4
Liq. calc. hydrox.,	q. s. 120

M. Lot.

303

℞

Ichthyol,	ʒ j
Tr. iodine,	f. ʒ j
Resorcin,	ʒ j
Petrolatum,	℥ ij

M. Apply night and morning.

304

℞

Ichthammol,	gr. iij
Ac. salicyl.,	gr. x
Amyli,	ʒ ij
Zinci oxidi,	ʒ ij
Petrolat., q. s.,	℥ j

M. ung.

305

℞

Ichthyol,	ʒ j
Phenol,	gr. xxiv
Ammon. chlor.,	gr. xl
Hydrous wool fat,	ʒ iv

Mix and make ointment.

306

℞

Ichthyol,	gr. xx
Quinine sulf.,	gr. xij
Resorcin,	gr. xx
Tinct. nux vomica,	f. ʒ ij
Water,	to make f. ℥ ij

Mix. Label: Teaspoonful as needed.

307

℞

Ichthyol,	ʒ ij

Ft. caps. No. 12.

308

℞

Ext. hyoscyam.,	gr. ij
Iodoform.,	ʒ j
Ol. neroli,	♏ iv

Ol. theobrom., q. s.
Misce. ft. suppos. No. xij

309

℞

Menthol,	gr. viij
Iodoform,	ʒ j
Ether,	f. ℥ j
Liquid petrolatum,	to make f. ℥ iv

Mix. Make solution. Label: Spray.

310 ✓

℞

Iodoform,	gr. xxx
Boric acid,	ʒ j
Calomel,	gr. xx
Bismuth subnitrate,	ʒ j

Mix. Label: Dust on abraded surface as directed.

311 ✓

℞

Iodoform,	
Tannic acid,	aa. ʒ ij

Mix and label: Dust over abraded surface.

312

℞

Iodine, resublimed,	ʒ ij
Mercurial oint.,	
Camphor,	aa. ʒ iij
Alcohol,	f. ℥ ij
Water,	q. s. ad f. ℥ iv

Mix and label: Apply as ointment to the neck.

✓ 313

℞

Hydrargyri chlor. mitis,	gr. xxx
Tinct. iodi,	f. ʒ ij
Aquæ,	q. s. ad f. ℥ iij

M. S.: To be painted on swelling on neck.

314

℞

Tr. iodi,	f. ʒ j
Lin. chlorof.,	f. ʒ vj
Lin. saponis,	q. s. f. ℥ ij.

M. Ft. lin.

315

℞

Tincturæ iodi,	f. ʒ iij
Liquoris potass. arsenitis,	f. ʒ ij

M. S.: Take five minims in water after meals.

316

℞

Pot. iodide,	ʒ ij
Tr. arnica,	f. ℥ ss
Tr. iodine,	f. ℥ ss
Chloroform,	f. ʒ ij
Cod liver oil,	f. ℥ ss

M. Label: Apply locally.

317

℞

Iodine,	gr. xx
Methyl salicyl.,	f. ʒ ij
Oil of anise,	f. ʒ ij
Wool fat,	f. ℥ j
Olive oil,	q. s. f. ℥ vj

M. Ft. lin.

Sig.: Apply to chest.

318

℞

Iodi resublim.,	gr. xl
Adipis,	℥ j

M. S.: Rub over the affected part.

319

℞

Iodine,	ʒ j
Pot. iodide,	ʒ j
Lanolin,	℥ ss
Olive oil,	q. s. f. ℥ iij

M. Lin.

320

℞

Cocaine hydrochloride,	gr. xx
Tinct. iodine,	f. ʒ iij
Phenol,	ʒ j
Rose water,	f. ℥ j
Glycerin,	ad f. ℥ iv

Mix and make solution. Label: Spray for throat.

321

℞

Ammon. carb.,	ʒ ij
Mentholis,	gr. xxx
Phenolis,	gr. x
Glycerini,	f. ℥ j
Liq. calc. hydrox.,	q. s. f. ℥ iij

M.

322

℞

Liquoris zinci chloridi,	f. ʒ j
Hydrargyri bichlor.,	gr. iv
Liquoris calcii hydrox.,	f. ℥ ij
Aquæ,	q. s. ad f. ℥ iv

Misce. Signa: Apply as directed.

323

℞

Calaminæ,	ʒ ij
Zinci oxidi,	ʒ iij
Liq. calc. hydrox.,	
Ol. olivæ,	aa. q. s. f. ℥ ij

M. Ft. lot.

324

℞

Calaminæ,	ʒ j
Ol. olivæ,	℥ ij
Liq. picis carbon.,	ʒ ij
Liq. calc. hydrox.,	q. s. f. ℥ viij

M. Ft. lotio.

325

℞

Acidi borici,	
Zinci oxidi,	
Glycerini,	aa. ʒ ij
Adipis lanæ,	ʒ iv
Ol. olivæ,	
Liq. calc. hydrox.,	aa. q. s. f. ℥ viij

M. Ft. lotio.

326

℞

Magnes. carb.,	25
Zinci oxidi,	10
Ol. amygdal. exp.,	45
Liq. calc. hydrox.,	25
Aquæ rosæ,	q. s. 240

M. Ft. lotio.

327

℞

Acid. phenic.,	
Acid. salicylic.,	
Resorcinol.,	aa. 1.3 Gm.
Ol. olivæ,	
Liq. calc. hydrox.,	aa. 30 cc.

M. Fiat lotio.

328

℞

Zinc oxide,	30
Calamine,	30
Tragacanth,	4
Glycerin,	5
Water,	120
Olive oil,	120
Lime water,	q. s. 500

M. Ft. lot.

329

℞

Liquoris hydrogenii perox.,	f. ℥ j
Potassii permangan.,	gr. xx
Aquæ,	f. ℥ j

Misce.

Sig.: Apply to the affected parts night and morning.

330

℞

Bismuth subsalicylate,	ʒ ij
Tannic acid,	ʒ iij
Sol. hydrogen peroxide,	f. ℥ vij

Mix. Label: Inject three times daily.

331

℞

Liq. hydrogenii peroxidi,	f. ℥ j
Zinci sulfatis,	ʒ vj
Phenol.,	ʒ j
Glycerini,	f. ℥ j
Aquæ,	q. s. ad f. ℥ viij

Misce et fiat lotio.

Signa: Apply locally.

332

℞

Zinc phenolsulfonate,	gr. xxiv
Lead water,	f. ℥ ij

Mix and make solution.

333

℞

Liq. plumbi. subacet.,	f. ʒ iss
Cupri sulfatis,	
Zinci sulfatis,	aa. ʒ ss
Aquæ dest.,	q. s. ad f. ℥ ij

M. Ft. lot.

Sig.: Apply externally.

334

℞

Sol. lead subacetate,	f. ℥ ij
Soap liniment,	to make f. ℥ ij

Mix. Label: Apply with friction.

335

℞

Solution lead subacetate,	f. ℥ viij
Liquefied phenol,	f. ʒ j

Mix. Label: Apply as directed.

336

℞

Tannin,	ʒ j
Mercuric chlor.,	gr. ¼
Morph. sulf.,	gr. v
Tr. arnica,	f. ℥ j
Sol. lead subacet.,	
Glycerin,	aa. f. ℥ j
Water,	f. ℥ iv

Mix. Label: Apply locally.

337

℞

Goulard's extract,	f. ℥ ij
Glycerin,	
Phenol,	aa. f. ʒ ij
Olive oil,	f. ℥ ix

M. Apply as directed.

338

℞

Zinci oxidi,	ʒ ij
Glycerini,	f. ʒ ij
Liq. plumbi subacetatis,	f. ʒ j
Liquor. calc. hydrox.,	q. s. ad f. ℥ iv

M. S. Lotion.

339

℞

Liq. plumbi subacet. dil.,	
Tincturæ opii,	aa. f. ℥ ss
Aquæ,	f. ℥ j

M. S. Lotion.

340

℞

Sodii phosphatis,	℥ ij
Sodii chloridi,	ʒ iv
Lithii bromidi,	ʒ iij
Aquæ,	q. s. f. ℥ viij

M. Ft. sol.

Sig.: Take dessertspoonful three times a day.

341

℞

Methyl. salicyl.,	f. ℥ ss
Ol. caryophylli,	♏ xxiv
Magmæ magnes.,	q. s. f. ℥ iij

M.

342

℞

Liq. sod. phos. co.	
Magmæ magnes.	
Elix. gent. glycerin.,	aa. q. s. ad f. ℥ iij

M.

343

℞

Milk of magnesia,	f. ℥ iv
Liquid petrolatum,	f. ℥ ij
Sod. borate,	ʒ j
Rose water,	q. s. f. ℥ viij

M.

344

℞

Magnes. oxid.,	15
Glycerini,	30
Elix. brom. tri.,	q. s. 120

345

℞

Magnes. oxid.,	
Sod. bicarb.,	aa. ʒ iv
Aq. menth. pip.,	q. s. f. ℥ iv

M.

346

℞

Magnesii sulfatis,	℥ j
Tinct. aconiti,	f. ʒ ij
Spiritus æthylis nit.,	f. ℥ ij
Aquæ,	q. s. ad f. ℥ iv

M. Ft. sol. Sig.: Tablespoonful every four hours.

347

℞

Menthol,	ʒ ss
Boric acid,	ʒ j
Tinct. of hydrastis,	f. ʒ ij
Water, enough to make	f. ℥ iv

Mix. Mark: Use as spray.

348

℞

Ephedrin. sulf.,	gr. iiss
Mercurochrome,	gr. iss
Dist. water,	q. s. f. ʒ j

M.

349

℞

Mercurochrome,	0.65
Salicylic acid,	2
Petrolatum,	
Lanolin,	aa. q. s. 30

M. Ft. ung.

350

℞

Aspirin,	
Methenamine,	aa ʒ i

Mix and make 12 capsules.

351

℞

Methenamine,	
Sodium biphosphate,	aa. ʒ vj
Simple elixir,	q. s. ad f. ℥ iv

M. S.: Teaspoonful four times a day.

352

℞

Morph. acetatis,	0.05 Gm.
Potassii iodidi,	2.0 Gm.
Ferri sulfatis,	1.0 Gm.
Aquæ,	50.0 cc.

M. S.: One teaspoonful every night.

353

℞

Tinct. myrrh,	f. ʒ iv
Tinct. chloride of iron,	f. ʒ ij
Glycerin,	f. ʒ iij
Sat. sol. potass. chlorate,	f. ℥ ij

Mix. Label: Use as gargle.

354

℞

Phenolis,	ʒ ss
Ac. salicylici,	ʒ j
Ac. benzoici,	ʒ j
Hydrarg. bichlor.,	gr. ij
Sp. vini rect.,	f. ℥ iij
Ol. ricini,	f. ʒ ij
Aq. camph.,	q. s. f. ℥ vj

M.

355

℞

Olei ricini,	
Glycerini,	aa. 20 cc.

M. S. Tablespoonful at night.

356

℞

Liq. iodi comp.,	f. ʒ ij
Liq. potassæ,	f. ʒ iv
Olei olivæ,	f. ℥ j

M. S.: Apply as directed.

357

℞

Cocainæ,	gr. xvj
Chloroformi,	ʒ j
Phenol.,	♏ v
Ol. amygdal. amar.,	q. s. f. ℥ j

M. Ear drops.

Sig.: Five drops in ear. Fill with cotton.

358

℞

Ac. borici,	℥ iv
Phenol.,	ʒ iij
Alumen.,	℥ j
Ol. menth. pip.,	ʒ iss

M. Ft. pulv.

359

℞

Oil of turpentine,	f. ℥ iss
Mercuric chloride,	ʒ ss

Mix and make solution.

Iodine,	ʒ ss
Alcohol,	f. ℥ iiss

Dissolve iodine in alcohol and add to above solution.

Label: Liniment.

360

℞

Vini ipecacuanhæ,	f ʒ iij
Syrupi scillæ,	f. ʒ vj
Olei terebinthinæ,	f. ʒ iss
Tinct. opii camphoratæ,	f. ʒ v
Liquoris ammonii acet.,	f. ℥ iss
Syrupi,	q. s. ad f. ℥ iv

M. S.: Teaspoonful three times a day.

361

℞

Oil of turpentine,	℥ vj
Alum,	
Borax,	
Rosin,	
Camphor,	aa. ʒ ij

Mix. Label: Give one-half at a drench and the remainder in two hours.

362

℞

Sodii bicarbonatis,	ʒ ij
Pepsini,	gr. xxiv
Sodii bromidi,	ʒ j
Rhei pulv.,	gr. xxxij

M. Ft. chart. No. xii.

363

℞

Zinci oxidi,	ʒ ij
Zinci carbonatis,	ʒ j
Petrolati,	℥ ss
Liquoris calcis,	q. s. ad f. ℥ iv

Misce. Signa: Apply with friction.

364

℞

Menthol,	gr. xx
Chloroform,	f. ʒ j
Tinct. benzoin,	f. ʒ iss
Liquid petrolatum,	f. ℥ j

Mix and label: Spray the throat every four hours.

365

℞

Phenobarb.,	gr. vj
Pot. brom.,	ʒ iv
Syr. aurant.,	f. ʒ vj
Aq. dest.,	q. s. f. ℥ iij

M.

366

℞

Sod. nitrate,	gr. xxiv
Sod. phenobarb.,	gr. vj
Tr. digital.,	f. ʒ ij
Ess. pepsin.,	q. s. f. ℥ iij

M.

367

℞

Phenol.,	ʒ iss
Aquæ,	q. s. ad f. ℥ j

M. S.: Use with camel-hair brush.

368

℞

Phenolis,	gr. x
Plumbi acetatis,	gr. x
Thymolis,	gr. xv
Morphinæ sulf.,	gr. ij
Olei theobromatis,	ʒ iij

Misce. Ft. suppos. No. x.

369

℞

Phenol.,	gr. xv
Thymol.,	gr. ij
Liq. potassæ,	♏ xij
Boroglycer.,	♏ xxiv
Sp. camph.,	ʒ vj
Aq. hamamel.,	q. s. f. ℥ ij

M.

370

℞

Solution cocaine hydroc., 4%,	
Phenol,	
Glycerin,	aa. f. ʒ j

Mix. Label: For toothache.

371

℞

Phenolphthalein,	gr. viij
Milk of magnesia,	f. ℥ iv

Mix. Label: One tablespoonful in water at night.

372

℞

Phenyl. salicyl.,	ʒ ij
Tr. opii camph.,	f. ℥ iij
Aq. dest.,	q. s. f. ℥ vj

M.

373

℞

Phenyl. salicyl.,	ʒ j

Dissolve in warm almond oil and add:

Elix. pepsin. co.,	f. ℥ j
Aq. menth. pip.,	f. ℥ j
Syrup.,	q. s. f. ℥ iij

M.

374

℞

Salol,	gr. x
Oil sandalwood,	
Oil cubeb,	
Oil wintergreen,	aa. ♏ x

Mix. Put into 12 capsules.

Label: Take one three times a day.

375

℞

Salol,	
Thymol,	aa. ʒ j
Ext. of nux vomica,	gr. x
Ext. of glycyrrhiza,	gr. xv

Po. soap, a sufficient quantity.

Mix and divide into 20 pills.

376

℞

Salol,	ʒ ij
Aspirin,	ʒ j
Antipyrine,	ʒ j
Strychnine sulfate,	gr. $\frac{1}{4}$

Mix and make capsules No. 24.

Label: One every four hours.

377

℞

Powdered nux vomica,	gr. iij
Orchic substance,	gr. ss
Cantharides, powd.,	gr. ss
Phosphorus,	gr. $\frac{1}{80}$

For one pill. Send 24 such.

378

℞

Pilocarpinæ hydrochlor.,	gr. $\frac{1}{8}$
Hydrarg. chlor. mitis,	gr. $\frac{1}{4}$

Misce. D. tales No. viij.

Signa: One powder night and morning.

379

℞

Pilocarpine,	gr. j
Terpin hydrate,	ʒ j
Glycerin,	f. ʒ ij
Syrup of tolu,	f. ℥ iss
Water,	f. ℥ iss

Mix and make a solution. Teaspoonful five times a day.

380

℞

Piperazine,	ʒ j
Strychnine sulfate,	gr. ij
Syrup of orange,	f. ʒ vj
Chloroform water,	to make f. ℥ vj

Mix. Teaspoonful three times a day

381

℞

Zinc oxide,	
Crude coal tar,	
Starch,	aa. ʒ j
Petrolatum,	q. s. ℥ j

M. Ft. ung.

382

℞

Pix liquid.,	12
Camphor.,	4
Phenol.,	4
Glycerin.,	4
Zinc. oxid.,	20
Liq. calcis,	q. s. 240

M. Ft. lot.

383

℞

Quininæ sulfatis,	gr. xx
Plumbi acetatis,	gr. xl
Bismuthi subnitratis,	ʒ ss
Syrupi aurantii cort.,	q. s. ad f. ℥ iv

M. S.: Teaspoonful every four hours.

384

℞

Alum,	
Zinc sulfate,	aa. ʒ ij
Lead acetate,	ʒ iss
Tannic acid,	ʒ ss

Mix. Label: One to two teaspoonfuls in a pint of water. Use locally.

385

℞

Plumbi acetatis,	ʒ ss
Acidi acetici dil.,	f. ʒ ij
Syrupi tolutani,	f. ʒ iv
Syrupi limonis,	f. ℥ iss
Aquæ cinnamomi,	q. s. ad f. ℥ vj

Mix. Label: Teaspoonful three times a day.

386

℞

Bismuthi subnit.,	gr. xx
Plumbi subacetatis,	gr. xxx
Morphinæ sulf.,	gr. j
Sodii bicarb.,	ʒ j

M. Ft. Chart. No. x

Signa: One powder two hours after each meal.

387

℞

Zinci sulf.,	ʒ ss
Potassæ sulfurat.,	ʒ ss
Aq. rosæ,	
Aq. dest.,	aa. q. s. f. ℥ ij

M. Ft. lot.

388

℞

Zinci sulf.,	
Pot. sulfurat.,	aa. ʒ ij
Petrolat. alb.,	q. s. ℥ ij

M. Ung.

389

℞

Acidi salicylici,	gr. x
Potassii permangan.,	gr. xv
Ferri sulfatis,	ʒ iv
Aquæ,	q. s. ad f. ℥ viij

M. S.: Lotion for ulcer.

390

℞

Potassium permanganate,	gr. xx
Oxalic acid,	gr. v
Iron and quinine citrate,	gr. xl

Mix and make pills No. xx. Give one three times a day after meals.

391

℞

Potassii permanganatis,	2 Gm.
Glycerini,	4 Gm.
Aquæ,	q. s. ad 50 cc.

M. S. Apply externally.

392

℞

Phenolis,	ʒ j
Potassii permanganatis,	gr. xx
Aquæ,	f. ℥ v

M. S.: Lotion.

393

℞

Potassii permanganatis,	gr. xx
Ext. glycyrrhizæ,	gr. xx
Glyceriti amyli,	q. s.

M. Fiant pil. No. xxv.

394

℞

Ferrous sulfate, dried and powdered,	
Alum, dried and powdered,	
Potassium permanganate,	aa. gr. j

For one tablet. Make 1000 tablets.

395

℞

Quininæ sulf.,	
Potassii permangan.,	
Ferri reducti,	aa. gr. x

Misce. Fiant pilulæ No. x.

396

℞

Procaine hydrochloride,	gr. iv
Adrenalin hydrochloride,	gr. $\frac{1}{100}$
Sugar of milk,	q. s.

Make 10 hypodermic tablets.

397

℞

Acetanilid,	gr. v
Acetophenetidin,	gr. x
Pyrocatechin,	gr. x

Mix and put into 10 capsules.
Label: One every four hours.

398

℞

Plumbi acetatis,	gr. x
Acidi pyrogallici,	gr. v
Aquæ,	f. ℥ ij

M. S.: Lotion.

399

℞

Pyrogallic acid,	gr. v
Mercuric chloride,	gr. ss
Lard,	℥ j

Mix and make an ointment.

400

℞

Antipyrin.,	
Caff. citrat.,	
Quin. bisulf.,	aa. gr. xvj
Sod. salicyl.,	gr. xxxij
Aq. dest.,	q. s. f. ℥ ij

M. Ft. sol.

401

℞

Ammon. carb.,	ʒ j
Quin. bisulf.,	gr. xij
Fldext. glycyrrh.,	f. ℥ j
Syrup.,	f. ℥ j
Aq. dest.,	q. s. f. ℥ vj

M.

402

℞

Fowler's solution,	f. ʒ j
Quinine bisulfate,	ʒ iss
Syr. hydriodic acid,	f. ʒ ij
Water,	to make f. ℥ iij

Mix. Teaspoonful after meals.

403

℞

Quininæ sulfatis,	gr. xx
Acidi sulfurici aromat.,	f. ʒ ss
Ammonii carbonatis,	ʒ j
Syrupi aurantii,	q. s. ad f. ℥ iv

M. S.: One teaspoonful three times daily.

404

℞

Tinct. ferri chloridi,	10 cc.
Acidi phosphorici dil.,	10 cc.
Quininæ sulf.,	5 Gm.
Strychninæ sulf.,	0.1 Gm.
Aquæ dest.,	100 cc.
Syrupi limonis,	80 cc.

M. S.: Teaspoonful three times a day.

405

℞

Quinine bisulfate,	℥ ss
Basham's mixture,	f. ℥ iv

Mix. Label: Teaspoonful every other hour.

406

℞

Quininæ sulfatis,	ʒ iss
Strychninæ sulfatis,	gr. ss
Tinct. ferri chloridi,	f. ℥ iss

M. S.: Half a teaspoonful in a glass of water three times a day.

407

℞

Quininæ sulf.,	gr. xvj
Acidi tannici,	℈ j
Acidi sulfurici arom.,	♏ v
Syr. eriodictyi arom.,	q. s. ad f. ℥ ij

M. S.: Teaspoonful twice a day.

408

℞

Quinine bisulf.,	ʒ j
Resorcin,	ʒ ss
Glycerin,	f. ℥ ss
Alcohol,	f. ℥ ij
Water,	to make f. ℥ viij

M. Label: Apply with friction.

409

℞

Menthol,	gr. vj
Eucalyptol,	♏ vj
Resorcin,	gr. iv
Liquid petrolatum,	f. ℥ j

Make solution. Label: Use as spray.

410

℞

Hydrarg. chlor. mit.,	gr. x
Santonini,	gr. xij

M. et fiant capsulæ No. 2.
S.: To be taken three hours apart.

411

℞

Calomel,	ʒ ij
Soap,	ʒ ij
Cotton-seed oil,	f. ℥ j
Water,	f. ℥ j

Mix. Label: Apply with friction.

412

℞

Quinine bisulfate,	ʒ ij
Po. boric acid,	℥ ij
Po. castile soap,	℥ ij

Mix and make impalpable powder.
Label: As directed.

413

℞

Sod. thiosulf.,	ʒ iv
Elix. pepsin. co.,	f. ℥ j
Aq. dest.,	q. s. f. ℥ iv

M. Ft. sol.

414

℞

Phenol.,	2.4
Acid. boric.,	8.
Sod. thiosulf.,	60.
Bis. subcarb.,	15.
Glycerin,	10.
Alcohol,	120.
Aq. dest.,	q. s. 240.

M.

415

℞

Tinct. ferri chloridi,	f. ʒ iss
Sodii thiosulfatis,	ʒ iss
Potassii chloratis,	ʒ iij
Quininæ sulfatis,	gr. xv
Aquæ,	f. ℥ ij

M. S.: Teaspoonful three times a day.

416

℞

Calomel,	gr. iv
Sod. thiosulfate,	gr. xl

Mix. Make 8 capsules.
Label: One every two hours.

417

℞

Sod. iodid.,	16.
Spir. æther.,	30.
Glycerin,	60.
Aq. dest.,	q. s. 120.

M.

418

℞

Pot. iod.,	gr. lxxx
Tr. bellad.,	f. ʒ iss
Sp. æth. co.,	f. ℥ j
Glycerin,	f. ℥ ij
Syr. tolu.,	f. ℥ iij
Aquæ dest.,	q. s. f. ℥ viij

M.

419

℞

Stront. brom.,	ʒ iss
Mist. rhei et sodæ,	q. s. f. ℥ ij

M.

420

℞

Stront. salicyl.,	ʒ iv
Sod. bicarb.,	ʒ iv
Phenyl. sal.,	ʒ ij
Elix. aromat.,	q. s. f. ℥ iij

M.

421

℞

Potassium citrate,	ʒ iv
Strontium bromide,	ʒ vj
Aromatic elixir,	to make f. ℥ iij

Mix. Label: Teaspoonful as directed.

422

℞

Pot. iodide,	ʒ iij
Strychnine sulf.,	gr. j
Fowler's solution,	f. ʒ iiss
Water,	to make f. ℥ iv

Mix. Teaspoonful four times a day.

423

℞

Gold and sodium chlor.,	gr. ss
Strychnine sulfate,	gr. j
Alcohol,	f. ℥ j
Syrup cinnamon,	f. ℥ ij
Water,	to make f. ℥ vj

M. Take one teaspoonful in water after each meal.

424

℞

Strychninæ,	gr. j
Glycerini,	♏ xxx
Aquæ,	q. s. ad f. ʒ iij

M. S.: Inject ten minims.

425

℞

Sulfur. præc.,	ʒ iv
Camphor,	gr. x
Liq. calcii hydrox.,	
Aq. dest.,	aa. q. s. f. ℥ ij

M. Lotio.

426

℞

Calcis calcinatæ,	ʒ ij
Sulfuris,	ʒ iij
Aquæ,	f. ℥ iv

Mix and boil for ten minutes and then filter.

Label: Use as directed.

427

℞

Morphine sulfate,	gr. vj
Terpin hydrate,	ʒ iiss
Sodium bromide,	ʒ iv
Strychnine sulf.,	gr. ss
Elixir,	to make ℥ iij

M. S. Teaspoonful every six hours.

428

℞

Theobrom. with sod. salicyl.,	gr. x
Sp. of ethyl nitrite,	♏ xxx
Tinct. of iron chlor.,	f. ʒ iv
Syrup,	enough to make f. ℥ ij

Mix. Label: Teaspoonful three times a day.

429

℞

Theobromine sodio-salicylate,	ʒ iv
Tinct. digitalis,	f. ʒ iv
Syrup,	f. ℥ j
Water,	q. s. ad f. ℥ iij

Dose. One teaspoonful.

430

℞

Thymol,	gr. xv
Borax,	gr. xxx
Water,	f. ℥ ij

Make solution. Label: Mouth wash.

431

℞

Salol,	gr. xlv
Thymol,	gr. xxx
Bismuth subnit.,	gr. lxxv

Mix. Make 15 konseals.

432

℞

Sod. borat.,	
Sod. chlor.,	
Sod. bicarb.,	aa. gr. xv
Zinc. sulf.,	gr. ij
Aq. dest.,	q. s. f. ℥ iv

M.

433

℞

Zinci chloridi,	
Zinci iodidi,	aa. gr. ij
Aquæ,	q. s. ad f. ℥ j

M. S.: Injection.

434

℞

Zinc sulfate,	gr. vj
Menthol,	gr. xv
Liquid petrolatum,	f. ℥ j

Mix. Label: Use with atomizer.

435

℞

Antipyrin.,	gr. xv
Ammon. brom.,	gr. xx
Pot. citrat.,	ʒ iv
Cod. sulf.,	gr. ij
Tr. hyoscyam.,	f. ʒ j
Tr. opii camph.,	f. ʒ ij
Aquæ dest.,	f. ℥ j
Syr. pruni virg.,	q. s. f. ℥ iv

M.

436

℞

Ext. henbane,	
Ext. stramonium,	aa. gr. vi
Camphor,	
Asafœtida,	aa. ʒ j
Ext. can. indica,	gr. v

Mix and make 30 capsules.
Label: One three times a day.

437

℞

Chloral hydrate,	
Camphor,	of each ʒ j
Starch,	℥ j

Mix. Label: Rub on as directed.

438

℞ ✓

Cocaine mur.,	gr. v
Morph. mur.,	gr. iiss
Glycerin,	f. ʒ iv
Sweet almond oil,	f. ʒ iv

Mix.

439

℞

Resorcin.,	
Ac. salicyl.,	aa. 2.
Bals. Peru.,	12.
Ung. zinci oxid.,	q. s. 30.

M. Ft. ung.

440

℞

Salol,	ʒ j
Oil sandalwood,	f. ʒ ij
Copaiba,	f. ʒ iv
Aromatic fldext. Cascara,	f. ʒ iv
Peppermint water,	to make f. ℥ iv

Mix. Label: Dessertspoonful every four hours.

441

℞

Copaiba,	
Tinct. cubeb,	
Sp. ethyl nitrite,	
Comp. tinct. lavender,	aa. f. ℥ j

M. Label: Teaspoonful three times a day.

442

℞

Syrup hypophosphites,	f. ℥ ij
Tinct. iron chloride,	f. ℥ ss
Tinct. nux vomica,	f. ℥ ss
Peppermint water,	to make f. ℥ iv

Mix. Label: Teaspoonful in water after meals.

443

℞

Fluidextract ergot,	
Tr. iron chlor.,	aa. f. ʒ vj
Tr. nux vomica,	f. ʒ iv

M. L.: Take thirty-five drops three times a day.

444

℞

Ammon. chlor.,	ʒ v
Ammon brom.,	ʒ iiss
Tr. lobeliæ,	f. ʒ iij
Sp. æth. nit.,	f. ℥ ss
Syr. acaciæ,	f. ℥ j
Aq. dest.,	q. s. f. ℥ iv

M.

445

℞

Liq. ferri dialysati,	f. ℥ j
Tinct. lavandulæ co.,	f. ʒ iv
Tinct. gentianæ co.,	f. ʒ iv
Bismuthi subnitratis,	ʒ iij
Elix. pepsin. co.,	q. s. ad f. ℥ iv

M. S.: Shake well and take one teaspoonful after each meal.

446

℞

Tinct. iron chlor.,	f. ʒ ij
Potass. chlorate,	℥ j
Glyc. tannic acid,	f. ℥ ss
Water,	to make f. ℥ iv

Mix. Label: Gargle.

447

℞

Heroinæ,	gr. iv
Hydrarg. bichlor.,	gr. $\frac{3}{4}$
Ol. terebin.,	gtt. lxxx
Tinct. aconiti,	gtt. xx
Strych. nit.,	gr. $\frac{1}{3}$
Muc. acaciæ,	f. ℥ ij

M. S.: Teaspoonful in a little water every three hours.

448

℞

Corros. chlor. mercury,	gr. j
Iodide of potass.,	ʒ ij
Mur. tinct. iron,	f. ℥ ss
Syr. sarsaparilla,	f. ℥ iss
Ess. of pepsin,	to make f. ℥ iv

Mix. Label: Teaspoonful in one-half glass of water after eating.

449

℞

Sod. salicyl.,	ʒ iij
Sp. æth. nit.,	f. ℥ j
Methenam.,	ʒ iv
Aquæ dest.,	q. s. f. ℥ vj

M.

450

℞

Pot. iodide,	ʒ ij
Ammon. carb.,	ʒ j
Salicylic acid,	ʒ iij
Mercuric chlor.,	gr. ij
Syr. orange,	f. ℥ ss
Water,	to make f. ℥ iij

Mix. One teaspoonful in water three times daily.

451

℞

Bichloride of mercury,	gr. j
Sodium arsenite,	gr. ss
Strychnine sulfate,	gr. ss
Potass. Carbonate,	
Dried sulfate of iron,	aa. gr. ix

Mix and divide into nine pills. Label: One after each meal.

452

℞

Cocaine,	4 Gm.
Ichthyol,	10 Gm.
Glycerin,	40 cc.
Water,	to make 100 cc.

Mix. Label: Lotion.

453

℞

Menthol,	gr. v
Phenol,	gr. x
Zinc oxide,	ʒ ij
Boric acid,	ʒij
Resorcin,	ʒ j
Olive oil,	f. ℥ iv
Lime water,	q. s. f. ℥ viij

M. Ft. lotio.

454

℞

Iodi,	gr. xxx
Pot. iodidi,	gr. xxv
Petrolat. liq.,	f. ʒ ij
Ol. terebinth.,	f. ʒ ij

Mix. Label: Paint on as directed.

455

℞

Powd. borax,	ʒ ij
Tinct. myrrh,	f. ʒ ij
Water,	to make f. ℥ ij

Mix. Label: As directed.

456

℞

Strychnine,	gr. ss
Cacao butter,	a sufficient amount.

Make twelve suppositories.

Label: Insert one three times a day.

457

℞

Camphor,	gr. xij
Salol,	gr. xxx
Oil theobroma,	a sufficient amount.

Make six suppositories.

Label: Insert one every night.

458

℞

Menthol.,	
Camphor.,	
Methyl. salicyl.,	aa. ʒ j
Pot. permang.,	gr. x
Sod. bicarb.,	
Sod. borat.,	aa. q. s. ℥ vj

M. Ft. pulv.
Sig.: Douche.

459

℞

Salol,	ʒ j
Tinct. iron chlor.,	
Sp. ethyl nitrite,	aa. f. ʒ iv
Glycerin,	
Syrup,	aa. f. ℥ j
Water,	to make f. ℥ vj

Mix. Label: Tablespoonful three times a day.

460

℞

Tinct. opium,	f. ℥ j
Tinct. gambir co.,	f. ℥ ij
Lead acetate,	gr. xv
Zinc sulf.,	gr. xv
Rose water,	to make f. ℥ viij

M. Label: Use as directed.

461

℞

Bis. subnit.,	ʒ iv
Tannic acid,	gr. xxx
Tinct. arnica,	f. ℥ iss
Sol. lead subac. dil.,	f. ℥ ij
Tinct. iodine,	f. ʒ ij
Rose water,	to make f. ℥ vj

Mix. Label: Apply locally.

462

℞

Phenyl. salicyl.,	gr. xxxvj
Acetophenet.,	
Quin. hydrochlor.,	aa. gr. xxiv
Camphor.,	gr. x
Hydrarg. chlor. mit.,	gr. iss

M. Ft. cap. No. xxiv.

463

℞

Potass. permangan.,	gr. xv
Ergotin,	gr. x
Codeine sulf.,	gr. iij

Make caps No. x.
Label: One three times a day.

464

℞

Quininæ sulf.,	1.3 Gm.
Sodii salicylatis,	15.5 Gm.
Acidi hydrobromici dil.,	30 cc.
Aquæ,	q. s. ad 250 cc.

M. S. Teaspoonful every four hours.

465

℞

Strontium bromide,	℥ iss
Sodium iodide,	℥ j
Magnesium sulfate,	℥ j
Syrup,	f. ℥ ij
Water,	to make f. ℥ xij

Mix. Label: Dessertspoonful three times a day.

466

℞

Calamine,	ʒ ij
Phenol,	♏ xxx
Menthol,	gr. v
Olive oil,	
Lime water,	aa. f. ℥ iss
Water,	q. s. f. ℥ vj

Misce. Ft. lotio.

467

℞

Aspirin,	gr. xl
Acetanilid,	gr. xxiv
Citrated caffeine,	gr. iv
Aromat. spirit ammonia,	q. s. ad f. ʒ j

Mix. Label: One teaspoonful every two hours.

468

℞

Sodium citrate,	ʒ iiss
Spirit ethyl nitrite,	f. ℥ iss
Water,	to make f. ℥ ij

Mix. Label: Teaspoonful three times a day.

469

℞

Calcii hypophosphitis,	ʒ x
Potass. hypophosphitis,	ʒ viij
Sodii hypophosphitis,	ʒ x
Ferri lactatis,	gr. iij
Strychninæ lactatis,	gr. iss
Acidi lactici,	f. ʒ vj
Elix. gentianæ et ferri,	f. ℥ viij
Aquæ,	q. s. ad f. ℥ xvj

M. Ft. solut.
S.: Teaspoonful three times a day.

470

℞

Sod. brom.,	ʒ ij
Sod. phenobarb.,	gr. x
Elix. pepsin. co.,	q. s. f. ℥ iij

M.

471

℞

Tr. of iron chlor.,	f. ℥ j
Dil. phosphoric ac.,	
Glycerin,	aa. f. ℥ ij
Co. sol. sod. phos.,	f. ℥ iij

Mix. Teaspoonful in ½ glass of water after each meal.

472

℞

Alcohol,	f. ℥ ij
Salicylic acid,	℥ ss
Oil gaultheria,	f. ʒ ij
Oil cajuput,	f. ʒ j
Petrolatum,	℥ vj

Make ointment. Rub on pain.

473

℞

Sodii salicylatis,	ʒ iij
Quininæ sulphatis,	gr. xvj
Tinct. podophylli,	f. ʒ ij
Spir. æthylis nitritis,	f. ʒ iv
Aquæ camphoræ,	f. ℥ vj

M. S.: Dessertspoonful twice a day.

474

℞

Potass. iodide,	ʒ j
Sodium salicylate,	ʒ iv
Syrup of orange,	to make f. ℥ iv

Mix. Label: Teaspoonful after meals.

475

℞

Quininæ sulfatis,	℈ j
Acidi sulfurici aromat.,	♏ xxx
Spir. ammoniæ aromat.,	f. ℥ ss
Syr. sarsaparillæ co.,	f. ℥ ivss

M. S.: Dessertspoonful three times a day.

476

℞

Sod. bicarb.,	gr. x
Sod. salicyl.,	gr. x
Syr. ferr. iod.,	♏ x
Aq. dest.,	q. s. f. ʒ j

M. Ft. sol. Mitte t. d. xxiv.

477

℞

Phenolis,	ʒ j
Tr. iodi,	f. ʒ ij
Acidi tannici,	ʒ j
Cerati,	℥ iv

Misce. Signa: Ointment.

478

℞

Sol. adrenalin chloride,	f. ʒ ij
Menthol,	gr. x
Liquid petrolatum,	f. ℥ j

Mix and make a spray.
Label: Spray three times a day.

479

℞

Red iodide mercury,	gr. ij
Pilocarpine hydrochlor.,	gr. v
Sol. adrenalin chlor.,	♏ x
Petrolatum,	℥ j

M. Label: Apply locally.

480

℞

Alum,	ʒ ij
Borax,	ʒ iij
Glycerin,	f. ℥ j
Water,	to make f. ℥ iv

Mix. Apply as directed.

481

℞

Mercuric chloride,	gr. j
Tartar emetic,	gr. j
Morph. hydrochloride,	gr. iij
Aromat. spirit of ammon.,	f. ʒ v
Syrup of licorice,	f. ℥ iij

Mix. Label: Teaspoonful when coughing.

482

℞

Antipyrine,	0.3 Gm.
Pyramidon,	0.3 Gm.
Salol,	0.1 Gm.
Codeine,	0.01 Gm.
Citrated caffeine,	0.08 Gm.

Mix. Make 12 capsules.

Label: One every hour.

483

℞

Tr. aconite,	f. ʒ iss
Spt. ethyl nitrite,	f. ʒ vj
Antipyrine,	ʒ j
Syr. tolu,	to make f. ℥ iv

Mix and make solution.

Teaspoonful every hour till fever cools.

484

℞

Menthol,	gr. ij
Ac. sod. oleate,	ʒ iss
Ac. salicyl.,	ʒ iss
Bis. subgall.,	ʒ iss

M. Ft. pil. No. xxxvj.

485

℞

Hydrarg. bichlor.,	gr. iij
Zinci sulfocarbol.,	gr. iv
Morphinæ sulf.,	gr. ij
Liq. hydrogenii peroxidi,	f. ℥ j
Aquæ rosæ,	q. s. ad f. ℥ vj

M. S.: Use as directed three times a day.

486

℞

Silver nitrate,	gr. ij
Glycerin,	
Antiseptic solution,	aa. f. ℥ j
Water,	to make f. ℥ iv

Mix. Label: Use as directed.

487

℞

Mercuric chloride,	gr. j
Fowler's sol., U. S. P., X,	gtt. xlviij
Syrup iodide of iron,	f. ʒ vj
Elixir of cinchona,	to make f. ℥ vj

Mix. Label: Teaspoonful after meals.

488

℞

Sod. bicarb.,	ʒ ij
Sod. citrat.,	ʒ ij
Hydrarg. chlor. mit.,	gr. iss
Acetophenet.,	gr. xv
Mucilag. acac.,	
Syrupi,	aa. q. s. f. ℥ iij

M.

489

℞

Liquoris sodii arsenatis,	f. ʒ j
Syrupi ferri iodidi,	f. ʒ vij

M. S.: One-half teaspoonful in water three times a day.

490

℞

Chlor. of gold and sod.,	gr. xij
Ammonium muriate,	gr. vj
Strychnine nitrate,	gr. j
Atropine sulfate,	gr. $\frac{1}{4}$
Fluidext. of cinchona,	f. ℥ iij
Fluidext. of coca,	f. ℥ j
Water,	
Glycerin,	of each f. ℥ j

M. L.: One teaspoonful every two hours.

491

℞

Magnes. salicyl.,	℥ j
Magma magnes.,	q. s. f. ℥ viij

M. Ft. sol.

492

℞

Antipyrine,	ʒ iiss
Caffeine,	ʒ ij
Sod. bromide,	ʒ vj
Syrup of lemon,	f. ℥ iss
Cinnamon water,	to make f. ℥ iv

Mix. Label: Teaspoonful as needed.

493

℞

Stront. brom.,	℥ ss
Lith. citrat.,	ʒ j
Pot. citrat.,	ʒ j
Aq. menth. pip.,	q. s. f. ℥ iij

M.

494

℞

Calamine,	ʒ j
Zinc oxide,	ʒ iss
Glycerin,	f. ℥ j
Lime water,	to make f. ℥ iv

Mix. Label: Lotion.

495

℞

Quinine bisulf.,	2 Gm.
Phenol,	1 Gm.
Glycerin,	4 cc
Water,	q. s. ad 60 cc.

M. S.: Teaspoonful three times a day.

496

℞

Diuretin,	gr. xv
Pot. iodide,	ʒ j
Mercuric bichloride,	gr. j
Water,	q. s. ad f. ℥ ij

M. S.: Teaspoonful after meals.

497

℞

Lithium citrate,	ʒ iss
Sodium salicylate,	ʒ iss
Sodium phosphate,	ʒ ij
Tinct. cardamom,	f. ʒ j
Syrup,	f. ℥ j
Water,	q. s. f. ℥ iij

Mix. Label: Two teaspoonfuls three times a day.

498

℞

Bismuth subnitrate,	ʒ iv
Iodoform,	ʒ iv
Liquid petrolatum,	q. s. ad f. ℥ iij

Mix. Apply as directed.

499

℞

Chloral hydrate,	ʒ ij
Tinct. nux vomica,	f. ʒ iij
Tinct. belladonna,	f. ʒ j
Potass. bromide,	ʒ iv
Sol. opium sed.,	f. ʒ iiss
Tinct. hyoscyamus,	f. ℥ j
Sp. ammon. aromat.,	f. ℥ ij
Peppermint water,	q. s. ad f. ℥ vj

Mix. Label: Two teaspoonfuls every three hours.

500

℞

Sodium salicylate,	ʒ ss
Potassium iodide,	gr. x
Methenamine,	gr. xxiv

Mix and make 12 capsules.

Label: One capsule four times a day.

501

℞

Sod. salicyl.,	ʒ ij
Sod. brom.,	ʒ iss
Caff. cit.,	gr. xxxvj
Aq. menth. pip.,	f. ℥ iss
Syrup.,	q. s. ad f. ℥ iv

M.

CRITICISMS

1

This prescription usually effervesces when it is prepared. Acacia is acid in reaction, and thus it reacts with the bismuth subcarbonate, liberating carbon dioxide. The acidity of the acacia may be neutralized before using it or the acacia might be displaced with some tragacanth which would cause no effervescence.

Borax is soluble in 15 parts of water, and in this case there is not enough to dissolve it. Boric acid requires 18 parts of water to dissolve it, but it is much more soluble in a solution of borax. The principal difficulty with this prescription is that the mucilage of acacia is gelatinized by the borax, making a stiff mass. Boric acid has not the effect of gelatinizing acacia, and borax is prevented from doing so by the presence of sugar. Glycerin also prevents this action by decomposing the borax.

3

If the oil is emulsified and then a solution of the borax in the water is added, a tough solid mass is formed. If, however, the borax is dissolved in the syrup with a little water and then added to the emulsion no trouble is experienced. Sugar prevents the gelatinizing effect of borax on the acacia.

When solution of lead subacetate is added to mucilage of acacia, a solid gelatinous mass is formed. In this prescription if both are diluted with the water and mixed with constant stirring, the acacia is precipitated in small masses. By putting the mucilage into a mortar and adding the solution in small portions with constant stirring, and then adding the water, a good mixture can be made. The addition of a few drops of acetic acid to the lead solution will prevent coagulation. Neutral lead acetate does not gelatinize mucilage of acacia.

The oxidase in the acacia produces a blue color with the guaiac if the tincture is fresh. If an old tincture is used a red-brown color will be produced. The physician has recognized the incompatibility between the resinous tincture and the aqueous syrup of acacia and has added honey to help prevent the precipitation of the guaiac.

Using the amount of acacia called for, it is almost impossible to make a good emulsion on account of the alcohol precipitating the acacia and cracking the emulsion. The best way is to make a primary emulsion of the copaiba by using 1½ drams of acacia and 3 drams of water. This leaves some water, a part of which should be used in diluting the emulsion and a part in diluting the mixture of tincture and spirit before adding to the emulsion. A smooth emulsion can thus be made. This prescription is similar to the Copaiba mixture of the N. F., V., but it will be noted that a considerable excess of spirit of ethyl nitrite has been added. Possibly the physician realizes the loss of ethyl nitrite which normally occurs in such mixtures and has added an extra amount to overcome such loss. The N. F., VI, has replaced the spirit with an equivalent amount of sodium nitrite.

The alcohol in the spirit and tincture precipitates the mucilage of acacia and ferric chloride gelatinizes it. The gelatinous mass will slowly dissolve in the syrup on standing. The best way to fill the prescription is to dilute the tincture with part of the syrup and mix the rest of the syrup with the spirit and then these with the mucilage. In this way the gelatinization is avoided. The acid tincture also decomposes the spirit of ethyl nitrite, liberating the gas.

8

A deep lavender color is produced almost at once due to the action of the enzyme in the acacia with the aminopyrine. The prescription becomes colorless in about twelve hours. If the acacia solution is first boiled, the enzyme will be destroyed and there will be no color reaction.

Different results may be obtained by changing the order of mixing these ingredients. If the corrosive sublimate is dissolved in the water and then added to the lime water the yellow mercuric oxide is precipitated. This if mixed with the mucilage and allowed to stand for some time changes to a dirty brown color. If the lime water is added to the solution of mercury the red-brown basic chloride of mercury is precipitated. If the solution of mercuric chloride is added to the mucilage of acacia and then the lime water added to this, no precipitation of mercury takes place. On allowing this to stand for a few days a flocculent precipitate is formed, slowly increasing. Acacia prevents the precipitation of a number of the heavy metals by the alkaline hydroxides.

10

Spirit of ethyl nitrite with acetanilid gives a yellow solution, becoming red on standing for some time. The color occurs more quickly with an acid spirit than with a neutral one, and the presence of a little sodium bicarbonate prevents it for several weeks. Probably diazo-compounds are formed.

11

When the acetanilid is added directly to the tincture of iron it makes a deep red clear solution. On adding the water the acetanilid is precipitated and the color changed back to that of diluted tincture of iron. A better mixture can be made by powdering the acetanilid first, mixing with water and acacia or tragacanth, then adding the tincture of iron highly diluted with water. The tincture of iron, unless diluted with water, has a tendency to coagulate acacia.

12

When antipyrine is rubbed with resorcin a pasty mass results, and this gradually becomes liquid. Acetanilid and resorcin triturated together make a liquid. When an aqueous solution of antipyrine is mixed with a solution of resorcin a white precipitate is formed. Acetanilid requires 190 parts of water for solution, so that in this prescription it will not be all dissolved. No matter how this is filled a clear solution cannot be made. Rub the acetanilid and antipyrine in a mortar with about 2 Gm. of acacia, and then add a part of the water. Dissolve the resorcin in the balance of the water and add it.

13

Acetophenetidin requires 1310 parts of water or 15 parts of alcohol for solution. In filling this prescription the acetophenetidin can be dissolved in the tincture and spirit, but on adding the syrup and water nearly all of it will be thrown out of solution. A better mixture would be made by powdering the acetophenetidin with about 1 dram of acacia, then adding the syrup and part of the water, and lastly the tincture and spirit diluted with the balance of the water.

14

Sodium bromide precipitates the codeine salt; ammonium chloride does not. The acetophenetidin is not dissolved. The mucilage will keep the codeine and acetophenetidin suspended so that the prescription can be dispensed as a shake mixture.

15

Ferric acetate is formed in this prescription and it gives a very deep red color to the solution. If the ingredients answer the pharmacopœial requirements there will be no incompatibility. However, the solution of ammonium acetate is sometimes quite strongly alkaline, due to excess of ammonium carbonate or deficiency of acetic acid used; and if the tincture of iron is free from an excess of acid the alkali causes the formation of ferric hydroxide which will be kept in solution by the syrup.

16

On dissolving the quinine sulfate in part of the cinnamon water with the aid of the sulfuric acid, then adding the potassium acetate previously dissolved in the remainder of the water, a voluminous precipitate of quinine acetate is obtained. Quinine acetate is only sparingly soluble in water, and the amount here formed is so large and bulky that it is difficult to pour out an even dose. By using one-half of a dram of diluted sulfuric acid a thinner mixture is obtained. Or, the quinine sulfate can be rubbed with about 10 grains of acacia and a little water. Then adding the acetate dissolved in the water containing the acid, a good shake mixture can be obtained. It has been suggested that quinine acetate hydrolyzes, making quinine hydrate.

17

The potassium acetate was dissolved in water and the spirit added. Effervescence ensued and continued for a few minutes, but ceased after several shakings. Alcohol effervesces a little when mixed with water, but not nearly as much as the above mixture did. One writer says that nitrous acid converts acetates into carbon monoxide and other gases. This explanation is not satisfactory since about as much effervescence results when spirit of ethyl nitrite is added to a strong solution of Rochelle salt, sodium chloride, or potassium nitrate. It has been suggested that the potassium acetate or other salt throws the ethyl nitrite out of solution in the mixture of alcohol and water and that the volatilization of the ethyl nitrite is the cause of the effervescence. There is much less effervescence when the solutions have been well chilled before mixing.

18

There are several points of interest in this prescription. The potassium citrate helps to carry the aspirin into solution. The tannin in the syrup of wild cherry causes effervescence with the spirit of ethyl nitrite as does also the salicylic acid which is formed as the aspirin hydrolyzes. These reactions may extend over a period of time and finally result in a darkening of the liquid.

19

The cachets may become colored blue because of the liberated iodine acting on the starch. The aspirin liberates hydriodic acid which is oxidized by the air, liberating iodine. The change takes place more quickly in a moist atmosphere than in a dry one.

20

Aspirin is only sparingly soluble in water. It is quite soluble in a solution of potassium citrate, and there is enough in this prescription to make a clear solution. In solution, aspirin hydrolyzes quite rapidly so that in a few weeks it is practically all changed. The citrate retards, but does not prevent, hydrolysis.

21

The physician probably had a pleasant surprise in this case as there is nothing to emulsify. Of course, he had added acacia to suspend the acetylsalicylic acid, but in the meantime, the solution of potassium acetate, like potassium citrate and numerous other salts, had rendered the aspirin soluble.

22

This is another case of aspirin being made soluble, in this instance methenamine being the agent which helps it into solution.

23

While this is a manufacturing proposition, it is interesting to note the trouble. Aminopyrine has many of the same incompatibilities as antipyrine. When it is rubbed or pressed with aspirin, a slightly damp sticky powder is formed which sticks to the punches and die of the compressing machine so that it is impossible to run them without a lubricant, such as talc or oil. Less trouble is experienced when separate granulations of the two are made and the granulations mixed. Even at best the tablets will change in a few months, becoming yellowish and acquiring a strong acetic odor.

24

The amount of insoluble matter in this prescription will vary with the method of filling. Acetophenetidin is insoluble and will not go into solution, however it may be mixed. If the aspirin is stirred into the milk, the magnesium hydroxide will practically all go into solution making magnesium acetylsalicylate and the addition of sodium bicarbonate will not cause further precipitation. But if the bicarbonate is mixed with aspirin and water, part of the aspirin is neutralized and there is not enough left to dissolve all the magnesium hydroxide. If filled by one method at one store and by the other at another store, the patient might easily think that one or the other had made a mistake.

25

The acid tincture causes effervescence with the alkaline aromatic solution and at the same time a marked precipitation of ferric hydroxide is produced, rendering the prescription very unsightly and certainly destroying the original intent of the prescriber. As the aspirin hydrolyzes and salicylic acid is formed, the latter reacts to form the well-known salicylate of iron.

26

This prescription changes from an original yellow to red and finally deep purple within twenty-four hours, due to the formation of iron salicylate. The potassium chlorate apparently decomposes also, as effervescence develops and carries or forces the mixture out of the bottle. The prescription should not be dispensed.

27

Three chemical reactions may take place in mixing these ingredients. One is between the sodium benzoate and the sulfuric acid, forming sodium sulfate and benzoic acid. The benzoic acid is only sparingly soluble in water, but there is enough alcohol in the elixir to keep it in solution. Another reaction is between the sulfuric acid and the quinine sulfate, making the soluble bisulfate. The third reaction is between the sodium benzoate and the quinine salt, forming quinine benzoate, which is not very soluble in water. The prescription was filled by dissolving the quinine sulfate in part of the elixir with the acid, and the benzoate in the remainder and then mixing the solutions. Precipitation commenced almost at once and in a short time there was a solid mass of needle-shaped crystals. This could be shaken up so that it could be poured. The use of sulfuric acid to aid in dissolving quinine salts was quite prevalent at one time. However, realizing that by so doing the bitterness of the quinine was made more pronounced, the physician of today usually prefers to have the insoluble and therefore "tasteless" salt suspended in some heavy vehicle.

28

Ammonium benzoate is the disturbing agent. Citric acid in the citrated caffeine or in the iron salt liberates benzoic acid and precipitates it. Ferric benzoate is only sparingly soluble in water but the citrate prevents its precipitation. Ammonium benzoate gives a sticky precipitate with the quinine in iron and quinine citrate. Precipitation of benzoic acid can be prevented by neutralizing the iron salt and using a proportional amount of caffeine in place of the citrated caffeine and this should be done. Some acacia is necessary to keep the quinine benzoate suspended.

29

If a solution of borax is added to a solution of lead acetate a white precipitate of lead borate is formed. Or if the glycerin is added to the solution of lead acetate and then the borax solution added, a precipitate is also formed. But if the glycerin is added to the borax solution first, the borax is decomposed, making an acid solution which does not cause as much precipitation.

30

This prescription offers an incompatibility which is not at all uncommon. Zinc borate is precipitated. Replacing the sodium borate with boric acid overcomes the difficulty, and this procedure is usually followed in cases of this kind. It has been suggested at times that glycerin be used to prevent the precipitation. There is nothing to be gained by such a method, as the glycerin simply reacts with the sodium borate forming an acid related to boric acid. In addition, glycerin in an eye prescription would be irritating.

31

In this prescription we have the borax decomposed by either the honey or the glycerin, with the liberation of an acid related to boric acid. [See GLYCERIN No. 1.] This acid liberates carbon dioxide from the sodium bicarbonate. Carbon dioxide may also be liberated by the bismuth subnitrate, bismuth subcarbonate being slowly formed. The bicarbonate of sodium may liberate the hydrastine from the acid with which it is combined, but the alkaloid will not be precipitated in the presence of so much honey, glycerin, and water. The bottle should not be sent out until effervescence is completed.

32

Borax is alkaline in reaction and precipitates the hydrastine as the free alkaloid, and also precipitates the alkaloids from the tincture of opium. The boric acid is not sufficient to neutralize the alkalinity of the borax. As the preparation is to be dropped into the eye, it should be filtered, and in so doing nearly all of the hydrastine is removed. The physician's attention should be called to this, and he should be advised to increase the amount of acid or decrease the borax or, what is better, leave out the latter. Boric acid does not give a precipitate with a solution of hydrastine salts. In this prescription the physician realized that hydrastine acetate is not a common chemical and he gave the following directions for its preparation: "Use 2 grains of hydrastine and 3 drops of acetic acid to make the hydrastine acetate." Water precipitates a little resinous matter from the tincture.

33

The acids were dissolved in the water and then the cocaine hydrochloride was added, producing a white precipitate at once. This is the borosalicylate of cocaine. If either acid is left out, or if the amounts of both are reduced to one-half the amounts given, there will be little or no precipitation.

34

Borax is alkaline in reaction and precipitates nearly all alkaloids from solutions of their salts. It precipitates the berberine in this prescription. If boric acid were used instead of borax no precipitation would occur and many pharmacists would use the acid in place of the borax.

35

Camphoric acid is soluble in the alcohol but insoluble in water, the prescription separating into two layers. However, the mucilage and the syrup add enough body to enable the preparation to be dispensed with a shake label. If the alcohol is omitted the camphoric acid may be suspended as a fine powder.

36

The citrate causes a decided change in the color of Basham's mixture, changing it from the deep red to an orange-yellow. Probably a double compound similar to the citro-chloride of iron is formed but the color is not green.

37

This might be called a prescription of mistaken identities, as the physician was prescribing a well-known gargle, but wrote for potassium citrate instead of the usual chlorate. The resulting product was green and the astringency of the tincture was destroyed, as the citrate produced a product similar to the official tincture of ferric citrochloride. Pharmacists should be ever watchful for errors of this type and of course should call the physician to insure the proper correction.

38

Apparently a satisfactory prescription when it is first prepared, it produces a solid cake after a few hours, due to the formation of insoluble calcium citrate. Another bromide salt, such as one of potassium or sodium, should be used.

39

The two salts apparently dissolve satisfactorily at first, but the product soon clouds and finally separates into two layers from which crystals eventually separate. The citrate is very soluble in water and practically insoluble in alcohol, and the bromide is also considerably more soluble in water than in alcohol. These salts consequently dehydrate the tincture taking some water with them and leaving the alcohol and the remainder of the water as a separate layer. Finally there is not enough water to hold the salts in solution, and consequently they separate in the form of crystals. The salts should be prescribed with another vehicle.

40

The quinine sulfate dissolves in the water and citric acid, making a clear solution that does not precipitate on standing. On adding the potassium citrate, crystals begin to separate at once. The citric acid is only slightly ionized and the solution of the quinine sulfate is apparently only a physical one. On the other hand, the potassium citrate is more readily ionized and the free citrate ions precipitate the comparatively insoluble quinine citrate. Adding more citric acid will dissolve the precipitate, and the addition of another portion of potassium citrate causes a precipitation again. [See ACIDUM ACETICUM, No. 3.]

41

The potassium citrate changes the ferric chloride in the red Basham's mixture to a green ferric-citro-chloride. The color eventually changes to a brownish-red. Prescriptions which change color in the hands of the patient are the ones which usually are difficult to explain, especially if the change is a gradual one and likely not to be distinctly observed by the patient until the prescription is refilled.

42

The cocaine hydrochloride is best dissolved in a little water before mixing with the base. No difficulty is experienced in filling this prescription, but the use of a metallic spatula should be avoided on account of danger of a coloration with gallic acid.

43

The citric acid in the syrup of orange and also the spirit of nitroglycerin liberate iodine from the sodium iodide. The use of simple syrup and a drop or two of oil of orange eliminate the difficulty as far as the citric acid is concerned.

44

When solutions of the first two ingredients are mixed together the insoluble mercuric iodide is formed, and this is redissolved in excess of potassium iodide, forming potassium mercuric iodide, or, as it is commonly known, Mayer's reagent. This compound precipitates the alkaloids of cinchona in the elixir. The alcohol in the elixir is a solvent for this precipitate, but upon addition of the syrup, the alcohol is too dilute to exercise much of a solvent effect. The syrup of rhubarb is generally turbid, and it will cause also a precipitation of some of the matter from the elixir of cinchona. The danger in such a prescription is that the patient may take most of the precipitate at one time and thereby get an overdose of the mercuric iodide, which is thrown out of solution with the alkaloids. In 4 fluid ounces of the elixir of cinchona alkaloids, N. F., there are 7.3 grains of the alkaloidal sulfates. This is more than enough to precipitate all the mercury, and the prescription should be dispensed with a "Shake well" label.

45

The sodium nitrite is decomposed by the acid in the elixir, resulting in a slow effervescence which is so annoying in prescription practice since it develops after the prescription has been delivered. The liberated N_2O_2 liberates iodine from the sodium iodide. The acidity of the elixir also precipitates phenobarbital from its sodium salt. Changing the vehicle to a non-acid one will eliminate the trouble though the sodium phenobarbital will decompose eventually in an aqueous solution.

46

The mercuric chloride combines with the sodium and ammonium iodides, forming insoluble mercuric iodide, which redissolves in excess of the alkali iodides, forming a double compound that precipitates some of the constituents of the compound syrup of sarsaparilla. Ammonium iodide very frequently contains a little free iodine, which probably combines with some of the organic matter present in the syrup. There is no danger of the potassium chlorate liberating iodine from the iodides so long as the mixture is neutral or alkaline. Corrosive sublimate is slowly reduced to calomel by the compound syrup of sarsaparilla (U. S. D.).

47

The hydriodic acid is decomposed upon standing and the liberated iodine precipitates codeine from solution. The solution is also colored red by the liberated iodine.

48

Potassium iodide is hygroscopic in a moist atmosphere and powders containing it usually become damp. There is no reaction between calomel and potassium iodide if the mixture is dry, but mixed in the above proportions in the presence of moisture a dark gray powder is produced. Mixed in more nearly equal proportions a yellowish-green powder is formed. Chemical reaction takes place, with the formation of potassium chloride and mercurous iodide, which is yellow. The mercurous iodide is decomposed by the excess of potassium iodide, forming metallic mercury and mercuric iodide and then potassium mercuric iodide; it is the metallic mercury that gives the mixture the gray color. This prescription should not be dispensed, because of the oxidation of the mercurous compound to the much more active mercuric compound, or if it is dispensed, the dose should be reduced to correspond with that of the mercuric salt.

49

The bismuth subnitrate is incompatible with the syrup of hydriodic acid. At first a reddish-brown precipitate like iron rust appears and upon prolonged standing a dark red gummy precipitate fills the entire bottle. Iodine liberated from the syrup is also likely to precipitate the codeine, though the prescription is so questionable that it should not be dispensed in the first place.

50

Several chemical reactions occur, depending on the order of mixing the ingredients. The possible reactions are as follows: 1. The potassium iodide in the tincture of iodine when mixed with a solution of ferric chloride forms free iodine, potassium chloride, and ferrous chloride. 2. Fowler's solution may be alkaline, due to the use of an excess of potassium bicarbonate which is changed to the normal potassium carbonate. This carbonate neutralizes part of the free hydrochloric acid when mixed with the tincture of iron, forming potassium chloride and carbon dioxide. 3. Ferric chloride with phosphoric acid forms the colorless ferric phosphate, which is insoluble in water, but soluble in water containing free acid. 4. Tincture of ferric chloride dissolves quinine sulfate, the free acid of the tincture combining with the quinine sulfate to form a more soluble compound. 5. The iron combines with tannic acid in the rhubarb, forming the black tannate of iron. 6. The free iodine in the tincture of iodine combines with quinine sulfate, forming an insoluble compound. 7. The free iodine will also combine with the tannin in the rhubarb. 8. If the Fowler's solution is alkaline, the alkali will neutralize part of the phosphoric acid when mixed with it. 9. The alkali in Fowler's solution when mixed with a solution of quinine sulfate combines with the sulfuric acid, liberating and precipitating the free alkaloid. 10. The phosphoric acid is a solvent for quinine sulfate, probably combining with it and under certain circumstances again precipitating it. 11. A solution of quinine sulfate is precipitated by the tannic acid of the rhubarb, forming the insoluble tannate of quinine.

In whatever way the ingredients are mixed the combination is an extremely inelegant one; it is black and inky in color and taste, and the quinine and rhubarb are not in solution.

51

Reaction takes place between the potassium iodide and the ferric chloride, forming free iodine, ferrous chloride, and potassium chloride. By using tincture of citrochloride of iron in place of the U. S. P. tincture, this reaction is prevented. Potassium iodide and spirit of ethyl nitrite react, forming free iodine and nitric oxide. The tannin in the compound tincture of gentian combines with the iron to form the black inky ferric tannate. This prescription should not be dispensed on account of the free iodine formed. The iodine is not precipitated because the iodide is not all decomposed.

52

This was filled by dissolving the quinine in a little water with the aid of the acid, adding the syrup, and lastly the potassium chlorate dissolved in the water. The solution was clear and nearly colorless at first, but in a few minutes a red-brown precipitate began to form and increased until the mixture was quite thick. Sulfuric acid liberates chloric acid from the potassium chlorate, and this oxidizes the ferrous iodide, liberating iodine, which combines with quinine sulfate precipitating it.

53

This prescription was filled by dissolving the quinine sulfate in a portion of the water with the aid of the acid; the potassium iodide dissolved in the balance of the water was added and lastly the sodium arsenate solution. The solution was clear and of a pale yellow color. Within five minutes precipitation had commenced, and in less than fifteen minutes there was quite a heavy purple-red precipitate. Within a few hours a solid mass had formed which was of a purple-chocolate color. Sodium arsenate in the presence of an inorganic acid oxidizes potassium iodide, liberating iodine, and this precipitates the quinine. Using quinine bisulfate and leaving out the acid gives a solution that stands well.

54

This prescription develops a series of interesting reactions. The acid syrup decomposes the spirit of ethyl nitrite, with the evolution of gas and the liberation of iodine which in turn produces a red color in the liquid. The bromine is also liberated from the sodium bromide. The camphor is thrown out of the spirit of camphor and unites with either the bromine or the iodine in the form of dark red or almost black droplets on the surface of the liquid, finally settling to the bottom of the bottle. Within a few days the red color of the liquid and the globules disappear. Eliminating the syrup of hydriodic acid automatically eliminates most of the trouble.

55

Glycerin is probably directed to prevent the crystallization of potassium iodide when the water evaporates. Lard is frequently acid and in that condition iodine is slowly liberated, discoloring the ointment. Wool fat is a better base in such a prescription, because it is neutral and iodine is not liberated, and it will take up the water and glycerin without any trouble.

56

On mixing these a heavy crystalline precipitate soon forms and it is difficult if not impossible to get an even dose. Potassium iodide combines with morphine sulfate. The physician should increase the amount of water and then increase the dose accordingly.

57

The quinine sulfate was dissolved in part of the water with the aid of the acid. When the solution of potassium iodide in the balance of the water was added to the quinine solution a slight precipitation occurred. This granular precipitate, which falls quickly, is potassium bitartrate, formed by the reaction between the potassium iodide and the tartaric acid. That it is not the quinine that is precipitated can be proved by substituting sodium iodide for potassium iodide, when no precipitation takes place. In concentrated solutions potassium iodide precipitates quinine. Hydriodic acid, formed by the action of tartaric acid on potassium iodide, is easily decomposed by the air, liberating iodine which precipitates the quinine. When this mixture is allowed to stand for two or three weeks without being disturbed, two layers in the precipitate are noticed, the bottom one is white and is the potassium bitartrate, while the upper one is red-brown and is the iodine compound of quinine sulfate. The addition of a few minims of diluted hypophosphorous acid will retard the liberation of iodine.

58

The quinine sulfate was dissolved in a part of the water with the aid of the acid. The potassium iodide was dissolved in the balance of the water and added to the quinine solution. Iodine is gradually formed by the acid acting on the iodide, and this combines with the quinine, forming a dark brown precipitate.

59

There is not enough water to dissolve all the quinine sulfate, as it requires 725 parts of water. The water will precipitate inert extractive matter from the tincture. While potassium iodide does not always precipitate strychnine sulfate when in solution with it, there is some danger of precipitation. (See the incompatibilities of strychnine.) The usual maximum medicinal dose of strychnine sulfate is 1/12 of a grain. In this prescription the dose is 5/16 of a grain and is dangerously large. The prescription should not be dispensed without first having called the prescriber's attention to that fact, as well as to the possibility of the strychnine being precipitated by the potassium iodide.

60

Spirit of ethyl nitrite is generally more or less acid and in that condition will liberate iodine from potassium iodide. It can be neutralized by shaking with sodium bicarbonate and the excess of bicarbonate removed by settling and decanting. If the acid spirit is allowed to stand with a solution of ammonium acetate and sodium citrate for an hour or more before the iodide is put in, the solution remains colorless for a time but slowly liberates iodine. The nitrous and nitric acids probably replace acetic and citric acids and so no iodine is liberated at once.

61

Donovan's solution precipitates many alkaloids from aqueous solutions of their salts. Quinine is no exception. This prescription was filled by dissolving the quinine sulfate in most of the syrup with the aid of the acid; dissolving the potassium iodide in the remaining syrup and adding to the first solution. Donovan's solution was then slowly added with constant stirring and the prescription sent out with a "Shake well" label. The danger in such a prescription does not come from the quinine which is precipitated, but the mercuric salt which is precipitated with the quinine. In concentrated solutions of quinine, potassium iodide gives a precipitate. At the end of two days all the mercury was precipitated and some iodine was liberated, the sulfuric acid displacing the hydriodic acid and the air oxidizing the latter. Any quinine not precipitated by the Donovan's solution was precipitated by the iodine.

62

The diluted hydrobromic acid liberates salicylic acid from the sodium salicylate. The addition of about a dram of potassium citrate serves to prevent the precipitation.

63

If the ingredients are powdered separately and are perfectly dry when mixed, no chemical reaction takes place. The powder will keep for months if protected from moisture. On the addition of water the powder at once becomes dark gray in color. The darkening is due to the formation of metallic mercury; at the same time some mercuric salt is formed, which with the excess of potassium bromide forms a compound soluble in water. This is a dangerous prescription and should not be dispensed unless the dose is reduced. If the reaction takes place according to the equation given below, each powder will contain about 3⁸⁄₁₀ grains of mercuric salt.

$$Hg_2Cl_2+2KBr=Hg+HgBr_2+2KCl.$$

64

This prescription is frequently given as an example of the incompatibility of bromides with strychnine salts. It is said that crystals of strychnine bromide will form after the mixture has been standing for a half hour. One of the authors failed repeatedly to get a precipitate even on making the solution twice as strong as that called for and also varying the proportions. The precipitation is partially explained by some writers by saying that the strychnine bromide is soluble in water, but insoluble in a solution of potassium bromide. In many instances the commercial potassium bromide is alkaline, due to the presence of a carbonate which has been left in to aid the preservation of the bromide. The carbonate precipitates the strychnine as the free alkaloid. Frequently also the free alkali of the prescription bottle is sufficient to precipitate the alkaloid.

65

If the alcohol is evaporated from the tincture and the residue mixed with the other ingredients and put into capsules, the capsules soften and are dissolved on account of the sodium bromide absorbing moisture. This can be prevented by using some absorbent powder.

66

The silver nitrate is entirely precipitated by the sodium chloride as silver chloride. It is customary to filter eye-washes, and if this one is filtered there will be only a very weak solution of sodium chloride and sodium nitrate left. There is no admissible method by which the precipitation can be prevented without changing the prescription.

67

It is impossible for the dispenser to tell what the prescriber wanted. "Hyd." may stand for hydrochloric, hydrobromic, hydriodic, or hydrocyanic. From the directions to the patient to take after meals probably hydrochloric was what was intended, but it would be necessary to consult the physician.

68

Commercial diluted hydrocyanic acid usually contains some free sulfuric or hydrochloric acid, which has been added to preserve the hydrocyanic acid. If one of these mineral acids is present an effervescence will take place. Hydrocyanic acid itself does not decompose carbonates to any extent. Hydrocyanic acid easily decomposes in water, but in an alkaline solution its decomposition is much quicker, giving a formate and a dark colored precipitate containing paracyanogen.

69

This was filled in several ways, the results being the same. The codeine was triturated with a little water and a half dram of diluted phosphoric acid added to dissolve the alkaloid. The hydrocyanic acid was next added, and then the tincture of iodine, which did not precipitate the alkaloid, but was itself decolorized at once. The further addition of the water simply diluted the solution. If the tincture of iodine is added to a solution of the codeine in water and phosphoric acid, a reddish-brown precipitate is formed, consisting of codeine and iodine. This precipitate is not dissolved by adding an excess of phosphoric acid or sulfuric acid, but the 20 minims of diluted hydrocyanic acid dissolves the precipitate and makes a clear colorless solution. The explanation is that the hydrocyanic acid reduces the iodine to an iodide and thus breaks up the compound of codeine and iodine. Other reducing agents, as sodium thiosulfate, have a similar effect.

70

The syrup of hypophosphites reduces the mercury bichloride to calomel and free mercury which settle to the bottom of the container. If the mercuric salt is mixed with the syrup of hydriodic acid, mercuric iodide is formed but becomes soluble in the excess of the hydriodic acid and the potassium bromide. Any excess bicarbonate in the Fowler's solution will cause effervescence with either of the acid syrups.

71

By dissolving the morphine in a little water and adding it to the tincture of iron a blue solution may be formed which quickly turns green. When the calcium hypophosphite, dissolved in the water and syrup, is added a white precipitate of ferric hypophosphite is thrown down. The color of the solution is nearly but not entirely destroyed. By adding the morphine dissolved in water, to the mixture of other ingredients no coloration is produced, and this is the method that should be followed, as the morphine is not decomposed by the iron hypophosphite. The precipitate of ferric hypophosphite can be dissolved by adding some potassium citrate to the moist magma. A better method of filling is to use the tincture of iron citrochloride of the National Formulary instead of the official tincture of iron, the two tinctures having the same iron strength. By using the citrochloride tincture no precipitation takes place for several days at least.

72

The calcium hypophosphite slowly reduces the mercuric chloride to mercurous chloride and finally to metallic mercury. This precipitation is not readily seen in the syrup of sarsaparilla, but if water is used instead of the syrup a turbidity is noticed as soon as solutions of the salts are brought together. The syrup of sarsaparilla also has a tendency to reduce the corrosive sublimate, but only very slowly.

73

Ferric hypophosphite is formed, and being nearly insoluble in water it separates to the extent that the preparation nearly becomes solid. An alkali citrate might prevent the precipitation or help to dissolve it, but the quantity which would be required in this instance would be prohibitive.

74

Filled as written the white bismuth subnitrate is soon changed to a black precipitate. Using more hydrochloric acid, the darkening takes place sooner, and leaving out the acid no darkening results for several days. The hydrochloric acid liberates hypophosphorous acid from the hypophosphites and the hypophosphorous acid reduces the bismuth to the metal.

75

The sodium hypophosphite is deliquescent in damp air and the powders become moist. Chemical reaction may then take place slowly, causing the mixture to become yellow and finally black. The hypophosphite in acid solution reduces the bismuth to the metallic condition, while the hypophosphite is oxidized to a phosphate. In a neutral or alkaline solution the reaction is slow. The dampening of the extract of nux vomica also tends to darken the mixture. By adding some althea and using oiled or parchment paper the mixture can be dispensed without difficulty.

76

The pharmacist who received this prescription, in attempting to fill it, rubbed the three ingredients together dry and caused an explosion, whereby he was quite severely injured. The explosion was due to the reaction between the chlorate and the hypophosphite. The pills can be made by powdering the ingredients separately, then mixing lightly with powdered extract of licorice and massing with water.

77

No immediate change is noticed but after a few minutes a gas begins to form and later there is considerable effervescence and red fumes are given off. If phosphoric acid is left out, there is little or no effervescence. The phosphoric acid liberates hydrochloric acid which then reacts with nitric acid making nitrohydrochloric acid and this reacts with alcohol. It has been suggested that the iron may have some catalytic action. This is a dangerous prescription and should not be sent out until the reaction has ceased.

78

The oil of turpentine reacts with the acids, with the generation of much heat, and unless care be taken it will be ignited. The acids should be mixed and cooled and then added in small portions to the oil, cooling after each addition. The alcohol should be added last, after the mixture is cold, so as to avoid volatilization.

79

Spirit of turpentine is another name for oil of turpentine. Oil of turpentine is easily oxidized and nitrohydrochloric acid is a strong oxidizing agent, so that there is quite a violent reaction when the two are brought together. Even though the oil is emulsified first, chemical change cannot be avoided. Supposing that the prescriber wanted a four ounce mixture, the dose of the acid would be about 13 minims. The maximum dose, as given in the U. S. Dispensatory, is six drops. The excessive dose would be sufficient to prohibit the filling of this prescription. In such a case where the prescriber could not be notified, many pharmacists would use the diluted nitrohydrochloric acid instead of the concentrated.

80

This makes a clear colorless solution at first. In a day or two it acquires a yellow color which deepens. The products formed have not been determined. A similar prescription containing glycerin is sometimes written, and does not change in color so readily.

81

If the acid is added to the tincture a red color is formed at the contact of the two liquids. This red color quickly changes to an orange and then to a yellow when the liquids are mixed. The changes in color are probably due to the action of the acid on the brucine. If now the mixture is allowed to stand a short time a further chemical reaction is evidenced by the evolution of bubbles of gas. This reaction continues slowly for several hours, and is due to the acid acting on the organic matter other than the alkaloids, probably tannin. The dilution with the elixir does not prevent it. On adding the acid or the elixir to the tincture a precipitate of inert matter is produced.

82

The spirit of ethyl nitrite reacts with the tannin in the syrup of wild cherry producing a dark red color. The nitre is "salted out" by the potassium citrate and there is some precipitate in the nitre layer. The addition of about 4 drams of glycerin prevents the separation and the precipitation. This "salting out" or two-layer effect is frequently encountered. It depends upon the quantities of the potassium citrate, the nitre, and the concentration. At times the addition of a small quantity of water will be all that is necessary to reunite the two liquids.

83

The fluidextracts and elixir are sufficiently acid so that chemical reaction takes place between the potassium nitrite and the organic matter. Considerable effervescence ensues and continues for some time. Oxides of nitrogen are given off. A slight precipitate forms on standing. Probably much of the physiological activity of the mixture is destroyed by the chemical reaction.

84

The antipyrine and the spirit of ethyl nitrite form the green iso-nitrosoantipyrine which crystallizes as the prescription stands. This reaction is hastened by the acids contained in the syrups of ipecac and lemon which also react directly upon the nitre, causing an effervescence. Although the new antipyrine compound is not considered to be poisonous, it is doubtful whether the physician would care to have the prescription dispensed under such circumstances. Upon standing for several days it becomes deep red in color.

85

This gave a clear solution at first but a turbidity was noticed within an hour and by the next morning the bottom of the bottle was covered with a white precipitate which responded to the tests for calomel. Mercuric chloride is slowly reduced to calomel by alcohol (M. & M., 1, 98). This does not explain the ready reduction that occurs, and the writers are inclined to think that the ethyl nitrite or acid have some effect.

86

When first prepared, this prescription is light yellow in color, but the color begins to deepen immediately until it becomes a clear red in about a day and further deepens to a very deep red upon standing. The color change is due to a reaction between the sodium salicylate and the ethyl nitrite. The speed of the reaction depends upon the relative concentrations and acidity of these two ingredients, an acid spirit developing the color more quickly. Free salicylic acid is likely to be liberated, although the presence of the potassium citrate prevents its precipitation in this instance. Neutralizing any free acid hinders precipitation and slows up the color change.

87

When an acid solution of ethyl nitrite is brought in contact with potassium iodide, iodine is liberated and the gas nitric oxide is formed. The spirit itself may be acid but if not the acidity is readily supplied by either the syrup of squill, syrup of ipecac, or syrup of citric acid, each of which contains an acid. This prescription should not be filled on account of the free iodine formed.

88

This mixture is quite frequently prescribed by physicians, even by those who know that it is incompatible. A chemical reaction takes place between the ethyl nitrite and the tannin in the buchu, causing an evolution of oxides of nitrogen. There is less reaction if the spirit has been neutralized first. Spirit of ethyl nitrite reacts with an aqueous solution of potassium acetate, giving off a gas, the composition of which has not been definitely determined. The gas must be allowed to escape before corking the bottle. Some of the resinous matter in the fluidextract will be precipitated by the water.

89

The citric acid in the syrup reacts with the sodium nitrite liberating nitrous acid which in turn liberates free iodine from the potassium iodide. The use of simple syrup and a drop of oil of orange eliminates the decomposition for the time being, but the sodium nitrite is not stable at best and finally causes trouble regardless of the change in syrup.

90

Several chemical reactions are possible in filling this prescription, depending upon the order of mixing the ingredients. If the potassium bicarbonate is added to the syrup of lemon, carbon dioxide will be liberated by the citric acid. Spirit of ethyl nitrite is usually acid with nitrous and nitric acids, and these will liberate the carbon dioxide if brought in contact with the bicarbonate. The solution of potassium hydroxide is capable of neutralizing the acid in the spirit or part of that in the syrup. The spirit of ethyl nitrite if added directly to the fluidextract will cause a reaction, with the evolution of red fumes. This will not take place as readily if the solution of potash is added to the fluidextract first. Some of the resinous matter in the fluidextract is precipitated by the syrup. The gas which is formed should be allowed to escape before corking the bottle, otherwise an "explosion" might result.

91

Unless all the ingredients are absolutely dry the sodium nitrite will be decomposed, resulting in the liberation of N_2O_2. The mixture becomes slightly brown, reddish-brown, and finally appears to be black in color and practically liquefied, probably due to the nitrite and salicylate reaction and also to the final decomposition of the aspirin. The sodium nitrite is hydroscopic enough to take up the necessary water during the process of filling the capsules.

92

When the spirit of ethyl nitrite is added to the resorcin dissolved in the water and glycerin, a dark red solution is formed. This is perhaps due to the formation of dinitroso-resorcin (or possibly mononitroso-resorcin), which crystallizes in yellowish plates. Using a spirit that has been neutralized with sodium bicarbonate seems to make no difference. Ammonia turns this solution a deep blue.

93

The acidity of the elixir hastens the decomposition of the sodium nitrite causing a slow effervescence which of course is annoying from a dispensing standpoint. Iodine is liberated and possibly also some bromine. Neutralizing the acidity of the elixir would change the character of the vehicle, and this should not be done without consulting the physician.

94

The spirit of ethyl nitrite gives a blue color with a fresh tincture of guaiac but a brown one with a tincture that has been exposed to the light for a time. The nitrous acid would probably affect the alkaloid colchicine, since it is so easily decomposed. Acids usually give yellow solutions with colchicine, but this change would not be noticed here. The syrup precipitates resinous matter from the tinctures.

95

On mixing the ingredients of the prescription, a thick liquid was formed. The trouble is due to the salicylic acid acting on the oleate, liberating oleic acid, which is liquid, and making sodium salicylate. If sodium salicylate is used, no trouble is experienced, and as sodium salicylate is formed in the mixture, there can be no objection to using it in the first place.

96

The tannin in the tincture of digitalis makes a black inky mixture with the tincture of iron. The phosphoric acid added to the tincture of iron before the two tinctures are mixed partially prevents, and if added after, partially destroys the inky color, the final mixture being dark brown and turbid. If 2 drams of diluted phosphoric acid be added to the tincture of ferric chloride the mixture becomes entirely colorless, due to the formation of ferric phosphate, and on the subsequent addition of a tannin solution the black color is not produced. A little light-colored precipitate is formed.

97

On adding the phosphoric acid to a solution of the iron and quinine citrate a white precipitate forms which gives tests for iron but not for quinine. It is probably iron phosphate and is soluble in a considerable excess of the acid. When the diluted phosphoric acid is further diluted with water and then added to the iron salt dissolved in the balance of the water and the syrup, little or no precipitation takes place. When the tincture is added to this, a turbidity results and the mixture acquires a dark green color, due to the precipitation of matter from the tincture and the formation of tannate of iron.

98

The quinine sulfate was dissolved in the tincture of iron and a portion of the elixir added. The strychnine sulfate was dissolved in the balance of the elixir and added to the iron solution and the phosphoric acid added last. Adding the acid causes the formation of a nearly white precipitate which is phosphate of iron. If water is used in place of the elixir no precipitation results. The phosphate of iron is insoluble in water but soluble in acidulated water, and it is thrown out of solution by the alcohol in the elixir.

99

The prescription calls for enough bicarbonate to neutralize the salicylic acid, forming sodium salicylate. When the tincture of ferric chloride is added a deep red color is produced due to the formation of an iron salicylate. Upon the addition of citric acid the red color is destroyed and the solution becomes amber in appearance. This same result may be obtained by omitting the bicarbonate and the acid, and using sodium citrate to obtain the solution of the salicylic acid as is done in similar cases.

100

It would be natural to expect that these two solids would make a permanent powder, but the mixture becomes damp after a time and then dries out. There is some rearrangement of bases and acids by which the water of crystallization is liberated.

101

A light bulky precipitate of lead salicylate is formed. It is doubtful that the physician desired this reaction, and therefore he should be consulted. If the precipitate is desired, a few grains of tragacanth are necessary to prevent the too rapid separation of the precipitate when the liquid is shaken for use.

102

If the bicarbonate is dissolved in water and the tincture is added to this, a precipitate having the color of iron rust, probably a mixture of hydroxide and oxide of iron, is formed. The amount may vary with the amount of free acid in the tincture. On adding the salicylate and stirring a brown-red clear solution is formed. If the salicylate is first dissolved in water and the iron added, a dark red solution is formed having some purplish color in it. On adding the bicarbonate to this the purplish color is destroyed. If tincture of citro-chloride of iron is used instead of the U. S. P. tincture, no precipitate is produced by the bicarbonate and the color of the finished solution is much lighter at first but gets darker. The solution is alkaline.

103

This is another instance of an insoluble substance, the salicylic acid, being made soluble through the intervention of an alkali phosphate (tartrates, citrates, etc., also serve the same purpose). The iron of course finally gives a deep red color to the solution by forming some iron salicylate.

104

If the citric acid is added to a solution of the sodium salicylate, salicylic acid will be precipitated. However, the ammonium carbonate and the citric acid will form ammonium citrate, and, with the ammonium citrate already present in the liquor, any salicylic acid is dissolved. The acid in the tincture of ferric chloride will also cause the separation of salicylic acid, and the ferric chloride itself causes the formation of an iron salicylate with a resulting red color in the finished prescription.

105

This foot powder undoubtedly produced some unexpected results. Traces of iron, probably in the kaolin, reacted with the salicylic and tannic acids to produce an inky color, the moisture being supplied by the feet.

106

The salicylic acid is not readily soluble in the water and glycerin; it requires 460 parts of water for solution. If the acid is dissolved in the glycerin with the aid of heat and the tincture then added, a clear solution results, but on adding the water a bulky crystalline precipitate comes down. A better method of filling is to rub the acid with the glycerin and water and then add the tincture. Free iodine reacts with salicylic acid, giving mono-, di-, and tri-iodobenzoic acids and tri-iodophenol (M. & M., III, 680). Not all the iodine is changed.

107

The solution becomes yellow as soon as the spirit of ethyl nitrite is added, but upon standing, the color becomes deeper, finally changing to a deep red, due to a reaction between the nitre and the sodium salicylate. The solution of ammonium acetate is acid and might liberate salicylic acid except for the fact that both potassium citrate and ammonium acetate will dissolve it or, as in this case, keep it in solution.

108

There is not a sufficient amount of water to dissolve all of the quinine sulfate. If the sodium salicylate is dissolved in part of the syrup and the quinine is mixed with the balance of the syrup and these two brought together, a bulky gelatinous precipitate of quinine salicylate is formed. The resulting mixture is so thick that it can be poured only with difficulty. When a little sulfuric acid is used to aid the solution of the quinine sulfate, or when quinine bisulfate is used, the precipitate of quinine salicylate subsequently formed is generally more bulky and tenacious.

109

On standing, the citric acid in the syrup combines with the sodium, liberating salicylic acid, which, being only sparingly soluble in water, is precipitated in needle-shaped crystals. Replacing the syrup of citric acid with simple syrup and one or two drops of oil of lemon would eliminate the difficulty and not change the intent of the prescriber.

110

This prescription becomes black in about three days. An aqueous solution of a salicylate, in the presence of an alkali, turns dark brown to black. This reaction is attributed generally to oxidation, and F. Grill states that it may take place due to atmospheric oxygen (or to a trace of ferric iron) with the formation of a quinoid structure of the phenolic group of the salicylate, light also affecting the color (J. A. Ph. A., XXI, [1932], 765). [See ACIDUM SALICYLICUM.] This coloration can be prevented by adding a trace of sodium bisulfite, sodium sulfite, or sodium thiosulfate.

111

The salicylic acid is quite readily soluble in alcohol but soluble only in 460 parts of water. If the alcoholic content is increased to one and one-half fluid ounces, a permanent solution results.

112

The physician has indicated, in this case, that he desires to make ammonium stearate although he does not allow the proper ingredients for its preparation at the point indicated. If the stearic acid is melted and the ammonia water added to it, the combination is too concentrated to produce proper results. The reaction is incomplete, and a solid cake is produced to which it is impossible to add the other ingredients and obtain a satisfactory and uniform mixture. The following procedure, however, gives a smooth product which has the physical characteristics of a good vanishing cream and should be dispensed in a jar. Melt the stearic acid on a water bath. Heat the 30 cc. of water to the same temperature as that of the melted stearic acid. Add the ammonia water to the warm water, and gradually add this solution to the melted stearic acid, continually stirring the preparation until a smooth cream results. Powder the salicylic acid, mix it with the starch, add the phenol and glycerin gradually to obtain a smooth mixture, and finally add this mixture to the ammonium stearate paste and mix thoroughly.

113

The aromatic sulfuric acid was probably added to reduce the bulk of the quinine, but an incompatibility is thereby introduced. The acid will liberate carbon dioxide from the mass of carbonate of iron, causing the pills to swell and forming ferrous sulfate. The acid should be omitted.

114

The Rochelle salt throws some of the camphor out of solution. Then, on the addition of the aromatic sulfuric acid the turbidity is increased on account of the separation of the oil of cinnamon and the resin of ginger. Chemical reaction takes place between the Rochelle salt and the sulfuric acid, sodium sulfate going into solution and potassium bitartrate being precipitated.

115

Although the sulfuric acid aids the solution of the quinine sulfate, it precipitates the glycyrrhizin of the fluidextract. The glycyrrhizin, thus precipitated as glycyrrhizic acid, loses much of its sweet taste and no longer disguises the taste of the quinine. It would have been better if the prescriber had omitted the sulfuric acid and directed a shake mixture. The water causes the separation of a small amount of inert matter from the fluidextract.

116

If the potassium chlorate and the glycerin are rubbed together an explosion is likely to occur. The chlorate and acid react to form a chloride and sulfate. After a day or two no odor of sulfurous acid can be detected. The chlorate does not all dissolve in the water, but the excess should not be filtered out, as it is to be mixed with more water before being used.

117

When the sulfurous acid is added to the solution of the sodium hypophosphite in the cinnamon water a turbidity results, due to the separation of free sulfur. The hypophosphite is oxidized to a phosphate and the sulfurous acid is reduced to sulfur. In the presence of a very large excess of the hypophosphite the sulfur is further reduced to hydrogen sulfide.

118

The digitalis contains tannin which forms a precipitate of black iron tannate with the Basham's mixture. The addition of one-half dram of sodium citrate will prevent the precipitation and produce a clear green liquid.

119

This mixture gives a precipitate on standing, light and bulky if the water used is cold, or small and dense if the water is hot. Any two of the ingredients can be dissolved in water without getting an appreciable precipitate. The precipitate seems to be tannic acid which is salted out of solution by the chlorate and boric acid.

120

On mixing these ingredients a blue-black solution is obtained. This is due to the presence of some ferric sulfate. Ferrous sulfate as found in drug stores nearly always contains some ferric sulfate. If strictly ferrous sulfate is used tannic acid gives no coloration with it.

This prescription was filled by dissolving the clear crystals of ferrous sulfate in water, adding 4 grains of sodium thiosulfate and 2 drops of sulfuric acid, and boiling until all of the ferric iron was reduced to the ferrous, as shown by adding a drop of this solution to a solution of potassium sulfocyanide and getting no red color. The tannic acid was dissolved in another portion of water, the syrup added, and this added to the iron solution. A colorless liquid was obtained, astringent in taste but not inky. In three days the solution had assumed a green color and in ten days it was blue-black. It would have been better to have had some ferric iron in the prescription when dispensed and to have sent out a dark mixture so that the patient would not have noticed any change.

121

Tannic acid precipitates the zinc salt only slightly, but does give a precipitate of morphine tannate and of lead tannate. Lead subacetate with zinc sulfate gives a precipitate of lead sulfate and with morphine muriate a precipitate of morphine alkaloid. Some lead chloride is formed. As this prescription is to be used locally, it can be filled without danger.

122

The sodium salicylate and benzoate and the liquefied phenol were dissolved in the lime water, making a nearly clear colorless solution, and then the tannic acid was added. A blue-white precipitate was formed, due to the reaction between the tannic acid and lime water. The precipitate afterwards slowly turned to a dirty yellow color.

123

The tannic acid in the tincture combines with the quinine to make the insoluble, nearly tasteless quinine tannate. The water precipitates the resinous matter from the tincture. A "Shake well" label should be put on the bottle.

124

The resinous matter in the tincture of myrrh is precipitated by the syrup. By adding the tincture to the syrup in small portions and shaking well after each addition the resin comes down in a form in which it can be more readily suspended in the liquid. Tannic acid combines with the morphine to form a compound insoluble in water. On standing, the precipitating matter forms into masses, rendering an even dosage difficult. Adding 1 or 2 drams of honey directly to the tincture in place of that much syrup helps to keep the precipitated matter finely divided.

125

No trouble is experienced with this prescription under ordinary conditions. Ether slowly forms a peroxide which liberates iodine from the iodide, but not before the prescription will have been used.

126

The anesthesine is rendered soluble by the addition of the diluted hydrochloric acid, but the Dobell's solution, being alkaline, is likely to precipitate it unless an excess of acid has been added. In the latter case the excess acid would then destroy the alkalinity of the Dobell's solution, so that the prescription is not satisfactory under any conditions. There is also a separation of a yellowish layer on the top of the liquid. This is probably menthol and phenol.

127

Mercuric chloride combines with albumin to form a compound insoluble in water. The presence of an equal weight or more of sodium or ammonium chloride prevents to a considerable extent the formation of the precipitate. "By dissolving one part of corrosive sublimate and a hundred parts of common salt in distilled water and evaporating to dryness, a soluble double preparation is obtained which does not coagulate albumin" (U. S. D.). If this prescription were filled as directed it would be practically inert. By adding 3 or 4 grains of ammonium chloride to the mercuric chloride, dissolving this in about one-half the water and the albumin in the remainder of the water, and mixing these solutions, a nearly clear solution can be obtained.

128

This prescription is an example of what might be called a case of pharmaceutical ethics. The prescription, as filled, produced a cloudy mixture. Since each of the ingredients is alcohol-soluble, a cloudy preparation seems illogical. Upon inquiry, it was discovered that the prescription had been filled with a "rubbing alcohol" which contained only about 70 per cent of ethyl alcohol. Needless to say, such practice is a blot on the profession of pharmacy.

129

This prescription was filled by dissolving the inorganic salts in the water and the camphor in the alcohol. The tincture was added to the alcoholic solution and then the two solutions mixed. A turbidity resulted at once, and on standing for some time crystals were formed. This is due to the insolubility of the inorganic salts in the alcohol, which throws them out of their aqueous solutions.

130

Solution of arsenous and mercuric iodide is a well-known alkaloidal precipitant and consequently it should not be used in this prescription since it will precipitate both the codeine and the morphine.

131

Most alkaloidal salts are insoluble in oil and liquid petrolatum, but are soluble in water. The alkaloidal base, however, is oil-soluble and should be used in a prescription such as this. It is not necessary to consult the physician about the change although it would be well to inform him of it so that the proper combination might be used in the future.

132

Aqueous solutions of alkaloidal salts do not keep indefinitely, and if they are required they should be prescribed in small quantities. The practice of some pharmacists of keeping aqueous solutions of alkaloidal salts on hand as stock solutions is likewise to be discouraged.

133

The fact that syrup of wild cherry contains tannins is frequently forgotten. Such tannins precipitate the strychnine in this prescription. The use of another flavoring vehicle should be suggested.

134

Morphine sulfate is insoluble in the collodion, comparatively insoluble in alcohol, and insoluble in ether. Morphine alkaloid is soluble in 210 parts of alcohol, and the hydrochloride is soluble in 52 parts of alcohol. Therefore morphine hydrochloride may be used by first dissolving it in some alcohol and then adding the solution to the flexible collodion. Since the collodion forms a film at once when it is used, it is questionable whether the morphine can do any possible good in such a combination.

135

Atropine sulfate is nearly insoluble in fixed oils. The free alkaloid is soluble in about 38 parts of olive oil, and should be used in filling this prescription. The change should be made and the doctor notified.

136

On inquiry it was found that this prescription was for a horse. It makes a turbid, deep red mixture, the red color being due to the action of spirit of ethyl nitrite on aloin.

137

The aspirin and the bicarbonate react, the mixture becoming moist and reddish brown in color. The color change is due to the bicarbonate acting with the aloin. If the bicarbonate is omitted the prescription remains satisfactory.

138

The ammoniated tincture of guaiac, if fresh, gives a blue color with the tincture of ferric chloride. If an old tincture is used, a brownish-black color is formed. The tincture of aloes gives a greenish-brown to blackish-brown color with the iron. The syrup precipitates the resinous matter from the tinctures, the mixture being very turbid. The resinous matter finally coagulates into a solid jell making the prescription very unsatisfactory. The addition of some honey to the bottle, before the tinctures are added, makes it possible to prepare a presentable mixture. There is not enough ammonia in the ammoniated tincture of guaiac to form ferric hydroxide, unless the tincture is freshly made with a fresh aromatic spirit of ammonia. Even then the syrup will tend to keep the ferric hydroxide in solution.

139

Aloin solutions turn red with alkalies. In this prescription the Fowler's solution, the sodium phenobarbital, and the compound mixture of rhubarb are all alkaline and act upon the aloin. The compound tincture of cardamon with its cochineal also turns red with alkalies. In this prescription the natural red color is considerably deepened. Alcohol causes some precipitation primarily from the rhubarb mixture.

140

Alum, being a soluble sulfate, will react with the lead acetate, precipitating the insoluble lead sulfate according to the following equation:

$$2Pb(C_2H_3O_2)_2\ 3H_2O + KAl(SO_4)_2\ 12\ H_2O$$
$$= 2PbSO_4 + KC_2H_3O_2 + Al(C_2H_3O_2)_3 + 15H_2O.$$

The precipitate should not be filtered out.

141

This prescription caused considerable annoyance, when, after being filtered to make a clear solution, it gradually developed a stringy precipitate. The alum precipitated the organic matter in the rose water. The difficulty was overcome by using a rose water prepared from a "soluble" rose concentrate.

142

Aluminum hydroxide is precipitated. By neutralizing the sodium borate with citric acid a clear solution may be prepared. However, the physician should be consulted before proceeding.

143

Considerable effervescence and foaming are produced by the alum and the alkaline aromatic solution, the preparation also becoming thick owing to the formation of aluminum hydroxide. One or the other of these two ingredients should be changed or omitted.

144

Alumnol with water gives a clear solution with a blue fluorescence. Resorcin dissolves in this solution, but destroys the fluorescence.

145

Reaction takes place between the two chemicals, resulting in the formation of the soluble ammonium acetate and the precipitation of a white basic carbonate of lead, which is really a carbonate and hydroxide combined in various proportions. All the lead is precipitated. As it is for external use, it may be dispensed with a "Shake well" label.

146

Chemical reaction takes place between the ammonium carbonate and the acetic acid of the syrup of squill, liberating carbon dioxide. If the syrup of squill is diluted with the water and then mixed with the ammonium carbonate, the effervescence will be completed sooner than if all the syrups are present, as the mixture is then heavy and the gas escapes with difficulty. Care must be taken not to stopper the bottle until effervescence has entirely ceased.

147

The bottle containing this mixture should not be stoppered tightly or it may burst. Infusion of digitalis is acid in reaction and slowly liberates carbon dioxide gas from ammonium carbonate.

148

Filled as written this prescription makes a thick mixture that will pour, and on standing a liquid separates. The amount of starch should be cut down to one-third or one-fourth of the amount and then boiled with the lime water. By so doing a much smoother ointment is made and there is practically no separation of liquid.

149

The two salts were dissolved in separate portions of the syrup and then mixed. A turbidity resulted, due to formation of calomel. The tartar emetic reduces the mercuric chloride to mercurous chloride.

150

The antipyrine was dissolved in the syrup and added to the syrup of iodide of iron without producing any apparent change at first. After a day or two, however, the liquid became dark red and a crystalline precipitate of a deep red color began to form. These crystals grew as the liquid was allowed to stand Their composition was undetermined.

151

Magnesium sulfate was dissolved in water, then the salicylate and then the antipyrine. This makes a clear solution, but a crystalline precipitate begins to form within an hour and increases for some time. According to experiments made (Finnemore & Colverd, Merck's Report, v. 22, p. 289) this precipitate is a double compound of magnesium antipyrine salicylate. It can be made by adding antipyrine to a solution of magnesium salicylate. It is soluble in about 30 parts of water.

152

The antipyrine and spirit of ethyl nitrite react to form green iso-nitrosoantipyrine. This reaction may be prevented for a time by first neutralizing the spirit and syrup with some sodium bicarbonate. The green compound is not considered to be dangerous.

153

Free bromine is formed if the potassium bromide is added to the tincture and the free bromine combines with antipyrine. If the bromide is dissolved in water and then added to the tincture of iron previously diluted with water, no bromine is liberated. Antipyrine gives an intense red coloration with the tincture of iron. With tincture of iron citro-chloride, no red color is produced, but on adding a mineral acid it is.

154

The tannin in the syrup of wild cherry forms a precipitate with the antipyrine. This precipitate coagulates and cakes, and a few grains of tragacanth should be added to keep the precipitate in a semi-suspended condition.

155

A mixture of these ingredients makes a clear colorless solution at first. Antipyrine destroys the fluorescence of quinine sulfate. A white amorphous precipitate forms in a day or two and increases in amount for some time. If the prescription is filled, using distilled water instead of cinnamon water, no precipitation results. The trouble seems to be due to antipyrine, sulfuric acid, and cinnamon water, since a mixture of any two or three ingredients of the prescription other than the combination mentioned does not precipitate.

156

If the antipyrine is triturated with the resorcin, a eutectic liquid will be formed which is insoluble in water. However, if the antipyrine and the resorcin are dissolved, each separately, in part of the salt solution and then the two solutions mixed together, there will be no separation.

157

An oily liquid separates. Antipyrine with phenol, antipyrine with chloral hydrate, or phenol with chloral hydrate gives a liquid insoluble in water. Borax acting on chloral hydrate gives chloroform.

158

When chloral hydrate and antipyrine are brought together in concentrated solutions in the right proportions an oily liquid separates and upon standing forms crystals of monochloral antipyrine, commonly known as hypnal. In this case there is more than enough of chloral for the antipyrine, the proper proportions being 47 Gm. of chloral to 53 Gm. of antipyrine. Possibly some dichloral antipyrine may be formed in this prescription. At least there is a separation of an oily liquid that does not solidify. The resinous matter in the fluidextracts is precipitated by the water.

159

This prescription was filled by mixing the first four ingredients and putting into capsules and then adding the tincture. The next day the box in which the capsules were dispensed was brought back, the capsules having been dissolved. Sodium bromide attracts moisture from the atmosphere. Antipyrine with caffeine citrate makes a mixture that forms a sticky mass on standing a few hours. A mixture of all the ingredients makes a damp powder at first, but in a few hours it becomes almost liquid. A large amount of drying powder is necessary.

In place of the tincture of aconite, an equivalent amount of fluidextract may be added to the powders and thoroughly mixed, thus reducing the liquid.

160

Apomorphine is very easily oxidized, giving a green compound. In an acid solution this takes place less quickly. Many samples of the hydrochloride are more or less green. The spirit of ethyl nitrite is an oxidizing agent and the change takes place quickly if the spirit has free nitric or nitrous acid in it. The spirit should be neutralized first by shaking it with sodium bicarbonate.

161

The ammonia water combines with the acid in the tincture of iron, forming ammonium chloride and ferric hydroxide. The precipitation of the ferric hydroxide may be prevented by mixing the glycerin with the tincture before adding the ammonia. If the ammonia is added to the tincture and then the glycerin, the precipitated ferric hydroxide dissolves but slowly in the mixture. Glycerin, as well as sugar, acacia, honey, and some other organic substances, prevents or hinders the precipitation of many of the metals by alkali hydroxides.

162

These ingredients make a clear dark red solution, which changes to a red-straw color within five minutes. The red color is due largely to the tincture of iodine. Iodine with ammonia in excess forms chiefly ammonium iodide with a little ammonium iodate, so that in this prescription, so far as physiological effect is concerned, it would be about as well to use some ammonium iodide instead of tincture of iodine. At the end of twenty-four hours the mixture is strongly alkaline and still slightly colored.

In a mixture of ammonia and iodine there is some danger of the violently explosive iodide of nitrogen being formed, more especially where the iodine is in excess. This iodide of nitrogen is insoluble and is slowly precipitated as a dark brown solid.

163

Strychnine (free alkaloid) is soluble in 6420 parts of water. There is enough water and alcohol in the elixir to prevent the aromatic spirit of ammonia from throwing it out of solution. The ammonia will not precipitate the alkaloids of the elixir of cinchona. The above mixture will not be clear, however, because the oils in the aromatic spirit will be separated by the elixir. If the spirit of ammonia were used instead of the aromatic spirit a clear dark red solution would be obtained. This substitution would not be allowable without the prescriber's consent.

164

Soluble metallic salts frequently "salt out" or throw out of solution the volatile ingredient of medicated or aromatic waters. In this case there will be a separation of camphor, which will rise and float on top. The amount is so small that it may be disregarded or filtered out.

165

A precipitate of yellow silver iodide is formed. The final product varies considerably dependent upon the method of preparation. If the salts are mixed together and then dissolved in water, or if concentrated solutions of each are prepared and then mixed, the resulting silver iodide will be coarse and granular. It may then be suspended to some extent with acacia. However, for the finest results, a colloidal suspension may be had by dissolving each salt separately in 1 fluid ounce of a 10 per cent mucilage of acacia. When these two solutions are slowly and carefully mixed, the resulting silver iodide is in such a fine state of subdivision that it remains suspended almost indefinitely. Of course, the prescription must be protected from light.

166

Solution of potassium arsenite of the U. S. P., XI, is not strongly alkaline but in previous editions of the U. S. P. it was strongly alkaline. In such cases the carbonate in the solution of potassium arsenite precipitates the yellow-white silver carbonate. The arsenic also combines with the silver, forming yellow silver arsenite, which is insoluble in a neutral aqueous liquid. In this prescription the silver is not all precipitated. The yellow-white precipitate becomes dark on standing for a day, with the formation of silver oxide or metallic silver or both. By slightly acidifying Fowler's solution, if alkaline, with nitric acid, precipitation can be prevented.

167

Silver nitrate should, of course, be protected from organic substances which will reduce it. Therefore care is necessary in preparing pills of silver nitrate, both as to other natural ingredients in the prescription and also as to the proper excipients to use. Moisture should be eliminated if possible. In this prescription the extracts will reduce the silver nitrate if they are moist, but, by using dry powdered extracts and an excipient such as rosin cerate, petrolatum and paraffin, or oil of theobroma and protecting the pills from light, satisfactory results may be obtained.

168

Yellow silver phosphate is precipitated. An organic suspending agent is not admissible because it would reduce the silver. The dispenser can acidify the sodium phosphate with a little diluted nitric or phosphoric acid or the physician should rewrite the prescription.

169

There will be a little silver permanganate thrown out of solution, it being soluble in 109 parts of water. This salt, like other silver salts, is decomposed by light and also by heat.

170

Insoluble silver chloride is formed. Epinephrine is easily oxidized and silver nitrate is readily reduced; consequently the activity of the epinephrine is destroyed. On the other hand, epinephrine may be precipitated when its chloride radicle is taken to produce the silver chloride.

171

When the cocaine is mixed with the solution of silver nitrate it gives a black precipitate of silver oxide. If the cocaine is first dissolved in water with the aid of a little diluted nitric acid, which converts the alkaloid into a salt, the solution can be mixed with the silver nitrate without any precipitation. A better method of filling would be to use the cocaine hydrochloride and follow the directions under No. 236.

172

The silver nitrate must first be dissolved in a small quantity of hot distilled water, ½ cc. being sufficient to dissolve 1 gram of the salt. This solution is then mixed with the glycerin. The solution becomes brownish-yellow almost at once, however, and changes to red within an hour, within a day becoming practically black. If dispensed at all, for possible immediate use, it should be placed in an amber bottle and protected as far as possible from light.

173

The prescriber has plainly indicated that he wishes the extract only as an excipient. The extract should not be used as it quickly reduces the silver to the metallic form. The silver nitrate should be powdered and then massed with petrolatum or wool fat and kaolin, using kaolin also as a dusting powder. Wool fat makes a more adhesive mass than petrolatum.

174

When silver oxide and creosote are triturated together there is great danger of an explosion. It has been proposed to mix the creosote with powdered soap and then with the oxide, which has been previously mixed with licorice root. The mass should not be rubbed hard and should be kept cool.

175

On adding the zinc sulfate to the protargol solution a voluminous light brown precipitate forms and settles. The addition of about 80 minims of ammonia water clears it, and the morphine gives only a slight precipitate with it; on standing a dark green precipitate forms in a few hours and remains suspended. The prescription should be filled as written.

176

On mixing a solution of protargol and cocaine hydrochloride, a precipitate is produced in a few hours and precipitation goes on slowly for several days. Saturating the water with boric acid seems to retard the precipitation. The precipitate in suspension has a grayish color, but when settled it is of a bluish-purple. The liquid has a blue fluorescence like solutions of quinine sulfate.

177

The argyrol might be finely powdered and then mixed with oil of theobroma, but the preferable procedure is to dissolve the argyrol in a minimum amount of water, absorb the aqueous solution with wool fat or a similar commercial absorbent base, and mix this with the necessary amount of oil of theobroma. By this procedure the argyrol is made readily available.

178

This prescription should be treated in the same manner as the previous one, using a small amount of water, wool fat, and sufficient petrolatum to make 60 grams. A smooth ointment results.

179

The argyrol was dissolved in a part of the water and the iodide and iodine in another portion. On pouring some of the argyrol solution into the other, the color of both solutions was practically destroyed and a dirty white precipitate was formed, presumably silver iodide. In this prescription the argyrol is in excess and much of the precipitate apparently goes back into solution. The color of the finished product is that of argyrol. However, precipitation goes on and in a few days much of the color is destroyed and the silver precipitated.

180

Copper arsenite is formed as a green precipitate. If solution of arsenous acid is used in place of the Fowler's solution there is no precipitation except for a small amount from the tinctures.

181

In using Fowler's solution previous to the U. S. P., XI, the excess of potassium bicarbonate used is changed to the carbonate by boiling and the carbonate makes the solution alkaline. Potassium carbonate precipitates a solution of mercuric chloride as the basic mercuric chloride. In this prescription there may be a red-brown precipitate of the oxychloride of mercury, but more generally a white precipitate of calomel forms. An arsenite in an alkaline solution reduces mercuric chloride to mercurous chloride and in excess to metallic mercury. The U. S. P., XI, Fowler's solution is not excessively alkaline and probably would not cause any trouble in this prescription. Solution of arsenous acid might also be used safely.

182

Several chemical reactions take place, depending on the order of mixing. The quinine sulfate is not all dissolved by the elixir. 1. The sodium salicylate combines with the quinine salt, forming the nearly insoluble quinine salicylate. 2. The quinine sulfate forms with the mercuric chloride a double compound which is insoluble in water, but soluble in alcohol. In this particular instance there is not enough alcohol in the elixir to dissolve it. 3. The quinine will also be precipitated as the free alkaloid if a Fowler's solution containing an excess of alkali is used. 4. An alkaline solution of potassium arsenite will also reduce mercuric chloride to calomel, but in this prescription there would not be enough to make any trouble. In filling this, quite a bulky precipitate results. The Fowler's solution, if alkaline, should be neutralized with a little acid. An excess of acid should be avoided because it will precipitate the free salicylic acid.

183

Different results are obtained, according to the order of mixing the ingredients. If the Fowler's solution is the U. S. P., X, variety containing excessive alkali, when it is added to the solution of dialyzed iron, ferric hydroxide is precipitated, and this combines with the arsenic to form an insoluble basic ferric arsenite. But if the syrup is added to the iron and the Fowler's solution is diluted with a little water and then added to the iron mixture, little or no precipitation takes place. Sugar to some extent acts as a solvent for the ferric hydroxide. Solution of dialyzed iron varies considerably in the amount of acidity which it has; if properly made it is nearly neutral. Some samples are sufficiently acid to prevent any precipitation even by an alkaline Fowler's solution. There is some danger of the strychnine being precipitated by the Fowler's solution if it is alkaline. Syrup or water added to the tincture of cinchona causes a turbidity. The tannin in the tincture will make a black mixture with the iron. To avoid the precipitations noted above the solution of potassium arsenite, if alkaline, should first be neutralized with hydrochloric acid.

184

The difficulty is to get the arsenous acid into solution. The suggestion has been made to use the component parts of tincture of iron, which are alcohol and solution of ferric chloride. By dissolving the arsenous acid in the solution of iron and then adding the bichloride and strychnine, dissolved in the alcohol, a clear solution is obtained. Frequently the constituent parts of a preparation can be used to great advantage.

185

This mixture is slightly acid, the salicylic acid more than neutralizing the alkalinity of the borax. A little precipitate slowly forms on account of the boro-salicylic acid acting on the alkaloids. This prescription should not be dispensed on account of the excessive doses of atropine and strychnine.

186

In medium-sized medicinal doses morphine and atropine are physiologically incompatible. But the minute dose of atropine in this prescription assists rather than diminishes the action of morphine by relieving the cardiac depression, indigestion, and constipation.

187

No apparent change takes place at first, but in less than four hours a yellow-brown precipitate of metallic gold forms. The arsenous acid reduces the gold chloride. It is also easily reduced by many other inorganic compounds as well as by organic matter and light.

188

The tincture of iodine contains iodine and potassium iodide dissolved in alcohol. Reaction takes place between the gold chloride and the potassium iodide. "Potassium iodide, added in small portions to a solution of auric chloride (so that the latter is constantly in excess where the two salts are in contact), and when equivalent proportions have been reached, gives a yellow precipitate of aurous iodide, AuI, insoluble in water, soluble in large excess of the reagent; the precipitate is accompanied with separation of free iodine, brown, which is quickly soluble in small excess of the reagent as a colored solution. But on gradually adding auric chloride to solution of potassium iodide, so that the latter is in excess at the point of chemical change, there is first a dark green solution of potassio-auric iodide, $KIAuI_3$; then a dark green precipitate of auric iodide, very unstable, decomposed in pure water," forming the yellow aurous iodide. (Prescott and Johnson's Qualitative Chemical Analysis, 6th ed., 92.) Probably the organic matter present also tends to the reduction and precipitation of the gold. The physician should be notified of the change which takes place. Only a very small amount of menthol is dissolved.

189

Gold and sodium chloride precipitates the sulfates of atropine and strychnine and the alkaloids in cinchona. About 30 per cent of alcohol is present, but not enough to prevent precipitation. By dissolving the gold and sodium chloride in water and adding an equal weight of sodium thiosulfate a compound is formed that does not precipitate the alkaloids from this mixture. The gold may be reduced on standing for some time. Water precipitates inert matter from the fluidextract. Atropine and strychnine are somewhat antagonistic in their physiological action.

190

The lard in the sulfur ointment prepared according to the U. S. P., X, takes up the oily portion of the Peruvian balsam, while the resinous part separates on the ointment slab in the form of a stringy, gummy mass. The lard is greatly in excess of the petrolatum. In this case, if the benzoinated lard of the sulfur ointment is replaced with petrolatum, as is done in the U. S. P., XI, a smooth uniform ointment may be prepared without any difficulty. The quantities of sulfur and betanaphthol are not sufficient to cause trouble.

191

The Peruvian balsam is not entirely soluble in the olive oil. The resinous portion separates and forms a very unsightly preparation, and upon standing it makes a solid cake in the bottom of the bottle. By adding an equal quantity of castor oil to the balsam, the resin does not granulate or separate in lumps, but the resulting product is very muddy in appearance. An equal quantity of alcohol added to the balsam makes a preparation which is more nearly clear and dark red in color. A small amount of resinous matter finally settles to the bottom of the container. A larger quantity of alcohol might prevent any separation.

192

The sulfur and the salicylic acid help to precipitate the resinous material from the balsam, producing a granular-appearing ointment. When the latter is applied to the skin the resinous matter rolls up under the fingers. Using solid petroxolin as a base in place of the petrolatum produces a satisfactory ointment.

193

In this prescription we find every ingredient working against the Peruvian balsam, so that the resinous matter of the balsam separates and rolls out in stringy masses. To prevent separation it is necessary to use both castor oil and solid petroxolin, replacing all the petrolatum and benzoinated lard. Four drams of castor oil, and solid petroxolin to make the 4 ounces of ointment was found to be satisfactory.

194

Benzyl benzoate is insoluble in water, and consequently it separates when the alcoholic solution is diluted with the weaker aromatic elixir. A better prescription could be prepared by using the proper amount of benzyl benzoate and emulsifying it with an aqueous vehicle.

195

An old specimen of bismuth and ammonium citrate is generally not entirely soluble in water unless a little ammonia water is added. At best the solution of this salt is usually slightly alkaline, and the pepsin on being added to this is rendered inert by the alkali. If, however, the hydrochloric acid is used in dissolving the pepsin in water and this solution added to the bismuth and ammonium citrate dissolved in the balance of the water, the action of the pepsin will not be destroyed, but a precipitation will take place. This precipitate is bismuth citrate, the hydrochloric acid breaking up the double salt and combining with the ammonia. Pepsin should not be prescribed with bismuth and ammonium citrate, as one or the other loses much of its activity. By using 4 fluid drams of the N. F. glycerite of bismuth about the same amount of bismuth is taken. This glycerite is acid to litmus and can be mixed with pepsin without injury to the pepsin but hydrochloric acid cannot be added to the glycerite without precipitating the bismuth.

196

The bismuth subnitrate is reduced to bismuth by the creosote, the white subnitrate changing to gray and then becoming darker as time goes on.

197

The calcium iodide is very hydroscopic and immediately reacts with the bismuth subnitrate to form a bismuth oxyiodide, the mixture being yellow at first and then changing to orange as the reaction continues.

198

The bismuth subnitrate is not dissolved. The aromatic spirit of ammonia precipitates the zinc as zinc carbonate, due to the presence of ammonium carbonate. The carbonate may be slowly decomposed by the bismuth subnitrate, liberating carbon dioxide, which might burst the bottle if tightly corked. Syrup is sufficiently viscid to keep the insoluble matter in suspension while pouring out a dose. A "Shake well" label is necessary.

199

The bismuth subnitrate is insoluble in the syrup, but a chemical reaction takes place between it and the hydriodic acid, as is evidenced by the change in color. Bismuth subnitrate is white; on mixing it with the syrup the color becomes yellow and quickly turns to a grayish-black, an iodide of bismuth being formed.

200

The tragacanth is best rubbed up with one-fourth to one-half of the water gradually, added until the lumps are all rubbed out. Then rub in the quinine, bismuth, and iodide, and lastly the rest of the water. This makes a thick yellowish mixture. Potassium iodide in the above proportions gives a yellow iodide of bismuth and the mixture becomes orange on standing. Ordinarily bismuth subnitrate with mucilage of tragacanth gives stringy masses but filled as above these are rubbed out. One-half the amount of tragacanth called for will be sufficient to suspend the bismuth.

201

The bromoform is insoluble, and being heavy it separates to the bottom of the container. It may be dissolved in a few cubic centimeters of olive oil and then emulsified to produce a satisfactory product.

202

Citrated caffeine contains citric acid which liberates free salicylic acid from the sodium salicylate. If the citrated caffeine is replaced by one-half the amount of caffeine, the source of the difficulty is removed.

203

This prescription can be filled in one of two ways. The chloral hydrate may be dissolved in the water, and the camphor powdered and mixed with the syrup and then with the solution of chloral. The camphor will rise to the top. Or the camphor may be triturated with the chloral hydrate until liquefied, and this shaken with the syrup and water. The oily chloral-camphor does not dissolve in the water, but seems to be decomposed by it, the chloral going into solution and the camphor coming to the top as a soft white solid. There seems to be no difference in the final result as to which method of filling is used. In either case the mixture is a difficult one to pour so as to get an even dose of the camphor. A more elegant preparation would be made by dissolving the camphor in a little expressed oil of almond and then emulsifying it with acacia, or rubbing the camphor directly with acacia.

204

The mixture becomes very soft owing to the fact that the camphor, salol, and quinine form a eutectic mixture. By adding 30 grains of magnesium carbonate, and adding the camphor and acetophenetidin last, after previously triturating them together, a satisfactory mixture may be had.

205

If a eutectic mixture is made of the menthol and camphor and this then added to the liquid petrolatum, a cloudy solution will result. The cloud disappears in about a day. However, if separate solutions are made of the menthol and camphor, no cloud will result when they are mixed together.

206

The camphor is precipitated, rising to the surface of the liquid. The addition of a dram of powdered acacia suspends the camphor, producing a creamy mixture which can be dispensed with a "Shake" label.

207

It is rather difficult to produce a smooth lotion with camphor. However, if it is dissolved in a small amount of alcohol, the sulfur added, and the mixture triturated until the alcohol evaporates, the tragacanth may then be added, followed by the lime water in small portions. A smooth, creamy product results.

208

Triturating salol and monobromated camphor together produces a liquid. But if the acetanilid and salol are rubbed together first and then the camphor added, a damp powder is obtained. If about 15 grains of powdered soap are then added and a little drying powder if necessary, a mass can be made, the pills becoming hard in an hour or two.

209

This is only a matter of technique, as the prescription makes a soft paste which is difficult to place into capsules. Probably the method offering the least objections would be to place the bismuth subcarbonate in a small capsule, insert the small capsule in a larger one, and then drop in a solution of the monobromated camphor in the eucalyptol. An absorbent such as magnesium carbonate might be used, but too much would be required, making the capsule excessively large.

210

Carbon dioxide will be generated by the sulfuric acid and the potassium bicarbonate. There is a sufficient amount of the bicarbonate to neutralize all of the acid and also to liberate quinine as free alkaloid, which is nearly insoluble. It will also liberate ammonia from the ammonium carbonate in the aromatic spirit of ammonia which is used as the menstruum in making the tincture. Resinous matter and the oils in the tincture are thrown out of solution by the water. Tincture of guaiac if freshly prepared may color acacia blue.

211

The bottle containing this mixture burst, owing to the liberation of carbon dioxide. Solutions of magnesium sulfate and potassium bicarbonate when shaken together give off carbon dioxide. It is also liberated by the iron salt which is often a little acid. This makes a clear solution at first, but on standing a reddish precipitate, possibly some insoluble iron citrate, forms and adheres to the bottle. An occasional shaking during an hour or two before sending out this prescription will get rid of much of the gas.

212

Rhubarb contains considerable tannic acid. If water is a part of the excipient, the pills are likely to swell on account of slow liberation of carbon dioxide. If glycerite of starch or a similar excipient is used no trouble will be experienced.

213

Although the preparation appears to be satisfactory when it is first prepared, it undergoes some decomposition within a day. Chloroform is liberated and the sodium barbital is destroyed, precipitating as barbital or some complex compound of it.

214

Chloral hydrate has a decided softening effect upon oil of theobroma. Twenty grains of chloral to a suppository represents an extremely large dosage and the only recourse one has is to make larger suppositories or make double the number, with 10 grains of chloral in each, and change the directions to two suppositories. Even with 10 grains of chloral, there is a marked softening, and some hardening agent must be added, care being taken not to add an excess and thus prevent the suppositories from melting after insertion. White wax is satisfactory, 1 grain of wax being used for each grain of chloral.

215

If the first two ingredients are dissolved in separate portions of the elixir and then mixed, a clear solution results. This, however, becomes turbid in a few minutes, and the liquid separates into two layers, the upper one having somewhat of an oily appearance. This oily liquid is chloral alcoholate, formed from the chloral hydrate and the alcohol of the elixir. Just what part the potassium bromide takes in the reaction seems not to be well understood, unless it be to render the alcoholate less soluble in the elixir. Other inorganic salts, such as sodium bromide or sodium chloride, act in a similar way. If there is not more than about 10 grains of chloral hydrate and 10 grains of potassium bromide in a dram of the solution there is but little danger of the chloral alcoholate separating. Chloral alcoholate is more soluble in alcohol than it is in water, and by the addition of a little more alcohol the separation of the two fluids can sometimes be prevented. This prescription when filled as written may be considered a dangerous one. Several cases have been reported where alarming symptoms have been caused by the taking of a teaspoonful of chloral alcoholate. On filling a similar combination, if a turbidity results the mixture should be kept until it can be determined whether there will be a separation into two layers, and if so, then remedied by adding a little alcohol or putting on a "Shake well" label.

216

Rubbing chloral hydrate and quinine sulfate together in a mortar gives a sticky mass which is insoluble in water. Rubbing them together in the presence of water gives about the same result. By dissolving the chloral and bromide in water and then adding the quinine a mixture is produced which on standing gets almost too thick to pour.

217

Chloral hydrate rubbed with acetophenetidin gives a liquid, and a sticky mass is obtained when chloral hydrate is rubbed with quinine sulfate. The acetophenetidin and quinine can be mixed and put into the capsules and then the chloral hydrate added. Absorbent powder is hardly admissible, as each capsule contains 15 grains of medicinal matter.

218

A statement has been made that a precipitate forms after standing a few hours, due to the formation of a compound and that glycerin retards, but does not prevent it. In the hands of one of the writers the prescription as written remained clear for at least a week, but the addition of 2 drams of glycerin caused a precipitate at once. Even 20 drops of glycerin gave a turbidity. Boric acid and glycerin slowly cause decomposition of the chloramine –T.

219

Chloramine –T without some binder will not make a tablet which will be hard enough to stand handling. If sugar of milk is used chloramine –T will be slowly decomposed and the tablet will become brown. A solution of soluble starch is a good binder and the chloramine –T keeps well.

220

This prescription is typical of one of two similar types of throat gargles frequently prescribed, the second type, without hydrochloric acid, being represented by the next prescription. When hydrochloric acid is included in the prescription, it is an indication that the physician wants a chlorine gargle. This is prepared by diluting the acid with a small quantity of water in a bottle, and adding the potassium chlorate, stoppering the container, and allowing the chlorine to be liberated, using a warm water bath if necessary to hasten the reaction. The balance of the water is gradually added to absorb the chlorine, and finally the tincture and the glycerin are added. This makes a bright yellow liquid containing much free chlorine.

221

This prescription differs from the previous one in not containing hydrochloric acid. It is prepared as a simple solution, producing an astringent gargle. Some operators have suggested mixing the potassium chlorate with the tincture and attempting to develop chlorine from the acidity of the tincture. This procedure, however, is not called for, and as a matter of fact the amount of chlorine which it is possible to develop under such circumstances is negligible.

222

If the ingredients are powdered separately and then mixed lightly together there probably will be no danger of explosion, and no chemical reaction will take place while the powder is dry. But when taken into the stomach the potassium chlorate with the hydrochloric acid of the gastric juice may oxidize the calomel, forming mercuric chloride. Although this may be considered a rather dangerous prescription it has been filled and taken without apparent ill effect.

223

Inasmuch as it would require an ounce of water to dissolve the potassium chlorate, this prescription is fundamentally unsound, as the physician is apparently interested in a glycerin solution. Of course hot water would dissolve the salts but they would recrystallize upon cooling. The potassium chlorate would not entirely dissolve in glycerin, and an explosion is likely to occur if these two are mixed together.

224

There is considerable danger of having a sudden production of gas in attempting to fill this, and such cases have been reported, although it has been dispensed many times. If the potassium chlorate is rubbed with the glycerin, explosion is likely to take place. Or if the chlorate be added to the solution of ferric chloride, which always contains some free hydrochloric acid, chlorine will be formed, and this may act upon the glycerin, converting it into oxalic and carbonic acids. In filling this the temperature should not go above 70° F., and then the bottle should be loosely stoppered for a time before giving to the patient. The chlorate is not entirely dissolved.

225

A clear solution was obtained which had at first a dark violet color, due to a reaction between the phenol and the iron, a reaction characteristic of this combination. The color soon changed to brown, and in a few hours a dark brown precipitate began to form. The amount of precipitate continued to increase for some time. Without the potassium chlorate, the phenol and iron chloride produce some precipitate but not nearly as much as is produced when the potassium chlorate is added.

226

There is a sufficient amount of water to dissolve the potassium salts and the solution remains clear for a time after the spirit is added. It is not long, however, before crystals begin to separate. The alcohol in the spirit throws the potassium chlorate out of solution.

227

If the directions to rub these solids together be followed, an explosion will probably result. Potassium chlorate forms an explosive mixture with either of the three other ingredients.

Each substance should be powdered separately and all mixed together lightly. Some pharmacists would decline to fill this prescription. If filled, however, the patient should be informed of the nature of the mixture and cautioned to keep it where there will be no danger of its receiving a blow between two hard surfaces.

228

Sodium bicarbonate requires 10 parts of water for solution. While there is sufficient water to dissolve the two salts and the acid, a precipitate very slowly forms after the addition of the chloroform, due, probably, to the throwing out of solution of some of the bicarbonate by the chloroform. The chloroform is not all dissolved, but sinks to the bottom. In dissolving sodium bicarbonate in water heat should not be used, because carbon dioxide is liberated, forming the normal sodium carbonate. Phenol does not liberate carbon dioxide from the sodium bicarbonate.

229

This prescription is presented to show the necessity of giving careful consideration to every prescription, no matter how simple. The physician intended chloretone and not chloroform. The chloretone was desired as a local anesthetic; the chloroform would have created great distress if applied to a burn.

230

The chondrus is precipitated by the quinine salt. Some other suspending agent should be used.

231

The chromic acid and cocaine hydrochloride were dissolved in separate portions of water, using 1 dram for each, and these solutions were mixed. A heavy yellow sticky precipitate formed which made a mass. It is necessary to use about 12 drams of water to get a clear solution, and then it may precipitate after standing for a time. Alcohol or glycerin cannot be used with chromic acid because of the danger of an explosion. The prescription cannot well be dispensed as written.

232

Chromic acid oxidizes glycerin to oxalic and carbonic acids; it oxidizes alcohol to aldehyde and acetic acid. There is great danger of causing an explosion or igniting the organic matter in filling this prescription. The reaction is very violent. The chromic acid is changed to an insoluble oxide of chromium. The prescription should not be filled.

233

Salicylic acid and resorcin dissolve in the collodion. Chrysarobin only partially dissolves and is difficult to mix with collodion after standing in the bottle for a time. It requires 16 parts of ether and 385 parts of alcohol for solution.

234

When calomel and cocaine hydrochloride are triturated together a gray mixture results. Probably a part of the calomel is reduced to metallic mercury, which gives the gray color, and another part is oxidized to mercuric chloride. As the amount of the mercuric chloride formed in each pill is within the limits of the dose of that substance, the pills may be dispensed. It would be well, however, to inquire the age of the patient and the frequency of the dose. By the addition of about 5 grains of starch or licorice root and a little water a suitable pill mass can be made, the pepsin giving sufficient adhesive qualities.

235

Cocaine hydrochloride is insoluble in ether and soluble in 3.2 parts of alcohol. As collodion is made up of 3 volumes of ether to 1 of alcohol, this salt will not dissolve in it. The free alkaloid, cocaine, is readily soluble in alcohol or ether, and consequently in collodion and this should be used.

236

Mixing a solution of silver nitrate with a solution of cocaine hydrochloride produces a white precipitate of silver chloride. If this is filtered out about one-half of the silver is removed. The pharmacist should use cocaine nitrate. If he does not have it he can make it by dissolving the 1 grain of cocaine hydrochloride in a little water and adding ½ grain of silver nitrate in a little water. This makes cocaine nitrate and silver chloride. The precipitate can then be filtered out and the requisite amount of silver nitrate added.

237

Camphor and menthol dissolve in liquid petrolatum; cocaine hydrochloride does not dissolve. The free alkaloid cocaine should be used as it is soluble in the liquid petrolatum called for.

238

Cocaine alkaloid is somewhat soluble in liquid petrolatum, requiring about 75 to 100 parts, but not in the proportion given in this prescription. The prescription was filled by dissolving the alkaloid in a little oleic acid and adding this to the liquid petrolatum, with which it makes a clear mixture. Using 45 minims of acid with a little heat gives a good preparation.

239

The codeine and also the terpin hydrate are insoluble. Codeine sulfate could be used but the codeine might be precipitated by the tannin in the wild cherry syrup. Acacia could be used to suspend the terpin hydrate, or an alcoholic vehicle might be used. The iso-alcoholic elixir of the N. F., VI, could well be used in this case as the alcohol would dissolve both the codeine and the terpin hydrate. It would also prevent the precipitation of the alkaloid by the syrup.

240

Evidently the prescriber wished to air a little of his knowledge or had some kind of an agreement with a certain pharmacist to fill his prescriptions. It is unusual to employ the chemical symbols in writing prescriptions, and it can hardly be expected that the dispenser will know and remember such complicated formulas as the first one and of a compound which is used comparatively seldom. $C_{18}H_{21}NO_3$ is codeine, KI is potassium iodide, $C_3H_8O_3$ is glycerin, and H_2O is water.

This prescription was filled by dissolving the codeine in the glycerin and part of the water. The iodide was dissolved in the remainder of the water and the two solutions mixed, without any precipitation occurring at once. After several days, however, there was a deposit of very fine crystals. Potassium iodide precipitates quite a number of the alkaloids from their solutions. This precipitation can be prevented by having a small amount of alcohol present.

241

Codeine is strongly basic and liberates ammonia from a solution of ammonium chloride. This can be proved readily by suspending wet red litmus paper in the bottle over the liquid. Codeine also liberates morphine from its salt, so that in the presence of the ammonia which is formed in this prescription there is some danger of the morphine being precipitated. A slight precipitate makes its appearance after some hours and gradually increases, but the morphine is not nearly all thrown out of solution. A salt of codeine, as the sulfate, should be used.

242

This prescription is presented as a real curiosity. Extract of cannabis and salicylic acid are commonly used with collodion to make corn remedies, although it is doubtful whether much of the cannabis is actually dissolved in the collodion. Zinc sulfate and sulfurated potash constitute the basis for a common external lotion, although water must be present to allow the reaction between the two to proceed. They are useless in this case. Oil of turpentine acts as a splendid liniment base, and finally, cocaine hydrochloride makes its appearance to help deaden the pain which this mixture would undoubtedly set up. The cocaine salt is not soluble in the collodion, and cocaine should be used under similar conditions. The prescription needs radical changes.

243

This mixture makes a solid mass which cannot be applied with a brush. A gelatinous mass which possibly might be applied with a brush is obtained when one-half of the collodion is replaced by alcohol.

244

The tincture of iodine and the collodion mix without any trouble or any reduction of the iodine even on standing for several days. If the tincture of iodine contains an iodide as the U. S. P. tincture now does, no coagulation is produced on adding ammonia water. If the tincture is a solution of iodine in alcohol without an iodide, the collodion is coagulated and on adding ammonia this goes into solution in a day or two. The ammonia changes the iodine to ammonium iodide chiefly and a small amount of ammonium iodate. When there is a deficient amount of ammonia some explosive iodide of nitrogen is likely to be formed. This prescription becomes nearly or entirely colorless in a few days.

Sometimes equal volumes of tincture of iodine, collodion, and stronger ammonia water are prescribed. In this case a coagulum is formed, but dissolves in a few hours and the solution becomes yellow by the next day. The coagulum is the gun-cotton thrown out of solution.

245

The person who wanted compressed tablets made of this composition would not get what he expected. The dichromate oxidizes the creosote and iodine, and iodine reacts with creosote. It would be difficult to tell what would be formed. There is always danger in making compressed tablets when a strong oxidizing agent is mixed with anything which can be oxidized.

246

Mixed as written the creosote separates, coming to the top on standing. If it is first cut with about 2 drams of alcohol the mixture will be much better. A good principle to follow if possible, when a volatile oil or similar liquid is to be mixed with an aqueous solution, is to add enough alcohol to the oil to cut it. Using the iso-alcoholic elixir of the National Formulary, it might be possible to prepare a satisfactory product which would not show any cloudiness or separation.

247

Creosote carbonate is immiscible with the elixir, but a presentable preparation may be had by emulsifying the creosote carbonate with acacia.

248

This prescription would be considered to be needlessly complex by many practitioners. The tartar emetic and the cupric sulfate should be dissolved in a little water, and this can be done by using the water represented in the hydrous wool fat and then using the relative amount of anhydrous wool fat later on. Part of the water may also be used to rub up the yellow oxide of mercury. The wool fat readily absorbs the aqueous mixtures. The other ingredients are mixed with the petrolatum and then the wool fat mixtures are incorporated, care being observed to keep the copper sulfate from contact with the yellow oxide as far as possible, as the latter will be reduced to mercury. A steel spatula should not be used as both the copper sulfate and the salicylic acid will react with it. The ointment is light yellow in color as it is prepared but turns gray upon standing, owing to the liberation of mercury.

249

The usual maximum dose of the fluidextract of digitalis is 2 minims, some authorities giving it as high as 3. In this prescription it is 5 minims. Taking into consideration the frequency of the dose and that digitalis is cumulative, the pharmacist might be justified in declining to fill it until he has consulted the prescriber, or ascertained that it is an urgent case. In some cases the physician wants as large a dose as this or even larger.

250

The Dobell's solution is alkaline and liberates epinephrine base which is quickly oxidized, the solution becoming reddish brown in color.

251

The compounder of this prescription stated that the mixture turned pink almost at once. Milk of magnesia is quite strongly alkaline and sets free the base adrenalin which is readily oxidized by the air in an alkaline mixture, turning pink. The immediate change in color would rather indicate that the solution used had already become partly oxidized. Adrenalin should not be dispensed in an alkaline mixture without first informing the prescriber that it is quickly rendered inert by alkalies.

252

A precipitate develops upon standing. The adrenalin is insoluble in liquid petrolatum but soluble in vegetable oils. Olive oil might be used as the diluent.

253

Silver chloride is precipitated. Adrenalin reduces silver to a metallic condition and adrenalin is oxidized. As eye solutions should be clear, if this is filtered, there will be practically nothing of value left. The prescriber should be informed of the reactions.

254

This combination has perhaps caused more trouble than almost any other one prescription. The phosphate of iron may be a double compound of sodio-ferric citro-phosphate or it may be a mixture of ferric phosphate and sodium citrate. If it is the double compound (and there are reasons for thinking that it is) the phosphoric acid decomposes it, precipitating the phosphate of iron. If it is a mixture the explanation given is that the sodium citrate is readily soluble in water and an aqueous solution of it is a good solvent for the ferric phosphate. Now when phosphoric acid is added it is supposed that the sodium citrate is decomposed, forming sodium phosphate and citric acid; the ferric phosphate, being no longer soluble in this solution, is precipitated. This difficulty can be overcome by using strictly pure dilute metaphosphoric acid (known also as glacial phosphoric acid) in place of the official orthophosphoric acid. A solution of metaphosphoric acid changes in time, forming some orthophosphoric acid, and if the meta-acid contain some of the ortho-variety a precipitation will occur. The dispenser must decide for himself as to the substitution proposed. There is sometimes, however, another difficulty present in this combination of ingredients. When quinine sulfate is present in a much larger proportion than 2 grains to the dram, a precipitation of the quinine by the ortho- or the meta-acid takes place, and there seems to be no way to make a permanent solution.

255

Soluble iron phosphate is water-soluble but insoluble in alcohol. Although part of the salt dissolves at first, it soon separates as a magma, and upon prolonged standing, a solid cake is formed. Another vehicle should be employed.

256

If an attempt is made to dissolve the soluble iron pyrophosphate and the sodium bromide together, the iron salt will not go into solution. If each salt is dissolved separately and then mixed, the resulting solution will be clear, but in a day or so it will cloud and precipitate. The sodium bromide breaks up the soluble iron pyrophosphate combination, which is explained in prescription No. 254, and the insoluble iron pyrophosphate is precipitated.

257

Pure ferric pyrophosphate is insoluble in water. The official soluble pyrophosphate of iron may be a double compound of sodio-ferric citro-pyrophosphate, or it may be a mixture of ferric pyrophosphate and sodium citrate, the former being soluble in a solution of the latter. When sulfuric acid is added to the solution of this compound or mixture the ferric pyrophosphate is precipitated, the sulfuric acid probably combining with the sodium and liberating citric acid. The quinine is not precipitated.

258

This makes a clear prescription at first, but on standing a precipitate begins to form in a few hours and continues for some time. The appearance of the precipitate is that of iron pyrophosphate. It has been suggested that potassium acetate salts out the iron pyrophosphate. Precipitation can be prevented by making the elixir slightly alkaline with ammonia.

259

This prescription represents a combination of a common gargle and a popular cold treatment item. However, the two do not go together as was expected. The solution of potassium citrate and the tincture of ferric chloride proceed to produce a green ferric citrochloride. The prescription should be filled with water and the potassium citrate solution dispensed separately.

260

In neutralizing tincture of ferric chloride by adding ammonia water to it a precipitate is formed, consisting of ferric hydroxide and basic ferric chloride. If the ammonia water is added to a part of the syrup, and then this added to the tincture of iron previously diluted with the balance of the syrup, no precipitation will occur even though an excess of ammonia is used. The resulting fluid is of a very dark red color. The syrup acts as a solvent for the ferric hydroxide. It is better to add a strong solution of ammonia than a weak one, as the water dilutes the syrup so much that it may not prevent the precipitation.

261

Again we have two popular types of prescriptions combined with disastrous results. The alkaline Dobell's solution effervesces with the tincture of ferric chloride, precipitating ferric hydroxide. Some change is necessary.

262

No matter what order is used in mixing these ingredients a clear solution cannot be obtained. Several chemical reactions are likely to take place. 1. Potassium acetate with tincture chloride of iron gives a red solution of ferric acetate. 2. Potassium acetate with a solution of quinine sulfate gives the almost insoluble quinine acetate. 3. Sodium bicarbonate precipitates morphine from a solution of its salt. 4. Sodium bicarbonate precipitates ferric hydroxide from the tincture of iron. 5. Sodium bicarbonate precipitates the quinine from a solution of the sulfate. 6. The morphine sulfate gives a blue-green solution with the tincture of iron. By replacing one-half of the water with glycerin the precipitation can be prevented to some extent.

263

In the first place, more than 4 fluid ounces of liquid is prescribed without considering the added salts and water. The ferric chloride reacts with tannins of both the tincture of belladonna and the syrup of wild cherry, producing a black color. Iodine is liberated also from the ammonium iodide.

264

Fowler's solution, if it is the old excessively alkaline variety, may precipitate basic ferric chloride from the tincture of iron, but the presence of a citrate will prevent it. Solution of iron peptomanganate contains a citrate. The ferric chloride will give a precipitate with some samples of peptomanganate, if they do not contain quite an excess of citrate. If a precipitate occurs more citrate should be added and this will also prevent the inky appearance produced by the tannin in digitalis and the iron. If tincture of iron citrochloride is used instead of the U. S. P. tincture no trouble will be experienced.

265

A bulky reddish-brown salicylate of iron is precipitated. It would be preferable to dispense the tincture of iron and the sodium salicylate, each separately.

266

The sodium phosphate gives a white gelatinous precipitate of ferric phosphate. Phosphoric acid will redissolve it but the amount of acid required is too large to use. If tincture of iron citrochloride is used in place of the U. S. P. tincture, no precipitate results on account of the citrate present. An alkali citrate in solution is a good solvent for salts of iron which are insoluble in water.

267

On mixing solutions of the first two ingredients a reaction takes place, with the formation of free iodine and a reddish-brown precipitate. The aqueous solution of iron and quinine citrate is acid, and ferric salts in acid solutions with potassium iodide are reduced to ferrous compounds, iodine being liberated. Iodine in an aqueous solution of potassium iodide is a general alkaloidal reagent and precipitates the quinine. Neutralizing the solution will prevent liberation of iodine for a time, or using the soluble iron and quinine citrate will prevent it also. The presence of a citrate retards liberation of iodine so that it is not liberated to such an extent in this prescription as it would be with ferric chloride.

268

The tincture of ferric chloride causes a gradual coagulation of the acacia. The solution may be perfectly clear when dispensed, but soon shows marked signs of fibrous filaments as the acacia is precipitated.

269

Adding the tincture to the syrup produces a gelatinous precipitate which dissolves on adding the acid. The precipitate is ferric hypophosphite which is decomposed by the phosphoric acid forming ferric phosphate and this is soluble in excess of acid. If the prescriber had used hydrochloric acid instead of the phosphoric, the precipitate would not have dissolved, the iron having a stronger affinity for the hypophosphorous acid than for hydrochloric, but less than for the phosphoric. Syrup of hypophosphites does not give a precipitate with tincture of iron citrochloride.

270

Although the Fowler's solution is alkaline, there is enough acid in the prescription to prevent any precipitation by it. The insoluble ferric phosphate or hypophosphite is thrown down. By using the tincture of iron citrochloride no precipitation results at once, but does after a day or two. If it were admissible to use twice as much phosphoric acid as tincture of iron there would be no precipitation.

271

Several reactions take place in this prescription. Syrup of ferrous iodide containing a trace of ferric iron will react with the sodium salicylate. The spirit of ethyl nitrite will also react with the sodium salicylate. Tannic acid in the syrup of wild cherry reacts with the ferrous iodide and also with the nitre, causing effervescence. The resultant mixture is almost black in color.

272

The red color of Basham's mixture is changed by the citrated caffeine, giving a greenish-yellow. The acetate and citrate of iron are both red, but many of the double salts of iron are yellow to green and there may be a double salt of citro-acetate of iron which is not as green as the citro-chloride.

273

This mixture makes a clear solution at first, but soon commences to become turbid and to give a slight deposit. This is due to the action of the ferric chloride on the cinnamic aldehyde in the oil of cinnamon which is in the water. The arsenic and quinine are not precipitated.

274

Iron cacodylate is said to be readily soluble in water. In cold water it dissolves very slowly and does not give the color it does if the water is boiling. It should be boiled with a part of the water, producing a dark red clear solution. After cooling, add the glycerophosphate dissolved in water, and filter. Great care should be taken to remove every fiber of filter paper or other insoluble matter as this is intended for intravenous injection. The ampules should be thoroughly sterilized after sealing. Sodium glycerophosphate is alkaline to litmus and iron cacodylate is acid. Sometimes the glycerophosphate is sufficiently alkaline to cause the precipitation of the iron during sterilization. The alkalinity and acidity should be determined before the solutions are mixed.

275

Filled as written there will be a purplish-brown, sticky mass of salicylate of iron and the liquid will have a purplish color. By using the tincture of iron citrochloride in place of the U. S. P. tincture a red clear solution is produced. This change should be made.

276

When the salol is added to the tincture of iron a dark green to red mixture is produced. The salol is partially dissolved, but nearly all of it is precipitated when the syrup is added. With a dilute solution of iron an alcoholic solution of salol gives a violet color.

277

The first two ingredients when mixed give a greenish-brown solution, which when diluted with water give a deep blue color and largely diluted give a violet color. On adding the sulfurous acid the color is destroyed within a few minutes. The ferric chloride is reduced to the ferrous chloride and sulfate, and a ferrous salt does not give a coloration with phenol. If the sulfurous acid is added direct to the tincture of ferric chloride a deep red solution of ferric sulfite is formed, which changes to ferrous sulfate and becomes colorless. Adding the phenol to this gives no coloration. It makes little or no difference what order is observed in filling this prescription.

278

Fowler's solution, previous to the U. S. P., XI, contained an excess of potassium carbonate. If such a solution is used for this prescription, the carbonate precipitates ferrous carbonate, which is white if purely ferrous, but quickly oxidizes, changing to a dark green. This slowly oxidizes still more, forming a red-brown basic ferric salt. Probably some of the arsenic is also precipitated. The sugar in the syrup tends to prevent the oxidation of the ferrous carbonate. An alkaline Fowler's solution should first be neutralized with diluted sulfuric or hydrochloric acid.

279

The resinous matter in the fluidextract of grindelia is precipitated by the water and clings to the sides and bottom of the container as a gummy mass. If the bottle is first coated with about 3 drams of honey, then the fluidextract and the tinctures added, and finally the sodium bromide dissolved in the peppermint water, the result is a turbid liquid, but one in which the resins do not settle out.

280

In filling this prescription there will be an effervescence, due to the generation of carbon dioxide. It is not caused by the phenol and sodium bicarbonate, as might be supposed. Glycerin in the presence of water decomposes borax forming glyceroboric acid, which in turn reacts with the sodium bicarbonate, liberating carbon dioxide. Other polyhydric alcohols, such as mannitol, dextrose, levulose, and glucose, act like glycerin in decomposing borax. [See GLYCERIN No. 1.]

281

Glycerite of boroglycerin calls for glycerinated gelatin as a suppository base. Tannic acid, however, precipitates this base and should not be used with it, but with oil of theobroma. Consequently the tannic acid and the glycerite should not be used in the same suppository prescription.

282

The trouble with this prescription is that the water breaks up the boroglycerin, liberating boric acid. Boric acid requires about 18 parts of water for solution, and there is not enough to dissolve it. By replacing one-half of the water with glycerin no precipitation results, boric acid being soluble in about 4 parts of glycerin.

283

The glycerite of boroglycerin which is called for can be mixed with the petrolatum, but it separates on standing. Using lanolin in place of petrolatum, no separation occurs.

284

Quite a precipitate is formed, due partly to inert matter being thrown out of solution by water. Part of it may be the alkaloids precipitated by the glycyrrhizin in the fluidextract or by the ammonia in it, although the ammonia content varies in different samples of fluidextract. Both ammonia and ammoniated glycyrrhizin precipitate alkaloids from solutions of their salts either as the free alkaloid or as the glycyrrhizate respectively. The tincture of cinchona contains some hydrochloric acid which may neutralize the ammonia in the fluidextract and precipitate the glycyrrhizin, although in this prescription there is probably not enough acid to cause any change. If an acid is added the alkaloids will not be precipitated but glycyrrhizic acid will be and the desired sweet taste of the licorice will be destroyed.

285

This was intended for intravenous injection. As written it should not be injected. Iodine combines with guaiacol and is decolorized. The iodides with guaiacol and water make a clear solution at first, but in a few hours precipitation commences and continues for several days. Making the solution alkaline at first prevents precipitation but it is questionable whether a good intravenous solution can be made.

286

The mercury bichloride reacts with the sodium borate. If the mercury salt is dissolved in ½ ounce of water and the glycerin added to it, and the borax is dissolved in 3 ounces of water, the solutions, when poured together, will produce a white precipitate which becomes slightly yellowish. If the two salts are added together without the glycerin, an immediate precipitation of reddish-brown mercury oxychloride takes place.

287

In filling this prescription each of the salts was dissolved in separate portions of water. The potassium iodide solution was added to the mercuric chloride solution, and at first there was a red precipitate of mercuric iodide, which was dissolved by the further addition of the potassium iodide, forming the soluble potassium mercuric iodide. On the addition of the ammonium carbonate solution to this no change of any kind was noticed. However, when the ammonium carbonate solution was added to the mercuric chloride solution a white precipitate of ammoniated mercury was formed. On adding the potassium iodide solution to this mixture the precipitate disappeared and a clear nearly colorless solution was produced. Probably the ammoniated mercury was decomposed and the soluble double compound of potassium mercuric iodide was formed.

288

The mercuric chloride destroys the color of the methylene blue. As the latter probably is used only as a dye, it may be replaced with indigo carmine which is permanent.

289

The quinine sulfate was dissolved in the tincture of iron with the hydrobromic acid and then an aqueous solution of the corrosive sublimate added. A precipitation commenced at once and continued for some time. Mercuric chloride is a general alkaloidal reagent, and so also is the double compound that it forms with the hydrobromic acid; these combine with the quinine to form insoluble compounds. In such a prescription as this the danger lies, not in the precipitation of the quinine, but of the mercuric chloride, and in this particular instance it is almost entirely thrown out of solution. This prescription might be considered dangerous to dispense.

290

Fowler's solution of the U. S. P., XI, is barely alkaline to litmus whereas in previous editions of the U. S. P. it contained a large excess of potassium carbonate. If the latter type of solution is used in this prescription there will be several possible reactions when the first two ingredients are mixed, depending upon the proportions. A mercuric oxychloride is formed by the carbonate of potassium in the Fowler's solution. Under certain circumstances mercuric arsenite is formed and is dissolved in a solution of potassium arsenite. In the presence of an alkali, arsenites reduce mercuric compounds to mercurous compounds and then to metallic mercury, and the arsenites are oxidized to arsenates. In this prescription a pinkish-white precipitate is first formed, consisting of calomel and the coloring matter of Fowler's solution. On further standing it turns dark, due to the reduction to metallic mercury. Fowler's solution added to the quinine sulfate liberates the free alkaloid. Using the U. S. P., XI, Fowler's solution or using the solution of arsenous acid instead of potassium arsenite there would have been no reduction and but little precipitation. Fowler's solution in the U. S. P., XI, also does not contain any coloring, it being eliminated because of the annoyance it caused with precipitation such as is observed here.

291

Several reactions are possible. 1. Corrosive sublimate precipitates the strychnine nitrate as a double compound. 2. With an alkaline Fowler's solution as described in the previous prescription the mercury may first be precipitated as the basic chloride by the carbonate and later reduced to a mercurous salt and metallic mercury by the arsenite, the arsenite being changed to an arsenate. 3. Mercuric chloride gives a precipitate with pepsin. 4. It is reduced to mercurous compound and then metallic mercury by the hypophosphites. 5. Strychnine alkaloid is liberated from the nitrate by the carbonate in Fowler's solution. 6. Potassium carbonate in Fowler's solution will give off carbon dioxide with hydrochloric acid in essence of pepsin and if it were in excess would render the pepsin inert. There is enough of acid present to prevent this. 7. Fowler's solution if sufficiently alkaline will precipitate many of the ingredients in the syrup. This prescription can be filled without danger by first dissolving the corrosive sublimate in a little water, the strychnine nitrate in another portion of water; to most of the syrup add the essence and then the Fowler's solution previously neutralized, then the solution of strychnine and lastly the solution of mercury. The above comments are based on a Fowler's solution of the U. S. P., X, or previous. The solution of the U. S. P., XI, would eliminate most of the trouble.

292

The mercuric chloride precipitates the strychnine sulfate as a double compound, which is soluble in a fairly strong alcohol, less soluble in the presence of hydrochloric acid. This prescription deposits a precipitate of long needle-shaped crystals on standing a few hours, but not immediately on filling. If the first ingredient is omitted no precipitation takes place within at least twenty-four hours, although there is danger of precipitation after the patient has received it. The addition of a few drops of hydrochloric acid quickly brings it down. If the mercuric chloride be omitted there will be but little danger of precipitation. This prescription as written should not be filled, because of the precipitation of strychnine and also because of the large dose of strychnine.

293

The mercuric chloride and ferrous iodide react to form mercuric iodide and ferrous chloride. The insoluble red iodide of mercury thus formed is redissolved in the excess of ferrous iodide. Creosote is only slightly soluble in water. In this case there is an excess of creosote, and it forms an oily layer on top unless it is emulsified. Occasionally the solution of ammonium acetate is alkaline, and in such a case it might give a precipitate with the mercuric chloride, forming ammoniated mercury, and with the ferrous iodide, forming ferrous carbonate. A "Shake well" label should be used.

294

This mixture if kept perfectly dry will not change in color, but potassium bromide is hygroscopic and absorbs moisture in sufficient amount to enable a reaction to take place between it and the calomel, or the lactose and the calomel, forming a mercuric compound and metallic mercury, the latter giving the dark color. Theoretically one-half of the calomel is required to form a mercuric salt, and if this is really so there would be about ¾ grain to the dose, which would be dangerous.

295

On triturating these two substances together the mixture becomes black. Ammonium carbonate acts like ammonium hydroxide, forming metallic mercury and a mercuric salt. [See HYDRARGYRI CHLORIDUM MITE, No. 3.] If all the calomel is thus decomposed there would be over 6 grains of the mercuric compound and the amount taken in one capsule would be a dangerous dose.

296

Reaction takes place between the calcium hydroxide and the mercurous chloride, forming calcium chloride and the black, insoluble mercurous oxide. This is similar to the "black wash" of the National Formulary.

297

If these three ingredients are mixed in the absence of moisture no change in appearance is noticeable. In the presence of moisture the mixture at once begins to turn gray. This is due to the formation of metallic mercury and mercurous oxide, while at the same time some mercuric chloride is formed. The sodium bicarbonate seems to play some part in the reaction since calomel and antipyrine with water do not readily darken. This might be considered a rather dangerous prescription, but probably not enough of the mercuric salt is formed to cause dangerous symptoms.

298

Sodium iodide decomposes mercurous iodide, making metallic mercury and mercuric iodide, the latter combining with the excess of sodium to make soluble sodium mercuric iodide. The amount formed here still would be within safe limits.

299

The three ingredients finely powdered were mixed together, making a dry powder. This was dampened with water and pressed into the mold. The tablets were put into a warm place to dry. In air at ordinary temperature the tablets became soft and wet. The first two ingredients united to make potassium mercuric iodide. What part the carbonate played was not determined, but it evidently had some effect. The use of alcohol as a dampening agent overcame the trouble. Potassium iodide is quite deliquescent in moist air. Pills containing mercuric iodide and potassium iodide may give similar trouble. If such pills or tablets are to be sugar coated, a sub-coating of shellac or similar resinous substance is necessary.

300

This mixture is said to be irritating to the eye due to the reaction between the cocaine hydrochloride and mercuric oxide, forming cocaine and mercuric chloride, the latter being the agent that causes the irritation. A soluble mercuric salt is formed. The trouble was prevented by using the free cocaine in a portion of warmed petrolatum.

301

If the zinc sulfate is dissolved in water, glycerin added and then the ichthyol, a nearly black mass is formed which sticks to the bottle and cannot be shaken up. It is zinc ichthyolsulfonate. If ichthyol and glycerin are mixed in a mortar, then the zinc sulfate added and thoroughly mixed, then a little water and the balance of water in portions, the precipitate separates quickly and after standing forms masses. However, if to the mixture of ichthyol and glycerin, 15 grains of powdered acacia are added, then the zinc sulfate and lastly the water in portions, rubbing well after each addition, the precipitate remains suspended for some time and can be shaken up more easily.

302

Both the magnesium carbonate and the lime water react with the ichthyol, liberating ammonia. The physician should be notified and the ichthyol prescribed in another manner.

303

Although this ointment is brown at first it becomes blue and then greenish-black, due to reaction between the ichthyol and iodine.

304

If the ichthyol and the salicylic acid are mixed together they will combine to form ammonium salicylate and ichthyol sulfonic acid. However, if each is mixed with a separate portion of petrolatum and then mixed, there will be no reaction.

305

Ichthyol when rubbed with ammonium chloride makes a mass resembling a pill mass and gas is slowly evolved, the mixture remaining neutral to litmus. On adding the phenol, the mass softens and mixes readily with the wool fat. Crystallized phenol when rubbed with ichthyol makes it thinner. This should be filled by mixing the ammonium chloride with wool fat, then adding phenol and lastly the ichthyol.

306

Ichthyol gives sticky precipitates with most alkaloids. In this prescription as ordinarily filled the precipitate sticks to the bottle. The ichthyol, quinine and resorcin with about 20 grains of powdered acacia should be rubbed in a mortar, then a little water added in portions, stirring well after each addition. Filled in this way the precipitate remains suspended for some time and can be shaken up.

307

Ichthyol contains about 50 per cent water, enough so that capsules will be softened if not dissolved. It has been suggested to swab the inside of the capsules with a fixed oil before putting in the ichthyol, but this is not always satisfactory in preventing the trouble. The ichthyol can be evaporated somewhat and then a drying powder added to make a stiff mass.

308

Iodoform has a very penetrating and disagreeable odor. The oil of neroli in this prescription serves quite satisfactorily in covering the persistent odor, and this principle can often be made use of in prescriptions.

309

Iodoform dissolves rather slowly in ether and the solution generally gets brown-red in a few minutes, deepening on standing. Iodine is liberated. Iodoform dissolves less readily in liquid petrolatum, but this solution slowly acquires a red color and liberates iodine.

310

So long as this mixture is kept from the light it does not change in color, but on exposure to direct sunlight for a few hours, or to diffused light for a longer period, it acquires a red color. This is due to the decomposition of iodoform, liberating iodine, and the iodine combines with and oxidizes the calomel, forming mercuric iodide.

311

No change is noticed in the appearance of this mixture on standing unless exposed to sunlight, when it becomes a dirty gray. The odor is still prominent at the end of a month. According to the U. S. D. the odor of the iodoform slowly diminishes, due to the decomposition caused by the tannic acid.

312

One gram of iodine is soluble in about 12.5 cc. of alcohol. As much of the iodine as possible was dissolved in the alcohol and then the camphor dissolved in this. This solution was then gradually added to the mercurial ointment with constant trituration and the water was added last. On standing a few minutes a red precipitate was formed and the mixture separated into three layers. In the bottom was the red precipitate, probably mercuric iodide; then a layer of fatty matter, and on top a hydro-alcoholic fluid containing free iodine. This mixture was such that it could be shaken up and applied. On the third day the red precipitate had disappeared, leaving the yellow fatty matter and a fluid somewhat red and containing a little free iodine. Seven days later the liquid was yellowish-brown and contained only a trace of iodine. Part of the iodine probably combined with the mercury to form mercuric iodide, and part was probably reduced to a soluble iodide, which dissolved the mercuric iodide. Another part of the iodine probably combined with some of the camphor and fatty matter. Although the activity of the iodine is very much diminished the mixture is decidedly active on account of the mercuric salt formed.

313

By mixing these ingredients a bright red precipitate is formed in a few minutes and the iodine color of the liquid is nearly destroyed. After a day or two there is no free iodine present. Probably three chemical reactions take place. The mercurous chloride and potassium iodide in the tincture form potassium mercuric iodide, potassium chloride, and metallic mercury. The metallic mercury with the iodine forms mercurous iodide, and this with more iodine makes the red mercuric iodide. The final products depend to some extent upon the proportion of the tincture to the calomel.

314

The color of this mixture is red at first, owing to the free iodine. The iodine soon combines with the soap liniment, a yellow liquid resulting. It may be a combination with the alkali or it may combine with any free acid in the soap to form an addition product.

315

The arsenite in an alkaline Fowler's solution, such as that of the U. S. P., X, reduces the iodine to an iodide while the arsenite becomes an arsenate. About one-eighth of the iodine is reduced. Iodoform might be produced on heating the mixture, but no odor of it is noticeable in the cold The Fowler's solution of the U. S. P., XI, is not excessively alkaline.

316

This mixture on standing separates into two layers, the oil coming to the top. Part of the iodine combines with the oil, but not all. Probably some other oil, less offensive in odor than cod liver, might have been used by the physician with equal advantage.

317

This is a well-known prescription of a "T. B." specialist. There are two methods of preparing the prescription. The first method consists of dissolving the iodine in the volatile oils and adding the olive oil and wool fat. The solution is red, and there is free iodine which is irritating, so that this method should not be used. The second and proper method consists of dissolving the iodine in the olive oil and adding the wool fat and volatile oils. The iodine combines with the olive oil as an addition product and thus is not irritating. In the first method, the iodine finally combines with the olive oil, but it takes time.

318

In making ointments the medicinal ingredients must be in the form of a fine powder, soft solid, or solution. Iodine is powdered with difficulty. It might be dissolved in alcohol and this solution added to the lard, but by dissolving it in a glycerin solution of potassium iodide, using equal amounts of potassium iodide and iodine and three times as much glycerin as iodide a better preparation would be made.

319

By using the water represented in the lanolin, the potassium iodide and iodine can be dissolved. Then the adjusted quantity of wool fat is added, together with the olive oil. The prescription will be cloudy, and as it stands, the iodine will be absorbed by the olive oil. A better-looking product, yielding the same results, would be obtained if the potassium iodide and the water were entirely eliminated.

320

Iodine with cocaine hydrochloride makes a compound which is insoluble in water or glycerin, although glycerin holds it in suspension. It is doubtful if this compound has much anesthetic effect and the suggestion should be made that separate solutions would be more effective.

321

The ammonium carbonate and the lime water produce a precipitate of calcium carbonate and liberate ammonia. The menthol and the phenol unite to separate into a layer at the top of the container. The phenol layer turns lavender in color, and the whole liquid develops a bluish cast within a few days.

322

The order of mixing these ingredients makes a difference in the products first formed, but after standing the results are probably similar. If the solution of zinc chloride and the lime water are mixed a white precipitate of zinc hydroxide is formed, and there is no change in appearance on adding the mercuric chloride dissolved in the water.

If, however, the mercuric chloride solution is added to the lime water the yellow oxide of mercury (yellow wash) is precipitated. On adding the zinc chloride solution and allowing it to stand the precipitate is changed within two hours from a dense yellow to a flocculent white precipitate.

If lime water is added to the solution of mercuric chloride a red-brown precipitate of oxychloride of mercury is formed, and this is replaced by a white precipitate when the zinc chloride is added.

That the lime water precipitates nearly all of the mercuric chloride when these two chemicals are brought together in the above proportions, is evidenced by taking some of the clear supernatant liquid and passing hydrogen sulfide gas through it and getting little or no black precipitate of mercuric sulfide. If some of the clear solution is taken after the zinc chloride has been added and the yellow precipitate turned white, and this solution is treated with hydrogen sulphide, a heavy black precipitate of mercuric sulfide is produced, showing that the mercuric oxide has been dissolved and the zinc precipitated. Owing to the fact that the mercury is in solution, this prescription might be dangerous if applied in large amounts to an abraded surface, since if all of the mercury is redissolved it will be in the proportion of about 1 to 500.

323

Alkali soaps are water-soluble and produce oil-in-water emulsions. Metallic soaps are oil-soluble and produce water-in-oil emulsions. In this prescription, the olive oil unites with the calcium hydroxide to form the metallic calcium oleate which in turn produces a water-in-oil emulsion. When the oil and the lime water are present in equal proportions, or where the oil is in excess, the emulsion is readily formed, providing there are no interfering substances. Where the lime water becomes excessive, it is difficult to prepare a good emulsion. In this prescription the calamine and the zinc oxide favor the emulsion as they too form a metallic soap, zinc oleate. As a matter of fact, there is really too much emulsifying agent in this case as the finished preparation is a paste rather than a liquid. Lesser quantities of the calamine and zinc oxide would produce thinner emulsions. Very often the portions of oil and lime water are not satisfactory or there may be interfering substances which tend to break the emulsion, usually by destroying the soap. Under such conditions the lotion must be prepared in some other manner. Additional prescriptions of this general class follow. [See LIQUOR CALCII HYDROXIDI.]

324

The ratio of olive oil to lime water is too low to prepare a satisfactory lotion of the water-in-oil type, although in general appearance the prescription would seem to be satisfactory. However, when the lotion is applied, the excess of water separates quite noticeably. This is the type of prescription in which it is well to reverse the phase system by replacing the lime water with water and using an alkali soap (external preparation), emulsifying the oil in the water. The following procedure gives a smooth uniform product which may be applied without any signs of separation. Mix about 3 drams of liniment of soft soap, which is a very convenient preparation of soap to use in such cases, with 3 ounces of water in a bottle, add the oil, and emulsify it by agitation. Mix the calamine in a bottle with 2 ounces of water; to this mixture add the emulsion, and shake thoroughly. Finally add the solution of coal tar and additional water as required. It is necessary to keep the calamine and the oil solutions diluted as much as possible to prevent the formation of a metallic soap which in turn favors a water-in-oil emulsion, the two systems then combating each other for supremacy. [See LIQUOR CALCII HYDROXIDI.]

325

Without the boric acid, this prescription makes a smooth creamy lotion of the water-in-oil emulsion type. When the boric acid is added, it breaks the emulsion by destroying the lime and zinc soaps. For a satisfactory product it is necessary to supply additional emulsifying agent to counteract the action of the boric acid. The use of several drams of oleic acid and a half dram of calcium hydroxide powder produces additional calcium oleate without changing the intended nature of the prescription, and results in a uniform, creamy lotion. The wool fat in this prescription is also an emulsifying agent of the water-in-oil type, but even its presence is not sufficient to ward off the action of the boric acid. [See LIQUOR CALCII HYDROXIDI.]

326

One might expect that the over-balance of the aqueous phase of this mixture as compared to the oily phase would present a problem in emulsification. The relatively large amount of magnesium carbonate, which is quite bulky, solves any question, however, as the finished prescription presents a white creamy suspension which can be applied readily with entire satisfaction.

327

The phenol, the salicylic acid, and the resorcin are all antagonistic to the emulsion formed by the olive oil and lime water, seriously breaking it. It is necessary to add additional emulsifying agent, consisting of oleic acid and calcium hydroxide, to counteract the action of the troublesome ingredients, in order to obtain emulsification of the water in the oil.

328

Here again is an illustration of an olive oil-lime water mixture with a large excess of the aqueous phase. The prescription also contains tragacanth which swells up with water to produce a mucilage. Tragacanth favors emulsions of the oil-in-water type so that under certain conditions it is antagonistic to the olive oil-lime water mixture. It would be possible in this case, and also in others, to add enough tragacanth to thicken the aqueous phase to such an extent that the small portion of emulsion would be suspended in the tragacanth mucilage. Such combinations are exceedingly thick, however, and do not spread well when applied. In this prescription it is best to omit the lime water and reverse the emulsion phase, by using liniment of soft soap to emulsify the oil, adding the emulsion to a mixture of the tragacanth, zinc oxide, calamine, glycerin, and about 150 cc. of water. A light pink creamy lotion results.

329

The first two ingredients are both disinfectants and oxidizing agents, yet they react on each other, with the reduction of both. The chemical reaction is represented by the following equation:

$$2KMnO_4+5H_2O_2+3H_2SO_4 \\ =5O_2+8H_2O+K_2SO_4+2MnSO_4.$$

The acid necessary for the reaction is usually present in the hydrogen peroxide, as a small amount is allowed to remain for preservation of the peroxide. The amount of hydrogen peroxide which 20 grains of potassium permanganate would act upon is 10.7 grains. If the hydrogen peroxide is official, 1 fluid ounce contains about 13.7 grains of hydrogen peroxide, which would be sufficient to reduce all of the permanganate. Usually there will be a precipitate of manganese dioxide, there not being enough acid to convert all into a salt. By adding a grain or two of sodium bicarbonate to neutralize the acid some of the change can be prevented.

330

Bismuth subsalicylate is white, insoluble in the solution and remains suspended for a few minutes. The insoluble matter turns yellow in a few hours, and yellow-brown in a few days, continuing to get darker. Some gas is slowly evolved, probably due to the reaction between the hydrogen peroxide and tannic acid.

331

This mixture gave a nearly black precipitate and a brown-black liquid. Several experiments were made to determine what agents caused the change. The hydrogen peroxide, glycerin, and water showed no change on standing several days but when a mixture of these contained zinc sulfate it acquired a yellow to a yellow-brown color and became turbid after some time. A mixture of phenol, hydrogen peroxide, water, and zinc sulfate began to color in a few minutes, getting brown-black by the next morning. A precipitate formed and increased on standing. Hydrogen peroxide is said to oxidize phenol to pyrocatechin and hydroquinone and to oxidize glycerin to glyceric, oxalic, and tartaric acids. Just what part the zinc sulfate played in this prescription was not determined. It perhaps acted only as a carrier or perhaps as a decomposer of the hydrogen peroxide.

332

Dissolving zinc phenolsulfonate in diluted solution of lead subacetate gives a white precipitate. A nearly clear solution can be obtained by dissolving the salt in an ounce of water, adding 2 drams of glycerin and then adding a mixture of the balance of the water and solution of lead subacetate corresponding with the amount of dilute solution which the prescription calls for.

333

A precipitate of lead sulfate is produced. Since this will materially change the character of the prescription the physician should be consulted.

334

A sticky mass of lead oleate is formed which adheres to the bottle and cannot be shaken up. There seems to be no way to overcome the difficulty, and the prescriber should be asked to change the prescription.

335

Phenol with lead subacetate forms a very soft, sticky white mass, soluble in alcohol. If glycerin is added to the phenol to make a 10 per cent solution, the lead subacetate solution may then be added without any further change.

336

Most of the medicinal matter will be thrown out of solution. The possible reactions are as follows: Tannin gives the insoluble compounds of mercuric tannate, morphine tannate, and lead tannate; mercuric chloride with lead subacetate gives the sparingly soluble lead chloride; morphine sulfate with solution of lead subacetate gives the insoluble free alkaloid and also lead sulfate. Glycerin will keep the precipitates suspended.

337

On adding olive oil to solution of lead subacetate a very thick liquid results, making a good emulsion. The addition of phenol dissolved in glycerin causes no apparent change. If the glycerin solution of phenol is added to the solution of lead subacetate, white masses are formed and stick to the bottle. Adding the oil and shaking vigorously breaks up the masses somewhat but does not give as good a mixture as when filled by the first method.

338

If the lime water is added to the solution of lead subacetate the lead is partially precipitated as lead hydroxide, the amount increasing on standing. By adding the glycerin to the lead solution first, the lime water causes no precipitation. The zinc oxide is insoluble and quickly settles to the bottom.

339

This is a very common combination. Lead subacetate forms compounds with nearly all alkaloids, and these are insoluble in water. The opium alkaloids are no exceptions. The alcohol undoubtedly tends to prevent the precipitation to some extent, though there is still quite a heavy one. The lead is also precipitated by the meconic and sulfuric acids in the opium. The precipitate should not be filtered out, but the mixture should be dispensed with a "Shake well" label.

340

Sodium phosphate precipitates a solution of lithium bromide as lithium phosphate. There is more sodium phosphate than the water will dissolve. Heat should not be used to aid the solution, since on cooling large crystals will form. The phosphate should be powdered and the cold water allowed to dissolve what it will. Even then the part left undissolved may form a crystalline mass that can be gotten out of the bottle only by heating.

341

A yellowish-green color is produced and the preparation thickens immediately. The color soon disappears, and the product solidifies in a rather granular or lumpy form. The color is due to a reaction between the oil of clove and the magnesium hydroxide, a reaction of the oil with any alkali. The solidification is apparently due to the formation of a basic magnesium salicylate which is insoluble. By using some glycerin the preparation does not become quite so solid although it is still rather granular.

342

Insoluble magnesium phosphate is formed and the preparation sets to a jell. This heavy jell can be broken up with a rod and reliquefied, after which it remains in a liquid form.

343

One might expect to have trouble with this mixture, but the milk of magnesia and the liquid petrolatum produce a good emulsion with simple agitation, the mixture remaining permanent for some time.

344

The magnesium oxide takes up water to form magnesium hydroxide which is so bulky that the prescription becomes solid. At the same time the ammonium bromide in the elixir is decomposed, liberating ammonia.

345

Magnesium oxide in aqueous solution unites with water to make the bulky magnesium hydroxide. In this prescription, the sodium bicarbonate also plays a part and the precipitate is probably a basic magnesium carbonate with possibly also some magnesium hydroxide. Some magnesium carbonate is also formed as crystals of it separate from the clear liquid above. As the reaction goes on the product first becomes heavy, but upon standing for twelve hours the insoluble portion sets, becoming so firm that it is almost impossible to break it up even with a glass rod.

346

Magnesium sulfate was dissolved in water and the other ingredients added, making a nearly clear solution. Crystallization of magnesium sulfate soon began and ultimately the bottle was over half full of crystals. The alcohol of the spirit and tincture caused the separation. The prescription was dispensed by making up to 8 ounces with water and doubling the dose. This additional water dissolves the crystals.

347

In this mixture the menthol floats on top and a part of the boric acid goes to the bottom. Using alcohol, glycerin, or a fixed oil instead of water will not make a clear solution. The attention of the physician should be called to this prescription, as it is almost impossible to use menthol in an aqueous solution.

348

Mercurochrome is not compatible with acids, acid salts, or alkaloids. There is an immediate precipitation, most of the color being removed from the solution. These items should not be used together.

349

The mercurochrome is destroyed by the salicylic acid and should not be prescribed with it. The ointment develops an orange cast.

350

If aspirin and methenamine are rubbed together, a damp powder is first formed changing in a few days to a greenish-yellow mass. Mixing them lightly with some starch will lessen the trouble.

351

Methenamine is slowly decomposed by acids into formaldehyde and an ammonium salt. The sodium biphosphate is acid and is used to render the urine more acid, as the methenamine is effective only in acid urine. The prescriber might get better results by giving the sodium salt an hour or two before giving the methenamine.

352

If the sulfate of iron is strictly ferrous, no liberation of iodine takes place when a solution of potassium iodide is added to it, but most of it contains some ferric salt which liberates iodine. If the morphine is now added it will be precipitated by the iodine. The solution of ferrous sulfate gradually deposits a precipitate of subsulfate of iron. Or if the solution of ferrous sulfate and the morphine are mixed before adding the potassium iodide, no free iodine is formed, the morphine seeming to reduce the ferric sulfate to ferrous.

353

The glycerin was added to the tincture of myrrh, then the solution of potassium chlorate in small amounts with continued shaking, and the tincture of iron last. Tincture of iron gives a dark green-brown color with tincture of myrrh. Water precipitates the resinous matter from the tincture of myrrh, and it forms in masses that cannot be evenly suspended. It seems to make but little difference whether the alcoholic mixture is added to the aqueous or the aqueous to the alcoholic. By using honey instead of glycerin the resin is separated, but does not form masses, consequently it can be distributed evenly through the liquid.

354

The castor oil is alcohol-soluble but insoluble in water. The two acids are also practically insoluble in water. To prepare a clear solution in this prescription it would be necessary to replace all the camphor water with alcohol. At times, prescriptions of this sort are found where the castor oil and other alcohol-soluble substances can be dissolved in the alcohol, and the aqueous liquid added slowly and carefully without any precipitation. It is entirely a matter of concentrations, of course.

355

Castor oil and nearly all other fixed oils do not make clear solutions with glycerin. A "Shake well" label is necessary for this prescription. The oil need not be emulsified, as the two liquids are thick and do not separate quickly.

356

Shaking the solution of potassium hydroxide with the olive oil gives a white emulsion; some soap is formed in the reaction and this acts as an emulsifying agent. The compound iodine solution added to this gives a red-brown mixture, which slowly loses its color, becoming white within a few hours. The iodine is partly changed by the alkali, forming an iodide and an iodate. Part of the iodine combines with the oil to form a nearly colorless compound in which two atoms of the iodine are combined with one molecule of olive oil.

357

This is another case of a prescription calling for careful consideration on the part of the dispenser. The prescriber meant to use expressed oil of almond but wrote for the bitter volatile oil instead.

358

The powder becomes green. It is due to a reaction between the phenol and the oil of peppermint and develops at once if these two items are mixed together directly. The color develops in several days under any conditions.

359

Filled as directed this prescription gives a nearly colorless mixture which does not give a test for free iodine. On standing, two layers are formed, the upper being about one-third of the volume of the lower. The upper layer consists chiefly of turpentine, while the lower consists of the alcohol containing some oil of turpentine and an iodide of mercury. Leaving out either the turpentine or mercuric chloride, the iodine is not all reduced. If the mercuric chloride is left out the lower layer is smaller in volume and is nearly colorless, while the upper one is chiefly alcohol containing free iodine. The turpentine is the principal factor in reducing the iodine. The mercuric chloride perhaps acts as a carrier or acts by breaking up the compound which iodine forms with the oil, thereby allowing the oil to combine with more iodine.

360

If these ingredients are mixed together and allowed to stand the oil of turpentine will rise to the top. The oil should first be emulsified with the syrup and about 45 grains of acacia and then the other liquids added. When water is added to paregoric the oil of anise and the benzoic acid are precipitated, but these would be held in suspension by the emulsion.

361

Oil of turpentine will dissolve rosin and camphor, but not alum or borax. If water were present borax and alum would react, but not in this mixture. A "Shake well" label must be put on, and even then the salts settle so quickly that an even dose is difficult to get. This is a veterinary prescription.

362

Sodium bromide on being exposed to the air attracts moisture. Pepsin is somewhat hygroscopic if contaminated with peptones. Pepsin is rendered inert by alkalies, as sodium bicarbonate.

363

By triturating the zinc oxide and carbonate with the petrolatum, and then adding the lime water gradually, a partial emulsion can be effected. Petrolatum is not saponified or otherwise chemically acted upon by calcium hydroxide or other hydroxides, as are the organic fixed oils and fatty substances. The best way to fill this prescription is to replace about one-half of the petrolatum with anhydrous wool fat, mix the water with this, then the oxide and carbonate, and lastly the petrolatum.

364

Menthol, chloroform, and liquid petrolatum make a clear mixture, but on shaking the mixture with the tincture it is made turbid and on standing separates into two layers. The upper one is nearly clear and colorless and the lower one is red and of small volume. Alcohol and the petrolatum oil do not remain mixed.

365

Phenobarbital is not soluble in water. It should be dispensed with alcoholic vehicles, the iso-alcoholic elixir of the N. F., VI, for instance, making it possible to obtain a clear and permanent solution with large or small doses. The potassium bromide, however, is not very soluble in alcohol, and the amount present in this prescription is too great to maintain both items in solution. The sodium salt of phenobarbital is water-soluble but not permanent in such a solution. For small quantities, to be used within a short time, it would be satisfactory.

366

This prescription becomes cloudy at once. The acid of the elixir decomposes the sodium phenobarbital, liberating phenobarbital, which is insoluble in the liquid. There is probably also some precipitation of material from the digitalis. The sodium phenobarbital might be dispensed in another vehicle provided it is to be used within a short time, since it is not stable in aqueous solutions for very long. Phenobarbital itself might be used with an alcoholic vehicle of proper strength.

367

Water can be added to phenol, forming a clear solution as exemplified in the case of liquefied phenol, where 10 per cent of water keeps the phenol in a liquid state. On adding more water the phenol separates as an oily liquid, going to the bottom. When water has been added so that the proportion is about 1 part of phenol to 15 parts of water, a clear solution again results, this being a straight case of solubility. In this prescription there will be a layer of liquefied phenol in the bottom of the bottle. If the brush should remain in the bottle between the periods of using it, there is danger that it will become saturated with the strong acid and that the patient will apply it in this condition. By the use of an equal quantity of glycerin added to the phenol a clear solution can be made, and this is what the dispenser should use. Many pharmacists automatically add glycerin to phenol in every case in order to be on the safe side and prevent subsequent separation.

368

Phenol when triturated with lead acetate or with thymol gives a liquid, and the reaction cannot be prevented by first mixing the ingredients with separate portions of the base and then rubbing these together. Both phenol and thymol soften the oil when rubbed with it. The mass is too soft to make into suppositories, and it is necessary to use some drying powder, white wax, or spermaceti to stiffen it.

369

The preparation is cloudy, and upon standing it separates into two layers, an upper oily layer consisting of the combined phenol, camphor, and thymol. It is not satisfactory to dispense.

370

The dispenser in commenting on this prescription said that phenol and the cocaine solution gave a precipitate which was dissolved by the glycerin. The trouble between the solution and the phenol is not on account of the cocaine but the water. Water and phenol in equal proportions make a turbid mixture which separates into two layers. Glycerin is a good solvent for phenol, and water does not cause its separation. This prescription makes a clear solution.

371

From a therapeutic standpoint this would look like a good combination for some cases, but is objectionable because of its color. Phenolphthalein is not soluble in water, but it combines with magnesium hydroxide and gives a dark red mixture. If the two ingredients are mixed the color deepens slowly, taking several hours for completion. If the phenolphthalein is first dissolved in a little alcohol, the maximum color is produced at once.

372

The salol is insoluble in the mixture and the prescription lacks the necessary body to give even temporary suspension or uniformity. By adding about one-half dram of tragacanth the salol is suspended sufficiently to make a presentable mixture. Another common method of procedure in such cases is to dissolve the salol in a small quantity of olive oil and then emulsify the mixture.

373

Dissolving the phenyl salicylate in 1 dram of oil makes a mixture which holds up fairly well, but it would be far better to first emulsify the salol and oil solution and then add the other ingredients.

374

Salol dissolves in the mixture of oils. A mass can be made with a drying powder, but it is preferable to use no drying powder. The capsules must be sealed. This can be done by swabbing the inside of the cap with a damp wad of absorbent cotton on a match. Or the caps when taken off can be placed on end on a filter paper wet with a mixture of equal volumes of water and alcohol. After the cap is put on, the capsule should be left standing on end until dry. Care should be used not to wet the cap too much or the capsule will be distorted. On the other hand the capsule must be completely sealed or there will be a leakage. Soft elastic capsules might be used, of course.

375

Salol and thymol triturated together make a liquid. When the other ingredients are added the mass is still much too soft to be made into pills. If a sufficient amount of licorice root is added to make the mass of the required consistency the pills are too large to be taken easily, and if dispensed as pills the number and the dose should be doubled. This prescription can best be dispensed in capsules. The oily liquid does not dissolve gelatin, the mass can be much softer and smaller than if pills are made, and generally a larger capsule can be taken than a pill.

376

Salol rubbed with antipyrine makes a mass. Aspirin rubbed with either salol or antipyrine does not become sticky. This prescription can be filled without trouble by powdering the salol alone and the other ingredients together, then mixing the salol and a little drying powder (starch because it is white) with a spatula on a pill tile.

377

The difficulty in this prescription is to get the phosphorus evenly divided and to keep it from being oxidized itself and destroying the other ingredients. The best solvent for phosphorus is carbon disulfide, in which it dissolves in its own weight. A piece approximately the weight wanted is weighed under water, as it takes fire quickly when exposed to air. It is quickly dried and dissolved in carbon disulfide. A sufficient amount of this solution is taken to get the right amount of phosphorus. The other ingredients are massed with glucose and water and the solution of phosphorus added and thoroughly mixed. Carbon disulfide is soon volatilized and the phosphorus is so finely divided and separated that it will not ignite.

378

In the presence of moisture this mixture becomes black. The pilocarpine hydrochloride breaks up the calomel, forming mercuric chloride, which combines with the alkaloidal salt, and metallic mercury, which gives the mixture its dark color. Several of the alkaloids have that property. The amount of mercuric salt formed is so small that the prescription can be filled without much danger.

379

The pilocarpine differs from many alkaloids in that it is soluble in water. The hydrochloride is used much more frequently than the free alkaloid. The terpin hydrate requires about 200 parts of water for solution; consequently only a small portion of it will be dissolved. A clear solution can be prepared by using the proper concentration of iso-alcoholic elixir of the N. F., VI.

380

Although a clear solution is produced at first, within a few minutes a crystalline precipitate begins to form. Piperazine is quite strongly alkaline and causes a precipitation of the strychnine. As written this should be considered a dangerous combination. The difficulty can be remedied by neutralizing the piperazine solution with diluted sulfuric acid.

381

There is a difference of opinion as to how this prescription should be prepared. In one locality it is used by a number of dermatologists who demand that a black or very dark green ointment be prepared. This is done by mixing the crude coal tar with the zinc oxide and then adding the other ingredients. In some cases it is even requested that the coal tar zinc oxide mixture be allowed to stand for twenty-four hours. If the coal tar is mixed with the starch or the petrolatum and later added to the zinc oxide, the resulting mixture varies from a gray to a light green. This mixture is considered by some to be irritating and valueless, although it is the preferred method in another section of the country. Therefore it might be well to consult the physician before preparing the prescription.

382

This is another example of what the alert pharmacist must be prepared for. Liquor picis carbonis was wanted, but in the meantime the prescriptionist had worn himself out trying to get a satisfactory product out of the original prescription, which formed a solid lump of material.

383

The quinine sulfate and the lead acetate react, forming quinine acetate and lead sulfate, both of which are practically insoluble in the syrup. The bismuth subnitrate is also insoluble. The syrup holds the insoluble substances in suspension for a time. A little acacia or tragacanth might be used if desired. A "Shake well" label should be put on the bottle.

384

Triturating the alum with the lead acetate produces a moist sticky mass. This is due to the chemical reaction which takes place, forming lead sulfate, aluminum sulfate, potassium acetate, and liberating the water of crystallization which makes the mixture sticky. A mass is obtained when zinc sulfate and lead acetate are rubbed together. In either case the odor of acetic acid is noticeable. When the mixture is put into water the tannic acid will precipitate the lead, if any remains not combined with sulfuric acid, as lead tannate. The other two salts are not so readily precipitated as tannates. In filling this prescription the water of crystallization may be removed by heating, or the ingredients may be powdered separately and then mixed lightly, and no difficulty will ensue.

385

This gives a white precipitate of lead citrate due to the action of the citric acid in the syrup of lemon acting on lead acetate. If simple syrup flavored with oil of lemon is used no precipitate results.

386

This mixture is permanent in a dry atmosphere, but in a damp one it absorbs moisture. Either in the presence of absorbed moisture or when taken into the stomach several reactions are likely to take place. Lead sulfate would be formed from the lead subacetate and morphine sulfate. The sodium bicarbonate would react with each of the other three ingredients, forming with bismuth subnitrate, bismuth subcarbonate, and carbon dioxide; with lead subacetate, lead carbonate; with morphine sulfate, the free alkaloid. Lead subacetate would also combine with the morphine to make a compound insoluble in water. These incompatibilities do not make a dangerous mixture, and there is no reason for declining to fill it.

387

The well-known "white wash" is formed, the zinc sulfate and the sulfurated potash precipitating the insoluble zinc sulfide. Each item is dissolved separately, the solutions made as dilute as possible, and they are mixed gradually in order to produce as fine a precipitate as possible. The color may have a grayish cast at first but it soon becomes perfectly white.

388

Here we have "white lotion" desired in ointment form. To prepare it, dissolve the salts separately in a minimum amount of water, mix them together until the precipitate becomes white, and then absorb the moist paste with anhydrous wool fat. Finally add the necessary amount of petrolatum.

389

Potassium permanganate oxidizes salicylic acid to formic acid and carbon dioxide, and oxidizes the ferrous sulfate to ferric sulfate, while manganese dioxide is precipitated. There not being enough acid to combine with all the ferric iron, part of it is precipitated as a red-brown basic ferric salt, which with the black manganese dioxide makes a dark brown mixture. When the solid matter settles, a violet-colored supernatant liquid is left. The violet color is due to the formation of ferric salicylate. There is not enough permanganate to oxidize all the salicylic acid or all the ferrous sulfate.

390

This prescription has come from several different sources. The object of the prescriber is not plain. Oxalic acid reduces the ferric iron and the permanganate. The permanganate quickly changes the oxalic acid to carbon dioxide. The best method to use in making pills is to powder each ingredient separately and mix each with a little wool fat so that the particles will not come in contact with one another, using kaolin as a drying and dusting powder. Petrolatum may be used but the mass is not quite as adhesive. A compressed tablet of a similar combination has been wanted. There is danger of explosion in compressing it. Physicians should realize that they will not get any benefit at all from the permanganate.

391

The potassium permanganate was dissolved in part of the water and the glycerin was diluted with the balance of the water; the two solutions were then mixed. Within two minutes the mixture was of a brownish-black color and almost solidified by the manganese dioxide that was formed. After standing, the precipitated manganese dioxide settled, leaving a clear colorless solution, showing that the permanganate was all reduced. When potassium permanganate and concentrated glycerin are brought together there is some liability of the mixture exploding or inflaming. The oxidation products of the glycerin are probably formic, propionic, and tartronic acids; in an alkaline mixture oxalic and carbonic acids are formed.

392

Potassium permanganate oxidizes phenol to oxalic acid and carbon dioxide (M. & M., III, 832). The permanganate is reduced and precipitated as manganese dioxide, which makes the mixture a semi-solid, but by shaking, it may be gotten into a condition so that it can be poured. There is a large excess of phenol not oxidized.

393

The pharmacist should not use the excipient directed. Potassium permanganate is easily reduced by organic matter, which it in turn oxidizes. Some excipient must be chosen that will not reduce the permanganate. A mixture of equal parts of petrolatum, paraffin, and kaolin makes a good one, or wool fat with kaolin may be used. When filled as written no permanganate could be detected at the end of a week.

394

Before compressing any powder in making compressed tablets, it is necessary that the powder be in a granular condition and the most common binding agents used in granulating are glucose and acacia. While this is a manufacturing proposition and the tablet is for poultry, the formula is inserted to call attention to the danger in compressing a mixture of oxidizing and reducing agents. Ferrous sulfate reduces and potassium permanganate oxidizes.

395

Potassium permanganate oxidizes quinine sulfate to pyridin tricarboxylic acid, oxalic acid, and ammonia (M. & M., IV, 375). It also oxidizes the iron. When the permanganate and the iron are rubbed together a detonation takes place. The excipient should be one that will not reduce the permanganate, and it should also protect the other ingredients; a mixture of equal parts of paraffin, petrolatum, and kaolin is a good one, or resin cerate with kaolin may be used.

396

Sometimes these tablets when made have a brownish color when they should be white. In some cases the trouble may be caused by the adrenalin which is slowly oxidized and turns brown. In other cases it may be due to procaine. Two or three samples of procaine have been found which give a brownish color when wet and allowed to dry. Probably a small amount of coloring matter was left in the crystals and alcohol brought this out, although the samples of procaine looked perfectly white.

397

An absorbent powder will be necessary to make a mass that can be put into capsules. When pyrocatechin is rubbed with acetanilid or acetophenetidin a liquid results. Acetanilid and acetophenetidin do not liquefy.

398

On adding a solution of pyrogallol to a solution of lead acetate a white precipitate is formed, which turns dark in a few days, the upper portion getting black much sooner than the lower. The lead in this prescription is not all precipitated.

399

This ointment, which is nearly white at first, soon becomes darkened and ultimately nearly black. The pyrogallic acid is oxidized and turns black by contact with air and light. It is also oxidized by the mercuric chloride, which is reduced to metallic mercury, while the pyrogallic acid is changed to acetic and oxalic acids.

400

If the quinine bisulfate and the sodium salicylate are mixed together, quinine salicylate is precipitated as a white bulky precipitate which is suspended in the liquid. As soon as the citrated caffeine is added it precipitates salicylic acid from the quinine salicylate, liberating also the quinine which separates as a gummy, stringy mass which adheres to the sides of the bottle and crystallizes as the characteristic quinine rosettes upon standing. If the citrated caffeine and the sodium salicylate are mixed together, salicylic acid is precipitated. The addition of a small amount of tragacanth prevents the formation of the gummy precipitate and makes it possible to dispense the mixture with a "Shake well" label.

401

The ammonium carbonate precipitates the quinine and at the same time glycyrrhizin is precipitated from the fluidextract. The precipitate is fine at first, but within a few days it forms into lumps which cannot be broken up by agitation.

402

This makes a clear solution at first, but in a few days a gelatinous precipitate begins to form and ultimately gives a gelatinous mass, white, getting a little yellow if allowed to stand for two or three weeks. Fowler's solution, being alkaline, neutralizes a part of the free acid and quinine is precipitated, perhaps as the sulfate or as the sulfate in combination with hydriodic acid. Ordinarily the prescription will be used up before there is enough gelatinization to trouble. By acidifying Fowler's solution first, precipitation will be lessened. The above is true with Fowler's solution prepared according to the U. S. P., X, or previously thereto. The solution of the U. S. P., XI, is not excessively alkaline.

403

There is enough ammonium carbonate present to neutralize all the sulfuric acid and liberate the free alkaloid. The quinine sulfate may be dissolved in part of the syrup with the aid of the acid, and the carbonate in the remainder of the syrup. These two solutions should be cooled thoroughly before mixing, because when warm the free alkaloid collects in sticky masses and it is impossible to get it evenly divided. The effervescence is due to the liberation of carbon dioxide by the acid and comes off slowly. The prescription might better be filled by mixing the acid and carbonate first and adding enough acid to decompose all the carbonate and convert the quinine sulfate into the soluble quinine bisulfate.

404

This can be filled by dissolving the alkaloidal salts in the syrup of lemon and tincture of iron, adding the water, and then the phosphoric acid last. The solution is clear and of a pale reddish color previous to the addition of the acid. After the addition of the acid the solution becomes colorless and slightly turbid and in a few minutes a heavy precipitate is formed. The three disturbing causes are tincture of iron, phosphoric acid, and quinine sulfate, leaving out any one of which prevents precipitation. If the amount of quinine is reduced to 3 grams there is but little precipitation and none if it is reduced to 2 grams. The decoloration is due to the formation of ferric phosphate, which is insoluble in water, but soluble when there is an excess of free acid. By using enough diluted sulfuric acid to dissolve the quinine in water no precipitation results.

405

Basham's mixture contains acetic acid and an acetate. The quinine salt dissolves in this, but within a few minutes it is thrown down as a bulky crystalline quinine acetate or hydrate. The mixture is so thick that it would be difficult to pour out an even dose.

406

This prescription makes at first a clear solution, which gives a precipitate on standing a short time. If the tincture of iron is not strongly acid the precipitate is yellowish-brown. The precipitate was filtered out and washed with water until the washings no longer gave a test for iron. It was then dissolved in diluted sulfuric acid; the solution was not fluorescent or bitter; on adding ammonia water it gave a heavy red-brown precipitate of ferric hydroxide. From this it was supposed that the original precipitate was a basic salt of iron, which had been thrown out of solution by the quinine taking some of the hydrochloric acid from the tincture, to form a more soluble quinine salt.

If, however, some hydrochloric acid is added to the tincture before adding the alkaloidal salts, or the tincture is quite strongly acid, or quinine bisulfate is used, the solution deposits prismatic crystals. These crystals dissolve readily on addition of water, and are a quinine salt separated out from a supersaturated solution. The pharmacist in dispensing the prescription should see that the tincture is quite strongly acid. The physician should also give his consent to allow the solution to be diluted with water with an increase in the dose.

407

The tannic acid combines with the quinine, forming the nearly insoluble quinine tannate which really improves the preparation since it is practically tasteless. This prescription should be filled by dissolving the quinine sulfate in a part of the syrup with the aid of the sulfuric acid. The tannic acid should be dissolved in the remainder of the syrup and this gradually added to the other solution with constant stirring. Both solutions should be cold, because if mixed when warm the precipitate formed is sticky and will make a mass that cannot be evenly divided. The resinous material in the eriodictyon unites with part of the quinine to form an insoluble tasteless compound. For this reason it makes a good vehicle for quinine prescriptions.

408

On dissolving the quinine bisulfate in glycerin, alcohol, and part of the water, and the resorcin in the balance of the water, a clear solution is obtained. In a few minutes small needle-shaped crystals are formed and crystallization continues for some time. The resorcin destroys the fluorescence and precipitates the quinine.

409

Resorcin does not dissolve in liquid petrolatum, but it is easily soluble in water, alcohol, or ether. It has been suggested that it be dissolved in alcohol before mixing with the petrolatum, but alcohol does not make a clear solution with liquid petrolatum and separates. Solutions of resorcin in alcohol and in ether were added to the petrolatum and heat applied to volatilize the solvent, but resorcin was precipitated. Probably the best that can be done is to dissolve the resorcin in a little water and add to the liquid petrolatum, sending the prescription out with a "Shake well" label, although this is not a good preparation for a spray. It would be well to communicate with the prescriber.

410

The maximum dose of santonin, as given by most authorities, is 4 grains, some giving as high as 5 grains. Having two maximum doses coming so close together renders this prescription a dangerous one. Prescriptions containing santonin should be protected from the light, as light causes a change in color from white to yellow, probably with the formation of new compounds. Inquiry should be made to determine whether it is for a child or an adult and if for the former the prescription should not be filled, as 2 grains are said to have killed a child.

411

The soap acts as an emulsifying and solidifying agent and the consistency of this mixture is about that of lard. Soap is nearly always alkaline and acts on the calomel, producing the black mercurous oxide. This explains why the mixture slowly turns dark.

412

Although this makes a fair powder at first, it becomes sticky on standing. Quinine sulfate and boric acid seem not to react on each other, but either one with soap liberates some oleic acid which causes the mixture to become sticky. If it is dispensed in a pasteboard box, the box becomes greasy.

413

The sodium thiosulfate is decomposed by the acid in the elixir. There is an odor of sulfur dioxide at once, and a cloudiness develops upon standing. A non-acid vehicle should be used.

414

Several reactions occur. There is an immediate separation into two layers, as the thiosulfate is insoluble in the alcohol and separates to the lower third of the liquid. The liquid soon begins to cloud as the boric acid and the sodium thiosulfate react with the liberation of sulfur. The bismuth subcarbonate turns yellow within fifteen minutes and continues to grow darker, finally becoming brownish-black.

415

Several chemical reactions will take place, depending upon the order of mixing. The possible reactions are as follows: 1. Ferric iron is reduced to ferrous iron, giving at first a red solution of ferric thiosulfate. 2. The hydrochloric acid of the tincture reacts with the thiosulfate, forming sodium chloride, sulfurous acid, and sulfur. 3. With potassium chlorate, the sulfurous acid thus formed gives potassium sulfate, hydrochloric and sulfuric acids. 4. Hydrochloric acid with potassium chlorate gives potassium chloride, water, chlorine, and several oxides of chlorine. 5. The chlorine thus formed oxidizes the reduced ferric salt back to the ferric condition and oxidizes the hyposulfite to a sulfate.

There is not enough water to dissolve all the chlorate, and after the reactions have taken place there is not enough acid to form a normal ferric salt of all the iron; a part of it remains as an insoluble oxychloride.

416

This combination is an unusual one. The thiosulfate reduces calomel to metallic mercury, the mixture being darkened at once. In triturating the mixture, it becomes almost liquid from the water of crystallization which is liberated.

417

The ether separates at once as it is not soluble in the mixture. Adding water to make double the volume and doubling the dose prevents separation.

418

The ethereal oil of the compound spirit of ether separates out as an oily layer. If the plain spirit of ether is used there is no separation.

419

The solution is clear at first, but a profuse effervescence soon develops and the preparation becomes very cloudy due to the formation of strontium carbonate which settles to the bottom of the container. Most of the coloring matter of the rhubarb mixture is also precipitated.

420

Effervescence occurs, and strontium carbonate is precipitated. The salol is insoluble. The salicylate darkens as the product stands. With a "Shake well" label the mixture may be dispensed.

421

A thick gelatinous mass of strontium citrate is formed. The mass is so thick that it is difficult to pour. The physician could well change to sodium or potassium bromide, which would not give any precipitate.

422

When this prescription is filled as written a crystalline precipitate forms at once. Both Fowler's solution, if of the U. S. P., X, variety or previous thereto, and potassium iodide precipitate the strychnine. Neutralizing the Fowler's solution will prevent its causing trouble, but there will still be danger from the potassium iodide precipitating the strychnine. Fowler's solution of the U. S. P., XI, is not excessively alkaline.

423

There is a sufficient amount of alcohol and water to prevent the gold salt from precipitating strychnine. However, the gold is reduced to the metallic condition in a few hours, largely by the alcohol, but partly by the syrup. The gold as precipitated has a purplish color by transmitted light, but yellow or brown by reflected light.

424

The strychnine will not dissolve in the glycerin or in the water. Strychnine sulfate or nitrate (the nitrate is the more common for hypodermic injection) should be used. In the absence of the prescriber the nitrate should be dispensed.

425

The prescription, as it is, is difficult to pour into a bottle and also difficult to pour out. Sulfur rises to the surface of the liquid almost instantly, and it is impossible to use the lotion and obtain a representative quantity of it for application. A small amount of tragacanth prevents the trouble by keeping the sulfur from separating so quickly. Two grains of tragacanth per fluid ounce is sufficient. The camphor should be dissolved in a little alcohol and mixed with the sulfur until the alcohol evaporates.

426

When lime and sulfur are boiled together a red solution is formed. The calcium and sulfur unite to form calcium thiosulfate and calcium disulfide or pentasulfide, depending on the proportions. This is the first reaction in making precipitated sulfur.

427

Terpin hydrate is not entirely soluble in elixir and separates quickly. It should be rubbed with about 30 grains of powdered acacia first, then a little water, and the elixir containing the other ingredients. The iso-alcoholic elixir of the N. F., VI, would not even dissolve the terpin hydrate, to say nothing of the sodium bromide which is not very soluble in alcohol.

428

Theobromine with sodium salicylate is readily soluble in water; acids decompose it. Theobromine differs from many alkaloids in that it does not readily combine with acids. In this prescription the theobromine with sodium salicylate was dissolved in the syrup, and then the spirit of ethyl nitrite added, and lastly the tincture of iron. When the iron is added a very deep violet color is produced, due to the formation of ferric salicylate, and on allowing the mixture to stand a few hours a white precipitate falls; the acids in the tincture and spirit liberate the theobromine and salicylic acid.

429

Acid, as in tincture of digitalis, or carbon dioxide in the air will decompose the theobromine compound, liberating the alkaloid. Theobromine is nearly insoluble in water and does not combine readily with acids. Most of the precipitation in this prescription may be prevented by the addition of a few drops of solution of potassium hydroxide.

430

Thymol dissolves in a solution of potassium or sodium hydroxide, but not in borax. It floats on top and will not stay mixed long enough to get an even amount. Dissolving it first in a little alcohol does not help. The thymol should be powdered with about 15 grains of acacia and water added and afterwards the borax dissolved in water. In dilute solutions borax does not gelatinize a solution of acacia.

431

Salol and thymol rubbed together make a liquid. Mixing the bismuth with the salol and putting into the konseal, then putting in the thymol without mixing, will give a mass on standing which does not affect the konseal. The suggestion has also been made to place the proper amount of thymol in a small capsule and place the capsule with the proper amounts of salol and bismuth in a konseal.

432

The sodium borate and the sodium bicarbonate both precipitate the zinc sulfate, the former as a borate and the latter as a carbonate. The physician should be consulted. Usually sodium borate in a prescription with zinc sulfate is replaced with boric acid, but with the added bicarbonate in this instance some further adjustment is necessary.

433

The pharmacist in filling this prescription shook the two salts with the water, expecting to get a clear solution, but instead got quite a heavy precipitate. Some samples of zinc iodide do not entirely dissolve in water and when filtered give a precipitate with a solution of zinc chloride. This is due to an alkali being left in to preserve the iodide. Some samples of zinc chloride do not entirely dissolve on account of the formation of some oxychloride resulting from too high fusion.

434

Menthol is soluble in the petrolatum, but zinc sulfate is not. About the only way this can be filled is to dissolve the sulfate in about 10 minims of water, mix with the petrolatum and put on a "Shake well" label. It is not a good practice to send out such mixtures for sprays. The prescriber should rewrite this prescription.

A TABLE SHOWING THE EFFECT OF RUBBING TOGETHER EQUAL WEIGHTS OF TWO SOLIDS

	Acetanilid	Acetophenetidin	Antipyrine	Betanaphthol	Bromal hydrate	Butyl chloral hydrate	Camphor	Camphor monobromated	Chloral hydrate	Ethyl carbamate	Lead acetate	Menthol	Methacetin	Naphthalene	Phenol	Phenyl salicylate	Pyrocatechin	Pyrogallol	Resin	Resorcin	Salicylic acid	Sodium phosphate	Sodium salicylate	Theobromine with sodium salicylate	Thymol	Urea
Acetanilid	P	P	P′	P	P	P	P	P	P′	P	P	P	P	P	L	P	L	P	P	L	P	P	P	P	L	P
Acetophenetidin	P	P	P	P	P	P	P	P	L	P	P	P	P	P	L	P	L	P	P	P	P²	P	P²	P	P	P
Antipyrine	P′	P	P	L	L	P²	P	P	L	L	P	P	P	P	L	P′	L	L	P	L	P²	P	M	P	L	P
Betanaphthol	P	P	L	P	P	P	L	P	P	L	P	L	P	P	L	P	L	P	P	P	P	P	P	P	P	P
Bromal hydrate	P	P	L	P	P	P	P	P	P	L	P	L	M	P	L	P	L	P	..	P	P	P	P	M	P	L
Butyl chloral hydrate	P	P	P²	P	P	P	P²	P	P	L	P	L	P	P	L	P	L	P	..	P	P	P	P	P	P²	P
Camphor	P	P	P	L	P	P²	P	P	L	L	P	L	P	P	L	L	L	L	P	L	P	P	P	P	L	P
Camphor monobromated	P	P	P	P	P	P	P	P	L	P	P	P	P	P	L	L	L	P	P	P	P	P	P	P	L	P
Chloral hydrate	P′	L	L	P	P	P	L	L	P	L	L	L	L	P	L	L	L	P	P	P	P	L	P	L	L	L
Ethyl carbamate	P	P	L	L	L	L	L	P	L	P	P′	L	P	P	L	L	L	L	M	L	L	P	P	P	L	P
Lead acetate	P	P	P	P	P	P	P	P	L	P′	P	P	P	P	L	P	M	M	..	M	L	L	M	P	P	L
Menthol	P	P	P	L	L	L	L	P	L	L	P	P	P	P	L	P	L	L	L	L	P	P	P	P	L	P
Methacetin	P	P	P	P	M	P	P	P	L	P	P	P	P	P	L	P	L	P	P	M	P	P	P	P	P	P
Naphthalene	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	L	P′	P	P	P	P	P	P	P	P	P
Phenol	L	L	L	L	L	L	L	L	L	L	L	L	L	L	P	L	L	L	L	L	P	L	P	L	L	P
Phenyl salicylate	P	P	P′	P	P	P	L	L	L	L	P	P	P	L	L	P	L	P	M	P	P	P	P	P	L	P
Pyrocatechin	L	L	L	L	L	L	L	L	L	L	M	L	L	P′	L	L	P	L	..	P′	P	L	P	M	L	L
Pyrogallol	P	P	L	P	P	P	L	P	P	L	M	L	P	P	L	P	L	P	P	P	P	M	P	M	P	L
Resin	P	P	P	P	..	..	P	P	P	M	..	L	P	P	L	M	..	P	P	P	P	P	..	..	M	..
Resorcin	L	P	L	P	P	P	L	P	P	L	M	L	M	P	L	P	P′	P	P	P	P	P′	P	P	P	P
Salicylic acid	P	P²	P²	P	P	P	P	P	P	L	L	P	P	P	P	P	P	P	P	P	P	L	P	P	P	P
Sodium phosphate	P	P	P	P	P	P	P	P	L	P	L	P	P	P	L	P	L	M	P	P′	L	P	P′	P	P	P
Sodium salicylate	P	P²	M	P	P	P	P	P	P	P	M	P	P	P	P	P	P	P	..	P	P	P′	P	P	P	P
Theobromine with sodium salicylate	P	P	P	P	M	P	P	P	L	P	P	P	P	P	L	P	M	M	..	P	P	P	P	P	P	P
Thymol	L	P	L	P	P	P²	L	L	L	L	P	L	P	P	L	L	L	P	M	P	P	P	P	P	P	P
Urea	P	P	P	P	L	P	P	P	L	P	L	P	P	P	P	P	L	L	..	P	P	P	P	P	P	P

L = Soft mass or liquid. M = Stiff mass which dries. P = Dry powder. P′ = Slightly damp powder, quickly drying. P² = Said to liquefy, but one of the writers obtained a dry powder.

TABLE OF SOLUBILITIES

These solubilities have been taken from a large number of sources. While they may differ from those given by other authorities, they are approximately correct. Official names or the names most commonly recognized are listed. Synonyms, for the most part, are not included.

Abbreviations: sol., soluble; v. s., very soluble; a., all proportions; m. s., moderately soluble; sp. s., sparingly soluble; dec., decomposed; ins., insoluble.

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Absinthin	sp. s.	sol.	sp. s.	sol.		
Acacia	2	ins.	ins.	ins.		
Acetanilid	190	3.4	17	3.7	5	47 benzol
Acetannin	sp. s.	sp. s.	.....	.....	.....	dec. alkali hydroxides
Acetone	a.	a.	a.	a.	.....	a. vol. oils
Acetophenetidin	1310	15	130	14		
Acetophenone	ins.	sol.	sol.	sol.	ins.	
Acetozone	sp. s.	sp. s.	m. s.	m. s.	.....	s. oils
Acid Abietic	ins.	sol.	sol.	sol.	.....	s. benzol
Acetylsalicylic	300	5	15	17	.....	alkali citrates, acetates, or tartrates
Agaric	sp. s.	10	sp. s.	sp. s.	.....	s. alkalies
Arsenous	30–100	sp. s.	.....	.....	5	
Benzoic	275	2.3	3	4.5	10	10 benzol
Boric	18	18	ins.	.....	4	
Bromauric	v. s.	v. s.				
Cacodylic	sol.	sol.				
Camphoric	125	v. s.	sol.	sol.		
Carminic	sol.	sol.	sp. s.	ins.	.....	s. alkalies
Chromic	v. s.	dec.	dec.	dec.	dec.	
Chrysophanic	ins.	sp. s.	sol.	sol.	.....	s. benzol
Cinnamic	3500	sol.	sol.			
Citric	0.5	1.8	30	n. ins.	sol.	
Filicic	ins.	sol.	sol.	.....	.....	s. oils, alkalies
Formic	v. s.	v. s.	sol.	.....	sol.	
Gallic	8.7	4.6	100	sp. s.	10	
Glycero-phos	sol.	sol.				
Hippuric	600	v. s.				
Hydriodic	a.	a.				
Hydrobromic	a.	a.				
Hydrochloric	a.	a.				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Acid Hydrocyanic	a.	a.				
Hypophosphorous	a.	a.				
Iodic	sol.	sp. s.	sp. s.	.....	sp. s.	
Lactic	a.	a.	a.	ins.	.....	ins. pet. ether
Meconic	115	sol.				
Nitric	a.	dec.				
Oleic	ins.	sol.	sol.	sol.	sol.	s. oils
Osmic	sol.	sol.	sol.			
Oxalic	12	2.5	sp. s.	ins.	7.5	
Phosphoric	a.	a.				
Phosphoric, glac.	v. s.	v. s.	ins.			
Picric	78	12	65	35	.....	10 benzene
Pyrogallic	1.7	1.3	1.6			
Salicylic	460	2.7	3	42	200	135 benzol
Stearic	ins.	21	3	2		
Sozoiodolic	sol.	sol.	.....	.....	sol.	
Succinic	19	8	sol.	sp. s.		
Sulfanilic	sp. s.	ins.	ins.			
Sulfuric	a.	a.				
Tannic	0.34	0.23	sp. s.	sp. s.	1	sp. s. benzol
Tartaric	0.75	3.3	sp. s.	sp. s.		
Trichloroacetic	0.1	v. s.	sol.			
Valeric	30	a.	a.	a.		
Acoin	17	v. s.	sol.	.....	.....	s. pet. ether
Aconitine	3200	28	65	v. s.	.....	s. benzol
Nitrate	sp. s.	sol.				
Acriflavine	3	sol.	ins.	ins.	.....	ins. oils
Hydrochloride	3	inc. sol.	ins.	ins.	.....	ins. oils
Adrenalin	sp. s.	sp. s.	ins.	.....	.....	s. in fixed alkalies
Chloride	sol.					
Agar	500	sp. s.				
Agurin	v. s.	sp. s.				
Airol (Bis. oxyiodogal.)	ins.	ins.	ins.	ins.	sol.	ins. oils
Alantol	.....	sol.	sol.	sol.		
Albumin (egg)	sol.	ins.	ins.			
Tannate	sp. s.	sp. s.	sp. s.	sp. s.		
Alcohol	a.	a.	a.	a.	a.	
Amyl	40	a.	a.	a.	a.	
Methyl	a.	a.	a.			
Aloin	65	10.75	664	4260		

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Alphanaphthol	sp. s.	sol.	sol.	sol.		
Alphol	ins.	sol.	sol.			
Alum, Ammonium	5.2	ins.				
Exsiccated	20	ins.				
Potassium	7.2	ins.				
Aluminum Chloride	0.5	4				
Hydroxide	ins.	ins.	ins.	ins.		
Salicylate	ins.	.....	.....	.....	.....	s. alkalies
Sulfate	1	ins.	ins.	ins.		
Alumnol	1.5	sp. s.	ins.	.....	sol.	
Alypin	v. s.	sol.	ins.	sol.		
Amidopyrine	18	1.5	13	1	.....	s. 12 benzol
Ammonium Benz.	10	35.5	.....	.....	8	
Bromide	1.3	12	sp. s.			
Carbonate	4	partly	.....	.....	5	
Chloride	2.6	100	.....	.....	8	
Citrate	sol.					
Hypophosphite	1	20				
Iodide	0.6	3.7	.....	.....	1.5	
Nitrate	0.5	20				
Oxalate	sol.					
Phosphate	4	ins.				
Salicylate	1	3				
Sulfate	1.3	ins.				
Valerate	0.3	0.6	sol.			
Amyl Acetate	sp. s.	a.	a.			
Nitrite	sp. s.	a.	a.	a.		
Amylene	sp. s.	a.	a.			
Hydrate	8	a.	a.	a.	a.	
Anethol	sp. s.	2	sol.	sol.		
Anhalonine Hydroc.	sol.	sp. s.	sp. s.	sp. s.		
Anilin	33	a.	a.	a.		
Sulfate	sol.	sp. s.	ins.			
Anthrarobin	.....	sp. s.	sp. s.	sp. s.		
Antim. and Pot. Tart.	12	ins.	.....	.....	15	
Sulfide	ins.	ins.				
Antipyrine	1	1.3	43	1		
Salicylate	200	sol.	sol.			
Antiseptol	ins.	sol.	.....	sol.		
Apiol	sp. s.	sol.	sol.			

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Apocodeine	ins.	sol.	sol.	sol.		
Hydrochloride	sol.	sol.				
Apomorphine Hydroc.	50	50	1864	3800	100	
Arbutin	8	16	ins.	ins.	.....	s. carbon disulfide
ArecolineHydrobromide	1	10	sp. s.	sp. s.		
Argonin	sol.	ins.				
Argyrol	v. s.	ins.	ins.	ins.	sol.	ins. oils
Aristochin	ins.	sp. s.	sp. s.	sol.	sol.	
Arsenic Trioxide	30–100	sp. s.	.....	.....	5	
Arsenous Iodide	12	28	sol.	sol.		
Arsphenamine	v. s.	sol.	.....	.....	sol.	
Asaprol	1.5	3				
Aspidospermine	6000	48	106	sol.	.....	s. benzol
Atropine	455	2	25	1	27	
Sulfate	0.4	5	3000	420	2.5	
Balsam Peru	ins.	5	partly	sol.	.....	partly oils
Tolu	ins.	sol.	sol.	sol.	.....	
Barbital	130	14	35	75	.....	s. acetone
Soluble	5	sp. s.	ins.			
Barium Acetate	1	100				
Bromide	1	v. s.				
Carbonate	ins.	ins.				
Chloride	2.5	ins.	.....	.....	10.3	
Dioxide	sp. s.					
Hydroxide	20					
Sulfate	ins.	ins.				
Bebeerine	6000	5	13			
Benzaldehyde	350	sol.	sol.	sol.		
Benzene	ins.	4	v. s.	v. s.		
Benzin	ins.	6	v. s.	v. s.		
Benzyl Benzoate	ins.	a.	a.	a.	ins.	
Berberine	sp. s.	sp. s.	sp. s.			
Sulfate	sp. s.	sol.				
Betaeucaine Hydroc.	30	35	.....	6		
Betanaphthol	1000	0.8	1.3	17	sol.	s. alkalies
Benzoate	ins.	sol.	sol.	33		
Betol	ins.	sp. s.	sol.	.....	ins.	s. benzol
Bismuth and Am. Cit.	v. s.	sp. s.				
Betanaphthol	ins.	sp. s.	sp. s.	sp. s.		
Citrate	ins.	ins.				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Bismuth Hydroxide	ins.					
Oxyiodogal	ins.	ins.	ins.	ins.	s.	ins. oils
Phenolsulfon	partly					
Potassium Tartrate	2	ins.	ins.	ins.		
Subcarbonate	ins.	ins.				
Subchloride	ins.	ins.				
Subgallate	ins.	ins.	ins.	ins.		
Subnitrate	ins.	ins.				
Subsalicylate	ins.	ins.	ins.			
Tannate	ins.	ins.				
Bromal	sp. s.	sol.	sol.	sol.	sol.	
Bromal Hydrate	sol.	sol.	sol.	sol.		
Brometone	sp. s.	sol.	sol.			
Bromine	90	sol.	sol.			
Bromoform	sp. s.	a.	a.	.....	80	
Brucine	750	2	sp. s.	sol.		
Sulfate	sol.	sol.				
Butesin	sp. s.	sol.	.....	.....	.....	s. oils
Butesin Picrate	2000	.....	.....	.....	.....	100 oils
Butyl Chloral Hydrate	50	1	sol.	20	1	
Butyn	1	v. s.	ins.	sp. s.	.....	s. acetone
Cadmium Bromide	sol.	sol.				
Iodide	sol.	sol.				
Caffeine	46	66	530	5.5	9	
Citrate	25	sol.				
and Sod. Benzoate	1.1	30	.....	partly		
Sod. Cinnam.	2	30				
Sod. Salicyl.	2	50				
Calcium Acetate	sol.	sol.				
Benzoate	20					
Betanaph. Sulfon	1.5	3				
Borate	ins.	.....	.....	.....	sol.	
Bromide	0.7	1.3	ins.	ins.		
Carbonate	ins.	ins.				
Chloride	1.2	10	ins.	ins.		
Chlorinated	partly	partly				
Citrate	sp. s.					
Creosotate	incompletely sol.					

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Calcium Gluconate....	30	ins.				
Glycerophos........	50	ins.	ins.			
Hydroxide.........	630	ins.	.....	.....	sol.	s. syrup
Hypophosphite.....	6.5	ins.				
Iodate............	300	sp. s.				
Iodide............	v. s.	v. s.				
Iodobehenate......	ins.	sp. s.	sp. s.	sol.		
Lactate...........	20	sp. s.				
Lactophos.........	sol.	sp. s.				
Oxide............	760					
Permanganate......	v. s.					
Phenosulfonate.....	sol.	sol.				
Phosphate.........	ins.	ins.				
Salicylate.........	ins.					
Sulfate, dried.......	378	ins.				
Sulfite............	800					
Thiosulfate........	1					
Calomelol...........	sol.	sol.	sol.			
Camphor...........	800	1	1	0.5	.....	s. oils
Monobromated.....	sp. s.	6.5	1.6	0.5	sp. s.	
Canada Balsam......	ins.	2.2				
Caramel............	v. s.	sp. s.	ins.	ins.		
Carbon disulfide......	526	2	a.	a.		
Tetrachloride......	2000	a.	a.	a.	ins.	
Carbromal..........	3000	18	14	3	.....	s. acids and alkalies
Carmine............	sp. s.	.....	.....	.....	.....	s. alkalies
Cephæline Hydroc....	sol.	sol.				
Cerium Oxalate......	ins.	ins.	ins.	ins.	ins.	
Chiniofon...........	25	ins.	ins.	ins.		
Chinosol............	v. s.	ins.	ins.			
Chloral Hydrate......	0.25	1.3	1.5	2	sol.	
Chloralformamide....	18.7	1.3	v. s.	.....	v. s.	
Chloralimide.........	ins.	sol.	sol.	sol.		
Chloralose..........	200	sol.	sol.			
Chloramine-T........	7	dec.	ins.	ins.		
Chlorobutanol........	125	v. s.	v. s.	v. s.	7	s. oils
Chloroform..........	210	a.	a.	a.	ins.	s. oils
Chlorthymol.........	sp. s.	0.5	1.5	2		
Chromium Trioxide...	0.6	dec.	dec.	dec.	dec.	
Chrysarobin.........	4812	385	160	12.5	.....	s. alkalies

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Cinchonidine	1600	20	188	sol.		
Hydrochloride	sol.	sol.				
Sulfate	65	90	4400	620		
Cinchonine	3760	116	526	163		
Sulfate	60	12.5	3230	47		
Cinchophen	sp. s.	120	100	400		
Cinnamic Aldehyde	sp. s.	a.	a.	a.		
Citrophen	40					
Cocaine	600	6.5	3.5	0.7	ins.	
Hydrochloride	0.4	3.2	ins.	12.5	sol.	
Codeine	120	2	18	0.5		
Hydrobromide	v. s.	sol.				
Hydrochloride	20					
Phosphate	2.3	325	1875	4500		
Sulfate	30	1280	ins.	ins.		
Colchicine	22	v. s.	220	v. s.		
Collargol	20					
Coniine	90	v. s.	sol.	sol.		
Convallamarin	sol.	sol.	ins.	ins.		
Copaiba	ins.	sol.	sol.	sol.		
Copper Acetate	15	135	ins.			
Chloride	v. s.	v. s.				
Citrate	sp. s.	.....	.....	.....	.....	alkali citrates
Nitrate	sol.	sol.				
Oleate	ins.	.....	sol.			
Sulfate	2.5	500	ins.	.....	2.8	
Cornin	.....	sol.				
Cornutine	ins.	sol.	sol.	sol.		
Cotarnine Hydroc.	sol.	sol.				
Cotoin	sp. s.	sol.	sol.	sol.		
Coumarin	400	10	sol.	sol.	.....	s. oils
Creosol	sp. s.	sol.	sol.			
Creosotal	ins.	sol.	sol.	sol.	.....	s. oils
Creosote	140	a.	a.	a.	.....	s. oils
Carbonate	ins.	sol.	.....	sol.		
Phosphate	ins.	sol.	sol.			
Tannate	sol.	sol.	.....	.....	sol.	
Cresol	50	a.	a.	a.	a.	
Iodide	ins.	ins.	sp. s.	sol.		
Cymarin	sp. s.	sol.	sp. s.	sol.		

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloro-form	Glyc-erin	Miscellaneous
Delphinine	sol.	sol.	sol.	sol.		
Dextrin	sol.	ins.	ins.			
Dextrose	1	59				
Diacetylmorphine	1700	31	100	1.4		
Hydrochloride	2	sol.	ins.	ins.		
Dichloramine-T	ins.	dec.	sp. s.	sol.	.....	Chlorinated [paraffi
Digitalin	1000	sol.	sp. s.	sp. s.		
Digitoxin	sp. s.	sol.	sp. s.	sol.		
Diiodoform	ins.	sp. s.	sp. s.	sol.		
Elaterin	4250	262	318	22	ins.	
Emetine	sp. s.	sol.	sp. s.	sol.		
Hydrochloride	sol.	sol.				
Ephedrine	sol.	sol.	sol.	sol.	.....	liq. petrolat.
Hydrochloride	3	14	ins.			
Sulfate	sol.	m. s.				
Epinephrine	sp. s.	sp. s.	ins.	ins.	.....	acids
Erythrityl Tetranitrate	sp. s.	sol.	sol.			
Ether	12	a.	a.	a.		
Acetic	9	a.	a.	a.		
Butyric	sp. s.	sol.				
Formic	sp. s.	sol.				
Ethyl Aminobenzoate	2500	5	4	2	.....	s. oils
Bromide	sp. s.	a.	a.	a.		
Carbamate	0.45	0.8	1.5	0.9	2.5	32 olive oil
Chloride	sp. s.	v. s.	v. s.			
Hydrocupreine Hydrochlor.	sol.	sol.				
Iodide	sp. s.	v. s.	sol.			
Morph. Hydrochlor.	8	22	sp. s.	sp. s.		
Ethylene Bromide	ins.	a.				
Chloride	sp. s.	a.	a.	a.		
Eucalyptol	sp. s.	a.	a.	a.		
Eugenol	sp. s.	a.	a.	a.		
Euphthalmine Hydro.	v. s.	sp. s.	ins.			
Fluorescein	ins.	ins.	ins.	ins.	.....	alkalies-acids
Soluble	sol.	sol.				
Gelatin	swells	ins.	ins.	ins.		
Gelseminine Hydroc.	sol.	sp. s.				
Gland, Suprarenal	partly					
Glucose	v. s.	sp. s.				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Glutol	ins.	ins.				
Glycerin	a.	a.	ins.	ins.		
Glycosal	100	sol.	sp. s.	sp. s.		
Glycyrrhizin	v. s.	sol.	ins.			
Gold and Sodium Chl.	v. s.	partly	partly			
Bromide	sol.	sol.				
Chloride	v. s.	sol.	sol.			
Guaiac	ins.	partly				
Guaiacol	53	a.	a.	a.	0.8	
Benzoate	sp. s.	sol.	sol.	sol.		
Carbonate	ins.	60	18	1	sp. s.	sp. s. fixed oils
Cinnamate	ins.	sol.	.....	sol.		
Phosphate	ins.	sol.	sol.	sol.		
Salicylate	ins.	sol.	sol.	sol.		
Hedonal	sp. s.	sol.	sol.	sol.		
Helleborein	sol.	sol.				
Helmitol	10	ins.	ins.			
Hematoxylin	sp. s.	sol.	sp. s.			
Hetocresol	ins.	sol.	sol.			
Histamine Phosphate	4					
Homatropine	sp. s.	sol.	sol.	sol.		
Hydrobromide	6	40	ins.	420		
Hydrastine	ins.	170	175	1.4		
Hydrochloride	v. s.	v. s.	sp. s.	sp. s.		
Hydrastinine	sp. s.	v. s.	135	3		
Hydrochloride	v. s.	v. s.	1820	195		
Hydronaphthol	1000	sol.	sol.	sol.	sol.	
Hydroquinone	20	v. s.	v. s.			
Hyoscine	sp. s.	sol.	sol.	sol.		
Hydrobromide	1.5	20	ins.	750		
Hyoscyamine	500	sol.	sol.	sol.		
Hydrobromide	v. s.	2.5	2260	1.7		
Sulfate	v. s.	6.4	2500	2300		
Hypnal	30					
Hypnone	ins.	sol.	sol.	sol.		
Ichthalbin	ins.	ins.	ins.			
Ichthammol	sol.	sp. s.	sp. s.	.....	sol.	
Ichthargin	sol.	ins.	ins.	.....	sol.	
Ichthyol	sol.	sp. s.	sp. s.	.....	sol.	
Ingluvin	sol.					

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloro-form	Glyc-erin	Miscellaneous
Iodalbin	ins.	ins.	ins.	ins.	.....	s. alkalies
Iodine	2950	12.5	v. s.	v. s.	80	s. iodides
Iodoform	9391	60	7.5	10	80	
Iodophthalein	7	sp. s.				
Iron Acetate	4	sol.				
Albuminate	ins.	ins.				
Arsenate	ins.	ins.				
Benzoate	ins.					
Bromide	sol.	sol.	sol.			
Carbonate	ins.	ins.	ins.	ins.		
Chloride	0.2	v. s.	sol.	.....	sol.	
Citrate	sol.	ins.				
Glycerophos	2	ins.				
Hypophosphite	2300	ins.	.....	.....	.....	s. sol. citrate
Iodide	v. s.	sol.	.....	.....	sol.	
Lactate	40	ins.	.....	.....	.....	s. sol. citrate
Phosphate	ins.	ins.	ins.	ins.		
Phosphate, sol.	sol.	ins.				
Pyrophos., sol.	sol.	ins.				
Sulfate	1.4	ins.	ins.			
Valerate	ins.	sol.				
and Am. Cit.	sol.	ins.				
Am. Sulf.	2.7	ins.	ins.			
Am. Tart.	sol.	ins.	.....	.....	sol.	
Potass. Tart.	sol.	ins.				
Quin. Cit.	sol.	partly				
Strych. Cit.	sol.	partly				
Kaolin	ins.	ins.	ins.	ins.		
Kino	partly	sol.	sp. s.			
Lactose	4.9	ins.	ins.	ins.		
Lanolin	ins.	sp. s.	sol.	sol.		
Lard	ins.	sp. s.	sol.	sol.	ins.	
Lead Acetate	1.4	38	.....	.....	sol.	
Carbonate	ins.	ins.				
Chloride	sp. s.	sp. s.				
Iodide	1300	sp. s.				
Nitrate	1.85	ins.				
Oxide	sp. s.	ins.				
Lime	840	ins.				
Chlorinated	partly	partly				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Lime Sulfurated	sp. s.	ins.				
Lithium Benzoate	3	16				
Bromide	0.6	v. s.	sol.			
Carbonate	78	ins.				
Chloride	1.7	sol.				
Citrate	1.4	sp. s.	ins.			
Phosphate	2540					
Salicylate	v. s.	v. s.				
Sulfate	sol.	sol.				
Lysol	sol.	sol.	.....	sol.	sol.	
Magnesium Acetate	sol.	sol.				
Benzoate	20	20				
Carbonate	sp. s.	ins.				
Chloride	0.6	v. s.				
Citrate	sol.					
Lactate	30	ins.				
Oxide	sp. s.	ins.				
Phosphate	sp. s.					
Salicylate	2	sol.				
Sulfate	1.3	ins.				
Sulfite	20	ins.				
Manganese Chloride	2.5	sol.				
Citrate, soluble	4	sp. s.				
Dioxide	ins.	ins.				
Glycerophosphate	sp. s.	ins.				
Hypophosphite	6.5	ins.				
Iodide	sol.					
Lactate	12	sp. s.				
Sulfate	0.7	ins.				
Mannite	6	ins.	ins.			
Mastic	ins.	sp. s.	sol.	sol.		
Menthol	sp. s.	v. s.	v. s.	v. s.	.....	s. oils
Merbaphen	sol.					
Mercuric Acetate	330	ins.	ins.			
Benzoate	sp. s.	ins.	ins.			
Bromide	80	sol.	sol.			
Chloride	13.5	3.8	22	.....	12	
Cyanide	12.8	15	sp. s.			
Iodide	ins.	115	120	910		
Oxides (red, yellow)	ins.	ins.				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Mercuric Oxycyanide.	80					
Salicylate..........	sp. s.	sp. s.				
Succinide..........	75	300				
Succinimide........	20	300				
Sulfate (basic)......	2000	ins.	ins.			
Mercurous Chloride...	ins.	ins.	ins.			
Iodide.............	ins.	ins.	ins.			
Mercury Ammon......	sp. s.	ins.	ins.			
Colloidal..........	sp. s.	ins.	ins.			
Mesotan.............	sp. s.	sol.	sol.	sol.		
Metaldehyde.........	ins.	sol.	sol.			
Methacetin..........	300	sol.	.....	sol.	sol.	
Methenamine........	1.5	12.5	320	10		
Methyl-Rosaniline....	10	20	ins.	sol.	15	
Salicylate..........	sp. s.	sol.	sol.	sol.		
Methylal............	sol.	sol.				
Methylene Chloride...	.....	sol.	sol.			
Methylthionine Hyd...	v. s.	sol.	.....	sol.		
Metycaine...........	1	sol.	ins.	sol.		
Morphine............	3340	210	6250	1220	.....	100 lime water
Acetate............	2.25	21.6	.....	480	5.2	
Hydrochloride......	17.5	52	ins.	ins.	sol.	
Meconate..........	34	sol.				
Sulfate............	15.5	565	ins.	ins.		
Tartrate...........	11	sp. s.				
Naphthalene.........	ins.	13	v. s.	v. s.		
Narceine............	1200	800	ins.			
Narcotine............	sp. s.	80	35	3		
Neoarsphenamine.....	v. s.	sp. s.	ins.	ins.	sol.	
Neocinchophen.......	sp. s.	sol. hot	v. s.	v. s.		
Neonal..............	sp. s.	5	10			
Neosilvol...........	sol.	.....	.....	.....	slowly sol.	
Nosophen............	ins.	sp. s.	sp. s.	sp. s.		
Nostal..............	sp. s.	sol.	.....	sp. s.		
Novaspirin..........	sp. s.	sol.	sp. s.	sp. s.		
Novocain............	1	30				
Orthoform...........	sp. s.	6	50			
Ouabain.............	100	30	sp. s.	sp. s.		
Ox Bile.............	v. s.	v. s.				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Pancreatin	sol.	ins.				
Papaverine	ins.	sp. s.	sol.	sol.		
Hydrochloride	sp. s.	40	ins.	sol.		
Sulfate	sol.	sol.	ins.	v. s.		
Paraffin	ins.	ins.	sol.	sol.	.....	s. oils
Paraform	sol.	sp. s.	sp. s.	.....	.....	s. alkalies
Paraldehyde	8	a.	a.	a.	.....	s. oils
Pelletierine	v. s.	v. s.	v. s.	v. s.		
Tannate	250	16	420	ins.		
Pental	ins.	a.	a.	a.		
Pepsin	50	ins.	ins.	ins.		
Peronin	sp. s.	218	ins.	390		
Petrolatum	ins.	sp. s.	sol.	sol.		
Liquid	ins.	sp. s.	sol.	sol.		
Phenacaine Hydrochlo.	50	sol.	ins.	sol.		
Phenetsal	sp. s.	sol.	sol.			
Phenocoll	sp. s.	sol.				
Hydrochloride	16	sol.				
Phenobarbital	1000	8	13	40	.....	s. alkalies
Soluble	v. s.	sol.	ins.	ins.		
Phenol	15	v. s.	v. s.	v. s.	v. s.	s. oils
Phenolphthalein	ins.	13	70			
Phenolsulfonphthalein	1300	350	sp. s.	sp. s.	.....	s. 500 acetone
Phenyl Salicylate	6670	6	v. s.	v. s.	.....	s. oils
Phloridzin	sp. s.	4	sp. s.			
Phloroglucin	sol.	sol.	sol.			
Phosphorus	ins.	400	102	40	400	carbon disulfide
Physostigmine	sp. s.	v. s.	v. s.	30		
Salicylate	75	16	250	6		
Sulfate	v. s.	v. s.	1200	v. s.		
Picrotoxin	330	13	.....	sol.		
Pilocarpine	sol.	v. s.	sol.	sol.		
Hydrochloride	0.3	3	ins.	366		
Nitrate	4	75	ins.	ins.		
Piperazine	sol.	sol.				
Piperin	ins.	15	36	1:7		
Pitch, Liquid	sp. s.	sol.	sol.	sol.		
Platinum Chloride	sol.	sol.				
Potassium Acetate	0.5	2.9	ins.			
and Sod. Tart.	0.9	sp. s.				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Potassium Arsenite	v. s.	sp. s.				
Benzoate	v. s.					
Bicarbonate	2.8	sp. s.	ins.			
Bisulfite	v. s.					
Bitartrate	155	8820	ins.			
Bromide	1.5	250	.....	.....	4.6	
Carbonate	0.9	ins.	ins.			
Chlorate	16	ins.	ins.	.....	28.2	
Chloride	3	ins.	ins.			
Citrate	0.6	sp. s.	.....	.....	sol.	
Cyanide	2	sp. s.				
Dichromate	9	ins.				
Ferricyanide	4	sp. s.				
Ferrocyanide	4	ins.				
Guaiacolsulfonate	7.5	ins.	ins.			
Hydroxide	0.9	3	sp. s.	.....	2.5	
Hypophosphite	0.6	9	ins.			
Iodide	0.7	22	.....	.....	2	
Nitrate	2.8	620				
Nitrite	v. s.					
Permanganate	13.5	dec.				
Phosphate	sol.					
Salicylate	sol.	sol.	ins.			
Sulfate	10	ins.	ins.			
Sulfide	2					
Sulfite	v. s.	sp. s.				
Sulfocyanate	0.5	12				
Tartrate	0.3	sp. s.				
Procaine Hydrochlor.	0.6	30	sp. s.	sp. s.		
Proflavine	sol.	sol.	sp. s.	sp. s.		
Protargol	1	.....	.....	.....	sol.	
Pyoktannin	75	12	ins.	sol.	50	
Pyridin	a.	a.	a.	a.		
Pyrogallol	1.7	1.3	1.6			
Quinalgen	ins.	sp. s.				
Quinidine	200	20	30			
Sulfate	90	10	sp. s.	19.5		
Quinine	1560	0.8	1.9	1.1	158	
and Urea Hydroc.	0.9	2.4				
Acetate	600	.....	.....	7		

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Quinine Arsenite	sp. s.	15	25	8		
Benzoate	350					
Bisulfate	9	23	2500	625	15	
Carbolate	400	80				
Citrate	900	45				
Dihydrochloride	0.6	12	ins.	sp. s.		
Ethyl Carbamate	sp. s.	2	10	1		
Ferrocyanide	sp. s.	sol.				
Glycerophos.	850	75	ins.	ins.		
Hydrobromide	40	1	23	0.6	7	
Hydrochloride	18	0.8	340	0.7	7	
Hypophosphite	35	12.5	sp. s.	27		
Lactate	3	sol.				
Phosphate	600	sp. s.				
Salicylate	sp. s.	14	160	25	13	
Sulfate	725	107	sp. s.	400	30	
Tannate	800	60	sp. s.	sp. s.		
Tartrate	sol. hot					
Valerate	sp. s.	6	a.			
Quinoline	ins.	a.				
Tartrate	80	150	300			
Resin	ins.	sol.	sol.	sol.		
Resorcin	0.9	0.9	v. s.	sp. s.	v. s.	
Retinol	ins.	ins.	sol.			
Saccharin	290	31	sp. s.	sp. s.	.....	s. alkalies
Soluble	1.2	50				
Safrol	sp. s.	1	a.	a.		
Salacetol	2200	15	sol.	sol.		
Salicin	23.5	88.5	ins.	ins.	8	
Saligenin	sol.	sol.	sol.	sol.	.....	s. oils
Sanguinarine	ins.	v. s.	v. s.	sol.		
Nitrate	sp. s.					
Sulfate	sol.	sol.				
Santonin	5300	43	110	1.7	18	
Scarlet Red	sp. s.	sp. s.	.....	15	.....	s. oils and paraffin
Scopolamine Hydrobromide	1.5	20	ins.	sp. s.		
Shellac	ins.	sol.				
Silver Acetate	100	sp. s.				
Bromide	ins.					

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Silver Chloride	ins.					
Citrate	3800					
Colloidal	50	500				
Cyanide	ins.	ins.				
Iodide	ins.	ins.				
Lactate	15					
Nitrate	0.4	30	sp. s.			
Oxide	sp. s.	ins.				
Phosphate	ins.					
Protein Mild	v. s.	ins.	ins.	ins.		
Strong	v. s.	ins.	ins.	ins.		
Sulfate	200					
Soap	sol.	sol.				
Sodium Acetate	0.8	19				
Arsenate	1.5	sp. s.	ins.	.....	2	
Arsenate, Dried	3.1	sp. s.				
Arsenilate	6					
Arsenite	sol.	sp. s.				
Benzoate	1.8	61	ins.	ins.	15	
Bicarbonate	10	ins.	.....	.....	12.4	
Biphosphate	sol.	sp. s.	sp. s.	sp. s.		
Bisulfite	3.5	70				
Borate	15	ins.	.....	.....	1	
Bromide	1.1	16				
Cacodylate	0.5	2.5				
Carbonate	1.6	ins.	ins.	.....	1	
Monohyd.	3	ins.	ins.	.....	7	
Chlorate	1	100				
Chloride	2.8	ins.	.....	.....	10	
Citrate	1.3	ins.				
Cyanide	v. s.					
Fluoride	25					
Glycerophos	v. s.	ins.				
Hydroxide	0.9	v. s.				
Hypophosphite	1	25	ins.	.....	sol.	
Hyposulfite	0.35	ins.				
Indigotin	sp. s.	ins.				
Iodide	0.5	2				
Nitrate	1.1	100				
Nitrite	1.5	sp. s.				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloro-form	Glyc-erin	Miscellaneous
Sodium Oleate	10	20	sp. s.			
Perborate	40					
Phenolsulfon	4.2	140	.....	.....	5	
Phosphate	2.7	ins.				
Pyrophosphate	11.5	ins.				
Salicylate	0.9	9.2	.....	.....	4	
Santoninate	3	12	ins.			
Sulfate	2.8	ins.	.....	.....	sol.	
Sulfide	v. s.	sp. s.				
Sulfite	1	sp. s.	.....	.....	sol.	
Sulfocarbolate	4.2	140	.....	.....	5	
Sulfocyanate	0.7	4				
Tartrate	5	ins.				
Theobrom. Salicyl.	1	sp. s.				
Thiosulfate	0.5	ins.				
Solanine	ins.	400	sp. s.			
Sparteine	sp. s.	v. s.	v. s.	v. s.		
Sulfate	1.1	3	ins.	ins.		
Spermaceti	ins.	sp. s.	sol.	sol.	.....	s. oils
Stovaine	v. s.	sol.	.....	.....	.....	s. wood alc.
Strontium Bromide	0.35	sol.	ins.			
Carbonate	sp. s.					
Chloride	2	20				
Citrate	sp. s.					
Iodide	0.2	sol.	sp. s.			
Lactate	4	sol.				
Nitrate	.....	sp. s.				
Salicylate	19	61				
Sulfate	7000	ins.				
Strophanthin	v. s.	sol.	sp. s.	sp. s.		
Strychnine	6420	136	5500	5	400	
Acetate	75	.....	.....	15		
Glycerophos	350	310	ins.	sp. s.		
Hydrochloride	35	60				
Nitrate	45	150	ins.	105	50	
Phosphate	30	sp. s.				
Sulfate	35	81	ins.	220	sol.	
Valerate	sp. s.	sol.	sp. s.	sol.		
Sucrol (Dulcin)	800	25				

TABLE OF SOLUBILITIES—*Continued*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Sucrose	0.5	170	ins.	ins.		
Suet	ins.	ins.	60			
Sulfonethylmethane	200	v. s.	v. s.			
Sulfonmethane	365	60	64	11	.....	s. benzol
Sulfur	ins.	sp. s.	sp. s.	sol.		
Iodide	sp. s.	partly	partly	.....	60	
Talcum	ins.	ins.	ins.	ins.		
Terebene	sp. s.	3				
Terpin Hydrate	200	13	140	135		
Thalline sulfate	5	100	sp. s.	sp. s.		
Theobromine	sp. s.	sp. s.	sol.			
Sodio-salicylate	1	sp. s.				
Theophyllin	100	80	ins.			
Ethylene Diamine	5	ins.	ins.			
Sodium Acetate	25	ins.	ins.	ins.		
Thiol	sol.	sol.	sp. s.	.....	sol.	
Thymol	1010	1	1.5	0.7	.....	s. oils
Chloride	.....	5	1.5	2		
Iodide	ins.	sp. s.	v. s.	v. s.	ins.	
Thyroxin	ins.	ins.	ins.	ins.	.....	s. alkalies
Trinitrophenol	78	12	65	35	.....	10 benzene
Trional	200	v. s.	v. s.			
Uranium Nitrate	1.2	sol.	sol.			
Urea	1	5	ins.	ins.		
Vanillin	100	v. s.	v. s.	v. s.	v. s.	
Veratrine	1760	2.8	4.2	0.7		
Wax	ins.	sp. s.	sol.	sol.	.....	s. oils
Wool Fat	ins.	sp. s.	sol.	sol.		
Xeroform	ins.	ins.				
Zinc Acetate	2.3	30				
Bromide	v. s.	v. s.	sol.			
Carbonate	ins.	ins.	ins.			
Chloride	0.25	1.3	sol.	.....	2	
Cyanide	ins.	ins.				
Iodide	v. s.	v. s.	sol.	.....	2.5	
Lactate	58	ins.				
Nitrate	v. s.	sol.				
Oxide	ins.	ins.				
Phenolsulfon	1.6	1.8				
Phosphide	ins.	sol.				

TABLE OF SOLUBILITIES—*Concluded*

	Water	Alcohol	Ether	Chloroform	Glycerin	Miscellaneous
Zinc Salicylate	20	v. s.	v. s.			
Stearate	ins.	ins.	ins.			
Sulfate	0.6	ins.	.....	.....	2.5	
Tannate	ins.	ins.				
Valerate	70	22	sp. s.			

INDEX TO INCOMPATIBILITIES

References are to pages

INDEX TO PRESCRIPTIONS

The reacting ingredients of each prescription are indexed, and references are to prescription numbers in Part II.

The series of prescriptions from number 435 to number 501, for which no comments are given in Part II, are indexed under each individual ingredient of the prescription, followed by +++. In other words, for obvious reasons, no reacting substances are mentioned, and those items which are so indexed do not necessarily enter into any incompatibility.