INCOMPATIBILITIES

IN

PRESCRIPTIONS.

FOR

STUDENTS IN PHARMACY AND MEDICINE
AND PRACTICING PHARMACISTS
AND PHYSICIANS.

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PREFACE.

THE busy prescriptionist is frequently at a loss to know what takes place in the prescription he is filling, and does not have the time nor books necessary to look up the change which he has noticed. The object of the first part of this book is to present to him in a convenient and condensed form the more common incompatibilities. The substances treated of are arranged in alphabetical order of their Latin names, except in case of some of the newer remedies. In order to avoid repetition all the incompatibilities of each substance are not always given under that heading. For instance, the reaction between two substances may be found under the heading of one of the substances and not under the other.

The second object of the writer is to furnish the student of pharmacy with a list of incompatible prescriptions in such form that he may find out for himself what the trouble is, and the best means of avoiding or overcoming it. It is suggested that he study the prescription thoroughly before referring to the notes.

Acknowledgment is hereby made of assistance received from all of the books and journals mentioned in the list of abbreviations of references.

EDSEL A. RUDDIMAN.

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ABBREVIATIONS OF REFERENCES.

Allen :	Allen's Commercial Organic Analysis, 2d ed.
Am. D. :	American Druggist.
A. J. A. :	American Journal of Pharmacy.
A. P. A. :	Proceedings of the American Pharmaceutical Association.
Caspari :	Caspari's Treatise on Pharmacy.
Coblentz :	Coblentz's New Remedies.
D. C. :	Druggists' Circular.
Extra Pharm. :	The Extra Pharmacopœia, by Martindale and Westcott, 7th ed.
M. & M. :	Muir and Morley's edition of Watts' Dictionary.
M. M. R. :	Merck's Market Reports.
Nat. Drug. :	National Druggist.
N. D. :	National Dispensatory, 5th ed.
N. E. D. :	New England Druggist.
Ph. E. :	Pharmaceutical Era.
P. D. :	Thompson's Practical Dispensing.
P. & J. :	Prescott and Johnson's Qualitative Chemical Analysis.
Prescott :	Prescott's Organic Analysis.
Richter :	Richter's Organic Chemistry.
Sayre :	Sayre's Organic Materia Medica.
Scoville :	Scoville's Art of Dispensing.
Sohn :	Sohn's Dictionary of Active Principles of Plants.
Squire :	Squire's Companion to the British Pharmacopœia, 16th ed.
Storer :	Storer's Dictionary of Solubilities.
U. S. D. :	United States Dispensatory.
U. S. P. :	United States Pharmacopœia.
W. D. :	Western Druggist.

PART I.

INCOMPATIBILITIES.

Acacia.—1. An aqueous solution of acacia is gelatinized or precipitated by a solution of a *ferric salt* (not if there is quite a large excess of free acid present or if the iron solution is well diluted with water); by *borax* (not if a sufficient amount of syrup or glycerin is present); by *lead subacetate* (not by neutral lead acetate); by a *silicate of potassium* or *sodium;* by a concentrated solution of *ammonium oxalate;* by a concentrated solution of *mercuric chloride;* and by *alcohol*, when the mixture contains over sixty per cent of alcohol. 2. The mucilage is colored blue by the *tincture of guaiac.* (U. S. D., 670.) 3. Acacia heated with *nitric acid* yields mucic, saccharic, oxalic, and tartaric acids. (M. & M., I. 296.) 4. Strong *sulphuric acid* converts a strong solution of gum into metagummic acid in a few hours. Dilute sulphuric acid converts it into a sugar. (M. & M., I. 296.) 5. Pepsin, in a dilute hydrochloric acid solution, changes acacia into arabinose. (M. & M., I. 296.) 6. In the presence of gum arabic, dilute solutions of salts of *mercury*, *lead*, *copper*, *silver*, *iron*, *arsenic*, etc., do not give precipitates with *sulphuretted hydrogen* or *alkaline sulphides.* Solutions of *alkaloidal salts* are not precipitated by *sodium phosphomolybdate*, by *potassium mercuric iodide*, or by *tannic acid* in the presence of acacia. (Allen, I. 353.) These are properties common to many gums. (M. & M., I. 296.) 7. Acacia prevents the precipitation of some of the metallic salts by alkali hydrates.

Aceta. [See under ACIDUM ACETICUM.]

Acetamide.—1. Acetamide unites directly with *hydrochloric* or *nitric acid.* (M. & M., I. 5.) With *acids* it forms unstable compounds. (Richter, 259.) 2. Boiled with *alkalies* or *acids* it is decomposed, forming acetic acid and ammonia. (Richter, 259.) 3. Acetamide gives a liquid or soft mass when triturated with *bromal hydrate*, *butyl chloral hydrate*, *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *lead acetate*, *pyrocatechin*, *pyrogallol*, *resorcin*, *sodium phosphate*, *thymol*, or *urethane*. With *antipyrin* it forms a damp powder that dries quickly.

Acetanilidum.—1. With *nitrous ether*, *amyl nitrite*, or *nitrous acid*, acetanilid gives a yellow solution, becoming red. The coloration is rather slow with a fresh spirit of nitrous ether. Probably diazo-compounds are formed. (Eccles, D. C., XXXVIII. 38.) 2. With *iodine* or *bromine* it forms compounds which are insoluble in water, but soluble in alcohol. (Moerk, M. M. R., IV. 359.) 3. A cold aqueous solution with *ferric chloride* gives no increase of color, but, if hot, it assumes a deep red color. (Squire, 4.) 4. With a strong solution of *potassa* or *soda*, acetanilid is decomposed slowly, forming anilin. (U. S. D. 10.) 5. In a dilute hydrochloric acid solution with dilute *chlorine* water, it gives a yellow color, becoming green. (N. E. D., 1894, 135.) 6. The *alkali iodides* or *bromides*, in aqueous solution with acetanilid, form insoluble compounds. (Coblentz, 2d ed., p. 1.) 7. A liquid or a soft mass is formed when acetanilid is triturated dry with *chloral alcoholate*, *chloral hydrate*, *carbolic acid*, *pyrocatechin*, *resorcin*, or *thymol*. Rubbed with *antipyrin* it is said to form a soft mass (M. M. R., IV. 359), but, from the experience of the writer, such is not the case.

Acetates. [See under ACIDUM ACETICUM.]

Acida.—1. Acids combine with *metallic oxides* and *hydrates*, with some *metals*, and with *alkaloids* to form salts. 2. They precipitate bismuth citrate from solutions of *bismuth* *and ammonium citrate* by combining with the ammonium. 3. They precipitate potassium bitartrate from solutions of *Rochelle salt* or *normal potassium tartrate*. 4. Strong mineral acids precipitate, from concentrated aqueous solutions of *borates*, *salicylates*, *benzoates*, or *silicates*, the free boric, salicylic, benzoic, or silicic acid. 5. Strong mineral acids form esters and ethers with *alcohol*. Many organic acids, in the presence of certain mineral acids, as sulphuric or hydrochloric, form esters with alcohol. 6. Nearly all acids, except hydrocyanic and hydrosulphuric acids, decompose *carbonates*, liberating carbon dioxide. 7. Acids diminish or prevent the action of *pancreatin*. 8. Organic acids, excepting acetic acid, generally form compounds with the heavy *metallic salts* which are insoluble in water.

The following official preparations contain a free acid: the vinegars of opium and squills; the fluid extracts of conium, ergot, nux vomica, and sanguinaria; glycerite of tannic acid; infusion of cinchona; lemon-juice, solutions of arsenous acid, ammonium acetate, chloride of iron, iron and ammonium acetate, nitrate of iron, subsulphate of iron, tersulphate of iron, and nitrate of mercury; oleates of mercury, veratrine, and zinc; spirit of nitrous ether, usually; syrups of citric acid, hydriodic acid, garlic, calcium lactophosphate, hypophosphites, ipecac, iron quinine and strychnine phosphates, and squills; tinctures chloride of iron, and sanguinaria; ointment of tannic acid and usually ointment of mercury nitrate.

Acidum Aceticum. [See ACIDA.]—1. Acetic acid decomposes nearly all *carbonates*, forming acetates and liberating carbon dioxide. 2. It forms with *chlorine* chloracetic acids, slowly in diffused light, more quickly in sunlight. 3. Soluble acetates and also free acetic acid, with solutions of *ferric salts*, give a deep red color, due to the formation of ferric acetate; this on heating precipitates as the basic ferric acetate. 4. They precipitate solutions of *quinine salts* as quinine acetate.

5. With a mixture of *alcohol* and *sulphuric acid* they form ethyl acetate. 6. The stronger *mineral acids* transpose acetates, liberating acetic acid. 7. Some acetates on being exposed to the air lose acetic acid and absorb carbon dioxide, thus becoming partially insoluble. 8. Nearly all normal acetates are soluble in water, except quinine, silver, and mercurous, the two latter being sparingly soluble. The acetates, except silver and mercurous, are generally soluble in alcohol.

Acidum Arsenicum. — 1. Soluble arsenates precipitate from neutral solutions of salts of *barium*, *calcium*, *lead*, *silver*, *mercury*, *antimony*, *copper*, *iron*, *aluminum*, *chromium*, and *zinc* the arsenates of these metals. The presence of ammonium salts sometimes prevents this precipitation. (P. & J., 124.) 2. In acid solution arsenates are reduced to arsenites by *oxalic acid*, *hypophosphites*, *hydrogen sulphide*, *sulphites*, and *iodides*, forming, respectively, carbon dioxide, phosphoric acid, sulphur, sulphuric acid, and iodine. 3. 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.

Acidum Arsenosum. [See ACIDA.]—1. Arsenous acid combines with the *alkali hydrates* and *carbonates* to form salts. 2. The soluble arsenites precipitate neutral solutions of nearly all metallic salts except those of the alkalies. 3. *Ferric hydrate* or a solution of dialyzed iron gives with arsenites a precipitate of basic ferric arsenite. 4. Arsenous compounds are oxidized to arsenic compounds by *nitric acid*, *chlorine*, *chloric acid*, *bromine*, *bromic acid*, *iodine* in alkaline mixtures, *iodic acid*, *silver salts* in alkaline mixtures, *mercurous* or *mercuric compounds* in alkaline mixtures, *ferric compounds* in alkaline mixtures, *permanangates*, and *chromates*. 5. Arsenous compounds are reduced to metallic arsenic by *hypophosphorus acid* or *hypophosphites* in acid solution. 6. Arsenites of potassium, sodium, and ammonium 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. 7. The insoluble arsenites are transposed by dilute acids.

Acidum Benzoicum. [See ACIDA.]—1. *Hydrogen dioxide* with *sulphuric acid* changes benzoic acid to salicylic acid. 2. *Chlorine* produces chlorobenzoic acid. 3. *Bromine* forms bromobenzoic acid. 4. Soluble benzoates precipitate solutions of ferric salts as ferric benzoate, which is flesh-colored. 5. Aqueous solutions of benzoates, unless too dilute, give a crystalline precipitate of benzoic acid with most *free acids*. 6. Most benzoates are soluble in water, and many are soluble in alcohol. The more sparingly soluble benzoates dissolve readily in aqueous solutions of sodium acetate, lead acetate, or sodium nitrate. (Storer, 61.) The solubility of the free acid in water is increased by the presence of borax or sodium phosphate.

Acidum Boricum. [See ACIDA.]—1. Boric acid combines with the *hydrates* of the *alkalies* and of the *alkaline earths* to form borates. 2. It decomposes *carbonates* of the *alkalies* and of the *alkaline earths*, liberating carbon dioxide. 3. The soluble borates, in concentrated aqueous solutions, give with most *free mineral acids* a precipitate of boric acid. 4. The soluble borates do not generally precipitate borates of the metals. 5. The alkali borates, such as borax, are frequently alkaline in reaction, and consequently cause a precipitation with solutions of many *metallic salts* and most *alkaloidal salts*. 6. All of the borates, excepting those of the alkalies, are insoluble in water, but generally soluble in the presence of free boric acid or tartaric acid. They are all nearly or quite insoluble in alcohol. 7. Borates are transposed by all ordinary acids, with the formation of boric acid; even carbonic acid, under certain conditions, causes a transposition. (P. & J., 174.) [See SODII BORAS.]

Acidum Carbolicum (PHENOL).—1. Carbolic acid absorbs moisture from the air. 2. Liquid carbolic acid on exposure to air becomes pink, red, and even brown. This is probably due to various causes, no explanation being entirely satisfactory. 3. Carbolic acid, in dilute solution with *ferric salts*, gives a violet-blue color which is prevented by acetic acid or alcohol. (M. & M., III. 831.) In concentrated solutions the color does not appear. The presence of many organic compounds prevents its formation. 4. With *ammonia* it gives a colorless mixture which slowly becomes green, then a deep blue, and finally a purplish blue. 5. With *ammonia* and a solution of *sodium hypochlorate* it gives a deep blue color. 6. With a mixture of *sulphuric acid* and *potassium nitrate* it gives a brown color, turning blue on standing. 7. Carbolic acid combines with concentrated solutions of *alkali hydrates* to form carbolates. It does not combine with alkali carbonates. 8. Alkaline solutions of carbolic acid absorb atmospheric oxygen, forming dark-colored products. 9. Phenol coagulates aqueous solutions of *albumen* or *dilute solutions* of *gelatin*. It also coagulates *collodion* (difference from creosote). 10. *Hydrogen dioxide* oxidizes it to pyrocatechin, hydroquinone, and quinone. (M. & M., III. 832.) 11. *Potassium permanganate* oxidizes it to oxalic acid and carbon dioxide. (M. & M., III. 832.) 12. *Nitric acid* oxidizes it to mono-, di-, or tri-nitrophenol, the tri-nitrophenol being known as picric acid. 13. *Nitrous acid* forms nitroso-phenol, in which nitrosyl replaces hydrogen. (M. & M., III. 833.) 14. Carbolic acid with *concentrated sulphuric acid* forms phenol-sulphonic acid. 15. An aqueous solution of phenol with *bromine water* gives a crystalline precipitate of tri-bromophenol. 16. Carbolic acid reduces many metallic salts, especially those of *silver* and *copper*. 17. Carbolic acid gives a liquid or soft mass when triturated with *acetamide*, *acetanilid*, *antipyrin*, *borneol*, *bromal hydrate*, *butyl chloral hydrate*, *camphor*, *monobromated camphor*, *chloral alcoholate*, *chloral hydrate*, *diuretin*, *euphorin*, *exalgin*, *lead acetate*, *menthol*, *methacetin, naphtalin, naphtol, phenacetin, pyrocatechin, pyrogallol, resin, resorcin, salol, sodium phosphate, thymol, urethane, chloralamid, terpin hydrate,* or *antisepsin.* These reactions are due in some cases to the formation of new chemical compounds, and in other cases probably to the fact that carbolic acid is hygroscopic, and liquefies when warmed by the trituration.

Acidum Chromicum.—1. Chromic acid combines with the *alkali hydrates* to form yellow normal chromates and red dichromates. 2. Chromic acid, or chromates in solution with sulphuric acid, are reduced to chromic salts by *tartrates,* producing formic acid, carbon dioxide, and water; 3. by *oxalates,* forming carbon dioxide; 4. by *hypophosphites* (no action in alkaline mixtures), forming phosphoric acid; 5. by *sulphides,* liberating sulphur; 6. by *sulphites,* forming sulphuric acid; 7. by *chlorides,* liberating chlorine; 8. by *bromides,* liberating bromine; 9. by *iodides,* liberating iodine; 10. by *dilute alcohol,* forming aldehyde and acetic acid. 11. Chromic acid, with *strong alcohol, glycerin, ether, volatile oils,* or other readily oxidizable matter, is liable to cause an explosion or the matter to take fire. 12. The soluble chromates and bichromates precipitate aqueous solutions of salts of *lead, silver, mercury, bismuth, manganese, barium,* and *strontium* as chromates, generally normal, varying in color from yellow to red. 13. 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 alkaloids. 14. The chromates of the alkalies, magnesium, calcium, and zinc are soluble in water; the others are sparingly or insoluble in water. They are nearly insoluble in alcohol. 15. Bichromates, triturated with *tannic acid, sugar,* or substances which are easily oxidized, are liable to cause an explosion.

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. (Allen, III. part I. 282.) 2. An ammoniacal solution of chrysophanic acid gives a lilac-colored precipitate with *acetate of lead* and rose-colored with *alum*. (Allen, III. part I. 283.) 3. Strong *nitric acid* (not dilute) converts it into tetranitro-chrysophanic acid. (Allen, III. part I. 283.)

Acidum Citricum.—1. Citric acid forms citrates with most *metallic hydrates* or *carbonates*, with most *acetates*, with *alkaline sulphides*, and with *soap*. 2. With a solution of *potassium tartrate* or *Rochelle salt* a citrate is formed and potassium bitartrate is precipitated. 3. Soluble citrates and also citric acid give, with *lime-water* or aqueous solution of *calcium chloride*, a clear solution, which gives a precipitate of calcium citrate on being heated. 4. Neutral soluble citrates precipitate solutions of *lead acetate* or *silver nitrate* as citrates. 5. An alkaline solution of a citrate with chlorine gives some chloroform. (M. & M., II. 194.) 6. Concentrated *nitric acid* oxidizes citric acid or citrates, forming acetic and oxalic acids. An acidulated solution of potassium permanganate oxidizes it, forming carbon dioxide and acetone. (Allen, I. 453.) 7. A solution of ammonium citrate dissolves the oxides or hydrates of aluminum, iron, nickel, manganese, magnesium, zinc, copper, and mercuric mercury to form double compounds. These salts are not precipitated by the alkali hydrates or carbonates. (M. & M., II. 194.) Heating with fixed alkali hydrates or carbonates may produce a precipitate. A solution of ammonium citrate also aids the solution of some acids, as gallic, salicylic, and benzoic. 7. The citrates of the alkalies are soluble in water; those of iron, zinc, and copper, moderately soluble; the other single citrates are insoluble. Citric acid in excess forms many double citrates which are soluble in water. The alkali citrates in neutral or alkaline mixtures have the property of making many insoluble metallic salts soluble in water. Citrates are generally insoluble in alcohol. 8. The insoluble citrates are transposed by dilute mineral acids.

Acidum Gallicum.—1. 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 by large excess of lime water. (U. S. D., 50.) If the gallic acid is in excess, the color is brown. (N. D., 55.) 2. An aqueous solution exposed to the air decomposes, turning yellow, brown, and black, and deposits a black substance; this is hastened by alkali hydrates, forming tanno-melanic acid. (Allen, III. part I. p. 68.) 3. With excess of *sodium bicarbonate* the liquid becomes indigo-blue and precipitates a deep blue-green solid. (Allen, III. part I. p. 68.) 4. Gallic acid gives a blue-black precipitate or solution with a solution of *ferric chloride*. With an excess of iron the solution is a greenish blue. Heat destroys the color, due (according to Allen, III. part I., p. 68) to the reduction of the ferric iron to the ferrous condition or (according to the U. S. D., 50) to the conversion of gallic acid into pyrogallic acid. 5. Gallic acid with a concentrated solution of a pure *ferrous salt* gives a white precipitate, but no precipitate if the iron solution is dilute. On exposure to air the mixture soon becomes colored, due to the oxidation of the iron. 6. With a solution of *potassium cyanide* gallic acid gives a red color, which quickly disappears. (Allen, III. part I. p. 68.) 7. With a solution of a mixture of *ammonia* and *ammonium chloride* it gives a red color. (M. & M., IV. 633.) 8. With a solution of *tartar emetic* it gives a precipitate of gallate of antimony; the reaction is prevented by ammonium chloride. (Allen, III. part I. p. 68.) 9. *Potassium permanganate* in aqueous solution is reduced. Triturating the two together dry, the gallic acid may take fire. 10. *Nitric acid* oxidizes it, yielding oxalic acid. (M. & M., IV. 632.) 11. Gallic acid reduces salts of *gold* or *silver*. 12. Oxidizing agents, such as *arsenic acid*, *silver oxide*, or *iodine*, with water, convert gallic acid into ellagic acid. 13. Gallic acid does not give a precipitate with solutions of *alkaloids*, *gelatin*, *albumin*, or *starch*. 14. The gallates of the metals, except the alkalies, are insoluble in water. Most of the gallates are insoluble in alcohol.

Acidum Hydriodicum. [See ACIDA.]—1. Soluble iodides and also hydriodic acid precipitate solutions of salts of *lead*, as the bright yellow lead iodide; of *silver*, as the yellow-white silver iodide; of *mercurous mercury*, as the yellow mercurous iodide; of *mercuric mercury*, as the red mercuric iodide. 2. The alkali iodides in excess form double compounds with *lead*, *silver*, and *mercuric* iodides, which compounds are soluble in water. The solution of the double salt of mercuric and potassium iodide is known as "Mayer's reagent," and precipitates nearly all alkaloids. *Mercurous iodide*, with excess of potassium iodide, is decomposed, forming metallic mercury and the soluble potassium mercuric iodide. 3. Soluble iodides precipitate solutions of *bismuth salts* as bismuth iodide, which is quickly decomposed by water, forming an oxyiodide of bismuth. 4. Soluble iodides reduce *cupric salts* in solution and give a precipitate of cuprous iodide; at the same time the solution becomes red, due to the liberation of iodine. 5. Soluble iodides with *ferric salts* in acid solution reduce the ferric to ferrous iron, but give no precipitate; at the same time iodine is liberated. 6. *Nitrites* in acid solution with iodides liberate iodine and form nitric oxide. 7. *Nitric acid* liberates iodine from iodides and then oxidizes it to iodic acid. 8. *Chlorine* oxidizes iodides, liberating iodine; then oxidizes the iodine to iodic acid, and in alkaline mixtures to a periodate. The chlorine is changed to a chloride. 9. *Chlorates* in an acid solution of an iodide liberate iodine and oxidize it to iodic acid. The chlorate becomes a chloride. 10. *Bromine* liberates iodine, and in alkaline mixtures forms an iodate. The bromine becomes a bromide. 11. *Bromates* in acid solution with iodides form iodine and bromine. 12. *Iodates* in acid solution with iodides liberate iodine from both. Iodides sometimes contain iodates as impurities, hence the liberation of iodine on adding an acid. 13. *Arsenic compounds* become arsenous, and liberate iodine from iodides in an acid solution. 14. *Chromates* in acid solutions liberate iodine and form chromic salts. 15. *Permanganates* in acid solutions liberate iodine and, if in great excess, oxidize it to iodic acid. 16. *Hydrogen peroxide* in acid solution liberates iodine from iodides. 17. Iodides sometimes contain carbonates as impurities, and would then have the incompatibilities of carbonates. 18. The alkali iodides precipitate aqueous solutions of many *alkaloidal salts*. This is partially explained by some writers by saying that the iodide of the alkaloid is thrown out of solution by the presence of the metallic iodide. 19. The iodides of lead, silver, mercurous and mercuric mercury, copper, and bismuth are insoluble in water; all others are soluble. Most iodides are soluble in alcohol except lead, silver, and mercurous.

Acidum Hydrobromicum. [See ACIDA.]—1. The soluble bromides and also hydrobromic acid precipitate solutions of salts of *lead*, *silver*, and *mercury* as bromides. 2. In concentrated aqueous mixtures the alkali bromides form soluble double compounds with lead and silver. 3. Alkali bromides with *mercurous chloride* cause the calomel to turn gray or black. Probably a reaction takes place similar to that between calomel and alkali iodides. [See under HYDRARGYRI CHLORIDUM MITE, No. 5.] 4. Bromides with *nitric acid* give bromine. 5. *Chlorine* forms bromine and hydrochloric acid. In alkaline mixtures a bromate is formed. 6. *Chlorates* in acid solution give bromine and hydrochloric acid. 7. *Bromates* in acid solution with bromides liberate bromine from both. 8. *Iodates* in acid solution with bromides liberate iodine and bromine. 9. Bromides in acid solutions reduce *permanganates* to manganous salts and liberate bromine. 10. Bromides in acid solutions reduce *chromates* to chromic salts and liberate bromine. 11. Bromides with an old sample of *spirit of nitrous ether* give free bromine. 12. The alkali bromides reduce antimonic, bismuthic, and cupric compounds. 13. The alkali bromides precipitate some of the *alkaloids* from aqueous solution of their salts. The presence of alcohol generally prevents the precipitation. [See ACIDUM HYDRIODICUM, No. 18.] 14. The alkali bromides sometimes contain carbonates as impurities. In such a case the incompatibilities of carbonates would exist. 15. The metallic bromides are soluble in water, except silver, lead, mercurous, mercuric (sparingly), and bismuth. They are generally somewhat soluble in alcohol.

Acidum Hydrochloricum. [See ACIDA.] — 1. Hydrochloric acid with *chlorates* gives free chlorine and various oxides of chlorine; the mixture of these is sometimes known as euchlorine. 2. Concentrated hydrochloric acid with concentrated *nitric acid* gives chlorine and oxychlorides of nitrogen. 3. *Bromates* with hydrochloric acid give free bromine and chlorine. 4. *Iodates* in dilute solution give no reaction; if concentrated, yellow chloride of iodine is formed. 5. *Permanganates* liberate chlorine and are reduced to manganous chloride. 6. *Chromates* form chromic chloride and liberate chlorine. 7. Hydrochloric acid, being stronger than most other acids, except nitric and sulphuric, very frequently takes the place of these other acids when they are combined with bases. 8. Hydrochloric acid with solutions of *tartar emetic* precipitates a basic compound of antimony. 9. Hydrochloric acid added to an alcoholic solution of *myrrh* gives a red to a violet color; added to alcoholic solution of *balsam of tolu* gives a yellow, changing through a brown to a cherry-red. 10. The soluble chlorides give hydrochloric acid when treated with sulphuric acid. 11. The soluble chlorides and also hydrochloric acid precipitate as chlorides solutions of salts of *lead*, *silver*, and *mercurous mercury*. 12. The soluble chlorides, in concentrated solutions, precipitate a few *alkaloids* from solutions of their salts. 13. The normal chlorides, except lead, mercurous, and silver, are soluble in water. Nearly all except these three are also soluble in alcohol.

Acidum Hydrocyanicum Dilutum [See ACIDA.]. — 1. The aqueous solution of hydrocyanic acid decomposes into formate of ammonium. (Richter, 266.) The presence of *alkalies* aids this reaction. There is also formed a black compound. 2. Concentrated mineral acids produce formic acid and a salt of ammonium. (M. & M., II. 302.) 3. The soluble cyanides (except mercuric cyanide), and also hydrocyanic acid, precipitate the white silver cyanide from solutions of *silver salts*; the precipitate forms soluble double cyanides with the alkali cyanides or hydrocyanic acid. 4. They precipitate solutions of *lead salts* as lead cyanide. 5. They decompose *mercurous compounds*, forming metallic mercury and mercuric cyanide. In case of *calomel*, the powder is colored gray to black by the metallic mercury. (A. P. A., XL. 884.) 6. The alkali cyanides precipitate from solutions of *copper salts* the yellow-green copper cyanide, which is soluble in excess of the alkali cyanide. The cupric cyanide is unstable, becoming cuproso-cupric cyanide. 7. With *hydrogen dioxide* and sulphuric acid, cyanides are decomposed, forming oxamide. (U. S. D., 64.) 8. Cyanides reduce *permanganates*, forming carbon dioxide, nitric, nitrous, oxalic, and formic acids. (M. & M., II. 342.) 9. Cyanides of the alkalies and alkaline-earth metals are decomposed by all acids, even carbonic, with liberation of hydrocyanic acid. 10. The aqueous solutions of the single cyanides are generally alkaline, and may precipitate *alkaloids* from aqueous solutions of their salts as free alkaloids. (Maisch, A. J. P. 1890, 163.) 11. *Atropine* is physiologically antagonistic to cyanides. 12. With *iodine* in concentrated solution, potassium cyanide forms potassium iodide and iodide of cyanogen. (M. & M., II. 342.) 13. Rubbed or heated with *potassium nitrate* or *chlorate*, potassium cyanide detonates violently. 14. Potassium cyanide rubbed in a mortar with *chloral hydrate* reacts with almost explosive violence; sufficient heat is produced to fuse the mass, which is turned brown; a large volume of white vapor is given off; when the two ingredients are powdered and lightly mixed, the reaction is slower. 15. The cyanides of the alkali and alkaline-earth metals and mercuric cyanide are soluble in water; the others are nearly or entirely insoluble. Excepting mercuric cyanide, they are nearly all insoluble in alcohol.

Acidum Hydrosulphuricum. — 1. Hydrogen sulphide precipitates as sulphides aqueous acid solutions of salts of *lead*, black; *silver*, black; *mercury*, black; *arsenic*, yellow; *antimony*, orange-red; *tin*, dark brown; *copper*, black; *cadmium*, yellow; *bismuth*, black. 2. Hydrogen sulphide with *nitric acid* gives sulphur, and the sulphur may be oxidized to sulphuric acid. 3. *Sulphurous acid* gives sulphur and water when mixed with hydrogen sulphide. 4. *Chlorine* gives sulphur, then sulphuric acid and hydrochloric acid. 5. *Chlorates* in acid solution give sulphur, then sulphuric and hydrochloric acids. 6. *Bromine* gives sulphur and hydrobromic acid. In alkaline mixtures a sulphate is formed. 7. *Bromates* in acid solution give hydrobromic acid and sulphur, then sulphuric acid. 8. *Iodine* or *iodates* in acid solution give hydriodic acid and sulphur. 9. *Arsenic compounds* in acid solution are reduced to arsenous with precipitation of arsenous sulphide and free sulphur. 10. *Permanganates* in acid solution give manganous compounds and sulphuric acid. 11. *Chromates* in acid solution are reduced to chromic compounds, and sulphur is liberated. 12. *Ferric compounds* are reduced to ferrous, and sulphur is liberated. 13. *Soluble sulphides* have about the same reducing properties as hydrogen sulphide. 14. The sulphides of potassium, sodium, and ammonium precipitate the same metals as hydrogen sulphide, and in addition *ferrous compounds* (reducing ferric to ferrous first), *zinc*, *cobalt*, *nickel*, and *manganese;* the precipitate is a sulphide, and is black—except zinc sulphide, which is white, and manganese sulphide, which is flesh-colored. Salts of *aluminum* and *chromium* are also precipitated by the alkali sulphides, but the precipitates are hydrates. 15. Sulphides (except mercuric) are transposed or decomposed by *hydrochloric*, *nitric*, and *sulphuric acids.* 16. Sulphides, when triturated dry with *chlorates*, *nitrates*, or other *oxidizing agents*, are liable to explode.

Acidum Hypophosphorosum Dilutum. [See ACIDA.]—Hypophosphites in acid solutions and hypophosphorous acid are oxidized to phosphoric acid by nearly all oxidizing agents, and cause the reduction of these agents as follows: 1. *Nitrous acid* or *nitric acid* forms nitric oxide. 2. *Sulphurous acid* forms sulphur. 3. *Sulphuric acid* is reduced to sulphurous acid and then sulphur. 4. *Chlorine* becomes hydrochloric acid. 5. *Chlorates* form hydrochloric acid or chlorides. 6. *Bromine* and also *bromates* form hydrobromic acid or bromides. 7. *Iodine* and also *iodates* form hydriodic acid or iodides. 8. *Silver*, *mercurous*, and *mercuric compounds* (in acid or alkaline mixtures) are reduced to the metals. 9. *Permanganates* are reduced to manganous salts. 10. *Chromates* are reduced to chromic salts. 11. *Ferric compounds* are reduced to ferrous. 12. *Cupric salts* become cuprous, and with heat metallic copper. 13. *Arsenic compounds* are reduced to arsenous, and then metallic arsenic. 14. Hypophosphites are decomposed by nearly all acids. 15. Hypophosphites when triturated dry with some *oxidizing agents*, as *potassium chlorate*, are apt to explode. 16. Hypophosphites are soluble in water, ferric being only sparingly so.

Acidum Lacticum.—1. Lactic acid displaces *carbonic* and *acetic acids* from their compounds. 2. It coagulates solutions of *albumen*, or of *milk*. (Extra Pharm., 19.) 3. With *nitric acid* it forms oxalic acid. 4. *Chromic acid* oxidizes it to formic and acetic acids. 5. With *potassium permanganate and sulphuric acid* it gives the odor of aldehyde. (U. S. P., 16.) 6. With *potassium permanganate* it gives pyruvic acid. (M. & M., III. 110.) 7. Lactates are generally insoluble in water or alcohol.

Acidum Meconicum.—1. Meconic acid, with a nearly neutral solution of a *ferric salt*, gives a red-colored solution, the color being destroyed by a large excess of hydrochloric acid. 2. With a weak solution of an *ammoniated copper sulphate* solution it gives a green precipitate. 3. It gives a white precipitate with solutions of *lead acetate*, *silver nitrate*, *barium chloride*, and *calcium chloride*. (U. S. D., 69.) 4. *Nitric acid* converts it into oxalic acid. (Allen, III. part II. 337.)

Acidum Nitricum (*concentrated*).—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. Nitric acid oxidizes *hypophosphites* to phosphates; *sulphides* to sulphur, and then sulphates; *sulphites* to sulphates; *bromides* to free bromine; *iodides* to free iodine, and then the iodine to iodic acid; *oxalates* to carbon dioxide; *citrates* to acetic and oxalic acids; *mercurous compounds* to mercuric; *arsenous compounds* to arsenic; *ferrous compounds* to ferric. 3. Nitric acid dissolves many *metals*, while it itself is partly decomposed. 4. With concentrated *hydrochloric acid* it forms chlorine and oxychlorides of nitrogen. 5. With *carbolic acid* it forms picric acid. 6. With *salicylic acid* it forms nitrosalicylic acid. 7. With *alcohol* it acts violently, giving off red fumes, and forming aldehyde, acetic, formic, and carbonic acids. 8. With *creosote*, *volatile oils*, *sawdust*, *and other organic substances* the reaction with nitric acid may be so violent as to cause explosion or ignition. 9. Nitric acid gives color reactions with many of the alkaloids. *Apomorphine* with nitric acid gives a violet-red; *brucine*, a scarlet to a blood-red; *physostigmine*, a yellow or red; *berberine*, a dark brown-red; *codeine*, a yellow; *hydrastine*, an orange; *morphine*, an orange-red, changing to yellow. 10. Nitric acid replaces many weak acids, such as carbonic, acetic, and boric acids, when they are combined with bases. 11. Nitric acid with concentrated sulphuric acid and *glycerin* forms the explosive nitroglycerin. 12. With sulphuric acid and *cotton* or other *cellulose* it forms **gun-cotton**, some of the compounds being explosive. 13. Nitric acid with *sugar* and heat forms oxalic acid. Very concentrated nitric acid in the cold with sugar forms an explosive compound. Dilute nitric acid oxidizes sugar to saccharic acid, while very dilute acid changes it to glucose. 14. Nitric acid with *silver* or *mercuric nitrates* and *strong alcohol* forms the explosive fulminate of silver or mercury. [See ACIDA.]

Dilute nitric acid, while an oxidizing agent, is not as active as the concentrated. It may not give color reactions with some of the alkaloids.

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.

Nitrates with sulphuric acid give nitric acid. Nitrates, particularly those of the fixed alkalies, when triturated with substances capable of being readily oxidized, are liable to explode; some of these substances are charcoal, phosphorus, sulphur, sugar, sulphides, potassium cyanide, glycerin, alcohol, and oils. The nitrates are all soluble in water; the basic nitrates of bismuth and of mercury are insoluble. Most of the nitrates are nearly or quite insoluble in alcohol.

Acidum Nitrohydrochloricum.—Nitrohydrochloric acid has the oxidizing properties of chlorine and the precipitating properties of hydrochloric acid. [See CHLORUM; also ACIDUM HYDROCHLORICUM and ACIDA.]

Acidum Nitrosum.—Nitrous acid and acid solutions of nitrites, such as potassium or sodium nitrites, amyl nitrite, or ethyl nitrite (in spirit of nitrous ether), 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. 1. *Hypophosphites* form phosphoric acid and nitric oxide when mixed with acid solutions of nitrites. 2. *Sulphites* form sulphates and nitric oxide. 3. *Chlorates* form peroxide of chlorine, then hydrochloric and nitric acids. 4. *Iodides* form iodine and nitric oxide. 5. *Iodates* form iodine and nitric acid. 6. *Mercurous salts* are reduced to metallic mercury. *Mercuric salts* are not reduced. 7. *Permanganates* are reduced to manganous salts and nitric acid is formed. 8. *Chromates* are reduced to chromic salts. 9. *Gold chloride* is reduced to metallic gold. 10. Nitrites with *sulphuric acid* and *alcohol* form ethyl nitrite. 11. *Antipyrin* with acid solutions of nitrites give the green isonitroso-antipyrin. A fresh neutral spirit of nitrous ether does not give the color, except on standing for a time. An old spirit gives it quickly, and the compound formed may separate in the form of crystals. This green compound was at one time thought to be poisonous, but is not now generally considered so. 12. *Acetanilid* gives a yellow, or even red, color with nitrites, probably due to the formation of diazo-compounds. (Ph. E., XI. 509.) 13. With *tannic acid* or preparations containing tannin in a large amount, nitrites in acid solution (as an old spirit of nitrous ether) give off gaseous compounds, consisting largely of oxides of nitrogen. 14. Nitrous acid converts *acetic acid* into carbon monoxide and other gases. [See ACIDA.]

Nitrites are all soluble in water, except silver nitrite, which is sparingly soluble.

Acidum Oleicum.—1. Oleic acid combines with *alkalies* to form soaps. 2. *Nitric acid* oxidizes oleic acid to acetic, propionic, butyric, valeric, adipic, azelaic, and other acids. [M. & M., III. 637.] 3. *Nitric acid* containing *nitrous acid* *fumes* or *nitrous acid* converts oleic acid into the isomeric elaidic acid, which is solid. 4. *Potassium permanganate* in alkaline mixtures gives azelaic acid and dioxystearic acids. (M. & M., III. 637.) 5. Concentrated *sulphuric acid* yields oxystearic acid. 6. Oleic acid combines with *bromine* to form dibromostearic acid. (Allen, II. 234.) 7. Iodine combines with oleic acid to form addition products. [See Acida.]

Acidum Osmicum.—1. Osmic acid liberates iodine from potassium iodide. (Extra Pharm., 21.) 2. It converts alcohol into aldehyde and acetic acid. (Extra Pharm., 21.) 3. Becoming reduced to metallic osmium, it blackens nearly everything with which it comes in contact. 4. It decolorizes indigo solution. (P. & J., 164.) 5. It gives a deep violet colored solution or precipitate with sulphites. (P. & J., 164.)

Acidum Oxalicum. [See Acida.]—1. The alkali oxalates and also oxalic acid precipitate as oxalates aqueous solutions of salts of all other common metals, except magnesium, chromium, aluminum, and ferric iron. 2. Concentrated *sulphuric acid* decomposes them, forming carbon monoxide, carbon dioxide, and water. 3. *Nitric acid* forms nitric oxide and carbon dioxide. 4. *Chlorine*, *chlorinated lime*, or a *chlorate* in acid solution, forms carbon dioxide and hydrochloric acid. 5. *Bromates* in acid solutions form bromine and carbon dioxide. 6. *Iodates* in acid solutions form iodine and carbon dioxide. 7. *Arsenic* compounds are reduced to arsenous, and carbon dioxide is formed. 8. *Permanganates* in acid solution are reduced to manganous salts, and carbon dioxide is formed. 9. *Chromates* in acid solution form chromic compounds and carbon dioxide. 10. Oxalic acid reduces *gold* from solutions of its salts. 11. Oxalic acid is transposed by sulphuric, nitric, or hydrochloric acid. 12. The alkali oxalates are soluble in water; the other oxalates for the most part are insoluble. Oxalates are generally insoluble in alcohol.

Acidum Phosphoricum (Ortho-). [See Acida.]—1. Orthophosphoric acid (free) gives a precipitate with solutions of *silver nitrate*, *lead acetate*, or ammoniacal solutions of *chlorides of barium*, *calcium*, or *magnesium*. With a tincture of *ferric chloride* it forms a colorless solution of ferric phosphate. 2. The alkali phosphates precipitate neutral solutions of salts of all other metals. The precipitate is a di- or tri-metallic phosphate, and, excepting lead, mercurous, antimony, and bismuth phosphates, is generally dissolved by phosphoric acid, forming monometallic salts, and by other acids. 3. Orthophosphates with acetic acid or free orthophosphoric acid do not coagulate *egg albumen* or *gelatin* (difference from meta- or pyro-phosphoric acid). 4. *Acetic acid* transposes most of the insoluble phosphates except those of iron, aluminum, and lead. Dilute *hydrochloric*, *nitric*, and *sulphuric acids* transpose all phosphates. 5. Phosphoric acid, by forming the stable ferric phosphate, prevents the formation of the black tannate of iron when solutions of ferric salts are brought in contact with tannic acid or preparations containing tannin. (Extra Pharm., 23.) 6. The di- and trimetallic phosphates except the alkalies are insoluble in water. The monometallic phosphates are soluble in water to some extent. Phosphates are insoluble in alcohol.

Metaphosphoric acid precipitates solutions of *silver nitrate*, *lead acetate*, and also *ferric chloride* (difference from the ortho-acid). It does not cause a precipitation of the ferric phosphate or pyrophosphate when it is added to a solution of the soluble phosphate or pyrophosphate of iron. It coagulates *egg albumen* and a solution of *gelatin*.

Pyrophosphoric acid precipitates solutions of *silver nitrate*, *lead acetate*, *ferric chloride*, *egg albumen*, or *gelatin*. The pyrophosphates of potassium, sodium, and ammonium are soluble in water, and precipitate solutions of salts of nearly all other metals. Most of the pyrophosphates are soluble in solutions of alkali pyrophosphates as double salts. Alkali citrates also have a solvent effect.

Acidum Picricum.—1. Picric acid and picrates precipitate *albumen*, *gelatin*, and most *alkaloids* from aqueous solutions of their salts. 2. Salts of picric acid explode when struck or strongly heated. (Richter, 678.) 3. It is explosive when rubbed or heated with readily oxidizable substances such as sulphur. [See ACIDA.]

Acidum Salicylicum.—1. Salicylic acid decomposes many of the *carbonates*. 2. *Potassium permanganate* oxidizes it to formic acid and carbon dioxide. 3. *Chlorine* forms mono- and di-chloro-oxybenzoic acids. 4. With *fuming nitric acid* it gives picric acid. (Allen, III. part I. 52.) 5. *Nitric acid* in combination with *bismuth oxide* will convert salicylic acid into betanitrosalicylic acid, which is capable of forming a series of salts the appearance of which varies with their composition. The neutral betanitrosalicylate of bismuth forms colorless needles; the basic salt, citron-yellow needles; and the sub-betanitrosalicylate precipitates in needles of a reddish-orange color. (M. M. R., IV. 10.) 6. *Potassium chlorate* with hydrochloric acid converts salicylic acid into tetrachloroquinone. (N. D., 89.) 7. *Iodine* or *iodic acid* gives mono-, di-, and tri-iodo-oxybenzoic acids and tri-iodophenol. (M. & M., III. 680.) 8. Salicylic acid combines with *camphor* in dilute alcoholic solution. (M. & M., III. 680.) 9. Salicylic acid is rendered more soluble in water by the presence of citrates, acetates, or phosphates of the alkalies by forming salicylates of the bases and liberating the citric, acetic, or phosphoric acid. Borax renders it more soluble by forming sodium salicylate. (Extra Pharm., 25.) A solution of salicylic acid and borax in water deposits crystals of $C_{14}H_{10}NaBO_7$. (M. & M., III. 680.) 10. Soluble salicylates and salicylic acid with solutions of *ferric salts* give a bluish-violet solution, or, if the solution be dilute, the color will be violet-red. In nearly neutral concentrated solutions a precipitate of basic ferric salicylate is formed. The color is destroyed by large excess of a free acid. 11. On heating with *copper sulphate* in dilute solution, they give an emerald-green colored solution from which the copper is not precipitated by alkalies. (M. & M., III. 680.) 12. *Bromine water* gives a precipitate with dilute solutions of the salicylates. 13. *Lime water* gives a precipitate of calcium salicylate when concentrated solutions are mixed. A 10 per cent. solution of calcium chloride gives no precipitate with a 10 per cent. solution of sodium salicylate. (A. P. A., XL. 1023.) 14. Salicylates or salicylic acid with *spirit of nitrous ether* give a yellow solution, turning red, brown, or even black. 15. Salicylic acid makes a liquid or soft mass when triturated with *exalgin, lead acetate, sodium phosphate*, or *urethane*. It is said to give a mass with *antipyrin* or *phenacetin*, but according to the writer's experiments this is not the case. Sodium salicylate is said to give a soft mass with *antipyrin* or *phenacetin*, but this is probably not true. It gives a stiff mass with *lead acetate* and a slightly damp powder with *sodium phosphate*. 16. Solutions of the salicylates in water become colored on standing, due perhaps to the formation of oxidation products. 17. Mineral *acids* and some organic acids liberate the salicylic acid from aqueous solutions of salicylates. The acid, being but slightly soluble, is generally precipitated. 18. With solutions of *quinine salts* soluble salicylates give a curdy, nearly insoluble precipitate of salicylate of quinine. 19. Neutral salicylates (not salicylic acid) precipitate solutions of *lead acetate* or *silver nitrate*. (Allen, III. part I. 52.)

Acidum Stearicum.—1. Stearic acid combines with *alkali hydrates* and their *carbonates*. 2. *Nitric acid* forms succinic and other acids. (M. & M., IV. 512.) 3. *Bromine water* forms mono- and di-bromostearic acid. (M. & M., IV. 513.)

Acidum Sulphuricum.—1. Sulphuric acid transposes the salts of nearly all other acids. 2. The concentrated acid with most organic matter forms a black mass, due to the extraction of elements of water, leaving carbon. Some organic acids, many alkaloids, and some other compounds are not thus effected. 3. With *alcohol* sulphuric acid forms ethylsulphuric acid and then ether. 4. Sulphuric acid dissolves many *metals* with the evolution of hydrogen, or sulphur dioxide where the acid is concentrated. 5. *Oxalic acid* is decomposed, forming water, carbon monoxide, and carbon dioxide. 6. With *hypophosphorous* acid it forms sulphurous acid, then sulphur. 7. *Hydriodic acid* with concentrated sulphuric acid forms iodine and sulphurous acid. 8. *Hydrobromic acid* in concentrated solution with strong sulphuric acid forms bromine and sulphurous acid. 9. Concentrated sulphuric acid causes detonation with *chlorates*, with evolution of greenish-yellow chlorine peroxide. 10. Sulphuric acid and soluble sulphates precipitate as sulphates, solutions of salts of *lead, barium, strontium*, and *calcium* (in concentrated solution). 11. With aromatic sulphuric acid, water precipitates the aromatics. 12. The sulphates of lead, barium, strontium, and calcium are nearly insoluble in water; silver and mercurous sulphates are sparingly soluble; mercuric, antimony, and bismuth sulphates are soluble in acidulated water; the others are soluble in water.

Acidum Sulphurosum. [See ACIDA.]—1. Sulphurous acid on exposure to air is slowly oxidized to sulphuric acid. 2. Sulphurous acid does not precipitate solutions of metallic salts due to the solubility of sulphites in acids. It generally contains sulphuric acid, which may cause a precipitation with some of the metals. 3. Sulphurous acid has a bleaching effect upon *litmus* and other *organic coloring substances*. 4. It decomposes *carbonates*. 5. The soluble sulphites—potassium, sodium, and ammonium—precipitate neutral solutions of salts of all other metals. 6. Sulphites are decomposed by nearly all acids, except carbonic, boracic, hydrocyanic, and in some instances hydrosulphuric. 7. Sulphites give a red color with a dilute *ferric chloride* solution, due to the formation of ferric sulphite. On warming the color is destroyed, due to the change of the ferric sulphite to ferrous sulphate. 8. *Nitric acid* or *nitrous acid* oxidizes sulphites to sulphates. 9. *Hypophosphites* in acid solution with sulphites form phosphoric acid and sulphur. 10. *Hydrogen sulphide* with sulphurous acid gives sulphur and water. 11. *Chlorine* with sulphites forms sulphates and chlorides. 12. *Chlorates* in acid solution with sulphites form sulphuric and hydrochloric acids. 13. *Bromates* in acid solution give first bromine and then the *bromine* is changed to hydrobromic acid. 14. *Iodates* in acid solution give first iodine and then the *iodine* is changed to hydriodic acid. 15. *Silver salts* are reduced to metallic silver when warmed with sulphites. 16. *Arsenic compounds* are reduced to arsenous. 17. *Permanganates* in acid solution are reduced to manganous compounds. 18. *Chromates* in acid solution are reduced to chromic salts. 19. *Mercuric* and also *mercurous nitrates* are reduced to metallic mercury. *Mercuric chloride* is slowly reduced to mercurous chloride, and on long boiling to metallic mercury. 20. The sulphites of the alkali metals are soluble in water; the others are insoluble or sparingly so. The sulphites are insoluble in alcohol.

Acidum Tannicum.—1. An aqueous solution of tannic acid slowly changes to some extent to gallic acid, and probably some ellagic acid. The solution gets darker on standing, and this is hastened by the presence of alkalies. 2. Tannic acid gives a precipitate with solutions of *albumen*, *gelatin*, *gluten*, and *starch*. 3. It precipitates nearly all *alkaloids* as tannates from aqueous or very dilute alcoholic solutions of their salts; the precipitate is generally soluble in strong alcoholic mixtures, and also in the presence of some organic acids. 4. Tannic acid precipitates some *glucosides* and some *neutral* or *bitter principles*. 5. It precipitates as tannates solutions of salts of many of the *metals*, especially *lead*, *copper*, *silver*, *chromium*, *mercury*, *bismuth*, and *antimony*. 6. *Potassium hydrate* or its *carbonate* gives, with a concentrated solution of tannic acid, a compound which is but slightly soluble in water, but dissolves in a certain excess of the alkali. (U. S. D., 101.) *Ammonia* in its reactions resembles potassium. *Sodium hydrate* gives no precipitate. (U. S. D., 101.) 7. An aqueous solution of tannic acid added to a small amount of *lime water* gives a bluish-white flocculent precipitate. On adding a moderate excess of lime water the precipitate is more copious and of a darker blue. (U. S. D., 100.) Lime water gives with tannic acid a white precipitate, turning blue. (Allen, III. part I. p. 89.) 8. The alkali tannates give precipitates with neutral solutions of *salts* of nearly all other *metals*. 9. A solution of tannic acid gives precipitates with *sulphuric*, *nitric*, *hydrochloric*, and *arsenic* acids. The precipitates are supposed to be compounds of tannic acid and the respective acids, and are soluble in pure water, but not in acidulated water. (U. S. D., 101.) 10. With dilute solutions of *ferric salts* tannic acid gives a blue-black or green-black solution. If the solutions are concentrated a precipitate results. 11. With purely *ferrous salts* in concentrated solution it gives a white, gelatinous precipitate, which on exposure to air quickly becomes blue. Nearly all commercial samples of ferrous salts contain more or less ferric compounds. 12. *Ammonia water* with *ammonium chloride* and tannic acid gives a white precipitate, rapidly becoming red. (M. & M., IV. 633.) 13. *Potassium cyanide* gives a green coloration with a solution of tannic acid. (M. & M., IV. 634.) No reaction takes place. (Allen, III. part I. 69.) 14. *Potassium bichromate* gives a brown precipitate with solutions of most tannins. (M. & M., IV. 634.) 15. With *iodine* and water tannic acid 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 to form an insoluble compound. The solution is capable of dissolving iodine. The iodine in a liquid containing tannic acid does not color starch blue. (U. S. D., 101.) 16. *Chlorine water* with *ammonia* and tannic acid gives a red color. 17. Saturated solutions of sodium chloride, calcium chloride, and some other salts precipitate tannic acid from its solution. 18. *Nitric acid* rapidly oxidizes it to oxalic acid. (Allen, III. part I. p. 89.) 19. Tannic acid reduces salts of *gold*, *silver*, *mercury*, and *copper*. 20. It reduces *permanganates*. 21. *Chlorine*, *bromine*, *iodine*, and *chromic acid* react violently with tannin. (Allen, III. part I. p. 89.) 22. Triturated with *potassium chlorate*, or other substances which yield their oxygen readily, tannic acid is liable to explode. 23. With *nitrous acid*, *spirit of nitrous ether*, or *amyl nitrite* tannic acid forms gaseous compounds, some of which are oxides of nitrogen. 24. All drugs or preparations containing tannic acid in large proportions will have the incompatibilities given above. Some of the drugs which contain notable quantities of tannin are catechu, kino, krameria, logwood, geranium, blackberry-root bark, and oak-bark. 25. Tannic acid precipitates solutions of *antipyrin*. 26. Tannic acid decomposes *iodoform*. (U.S.D., 741.)

Acidum Tartaricum.—1. Tartaric acid in excess, with solutions of *potassium hydrate* (not too dilute) or its *salts*, gives a crystalline precipitate of potassium bitartrate. 2. Tartaric acid in excess with *ammonia* in strong solution gives a precipitate of ammonium bitartrate. 3. The soluble tartrates precipitate neutral solutions of salts of most metals as tartrates. The precipitate is generally soluble in tartaric acid or mineral acids. Many of the tartrates with the alkali hydrates form soluble compounds, due to the formation of double tartrates. 4. Under certain conditions tartrates reduce salts of *gold*, *silver*, and *platinum*; *mercuric chloride* becomes mercurous chloride. 5. *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. 6. *Chromates* are reduced to chromic compounds, and formic acid, carbon dioxide, and water are formed. (M. & M., IV. 642.) 7. Tartaric acid and tartrates tend to prevent the precipitation by alkali hydrates of the oxides and hydrates of the metals *aluminum*, *bismuth*, *nickel*, *cobalt*, *chromium*, *copper*, *iron*, *lead*, and *zinc*. (M. & M., IV. 641.) 8. Tartrates are transposed by mineral acids. 9. 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 insoluble. Tartrates are insoluble in alcohol.

Aconitina.—1. Aconitine is decomposed by heating with *acids*, *alkalies*, or *water*, forming benzoic acid and aconine. 2. *Nitric* acid gives a reddish-brown solution. 3. Aconitine is precipitated by the *general alkaloidal reagents*. [See ALKALOIDS.] 4. *Strychnine*, *atropine*, *scoparine*, *morphine*, and *digitalis* are more or less incompatible physiologically.

Adeps.—Lard is decomposed by *alkali hydrates* or *carbonates*, forming oleates, stearates, and palmitates of the alkalies and glycerin. [See ACIDUM OLEICUM, also ACIDUM STEARICUM.]

Æther.—1. Ether with *bromine* forms ethyl bromide, bromal, and other products, after a few days. (M. & M., II. 465.) 2. Hot *nitric acid* forms acetic acid, oxalic acid, and carbon dioxide. 3. *Chromic acid* oxidizes it to acetic acid. (M. & M., II. 465.)

Æther Aceticus.—1. Acetic ether or ethyl acetate in the presence of moisture decomposes into alcohol and acetic acid. (M. & M., I. 14.) 2. With *alkali hydrates* it yields alcohol and acetate of the alkali. 3. Dilute *chromic acid* oxidizes it to acetic acid. 4. With *chlorine* it forms chlorinated compounds. 5. With *lime water* and *chlorinated lime* it yields chloroform.

Æthyl Bromidum.—1. Ethyl bromide is decomposed by light and air, forming alcohol, hydrobromic acid, and some free bromine. (N. D., 141.) 2. With *alkali hydrates* it gives ether and potassium bromide. (M. & M., II. 480.)

3. Ethyl bromide with *ammonia* gives ethylamine. (M. & M., II. 480.)

Æthyleni Bichloridum.—1. Dichlorethane with water in the sunlight yields hydrochloric acid and acetic ether. 2. *Chlorine* forms addition products. 3. *Ammonia water* forms various ethylene amines. (M. & M., II. 488.) 4. *Alcoholic potash* gives ethylene and vinyl chloride. (M. & M., II. 488.)

Æthyl Iodidum.—1. Ethyl iodide or hydriodic ether on being exposed to air and light is decomposed, with liberation of iodine. (U. S. D., 1625.) 2. Concentrated *nitric acid* liberates iodine. 3. *Chlorine* gives ethyl chloride and iodine. 4. *Bromine* gives ethyl bromide and iodine. 5. *Chromic acid* gives acetic acid and iodine. (M. & M., II. 499.) 6. Concentrated *sulphuric acid* liberates iodine. 7. *Silver nitrate* gives a precipitate of silver iodide. (M. & M., II. 499.)

Albumen.—Aqueous solutions of albumen are coagulated or precipitated by *heat*, most *mineral acids*, *tannic acid* and substances containing it (not by gallic acid), *carbolic acid* (not by creosote), *alcohol*, *ether*, *collodion*, *lactic acid*, *picric acid*, *acetic acid* with heat, *trichloracetic acid*, *resorcin*, *mercuric chloride* (prevented to considerable extent by the presence of sodium or ammonium chloride), *alum*, *copper sulphate*, *ferric chloride*, salts of most *heavy metals*, some neutral salts as *ammonium sulphate*, *metaphosphoric acid* (not by ortho- or pyro-phosphoric acid), *coniine* (not by nicotine), *hydrogen peroxide water*, *camphor*, *thymol*, and *volatile oils*.

Alcohol.—1. Alcohol precipitates *albumen*, *acacia*, and many *inorganic salts* from their aqueous solutions; the resulting mixture must generally contain above 50 or 60 per cent. alcohol before a permanent precipitate results. 2. Strong *nitric acid* acts violently on alcohol, forming nitric oxide, nitrous ether, carbon dioxide, aldehyde, acetic acid, and formic acid. (M. & M., I. 97.) 3. *Chromic acid* or a *bichromate* with sulphuric acid oxidizes alcohol to aldehyde and acetic acid. 4. *Potassium permanganate* in acid (not in alkaline) solution oxidizes it to aldehyde and acetic acid. 5. *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.) 6. *Bromine* forms hydrobromic acid, water, ethyl bromide, bromal, and bromal alcoholate. (M. & M., I. 97.) 7. *Mercuric chloride* is slowly reduced to calomel by alcohol. (M. & M., I. 98.) 8. *Nitric acid* with the *nitrate of silver* or *mercury* and strong alcohol forms the explosive fulminate of silver or mercury (M. & M., I. 97.) 9. *Concentrated mineral acids* convert alcohol into ethers. 10. Alcohol sometimes contains traces of aldehyde or other impurities which are darkened by alkali hydrates. 11. The official alcoholic preparations, except those mentioned in the following classes, give precipitates when mixed with water; in some instances the precipitate is the active principle, and sometimes inert matter: Tinctures, except acetate of iron, chloride of iron, an *old* tincture of iodine and deodorized tincture of opium; fluid extracts, except chestnut; spirits, except nitrous ether, ammonia, whiskey, and brandy; wines, except white, red, and antimonial. 12. Water generally causes a precipitation, when mixed with alcoholic solutions, of free alkaloids, alkaloids combined with any of the general alkaloidal reagents, glucosides, neutral and bitter principles, salicylic acid, benzoic acid, volatile oils, resins, camphors, oleoresins, or balsams.

Alkalies. [See HYDRATES, FIXED ALKALI, and also HYDRATES, VOLATILE ALKALI.] — The following preparations contain an alkali hydrate or carbonate: Ammonia water, stronger ammonia water, bismuth and ammonium citrate, fluid extracts of glycyrrhiza and senega, saccharated carbonate of iron, ammonia liniment, lime liniment, lime water, solution of potassium hydrate, solution of potassium arsenite, solution of sodium hydrate, mass of carbonate of iron, Griffith's mixture, chalk mixture, mixture of rhubarb and soda, pills carbonate of iron, spirit of ammonia, aromatic spirit of ammonia, syrup of lime, ammoniated tincture of guaiac, ammoniated tincture of valerian, and syrup of rhubarb.

Alkaloids.—1. Alkaloids combine with *mineral acids* and *acetic* or *citric* acids to form salts, which are generally soluble in water or alcohol, but insoluble in ether, chloroform, benzol, benzin, carbon bisulphide, or oils. 2. Alkaloids combined with acids and dissolved in water or very dilute alcohol are generally precipitated as free alkaloids by solutions of alkali hydrates, alkaline carbonates or bicarbonates, borax and soluble borates, and sodium phosphate. They are generally precipitated in combination with the precipitant by soluble salicylates, soluble benzoates, bichromates, iodides, bromides, and by the following general alkaloidal reagents: tannic acid, picric acid, iodine in a solution of potassium iodide, bromine in a solution of potassium bromide, potassium mercuric iodide (Mayer's reagent), potassium bismuthic iodide, potassium cadmic iodide, mercuric chloride, platinic chloride, gold chloride, phosphomolybdic acid and phosphotungstic acid. M. Christiaens says: All salts whose reaction to litmus is alkaline, whatever be their chemical function, precipitate the alkaloids from their salts. (D. C., XXXVIII. 59.) The free alkaloids and the compounds formed by the above-mentioned reagents are generally soluble in a mixture containing 50 per cent. alcohol. 3. In the presence of gum arabic, the alkaloids are not precipitated from aqueous solutions of their salts by tannic acid, potassium mercuric iodide, or sodium phosphomolybdate. (Allen, I. 353.) Starch dissolved by boiling water has a similar effect. 4. Some alkaloidal salts are thrown out of solution by the presence of very soluble inorganic salts, e.g., strychnine hydrochlorate by ammonium chloride. 5. Tartaric, oxalic, and phosphoric acids form insoluble compounds with some alkaloids. 6. Some alkaloids are strong reducing agents; most alkaloids are decomposed by *oxidizing agents*. 7. The free alkaloids are generally insoluble in water, except 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 hydrates, e.g., morphine; a few are soluble in excess of ammonia water, e.g., quinine. 8. A solution of chloral hydrate dissolves morphine, quinine, and many other alkaloids. (U. S. D., 367.)

Aloinum.—1. Concentrated solutions of aloin are precipitated by *basic lead acetate* (not by the neutral acetate), *tannic acid*, or *bromine water*. 2. With a solution of *ferric chloride* it gives a green-black color. Ferric chloride is said to precipitate all aloins. 3. With *alkali hydrates* an orange-yellow solution is formed, which readily decomposes. 4. Concentrated *nitric acid* gives a red color with barbaloin or nataloin (not with socaloin), and by further action picric and oxalic acids are formed.

Alumen.—1. Alum in solution is precipitated as aluminum hydrate by the *alkali hydrates* and their *carbonates*, *borax*, and *lime water*. 2. With *tartaric acid* it gives a precipitate of potassium bitartrate. 3. The *alkali phosphates* give the insoluble aluminum phosphate. 4. It has the incompatibilities of the soluble sulphates. [See ACIDUM SULPHURICUM.]

Alumini Hydras.—Aluminum hydrate, especially when freshly precipitated, removes suspended solid matter and coloring matter in solution from liquids.

Alumnol.—1. A solution of alumnol gives a precipitate of aluminum hydrate when treated with *alkalies*, the precipitate being soluble in excess of fixed alkali hydrates. 2. It is also precipitated by a solution of *albumen* or *gelatin*, the precipitate being soluble in excess of these substances. 3. *Silver nitrate* is decomposed by it with the separation of metallic silver. (Moerk, M. M. R., IV. 266.)

Ammonii Benzoas. [See soluble benzoates under ACIDUM BENZOICUM, and also AMMONIUM.]

Ammonii Bromidum. [See soluble bromides under ACIDUM HYDROBROMICUM, and also AMMONIUM.]

Ammonii Carbonas.—Ammonium carbonate with *calomel* gives a black compound having the following formula: NH_2Hg_2Cl. With a solution of *mercuric chloride* it gives a white precipitate of ammoniated mercury. It gives no precipitate with *magnesium salts,* except in concentrated solutions. The precipitate with *copper* or *silver salts* is dissolved by excess of the carbonate. With these exceptions, ammonium carbonate acts similarly to potassium or sodium carbonate. [See CARBONATES, and also AMMONIUM.]

Ammonii Chloridum.—An aqueous solution is decomposed by chlorine, forming hydrochloric acid and explosive nitrogen chloride. (M. & M., I. 202.) [See soluble chlorides under ACIDUM HYDROCHLORICUM, and also AMMONIUM.]

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

Ammonii Nitras. [See soluble nitrates under ACIDUM NITRICUM, and also AMMONIUM.]

Ammonii Phosphas. [See soluble phosphates under ACIDUM PHOSPHORICUM, and also AMMONIUM.]

Ammonii Valerianas.—Ammonium valerianate, in concentrated aqueous solution with *sulphuric acid,* gives an oily layer of valerianic acid. [See AMMONIUM.]

Ammonium.—1. Ammonium compounds, with solutions of the *fixed alkali hydrates* or *carbonates,* or with the *hydrates* of *barium, calcium,* or *strontium,* give free ammonia. 2. Some ammonium salts with *chlorine gas* give explosive nitrogen chloride. 3. Some ammonium salts, such as the acetate, citrate, and chloride, in aqueous solution may act as solvents for otherwise insoluble compounds. [For ammonia water see HYDRATE, VOLATILE ALKALI.]

Amyl Nitris.—1. Amyl nitrite is decomposed slowly by light and air, becoming acid. (Allen, I. 158.) 2. With *alcohol* or alcoholic preparations, it gradually forms ethyl nitrite and amyl alcohol. (U. S. P., 40.) 3. With *potassium hydrate* it forms potassium nitrite and amyl alcohol. (Allen, I. 159.) 4. *Chloroform*, *morphine*, and *strychnine* are somewhat antagonistic physiologically to amyl nitrite. [See also ACIDUM NITROSUM.]

Amylum.—1. Starch in aqueous solution is precipitated by *strong alcohol*, *lime water*, *tannic acid*, or a solution of *subacetate of lead*. 2. Starch with *iodine* forms the blue-black iodide of starch. 3. *Bromine* colors it yellow. 4. Starch in aqueous solution is oxidized by *chlorine* or *bromine* to gluconic acid. 5. With solutions containing over five per cent. of an *alkali hydrate* it forms a soluble compound. 6. *Acids* gradually change it to dextrin. *Diastase* has a similar action.

Antimonii et Potassii Tartras.—1. Tartar emetic in aqueous solution is precipitated by *hydrochloric*, *nitric*, or *sulphuric acid*, forming a basic chloride, nitrate, or sulphate of antimony. (U. S. D., 177.) 2. *Ammonia* or *ammonium carbonate* gives a precipitate of the oxide of antimony. (U. S. D., 177.) 3. *Potassium hydrate* or *carbonate* gives, with solutions not too dilute, a white precipitate of oxide of antimony. 4. *Lime water* throws down a precipitate consisting of the mixed tartrates of calcium and antimony. (U. S. D., 177.) 5. The salts of most metals and earths, being precipitated by normal tartrates, are incompatible with tartar emetic. (N. D., 218.) 6. Strong *alcohol* throws it out of aqueous solution. 7. *Tannic acid* gives a precipitate of tannate of antimony. 8. In aqueous solution *mercuric chloride* is reduced to calomel by tartar emetic. (M. & M., IV. 643.) 9. *Hydrogen sulphide* does not precipitate solutions of tartar emetic except they be acidulated with a mineral acid. 10. Salts of antimony precipitate *mucilage* and *albumen*. (Scoville, 225.)

Antimonii Sulphidum.—1. Triturated with a strong *oxidizing agent*, such as potassium chlorate, sulphide of antimony may explode. 2. Concentrated *nitric acid* forms the nitrate and sulphate of antimony.

Antipyrinum.—1. Antipyrin forms salts with *acids*. (N. D., 227.) 2. Antipyrin, with substances containing *nitrous acid*, such as *spirit of nitrous ether* or *amyl nitrite*, gives a green solution, and on standing there may be formed some green crystals if the solution is concentrated. This green compound formed is isonitroso-antipyrin. According to Sayre (Sayre, p. 518), there is also formed a small amount of hydrocyanic acid. 3. A dilute solution of antipyrin and *sodium nitrate* with a little dilute sulphuric acid gives a deep green color. (U. S. D., 1021.) 4. A 1 per cent. solution of antipyrin, with an equal volume of *nitric acid*, gives a yellow solution, passing into a crimson on warming. (U. S. D., 1021.) 5. With a solution of *ferric chloride* it gives a deep red color. 6. With a solution of *copper sulphate* it gives a green color. 7. With *ferrous sulphate* it gives a reddish color, probably due to the ferric sulphate present. 8. *Syrup iodide of iron*, free from iodine, soon turns red, and in a few hours it gives a reddish-brown precipitate with antipyrin. The precipitate, after standing a few days, becomes crystalline, and gives comparatively large prismatic or needle-shaped crystals of a ruby-red color. 9. A solution of *iodine* gives with a solution of antipyrin a red-brown precipitate, which with excess of antipyrin dissolves, and the solution becomes colorless. There is probably formed the colorless iodoantipyrin (iodopyrin). 10. *Bromine* forms a compound with antipyrin. 11. *Chromic acid* gives an orange precipitate. (M. & M., III. 746.) 12. *Picric acid* precipitates antipyrin from solution. 13. An aqueous solution of antipyrin gives a precipitate with *mercuric chloride*, *Donovan's solution*, *tannic acid* or preparations containing it in considerable amount, and by most of the *general alkaloidal reagents*. [See under ALKA-

LOIDS.] 14. Crystallized *carbolic acid* when triturated with antipyrin gives an odorless liquid called phenopyrin. On mixing aqueous solutions of these two chemicals a turbidity results, and on allowing the mixture to stand for a few hours an oily liquid settles to the bottom. 15. Triturating 165.5 parts of chloral hydrate with 188 parts of antipyrin forms the oily liquid monochloral-antipyrin, from which hypnal is obtained by dissolving it in hot water and crystallizing. If one half the amount of antipyrin be used, there will be formed dichloral-antipyrin. Moderately dilute aqueous solutions of antipyrin and chloral hydrate can be mixed without incompatibility. (Squire, 398.) 16. Antipyrin gives a liquid or soft mass when triturated with *carbolic acid, choral alcoholate, pyrocatechin, pyrogallol, resorcin, thymol,* or *urethane.* With *bromal hydrate, salol, acetamide,* or *choral hydrate* it gives a damp powder which quickly dries. It is said to give a mass with *acetanilid, butyl chloral hydrate, salicylic acid,* or *sodium salicylate,* but this seems to be a mistake. 17. When antipyrin is rubbed with *sodium salicylate* there is formed after a time a mass or liquid due probably to the absorption of moisture from the air. (N. D., 227.) In solution they do not act on each other. (Sayre, 518.) 18. Antipyrin dissolved in wine causes the gradual precipitation of the coloring matter of the wine. (N. D., 227.) 19. It slowly reduces *potassium permanganate,* precipitating the manganese dioxide. 20. Antipyrin increases the solubility of caffeine and of quinine salts. (Coblentz, 2d ed., 10.) 21. When antipyrin and *calomel* are triturated together in the presence of water, the mixture turns gray, due to metallic mercury and mercurous oxide. At the same time mercuric chloride is formed. (M. M. R., v. 358.) 22. Antipyrin forms a precipitate with *cinchona alkaloids* which is soluble in weak acids. (Extra Pharm., 135.) 23. It is said to be incompatible with *lead subacetate, sodium bicarbonate, ammonia* *water*, *alum*, *hydrocyanic acid*, *tartar emetic*, *arsenic*, *benzoates*, and *iodides*.

Apomorphinæ Hydrochloras.—1. An aqueous solution of apomorphine hydrochlorate rapidly becomes green in color; the exact change which takes place has not been determined. 2. An aqueous solution is precipitated by the *alkali hydrates* 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. With a concentrated solution of *ferric chloride* it gives a red precipitate, turning black. (Sohn, 68.) According to Morley and Muir (M. & M., III. 440), an amethyst color is produced. 5. Concentrated nitric or sulphuric acid added to the crystals gives a red solution. 6. Apomorphine hydrochlorate in aqueous solution reduces *iodates*, *permanganates*, and *silver nitrate*. 7. *Strychnine*, *chloral hydrate*, and *chloroform* are somewhat incompatible with it physiologically.

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. [See HYDRATES, VOLATILE ALKALI.]

Aqua Amygdalæ Amaræ. [See ACIDUM HYDROCYANICUM and also BENZALDEHYDUM.] If the water is made from the artificial oil of almonds, it does not contain hydrocyanic acid.

Aqua Chlori. [See CHLORUM.]

Aqua Cinnamomi. [See OLEUM CINNAMOMI.]

Aqua Creosoti. [See CREOSOTUM.]

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 potassium bromide is dissolved in it.

Aqua Hydrogenii Dioxidi.—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 dioxide slowly undergoes decomposition, liberating oxygen, and if the bottle is tightly corked a sufficient pressure may be produced to burst the bottle. 3. Hydrogen dioxide is a strong oxidizing agent, changing *mercurous* compounds to mercuric, *ferrous* to ferric, *arsenous* to arsenic, *hypophosphites* to phosphates, and *sulphites* to sulphates. 4. With *hydrogen sulphide* sulphur is liberated. 5. *Iodides* are oxidized, liberating iodine. 6. Hydrogen peroxide reduces *potassium permanganate*, and is itself reduced, the products in a sulphuric acid solution being manganous sulphate, potassium sulphate, water, and oxygen. 7. It reduces *gold, silver, mercuric mercury*, and *platinum* from their oxides. (P. & J., 212.) 8. *Chlorine* forms hydrochloric acid and oxygen. (M. & M., II. 723.) 9. It bleaches *litmus* and most organic colors. 10. *Ammonia* in solution forms ammonium nitrite. (M. & M., II. 723.) 11. *Caustic alkalies* decompose it, forming oxygen and water. 12. Hydrogen dioxide oxidizes *carbolic acid* to pyrocatechin, hydroquinone, and quinone. (M. & M., III. 832.) 13. Some substances, such as ammonia, hydrocyanic acid, tobacco, aconite, and most narcotic substances are unaffected by it, and restrain its oxidizing influence on other bodies. (U. S. D., 213.) 14. Hydrogen dioxide coagulates *albumen*. (U. S. D., 214.) 15. *Chromic hydrate* in the presence of an alkali hydrate is oxidized to a chromate. A chromate in the presence of an acid is reduced to a chromic salt. (M. & M., II. 723.) 16. Quite a number of substances decompose hydrogen peroxide into water and oxygen while they themselves are unaffected. Some examples of these are: charcoal, manganese dioxide, sodium sulphate, potassium bromide, and potassium chloride. (M. & M., II. 724.)

Aqua Lauro-cerasi. [See ACIDUM HYDROCYANICUM.]

Aqua Mentha Piperitæ. [See OLEUM MENTHÆ PIPERITÆ.]

Aqua Pimentæ. [See OLEUM PIMENTÆ.]

Argenti Cyanidum.—1. Silver cyanide dissolves in *ammonia water*, forming a double cyanide of silver and ammonium. 2. *Potassium cyanide* forms a double cyanide with it, which is soluble. 3. *Sulphuric acid, hydrochloric acid*, or *hydrogen sulphide* forms hydrocyanic acid and a sulphate, chloride, or sulphide of silver.

Argenti Nitras.—1. Silver nitrate in aqueous solution is precipitated as the gray-brown silver oxide by the *hydrates* of *potassium, sodium*, and *ammonium*, the precipitate being soluble in excess of ammonia water. 2. The *alkali carbonates* precipitate the yellowish-white silver carbonate. 3. *Hydrogen sulphide* and *alkali sulphides* precipitate the black silver sulphide. 4. Soluble *chlorides* precipitate the white silver chloride. 5. Soluble *arsenites* precipitate the yellow silver arsenite. 6. Soluble *arsenates* precipitate the red-brown silver arsenate. 7. *Sodium phosphate* precipitates the yellow silver phosphate. 8. Soluble *bromides, iodides*, or *cyanides* precipitate the silver *bromide, iodide*, or *cyanide*. 9. *Chromates* precipitate the red-brown silver chromate. 10. It is reduced to metallic silver by *metallic zinc, copper, tin, mercury*, and *lead;* by *hypophosphites* and *sulphites;* in alkaline mixtures, by *arsenites, manganous salts, antimonious salts;* by *ferrous sulphate* in the cold. 11. *Tannic acid* precipitates the silver tannate. 12. *Morphine salts* are precipitated by silver nitrate with a red coloration. 13. Silver nitrate in solution is reduced to the metallic condition by *glucose, volatile oils, aromatic waters, tartrates, creosote*, and many other *organic substances*, but not generally by alkaloids. 14. An *alcoholic* solution of silver nitrate gradually deposits metallic silver. 15. Silver nitrate heated with *nitric acid* and *alcohol* produces the violently explosive fulminate of silver. (N. D. 279.)

Argenti Oxidum.—1. Silver oxide readily parts with its oxygen, forming explosive mixtures with many substances. Triturated dry with *sulphur*, *sulphide of antimony*, *sulphide of arsenic*, *phosphorus*, *tannic acid*, *creosote*, and some other *organic substances*, it is liable 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*. (M. & M., IV. 470.) 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.)

Aristol.—1. Aristol is decomposed by light and heat, liberating iodine. 2. It should not be mixed with bodies having a strong affinity for iodine.

Arseni Iodidum.—Iodide of arsenic precipitates many alkaloids from solution of their salts. Its incompatibilities are about the same as those of the soluble iodides and arsenous acid. [See ACIDUM HYDRIODICUM and ACIDUM ARSENOSUM.] It readily undergoes decomposition, liberating iodine, and in such condition may have the incompatibilities of iodine. [See IODUM.]

Arsenates. [See ACIDUM ARSENICUM.]

Arsenites. [See ACIDUM ARSENOSUM.]

Asaprol.—When a neutral solution of quinine sulphate or hydrochlorate is poured suddenly into a solution of asaprol, there forms on the surface of the liquid a resinous body adhering to the walls of the vessel. If the asaprol solution is gradually poured into the quinine solution a precipitate forms and settles. Merck's Market Report points out the fact that, asaprol being a calcium salt, it has the incompatibilities of the calcium salts, and also that it is incompatible with potassium iodide. (D. C., XXXVIII. 107.)

Atropina.—1. Atropine is precipitated from concentrated aqueous solutions of its salts as the free alkaloid by *alkali hydrates* and *carbonates* and by the *general alkaloidal reagents*, except platinic chloride. [See ALKALOIDS.] 2. By continued heating with *alkali hydrates*, *acids*, or *water*, atropine is decomposed, forming tropine and tropic acid. 3. *Chromic acid* converts it into benzoic acid. (M. & M., I. 362.) 4. The substances in the list following are said to be somewhat incompatible physiologically: *Morphine*, *pilocarpine*, *physostigmine*, *aconitine*, *chloral hydrate*, *hydrocyanic acid*, *muscarine*, *quinine*, *bromal hydrate*, and *phytolacca*. (Ph. E., XIV. 328.)

Auri et Sodii Chloridum.—1. Gold and sodium chloride precipitates many of the *alkaloids* from solutions of their salts. 2. *Potassium iodide* added to a solution of gold chloride (the latter being in excess) precipitates yellow aurous iodide and liberates iodine. But if the solution of gold chloride be 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 instable, decomposing in pure water, forming aurous iodide. (P. & J., 154.) 3. Gold chloride in solution is reduced to metallic gold by metallic *silver*, *mercury*, *copper*, and *iron;* by *mercurous salts*, *arsenites*, *ferrous salts*, *oxalic acid*, *nitrous acid*, *hypophosphorous acid*, *sulphurous acid*, and many *organic substances*. (P. & J., 154.) [See soluble chlorides under ACIDUM HYDROCHLORICUM.]

Barium.—Barium salts in aqueous solution are precipitated by sulphuric acid and soluble sulphates, phosphoric acid and soluble phosphates, tartaric acid and soluble tartrates, oxalic acid and soluble oxalates, soluble carbonates, soluble chromates, or tannic acid, the precipitate being barium sulphate, phosphate, tartrate, oxalate, carbonate, chromate, or tannate.

Beberinæ Sulphas.—Beberine sulphate in aqueous solution is precipitated by *soluble tartrates* and the *alkaloidal reagents.* [See ALKALOIDS.]

Belladonna. [See ATROPINA.]

Benzaldehydum.—1. Benzoic aldehyde or synthetic oil of bitter almonds is readily oxidized by the air and *oxidizing agents,* forming benzoic acid. 2. With an aqueous or alcoholic solution of *potassium hydrate* it gives benzyl alcohol and potassium benzoate. 3. *Ammonia water* converts it into crystalline hydrobenzamide, which is again resolved by acids into ammonia and benzoic aldehyde. (Allen, vol. III. part I. 18.) 4. *Chlorine* converts it into benzoyl chloride. 5. Benzaldehyde with *resorcin,* in the presence of hydrochloric acid forms a resin. *Phenol* and *pyrocatechin* act similarly. 6. With an aqueous solution of *sodium bisulphite* a crystalline compound is formed.

Benzoates. [See under ACIDUM BENZOICUM.]

Bismuthi et Ammonii Citras.—1. Citrate of bismuth and ammonium in aqueous solution is precipitated by strong *acids,* forming the bismuth citrate. 2. It is not readily precipitated by the *alkali hydrates,* but these on heating liberate the ammonia.

Bismuthi Subgallas.—1. Bismuth subgallate, or dermatol, is decomposed by *strong acids.*

Bismuthi Subnitras.—1. Bismuth subnitrate is converted into the hydrate by solutions of the *alkali hydrates.* 2. In the presence of water the *alkali carbonates* convert it into the subcarbonate and liberate carbon dioxide. 3. *Tannic acid* in the presence of water slowly forms the yellow tannate of bismuth. 4. Soluble *iodides* convert it into bismuth iodide, varying in color from a yellow to a steel-gray, depending upon the proportion of normal iodide to the basic salt. 5. *Salicylic acid* forms a series of salts with bismuth and nitric acid, varying in color from white to reddish orange. (D. C., XXXIX. 9.) 6. *Hypophosphites,* in neutral or alkaline mixtures, reduce bismuth subnitrate to a form of bismuth having a quantivalence of two. (P. & J., 220.) 7. *Chlorine* and *chlorinated lime* in alkaline mixtures convert the bismuth into a form having a quantivalence of five.

Borates. [See ACIDUM BORICUM and also SODII BORAS.)

Bromal Hydras.—Bromal hydrate liquefies with *acetamide*, *borneol*, *carbolic acid*, *exalgin*, *menthol*, *pyrocatechin*, *urea*, or *urethane*. With *diuretin* or *methacetin* it gives a stiff mass, which dries, and with *antipyrin* it gives a damp powder, which dries quickly.

Bromates.—1. Bromates in aqueous solution with a strong mineral acid give, with *hypophosphites*, phosphates and bromine, and then hydrobromic acid; with *bromides*, bromine; with *iodides*, bromine and iodine. 2. Bromates may cause an explosion when triturated dry with *iodine*, *sulphur*, *reduced iron*, *sulphides*, and other substances that are easily oxidized. 3. All metallic bromates are soluble in water, except silver, mercurous, and lead, which are sparingly soluble. They are nearly insoluble in alcohol.

Bromida. [See soluble bromides under ACIDUM HYDROBROMICUM.]

Bromoformum. — 1. Bromoform turns yellow in the light. 2. *Potassium hydrate* converts it into a chloride and a formate of potassium. 3. With *alcoholic potash* bromoform is decomposed, producing potassium bromide, carbon monoxide, ethylene, and water. (Allen, I. 184.)

Bromum.—1. Bromine with *alkali hydrates* forms bromides and bromates. 2. With *silver nitrate* it forms insoluble silver bromide and bromate. 3. With *hydrogen sulphide* it forms hydrobromic acid and sulphur, and then sulphuric acid. 4. With *sulphites* it forms sulphates and bromides. 5. With *hypophosphites* it forms phosphates and bromides. 6. With *hydriodic acid* it forms iodine and hydrobromic acid. In alkaline mixtures it forms a bromide and an iodate. 7. *Metallic mercury* and *mercurous com-*

pounds are oxidized to mercuric compounds. 8. *Arsenites* are converted into arsenates. 9. *Ferrous salts* are converted into ferric salts, and in alkaline mixtures into ferrates. 10. Bromine bleaches *vegetable colors.* 11. It combines with many *fixed oils* containing olein, forming addition products. 12. With *turpentine* and some other *volatile oils* it is liable to react violently and cause ignition. 13. Bromine in *water* gradually forms hydrobromic acid and oxygen. (M. & M., I. 536.) 14. An *alcoholic solution* is gradually decolorized, forming hydrobromic acid. 15. Bromine oxidizes *sugar* and *mannite*, forming oxidized derivatives. (M. & M., I. 536.) 16. *Hydrogen peroxide* evolves oxygen, and hydrobromic acid is formed. (M. & M., I. 536.) 17. Bromine colors *starch-paste* yellow.

Butyl Chloral Hydras.—1. Butyl chloral hydrate (erroneously called croton chloral) gradually undergoes decomposition in aqueous solution. 2. With *alkalies* it is decomposed, producing a formate and propylic chloroform, which splits up with the formation of a chloride of the alkali and dichloride of allylene. (Allen, I. 176.) 3. It liquefies or gives a soft mass when triturated dry with *acetamide*, *carbolic acid*, *exalgin*, *menthol*, *pyrocatechin*, or *urethane*. With *antipyrin*, *camphor*, or *thymol* it is said to liquefy, but a powder was obtained in each case. 4. *Picrotoxin* is said to be physiologically incompatible with it, as are *atropine*, *strychnine*, and *caffeine*.

Cadmium.—The soluble cadmium salts in aqueous solution are precipitated by the *alkali hydrates*, forming white cadmium hydrate; by *alkali carbonates*, forming the white cadmium carbonate; by the soluble *sulphides* and *hydrosulphuric acid*, as the yellow cadmium sulphide; by the *alkali chromates*, as the yellow cadmium chromate; by the soluble *phosphates*, as the white cadmium phosphate.

Caffeina.—1. Caffeine in moderately dilute solutions is not precipitated by the *alkali hydrates* or *carbonates* or the *general alkaloidal reagents*, except *tannic acid*, *phosphomolybdic acid*, and *mercuric chloride*. 2. Warmed with alcoholic *potassium hydrate*, it forms methylamine, carbon dioxide, and a little ammonia. (N. D., 362.) 3. The solubility of caffeine is increased by the presence of sodium salicylate, sodium benzoate, or antipyrin. (Extra Pharm., 89.) 4. *Chloral hydrate* and *physostigmine* are somewhat antagonistic to caffeine physiologically.

Calcium.—The soluble calcium salts in concentrated solutions are precipitated by the *fixed alkali hydrates* as calcium hydrate; by soluble *sulphates* in not too dilute solutions; by soluble *carbonates*, *phosphates*, *oxalates*, or *tartrates* as calcium carbonate, phosphate, oxalate, or tartrate. Soluble *citrates* on heating precipitate the calcium citrate.

Calcii Bromidum. [See CALCIUM, and also soluble bromides under ACIDUM HYDROBROMICUM.]

Calcii Carbonas. [See CALCIUM, and also CARBONATES.]

Calcii Hypophosphis.—Excess of sugar throws calcium hypophosphite out of solution. (Scoville, 227.) [See CALCIUM, and also soluble hypophosphites under ACIDUM HYPOPHOSPHOROSUM.]

Calcii Phosphas.—Calcium phosphate forms soluble compounds with nearly all acids except those which precipitate calcium salts. [See CALCIUM, and also phosphates under ACIDUM PHOSPHORICUM.]

Calcii Sulphas.—Calcium sulphate is sparingly soluble in water. [See CALCIUM, also sulphates under ACIDUM SULPHURICUM.

Calx.—Lime combines with water to form calcium hydrate, which has the properties of the fixed alkalies. [See HYDRATES, FIXED ALKALI, and also CALCIUM.]

Calx Chlorinata.—Chlorinated lime contains calcium hypochlorite, which is very easily decomposed, liberating chlorine. [See CHLORUM, CALCIUM, and also soluble chlorides under ACIDUM HYDROCHLORICUM.]

Cambogia.—1. Gamboge gives an orange-red solution with a solution of *sodium* or *potassium hydrate*. 2. With *ammonia water* it gives a deep red and then a brown solution. 3. With a solution of *ferric chloride* it gives a black-brown solution.

Camphora.—1. Camphor when oxidized by *nitric acid* forms camphoric acid, which is insoluble in water, and camphoronic acid, which is soluble in water. (M. & M., I. 669.) 2. With *chromic acid* it forms camphoronic acid. (M. & M., I. 669.) 3. *Potassium permanganate* in alkaline solution converts camphor into camphoric acid. (M. & M., I. 669.) 4. *Bromine* unites with it to form the crystallizable instable dibromide of camphor, which on heating forms hydrobromic acid and monobromated camphor. (Allen, II. 447.) 5. With *iodine* it yields a hydrocarbon, $C_{10}H_{20}$, carvacrol, dimethylethyl benzene, tetramethyl benzene, and traces of ordinary cymene. (M. & M., I. 669.) 6. Camphor absorbs *hydrochloric acid*, *sulphur dioxide*, and *nitric peroxide* gases, forming colorless liquids which are decomposed on the addition of water. (Allen, II. 446.) 7. *Chlorine* in alkaline solutions with camphor forms chlorinated compounds. 8. *Hydrochloric acid* in water splits it up, forming cymene and water. (M. & M., I. 669.) 9. Camphor produces a liquid when triturated dry with about an equal weight of any one of the following substances: *butyl chloral hydrate*, *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *euphorin*, *menthol*, *naphtol*, *pyrocatechin*, *pyrogallol*, *resorcin*, *salol*, *thymol*, *urethane*, *monochloracetic acid*, or *dichloracetic acid*. 10. Camphor does not liquefy when triturated with acetamide, acetanilid, antipyrin, bromal hydrate, diuretin, exalgin, methacetin, naphtalin, phenacetin, salicylic acid, sodium phosphate, sodium salicylate, urea, oxalic acid, cumarin, or iodoform. 11. Camphor when heated with *butyl chloral hydrate* or with *salicylic acid* will form a liquid which solidifies on cooling. (Extra Pharm., 95.)

Camphora Monobromata.—1. Monobromated camphor with *nitric acid* forms bromo-nitro-camphor and camphoric acid. (M. & M., I. 670.) 2. With *alcoholic potash* it gives camphor. (M. & M., I. 670.) 3. When triturated with *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *euphorin*, *pyrocatechin*, *salol*, or *thymol* it gives a liquid or soft mass.

Cannabis Indica.—Water added to an alcoholic extract causes the precipitation of a large amount of resinous matter.

Cantharidin.—1. Cantharidin combines with *alkalies* to form soluble cantharidates. (Allen, II. 450.) 2. It is precipitated from solutions by neutral *lead acetate*, *silver nitrate*, *mercuric chloride*, and *copper sulphate*.

Carbo.—1. Charcoal absorbs many *gases*, such as *ammonia*, *hydrogen sulphide*, etc. 2. When mixed with solutions it absorbs and removes from solution *tannic acid*, many *alkaloids*, many *glucosides*, many *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.

Carbonates.—1. Carbonates are decomposed by all common *acids*, except hydrosulphuric and hydrocyanic acids, with effervescence due to the formation 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*, *cadmium*, *ferrous iron*, *manganese*, *barium*, *strontium*, and *calcium;* it is a hydrate in case of *tin*, *aluminum*, *ferric iron*, and *chromium;* it is an oxide in case of *antimony;* it is a basic carbonate in case of *lead*, *nickel*, *bismuth*, *copper*, *zinc*, *cobalt*, and *mercuric mercury*. 3. Ammonium carbonate causes precipitation similar to potassium carbonate, except as noted under ammonium carbonate. [See AMMONII CARBONAS.] 4. Potassium, sodium, and ammonium carbonates precipitate as free alkaloids many *alkaloidal salts* from their aqueous solutions. 5. In the presence of water *bismuth sub-*

nitrate liberates carbon dioxide from the alkali carbonates. 6. Aqueous solutions of *acid salts* generally cause the formation of carbon dioxide when mixed with carbonates. 7. 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 carbonic acid, forming bicarbonates. The carbonates are insoluble in alcohol.

The bicarbonates of the alkalies have about the same incompatibilities as the normal carbonates, although they do not precipitate as many of the alkaloids. The bicarbonates of some of the metals besides the alkalies are soluble in water.

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*, *albumen*, and dilute *sulphuric acid*. (M. & M., I. 714.) 3. Catechu-tannic acid gives a greenish-black solution or precipitate with solutions of *ferric salts*.

Cerii Oxalas.—1. Cerium oxalate with *alkali hydrates* slowly forms the cerium hydrate and the oxalate of the alkali. 2. It dissolves in dilute *hydrochloric acid* or dilute *sulphuric acid*, and this solution is precipitated by the alkali hydrates or carbonates.

Chinolin.—1. Chinolin turns a reddish-brown color on exposure to air. 2. It combines with *acids* to form salts. The salts are decomposed by fixed alkali hydrates, liberating chinolin. 3. Chinolin is precipitated by many of the *alkaloidal reagents*, such as iodine, picric acid, mercuric chloride, or potassium bichromate. 4. It is oxidized by *bleaching-powder* and other hypochlorites to oxychinolin. 5. *Potassium permanganate* in alkaline mixtures forms pyridin dicarboxylic acid. (M. & M., IV. 380.)

Choral.—1. Chloral hydrate in aqueous solution slowly undergoes decomposition, becoming acid. 2. An aqueous solution, with *alkaline hydrates*, *alkaline carbonates*, or *borax*, produces chloroform and a formate of the base. 3. With *alcohol* in the presence of *water* and certain *soluble salts*, e.g., potassium bromide or sodium bromide, chloral hydrate forms chloral alcoholate, which may separate as an oily liquid. 4. Heated with *glycerin*, it forms chloroform, formic acid, and allyl formate. (M. & M., II. 4.) 5. *Potassium permanganate* oxidizes it, forming chloroform, chlorine, carbon dioxide, and oxygen. (M. & M., II. 4.) 6. *Mercuric oxide* decomposes chloral, forming $COCl_2$, carbon monoxide, and carbon dioxide. (M. & M., II. 4.) 7. With *mercuric nitrate* calomel is formed. (M. & M., III. 33.) 8. With *potassium cyanide* it forms dichloracetic acid. (M. & M., II. 4.) If chloral hydrate and potassium cyanide be rubbed together dry in a mortar, chemical reaction takes place with almost explosive violence, and a large amount of white fumes is formed, leaving a brownish mass. If the two be powdered separately and mixed lightly, the reaction is slower, but a brown mass finally results. 9. A solution of chloral hydrate in water dissolves morphine, quinine, and most alkaloids. (U. S. D., 367.) 10. In aqueous solution with *potassium iodide*, chloroform and iodine are formed. (M. & M., II. 2.) 11. Chloral hydrate produces a liquid when triturated dry with about an equal weight of *acetamide, acetanilid, borneol, camphor, monobromated camphor, carbolic acid, diuretin, euphorin, exalgin, lead acetate, menthol, methacetin, phenacetin, pyrocatechin, salol, sodium phosphate, thymol, urea, urethane, benzamide, quinine sulphate, saligenin,* or *salocoll.* With *antipyrin* it gives a damp powder, quickly becoming dry. With betanaphtol, bromal hydrate, naphtalin, pyrogallol, resin, resorcin, salicylic acid, terpin hydrate, zinc sulphate, or alum, it does not liquefy. 12. The physiological incompatibilities are *caffeine, strychnine, picrotexin, atropine, digitalis, physostigmine, codeine, thebaine,* and *brucine.* (Ph. E., XIV. 328.)

Chloral Alcoholate.—Choral alcoholate liquefies with *acetamide, acetanilid, antipyrin, borneol, camphor, camphor monobromated, carbolic acid, diuretin, euphorin, exalgin, menthol,* *methacetin*, *pyrocatechin*, *resorcin*, *salol*, *thymol*, *urea*, or *urethane*.

Chloralimide.—Chloralimide is decomposed by *mineral acids*, forming the corresponding ammonium salt and chloral. (M. M. R., IV. 401.) 0

Chloralum Formamidatum. (Chloralamide.)—1. Chloral formamide is decomposed by *warm water* or by *alkalies*, forming chloral hydrate and ammonium formate. (N. D., 461.) The chloral may be further decomposed by the alkalies, forming chloroform. 2. It reduces *silver nitrate*. (M. M. R., IV. 401.) 6

Chlorates.—1. Chlorates are liable to cause an explosion, when triturated dry with sulphur, sulphides, sulphites, cyanides, hyposulphites, 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, shellac, or many other oxidizable substances. 2. Chlorates with *sulphuric* acid detonate or explode, forming dichlorine tetroxide and a perchlorate. (M. & M., II. 18.) 3. With *hydrochloric acid* they form chlorine and dichlorine tetroxide (the mixture is called euchlorine), both of which substances are liable to form explosive mixtures with organic or other easily oxidizable substances. 4. In a dilute solution of one of the stronger mineral acids, chlorates form with *oxalic acid*, carbon dioxide, chlorine, and hydrochloric acid; with *hypophosphites*, phosphoric and hydrochloric acids; with *hydrogen sulphide*, hydrochloric acid and sulphur, and then sulphuric acid; with *sulphites*, hydrochloric and sulphuric acids; with *bromides*, hydrochloric acid and bromine; with *iodides*, hydrochloric acid and iodine, which is further oxidized to iodic acid; *arsenites* become arsenates; *mercurous compounds* become mercuric; *ferrous compounds* become ferric. 5. The metallic chlorates are soluble in water, and are generally soluble in alcohol, except potassium.

Chlorida. [See chlorides under ACIDUM HYDROCHLORICUM.]

Chlorum.—1. Chlorine with a solution of a *fixed alkali hydrate* forms a chloride and a chlorate of the alkali. 2. With *lime water* it forms calcium hypochlorite. 3. With *ammonia water* it forms ammonium chloride. 4. With some *salts of ammonium* chlorine is liable to form the explosive nitrogen chloride. 5. Chlorine water precipitates solutions of salts of *lead*, *mercurous mercury*, and *silver* as chlorides. 6. Chlorine water after standing a time forms hydrochloric acid. 7. Chlorine is a strong oxidizing agent, and is itself reduced to hydrochloric acid or a chloride by the agents which it oxidizes. With *iodides* it forms iodine and then iodic acid, and in the presence of an alkali a periodate ; with *bromides* it forms bromine, and in alkaline mixtures a bromate ; with *oxalic acid* carbon dioxide is formed; with *hypophosphites* phosphates are formed ; with *hydrogen sulphide* it forms sulphuric acid; *mercurous*, *arsenous*, and *ferrous compounds* are changed to mercuric, arsenic, and ferric compounds in either acid or alkaline mixtures. 8. Chlorine bleaches *indigo*, *litmus*, and other *vegetable colors*. 9. It oxidizes most all organic matter. 10. Chlorine is rapidly absorbed by *alcohol*. [See ALCOHOL, NO. 5.] 11. Chlorinated lime is liable to cause an explosion when triturated with *glycerin* (unless diluted with water), *fats*, *oils*, and *iodides*. (A. P. A., XLIII. 525.)

Chromates. [See under ACIDUM CHROMICUM.]

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 a brown to a blackish green with solutions of *ferric salts*. 3. The cinchona alkaloids in solution form compounds with the *general alkaloidal reagents* [see under ALKALOIDS], which compounds are nearly insoluble in water, but soluble in alcohol. [See QUININA.]

Citrates. [See ACIDUM CITRICUM.]

Cocaina.—1. Cocaine is precipitated from aqueous solutions of its salts by the reagents that usually precipitate alkaloids. [See ALKALOIDS.] 2. Cocaine is quite easily decomposed by strong *acids*, strong solutions of *alkali hydrates*, or by *hot water*, forming methyl alcohol, benzoic acid, and ecgonine. 3. Mixed with *calomel* in the presence of moisture, cocaine hydrochlorate turns the mixture gray or even black, due probably 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 cocaine to form an insoluble compound. 4. *Morphine*, *chloral hydrate*, *amyl nitrite*, *caffeine*, *digitalis*, and *alcohol* are physiologically antagonistic to cocaine.

Codeina.—1. Codeine (free alkaloid) in aqueous solution is not precipitated by alkaline carbonates (Sohn, 71), but is precipitated by most of the other *general alkaloidal precipitants*. [See ALKALOIDS.] 2. Codeine in aqueous solution gives a precipitate with solutions of salts of *iron*, *copper*, *lead*, and some other *metals*. (N. D., 515.) This is probably due to the fact that it is alkaline in reaction, and one of the most soluble of the non-volatile alkaloids. 3. With some *ammonium salts*, as ammonium chloride, codeine liberates ammonia. (N. D., 515.) 4. If codeine is added to a solution of a *morphine salt*, morphine is precipitated. (N. D., 515.) 5. *Nitric acid* gives a yellow solution with codeine. (U. S. P., 96.) 6. Concentrated *sulphuric* acid, *with nitric acid* or with *ferric chloride*, gives a blue color with codeine. (Sohn, 72.)

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. 4. Most of its salts are decomposed by water. (M. & M., II. 234.) 5. *Nitric acid* gives a blue to a violet color, turning brown and then yellow. (Sohn, 42.) 6. Acids generally give a yellow color.

Collodium.—Collodion is gelatinized by *carbolic acid* (not by creosote). (U. S. P., 9.) [See PYROXYLINUM.]

Coniina.—1. Coniine becomes yellow and resinoid on keeping. (Allen, III. part II. 172.) 2. It is not precipitated by the *alkali hydrates* or *carbonates*, but is by the *general alkaloidal reagents*, except platinum chloride. [See ALKALOIDS.] 3. Coniine coagulates *albumen*. (U. S. D., 441.) 4. It precipitates the salts of *aluminum*, *copper*, *zinc*, *manganese*, *iron*, and *silver*. (U. S. D., 441.) 5. It forms butyric acid when treated with *chromic acid*. (Allen, III. part II. 173.) 6. An alcoholic solution of *iodine* with coniine gives a brown precipitate, which afterwards disappears, and the liquid becomes colorless. [M. & M., II. 246.)

Copaiba.—1. Copaiba, with the *hydrates of the alkalies or alkaline earths*, forms saponaceous compounds, in which the resin acts the part of an acid. [U. S. D., 445.] 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 hydrate*. (U. S. D., 445.)

Creosotum.—1. Creosote reduces some of the *inorganic salts*, such as salts of silver, gold, and copper, to the metallic state. 2. If mixed suddenly or triturated dry with strong *oxidizing agents*, it is liable to cause an explosion. 3. It precipitates solutions of *gum* and *albumen* (not gelatin or collodion). 4. Creosote, with solutions of *ferric salts*, gives a violet-blue color, changing to a 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. (U. S. D., 450.) 5. Triturated with *silver oxide*, an explosion is liable to take place. 6. With concentrated *nitric acid* reddish fumes of the oxides of nitrogen are given off. With dilute nitric acid a brown resin is formed. (U. S. D., 450.) 7. With concentrated *sulphuric acid* it gives a red color, becoming black on addition of more acid.

Creta Præparata. [See CALCIUM, and also CARBONATES.]

Cupri Sulphas.—1. Copper sulphate is precipitated by the *fixed alkali hydrates* as blue cupric hydrate, which on standing becomes basic and black. This precipitation is more or less prevented by tartrates, citrates, salicylates, sugar, milk sugar, and certain other organic substances. 2. *Ammonia water* precipitates the cupric hydrate and in excess dissolves the precipitate, forming an intense blue solution of double salts. This solution dissolves cotton, filter-paper, and other forms of cellulose. 3. *Ammonium carbonate*, like ammonia water, precipitates the copper and redissolves it, forming a blue solution. 4. The *carbonates* of the *fixed alkali metals* precipitate the copper as a basic carbonate of variable composition. 5. Copper sulphate with *hydrogen sulphide* or soluble sulphides forms the black insoluble copper sulphide. 6. In neutral solutions the soluble *phosphates* give a bluish-white precipitate of copper phosphate. 7. *Arsenites* in neutral solution give a green precipitate of copper arsenite. 8. Soluble *iodides* reduce and precipitate copper sulphate as cuprous iodide (Cu_2I_2), iodine being liberated. 9. In alkaline mixtures cupric compounds are reduced to cuprous oxide by *arsenous acid*, *glucose*, and many other organic compounds.

Cyanida. [For cyanides, see under ACIDUM HYDROCYANICUM.]

Decocta.—The incompatibilities of decoctions are similar to those of infusions. [See INFUSA.]

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 a yellow or a green. (Sohn, 50.)

Digitonin is precipitated from aqueous solutions by *ammonia*, *tannic acid*, or *lead acetate*. (Sohn, 50.)

All of the principles of digitalis are quite easily decomposed by strong *acids* or *alkalies*. The substances that are incompatible physiologically are *aconite*, *scoparin*, *strychnine*, *muscarine*, *chloral hydrate*, *and nitroglycerin*.

Diuretin.— 1. Sodio-theobromine salicylate in aqueous solution is strongly alkaline, and is decomposed by all *acids*, even the carbon dioxide in the air, with precipitation of theobromine. (Moerk, M. M. R., IV. 401.) 2. Diuretin is incompatible with *bicarbonates*, *borates*, and *phosphates*. (M. M. R., IV. 401.) 3. It has the incompatibilities of salicylic acid and of theobromine. [See ACIDUM SALICYLICUM, and also THEOBROMINE.] 4. Diuretin forms a liquid or soft mass with *carbolic acid* or *chloral hydrate*. With *bromal hydrate*, *pyrocatechin*, *chloral alcoholate*, or *pyrogallol* it gives a stiff mass, which dries.

Elaterinum.—1. Elaterin combines with the *alkali hydrates* to form compounds soluble in water, from which solution acids precipitate the elaterin.

Emulsa.—Emulsions are broken up by substances which precipitate the emulsifying agent. [For emulsions made with gum arabic, see ACACIA.]

Ergota.—The active principles of ergot are generally precipitated by *tannic acid*, *potassium mercuric chloride*, and some of the other *general alkaloidal reagents*.

Eucalyptol.—Eucalyptol is oxidized to cineolic acid by potassium permanganate. (M. & M., II. 526.)

Eugenol.—1. Eugenol is oxidized to vanillin by *potassium permanganate*. 2. *Bromine* forms dibromo-eugenol. 3. *Alkalies* unite with it to form soluble salts. (Coblentz, 36.) 4. *Ferric chloride* colors its alcoholic solution blue. (M. & M., II. 526).

Euphorin.—Phenyl urethane liquefies when triturated with *antipyrin*. If it be first triturated with sugar, it can then be mixed with antipyrin and dispensed as a powder. (Moerk, M. M. R., IV. 401.) It makes a liquid or soft mass with *antipyrin*, *borneol*, *bromal hydrate*, *camphor*, *monobromated camphor*, *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *exalgin*, *menthol*, *pyrocatechin*, *resin*, *resorcin*, *salol*, *thymol*, or *urethane*.

Europhen.—1. Europhen yields iodine to metallic salts. (Coblentz, 37.) 2. It is decomposed by heat, light, water, or alkalies, liberating iodine. (N. D., 879.) 3. It should not be combined with starch. (Extra Pharm., 244.)

Exalgin.—Exalgin gives a liquid or soft mass when triturated dry with *bromal hydrate*, *butyl chloral hydrate*, *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *euphorin*, *menthol*, *naphtol*, *pyrocatechin*, *pyrogallol*, *resorcin*, *salicylic acid*, *salol*, *thymol*, or *urethane*.

Ferropyrin.—Alkali hydrates, carbonates, or bicarbonates precipitate ferric hydrate from solutions of ferropyrin. (Coblentz, 37.)

Ferri Phosphas Solubilis.—1. The soluble phosphate of iron is a mixture of ferric phosphate and sodium citrate. It is the presence of the sodium citrate that renders the ferric phosphate soluble in water. When a dilute *mineral acid* is added to a solution of a mixture of these compounds, the sodium citrate is decomposed and the ferric phosphate is precipitated. 2. In aqueous solution, the soluble phosphate of iron is precipitated by *sodium* or *potassium hydrate* as ferric hydrate. [See FERRICUM, and also ACIDUM PHOSPHORICUM.]

Ferri Pyrophosphas Solubilis.—1. This is a mixture consisting of ferric pyrophosphate and sodium citrate, and it is the presence of the latter salt that makes the former salt soluble in water. A weak *mineral acid* precipitates ferric pyrophosphate from an aqueous solution of the soluble pyrophosphate of iron by decomposing the sodium citrate. 2. In aqueous solution the soluble pyrophosphate with *potassium* or *sodium hydrate* gives the red-brown ferric hydrate. [See

FERRICUM, and also pyrophosphoric acid under ACIDUM PHOSPHORICUM.]

Ferri Sulpas.—Ferrous sulphate nearly always contains some ferric sulphate, and consequently has the incompatibilities of ferric salts. [See FERROSUM, FERRICUM, and also soluble sulphates under ACIDUM SULPHURICUM.]

Ferrum.—1. Reduced iron combines with *acids* to form salts. 2. It is oxidized by the air in the presence of moisture. 3. It reduces to the metallic condition *salts of copper, bismuth, lead, silver, mercuricum, mercurosum,* and *antimony* in the presence of water, while the iron is oxidized to ferrous or ferric compounds. 4. Triturated dry with strong *oxidizing agents* such as *potassium permanganate* or *potassium chlorate,* it is liable to cause an explosion. 5. Iron decomposes a solution of *hydrogen dioxide,* forming ferric hydrate. (M. & M., III. 52.)

Ferrosum.—1. Ferrous salts in aqueous solution are precipitated by the *alkali hydrates* as the white ferrous hydrate, quickly changing to ferroso-ferric hydrate, which is of a dirty green to a black color. This precipitate ultimately oxidizes to a ferric hydrate or oxide of reddish-brown color. Ammonium chloride or sulphate, sugar, glycerin, and many organic acids dissolve the ferrous hydrate or prevent its precipitation. 2. The soluble *carbonates* precipitate the ferrous carbonate, white if purely ferrous, but quickly becoming green and ultimately red-brown, due to the formation of ferric hydrate. 3. The soluble *phosphates* precipitate the ferrous phosphate, white to a bluish white. 4. The *alkali sulphides* (not hydrogen sulphide) precipitate the black ferrous sulphide. 5. *Ferrocyanides* precipitate a ferrous ferrocyanide, light blue. 6. *Ferricyanides* precipitate the dark blue ferrous ferricyanide. 7. *Tannic acid* with purely ferrous salts gives a white gelatinous ferrous tannate. This quickly oxidizes, forming a blue-black ferric tannate. Ferrous salts generally contain enough of a ferric salt to give a dark color at once. 8. Ferrous salts in solution are oxidized to ferric salts by salts of *gold* or *silver*, by *hydrogen dioxide*, by *chromates* or *permanganates*, by *nitrous* or *nitric acids*, by *chlorine* or *chlorates* in acid solution, by *bromine* or *bromates* in acid solution, by *iodates* in acid mixture, by *mercuric compounds* in alkaline mixture, by *arsenates* in alkaline mixture, and by the *oxygen* of the air. 9. The *alkaline citrates* in solution modify the astringent effects of ferrous salts and dissolve many of the salts not soluble in water.

Ferricum.—1. Ferric salts in solution are precipitated by the *alkali hydrates* and *carbonates* as ferric hydrate, red-brown. This is more or less prevented by sugar, glycerin, acacia, citrates, tartrates, and other organic compounds. 2. Solutions of the *alkali phosphates* precipitate from neutral solutions of ferric salts the ferric phosphate. This is prevented by citrates, tartrates, and free acids. *Phosphoric acid* decolorizes solutions of ferric chloride due to the formation of the colorless ferric phosphate. Phosphoric acid, in sufficient amount to convert all of the iron into ferric phosphate, decomposes the tannate of iron, destroying the black color. 3. The *alkali sulphides* precipitate the black ferrous sulphide after reducing the ferric compound to ferrous, and liberating sulphur. *Hydrogen sulphide* reduces ferric salts, but does not cause a precipitation, except of sulphur. 4. *Soluble cyanides* precipitate the neutral solutions of ferric salts as ferric hydrate with evolution of hydrocyanic acid. 5. *Ferrocyanides* precipitate the blue ferric ferrocyanide (Prussian blue). 6. *Ferricyanides* give a brown solution with solutions of ferric salts. 7. *Acetates* give a deep dull red liquid with solutions of ferric salts, due to the formation of ferric acetate. This solution on heating gives a precipitate of basic ferric acetate. 8. *Sulphites* give a red solution of ferric sulphite, which changes to ferrous sulphate and the solution becomes nearly colorless. 9. *Formic acid* and *meconic acid* give red solutions with ferric salts. 10. *Benzoates* in neutral solutions of ferric salts give the flesh-colored precipitate of ferric benzoate. 11. The insoluble *carbonates of barium, calcium, magnesium, zinc,* and *copper,* when mixed with solutions of ferric salts, precipitate the ferric hydrate. 12. Ferric salts in slightly acid solutions are reduced to ferrous compounds by *hydrogen sulphide* and the *alkali sulphides,* by *hypophosphites,* by *sulphites,* and by *hyposulphites.* 13. *Hydriodic acid* or soluble iodides, with a mineral acid reduce ferric salts to ferrous compounds, and iodine is liberated. 14. The official *tannic acid* gives a blue-black precipitate of ferric tannate. Some tannic acids give a green-black precipitate with solutions of ferric salts. 15. *Gallic acid* gives a bluish-black precipitate. 16. With solutions of *salicylates* ferric salts give a bluish-violet to a violet-red solution. In concentrated or neutral solutions ferric salicylate may be precipitated. 17. With *carbolic acid* in dilute solutions ferric salts give a violet-blue solution. This is prevented by acetic acid or alcohol. (M. M., III. 831.) 18. With *creosote* solutions of ferric salts give a blue-violet color, changing to a greenish-brown. 19. A solution of ferric chloride with *morphine* or its salts in nearly neutral mixture gives a blue coloration, changing to a dirty green; with *antipyrin* it gives a deep red solution; with *guaiacol,* a violet solution, changing to a green; with *resorcin,* a violet; with *salol,* a violet; with oil of *wintergreen,* a violet; with *oil of cloves, bay,* or *pimenta,* a blue to a green; with *oil of cinnamon,* a brown; with *oil of thyme,* a green-brown, changing to a red; with *aloin,* a green; with *guaiac,* a blue to a green; with an alcoholic solution of *benzoin,* a dark green; with an alcoholic solution of *gamboge,* a black; with an alcoholic solution of *balsam of Peru,* a black; with an alcoholic solution of *shellac,* a black; and with *apomorphine,* a red, changing to a black. 20. Solutions of ferric salts gelatinize solutions of *acacia* (prevented by large excess of free acid) and break up emulsions made with acacia. 21. They coagulate solutions of *albumen.*

Formaldehydum.—1. Formalin (formic aldehyde), with dilute solutions of the *hydrates* of the *alkalies* or *alkaline earths*, is converted into methylenenitan and formose. (Richter, 192.) 2. *Hydrogen sulphide* precipitates it as trithiomethylene. (Richter, 192.) 3. *Ammonia* unites to form hexamethyleneamine. (Richter, 192.) 4. Formaldehyde is a strong reducing agent, reducing salts of *gold* and alkaline solutions of salts of *silver* and *copper*. 5. It is incompatible with alkaline *bisulphites* and with *phenylhydrazin*. (Moerk, M. M. R., IV. 401.) 6. It precipitates a solution of *gelatin*. (D. C., XXXIX. 105.)

Galla. [See ACIDUM TANNICUM.]

Gallates. [See ACIDUM GALLICUM.]

Gelatinum.—Solutions of gelatin are precipitated by tannic acid, alcohol, mercuric chloride, picric acid, metaphosphoric acid (not by ortho- or pyrophosphoric acids), chlorine water, platinic chloride, potassium ferrocyanide, alumnol, or formic aldehyde. The aqueous solutions of gelatin are not precipitated by dilute acids, alum, acetate of lead, ferric chloride, or the mineral salts generally.

Glonoinum.—1. Nitroglycerin explodes violently on percussion. 2. When impure, it gradually decomposes, forming glyceric, oxalic, and nitrous acids. (M. & M., II. 619.) 3. *Alkalies* or their *carbonates* decompose it when dissolved in alcohol, forming a nitrite, nitrate, acetate, oxalate, and a formate. (M. & M., II. 619.) Alkalies convert it into glycerin and nitric acid. (Richter, 454.) 4. *Hydrochloric acid* decomposes it. (M. & M., II. 619.) 5. *Hydriodic acid* decomposes it, forming glycerin and nitric oxide. (M. & M., II. 619.)

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, other glucosides by two or more of the agents. One of the products formed is glucose. 2. *Tannic acid* or a solution of *lead subacetate* generally precipitates the glucosides from thei: aqueous solutions. 3. The glucosides are not usually precipitated by the alkali hydrates or carbonates nor by many of the general alkaloidal reagents. 4. Many of them give color reactions resembling those produced by the alkaloids.

Glycerinum.—1. Glycerin with *borax* in water forms glycerol borate and sodium metaborate. The glycerol borate is decomposed by water, forming boric acid and glycerin. In consequence of the formation of free acid, this mixture 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 sulphuric acid converts glycerin into the explosive nitroglycerin. 3. When glycerin is carefully treated with *nitric acid*, it is converted into a mixture of oxalic acid, glyceric acid, and other organic acids. (Allen, II. 278.) 4. Gently heated with solid *potassium hydrate*, glycerin is converted into potassium acetate and formate, with evolution of hydrogen. (Allen, II. 278.) 5. An alkaline solution of *potassium permanganate* oxidizes glycerin to oxalic and carbonic acids. (Allen, II. 278.) If the solution of permanganate be weak, formic acid, propionic acid, and traces of tartronic acid are formed. (M. & M., II. 618.) 6. Other oxidizing agents, such as *chromates*, *chlorinated lime*, and *manganese dioxide*, with *hydrochloric acid* convert glycerin into oxalic and carbonic acids. 7. Concentrated *sulphuric acid* with glycerin forms acrolein. 8. Warming glycerin with *dilute nitric acid* may cause a violent reaction. (M. & M., II. 617.) 9. With the *alkaline earths* or *oxide of lead* glycerin yields compounds which are soluble in water, and the solutions of which are not decomposed by carbonic acid. (Allen, II. 278.) 10. When glycerin is heated with *acids*, one or more acid radicals usually displace its hydroxylic hydrogen. (M. &. M., II. 617.) 11. Glycerin prevents the precipitation of solutions of salts of some metals by the alkali hydrates and other reagents. 12. Glycerin dissolves deliquescent salts and increases the solubility of many organic and inorganic compounds. 13. Glycerin sometimes precipitates alkaloidal salts from their aqueous solutions. (U. S. D., 653.) 14. With many of the *fixed oils* it does not make clear solutions. 15. Glycerin is frequently contaminated with iron from the container, and this may give a color with carbolic acid, tannic acid, etc. (A. P. A., XLVIII. 531.)

Glycyrrhizinum Ammoniatum.—1. Ammoniated glycyrrhizin in aqueous solution is decomposed and the glycyrrhizic acid precipitated by *mineral acids.* 2. With solutions of *salts* of most *heavy metals* it gives voluminous precipitates. (N. D., 788.) 3. *Fixed alkali hydrates* liberate ammonia from it.

Guaiaci Resina.—1. An alcoholic solution of the resin of guaiac is colored blue by *nitric acid*, *chromic acid*, *chlorine*, *potassium ferricyanide*, *potassium permanganate*, *ferric chloride*, *gold chloride*, *ozone*, *spirit of nitrous ether*, and other *oxidizing agents.* Exposure to light or heat is said to deprive the tincture of guaiac of the property of being turned blue by ozone. (M. & M., II. 652.) 2. Both the resin and its alcoholic solution turn green in the light. 3. *Sulphuric acid* dissolves it, forming a red solution. (M. & M., II. 652.) 4. The tincture affords blue, green, and brown precipitates with the *mineral acids.* (U. S. D., 670.) 5. Either in substance or tincture, guaiac gives a blue color to *gluten*, *mucilage of acacia*, and *milk.* (U. S. D., 670.)

Guaiacolum.—The incompatibilities are similar to those of creosote. [See CREOSOTUM.] It combines with many *acids* to form crystalline compounds. With *ferric chloride* it gives at first a blue color, changing to a green on adding more ferric chloride. (N. D., 798.)

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

Hydrargyri Chloridi Corrosivi.—1. Mercuric chloride in aqueous solution is precipitated by solutions of *fixed alkali* *hydrates* or *lime water*. The precipitate is the red-brown basic chloride of mercury if the mercuric chloride is in excess. If the alkali is in excess the orange-yellow mercuric oxide will be formed. 2. *Ammonia water* produces the "white precipitate," or "ammoniated mercury," nitrogen dihydrogen mercuric chloride. 3. *Ammonium carbonate* acts like ammonium hydrate. 4. *Potassium carbonate* or *sodium carbonate* precipitates solutions of mercuric chloride as an oxychloride, red-brown, which by excess of the carbonates with heat is converted into the yellow mercuric oxide. 5. *Hydrogen sulphide* and the *alkali sulphides* with solutions of mercuric chloride give mercuric sulphide. The precipitate first formed is white, and consists of the union of mercuric chloride and mercuric sulphide. By further addition of the precipitating agent the black mercuric sulphide is formed. (P. & J., 110.) 6. 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 double compounds. If potassium iodide has been used in excess, the double compound 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 aqueous solutions of their salts; the presence of alcohol prevents to some extent this precipitation. 7. The soluble *bromides* precipitate from concentrated solutions of mercuric chloride the white mercuric bromide, which is soluble in excess of the soluble bromide or in excess of mercuric chloride. 8. Soluble *phosphates* precipitate from neutral solutions of mercuric chloride the white mercuric phosphate. 9. A solution of *albumen* is coagulated by mercuric chloride; this is prevented to some extent by the presence of sodium or ammonium chloride. 10. Mercuric chloride precipitates from aqueous solution nearly all *alkaloidal salts*, some *neutral* and *bitter principles*, some *glucosides*, *tannic acid*, *vegetable* *extractive matter*, *tartar emetic*, and *gelatin*. 11. *Hypophosphorous acid* and *hypophosphites* in presence of acids or fixed alkalies reduce mercuric chloride to mercurous chloride, and finally metallic mercury. 12. *Sulphurous acid* slowly reduces mercuric chloride to mercurous chloride. 13. Mercuric chloride is reduced by metallic *copper*, *zinc*, or *iron*, in the presence of water, to calomel, and then metallic mercury. 14. In alkaline mixtures *arsenous* and *antimonious compounds* reduce the mercuric chloride to a mercurous compound and then metallic mercury, and form arsenates and antimoniates. 15. *Ferrous compounds* in alkaline mixture with mercuric compounds are oxidized to ferric compounds, and reduce the mercuric to mercurous compounds. 16. Mercuric chloride is slowly reduced to calomel by *alcohol*. (M. & M., I. 98.) 17. Corrosive sublimate is reduced to calomel by *formic acid*. 18. According to MM. Mialhe and Lepage, corrosive sublimate is slowly converted into calomel by *compound syrup of sarsaparilla* and by *honey*, but not by pure syrup. (U. S. D., 689.) Dr. S. Kennedy has proven that when mercuric chloride is prescribed with the compound syrup of sarsaparilla precipitation invariably occurs, and that this precipitation is retarded by sodium chloride. (U. S. D., 689.) 19. With many carbon compounds mercuric chloride forms mercurous chloride and hydrochloric acid. (M. & M., III. 217.) [See chlorides under ACIDUM HYDROCHLORICUM.]

Hydrargyri Chloridum Mite.—1. Calomel is changed to the black mercurous oxide by a solution of the *hydrates* of *potassium*, *sodium*, *calcium*, or *barium*. 2. Calomel with *ammonia water* forms the black compound nitrogen dihydrogen mercurous chloride. 3. *Ammonium carbonate* acts like the ammonium hydrate. 4. Solutions of *carbonates* of the *fixed alkalies* convert calomel into a black mass, probably a mixture of the basic carbonate and oxide. 5. The soluble *iodides* in the presence of water convert calomel into the 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 double compound, soluble in water. The presence of a little metallic mercury gives a green color to mercurous iodide. The color of the solid matter becomes more gray or black as the amount of metallic mercury increases and the mercurous iodide decreases. 6. Soluble *bromides* act similarly to the soluble iodides. 7. Alkali *cyanides* in aqueous solution and also *hydrocyanic acid* convert calomel into metallic mercury and mercuric cyanide and chloride. 8. According to M. Mialhe, calomel is in part converted into corrosive sublimate and metallic mercury by *ammonium chloride* and by *sodium* and *potassium chlorides* at the temperature of the body. (U. S. D., 695.) 9. According to Jolly, corrosive sublimate is formed from calomel in the presence of *hydrochloric acid*, *citric acid*, *alkalies* and their *carbonates*, *alkaline earths*, and impure *sugar*. (N. D., 827.) 10. *Bicarbonate of sodium* with calomel produces corrosive sublimate very slowly; the change does not occur within four to six weeks ordinarily. (Scoville, 229.) 11. Calomel with alkali *sulphites* in solution separates metallic mercury, and a double sulphite of the alkali and mercury goes into solution. (M. & M., III. 216.) 12. Solutions of *hydrogen sulphide* or the alkali *sulphides* convert calomel into the black mercurous sulphide. 13. *Iodine* converts calomel into mercuric iodide and mercuric chloride in the presence of water or alcohol. 14. Exposed to *sunlight*, calomel darkens, due to the separation of metallic mercury. (M. & M., III. 216.) 15. Calomel is reduced to metallic mercury by *nitrous acid*, *hypophosphorous acid*, and in alkaline mixtures by *arsenites*, *chromic salts*, or *antimonious salts*. 16. Mercurous chloride is oxidized to mercuric compounds by *nitric*, *nitrohydrochloric*, *chloric*, and *bromic acids*, by *chlorine*, *bromine*, *iodine*, *hydrogen peroxide*, and in alkaline mixtures by *silver salts*. 17. *Boiling hydrochloric acid* converts calomel partly into mercuric chloride and partly into metallic mercury; if dilute hydrochloric acid be used, no metallic mercury will be separated. (M. & M., III. 216.) 18. Calomel in the presence of moisture is darkened by mixing with 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. 19. Calomel is changed by heavy trituration, forming metallic mercury and mercuric chloride. 20. Dry calomel in contact with perfectly dry *cane-sugar* even without trituration is always partially decomposed, and a portion of the mercurous salt is transformed into mercuric chloride. The quantity thus affected depends upon the proportion of sugar and the length of the period of contact, being in direct proportion in both instances. Milk-sugar acts in the same manner as cane-sugar toward calomel, and both gum arabic and tragacanth have the same properties in this direction, but in a lesser degree. (Telmon, in *Nat. Drug.*, XXVI. 201.) [See chlorides under ACIDUM HYDROCHLORICUM.]

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 hydrates or iodides on account of the formation of soluble double compounds. [See HYDRARGYRI CHLORIDUM CORROSIVUM and also ACIDUM HYDROCYANICUM.]

Hydrargyri Iodidum Flavum. — 1. Mercurous iodide when moist is rapidly darkened by the light. (M. & M., III. 219.) The darkening is in proportion to the decomposition into mercuric iodide and mercury. (N. D., 833.) 2. With solutions of *iodides* mercurous iodide is decomposed, forming metallic mercury and mercuric iodide. [See HYDRARGYRI CHLORIDUM MITE, No. 5.] 3. Most *heavy metals* when triturated with it form the iodide of the metals, leaving mercury.. (M. & M., III. 219.) 4. Mercurous iodide is oxidized and reduced by the same reagents that oxidize and reduce calomel. [See HYDRARGYRI CHLORIDUM MITE.]

Hydrargyri Iodidum Rubrum.—1. Mercuric iodide is decomposed by solutions of fixed *alkali hydrates*, forming the yellow mercuric oxide and a soluble double iodide of the alkali and mercury. (M. & M., III. 220.) 2. *Lime, sodium carbonate*, and *potassium carbonate* do not decompose mercuric iodide in the presence of water, but do in the presence of alcohol. (M. & M., III. 220.) 3. The incompatibilities are quite similar to those of mercuric chloride. 4. With soluble *iodides* it forms soluble double compounds.

Hydrargyri Oxidum Flavum.—1. Mercuric oxide combines with most *acids* to form salts. 2. With *mercuric chloride* in solution it darkens, due to the formation of an oxychloride of mercury. (M. & M., III. 217.) 3. Mercuric oxide decomposes *chloral hydrate*, forming carbon monoxide, carbon dioxide, and a compound of carbon, oxygen, and chlorine, $COCl_2$. (M. & M., II. 4.)

Hydrargyri Subsulphas Flavus.—1. Turpeth mineral dissolves readily in *sulphuric, nitric*, or *hydrochloric acid.* 2. Solutions of *fixed alkali hydrates* decompose turpeth mineral, forming mercuric oxide and the sulphate of the alkali.

Hydrargyrum Ammoniatum.—1. White precipitate is decomposed by solutions of the *fixed alkali hydrates* 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 nitrogen iodide formed in it; but in the presence of alcohol the decomposition takes place suddenly and with violent explosion. (N. D., 847.) 4. *Bromine* or *chlorine* causes the evolution of hydrogen and the formation of mercuric bromide or mercuric chloride. (M. & M., III. 208.)

Hydrastininæ Hydrochloras.—An aqueous solution of hydrastinine hydrochlorate is not precipitated by ammonia or by a solution of sodium carbonate. (M. & M., II. 703.) It is precipitated by most of the *general alkaloidal reagents.* [See ALKALOIDS.]

Hydrates, Fixed Alkali.—The fixed alkali hydrates are the hydrates of potassium and sodium. 1. In aqueous solution they combine with *acids* to form salts. 2. In the presence of water and heat they liberate ammonia from its compounds. 3. They precipitate solutions of salts of all other common *metals* and the precipitate is a hydrate, except in case of silver, mercury, and antimony, in which cases it is an oxide. This precipitation is hindered or prevented with salts of several of the metals by the presence of sugar, glycerin, acacia, citrates, tartrates, and other organic substances. 4. The fixed alkali hydrates precipitate nearly all of the *alkaloids* from aqueous solutions of their salts, the precipitate being the free alkaloid. In some cases the precipitate is soluble in excess of the precipitant. The precipitation is generally prevented by alcohol, although the alkaloid is set free. 5. They decompose some of the *alkaloids,* such as atropine, cocaine, and aconitine when left in contact for some time or more quickly when heated. 6. They decompose many *glucosides* when warmed with them. 7. With *fats* they form glycerin and a salt (soap) of the fat acid. 8. With *resins* they form resin soaps. 9. *Chloral hydrate* is decomposed by the fixed alkali hydrates, forming chloroform. 10. They turn *calomel* black, due to the formation of mercurous oxide. 11. The fixed alkali hydrates are soluble in water and alcohol. [See ALKALIES.]

Hydrate, Volatile Alkali.—Ammonia water is the only common volatile alkali. 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 hydrate, except in case of silver and antimony, in which it is an oxide; in case of lead, it is a basic salt; in case of mercurous salts, the precipitate is a black double compound; and in case of mercuric salts, the precipitate is a white double compound. The precipitation in many cases is hindered or prevented by sugar, glycerin, acacia, citrates, tartrates, and other organic substances. 3. A solution of *corrosive sublimate* is precipitated by ammonia, giving ammoniated mercury. 4. *Calomel* is converted by ammonia into the black compound, nitrogen dihydrogen dimercurous chloride. 5. With *carbolic acid* ammonia gives at first a colorless solution, which slowly becomes green, then a deep blue, and finally a purplish blue. 6. With *carbolic acid* and *sodium hypochlorite* solution ammonia produces a deep blue color. 7. With a concentrated solution of *tartaric acid* ammonia gives a precipitate of ammonium bitartrate. 8. In not very dilute solutions of *picric acid* ammonia gives a precipitate. 9. Ammonia precipitates most *alkaloids* from aqueous solutions of their salts. The precipitate is the free alkaloid, and is sometimes soluble in a large excess of ammonia 10. With *chlorine* ammonia forms ammonium chloride and nitrogen. If a larger proportion of chlorine gas be used, the ammonium chloride may be decomposed, forming hydrochloric acid and nitrogen. If a still larger proportion of chlorine gas be used, the ammonium chloride may be decomposed into hydrochloric acid and the explosive nitrogen chloride. 11. *Bromine* with ammonia acts like chlorine. (P. & J., 24.) 12. With *iodine* ammonia may under certain circumstances form ammonium iodide, ammonium iodate, and water; under different circumstances ammonium iodide and the explosive iodide of nitrogen are formed. (P. & J., 24.) [See under IODUM, No. 2.] 13. *Permanganates* oxidize ammonium hydrate to a nitrate. (P. & J., 24.) [See ALKALIES.]

Hydrogenii Dioxidum. [See AQUA HYDROGENII DIOXIDI.]

Hydroquinone.—1. Hydroquinone is oxidized to quinone by *ferric chloride*, *chlorine*, *dilute nitric acid*, and *chromic acid.* (M. & M., II. 730.) 2. Strong *nitric acid* decomposes it in the cold, forming oxalic acid and hydrocyanic acid. (M. & M., II. 730.) 3. An aqueous solution turns brown in the air, more quickly in the presence of an alkali.

Hyoscyamina.—Hyoscyamine is converted into atropine by heating for five or six hours above its melting-point. (M. & M., II. 745.) It has about the same incompatibilities as atropine. [See ATROPINA.)

Hyoscyamus. [See ATROPINA.]

Hypochlorites.—1. The more common hypochlorites are found in the form of chlorinated lime, solution of chlorinated soda, and solution of chlorinated potassa. 2. Hypochlorites are decomposed by all *acids* at the ordinary temperature with liberation of chlorine. Consequently hypochlorites are strong oxidizing agents and have in general the same effect as chlorine. [See CHLORUM.] 3. The hypochlorites are soluble in water, but insoluble in alcohol. 4. Care should be used in mixing hypochlorites with readily *oxidizable substances* to avoid explosion or violent reaction.

Hypophosphites. [See under ACIDUM HYPOPHOSPHOROSUM.]

Hyposulphites. [See under SODII HYPOSULPHITUM.]

Ichthyol.—1. *Acids* precipitate a dark resinous mass. (M. M. R., IV. 266.) 2. *Alkaline hydrates* or *carbonates* decompose it, liberating ammonia. (M. M. R., IV. 266.) 3. It is incompatible with strong *alcoholic* preparations. (M. M. R., IV. 266.) 4. *Ferric salts* in solution with ichthyol form compounds of iron and ichthyol, while at the same time a partial oxidation of the ichthyol is brought about by the ferric salt. Ferrous salts in solution precipitate the sulpho-ichthyolate of iron. (*Am. D.*, XXVI. 364.)

Infusa.—1. Infusions generally contain some tannic acid, albuminous and extractive matters, which are precipitated by many of the metallic salts, such as *mercuric chloride*, *lead ace-*

tate, *silver nitrate*, *tartar emetic*, or *formic chloride*. 2. When the tannic acid is present in a large amount, infusions are incompatible with *salts* of *alkaloids*, because of the formation of the insoluble alkaloidal tannates. 3. Many of the infusions are decolorized by a solution of *subacetate of lead* or by *aluminum hydrate*. 4. Infusions should not be mixed with alcoholic solutions of substances insoluble in water.

Iodates. — 1. Iodates are strong oxidizing agents. In solution with a dilute mineral acid they are reduced to iodine and then iodides by *sulphites*, *hyposulphites*, *sulphides*, and *hypophosphites*; they are reduced to iodine by *iodides*, *oxalates*, *nitrites*, *hydrobromic acid*, *arsenous compounds*, *ferrous compounds*, and *hydrochloric acid*. 2. Iodates when mixed dry and rubbed or heated with readily *oxidizable matter*, such as *iodine*, *sulphur*, *sulphides*, or *reduced iron*, explode with more or less violence. The explosion is not as violent as when chlorates or nitrates are present instead of iodates. 3. *Morphine* in acid solution liberates iodine. 4. Iodates, except those of the alkali bases, are nearly insoluble in water or alcohol.

Iodida. [For iodides, see under ACIDUM HYDRIODICUM.]

Iodoformum.—1. Iodoform with a solution of an *alkali hydrate* gives, on heating, an iodide and a formate. (U. S. D., 739.) 2. *Silver nitrate* in solution decomposes iodoform, producing silver iodide, nitric acid, and carbon monoxide. (M. & M., III. 33.) 3. Exposed to direct *sunlight*, iodoform is completely oxidized by the air, forming carbon dioxide, iodine, and water. (M. & M., III. 33.) 4. Iodoform in *solution* or mixed with *fatty matter* decomposes in the light, forming iodine and methylene iodide. (M. & M., III. 33.) 5. Triturated dry with *silver nitrate*, violent reaction takes place with the formation of silver iodide, carbon dioxide, and nitrogen tetroxide. (Ph. E., VIII. 302.) 6. Yellow *mercuric oxide* decomposes it, forming carbon monoxide, formic acid, mercuric iodide, and water. (M. & M., III. 33.) 7. *Tannin* deodorizes and decomposes iodoform. (U. S. Disp., 741.)

8. *Balsam of Peru* deodorizes it, forming a compound. (U. S. Disp., 741.) 9. When equal parts of iodoform and *calomel* are mixed together, the color is yellow. After a time it becomes red on the surface, and after some months the whole mass is one of red crystals. All of the mercury has been converted into the biniodide or a mixture of this and the chloriodide. Chloroform is formed at the same time. (A. P. A., XLVIII. 952.)

Iodol. — 1. When warmed it gives off iodine. (Extra Pharm., 245.)

Iodophenacetin (Iodophinin).—1. Water decomposes it, liberating iodine. (Moerk, M. M. R., IV. 359.) 2. *Alkalies* abstract iodine, regenerating phenacetin. (M. M. R., IV. 359.) 3. It should not be mixed with substances having a strong affinity for iodine.

Iodum.—1. With fixed *alkali hydrates* in aqueous solution, iodine forms a colorless solution of iodides and iodates. 2. Iodine with *ammonia water* slowly becomes colorless, forming chiefly ammonium iodide, with some ammonium iodate. There is a liability 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 mixing alcoholic solutions of ammonia and iodine; by adding a solution of chlorinated lime (neutralized by acetic acid) to an aqueous solution of ammonium iodide; by adding ammonia to a mixture of hydrochloric acid and iodic acid; by the action of nitrogen chloride on an aqueous solution of potassium iodide; or by adding an alcoholic solution of iodine to ammoniated mercury. Analyses of the products of these reactions seem to show that at least three different explosive compounds are formed, differing in the number of hydrogen atoms replaced by the iodine. (M. & M., III. 560.) 3. *Nitric acid* slowly oxidizes iodine to iodic acid. 4. *Hypophosphites* are changed to phosphates, and the iodine is reduced to an iodide. 5. *Hydrogen sulphide* forms hydriodic acid and sulphur. 6. *Hyposulphites* form sulphates and an iodide. 7. *Sulphites* form sulphates and an iodide. 8. *Chlorine* forms iodic and hydrochloric acids and, in the presence of potassium hydrate, a periodate. 9. *Chlorates* in the presence of an acid form chlorides and iodic acid. 10. *Bromine* in the presence of an alkali hydrate forms a bromide and an iodate. 11. Iodine changes *mercurous compounds* either in acid or alkaline mixtures, to mercuric, and the iodine is reduced to an iodide. 12. In the presence of an alkali *arsenous compounds* are changed to arsenic. 13. In the presence of an alkali *ferrous compounds* become ferric, and *antimonious* become antimonic. 14. Iodine with *lime* and water forms a bleaching liquid. (M. & M., III. 16.) 15. Iodine combines with most metals and many non-metals, such as *chlorine*, *bromine*, *sulphur*, *phosphorus*, or *arsenic*. (M. & M., III. 16.) 16. *Starch* and preparations containing it are turned blue by iodine. If a larger amount of iodine is present, the color will be violet; and if a still larger amount be added, the color changes to a blue-green. By heating the iodized starch to a temperature of 70° to 80° C. the color is destroyed but on cooling it again assumes its blue color. (P. & J., 265.) 17. Iodine bleaches *litmus* and other vegetable colors. 18. It combines with many of the *fixed oils* to form additive compounds. 19. It combines with many *volatile oils*, and in some cases, as with turpentine, it acts with almost explosive violence. 20. In solution iodine slowly forms hydriodic acid. A freshly prepared tincture of iodine is precipitated by water, but an old tincture may not be, owing to the presence of the hydriodic acid. 21. Iodine, either in alcoholic solution or dissolved in an aqueous solution of potassium iodide, precipitates nearly all *alkaloids* from solution 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. 22. Iodine with *alcohol* and a fixed alkali forms iodoform. 23. It reacts with *tannic acid.* [See ACIDUM TANNICUM, No. 16.]

Liquor Acidi Arsenosi. [See ACIDUM ARSENOSUM, and also ACIDUM HYDROCHLORICUM.]—This solution contains arsenous and hydrochloric acids.

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

Liquor Arseni et Hydrargyri Iodidi. [See under ACIDUM ARSENOSUM, and also soluble iodides under ACIDUM HYDRIODICUM.] Many of the incompatibilities are similar to those of mercuric chloride. [See HYDRARGYRI CHLORIDUM CORROSIVUM.]—Donovan's solution precipitates nearly all *alkaloids* from aqueous solution of their salts, and is itself precipitated by *alkali hydrates.*

Liquor Calcis. [See under HYDRATES, FIXED ALKALI, and also CALCIUM.]—1. Lime water is precipitated by *tannic acid* and preparations containing it. 2. Heat throws the calcium hydrate out of solution, since it is less soluble in hot water than it is in cold. 3. Lime water has all of the incompatibilities of the fixed alkali hydrates and of the soluble calcium salts.

Liquor Ferri Chloridi. [See FERRICUM, and also soluble chlorides under ACIDUM HYDROCHLORICUM.]

Liquor Ferri et Ammonii Acetatis. [See FERRICUM, AMMONIUM, and soluble acetates under ACIDUM ACETICUM.]

Liquor Ferri Subsulphatis. [See FERRICUM, and also soluble sulphates under ACIDUM SULPHURICUM.]

Liquor Iodi Compositus. [See IODUM, and also soluble iodides under ACIDUM HYDRIODICUM.]

Liquor Plumbi Subacetatis. [See PLUMBI ACETAS.]—1. Goulard's extract is precipitated by nearly all *organic acids* except acetic, formic, butyric, and lactic acids. 2. It precipitates from solutions nearly all *alkaloids*, *glucosides*, and *neutral principles.* 3. It gives a precipitate with solutions of *acacia*, *albumen*, or *antipyrin*. 4. Lead subacetate has all of the incompatibilities of lead acetate. 5. It unites readily with liquid or solid *fats*. (N. D., 974.)

Liquor Potassæ. [See POTASSA.]

Liquor Potassii Arsenitis. [See CARBONATES, and also soluble arsenites under ACIDUM ARSENOSUM.]—Fowler's solution is alkaline to litmus and contains some potassium bicarbonate, which has been more or less changed to the normal carbonate. It consequently has the incompatibilities of the carbonates as well as those of a soluble arsenite.

Liquor Sodæ. [See HYDRATES, FIXED ALKALI.]

Liquor Sodæ Chloratæ. [See CHLORUM, and also soluble chlorides under ACIDUM HYDROCHLORICUM.]—Labarraque's solution has about the same incompatibilities as chlorine and soluble chlorides.

Liquor Sodii Silicatis. [See HYDRATES, FIXED ALKALI.]—1. This solution is precipitated by *alcohol*, concentrated *mineral acids*, or dilute mineral acids with heat. 2. It gelatinizes mucilage of *acacia*. 3. It is strongly alkaline, and consequently has many of the incompatibilities of the fixed alkali hydrates.

Lithii Benzoas. [See LITHIUM, and also soluble benzoates under ACIDUM BENZOICUM.]

Lithii Salicylas. [See LITHIUM, and also soluble salicylates under ACIDUM SALICYLICUM.]

Lithium.—The soluble lithium salts are precipitated from their solutions by soluble *carbonates*, the precipitate being lithium carbonate; by soluble *phosphates*, the precipitate being lithium phosphate. With the exception of the carbonate and the phosphate, the common lithium salts are soluble in water and nearly all soluble in alcohol. (P. & J., 25.)

Lobelia. [See under ALKALOIDS.]—Lobelia contains the volatile alkaloid lobeline, which is easily decomposed by alkalies or hot water. It is precipitated by most of the general alkaloidal reagents.

Magnesia. [See MAGNESIUM, and also HYDRATES, FIXED ALKALI.]—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 hydrate. Magnesium hydrate is slightly soluble in water, and its action is similar to the fixed alkali hydrates, but much weaker. 3. With sixteen times its weight of *copaiba* it makes a thick or solid mass on standing.

Magnesii Sulphas. [See MAGNESIUM, and also soluble sulphates under ACIDUM SULPHURICUM.]

Magnesium.—Soluble salts of magnesium in concentrated aqueous solution are precipitated: 1. by the *fixed alkali hydrates* and the *hydrates of barium, strontium*, and *calcium*, as magnesium hydrate; 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 *sulphites*, *oxalates*, or *tartrates*, as magnesium sulphite, oxalate, or tartrate respectively. 6. *Ammonium hydrate* or *carbonate* scarcely precipitates magnesium salts, and may prevent to some extent the precipitation by the fixed alkali hydrates.

Manganum.—1. Salts of manganese in aqueous solution are precipitated by the fixed *alkali hydrates* as manganous hydrate, white, but soon turning brown in the air from oxidation. *Ammonium hydrate* 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*, *bromine*, and *iodine*.

Mel.—1. The presence of honey prevents the precipitation of some of the metallic salts by the alkali hydrates. 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 liable to form an explosive mixture.

Menthol.—1. Menthol when triturated dry gives a liquid or soft mass with *borneol, bromal hydrate, butyl chloral hydrate, camphor, carbolic acid, chloral alcoholate, chloral hydrate, euphorin, exalgin, naphtol, pyrocatechin, pyrogallol, resin, resorcin, thymol*, or *urethane*. 2. Fuming *nitric acid* forms an explosive oil. (M. & M., III. 203.) 3. *Potassium permanganate* in solution decomposes menthol, forming pimelic, formic, propionic, butyric, and oxymenthylic acids. (M. & M., III. 203.) 4. *Chromic acid* oxidizes it to dextro- and lævo-menthol. (U. S. D., 868.)

Methacetinum.—Methacetin produces a liquid when triturated with *carbolic acid, chloral alcoholate, chloral hyarate, pyrocatechin;* and with *bromal hydrate* or *resorcin* it gives a stiff mass.

Methylene-blue.—1. Tetramethylthionine hydrochloride is decomposed by a strong solution of *potassium hydrate*, liberating the base as a violet precipitate. (Moerk, M. M. R., IV. 359.) 2. *Reducing agents* cause the formation of a colorless substance, which again takes up oxygen, forming methylene-blue. (M. M. R., IV. 359.) 3. *Sulphuric acid* changes the blue aqueous solution to a bright green color. (M. M. R., IV. 359.) 4. In aqueous solutions *potassium iodide* and *potassium bichromate* precipitate the base as an iodide and a chromate. (Allen, III. part I. 286.)

Methyl Salicylas. [See under ACIDUM SALICYLICUM.]—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 hydrates* decompose it, forming methyl alcohol and a salicylate. 3. Methyl salicylate has incompatibilities quite similar to those of the soluble salicylates.

Morphina. [See ALKALOIDS.]—1. Morphine combines with *acids* to form salts. 2. Morphine is precipitated from aqueous solutions (not too dilute) of its salts by *ammonium, potassium, sodium, calcium,* and *barium hydrates,* by *alkaline carbonates* and *bicarbonates,* and by *borax,* as the free alkaloid. The precipitate is soluble in a large excess of the above-mentioned fixed hydrates. 3. Morphine is precipitated from aqueous solutions of its salts by *lead subacetate* (not neutral lead acetate), by *potassium cyanide, potassium chromate,* and by the *general alkaloidal reagents.* 4. *Silver nitrate* is reduced and gives a red coloration with morphine. (Sohn, 67.) 5. *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. 6. *Nitric acid* gives a red color, changing to an orange, and then a light yellow. 7. Concentrated *sulphuric acid* with nitric acid gives a violet. 8. *Fröhde's reagent* (molybdic acid dissolved in sulphuric acid) gives a violet, changing into a green, brownish green, then yellow, and, after twenty-four hours, to a bluish-violet. (Sohn, 68.) 9. *Iodates* are reduced by morphine salts, liberating iodine. 10. *Potassium ferricyanide* oxidizes morphine to pseudomorphine. (M. & M., III. 436.) 11. *Chloride of gold* colors a solution of morphine blue, and the gold is reduced. (M. & M., III. 436.) 12. *Nitrous acid* (or spirit of nitrous ether) converts morphine into nitroso-morphine, pseudomorphine, and a base, $C_{17}H_{21}NO_5$. (M. & M., III. 436.) 13. With a solution of *chlorine* or *chlorinated lime* morphine gives an orange to a yellow color. 14. Morphine is oxidized by an alkaline solution of *potassium permangnate,* forming an acid. (M. & M., III. 436.) With an acid solution of *potassium permanganate* a green coloration is produced. 15. When *chlorine water* is added to a solution of morphine, and then *ammonia,* a reddish-brown color is formed. 16. *Chlorates* and also *chromic acid* oxidize morphine. 17. Some of the physiological incompatibilities of morphine are *atropine*, *cocaine*, *physostigmine*, *strychnine*, *gelsemium*, *veratrum viride*, *caffeine*, *picrotoxin*, and *paraldehyde*.

Mucilago Acaciæ. [See ACACIA.]

Mucilago Amyli. [See AMYLUM.]

Mucilago Tragacanthæ. [See TRAGACANTHA.]

Naphtalinum.—1. Naphtalin is converted into nitro- or dinitro-naphtalin by *nitric acid*, according to the strength of the acid used. (Allen, II. 508.) 2. *Chromic acid*, a boiling solution of *potassium permanganate*, or *potassium chlorate* with sulphuric acid converts naphtalin into phthalic acid. (Allen, II. 508.) 3. *Chlorine* and *bromine* form chloro- and bromo-derivatives. 4. Triturated dry with *phenol* or *salol* naphtalin produces a liquid. It gives a damp powder with *pyrocatechin*.

Naphtol.—1. Beta-naphtol in aqueous solution imparts a pale green color when *ferric chloride* is added, and slowly deposits dinaphtol (M. & M., III. 460.) 2. Warming with *sulphuric acid*, naphtol forms a sulphonic acid. (Allen, II. 511.) 3. *Chlorine* or *chlorinated lime* colors a solution of naphtol a pale green or yellow. (Allen, II. 511.) 4. A cold saturated aqueous solution of naphtol gives a faint bluish fluorescence with *ammonia*. (U. S. D., 895.) 5. Alkaline *potassium permanganate* oxidizes it to ortho-carboxy-cinnamic acid. (M. & M., III. 460.) 6. Beta-naphtol when triturated with *antipyrin*, *borneol*, *camphor*, *carbolic acid*, *exalgin*, *menthol*, *pyrocatechin* or *urethane* gives a liquid or a soft mass.

Nitrates. [See under ACIDUM NITRICUM.]

Nitrites. [See under ACIDUM NITROSUM.]

Nux Vomica. [See STRYCHNINA.]

Olea Fixa.—1. Fixed oils with solutions of *alkali hydrates*, *lime water*, and *oxides of many metals*, form oleates (soaps) of the base and glycerin. 2. The olein of fixed oils with *nitric acid* or *nitrous acid gas* forms the isomeric elaidin, which is solid. 3. Fixed oils absorb and combine with *bro-*

mine and *iodine*. 4. *Concentrated nitric acid* and also *concentrated sulphuric acid* give various color reactions with different oils.

Olea Volatilia.—1. Volatile oils with concentrated *sulphuric acid* generally give a yellow color, turning to a brown and sometimes a red. 2. *Ferric chloride* gives colors with some oils. 3. *Iodine* with certain oils reacts with violence. 4. Concentrated *nitric acid* gives color reactions with many oils.

Oleum Æthereum.—Ethereal oil with water is slowly decomposed, forming sulphovinic acid and a light oil of wine. (N. D., 1105.) It may also have the incompatibilities of sulphurous and sulphuric acids. The sulphuric acid is not precipitated by the general precipitants of this acid because it exists in the form of sulphovinates, which are soluble (U. S. D., 919.)

Oleum Amygdalæ Amaræ.—[See BENZALDEHYDUM and also ACIDUM HYDROCYANICUM.] Oil of bitter almonds consists chiefly of benzaldehyde and hydrocyanic acid. The artificial oil contains no hydrocyanic acid.

Oleum Aurantii Corticis.—1. Oil of orange gives a deep red or a red-brown color with *sulphuric acid*. 2. *Nitric acid* gives a greenish-yellow color. 3. Exposed to the *air* the oil is oxidized and acquires a turpentine odor and taste. 4. *Iodine* reacts violently with the oil.

Oleum Aurantii Florum.—Oil of neroli with a saturated solution of sodium bisulphite gives a permanent purplish-red color. (U. S. P., 273.)

Oleum Betulæ Volatile. [See METHYL SALICYLAS.]—Oil of sweet birch consists chiefly of methyl salicylate.

Oleum Caryophylli.—1. Oil of cloves 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 a yellow. (U. S. P., 275.) 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., 931.) 4. *Sulphuric acid* colors the oil a blood-red, which changes to a blue. (N. D., 1117.) 5. Strong solutions of *alkalies* convert it into a crystalline mass of potassium eugenol. (N. D., 1117.)

Oleum Cinnamomi.—1. Oil of cinnamon dissolved in alcohol gives a brown color with a solution of *ferric chloride.* 2. With a saturated solution of *sodium bisulphite* the oil solidifies to a crystalline mass. 3. *Nitric acid* slowly oxidizes it to a crystalline mass of cinnamic acid. 4. *Iodine* dissolves in it quietly, forming a thick mass. (N. D., 1119.)

Oleum Gaultheriæ. [See METHYL SALICYLAS.]—Oil of wintergreen is chiefly methyl salicylate.

Oleum Gossypii Seminis.—1. Cottonseed oil with *sulphuric acid* gives a dark reddish-brown color. (U. S. P., 279.) 2. *Nitric acid* converts the oil into a reddish-brown mass that partly solidifies on standing.

Oleum Lavendulæ.—Oil of lavender reacts violently with iodine or bromine.

Oleum Limonis. — Oil of lemon reacts violently with iodine or bromine.

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 hydrates* 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 dissolves *iodine* quietly and becomes thicker. 2. *Chloral hydrate* colors the oil red. This is perhaps due to an impurity in the chloral hydrate. (N. D., 1131.) 3. An alcoholic solution of the oil with *salicylic acid* turns green slowly. (N. D., 1131.)

Oleum Pimentæ.—An alcoholic solution of oil of pimenta with a solution of *ferric chloride* gives a bright green color. If the iron solution be very dilute, a blue color is formed, changing to green and then yellow. (U. S. P., 285.)

Oleum Sassafras.—1. *Nitric acid* reacts violently with oil of sassafras, converting it into a red liquid and finally into a red resin. 2. *Sulphuric acid* gives the oil a deep red color which soon becomes blackish. (U. S. P., 288.) 3. *Iodine* and *bromine* react with the oil.

Oleum Terebinthinæ.—1. Oil of turpentine with a small proportion of *sulphuric acid* is partially converted into terebene. 2. Dry *hydrochloric acid gas* with oil of turpentine forms a crystalline monohydrochloride of terpene. This has been called "artificial camphor." 3. *Chlorine* and *bromine* react so violently that the oil is frequently ignited. 4. *Iodine* is dissolved by oil of turpentine to form a green solution, which afterwards becomes hot and gives off hydriodic acid; and when considerable quantities of iodine and turpentine oil are brought suddenly together, explosion frequently ensues. (Allen, II. 424.) 5. Heated with *chlorinated lime*, oil of turpentine yields chloroform. (Allen, II. 424.) 6. 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 (Allen, II. 424) or by alcohol (U. S. D., 971.) 1. *Nitric acid* converts the oil into resinous matter, the violence of the reaction and the products formed depending on the strength of the acid. 8. *Fuming nitric acid* reacts violently and may set the oil on fire. 9. Strong *chromic acid* solution oxidizes oil of turpentine to acetic acid and other products. (Allen, II. 425.) 10. The oil when exposed to *air* slowly absorbs oxygen and forms a resinous substance, which seems to have the power of producing hydrogen dioxide. (U. S. D., 971.)

Opium. [See MORPHINE, and also ACIDUM MECONICUM.] —A solution of opium contains so many alkaloids, besides other substances, that it is generally incompatible with the inorganic salts, general alkaloidal reagents, and many other compounds.

Oxalates. [See under ACIDUM OXALICUM.]

Pancreatinum.—1. Pancreatin digests albuminoids, converts starch into sugar, and emulsifies fat. 2. An aqueous solution is precipitated by *alcohol* or a saturated solution of *sodium chloride*. 3. The action of pancreatin is destroyed by prolonged contact with *acids*.

Paraldehydum.—1. Paraldehyde with *alkalies* forms aldehyde resin. 2. It is a strong reducing agent and is oxidized to alcohol. 3. *Chlorine* forms substitution compounds. 4. *Hydrocyanic acid* combines with aldehydes to form nitrites. (M. & M., I. 107.) 4. Paraldehyde liberates iodine from iodides. (Ph. Era, XVII. 298.)

Pepsinum.—Pepsin is rendered inert by alkaline substances, by prolonged contact with alcohol, or by tannic acid.

Permanganates. [See POTASSII PERMANGANAS.]

Phenacetinum.—1. Phenacetin in strong aqueous solution gives with *chromic acid*, *chlorine*, *chlorinated lime*, *iodine*, and some other oxidizing agents colorations varying from pink to red. These colorations are due to the presence of paraphenetidin in the phenacetin, or upon its formation by decomposition of the phenacetin. (Moerk, M. M. R., IV. 359.) 2. Heating phenacetin with hydrochloric acid and then adding a solution of *ferric chloride* gives a red color. 3. *Salicylic acid* when triturated with phenacetin is said to give a pasty mass. The writer failed to get anything but a dry powder. 4. Phenacetin triturated with *carbolic acid*, *chloral hydrate*, or *pyrocatechin* gives a liquid. 5. It is decomposed by strong *acids* or *alkalies*. (Scoville, 234.) 6. Phenacetin combines with iodine to form a compound known as iodophenin. (Extra Pharm., 134.) 7. Phenacetin conceals the fluorescence of quinine sulphate, especially in dilute solutions. (D. C., XL. 299.)

Phenocoll Hydrochloride.—1. Phenocoll hydrochloride in aqueous solution is precipitated by the *alkaline hydrates* and *carbonates* as the free base. 2. *Piperazin* is said to precipitate the base phenocoll when mixed with a strong solution of phenocoll hydrochloride. According to Roe, the best results for making a solution are obtained when the phenocoll salt is from fifty to one hundred per cent in excess of the piperazin, and each compound should be dissolved in a portion of water before being mixed. (D. C., XXXIX. 14.)

Phosphates. [See under ACIDUM PHOSPHORICUM, and also SODII PHOSPHAS.]

Phosphorus.—1. Phosphorus is oxidized in the air, forming oxides of phosphorus, and may cause fire. 2. A warm solution of *potassium* or *sodium hydrate* 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. *Chloric*, *bromic*, and *iodic* acids give the same products. 4. Phosphorus is oxidized by *nitric acid, chromic acid, old oil of turpentine*, and other substances rich in oxygen. 5. Phosphorus unites directly with *chlorine*, *bromine*, *iodine*, or *sulphur*. 6. When phosphorus is triturated with *potassium chlorate*, *chromic oxide*, *lead dioxide*, *mercuric oxide*, *silver oxide*, *potassium bichromate*, *potassium nitrate*, *sulphur*, or *sulphides*, explosion is liable to take place.

Physostigmina. [See ALKALOIDS.]—1. Physostigmine is precipitated from aqueous solutions of its salts by the *general alkaloidal reagents*, except picric acid and platinum chloride. 2. *Alkaline hydrates* and *carbonates* precipitate the alkaloid from concentrated aqueous solutions of its salts and give a red color, changing to a yellow, green, and blue. (Sohn, 23.) 3. *Gold chloride* gives a blue coloration. 4. A solution of *chlorine* or *bromine* gives a red coloration. 5. *Nitric acid* gives a yellowish-red color. 6. *Barium hydrate* produces the red substance rubreserine. 7. The free alkaloid precipitates *iron* as the hydrate from a solution of ferric chloride. (Sohn, 23.) 8. Physostigmine is physiologically incompatible with *atropine*, *chloral hydrate*, *morphine*, *strychnine*, and *caffeine*.

Picrotoxinum.—1. Picrotoxin is dissolved by solutions of *alkalies*, and precipitated from these solutions by acids. 2. Picrotoxin is not precipitated from its solutions by *lead subacetate*, *tannic acid*, or the other *general alkaloidal reagents*. 3. *Chloral hydrate* is a physiological incompatibility.

Pilocarpinæ Hydrochloras. — 1. Pilocarpine hydrochlorate in aqueous solution is precipitated by the reagents that generally precipitate alkaloids. 2. *Calomel* mixed with this salt and moistened turns dark. According to A. Schneider, there is formed a double salt of the alkaloid and mercuric chloride, metallic mercury being separated. (D. C., XXXVIII. 106.) 3. *Potassium permanganate* oxidizes it to pyridin. (M. & M., IV. 275.) 4. *Atropine* has an opposite physiological effect.

Piperazinum.—1. Piperazin combines with *acids* to form salts. 2. On account of its strong alkalinity it produces precipitates with solutions of *alkaloidal salts* and with some *inorganic salts*. 3. With an aqueous solution of piperazin *tannic acid* gives a precipitate and a green color; *alum* gives a white precipitate; *sulphate of iron* gives a dark green color; *Donovan's solution* gives a pink precipitate; *spirit of nitrous ether* gives a red color; and *ferric chloride* gives a precipitate. (Roe, D. C., XXXVII. 108.) 4. An aqueous solution is also precipitated by *mercuric chloride*, *copper sulphate*, *Mayer's reagent*, and *picric acid*. 5. *Potassium permanganate* and *silver nitrate* are reduced by piperazin. 6. When piperazin is triturated dry with *sodium salicylate*, *butyl chloral hydrate*, *antifebrin*, *phenacetin*, or *chloral hydrate*, a moist mass or a liquid is produced. (Roe, D. C., XXXVII. 108.) Piperazin is quite deliquescent when exposed to air. 7. *Sodium hypochlorite* solution saturated with chlorine forms a body with piperazin that explodes when heated to a temperature of 80°–85° C. (M. & M., IV. 349.) 8. *Bromine water* forms the corresponding di-bromo-piperazin, which is also unstable. (M. & M., IV. 349.) 9. *Quinine* gives an amorphous violet-brown body with piperazin. (M. & M., IV. 349.) 10. *Phenol* gives a compound with piperazin. (M. & M., IV. 349.)

Plumbi Acetas. [See soluble acetates under ACIDUM ACETICUM.]—1. Lead acetate in aqueous solution is precipitated by the *fixed alkali hydrates* as lead hydrate, soluble in excess of the alkali hydrates. 2. Lead acetate, except in very concentrated solution, is not precipitated by *ammonium hydrate*. 3. The soluble *carbonates* precipitate the white basic carbonate of lead. 4. *Hydrogen sulphide* and the *alkali sulphides* precipitate the brownish-black lead sulphide. 5. *Sulphuric acid* and the soluble *sulphates* precipitate the white lead sulphate. 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. Soluble *chromates* precipitate the yellow lead chromate. 10. *Sodium phosphate* precipitates the white lead phosphate. 11. *Alkali sulphites* precipitate the white lead sulphite. 12. The soluble *cyanides* precipitate white lead cyanide. 13. *Tannic acid* and solutions containing it precipitate the yellow-gray lead tannate. 14. A solution of lead acetate is precipitated by many *organic acids*, *coloring matters*, *resins*, *gums*, *neutral principles*, *glucosides*, and a few *alkaloids*. 15. With a solution of opium the *morphine meconate* is decomposed, forming morphine acetate and lead meconate, the latter being precipitated. 16. Lead acetate mixed with a solution of potassium hydrate is oxidized to lead dioxide by *chlorine*, *bromine*, *potassium permanganate*, or *hydrogen dioxide*. 17. Lead acetate gives a liquid or soft mass when rubbed with *acetamide*, *carbolic acid*, *chloral hydrate*, *salicylic acid*, *sodium phosphate*, or *urea*. It gives a stiff mass with *pyrocatechin*, *pyrogallol*, *resorcin*, *sodium salicylate*, or *urethane*.

Plumbi Nitras. [See PLUMBI ACETAS, and also soluble nitrates under ACIDUM NITRICUM.]—Lead nitrate has the same incompatibilities, so far as the base is concerned, as lead acetate, except that it is precipitated by ammonia.

Plumbi Subacetas. [See LIQUOR PLUMBI SUBACETATIS.]

Potassa. [See HYDRATES, FIXED ALKALI, and also POTASSIUM.]—Potassium hydrate has all of the incompatibilities of the fixed alkali hydrates.

Potassa Sulphurata. [See soluble sulphides under ACIDUM HYDROSULPHURICUM.]

Potassii Acetas. [See soluble acetates under ACIDUM ACETICUM, and also POTASSIUM.]

Potassii Bicarbonas. [See bicarbonates under CARBONATES, and also POTASSIUM.]

Potassii Bichromas. [See soluble chromates and Bichromates under ACIDUM CHROMICUM.]

Potassii Bitartras. [See ACIDUM TARTARICUM, and also POTASSIUM.]—Cream of tartar combines with the hydrates and carbonates of the alkalies to form neutral salts, which are more soluble in water. Cream of tartar in aqueous solution is acid in reaction, and consequently has the incompatibilities of tartaric acid.

Potassii Bromidum. [See soluble bromides under ACIDUM HYDROBROMICUM, and also POTASSIUM.]

Potassii Carbonas. [See CARBONATES, and also POTASSIUM.]

Potassii Chloras. [See CHLORATES, and also POTASSIUM.]

Potassii Citras. [See soluble citrates under ACIDUM CITRICUM, and also POTASSIUM.]

Potassii Cyanidum. [See soluble cyanides under ACIDUM HYDROCYANICUM.]—1. An aqueous solution of potassium cyanide dissolves *iron*, *zinc*, or *copper* with the evolution of hydrogen. (N. D., 1296.) 2. An aqueous solution exposed to the air absorbs carbon dioxide, becomes brown, and deposits a dark brown precipitate. It is sometimes strongly alkaline. 3. Potassium cyanide with *iodine* forms potassium iodide and iodide of cyanogen. (M. & M., II. 346.)

Potassii et Sodii Tartras. [See soluble tartrates under ACIDUM TARTARICUM, and also POTASSIUM.]—Nearly all *acids* in solution combine with the sodium and throw out of solution the potassium bitartrate.

Potassii Hypophosphis. [See soluble hypophosphites under ACIDUM HYPOPHOSPHOROSUM, and also POTASSIUM.]

Potassii Iodidum. [See STRYCHNINA No. 2; also soluble iodides under ACIDUM HYDRIODICUM, and also POTASSIUM.]—Potassium iodide precipitates strychnine from solutions of its salts unless the solution is dilute; even then it may precipitate after standing some days.

Potassii Nitras. [See soluble nitrates under ACIDUM NITRICUM, and also POTASSIUM.]

Potassii Permanganas.—Potassium permanganate in acid solution is reduced to the manganous condition by *nitrous acid* and *nitrites*, forming nitric acid; by *hydrochloric acid* and *chlorides*, forming chlorine; by *hydrobromic acid* and *bromides*, liberating bromine; by *hydriodic acid* and *iodides*, liberating iodine; by *sulphites* and *hyposulphites*, forming sulphates; by *mercurous compounds*, forming mercuric compounds; by *arsenites*, forming arsenates; by *ferrous compounds*, forming ferric compounds; by *hypophosphites*, forming phosphates; by *oxalic acid* and *oxalates*, forming carbon dioxide; by *tartaric acid* (more readily in neutral or alkaline mixtures); by *ammonia*. (M. & M., III. 187.) 2. *Alcohol* is oxidized by potassium permanganate, forming potassium acetate and precipitating manganese dioxide and manganese monoxide. (M. & M., III. 187.) 3. *Glycerin* gives a precipitate similar to that produced by alcohol and forms potassium carbonate. (M. & M., III. 187.) 4. *Carbolic acid* is oxidized by potassium permanganate, forming oxalic acid and carbon dioxide. (M. & M., III. 832.) 5. With *hydrogen dioxide water* mixed with sulphuric acid, potassium permanganate forms manganous sulphate, potassium sulphate, water, and oxygen, the oxygen coming from both the permanganate and the hydrogen dioxide. 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 *sulphur*, *sulphides*, *reduced iron*, *hypophosphites*, *charcoal*, *sugar*, *glycerin*, *alcohol*, *tannic acid*, *oxalic acid*, *picric acid*, *fats*, *oils*, *gums*, and other *readily oxidizable matter*, an explosion is liable to ensue. 8. The permanganates are all soluble in water, except silver, which is sparingly soluble. They are insoluble in alcohol.

Potassii Tartras. [See soluble tartrates under ACIDUM TARTARICUM, and also POTASSIUM.]—A concentrated solution of potassium tartrate with many acids gives a precipitate of potassium bitartrate.

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 solution with *sodium bitartrate* give a precipitate of potassium bitartrate. 3. A solution of the hydrate or carbonates of potassium with an excess of *tartaric acid* gives a precipitate of potassium bitartrate. 4. Many of the potassium salts give a yellow precipitate with a solution of *sodium cobaltic nitrate*.

Pulvis Morphinæ Compositus. [See MORPHINA, and also CAMPHORA.]—Since this preparation contains morphine and camphor, it will have the incompatibilities of these two compounds.

Pyoktannin.—1. Pyoktannin in solution is decomposed by the light. 2. *Alkalies* with a solution of pyoktannin precipitate the base as a reddish powder. (Moerk, M. M. R., IV. 359.) 3. Pyoktannin is incompatible with *mercuric chloride.*

Pyrocatechin.—1. An alkaline solution of pyrocatechin assumes a green color, changing to brown, and finally black. (Allen, II. 562.) 2. With a solution of *ferric chloride* it gives a green color, changed to a violet-red by ammonia. (Allen, II. 562.) 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. (Allen, II. 562.) 8. Pyrocatechin forms a liquid with *acetamide, acetanilid, antipyrin, borneol, bromal hydrate, butyl chloral hydrate, camphor, camphor monobromated, carbolic acid, chloral alcoholate, chloral hydrate, euphorin, exalgin, menthol, methacetin, naphtol, phenacetin, pyrogallol, salol, sodium phosphate, urea,* or *urethane.* It gives a stiff mass with *diuretin, lead acetate,* or *thymol,* and a damp powder with *naphtaln* or *resorcin.*

Pyrogallol.—1. Pyrogallic acid in aqueous solution gradually absorbs *oxygen* from the air and forms a brown solution. This takes place much more rapidly in the presence of *alkalies,* and an almost black solution is ultimately formed. With *ammonia* pyrogallein is formed. (M. & M., IV. 359.) 2. With a solution of *ferrous sulphate* pyrogallol forms a blue solution, rapidly changing to a green and red. 3. With *ferric choride* solution a red color is formed at once. 4. With *lime water* a purple color is produced, rapidly changing to a brown, but no precipitate is formed. (Allen, III. part I. 71.) 5. With a solution of *ferric acetate* a purple-black coloration is formed. (Allen,

III. part I. 69.) 6. *Nitrous acid* colors the aqueous solution of pyrogallol brown. 7. Pyrogallol 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.) 8. Pyrogallol in aqueous solutions reduces salts of *silver*, *mercury*, and *gold*, and it is oxidized to acetic and oxalic acids. (Richter, 695.) 9. A solution of *mercuric chloride* and pyrogallol in alcohol gives a black precipitate with *alkaloids*, but not with glucosides. (M. & M., IV. 359.) 10. *Iodine* in solution imparts a purple-red color to an aqueous or alcoholic solution of pyrogallol. 11. *Bromine* forms tri-bromo-pyrogallol. (M. & M., IV. 359.) 12. Pyrogallol does not precipitate a solution of gelatin. 13. Fuming *nitric acid* converts it into oxalic acid. (M. & M., IV. 359.) 14. With a solution of *lead acetate* it gives a white precipitate. 15. Pyrogallol gives a liquid or soft mass when rubbed with *acetamide*, *antipyrin*, *camphor*, *carbolic acid*, *exalgin*, *menthol*, *pyrocatechin*, *urea*, or *urethane*. It gives a stiff mass with *diuretin*, *lead acetate*, or *sodium phosphate*.

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 nitrocellulose is converted back to cellulose by *reducing agents*, such as ferrous salts or alkali sulphides. (Richter, 514.)

Quinina. [See ALKALOIDS.]—1. Quinine unites with *acids* to form salts. 2. Quinine salts in aqueous solutions are precipitated by all of the reagents mentioned under ALKALOIDS No. 2, except bromides and iodides; in very concentrated solutions of the alkaloidal salt these may also give a precipitate. 3. Quinine is also precipitated from the aqueous solution of its salts by *acetates* as the voluminous quinine acetate. In concentrated solutions it is also precipitated by soluble *citrates*, *tartrates*, and *arsenites* as quinine citrate, tartrate, and arsenite. 4. Quinine gives a blue fluorescence with *sulphuric* or *nitric* acid. This is more or less destroyed or prevented by the halogen acids or their salts, and by phenacetin. 5. The free alkaloid displaces ammonia from its salts when dissolved in water and heated. 6. Quinine sulphate is oxidized by *potassium permanganate* to pyridin tricarboxylic acid, oxalic acid, and ammonia. (M. & M., IV. 375.) 7. An aqueous solution in sunlight gives a brown flocculent precipitate of quiniretin. (M. & M., IV. 375.)

Resina. [See RESINÆ.]—Resin when triturated with *menthol, phenol, salol,* or *urethane* makes a liquid or a pasty mass. *Nitric acid* oxidizes it to isophthalic and trimellitic acids. (M. & M., I. 1.) *Potassium permanganate* oxidizes it to formic, acetic, and carbonic acids. (M. & M., I. 1.)

Resinæ.—1. With aqueous solutions of *alkali hydrates* or *carbonates* resins form resin soaps. 2. *Nitric acid* converts them into artificial tannin. 3. *Ferric chloride* in alcoholic solution gives a blue color with guaiac; a dark green color with benzoin; a black color with gamboge, balsam of Peru, storax, or shellac. (M. & M., IV. 395.) 4. 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 balsam of Tolu; greenish, changing to a dingy violet, by asafœtida; and brown by some other resins. (M. & M., IV. 395.)

Resorcinum.—1. An aqueous solution exposed to the air becomes red and brown. This reaction is hastened by the presence of *alkalies*. 2. With a solution of *ferric chloride* resorcin gives a violet coloration. 3. With *chlorinated lime* or *soda* a solution of resorcin gives a violet coloration, quickly changing to a yellow. 4. *Nitrous acid* or *spirit of nitrous ether* gives a dark brown solution with resorcin. Nitrous acid acting on a dilute solution of resorcin produces di-nitroso-resorcin, which occurs in commerce under the names "solid green" and "fast green." (Richter, 690.) 5. An aqueous solution of resorcin with *bromine water* yields needles of tri-bromo-resorcin. (Allen, II. 563.) 6. A solution of resorcin with *copper sulphate* and *ammonia* or with *silver nitrate* and *ammonia* gives a deep black color. (Allen, II. 563.) 7. An alkaline solution of resorcin with *potassium iodide* gives a violet-red precipitate. (M. & M., IV. 398.) 8. A solution of resorcin with a solution of *chloral hydrate* and *sodium bisulphate* gives a deposit of silky needles. 9. Resorcin with *hydrogen dioxide* and *ammonia water*, after acidifying, gives a brown precipitate (lacmoid), which forms an indigo-blue solution with alkalies. 10. A solution of resorcin precipitates a solution of *albumen*. (Extra Pharm., 355.) 11. *Chloroform* or *chloral hydrate* with a solution of sodium hydrate, on being warmed, gives a yellowish-red liquid with a green fluorescence. 12. Resorcin produces a liquid or soft mass when triturated with *acetamide*, *acetanilid*, *antipyrin*, *borneol*, *camphor*, *carbolic acid*, *chloral alcoholate*, *euphorin*, *exalgin*, *menthol*, *methacetin*, or *urethane*. With *lead acetate*, *pyrocatechin*, or *sodium phosphate* it gives a slightly damp powder, which quickly dries.

Saccharum.—1. A solution of sugar heated with *lime* forms calcium saccharates. 2. Very strong *nitric acid* with sugar, in the cold, forms explosive nitrosaccharose. (Allen, I. 214.) Moderately concentrated nitric acid converts sugar into saccharic and tartaric acids, and with heat into oxalic acid and carbon dioxide. (Allen, I. 214, 240.) 3. With concentrated *sulphuric acid* sugar is decomposed, forming carbon, while formic acid, sulphur dioxide, and other gases are given off. (Allen, I. 215.) 4. Sugar warmed with dilute solutions of *acids* is changed to invert-sugar. 5. When a concentrated solution of sugar and *potassium hydrate* is heated, carbon dioxide, acetone, acetic, propionic, and oxalic acids are formed. (M. & M., IV. 551.) 6. *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.) 7. *Iodine* with potassium carbonate and sugar yields a little iodoform. (M. & M., IV. 551.) 8. Dilute *chromic acid* solution oxidizes sugar to oxalic, formic, and carbonic acids. (M. & M., IV. 551.) 9. *Potassium permanganate* converts sugar into oxalic, formic, and carbonic acids. (M. & M., IV. 551.) 10. *Lime*, *magnesia*, and *litharge* dissolve with some facility in syrup, forming definite compounds. (Allen, I. 241.) 11. The presence of sugar hinders or prevents the precipitation, or dissolves the precipitates, of many metallic hydrates or oxides which are normally formed when alkali hydrates are added to solutions of metallic salts. The interference takes place in case of lead, copper, ferric, mercuric, calcium, and magnesium salts. 12. Sugar triturated with *potassium chlorate*, *permanganate*, or *bichromate*, or with other strong oxidizing agents, is liable to cause an explosion.

Saccharum Lactis.—1. Milk-sugar in alkaline solution reduces salts of silver, mercury, bismuth, or copper. (N. D., 1398.) 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. A mixture of sulphuric and nitric acids with milk-sugar gives lactose pentanitrate, which is explosive. (M. & M., IV. 553.) 5. *Chromic acid* with milk-sugar yields aldehyde. (M. & M., IV. 553.) 6. *Alkali permanganates* oxidize milk-sugar. 7. Silver oxide oxidizes it, forming oxalic, glycollic, and lactonic acids. (M. & M., IV. 553.) 8. Milk-sugar with a solution of *iodine* and sodium bicarbonate yields a little iodoform. (M. & M., IV. 553.) 9. Triturated with *oxidizing agents*, it is liable to cause an explosion.

Salicylates. [See ACIDUM SALICYLICUM.]

Salol.—1. Salol in alcoholic solution gives a violet color when a dilute solution of *ferric chloride* is added to it. If, however, a little of the salol solution be added to the ferric chloride solution, a white cloudiness, but no violet color, will appear. (U. S. P., 344.) 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 carbolic acid. (Allen, III. part I. 60.) 4. When salol is triturated dry with *borneol*, *camphor*, *monobromated camphor*, *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *euphorin*, *exalgin*, *naphtalin*, *pyrocatechin*, *resin*, *thymol*, or *urethane*, a liquid or soft mass results. It gives a slightly damp powder with *antipyrin*, quickly drying.

Santonin.—1. Santonin on exposure to light turns yellow, forming photo-santonic acid and a yellow-resinous body. (N. D., 1414.) 2. With *alkali hydrates* in solution it forms santoninates, which are soluble in water. 3. An aqueous solution of a santoninate is precipitated by lead acetate or lead subacetate as lead santoninate. It is also precipitated by tannic acid, ferrous sulphate, copper sulphate, chlorine water, and by acids, if the solution of santoninate is not too dilute. 4. Santonin is turned pink or red by *potassium hydrate*, especially in the presence of alcohol. (M. & M., IV. 429.) 5. Heated with *nitric acid*, santonin forms carbon dioxide, succinic, oxalic, and acetic acids. (M. & M., IV. 429.)

Sapo.—1. Aqueous solutions of soap are decomposed by *mineral acids*, which combine with the sodium, liberating the free fat acid. 2. Aqueous solutions of *metallic salts* give precipitates of metallic oleates with soaps. 3. Soap is frequently alkaline, and when so it makes a black mixture with *calomel*, due to the mercurous oxide formed.

Soda. [See HYDRATES, FIXED ALKALI.]—Sodium hydrate has all the incompatibilities of the fixed alkali hydrates.

Sodii Acetas. [See soluble acetates under ACIDUM ACETICUM.]

Sodii Arsenas. [See under ACIDUM ARSENICUM.]—Sodium arsenate is frequently alkaline in reaction to litmus.

Sodii Benzoas. [See soluble benzoates under ACIDUM BENZOICUM.]

Sodii Bicarbonas. [See bicarbonates under CARBONATES.]

Sodii Boras. [See also soluble borates under ACIDUM BORICUM.]—1. Borax coagulates mucilage of *acacia.* This is prevented by the presence of sugar. 2. Borax is alkaline in reaction and precipitates *alkaloids* from solutions of their salts. Glycerin prevents this by decomposing the borax. 3. Glycerin and borax react in the presence of water, forming an acid solution which is changed to alkaline upon large dilution with water. (Caspari, 446.) *Glucose, mannitol,* and *honey* cause a similar reaction. [See GLYCERINUM No. 1.] 4. Borax increases the solubility of boric, benzoic, gallic, stearic, and salicylic acids in water. 5. When triturated with *alum,* borax forms a damp, almost moist mixture. (Caspari, 446.)

Sodii Bromidum. [See bromides under ACIDUM HYDROBROMICUM.]

Sodii Carbonas. [See CARBONATES.]

Sodii Chloras. [See CHLORATES.]

Sodii Chloridi. [See chlorides under ACIDUM HYDROCHLORICUM.]

Sodii Hypophosphis. [See hypophosphites under ACIDUM HYPOPHOSPHOROSUM.]

Sodii Hyposulphis.—1. Sodium hyposulphite (or thiosulphate) in aqueous solution is decomposed by nearly all *acids,* forming sulphur and sulphurous acid. 2. Sodium hyposulphite precipitates, as hyposulphites, solutions of *barium chloride, silver nitrate, lead acetate,* and *mercurous nitrate.* The precipitates with the last three salts are white at first, but become black on standing, forming the sulphide of the metal and sulphuric acid. (P. & J., 231.) 3. In acid solution sodium hyposulphite reduces *iodates* to iodine and then hydriodic acid; *bromates* to bromine and hydrobromic acid; *chlorates* to chlorine and hydrochloric acid; *ferric salts* to ferrous; *chromates* to chromic salts; *permanganates* to manganic salts; *arsenic compounds* to arsenous. 3. An acidulated solution of sodium hyposulphite bleaches *litmus* and other vegetable colors. 4. When sodium hyposulphite is triturated with *potassium chlorate*, *nitrate*, *permanganate*, or with other strong *oxidizing agents*, explosion is liable to take place.

Sodii Iodidum. [See iodides under ACIDUM HYDRIODICUM.]

Sodii Nitras. [See nitrates under ACIDUM NITRICUM.]

Sodii Nitris. [See nitrites under ACIDUM NITROSUM.]

Sodii Phosphas. [See also phosphates under ACIDUM PHOSPHORICUM.]—1. The official sodium phosphate is slightly alkaline in reaction, and precipitates some of the *alkaloids* from aqueous solutions of their salts. 2. Sodium phosphate gives a liquid or soft mass with *acetamide*, *carbolic acid*, *chloral hydrate*, *lead acetate*, *pyrocatechin*, *pyrogallol*, *salicylic acid*. It forms a slightly damp powder with *antipyrin*, *resorcin*, or *sodium salicylate*.

Sodii Pyrophosphas. [See pyrophosphoric acid under ACIDUM PHOSPHORICUM.]

Sodii Salicylas. [See salicylates under ACIDUM SALICYLICUM.]

Sodii Sulphas. [See sulphates under ACIDUM SULPHURICUM.]

Sodii Sulphis. [See ACIDUM SULPHUROSUM.]—In acid solutions it has the same incompatibilities as sulphurous acid.

Spiritus.—Water causes a separation of the volatile substance from all of the official spirits except spirit of nitrous ether, spirit of ammonia, whiskey, and brandy. They all contain alcohol and consequently have the reactions of alcohol.

Spiritus Ætheris Compositus. [See OLEUM ÆTHEREUM, and also ALCOHOL.]

Spiritus Ætheris Nitrosi. [See ACIDUM NITROSUM.] —1. The ethyl nitrite in the spirit of nitrous ether is decomposed by *alkali hydrates,* forming alcohol and a nitrite of the alkali. 2. Spirit of nitrous ether readily undergoes decomposition, forming alcohol and nitrous acid, which latter changes to nitric acid. The spirit has the incompatibilities mentioned under nitrous acid.

Spiritus Ammoniæ. [See HYDRATES, VOLATILE ALKALI.]—Spirit of ammonia has the same incompatibilities as water of ammonia, 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.

Spiritus Ammoniæ Aromaticus.—The incompatibilities of this preparation are similar to those of the spirit of ammonia, and, in addition, the ammonium carbonate with acids liberates carbon dioxide. Aqueous or weak alcoholic liquids cause the separation of the aromatic oils.

Spiritus Camphor. [See CAMPHORA, ALCOHOL, and SPIRITUS.]

Spiritus Frumenti. [See ALCOHOL.]—Whiskey usually contains a little tannic acid.

Spiritus Gaultheriæ. [See METHYL SALICYLAS, ALCOHOL, and also SPIRITUS.]

Spiritus Glonoini. [See GLONOINUM, ALCOHOL, and also SPIRITUS.]

Spiritus Limonis. [See OLEUM LIMONIS, ALCOHOL, and also SPIRITUS.]

Spiritus Vini Gallici. [See ALCOHOL.]—Brandy usually contains a little acetic and tannic acids.

Stramonium. [See ATROPINA.]

Strontii Bromidum. [See STRONTIUM, and also soluble bromides under ACIDUM HYDROBROMICUM.]

Strontii Iodidum.—[See STRONTIUM, and also soluble iodides under ACIDUM HYDRIODICUM.]

Strontii Lactas. [See STRONTIUM, and also ACIDUM LACTICUM.]

Strontium.—Salts of strontium in aqueous solution are precipitated by the soluble *carbonates*, *phosphates*, or *oxalates* as strontium carbonate, phosphate, or oxalate. The soluble *sulphates*, *chromates*, or *alkali hydrates* precipitate from concentrated solutions the strontium sulphate, chromate, or hydrate.

Strychnina.—1. Strychnine combines with acids to form salts. 2. Strychnine salts in aqueous solution are precipitated by the reagents mentioned under ALKALOIDS NO. 2. 3. In rather concentrated solutions of the strychnine salt the soluble *chlorides*, *bromides*, and especially the *iodides*, are liable to cause a precipitation. The precipitation may not take place for several days. A satisfactory explanation of the cause of the precipitation has not been given. It is partially explained by some writers by saying that the salts of strychnine are insoluble in solutions of inorganic salts. The presence of alcohol to the extent of fifteen per cent is said to prevent the precipitation. 4. *Hydrochloric acid* added to a solution of strychnine hydrochlorate gives a crystalline precipitate. (M. & M., IV. 517.) 5. *Potassium cyanide* added to a solution of a salt of strychnine precipitates the pure base. (M. & M., IV. 517.) 6. *Potassium permanganate* in alkaline solution yields ammonia, oxalic acid, carbon dioxide, and another crystalline acid. In acid solution potassium permanganate gives an amorphous acid with strychnine. (M. & M., IV. 517.) 7. The physiological incompatibilities are *atropine*, *aconite*, *morphine*, *chloral hydrate*, *potassium bromide*, *physostigmine*, *hydrocyanic acid*, *amyl nitrite*, *chloroform*, *alcohol*, *digitalis*, *curarine*, *nicotine*, *paraldehyde*, and *urethane*.

Sulphates. [See ACIDUM SULPHURICUM.]

Sulphida. [See ACIDUM HYDROSULPHURICUM.]

Sulphites. [See ACIDUM SULPHUROSUM.]

Sulphonal. — Sulphonal is not acted upon by alkalies, acids, or oxidizing agents.

Sulphur.—Sulphur readily dissolves in hot aqueous solutions of *hydrates of potassium, sodium, barium*, or *calcium*, forming polysulphides and hyposulphites. Triturated dry with strong oxidizing agents, as *potassium chlorate* or *permanganate*, explosion is liable to occur.

Syrupus Acidi Citrici. [See SACCHARUM, and also ACIDUM CITRICUM.]

Syrupus Acidi Hydriodici. [See SACCHARUM, ACIDUM HYDRIODICUM, and IODUM.]—This syrup sometimes becomes yellow or brown, due to the formation of iodine.

Syrupus Allii. [See SACCHARUM, and also ACIDUM ACETICUM.]—Syrup of garlic darkens in the light. It contains acetic acid.

Syrupus Calcis. [See SACCHARUM and LIQUOR CALCIS.]

Syrupus Ferri Iodidi. [See SACCHARUM, FERROSUM, and soluble iodides under ACIDUM HYDRIODICUM.] — The sugar prevents, to some extent, the precipitation of ferrous hydrate by alkali hydrates.

Syrupus Hypophosphitum. [See SACCHARUM and soluble hypophosphites under ACIDUM HYPOPHOSPHOROSUM.]

Syrupus Ipecacuanhæ. [See ACIDUM ACETICUM, and also SACCHARUM.]—This syrup contains acetic acid.

Syrupus Scillæ. [See ACIDUM ACETICUM, and also SACCHARUM.]—This syrup contains acetic acid.

Tannates. [See ACIDUM TANNICUM.]

Tartrates. [See ACIDUM TARTARICUM.]

Terebenum. [See OLEUM TEREBINTHINÆ.]—Terebene on exposure to *air* and *light* resinifies and becomes *acid*. It combines with *chlorine, bromine*, and *iodine* to form additive products. In many reactions it resembles oil of turpentine.

Theobromina. — 1. Theobromine acts like a weak base, and also like a weak acid. It combines with strong *acids* to form salts that are quite readily decomposed by water. It dissolves in an excess of an alkali hydrate solution. 2. From an aqueous solution theobromine gives a crystalline precipitate with *silver nitrate*, *mercuric chloride*, and *gold chloride*. With many of the general alkaloidal reagents it does not precipitate.

Thymol.—1. Thymol unites with *alkalies* to form soluble salts. (U. S. D., 1360.) 2. With excess of *bromine water* solutions of thymol yield a yellowish-white precipitate of a bromo-derivative, which gradually collects to form globules of a yellowish liquid. (Allen, II. 449.) 3. A solution of thymol with *iodine* and potassium hydrate gives a red amorphous precipitate of iodothymol. 4. *Spirit* of *nitrous ether* gives a green and then a brown color, changing the thymol to nitrosothymol. 5. Thymol absorbs *ammonia-gas* and becomes liquid. (M. & M., IV. 715.) 6. *Chromic acid* oxidizes thymol to thymoquinone. (M. & M., IV. 715.) 7. A solution of thymol coagulates *albumen*. 8. Thymol gives a liquid or soft mass when rubbed with *acetamide*, *acetanilid*, *antipyrin*, *borneol*, *camphor*, *monobromated camphor*, *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *euphorin*, *exalgin*, *menthol*, *pyrocatechin*, *resin*, *salol*, or *urethane*. It is said to liquefy with *butyl chloral hydrate*. 9. Thymol reduces *gold* and *platinum* from their solutions. (Allen, II. 449.)

Tinctura Ferri Chloridi.—[See FERRICUM, and also ALCOHOL.]

Tinctura Iodi. [See IODUM.]—An old tincture usually contains some hydriodic acid, which prevents the precipitation of the iodine when water is added.

Tragacantha.—Tragacanth is colored yellow by a solution of *sodium hydrate*. (Allen, I. 355.) An aqueous mixture is thickened by *alcohol*, and by *neutral* and *basic lead acetate* (not coagulated by borax, silicates, or ferric salts). (Allen, I. 355.)

Urea.—Urea becomes soft or liquid with *bromal hydrate*, *chloral alcoholate*, *chloral hydrate*, *lead acetate*, *pyrocatechin*, or *pyrogallol*.

Urethanum.—1. Urethane in the presence of *iodine* and an *alkaline hydrate* or *carbonate* produces iodoform. 2. Urethane with an alcoholic solution of *potassium hydrate* gives large crystals of potassium cyanate. (M. & M., I. 679.) 3. Urethane is decomposed by *alkalies*. 4. When urethane is triturated in a mortar with *acetamide*, *antipyrin*, *borneol*, *bromal hydrate*, *butyl chloral hydrate*, *camphor*, *carbolic acid*, *chloral alcoholate*, *chloral hydrate*, *euphorin*, *exalgin*, *menthol*, *naphtol*, *pyrocatechin*, *pyrogallol*, *resin*, *resorcin*, *salicylic acid*, *salol*, *thymol*, or *benzoic acid*, a liquid is produced.

Vinum. [See ACIDUM TANNICUM, and also ALCOHOL.] —Wine generally contains some tannic acid.

Vitellus. [See ALBUMEN.]

Zinci Chloridi. [See ZINCUM, and also soluble chlorides under ACIDUM HYDROCHLORICUM.]—Zinc chloride has a strong tendency to combine with organic bases, as with strychnine, morphine, quinine, etc. (U. S. D., 1469.)

Zinci Sulphas. [See ZINCUM, and also soluble sulphates under ACIDUM SULPHURICUM.]

Zincum.—Zinc salts in aqueous solutions are precipitated by *alkali hydrates*, by soluble *carbonates*, *phosphates*, *arsenates*, *oxalates*, or *alkaline cyanides*, as zinc hydrate, basic carbonate, phosphate, arsenate, oxalate, or cyanide. *Alkali sulphides* (not hydrogen sulphide) precipitate white zinc sulphide.

Quinine free by acetic acid
morphine oxidized by K₂Mn₂O₈

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 student should practice translating the Latin into English, and the English into Latin; also converting the metric system into the common, and *vice versa.*

1.

℞

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

Misce et signa: Teaspoonful three times a day.

2.

℞

Quininæ sulphatis,	gr. xx
Acidi sulphurici aromat.,	f. ʒ ss
Ammonii carbonatis,	ʒ j
Syrupi aurantii, q. s. ad	f. ℥ iv

M. S. Cochleare parvum t. i. d.

3.

℞

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

Mix and make six powders.
Label: One every two hours.

4.

℞

Ammonii carbonatis,	℥ iiss
Syrupi tolutani,	
Syrupi scillæ,	aa. f. ℥ ij

Misce et fiat solutio.

Sig. Teaspoonful when coughing.

5.

℞
Quininæ sulphatis, ℈ ij
Olei carophylli, gtt. ij
Potassii permanganatis, gr. iij
Acidi sulphur. aromat., f. ʒ ij
Mucilag. acaciæ, q. s. ad f. ℥ viij

M. S. Tablespoonful every three hours.

6.

℞
Tincturæ guaiaci,
Muc. acaciæ, aa. f. ℥ j

M. S. Teaspoonful every three hours.

7.

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

Misce, fiat pulvis et divide in partes æquales No. xxv.

8.

℞
Hydrargyri chloridi cor., 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.

9.

℞
Potassium chlorate, gr. xl
Sodium hypophosphite, gr. xxx
Water, enough to make f. ℥ xx

Mix and label: Use as gargle.

10.

℞
Potassii permanganatis, gr. xv
Morphinæ sulphatis, gr. x
Aquæ, f. ℥ iij

M. S. Teaspoonful at night.

11.

℞
Extracti buchu fl., f. ℥ ss
Spiritus ætheris nitrosi, f. ℥ j
Potassii acetatis, ʒ ij
Syrupi, q. s. ad f. ℥ iv

Misce et signa: Teaspoonful half hour after meals.

12.

℞
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.

13.

℞
Quininæ sulphatis, gr. xx
Plumbi acetatis, gr. xl
Bismuthi subnitratis, ʒ ss
Syrupi aurantii cort.,
q. s. ad f. ℥ iv

M. S. Teaspoonful every four hours.

14.

℞
Sugar of lead, ʒ ss
Alum, gr. xv
Rose water, f. ℥ iv

Mix and label: Lotion.

15.

℞
Quininæ sulph., gr. xvj
Acidi tannici, ℈ j
Acidi sulphurici arom., ♏ v
Syr. eriodictyi arom.,
q. s. ad f. ℥ ij

M. S. Teaspoonful twice a day.

16.

℞
Olei morrhuæ, f. ℥ j
Syr. ferri iodidi, f. ʒ j
Olei gaultheriæ, ♏v
Syrupi, f. ʒ xv
Liquoris calcis, f. ℥ j
M. S. Dessertspoonful twice a day.

17.

℞
Liq. arseni et hydrarg. iodidi, 10 Cc.
Potassii iodidi, 5 Gm.
Quininæ sulphatis, 2 Gm.
Acidi sulphurici aromat., q. s.
Syrupi, q. s. ad 300 Cc.
M. S. 4 Cc. after each meal.

18.

℞
Sodii salicylatis, gr. xx
Quininæ sulphatis, gr. xx
Syrupi zingiberis, f. ℥ ij
M. S. Teaspoonful doses.

19.

℞
Liquoris acidi arsenosi, f ʒ j
Hydrargyri chlor. cor., gr. j
Strychninæ sulphatis, gr. j
Spiritus vini rectificati, f. ʒ j
Aquæ, f. ℥ j
Misce. Signa: Teaspoonful night and morning.

20.

℞
Potassii bromidi, ʒ iij
Chloralis, ʒ iv
Elixiris aromatici, q. s. ad f. ℥ ij
M. S. Take one teaspoonful at night.

21.

℞
Plumbi subacetatis, ʒ ss
Zinci sulphatis, gr. xl
Tinct. catechu co.,
Tincturæ opii, aa. f. ℥ ss
Aquæ, q. s. ad f. ℥ viij
M. S. Injection. Shake well before using.

22.

℞
Hydrargyri chloridi cor., gr. iij
Albuminis, ʒ iss
Aquæ, q. s. ad f. ℥ x
Misce et cola.
Signa: Teaspoonful three times a day.

23.

℞
Sodii phosphatis, ʒ v
Syrupi rhei, f. ʒ iv
Syrupi, f. ℥ ss
Aquæ, q. s. ad ℥ ij
M. S. Teaspoonful in a little water before meals.

24.

℞
Ammonii carbonatis, gr. xx
Ammonii chloridi, gr. xxx
Syrupi allii, f. ℥ j
Aquæ, q. s. ad f. ℥ ij
M. S. One-half teaspoonful as required.

25.

℞
Sodii boratis, gr. x
Zinci sulphatis, gr. ij
Aquæ camphoræ, f. ʒ j
Aquæ rosæ, q. s. ad f. ℥ j
M. S. Put one drop in each eye night and morning.

[illegible] imperfect [illegible] [illegible] [illegible] for [illegible]

[illegible] expectorant

[illegible] [illegible] tonic

26.

℞

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

Misce. Signa: Teaspoonful when coughing.

27.

℞

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

Misce. Sig. Teaspoonful after meals.

28.

℞

Quinine sulphate,	ʒ j
Strychnine sulphate,	gr. j
Sulphuric acid,	ʒ ij
Iron pyrophosphate, sol.,	ʒ j
Syrup ginger,	enough to make f. ℥ vj

Mix. Teaspoonful three times a day.

29.

℞

Iodine,	gr. xxx
Spirit of camphor,	f ℥ j.
Soap liniment,	f. ℥ iij

Mix and label: Apply as directed.

30.

℞

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.

31.

℞

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

M. S. Teaspoonful for vomiting.

32.

℞

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

Misce et fiat pulvis et in chartulas decem divide.

Signa: One powder after each meal.

33.

℞

Tinct. nucis vom.,	
Acidi nitromur.,	aa. f. ʒ ij
Elixiris quininæ co., N. F.,	f. ℥ iiiss

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

34.

℞

Quininæ sulphatis,	ʒ ss
Potassii iodidi,	ʒ j
Strychninæ sulph.,	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.

35.

℞

Ammonii carbonatis,	ʒ j
Syrupi ipecacuanhæ,	f. ʒ j
Vini pepsini,	
Misturæ amygdalæ,	aa. f. ℥ j

M. S. Teaspoonful in milk every three hours.

36.

℞

Potassii chloratis,	gr. iv
Sulphuris præcip.,	gr. vj
Antimonii sulphur.,	gr. j
Sacchari,	gr. x

Tere. Fiant chartulæ II.
Signa : Insufflation.

37.

℞

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.

38.

℞

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

M. S. Teaspoonful every four hours.

39.

℞

Potassium chlorate,	℥ ss
Fluid hydrastis colorless,	f. ℥ ss
Carbolic acid,	gtt. v
Tincture of myrrh,	f. ℥ ss
Peppermint water,	q. s. ad f. ℥ iij

Mix and label : Gargle.

40.

℞

Copaibæ,	
Tinct. ferri chlor.,	
Tinct. cantharid.,	aa. 10 Cc.
Glycerini,	20 Cc.
Syrupi,	50 Cc.

M.

41.

℞

Camphoræ,	
Chloralis,	aa. 5 Gm.
Cocainæ hydrochloratis,	5 Dg.

M. S. To be applied externally as directed.

42.

℞

Chloroformi,	
Acidi nitrici,	
Creosoti,	aa. f. ʒ ij

M. S. For cauterizing.

43.

℞

Sodii boratis,	ʒ ij
Chloralis,	ʒ j
Alcoholis,	f. ℥ ss
Aquæ sambuci,	q. s. ad f. ℥ vj

Misce et fiat lotio.

44.

℞

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

M. S. Teaspoonful twice a day.

45.

℞

Potassii chloratis,	ʒ ij
Acidi hydrochlorici,	f. ʒ ij
Aquæ,	f. ℥ viij

M. S. Gargle.

46.

℞

Tinct. cimicifugæ,	f. ʒ vj
Tinct. sanguinariæ,	f. ℥ ss
Tinct. lobeliæ,	f. ℥ iss
Syrupi tolutani,	f. ʒ ij
Syrupi scillæ co., q. s. ad	f. ℥ iij

M. S. Tablespoonful every hour until cough is relieved.

47.

℞

Iodoform,	aa. ʒ ij
Tannic acid,	

Mix and label: Dust over abraided surface.

48.

℞

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

M. Ft. capsulæ No. VIII.
Sig. One every three hours.

49.

℞

Potassii cyanidi,	ʒ j
Morphinæ acet.,	gr. ij
Acidi acetici,	gtt. ij
Syrupi, q. s. ad	f. ℥ viij

M. S. Cochleare parvum ter in die.

50.

℞

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

M. S. Teaspoonful three times a day.

51.

℞

Potassii citratis,	ʒ vj
Potassii bicarbonatis,	ʒ iij
Liquoris potassæ,	f. ʒ ij
Ext. buchu fluidi,	f. ʒ vj
Spiritus ætheris nitrosi,	f. ʒ iv
Syrupi limonis, q. s. ad	f. ℥ vj

M. S. Tablespoonful three times a day.

52.

℞

Bichloride of mercury,	gr. j
Sodium arsenite,	gr. ss
Strychnine sulphate,	gr. ss
Carbonate of potass.,	
Dried sulphate of iron,	aa. gr. ix

Mix and divide into nine pills. Label: One after each meal.

53.

℞

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

Mix and make 20 powders.

54.

℞

Sodii salicylatis,	ʒ iiss
Syrupi limonis,	f. ℥ ij

M. S. Teaspoonful three times a day.

55.

℞

Potassii iodidi,	ʒ ij
Spiritus ætheris 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.

56.

℞
Fowler's solution, f. ʒ ij
Sol. of dialyzed iron, f. ℥ iv
Mix. Label: Teaspoonful after meals.

57.

℞
Liq. strychninæ, B. P., 1.5 Cc.
Sodii bicarbonatis, 3.0 Gm.
Aquæ, q. s. ad 100.0 Cc.
Misce et signa: Teaspoonful three times a day.

58.

℞
Liquoris potass. arsenitis, f. ʒ j
Hydrargyri chloridi cor., gr. j
Aquæ, f. ℥ iv
Misce et fiat sol. Sig. Dessertspoonful three times a day.

59.

℞
Quininæ sulph., gr. x
Potassii acetatis, gr. xx
Acidi sulphurici dil., gtt. iv
Aquæ, q. s. ad f. ℥ j
M. S. Teaspoonful after meals.

60.

℞
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. S. Capiat cochleare parvum post prandium.

61.

℞
Quininæ sulph., ʒ j
Morphinæ sulph., gr. iij
Strychninæ sulph., gr. ⅔
Acidi arsenosi, gr. 1⅙
Ext. belladonnæ, gr. v
Aconitinæ, gr. ij
Ferri bromidi, ℈ j
M. Ft. pil. No. XXIV.

62.

℞
Nitromuriatic acid, f. ʒ iss
Strychnine sulph., gr. ¾
Glycerin, f. ʒ v
Water, enough to make f. ℥ iv
Mix and label: Teaspoonful in water after meals.

63.

℞
Liq. ammonii acet.,
Syrupi ferri iodidi, aa. f. ℥ ss
Syrupi tolutani, f. ℥ ij
Hydrarg. chlor. corrosivi, gr. ss
Creosoti, f. ʒ ss
M.

64.

℞
Iodoformi. gr. xx
Acidi carbolici, gr. xxx
Zinci oxidi,
Balsami peruvi.,
Petrolati mol., aa. ℥ j
M. S. Apply as directed.

65.

℞
Potassii bromidi, ℥ ss
Potassii chloratis, ʒ ij
Syr. aurantii, f. ℥ ss
Aquæ dest., q. s. ad f. ℥ iij
M.

66.

℞
Carbolic acid, cryst.,
Euphorin,
Aristol,
Tannic acid,
Dried alum, aa. gr. xl
Cacao butter,
a sufficient amount
Make suppositories No. XL.

67.

℞
Quininæ sulph., gr. xvj
Aquæ, f. ʒ ij
Acidi sulphurici dil., q. s.
Ext. glycyrrhizæ fl.,
q. s. ad f. ℥ ij
M. et ft. mist.

68.

℞
Tinct. ferri chlor., f. ʒ iv
Potassii chloratis, ʒ j
Glycerini, f. ℥ j
Ext. glycyrrhizæ fl., f. ℥ j
Aquæ, q. s. ad f. ℥ iv
M. S. One teaspoonful four times a day.

69.

℞
Ferri reducti, 3. 0 Gm.
Acidi arsenosi, 0.35 Gm.
Quininæ sulph., 8. 0 Gm.
Strychninæ sulph., 0.35 Gm.
Extracti gentianæ, 8. 0 Gm.
M. Ft. pil. No. XL.

70.

℞
Acidi carbolici, ʒ iss
Aquæ, q. s. ad ℥ j
M. S. Use with camel-hair brush.

71.

℞
Liq. ammonii acet., f. ℥ iv
Acidi acetici, f. ʒ j
Tinct. ferri chlor., f. ℥ ss
Glycerini, f. ℥ ss
Mucilaginis acaciæ, f. ℥ iij
M. S. Teaspoonful every three hours.

72.

℞
Hydrarg. chlor. cor., gr. iij ✓✓
Muc. acaciæ, ℥ j
Aquæ,
Liquoris calcis, aa. ℥ ij
M.

73.

℞
Syrupi acidi hydriodici, f. ℥ ij
Bismuthi subnit., ʒ iss
M. S. Teaspoonful three times a day.

74.

℞
Ammonium carbonate, ʒ j
Resorcin, ʒ ij
Bitter almond water,
enough to make f. ℥ iij
M.

75.

℞
Sodii phosphatis, gr. xxx
Strychninæ sulph., gr. ss
Syr. aurantii corticis, ℥ ij
M. S. Teaspoonful three times a day.

76.

℞
Alcohol, 30 Cc.
Iodine, 10 Gm.
Turpentine, 200 Cc.
Mix. To be used as a spray.

77.

℞

Hall's sol. of strych.,	f. ʒ ij
Fowler's sol. of arsenic,	f. ʒ ij
Alcohol,	f. ℥ iiss

Mix. Label: Teaspoonful in half glass of water after meals.

78.

℞

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

Misce et fiat sol.

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

79.

℞

Hydrargyri chlor. cor.,	.5 Gm.
Ammonii carbonas,	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.

80.

℞

Potassii chloratis,	ʒ ij
Syr. ferri iodidi,	f. ℥ ij
Vini antimonii,	f. ʒ ss
Spt. chloroformi,	f. ʒ ij
Aquæ,	q. s. ad f. ℥ viij

M. S. Teaspoonful three times a day.

81.

℞

Liq. ammonii acetatis,	f. ℥ ij
Aq. camphoræ,	f. ʒ iss
Spiritus ætheris nit.,	f. ℥ ss
Antimonii et pot. tart.,	gr. ss
Morphinæ acetatis,	gr. ss

M.

82.

℞

Potassii chloratis,	1.0 Gm.
Potassii salicylatis,	0.5 Gm.
Cinchonæ pulv.,	3.0 Gm.
Carbonis ligni,	5.0 Gm.

M. Divide into 10 powders.

S. One just after a meal.

83.

℞

Calcii hypophosphitis,	2.5 Gm.
Ferri lactatis,	.3 Gm.
Potassii chloratis,	4.0 Gm.

M. Ft. pil. No. XXX.

84.

℞

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.

85.

℞

Boric acid,	ʒ iv
Creolin,	ʒ j
Water,	℥ xv

Mix and label: Lotion for the eye.

86.

℞

Magnesii carbon.,	ʒ iss
Sodii boratis,	
Acidi citrici,	aa. ʒ ij
Aquæ bullientis,	q. s. ad f. ℥ viij

M. S. Tablespoonful in the morning before breakfast.

87.

℞

Auri et sodii chloridi,	gr. xij
Strychninæ sulph.,	gr. j
Atropinæ sulphatis,	gr. ¼
Ext. cinchonæ fl.,	f. ℥ iij
Aquæ,	q. s. ad f. ℥ vj

M. Ft. sol.

88.

℞

Morphinæ sulph.,	gr. iv
Atropinæ sulph., 32 (1–500 gr.) tablets	
Aquæ,	℥ iv

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

89.

℞

Potassii permanganatis,	gr. xx
Ext. glycyrrhizæ,	gr. xx
Glyceriti amyli,	q. s.

M. Fiant pil. No. xxv.

90.

℞

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

M. S. Caustic.

91.

℞

Acidi salicylici,	
Sodii bicarbonatis,	aa. ℥ j
Aquæ,	q. s. ad f. ℥ vj

M. Ft. sol.
Sig. ʒ j t. i. d.

92.

℞

Tinct. ferri chloridi,	10.0 Cc.
Acidi phosphorici dil.,	10.0 Cc.
Quininæ sulph.,	5.0 Gm.
Strychninæ sulph.,	0.1 Gm.
Aquæ dest.,	100.0 Cc.
Syrupi limonis,	80.0 Cc.

M. S. Teaspoonful three times a day.

93.

℞

Quinine bisulph.,	ʒ ss
Antikamnia,	ʒ j
Elixir aromatic,	f. ʒ xx

Mix and label: Two teaspoonfuls every four hours.

94.

℞

Tinct. ferri chloridi,	ʒ iv
Acidi carbolici,	ʒ j
Acidi sulphurosi,	ʒ iij
Aquæ,	q. s. ad ℥ viij

Misce et signa: Gargle.

95.

℞

Pot. chlorat.,	
Calc. hypophosphit.,	aa. gr. xv
Magnesii sulphatis,	gr. xxx
Ferri sulphatis,	gr. vj
Liq strychninæ,	♏ xx
Aquæ,	q. s. ad f. ℥ iij

Misce et signa: Teaspoonful three times a day.

96.

℞

Sodium salicylate,	gr. x
Ammonium carbonate,	gr. iij
Sp. of nitrous ether,	
Sp. of chloroform,	aa. ♏ x
Water, enough to make	℥ j

Mix.

97.

℞

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.

98.

℞

Mercury subchloride,	ʒ ss
Sol. saccharate of lime,	℥ j
Water,	O. j

Mix and label: Lotion.

99.

℞

Hydrargyri chlor. cor.,	gr. v
Glycerini,	ʒ ss
Liq. calcis saccharati,	℥ j
Aquæ,	q. s. ad O. j

M. S. Lotion.

100.

℞

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

M. S. Teaspoonful twice a day.

101.

℞

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.

102.

℞

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

Misce et signa: Teaspoonful every four hours.

103.

℞

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

Mix. Label: Teaspoonful after meals.

104.

℞

Tinct. ferri chlor.,	ʒ ss
Potassii chloratis,	ʒ iv
Morphinæ sulph.,	gr. ij
Aquæ,	℥ iv

M.

105.

℞

Hydrargyri chlor. cor.,	gr. ss
Calcii sulphidi,	gr. x
Potassii bicarb.,	gr. xxx
Aq. carbolici,	q. s. ad f. ℥ iv

M. S. Lotion.

106.

℞

Morph. acetatis,	.05 Gm.
Potassii iodidi,	2.0 Gm.
Ferri sulphatis,	1.0 Gm.
Aquæ,	50.0 Cc.

M. S. Cochleare parvum omnibus noctibus.

107.

℞

Bismuthi subnit.,	ʒ j
Sodii bicarbonatis,	gr. xxx

M. Fiant pil. No. xx.

108.

℞

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

Misce et fiat pulvis; mitte tales No. XII.

109.

℞

Plumbi acetatis,	ʒ ss
Zinci sulphatis,	gr. xv
Aquæ rosæ,	q. s. ad f. ℥ iv

Misce et signa: Injection.

110.

℞

Aq. hydrogenii dioxidi,	℥ j
Zinci sulphatis,	ʒ vj
Acidi carbolici,	ʒ j
Glycerini,	℥ j
Aquæ,	q. s. ad ℥ viij

Misce et fiat lotio.

Signa: Apply locally.

111.

℞

Bismuthi subnit.,	gr. xx
Plumbi subacetatis,	gr. xxx
Morphinæ sulph.,	gr. j
Sodii bicarbon.,	ʒ j

Misce et divide in chartulas decem.

Signa: One powder two hours after each meal.

112.

℞

Iodol,	0.5 Gm.
Yellow oxide of mercury,	0.2 Gm.
Petrolatum,	10.0 Gm.

Mix and make an ointment.

113.

℞

Antipyrin,	
Sodium salicylate,	aa. gr. xxx

Mix and make 15 powders.

114.

℞

Thymol,	
Salicylic acid,	aa. gr. xxx
Menthol,	gr. xx
Eucalyptol,	ʒ iss
Benzoic acid,	ʒ j
Sodium bicarbonate,	
Borax,	aa. ʒ ij
Oil of wintergreen,	ʒ ss
Glycerin,	
Water,	aa. q. s. ad f. ℥ xvj

Mix. Label: Gargle.

115.

℞

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

M. S. Teaspoonful after meals.

116.

℞

Quinine bisulphate,	ʒ ss
Basham's mixture,	f. ℥ iv

Mix. Label: Teaspoonful every other hour.

117.

℞

Hydrastine sulphate,	gr. j
Boracic acid,	
Borax,	aa. gr. vij
Tinct. of opium,	gtt. xx
Water,	f. ℥ j

Mix. Mark: Put 2 drops in each eye two or three times a day.

118.

℞

Antipyrin,	ʒ j
Sp. of nitrous ether,	f. ʒ j
Tincture of aconite,	gtt. xx
Elixir, enough to make	f. ℥ ij

Mix.

119.

℞

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

Misce. Signa: Cochleare parvum bis vel ter in die sumatur.

120.

℞

Resorcin,	10 Gm.
Glycerin,	15 Gm.
Spirit of nitrous ether,	10 Cc.
Water,	35 Cc.

Mix.

121.

℞

Acidi carbolici,	ʒ ij
Aquæ ammoniæ,	ʒ iv
Spiritus vini rectificati,	℥ j

M. S. Use with atomizer.

122.

℞

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

M. S. Embrocation.

123.

℞

Quininæ sulphatis,	ʒ iss
Strychninæ sulphatis,	gr. ss
Tinct. ferri chloridi,	℥ iss

M. S. Half a teaspoonful in a glass of water three times a day

124.

℞

Tinct. ferri chlor.,	f. ʒ ij
Aquæ gaultheriæ,	f. ℥ iij
Syrupi tolutani,	f. ℥ j

M. S. Teaspoonful one half-hour after meals.

125.

℞

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.

126.

℞

Morphinæ sulph.,	gr. ij
Sp. ætheris nitrosi,	
Aquæ,	aa. f. ℥ ss

Misce. Signa: Capiat cochleare unum parvum quoties requiritur.

127.

℞

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

M. S. Half teaspoonful three times a day.

128.

℞

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

Mix and make a solution.

129.

℞

Liquoris ferri dialysati,	f. ʒ iv
Syrupi,	f. ℥ j
Mucilaginis acaciæ,	f. ʒ iv

Misce.

130.

℞

Hydrargyri chlor. mitis,	℈ j
Ammonii chloridi,	ʒ j

Misce et divide in partes æquales viginti.

Sig. Sumat unam bis vel ter in die.

131.

℞

Liq. plumbi subacetatis,	f. ʒ j
Tinct. ferri chloridi,	f. ℥ j
Elixiris,	q. s. ad f. ℥ iv

M. S. Teaspoonful three times a day.

132.

℞

Amyl nitritis,	f. ʒ j
Alcoholis,	f. ℥ j
Potassii iodidi,	ʒ j
Syrupi limonis,	q. s. ad f. ℥ ij

Misce. Cito dispensetur!

Signetur: A teaspoonful to be taken every hour.

133.

℞

Ext. valerianæ fl.,	f. ℥ iss
Ext. taraxaci fl.,	f. ℥ ss
Tinct. gentianæ co.,	f. ℥ iv
Magnesii sulphatis,	℥ ij
Aquæ,	q. s. ad O. ss

M. S. Tablespoonful twice a day.

134.

℞
Tincturæ iodi, ʒ ij
Glycerini, ʒ j
Aquæ, q. s. ad ℥ ij
M. S. Apply locally.

135.

℞
Liquoris bismuthi, N. F., f. ℥ ss
Tinct. nucis vomicæ, f. ʒ iiiss
Vini pepsini, f. ℥ j
Elix. gentianæ, q. s. ad f. ℥ iv
M. S. Teaspoonful three times a day.

136.

℞
Hydrarg. chlor. mit.,
Cocainæ hydrochlor., aa. gr. j
Pepsini, gr. iv
Aquæ, quantitas sufficiens
Divide in pilulas numero octo.

137.

℞
Liq. plumbi subacet. dil.,
Tincturæ opii, aa. f. ℥ ss
Aquæ. f. ℥ j
M. S. Lotion.

138.

℞
Ext. digitalis fl., 8 Cc.
Ext. erythroxyli fl., 30 Cc.
Sp. ætheris nit., 30 Cc.
Glycerini, 30 Cc.
Aquæ, q. s. ad 125 Cc.
M. S. Teaspoonful three times a day.

139.

℞
Argenti oxidi, gr. vj
Creosoti, gtt. vj
Glycyrrhizæ, q. s.
M. Make six pills.

140.

℞
Quinine bisulph., gr. xx
Tincture of catechu co., f. ʒ iij
Water, enough to make f. ℥ iij
Mix. Mark: Teaspoonful every hour.

141.

℞
Acidi carbolici, 3 Gm.
Sodii bicarb., 15 Gm.
Sodii boratis, 15 Gm.
Glycerini, 35 Cc.
Aquæ, q. s. ad 1000 Cc.
Misce. Sig. Use as gargle.

142.

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

143.

℞
Acidi nitrohydrochlorici, ʒ vij
Spiritus terebinthinæ, ℥ j
Make emulsion, ℥ iv
Sig. Teaspoonful three times a day.

144.

℞
Potassii permanganatis, 2 Gm.
Glycerini, 4 Gm.
Aquæ, q. s. ad 50 Cc.
M. S. Apply externally.

145.

℞
Spiritus ætheris nit., f. ℥ j
Potassii citratis, ʒ ij
Syrupi, f. ℥ j
M. S. Capiat cochleare parvum post prandium.

146.

℞

Hydrargyri chlor. cor.,	gr. ij
Infusi cinchonæ,	℥ iv
Sp. ammoniæ aromatici,	ʒ ij

M. S. Cochleare minimum bis in die.

147.

℞

Alum,	
Zinc sulphate,	aa. ʒ ij
Lead acetate,	ʒ iss
Tannic acid,	ʒ ss

Mix. Label: One to two teaspoonfuls in a pint of water. Use locally.

148.

℞

Cocaine hydrochlorate,	gr. ij
Salicylic acid,	℈ ij
Phenacetin,	
Exalgin,	aa. ʒ j

Mix and make 30 powders.

149.

℞

Magnesiæ calc.,	℥ ss
Sodii bicarb.,	ʒ iij
Sp. ammoniæ arom.,	f. ʒ iv
Tinct. zingiberis,	f. ʒ iij
Syr. tolutani,	f. ℥ j
Aq. menth. piper., q. s. ad	f. ℥ iv

M. S. Dessertspoonful after meals.

150.

℞

Tinct. ferri chloridi,	ʒ iss
Sodii hyposulphitis,	ʒ iss
Potassii chloratis,	ʒ iij
Quininæ sulphatis,	gr. xv
Aquæ,	f. ℥ ij

M. S. Teaspoonful three times a day.

151.

℞

Acidi hydrobromici,	♏ x
Phenacetini,	gr. xl
Quininæ sulph.,	gr. xx
Hydrargyri chlor. mit.,	gr. v
Codeinæ sulph.,	gr. ij
Ext. nucis vomicæ,	gr. ij

Misce et divide in partes æquales decem ingerendas in capsulas gelatinosas.

Sig. Horum capsularum una sumatur omni trihorio.

152.

℞

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

M. S. Teaspoonful three times a day.

153.

℞

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

Mix and make 40 pills.

154.

℞

Liquoris zinci chloridi,	f. ʒ j
Hydrargyri chlor. cor.,	gr. iv
Liquoris calcis,	f. ℥ ij
Aquæ, q. s. ad	f. ℥ iv

Misce. Signa: Apply as directed.

155.

℞

Piperazin,	
Phenocoll hydrochlor.,	aa. ℈ j
Syrup simple,	
Elixir aromatic,	aa. f. ʒ j
Peppermint water,	f. ℥ j
Water, enough to make	f. ℥ ij

Misce et fiat sol.

156.

℞

Tinct. ferri chloridi,	3 Cc.
Tinct. guaiaci ammon.,	30 Cc.
Tinct. aloes,	15 Cc.
Syrupi,	q. s. ad 120 Cc.

M.

157.

℞

Morph. sulph. ! ! !,	gr. vij
Ext. hyoscyami,	gr. v
Ext. cannabis indicæ,	gr. v

Misce. Dispensa in capsulas decem.

Signa Cursu noctis una sumatur.

158.

℞

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

M. S. Teaspoonful every two hours.

159.

℞

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

Mix and mark : Teaspoonful three times a day.

160.

℞

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.

161.

℞

Potassii cyanidi,	gr. iss
Hydrarg. chlor. mitis,	gr. xxiv

Tragacanthæ,
Aquæ, aa. quantum requiritur ut fiat massa in pilulas triginta formanda.

Signa : Capiat pilulas duas omni nocte.

162.

℞

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

M. S. Dessertspoonful before retiring at night.

163.

℞

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

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

164.

℞

Ext. gelsemii fl.,	♏ xij
Antipyrini,	ʒ ij
Ammonii iodidi,	gr. xx
Liq. pot. arsenitis,	f. ʒ j
Elixiris,	q. s. ad f. ℥ ij

M. S. Teaspoonful every two or three hours.

165.

℞

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

Misce et signa : Cochleare parvum ter in die.

166.

℞
Extracti cannab. ind. fl., f. ʒ j
Copaibæ, f. ʒ iv
Tinct. guaiaci,
Ol. terebinthinæ, aa. f. ʒ ij
Tinct. camphoræ, f. ʒ iss
Syr. zingiberis, q. s. ad f. ℥ iv
Misce. Fiat mistura.

167.

℞
Acidi carbolici, ʒ j
Collodii, ʒ vij
M. Ft. sol.
Sig. Apply with camel-hair brush.

168.

℞
Fowler's solution, f. ʒ ij
Infusion of cinchona, f. ℥ vss
Tinct. of nux vomica, f. ʒ ij
Mix.

169.

℞
Liq. plumbi subacet., f. ʒ ss
Muc. acaciæ, f. ℥ j
Aq. destil., q. s. ad f. ℥ iv
M. Ft. lotio.

170.

℞
Silver nitrate, 1.5 Gm.
Sodium chloride, 0.6 Gm.
Water, 200 Cc.
Mix. Label: Use as an eye-wash.

171.

℞
Lithii salicylatis, ʒ ij
Ferri et ammon. cit., ʒ iv
Syr. limonis,
Aquæ, aa. f. ℥ iv
M.

172.

℞
Calcii hypophosphitis, gr. xv
Hydrarg. chlor. cor., gr. ss
Syr. sarsaparil. co., f. ℥ ij
M. S. Teaspoonful two or three times a day.

173.

℞
Hydrarg. chlor. mit., gr. x
Santonini, gr. xij
M. et fiat capsulæ No. II.
S. To be taken three hours apart.

174.

℞
Carbolic acid cryst., gr. c
Gum arabic, ℥ ss
Benzoin,
Balsam of tolu, aa. gr. x
Essence of cinnamon, ♏ v
Saccharin, gr. v
Alcohol, a suf. quant. to make f. ℥ ij
Mix and make a solution.

175.

℞
Mercuric nitrate, gr. x
Nitric acid conc., ♏ x
Alcohol, f. ℥ j
Mix. Label: Apply with brush.

176.

℞
Cocainæ hydrochlor., gr. v
Sodæ boratis, gr. ij
Aquæ dest., ℥ j
M. S. Drop one drop in right eye at night.

177.

℞
Liq. hydrarg. chlor., ʒ j
Sp. ammon. arom., ʒ vij
M. Ft. sol.

178.

℞

Quininæ sulph.,	1.3 Gm.
Sodii salicylatis,	15.5 Gm.
Acidi hydrobromici dil.,	30.0 Cc.
Aquæ,	q. s. ad 250.0 Cc.

M. S. Teaspoonful every four hours.

179.

℞

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

M.

180.

℞

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

Misce et signa: Teaspoonful three times a day.

181.

℞

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 sulph.,	gr. j
Aquæ,	q. s. ad f. ℥ iv

M. S. Teaspoonful three times a day.

182.

℞

Hydrarg. chlor. mitis,	gr. xx
Syr. zingiberis,	f. ℥ j
Ac. hydrochlorici,	f. ʒ j
Elixiris,	f. ℥ j

M. S. Dessertspoonful before going to bed.

183.

℞

Terpin hydrate,	ʒ ij
Iodol,	gr. v
Ammon. carbon.,	gr. xl
Glycerin,	℥ iss
Syrup tolu, enough to make	f. ℥ iv

Mix. Label: Tablespoonful every two hours.

184.

℞

Potassii chloratis,	gr. xx
Catechu,	gr. xxx

M. et fiant pulv. No. VI.

185.

℞

Menthol,	ʒ ss
Boric acid,	ʒ j
Tinct. of hydrastis,	f. ʒ ij
Water, enough to make	f. ʒ iv

Mix. Mark: Use as spray.

186.

℞

Fl. ext. of pinkroot,	
Fl. ext. of senna,	aa. f. ℥ j
Turpentine,	f. ʒ j
Santonin,	gr. xv
Fl. ext. of dandelion,	f. ʒ vij
Syrup,	f. ℥ j

Mix. Label: Teaspoonful morning, noon, and night.

Shake well before using.

187.

℞

Massæ ferri carbon.,	
Potassii carbonatis,	aa. ʒ ss
Acidi arsenosi,	gr. ss

M. Ft. pil. No. XX.

Sig. One after each meal.

188.

℞
Zinci sulphatis,
Cupri sulphatis, aa. ʒ j
Morphinæ sulph., ʒ ss
Aquæ rosæ, q. s. ad ℥ j
M. S. One or two drops in the eyes twice a day.

189.

℞
Acidi sulphurici, 15 Gm.
Acidi nitrici, 6 Gm.
Syrupi, 20 Cc.
Aquæ, q. s. ad 150 Cc.
M. S. Half teaspoonful well diluted with water after meals.

190.

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

191.

℞
Aquæ hydrogenii diox., ℥ j
Potassii permangan., gr. xx
Aquæ, ℥ j
Misceatur conquassando.
Signetur: Pars affecta fricetur nocte maneque.

192.

℞
Hydrargyri chlor. mit., gr. viij
Acaciæ, ʒ ij
Aquæ lauro-cerasi, f. ℥ ij
M. S. Shake well. Teaspoonful at 8 and 10 o'clock P.M.

193.

℞
Thymol, gr. x
Alcohol, f. ℥ ss
Ammonia, f. ʒ ij
Sol. of chlorinated soda, f. ℥ iss
Mix. Label: Use as spray.

194.

℞
Argentic nitrate, gr. x
Cocaine, gr. xij
Water, enough to make ℥ j
Mix and label: Lotion.

195.

℞
Tinct. ferri chloridi, f. ʒ ij
Quininæ sulph., gr. xviij
Spiritus chloroformi, f. ʒ j
Aquæ pimentæ, q. s. ad f. ℥ iv
M.

196.

℞
Quininæ sulph., ℈ ij
Potassii citratis, ʒ ij
Acidi citrici, ʒ j
Aquæ, q. s. ad f. ℥ vj
M. S. Cochleare medium post cibum.

197.

℞
Pilocarpinæ hydrochlor., gr. $\frac{1}{8}$
Hydrarg. chlor. mitis, gr. $\frac{1}{4}$
Misce. Da tales numero octo.
Signa: Horum pulverum sumatur unus nocte maneque.

198.

℞
Acidi sulphurici conc., ℥ ss
Picis liquidæ, ℥ iv
Potassii bichromatis, ʒ iij
Misce caute.
Signa: Caustic for horse.

199.

℞
Ung. hydrarg. nitratis,
Linimenti calcis, aa. ℥ j
Fiat unguentum, more dicto utendum.

200.

℞
Ext. gelsemii fl., f. ʒ iss
Ext. cannabis ind. fl., gtt. xviij
Chloralis, ʒ iss
Antipyrini, ʒ j
Aquæ puræ, f. ℥ j
M. S. One teaspoonful every four hours.

201.

℞
Liquoris ammonii acet., 30 Cc.
Tinct. ferri chloridi, 15 Cc.
Syrupi, q. s. ad 60 Cc.
Misce.

202.

℞
Strychninæ nitratis, gr. ij
Liq. potassii arsenitis, f. ʒ ij
Aquæ, q. s. ad f. ℥ iij
M. S. Dram doses.

203.

℞
Potassii cyanidi, ʒ ss
Chloralis, ʒ ij
Cerati, ℥ j
Misce et signa: Unguentum.

204.

℞
Quininæ sulph., 2.0 Gm.
Tinct. cantharidis, 3.5 Cc.
Spiritus rosemarini, 15.0 Cc.
Infusi salviæ, 120.0 Cc.
M. S. Apply to the scalp.

205.

℞
Zinci oxidi, ʒ ij
Zinci carbonatis, ʒ j
Petrolati, ℥ ss
Liquoris calcis, q. s. ad ℥ iv
Misce. Signa: Apply with friction.

206.

℞
Acidi salicylici, ʒ j
Glycerini, ʒ ij
Aquæ dest., ℥ iij
Misce et fiat sol.
Signa: Teaspoonful every hour.

207.

℞
Hydrargyri chlor. mitis, gr. xxx
Tinct. iodi B. P., ʒ ij
Aquæ q. s. ad ℥ iij
M. S. To be painted on swelling on neck.

208.

℞
Cocain. hydrochlor.,
Morph. sulphatis, aa. gr. xv
Chloralis hydratis,
Camphoræ, aa. ʒ ij
Tinct. cannabis ind.,
Chloroformi,
Ætheris, aa. f. ℥ ij
M. S. Ten drops in a teaspoonful of water every two hours until relieved.

209.

℞
Tinct. ferri chloridi, ʒ ij
Aquæ ammoniæ,
q. s. to neutralize the acid
Syrupi, f. ℥ ij
Misce. Signa: Dessertspoonful three times a day.

210.

℞
Sodii salicylatis, gr. xxx
Spiritus ætheris nitrosi, ♏ xxx
Aquæ, f. ℥ ij
Misce. Signa: Cochleare medium ter quotidie.

211.

℞

Tinct. ferri chloridi,	f. ℥ ss
Acidi sulphurosi,	f. ʒ ij
Potassii chloratis,	ʒ ij
Glycerini,	f. ℥ j
Aquæ,	q. s. ad f. ℥ vj

Misce. Signa: Use with atomizer.

212.

℞

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.

213.

℞

Hydrargyri chlor. cor.,	gr. xx
Sodii boratis,	ʒ ij
Aquæ destil.,	℥ iv

Fiat lotio. Sæpe utenda.

214.

℞

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

M. S. Teaspoonful three times a day

215.

℞

Piperazini,	ʒ j

Teratur bene. Fiant pulveres duodecim.

216.

℞

Acidi gallici,	2 Gm.
Liquoris sodæ,	10 Cc.
Aquæ,	30 Cc.

Misce. Fiat lotio.
Signa: Applicetur modo dicto.

217.

℞

Acidi carbolici cryst.,	gr. x
Plumbi acetatis,	gr. x
Thymol,	gr. xv
Morphinæ sulph.,	gr. ij
Olei theobromatis,	ʒ iij

Misce accuratissime. Fiant suppositoria numero decem.

218.

℞

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

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

219.

℞

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

Mix. Label: Teaspoonful three times a day.

220.

℞

Raw linseed-oil,	f. ℥ viij
Potassium nitrate,	
Lead acetate,	
Sulphuric acid,	aa. ℥ ss
Carbolic acid,	ʒ ij

Mix and label: Caustic.

221.

℞

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

M. S. Teaspoonful three times a day.

222.

℞

Strychnine,	gr. j
Caffeine,	gr. iij
Arsenous acid,	gr. j
Iodoform,	gr. viij
Syrup of hydriodic acid,	f. ℥ ij
Syrup of hypophosphites,	f. ℥ vj

Mix. Label: Teaspoonful four times a day.

223.

℞

Iodoform,	ʒ ij
Balsam of Peru,	ʒ iij
Glycerin,	ʒ xiv

Mix and mark: Apply as directed.

224.

℞

Carbolic acid,	
Vaselin,	
Bay rum,	aa. ℥ j

Mix and use externally.

225.

℞

Tinct. ferri chlor.,	f. ʒ ij
Sodii salicylatis,	ʒ iv
Liq. ammon. acet.,	f. ℥ j
Ol. gaultheriæ,	gtt. x
Glycerini,	f. ℥ ss
Aquæ,	q. s. ad f. ℥ iv

M.

226.

℞

Exalgin,	gr. x
Phenacetin,	gr. xv
Camphor,	gr. v
Salol,	gr. xv

Mix and make 10 powders.

227.

℞

Hydrarg. perchloridi,	gr. ij
Potassii iodidi,	ʒ ij
Sp. chloroformi,	
Tinct. cinchonæ,	aa. f. ℥ j
Quininæ sulph.,	ʒ ss
Aquæ,	℥ ij

M.

228.

℞

Sp. ammoniæ arom.,	f. ʒ ij
Liquoris calcis,	f. ℥ iiss

M. S. Dessertspoonful as needed.

229.

℞

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.

230.

℞

Pyrogallol,	
Camphor,	
Alcohol,	aa. ℥ j

Mix and make a liniment.

Label: Use as directed.

231.

℞

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

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

232.

℞

Ergotinæ,	gr. xx
Apioli,	ʒ iss
Olei sabinæ,	ʒ ss

Mix and make 18 pills.

233.

℞
Sodii salicylatis, ʒ ij
Quininæ sulph., gr. xxiv
Hydrargyri chlor. cor., gr. ¾
Liq. potassii arsenitis, ♏ xlviij
Elixiris aromatici, q. s. ad f. ℥ iij
M.

234.

℞
Fl. ext. hydrastis colorless, f. ℥ j
Sodium bicarbonate,
Bismuth subnitrate, aa. ℥ ss
Borax, ʒ ij
Honey, ℥ ss
Peppermint water,
enough to make ℥ vj
Mix. Label: Shake well. Teaspoonful before meals.

235.

℞
Iodine, gr. xxx
Compound camphor lin., f. ʒ iij
Soap liniment,
enough to make f. ℥ ij
Mix. Label: Apply as directed.

236.

℞
Acidi carbolici, ʒ iij
Aquæ ammoniæ,
Liq. sod. chloratæ, aa. ʒ ij
Aquæ, q. s. ad f. ℥ viij
M. S. Lotion.

237.

℞
Pulv. oryzæ, ʒ iiss
Plumbi oxidi,
Glycerini, aa. ʒ viiss
Acidi acetici dil., f. ℥ ij
Mix and boil down to 20 drams.

238.

℞
Calomel, gr. x
Sodium bicarb., gr. xx
Sugar, powd., gr. xl
Mix and make 40 powders.

239.

℞
Sodii bicarbonatis, ʒ ij
Sodii salicylatis, ʒ iv
Chloroformi, ʒ ss
Acidi carbolici, ♏ x
Aquæ fontanæ, q. s. ad ℥ iv
M.

240.

℞
Antipyrin,
Acetanilid, aa. 2 Gm.
Resorcin, 3 Gm.
Water, 100 Cc.
Mix. Label: Teaspoonful every hour until the fever begins to subside.

241.

℞
Cocaine hydrochlor., 0.8 Gm.
Flexible collodion, 10.0 Gm.
Mix. Apply with camel-hair brush.

242.

℞
Atropine sulphate, gr. ij
Olive oil, ʒ j
Mix. Label: Apply with friction.

243.

℞
Chromic acid, gr. iv
Cocaine hydrochlorate, gr. vj
Water, ʒ ij
Mix. Use as caustic.

244.

℞
Sp. ætheris nitrosi,
Tincturæ guaiaci, aa. f. ℥ j
Tincturæ colchici, f. ʒ iv
Syrupi, f. ℥ iij
M.

245.

℞

Zinci sulphatis,
Pot. sulphuratæ, aa. gr. xxx
Aquæ rosæ, ℥ vj
Mix. Label : Lotion.

246.

℞

Strychnine sulph., gr. j
Arsenous acid, gr. $\frac{2}{3}$
Mass carb. of iron, gr. l
Sulphuric acid aromat., gtt. iij
Quinine sulphate, gr. xx
Mix and divide into 20 pills.

247.

℞

Silver nitrate, gr. x
Potassium permanganate, gr. xv
Distilled water, ℥ ij
Mix. Use as wash.

248.

℞

Guaiacol carbonate, gr. iij
Thymol, gr. j
Menthol, gr. ss
Eucalyptol, ♏ v
For one capsule. Send 20 such.

249.

℞

Benzoic acid,
Salicylic acid, aa. gr. iij
Cocaine hydrochlorate, gr. v
Distilled water, ℥ j
Mix and make solution by aid of water-bath.
Label : Apply locally.

250.

℞

Antikamnia, ʒ j
Strychnine sulph., gr. j
Iron sulphate, dried, gr. iij
Quinine sulphate, ʒ j
Mix and put into 9 capsules.
Label : One every night and morning.

251.

℞

Oil of cinnamon, gtt. x
Chloroform,
Tincture of opium,
Spirit of camphor,
Aromat. spirit of ammonia, aa. f. ʒ v
Whiskey, ℥ iss
Mix. Dose : One dram as needed.

252.

℞

Argenti nitratis, gr. vj
Liquoris Fowleri, f. ʒ j
Aquæ, q. s. ad f. ℥ iv
M. S. Teaspoonful twice a day.

253.

℞

Syr. of hydriodic acid,
Hydrogen peroxide water,
Distilled water, aa. f. ℥ j
Mix. Give one teaspoonful every hour.

254.

℞

Olei ricini,
Glycerini, aa. 20 Cc.
M. S. Tablespoonful at night.

255.

℞

Pot. et sodii tartratis, 20 Gm.
Tincturæ ferri chloridi, 5 Cc.
Aquæ,
Syrupi limonis, aa. 50 Cc.

256.

℞

Borax, gr. x
Acacia, ʒ ij
Petroline oil, f. ℥ j
Water, enough to make f. ℥ ij
Mix and make an emulsion.

257.

℞

Syr. ferri iodidi,	f. ℥ j
Antipyrini,	ʒ ij
Syrupi,	f. ℥ j

M. S. Teaspoonful as directed.

258.

℞

Acidi carbolici,	ʒ j
Potassii permanganatis,	gr. xx
Aquæ,	f. ℥ v

M. S. Lotion.

259.

℞

Plumbi acetatis,	
Boracis,	aa. 1 Gm.
Glycerini,	20 Cc.
Aquæ,	80 Cc.

M. S. Apply as directed.

260.

℞

Acidi tannici,	gr. xv
Tincturæ iodi,	f. ʒ j
Glycerini,	f. ʒ ij
Aquæ,	f. ʒ v

M. S. Apply twice a day.

261.

℞

Potassii chloratis,	ʒ j
Acidi sulphurosi,	ʒ iv
Glycerini,	ʒ iij
Aquæ,	℥ j

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

262.

℞

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

M. S. Caustic.

263.

℞

Ammoniated mercury,	ʒ ss
Tincture of iodine,	ʒ ss
Lard,	℥ j

Mix and make an ointment.

264.

℞

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

M. S. Teaspoonful three times a day.

265.

℞

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

Mix. Apply with camel-hair brush.

266.

℞

Liq. iodi comp.,	f. ʒ ij
Liq. potassæ,	f. ʒ iv
Olei olivæ,	f. ℥ j

M. S. Apply as directed.

267.

℞

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

Mix. Label: Teaspoonful three times a day.

268.

℞

Pyrogallic acid,	gr. v
Mercuric chloride,	gr. ss
Lard,	℥ j

Mix and make an ointment.

269.

℞

Exalgin,	gr. iv
Beta-naphthol,	gr. xij
Lard,	ʒ iv

Mix.

270.

℞

Olei tiglii,	gtt. ij
Glycerini,	f. ʒ j

M. S. Take in two doses four hours apart.

271.

℞

Plumbi acetatis,	gr. x
Acidi pyrogallici,	gr. v
Aquæ,	℥ ij

M. S. Lotion.

272.

℞

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.

273.

℞

Strychninæ sulph.,	
Potassii cyanidi,	aa. gr. ss
Aquæ,	q. s. ad f. ℥ ij

M. S. Teaspoonful night and morning.

274.

℞

Glycerini,	ʒ iij
Sodii boratis,	ʒ ss
Unguenti,	ʒ iij

M. S. Apply at night.

275.

℞

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

Mix and label: Half teaspoonful as directed.

276.

℞

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.

277.

℞

Calcis calcinatæ,	ʒ ij
Sulphuris,	ʒ iij
Aquæ,	f. ℥ iv

Mix and boil for ten minutes and then filter.

Label: Use as directed.

278.

℞

Zinci oxidi,	ʒ ij
Glycerini,	f. ʒ ij
Liq. plumbi subacetatis,	f. ʒ j
Liquoris calcis,	q. s. ad f. ℥ iv

M. S. Lotion.

279.

℞

Calcis chloratæ,	
Glycerini,	aa. 10 Gm.

M. S. Apply as directed.

280.

℞

Cupri sulphatis,	gr. xxx
Acidi salicylici,	gr. iv
Aquæ,	f. ℥ iv

M. S. Lotion.

281.

℞

Acidi salicylici,	gr. x
Potassii permangan.,	gr. xv
Ferri sulphatis,	ʒ iv
Aquæ,	q. s. ad f. ℥ viij

M. S. Lotion for ulcer.

282.

℞

Quininæ sulphatis,	ʒ ss
Tinct. ferri chlor.,	f. ʒ ij
Syrupi zingiberis,	f. ℥ ij
Tinct. guaiaci ammon.,	f. ℥ j

M. S. Teaspoonful twice a day.

283.

℞

Quininæ sulph.,	
Potassii permangan.,	
Ferri reducti,	aa. gr. x

Misce. Fiant pilulæ No. x.
Sig. Pil. j ter in die.

284.

℞

Strychninæ,	gr. j
Glycerini,	♏ xxx
Aquæ,	q. s. ad f. ʒ iij

M. S. Inject ten minims.

285.

℞

Acidi carbolici cryst.,	gr. xxx
Thymol,	gr. x
Vaselini,	
Cerati,	aa. ʒ j

M. S. Unguentum.

286.

℞

Liquoris bismuthi,	
Mucilaginis,	aa. f. ℥ j

M. S. Teaspoonful every four hours.

287.

℞

Quinine sulph.,	gr. l
Podophyllin,	gr. iv
Tinct. chlor. of iron,	f. ʒ iiss
Tinct. of rhubarb,	f. ℥ iss

Mix.

288.

℞

Powdered camphor,	gr. lxx
Lead acetate,	gr. l
Tinct. of iodine,	♏ l
Carbolic acid,	gr. xx

Mix and make 24 pills.

289.

℞

Quininæ sulphatis,	gr. xx
Potassii iodidi,	ʒ ij
Acidi citrici,	gr. xx
Aquæ,	f. ℥ ij

M. S. Teaspoonful three times a day.

290.

℞

Phenacetin,	gr. xv
Tincture ferric chloride,	f. ʒ ij
Water, enough to make	f. ℥ ij

Mix and label: Teaspoonful twice a day.

291.

℞

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

Mix. Label: Teaspoonful half hour after meals.

292.

℞

Gallic acid,	gr. x
Lime water,	f. ℥ iv

Mix. One dessertspoonful in two ounces of milk.

293.

℞

Potassii chloratis,	ʒ j
Aquæ bullient.,	f. ℥ j
Liq. morph. hydrochlor., B. P.,	f. ʒ j
Syrupi tolutani,	f. ℥ ij

M. S. Teaspoonful when coughing.

294.

℞

Syrupi acidi hydriodici,	f. ʒ vj
Ext. cinchonæ fl.,	f. ʒ j
Liq. hydrarg. chlor. cor. (1–500),	f. ʒ ij
Syrupi,	f. ʒ vij

Misce et signa: Teaspoonful every four hours.

295.

℞

Ung. hydrargyri,	℥ ss
Aquæ ammoniæ,	
Lin. camphoræ,	aa. f. ℥ ss

M. S. Liniment. Apply as directed.

296.

℞

Syr. ferri iodidi,	f. ʒ iv
Syr. hypophosphitum,	f. ℥ j
Quininæ sulph.,	ʒ j
Acidi phosphorici dil.,	f. ʒ iij

M.

297.

℞

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

M. S. Teaspoonful three times a day.

298.

℞

Hydrargyri chlor. cor.,	gr. iv
Sodii arsenitis,	gr. iiss
Strychninæ sulph.,	gr. ¼
Potassii carbonatis,	
Ferri sulph. exsic.,	aa. gr. x

Misce et fiant pilulæ No. x.

299.

℞

Calomel,	ʒ ij
Soap,	ʒ ij
Cotton-seed oil,	f. ℥ j
Water,	f. ℥ j

Mix. Label: Apply with friction.

300.

℞

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

M. S. Teaspoonful twice a day.

301.

℞

Balsami Peruviani,	4 Gm.
Ext. glycyrrhizæ,	q. s.

Misce. Make 10 pills.

Signa: One night and morning.

302.

℞

Acidi hyd. dil.,	20 Cc.
Aquæ,	100 Cc.

M. Sig. Teaspoonful in water after meals.

303.

℞

Petrolatum,	30 Gm.
Oxide of zinc,	4 Gm.
Glycerin,	5 Gm.
Gum tragacanth,	5 Gm.

Mix and make ointment.

Label: Apply as directed.

304.

℞

Potassii iodidi,	2 Gm.

Divide into 12 powders.

Take one dissolved in water at night.

305.

℞

Iodi resublim.,	gr. xl
Adipis,	℥ j

M. S. Rub over the affected part.

306.

℞

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

M. S. Teaspoonful after each meal.

307.

℞

Tincture of aconite,	♏ xx
Phenacetin,	gr. xl
Spirit of nitrous ether,	f. ʒ v
Syrup,	f. ʒ iij
Water	f. ℥ ij

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

308.

℞

Bals. copaibæ,	
Pulv. cubebæ,	aa. ʒ j

Misce et fiant pilulæ No. xx.

Signa: One night and morning.

309.

℞

Bismuthi subnit.,	ʒ j
Sodii salicylatis,	ʒ j
Aquæ cinnamomi,	℥ ij

M. S. Shake well! Teaspoonful twice a day.

310.

℞

Chloral hydrate,	ʒ j
Phenacetin,	gr. xl
Quinine sulphate,	gr. l

Mix and put into 10 capsules,
Label: Take one at night.

311.

℞

Aloin,	gr. ij
Salol,	gr. xl
Tinct. of hyoscyamus,	ʒ iss
Ext. of jalap,	gr. x
Strychnine sulph.,	gr. $\frac{1}{4}$

Mix and make 20 pills.
Label: Take one at night.

312.

℞

Salicylic acid,	gr. xx
Glycerin,	f. ℥ j
Lime water,	f. ℥ v

Mix. Label: Tablespoonful twice a day.

313.

℞

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.

314.

℞

Potassii bichromatis,	gr. x
Ferri sulphatis,	ʒ iss
Aq. hydrogenii dioxidi,	
Glycerini,	aa. f. ℥ j
Aquæ dest.,	q. s. ad f. ℥ iv

M. S. Lotion.

315.

℞

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

Mix. Label: Dust on abraided surface as directed.

316.

℞

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

M. S. Apply to ulcer.

317.

℞

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.

318.

℞

Citrate of iron and quin.,	ʒ iiss
Carbolic acid,	
Tinct. of lavender co.,	aa. ʒ ss
Wine, enough to make	℥ iv

Mix. Label: Teaspoonful three times a day.

319.

℞

Diuretin,	gr. x
Sp. of nitrous ether,	♏ xxx
Tinct. chlor. of iron,	ʒ iv
Syrup, enough to make	f. ℥ ij

Mix. Label: Teaspoonful three times a day.

320.

℞

Quinine sulph.,	gr. x
Antipyrin,	gr. x
Chloral hydrate,	gr. xx

Mix and put into 8 capsules.
Label: One every two hours.

321.

℞

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.

322.

℞

Syr. ferri iodidi,	f. ℥ iss
Potass. iodidi,	ʒ j
Potass. bicarbon.,	ʒ j
Syr. tolutani,	f. ℥ ss
Aquæ,	f. ℥ ij

M. S. Teaspoonful three times a day.

323.

℞

Acetanilid,	gr. v
Phenacetin,	gr. x
Pyrocatechin,	gr. x

Mix and put into 10 capsules.
Label: One every four hours.

324.

℞

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

M. S. Teaspoonful three times a day.

325.

℞

Ferri et potass. tartratis,	ʒ ss
Potassii iodidi,	ʒ ss
Quininæ sulphatis,	gr. xv
Acidi sulphurici dil.,	♏ xx
Syrupi,	f. ℥ ss
Aquæ,	q. s. ad f. ℥ ij

M. S. Teaspoonful twice a day.

CRITICISMS.

1.

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 also cause 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 take an overdose of the mercuric iodide, which is thrown out of solution with the alkaloids. In 4 fluid ounces of the elixir of cinchona there should be 2.8 grains of total alkaloids. This amount of alkaloids will precipitate about 4 grains of mercuric iodide. In this prescription most of the mercury will be precipitated.

2.

There is enough of ammonium carbonate present to neutralize all of the sulphuric acid and liberate the free alkaloid. The quinine sulphate should 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.

3.

If the ingredients are powdered separately and then mixed lightly together there will probably 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 will undoubtedly oxidize the calomel, forming mercuric chloride. When one of the above powders was mixed with two ounces of water containing four per cent. of hydrochloric acid and the mixture allowed to stand for some time tests for mercuric chloride could be obtained. The reaction would have taken place much more quickly at the temperature of the body. This should be considered a dangerous prescription to dispense.

4.

Chemical reaction takes place between the ammonium carbonate and the acetic acid of the syrup of squills, liberating carbon dioxide. Care must be taken not to cork the bottle until effervescence has entirely ceased.

5.

This prescription was filled by dissolving the quinine sulphate in the acid and mixing with the mucilage, and then adding the oil of cloves. The potassium permanganate was dissolved in a little water and added slowly to the other mixture. Dark-brown masses were formed, consisting of coagulated acacia holding in it the manganese dioxide, the permanganate being reduced. It was almost impossible to mix these masses so as to make a homogeneous mixture or even one that would pour readily. The patient using this prescription had it refilled several times.

6.

The alcohol of the tincture throws the acacia out of solution. Moreover, the guaiac gives the acacia a blue color. With the consent of the physician the prescription was filled by using glycerin and water instead of mucilage.

7.

The sodium hypophosphite is deliquescent in damp air and the powders become moist. Chemical reaction then takes place, causing the mixture to become yellow and finally black. The hypophosphite reduces the bismuth to a yellow and then a black compound, in which the quantivalence of bismuth is two, while the hypophosphite is oxidized to a phosphate. The dampening of the extract of nux vomica also tends to darken the mixture. The directions translated into English are: Mix, make a powder, and divide it into 25 equal parts.

8.

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. Dispens., 17th ed., 689.)

9.

If the first two ingredients are triturated together an explosion is liable to occur. If, however, they be dissolved separately in the water and then mixed there is probably no danger. If the solution were acid chemical reaction would take place with the formation of hydrochloric and phosphoric acids.

10.

When potassium permanganate and morphine sulphate are brought together in solution the permanganate is reduced to manganese dioxide and the morphine is oxidized and most of it probably rendered inert. Dr. Mohr proposed potassium permanganate as an antidote for morphine-poisoning, but it probably has very little effect except upon the morphine with which it comes in immediate contact.

11.

This mixture is quite frequently prescribed by physicians, even by those who know that it is incompatible. A chemical reaction takes place between the nitrous ether and the tannin in the buchu, causing an evolution of oxides of nitrogen. The gas must be allowed to escape before corking the bottle. Some of the resinous matter in the fluid extract will be precipitated by the water.

12.

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, or if added after partially destroys, the inky color, the final mixture being dark brown and turbid. If two drams of dilute phosphoric acid be added to the tincture chloride of iron 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.

13.

The quinine sulphate and the lead acetate react, forming quinine acetate and lead sulphate, both of which are practically insoluble in the syrup. The bismuth subnitrate is also insoluble. In filling this prescription it is best to add some acacia to aid in suspending the insoluble substances. A "Shake well" label should be put on the bottle.

14.

Alum, being a soluble sulphate, will react with the lead acetate, precipitating the insoluble lead sulphate according to the following equation:

$$4Pb(C_2H_3O_2)_2 + K_2Al_2(SO_4)_4 24H_2O$$
$$= 4PbSO_4 + 2KC_2H_3O_2 + Al_2(C_2H_3O_2)_6 + 24H_2O.$$

The precipitate should not be filtered out.

15.

The tannic acid combines with the quinine, forming the nearly insoluble quinine tannate. This prescription should be filled by dissolving the quinine sulphate in a part of the syrup with the aid of the sulphuric 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.

16.

Emulsify the cod-liver by adding it in portions to the lime water in a bottle. Then add the oil of wintergreen, the syrup, and the syrup iodide of iron. The calcium hydrate of the lime water saponifies a small amount of the cod-liver oil, which soap helps to emulsify the balance of the oil. When the syrup of ferrous iodide is added to the mixture containing the calcium hydrate ferrous hydrate is precipitated. Ferrous hydrate if free from ferric hydrate is white, but it quickly oxidizes to ferroso-ferric hydrate, which varies from a dirty green to almost black. After some time it is oxidized to a yellow-brown basic ferric oxide. This prescription will go through these various colors.

17.

Donovan's solution precipitates many alkaloids from aqueous solutions of their salts. Quinine is no exception. This prescription was filled by dissolving the quinine sulphate 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.

18.

There is not a sufficient amount of water to dissolve all of the quinine sulphate. 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.

19.

The mercuric chloride precipitates the strychnine sulphate 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. This prescription as written should not be filled. If the mercuric chloride be omitted there will be but little danger of precipitation.

20.

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 ten grains of chloral hydrate and ten 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.

21.

A reaction takes place between the first two ingredients, with the precipitation of lead sulphate. All of the lead is precipitated. If the lead subacetate is dissolved in water and then added to the tinctures it will precipitate the alkaloids of the opium as well as other matter. Water also causes a precipitation of the resinous matter from the tinctures. This prescription should be dispensed without filtering, but with a " Shake well " label.

22.

Mercuric chloride combines with albumen 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 albumen." (U. S. Dispens., 689.) If this prescription were filled as directed it would be practically inert. By adding three or four grains of ammonium chloride to the mercuric chloride, dissolving this in about one half the water and the albumen in the remainder of the water, and mixing these solutions, a nearly clear solution can be obtained.

23.

Sodium phosphate requires 5.8 parts of water to dissolve it; consequently in this prescription it would not be all dissolved. It should be powdered before adding to the syrup and water and the prescription then dispensed with a "Shake well" label.

24.

The syrup of garlic contains acetic acid, which combines with the ammonium of the ammonium carbonate, liberating carbon dioxide. The reaction should be completed before the bottle containing the solution is corked, or the pressure of the gas formed may be sufficient to burst the bottle.

25.

The zinc is entirely precipitated by the borax, producing a white flocculent precipitate of zinc borate or hydrate. The prescriber should be advised of this fact. If the prescription is dispensed the precipitate should be filtered out.

26.

The spirit of nitrous ether is generally acid in reaction, and when an acid solution of nitrous ether is brought in contact with potassium iodide, iodine is liberated and the gas nitric oxide is formed. This prescription should not be filled on account of the free iodine formed.

27.

Several chemical reactions occur, depending on the order of mixing the ingredients. The possible reactions are as follows: 1. The potassium iodide in the compound tincture of iodine when mixed with a solution of ferric chloride forms free iodine, potassium chloride, and ferrous chloride. 2. Fowler's solution is alkaline, due to the presence of potassium bicarbonate and perhaps some 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 chloride of iron dissolves quinine sulphate, the free acid of the tincture combining with the quinine sulphate 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 compound tincture of iodine combines with sulphate of quinine, forming an insoluble compound. 7. The free iodine will also combine with the tannin in the rhubarb. 8. The alkali in Fowler's solution 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 sulphate combines with the sulphuric acid, liberating and precipitating the free alkaloid. 10. The phosphoric acid is a solvent for quinine sulphate, probably combining with it and under certain circumstances again precipitating it. 11. A solution of quinine sulphate 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.

28.

Pure ferric pyrophosphate is insoluble in water. The official pyrophosphate of iron is a mixture of ferric pyrophosphate and sodium citrate. The sodium citrate in solution acts as a solvent for the pyrophosphate. When sulphuric acid is added to a solution of the official iron pyrophosphate the sodium citrate is decomposed, forming sodium sulphate and citric acid, and the ferric pyrophosphate, not being soluble in this solution, is precipitated. To determine whether the quinine would be precipitated as a pyrophosphate or not fifteen grains of sodium pyrophosphate were dissolved in six drams of water and this added to a solution of quinine sulphate in water acidulated with sulphuric acid. No precipitation occurred at once or on standing several days.

29.

This makes a clear brownish-red solution, which on standing two or three days loses much of its color, becoming light brown. On applying the starch test for free iodine no blue color was obtained. According to Muir and Morley (vol. I. p. 669), iodine with camphor forms a hydrocarbon, carvacrol, dimethylethyl benzene, tetramethyl benzene, and traces of cymene.

30.

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. When such a prescription is to be filled it is best to dissolve each ingredient separately, making each solution neutral before mixing them.

31.

When the sulphurous acid is added to the solution of the sodium hypophosphite in the cinnamon water a turbidity results, due to the separation of free sulphur. The hypophosphite is oxidized to a phosphate and the sulphurous acid is reduced to sulphur. In the presence of a very large excess of the hypophosphite the sulphur is further reduced to hydrogen sulphide.

32.

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 a double salt of potassium and mercuric iodide and metallic mercury, and 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. The directions are: Mix, make a powder, and divide into 10 powders (papers).

33.

If the acid is added to the tincture a red coloration is formed at 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 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.

34.

There is not enough of water to dissolve all of the quinine sulphate, as it requires 740 parts of water. The water will precipitate inert extractive matter from the tincture. While potassium iodide does not always precipitate strychnine sulphate when in solution with it, there is some danger of precipitation. (See the incompatibilities of strychnine.) The usual maximum medicinal dose of strychnine sulphate is $\frac{1}{12}$ of a grain. In this prescription the dose is $\frac{5}{16}$ of a grain and is dangerously large. The prescription should not be dispensed without having first called the prescriber's attention to that fact, as well as to the possibility of the strychnine being precipitated by the potassium iodide.

35.

The wine of pepsin of the National Formulary contains hydrochloric acid and the syrup of ipecac contains acetic acid. There is a sufficient amount of ammonium carbonate to neutralize both of these acids and render the solution alkaline, thereby destroying the activity of the pepsin. In the reaction carbon dioxide is given off and the bottle must not be corked until the reaction is complete, for the pressure of the gas might burst the bottle.

36.

If the directions to rub these solids together be followed an explosion will probably result. Potassium chlorate forms an explosive mixture with each 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.

37.

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 forty-five 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. Sometimes the solution of ammonium acetate is alkaline, there having been an excess of ammonium carbonate or a deficient amount of acetic acid used in making it. In such a case the acid in the syrup of squills will liberate carbon dioxide.

38.

Evidently the prescriber wished to air a little of his knowledge or then 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.

39.

The potassium chlorate is soluble in about 16 parts of water; consequently only a small proportion is dissolved in the three ounces of water. Some pharmacists would contend that the excess of the chlorate in a powdered condition should be left in the bottle, so that the patient could add water to it as the liquid was used up. This might be all right if it were a simple mixture of the chlorate and water. But in the above prescription, since the fluids are all more or less medicinal, it is evident that the physician wanted only a saturated solution of the chlorate and the excess removed. The resinous matter of the tincture is precipitated by the water. The fluid hydrastis colorless is a preparation which seems to vary much in composition. The U. S. Dispensatory gives a method of making it which consists in dissolving twenty grains of hydrastine sulphate in one pint of a mixture of equal parts of glycerin and water.

40.

The copaiba when mixed with the tinctures does not make a clear solution, as it requires from three to four times its amount of alcohol, although it is readily soluble in absolute alcohol. On the further addition of glycerin the mixture was made more turbid and the syrup when added threw out of solution most of the copaiba, which had been dissolved by the alcohol of the tinctures. On standing the copaiba rises to the top, but the syrup and glycerin are viscid enough to hold it in suspension for some little time, so that the patient can get a uniform dose. Or this can be made into an emulsion with the aid of some acacia. It should be dispensed with a " Shake well " label.

41.

When the first two ingredients are rubbed together the liquid chloral camphor is formed. This will not dissolve all of the cocaine hydrochlorate for which the prescription calls. 5 Dg. is 5 dekagrams or 50 grams, which is undoubtedly a mistake. The prescriber probably meant 5 dg., which is 5 decigrams or one half of a gram. That being the case, the cocaine can be readily mixed with the oily liquid.

42.

Strong nitric acid decomposes creosote, with the formation of red fumes. Dilute nitric acid converts it into a brown resin. (U. S. Dispensatory, 17th ed., 450.) In filling this prescription the nitric acid should be slowly added to the creosote with constant stirring. A considerable heat is generated by the reaction, and the mixture should be allowed to cool before adding the chloroform, so that it will not be volatilized.

43.

Chloral hydrate is decomposed by alkalies, forming chloroform and a formate of the base. Borax is sufficiently alkaline so that chloroform will be slowly generated and can be recognized by the odor. Aqua sambuci—elder-flower water—is a British preparation made by distilling the flowers with water.

44.

There is considerable danger of having an explosion in attempting to fill this. If the potassium chlorate is rubbed with the glycerin explosion is liable 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 will 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.

45.

The amount of chlorine formed will depend upon the order of mixing the ingredients. If the potassium chlorate and hydrochloric acid are mixed and then the water added a yellow liquid containing much free chlorine with oxides of chlorine will result. If, however, the salt is first dissolved in water and then hydrochloric acid added the amount of chlorine formed will be small. The physician has not indicated which was wanted, but probably the latter, as the former would be exceedingly irritating.

46.

The usual maximum dose of the tincture of lobelia is sixty minims. This prescription calls for twice that amount. The doses of the other two tinctures are rather large, although not above the maximum. Taking into consideration the fact that the mixture is to be taken every hour, it may be considered a dangerous one and the prescriber should be consulted. Another evidence of a mistake having been made is seen in the fact that a three-ounce mixture is obtained without using any of the compound syrup of squills at all. Perhaps the physician intended to have omitted the "q. s. ad," thus making a six-ounce mixture.

47.

No change is noticed in the appearance of this mixture on standing. The odor of the iodoform slowly diminishes, and, according to the U. S. Dispensatory (17th ed., p. 741), this is due to the decomposition of the iodoform by the tannic acid.

48.

On triturating these two substances together the mixture becomes black. Ammonium carbonate acts like ammonium hydrate, forming the black compound nitrogen dihydrogen dimercurous chloride ($NHHg_2Cl$). There seem to have been no physiological experiments made with this compound, but, as acids decompose it, probably the gastric juice breaks it up into calomel and ammonium chloride. The ammonium carbonate probably increases the action of the calomel, and may possibly tend to the formation of some mercuric salt.

49.

The dose of potassium cyanide is dangerously large, the usual maximum dose being about one-fourth of a grain. The physician, knowing that morphine acetate frequently is not entirely soluble, has directed the use of acetic acid. The excess of acid combines with the potassium, liberating hydrocyanic acid. The potassium cyanide frequently contains a carbonate as an impurity, and in such case might neutralize the free acid and precipitate some of the free morphine. In neutral solutions the potassium cyanide precipitates morphine cyanide from morphine salts. Morphine cyanide is soluble in acid solutions. The prescription should not be filled.

50.

The alcohol in the spirit and tincture as well as the ferric chloride gelatinizes the mucilage of acacia. 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.

51.

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 nitrous ether 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 hydrate is capable of neutralizing the acid in the spirit or part of that in the syrup. The spirit of nitrous ether if added directly to the fluid extract 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 spirit first. Some of the resinous matter in the fluid extract is precipitated by the syrup. The gas which is formed should be allowed to escape before corking the bottle; otherwise an " explosion " might result.

52.

This prescription resembles Bland's pills, inasmuch as the potassium carbonate reacts with ferrous sulphate in the presence of moisture to form the green ferrous carbonate. This ferrous carbonate oxidizes in the air, forming ferric oxide, and to prevent this some sugar should be added. The potassium carbonate with mercuric chloride gives the red-brown oxychloride of mercury, and with strychnine sulphate it gives the free alkaloid. As the mixture is to be made into pills, and the compounds formed are not more active than those prescribed, there need be no hesitation about filling the prescription. It may be filled by following the general directions in the U. S. P. for making Bland's pills. The mass is strongly alkaline.

53.

If these three ingredients are mixed in the absence of moisture no change in appearance is noticeable. In the presence of moisture the mixture turns gray, due to the formation of metallic mercury and mercurous oxide; at the same time some mercuric chloride is formed. (Merck's Market Report, V. 358.) According to Sayre (Organic Materia Medica, 518), a very poisonous organic mercuric salt is formed. This change is due to the reaction between the calomel and antipyrin. The sodium bicarbonate is said to be incompatible with antipyrin, and perhaps also with the calomel. (See HYDRARGYRI CHLORIDUM MITE, No. 10, under INCOMPATIBILITIES.)

54.

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. This can be dispensed as a shake mixture. The precipitation is rather tardy, and it would be well to inform the patient of the change which will take place.

55.

Reaction takes place between the potassium iodide and the ferric chloride, forming free iodine, ferrous chloride, and potassium chloride. Potassium iodide and spirit of nitrous ether react, forming free iodine and nitric oxide. Gentian is said to contain no tannin, but the other drugs with which it is combined in the compound tincture do. The tannin combines with the iron to form the black inky ferric tannate. This prescription should not be dispensed on account of the free iodine formed.

56.

If the solution of dialyzed iron has been improperly made and is strongly acid no precipitation occurs. But if it is nearly neutral, as it should be, ferric hydrate is precipitated by the alkali that is in Fowler's solution. The ferric hydrate forms with the arsenic an insoluble compound of basic ferric arsenite, which to some extent changes to ferrous arsenate.

57.

Giving but a glance at this prescription we would conclude that it should not be dispensed, that the strychnine would be precipitated. But upon closer study we find that the solution of strychnine, B. P., is an acid hydro-alcoholic solution containing about one per cent. of strychnine hydrochlorate. On adding sodium bicarbonate to this the hydrochloric acid combines with it, and the strychnine is liberated, but not precipitated. Strychnine (free alkaloid) is soluble in about 6700 parts of water. In this prescription we have only about .015 Gm. in 100 Cc., or 1 part to 7500 of water, a sufficient amount of water to keep the alkaloid in solution.

58.

Fowler's solution is alkaline, due to the excess of potassium bicarbonate used in making the solution. Boiling with water converts the bicarbonate into the normal carbonate of potassium to some extent. Either the bicarbonate or the normal carbonate precipitates mercuric chloride in solution as the red-brown mercuric oxychloride. The prescriber should be informed of this precipitation and advised to use the solution of arsenous acid, as that will not give a precipitate with corrosive sublimate.

59.

On dissolving the quinine sulphate in part of the cinnamon water with the aid of the sulphuric 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.

60.

Different results are obtained, according to the order of mixing the ingredients. If the Fowler's solution is added to the solution of dialyzed iron ferric hydrate 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 a little with water and then added to the iron little or no precipitation takes place. Sugar to some extent acts as a solvent for the ferric hydrate. 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 by Fowler's solution. There is some danger of the strychnine being precipitated by the alkali in the Fowler's solution. 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 should first be neutralized with hydrochloric acid; or a better way would be to get the prescriber to use the solution of arsenous acid instead of potassium arsenite. The directions translated into English are: Mix. Label: Let a teaspoonful be taken after dinner.

61.

The dose of aconitine is entirely too large unless the particular sample to be used has been proven to be comparatively inert. Two and one half grains of a so-called aconitine have been taken without ill effects, while $\frac{1}{128}$ of a grain has been reported to have caused death. The commencing dose of absolute aconitine should not be much over $\frac{1}{600}$ of a grain. In this prescription there are several physiological incompatibilities. In action aconitine is more or less opposed to morphine, strychnine, and belladonna. Morphine is to some extent antagonistic to atropine and strychnine, and atropine to strychnine.

62.

There is some danger of a violent chemical reaction being produced if the acid is added directly to the glycerin. By diluting the acid with water first the danger is very much lessened. In a diluted solution chlorine will gradually oxidize glycerin to oxalic and carbonic acids.

63.

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. The creosote requires 150 parts of water for solution. 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.

64.

The ingredients of this prescription can be mixed so as to make a homogeneous mass, but on standing for a few days the balsam separates from the petrolatum. This can be prevented by incorporating one and a half drams of simple cerate in place of a like amount of petrolatum.

65.

A solution of potassium bromide and potassium chlorate in a neutral liquid does not change. In the presence of a free inorganic acid reaction takes place, with the liberation of bromine. This reaction would take place to some extent in the stomach, the bromine producing some irritation. There is not enough of water to dissolve all of the chlorate.

66.

The euphorin, aristol, tannic acid, and alum can be triturated together, producing a powder. On adding the crystallized carbolic acid to this mixture, it becomes very soft, almost liquid. This change is the result of bringing carbolic acid in contact with the euphorin, these two substances liquefying when triturated together. The mass with the oil of theobroma makes a mixture too soft to be made into suppositories. It is necessary to render it firmer by the addition of wax, spermaceti, or some absorbing powder, as starch or slippery elm.

67.

Although the sulphuric acid aids the solution of the quinine sulphate, it precipitates the glycyrrhizin of the fluid extract. 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 sulphuric acid and directed a shake mixture. The water causes the separation of a small amount of inert matter from the fluid extract.

68.

Several chemical reactions take place, depending upon the manner of filling this prescription: 1. Between the hydrochloric acid in the tincture and the potassium chlorate, liberating chlorine. 2. The chlorine thus formed may act upon the glycerin or alcohol. 3. Between the hydrochloric acid and the ammonia and glycyrrhizin in the fluid extract, precipitating the glycyrrhizin. 4. Between the iron and tannic acid in the fluid extract, giving the black tannate of iron.

69.

The dose of the arsenic and of the strychnine is between $\frac{1}{7}$ and $\frac{1}{8}$ of a grain in this prescription. The maximum dose of each, as generally given, is not over $\frac{1}{10}$ of a grain. The prescriber should be consulted. Moreover, each pill would contain about seven grains of medicinal matter, which, considering the bulky quinine sulphate and extract of gentian, makes a very large pill. Where such a large pill is prescribed twice as many pills are sometimes made as directed and then the number to be taken at one time is doubled.

70.

Water can be added to carbolic acid, until the proportion is about 3 parts of acid to 1 part of water, forming a clear solution. (Allen, Organic Analysis, vol. II. p. 537.) On adding more water the acid separates as an oily liquid, going to the bottom. When water has been added so that the proportion is about 1 part of acid to 15 parts of water, a clear solution again results. In this prescription there will be a layer of liquefied acid 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 some glycerin in place of part of the water a clear solution can be made, and this is what the dispenser should use.

71.

If the tincture of iron is added directly to the mucilage of acacia the acacia is gelatinized by the iron. This gelatinous mass will redissolve after standing for some time with the other ingredients, but can be avoided by diluting the iron with the other ingredients first. When an acetate or acetic acid is added to a solution of a ferric salt the solution turns a deep red, due to the formation of ferric acetate.

72.

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, it probably being the acacia. Acacia prevents the precipitation of a number of the heavy metals by the alkaline hydrates.

73.

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 within a few minutes it turns to a dark brown and then grayish black. On allowing the precipitate to settle it appears to be a mixture of two compounds, one yellow and the other dark gray. According to Watts' Dictionary, the oxyiodide of bismuth is copper-colored and the bismuth iodide is a brilliant gray.

74.

This mixture made a clear solution, which was slightly red in color, due to the oxidation products of resorcin. In an hour or two the color had deepened very noticeably.

On allowing the solution to stand for fifteen or twenty hours the upper portion of the liquid had turned to a deep-blue color and a thin layer at the bottom was still red. A few hours later the entire solution was blue and remained so. After about a week a slight precipitate was noticed. The change of color is due to the reaction between the ammonium carbonate and the resorcin, the bitter-almond water seeming to take no part in it. A solution of resorcin in distilled water slowly turns brown.

75.

The sodium phosphate of the U. S. P. is the Na_2HPO_4 and is slightly alkaline to litmus. This alkalinity causes a precipitation of the strychnine, and it should be neutralized with a little phosphoric acid before the solutions of sodium phosphate and strychnine sulphate are mixed.

76.

If the turpentine is poured upon the iodine violent chemical reaction results, with the formation of violet fumes of vaporized iodine, caused by the heat generated. While there is not enough of alcohol to dissolve all of the iodine, it is best to dissolve as much as possible before adding the turpentine, which should be added in small portions, cooling the mixture if necessary. Upon standing the liquid separates into two layers. The lower one, being much smaller in amount and very dark-colored, is probably the alcohol holding most of the iodine in solution; the upper stratum is very much lighter in color and is probably the turpentine. Turpentine and alcohol are not miscible in all proportions.

77.

According to the National Formulary, Hall's solution of strychnine contains $\frac{1}{8}$ of a grain of strychnine acetate to the dram, together with some acetic acid. Fowler's solution contains, besides the potassium arsenite, some potassium bicarbonate or carbonate (formed by the boiling of the bicarbonate in water). This carbonate will react with the acetic acid, liberating a little carbon dioxide and forming potassium acetate. If there is an excess of the alkaline carbonate the strychnine will be liberated as the free alkaloid. The strychnine will not be precipitated, however, as it is soluble in 110 parts of alcohol, and the prescription can be filled without difficulty.

78.

The resinous matter in the tincture of myrrh is precipitated by the syrup. Tannic acid combines with the morphine to form a compound which is insoluble in water.

79.

In filling this prescription each of the salts were 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 formed. Probably the ammoniated mercury was decomposed and the soluble double compound of potassium mercuric iodide was formed.

80.

When the ingredients of this prescription are mixed the liberation of iodine commences at once and continues for some time. This was also filled by adding ammonia immediately after mixing to neutralize any acid, thinking thereby to prevent the formation of iodine. The ammonia turned the mixture black-green, probably due to the formation of some ferroso-ferric hydrate. In a few minutes the color had turned to brownish red and a test for free iodine could be obtained. After standing some time a deposit formed. This prescription should not be dispensed, on account of the free iodine.

81.

This mixture in a short time becomes yellow and within twenty-four hours it changes to a light brown. The coloration is due largely to the action of the nitrous acid and ethyl nitrite on the morphine and to a slight extent on the ammonium acetate.

82.

Potassium chlorate with such easily oxidized organic matter as charcoal makes a mixture which can be quite readily exploded. Perhaps the patient should be informed of the nature of the mixture. There is but little danger to the pharmacist provided he powders each ingredient and then mixes lightly.

83.

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 hypophosphite. The pills can be made by powdering the ingredients separately, then mixing lightly with powdered extract of liquorice and massing with water.

84.

Iodine is soluble in about 10 parts 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 mercuric 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 this 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.

85.

"Creolin is said to be an emulsion of cresol, obtained by means of resin soap. Creolin forms a milky emulsion or mixture with water." (U. S. Dispensatory, 1610.)

This prescription may be filled by dissolving the acid in the water and adding the creolin slowly with constant shaking. Part of the creolin separates on standing, but it may be readily mixed by agitation. As this is an eye-lotion and not clear, an attempt was made to filter it, but with the result of separating nearly all of the creolin. It should be dispensed with a " Shake well " label.

86.

The citric acid should be dissolved in the boiling water and then the magnesium carbonate added to this. Carbon dioxide is liberated and magnesium citrate goes into solution. The addition of borax does not cause any precipitation, although the solution is alkaline. If the borax is added to the solution of citric acid and then the magnesium carbonate a large amount of the last ingredient is not dissolved, the acid having been nearly neutralized by the borax.

87.

This is said to be a part of the Keely cure. Gold chloride precipitates many alkaloids from aqueous solutions of their salts, and it precipitates strychnine, atropine, and the cinchona alkaloids. The precipitates are somewhat soluble in mixtures containing alcohol, and as this one contains about 30 per cent., there will be but little or no precipitation of the alkaloids. Gold chloride is quite easily reduced, and the organic matter in the fluid extract will have a tendency to reduce it. The water precipitates some of the inert matter from the fluid extract. Atropine and strychnine are somewhat antagonistic in their physiological action.

88.

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.

89.

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.

90.

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.

91.

On mixing the acid with the bicarbonate in the presence of water effervescence takes place, due to the liberation of carbon dioxide; a nearly colorless quite strongly alkaline solution results. If this is allowed to stand undisturbed for two or three days the lower part of the liquid will be of a light-brown color and the upper part of a dark brown, and finally it will become dark brown throughout. An aqueous solution of a salicylate turns dark when exposed to the air, probably on account of the formation of some oxidation products. This change takes place much more quickly when the solution is alkaline. If the physician had prescribed sodium salicylate instead of the salicylic acid and sodium bicarbonate he would have gotten the same physiological effect, made a better preparation pharmaceutically, and saved the pharmacist considerable time and work. The patient should be informed of the change of color that will take place.

92.

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 of quinine phosphate is formed. If three grams instead of five grams of quinine are used only a slight turbidity occurs. The decoloration caused by the phosphoric acid is due to the formation of the colorless ferric phosphate, which is insoluble in water, but soluble when there is an excess of free acid.

93.

This was filled by dissolving the antikamnia in the elixir with the aid of heat; there was no separation on cooling. The quinine bisulphate was then added and an effervescence took place. A clear solution resulted, which on standing a short time deposited needle-shaped crystals. The solution is alkaline to litmus. Antikamnia is said to contain acetanilid, sodium bicarbonate, and caffeine. It is probably this bicarbonate that causes the effervescence with the bisulphate of quinine and at the same time sets free the alkaloid which is precipitated.

94.

The first two ingredients when mixed together give a greenish-brown solution, which when diluted with water gives a deep-blue color and largely diluted gives a violet color. On adding the sulphurous acid the color is destroyed within a few minutes. The ferric chloride is reduced to the ferrous chloride and sulphate, and a ferrous salt does not give a coloration with carbolic acid. If the sulphurous acid is added direct to the tincture of ferric chloride a deep-red solution of ferric sulphite is formed, which changes to ferrous sulphate and becomes colorless. Adding the carbolic acid to this gives no coloration. It makes little or no difference what order is observed in filling this prescription.

95.

Ferrous sulphate usually contains some ferric sulphate and this reacts with the calcium hypophosphite to form ferric hypophosphite and calcium sulphate, the former being only sparingly soluble, and the latter requiring 380 parts of water for solution. Part of the sulphuric acid of the Epsom salt will go to form calcium sulphate. In an acid solution the potassium chlorate would have an oxidizing effect on the ferrous sulphate and also on the hypophosphite; in this prescription it probably has but little chemical action. The solution of strychnine is a British preparation containing about one per cent. of strychnine hydrochlorate. Potassium chlorate and a hypophosphite should not be triturated together dry, as they form an explosive mixture.

96.

This mixture makes a clear alkaline solution, colorless at first, but in a few minutes acquiring a light-brown color, which slowly becomes dark red-brown or almost black. This coloration is due partly to the alkaline salicylate acquiring a red color in the air, and partly to the effect of action of the spirit of nitrous ether upon the salicylate. Prof. Attfield suggests the formation of nitrosalicylic acid which is colored. The change does not take place quite as rapidly when the spirit is mixed with the carbonate previous to the dissolving of the sodium salt. Generally the spirit of nitrous ether is acid, and when ammonium carbonate is added to it carbon dioxide is given off.

97.

This was filled in several ways, the result being the same. The codeine was triturated with a little water and half a dram of dilute 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 the solution of 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 sulphuric acid, but the twenty minims of dilute 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 hyposulphite, have a similar effect.

98.

Solution of saccharate of lime is another name for syrup of lime. The calcium hydrate in it converts the calomel into mercurous oxide which is black. This is very similar to "black wash."

99.

The best way to fill this prescription is to dissolve the corrosive sublimate in the glycerin mixed with half a dram of water. Then to this solution add *all at once* the syrup of lime. A yellow precipitate is formed at first, but this quickly disappears and a clear slightly yellowish liquid results. A slight light-gray-colored precipitate is formed after standing a day, and this increases slowly for several days. Certain organic substances, such as glycerin, sugar, and gum arabic, have the power of preventing the precipitation of solutions of some of the metallic salts by alkali hydrates.

If the syrup of lime is added slowly to the solution of corrosive sublimate a yellow precipitate is formed, but is redissolved again when the water is added. Quite a heavy steel-gray precipitate forms within an hour and it slowly increases on further standing. A similar result takes place if the solution of mercuric chloride is added to the syrup of lime.

100.

Free bromine is formed if the potassium bromide is added to the tincture and the free bromine combines with antipyrin. If the bromide is dissolved in water and then added to the tincture of iron previously diluted with water no bromine is liberated. Antipyrin gives an intense red coloration with the tincture of iron.

101.

The compound tincture of iodine was official in the 1870 Pharmacopœia and contained 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 potassic 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 instable, decomposed in pure water," forming the yellow aurous iodide. (Prescott and Johnson's Qualitative Chemical Analysis, 4th ed., p. 154.) 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.

102.

The usual maximum dose of the fluid extract of digitalis is two minims, some authorities giving it as high as three. In this prescription it is about three and a half minims. Taking into consideration the frequency of the dose and that digitalis is cumulative, the pharmacist should decline to fill it until he consults the prescriber.

103.

Metallic gold is precipitated by the arsenous acid. Gold chloride is very easily reduced by many inorganic compounds as well as by organic matter and light.

104.

Tincture of iron if not too strongly acid will give a color varying from a blue to a dirty green with morphine. This color is destroyed by excess of acid or by alcohol. This prescription will give a bluish-green mixture, which will turn to a yellowish-orange in a day or two. This latter change is probably due partly to the slow formation of chlorine by the action of the hydrochloric acid in the tincture on the potassium chlorate. Chlorine turns a morphine solution orange-colored. There is not enough of water to dissolve all of the chlorate.

105.

Reaction takes place between the mercuric chloride and the calcium sulphide, forming the black mercuric sulphide and calcium chloride. Potassium carbonate precipitates mercuric chloride as an oxychloride and the calcium sulphide as calcium carbonate. No reaction takes place between the carbolic acid and the bicarbonate. As the mixture is to be used as a lotion, these incompatibilities should not deter the pharmacist from filling it.

106.

If the sulphate 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 sulphate gradually deposits a precipitate of subsulphate of iron. Or if the solution of ferrous sulphate and the morphine are mixed before adding the potassium iodide no free iodine is formed, the morphine seeming to reduce the ferric sulphate to ferrous.

107.

In massing these two chemicals together reaction takes place, with the liberation of carbon dioxide, which causes the mass to swell to several times its original size. This reaction goes on slowly, requiring several hours for completion, and the mass should not be made into pills until the reaction has been completed. Had the prescriber directed the subcarbonate of bismuth instead of the subnitrate he would have avoided this difficulty and gotten the same physiological effects.

108.

If the ingredients are powdered separately and are perfectly dry when mixed no chemical reaction takes place. But upon addition of water or in the presence of moisture the powder becomes dark gray in color. The darkening is due to the formation of metallic mercury. At the same time some of the calomel is converted into a mercuric salt, rendering the prescription dangerous. It should not be dispensed. (See ℞ No. 32.)

109.

Upon bringing together solutions of lead acetate and zinc sulphate, mutual decomposition takes place and lead sulphate is precipitated. In a prescription for injection, like this, it is not customary to filter out the precipitate.

110.

The hydrogen dioxide oxidizes carbolic acid to pyrocatechin and hydroquinone, and oxidizes the glycerin to glyceric, oxalic, and tartaric acids. This makes a dark-colored mixture of rather thick consistency.

111.

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 liable to take place. Lead sulphate would be formed from the lead subacetate and morphine sulphate. 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 sulphate, 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.

112.

Triturating the iodol with the mercuric oxide caused an explosion, which might have been avoided by mixing the ingredients separately with portions of petrolatum and then mixing these.

113.

A mixture of these two chemicals becomes sticky at once and soon liquid. " The reaction between sodium salicylate and antipyrin, thought to be due to chemical change, is simply due to deliquescence." (Nat. Dispensatory, 5th ed., 227.) By putting these ingredients into capsules without previous mixing they in time become liquid when exposed to the air. If it is necessary to dispense this prescription in a solid form the best way would be to put into capsules and then put these into a tight container.

114.

This was filled by dissolving the sodium bicarbonate. borax, salicylic and benzoic acids in water. The thymol and menthol were rubbed together until a liquid resulted: then the eucalyptol, the glycerin, and the oil of wintergreen were added. To this was added the first solution and an effervescence ensued. After allowing the mixture to stand an oily liquid separated, rising to the top. The effervescence is due to a reaction between the bicarbonate and the salicylic, benzoic, and boric acids, the latter acid being formed by the action of glycerin on borax. (See No. 141.) Eucalyptol makes a clear mixture with glycerin, but is separated on the addition of water. The oily liquid formed by the menthol and thymol does not make a clear solution with glycerin, nor does the oil of wintergreen; and whatever of these may have been dissolved by the glycerin is thrown out of solution by the water. A " Shake " label is necessary.

115.

The quinine sulphate 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.

116.

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. The mixture is so thick that it would be difficult to pour out an even dose.

117.

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 be advised to increase the amount of acid or decrease the borax or, better, leave it out entirely. Boric acid does not give a precipitate with a solution of hydrastine sulphate.

118.

When these ingredients were mixed together a clear solution resulted, which was of a light-yellow color at first, but within five minutes became green. On allowing this to stand no change in color took place until the third or fourth day, when it acquired a greenish-brown color, and by the sixth day it had lost all green and was of a brownish-red color; further standing changed it to a deep red.

It has been proven that ethyl nitrite or amyl nitrite or any substance containing nitrous acid forms with antipyrin the green isontiroso-antipyrin, which crystallizes out of concentrated solutions. At one time it was thought that this green compound was poisonous, but it is not now generally considered so.

119.

The quinine sulphate 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 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 proven by substituting sodium iodide for potassium iodide, when no precipitation takes place. In concentrated solutions potassium iodide precipitates quinine. The directions are: Mix. Label: Let a teaspoonful be taken two or three times a day.

120.

When the spirit of nitrous ether is added to the resorcin dissolved in the water and glycerin a dark-brown solution is formed. This is perhaps due to the formation of dinitroso-resorcin (or possibly mononitroso-resorcin), which crystallizes in yellowish plates.

121.

This mixture is sometimes known as Hager's Olfactorium Anticatarrhoicum. When first mixed the solution is clear and colorless, but changes in a day or two to a blue. This on standing for two or three weeks becomes a dark purple or violet-blue.

122.

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 was 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.

123.

This prescription makes at first a clear solution, which gives a precipitate on standing for a few hours. 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 dilute sulphuric acid; the solution was not fluorescent nor bitter; on adding ammonia water it gave a heavy red-brown precipitate of ferric hydrate. 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 the solution remains clear for some time, but finally deposits prismatic crystals. These crystals dissolve readily on addition of water, and are probably 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.

124.

This solution is bluish-red in color. No chemical reaction occurs except that the salicylic acid occurring as methyl salicylate in the oil of wintergreen combines with the iron to form a salicylate of iron, which gives the increase of color. By adding the water gradually to the iron a play of colors is noticed: first a yellow, then red, dark red, and finally a violet-red.

125.

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 liquorice-root is added to make the mass of the required consistency the pills are too large to be taken easily. If the soap and extract of liquorice are omitted and in their place one dram of magnesia and one dram of kaolin are used a fair mass is made and the pills, though large, can be dispensed.

126.

The nitrous ether acts upon the morphine, giving a yellowish-green solution. Morphine is undoubtedly oxidized by the nitrous acid, but the products have not been determined. The directions are: Mix. Label: Take a teaspoonful as often as is required.

127.

Several reactions may occur when the first two ingredients are mixed together, 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 most of the mercury is reduced to the metallic state. Had the prescriber directed the solution of arsenous acid instead of Fowler's solution he would have obtained a better solution. Fowler's solution added to the quinine sulphate liberates the free alkaloid.

128.

The ammonia water combines with the acid in the tincture of iron, forming ammonium chloride and ferric hydrate. The precipitation of the ferric hydrate 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 hydrate dissolves but slowly in the glycerin. Glycerin, as well as sugar, acacia, honey, and some other organic substances, prevents or hinders the precipitation of many of the metals by alkali hydrates.

129.

Ferric salts gelatinize mucilage of acacia, and if the solution of dialyzed iron is added directly to the mucilage a solid mass results, which dissolves slowly in the syrup. By diluting the solution of iron with the syrup, and then adding this slowly to the mucilage with constant stirring, a thick homogeneous liquid may be obtained.

130.

" According to M. Mialhe, calomel is partly converted into corrosive sublimate and metallic mercury by ammonium chloride and by sodium and potassium chlorides, even at the temperature of the body." (U. S. Dispensatory, 17th ed., 695.) The directions are: Mix and divide into 20 equal parts. Label: Take one two or three times a day.

131.

Chemical reaction takes place between Goulard's solution and the tincture of ferric chloride, with the formation of lead chloride and ferric subacetate or acetate. Lead chloride and ferric subacetate are nearly insoluble in water and less soluble in elixir. Acacia cannot be used to aid the suspension of the precipitate, as both the solution and the tincture gelatinize it. Tragacanth might be used with better effect, although not with complete satisfaction.

132.

Amyl nitrite and potassium iodide in the presence of an acid give free iodine, nitric oxide, and amyl alcohol. The prescription should not be dispensed as written. As from the directions—" Let it be dispensed quickly "—it seems to be an urgent case, and in all probability the effect of the amyl nitrite is what is wanted, the potassium iodide should be omitted. At the very first opportunity the physician should be informed of the omission.

133.

The first three ingredients were mixed together and the Epsom salt dissolved in the water and the two solutions mixed. A turbidity occurred at once, due to the precipitation of extractive matter from the alcoholic liquids by the water. Within a few hours the magnesium sulphate had crystallized out so that its bulk was nearly one half of that of the mixture. Magnesium sulphate, being insoluble in alcohol, is thrown out of its aqueous solution by the alcohol of the fluid extracts and the tincture. This cannot be prevented except by diminishing the magnesium sulphate or increasing the proportion of water.

134.

Iodine is soluble in 10 parts of alcohol and 60 parts of glycerin; nearly insoluble in water. The first two ingredients mix, making a clear solution, but water precipitates the iodine unless an old tincture of iodine which contains some hydriodic acid is used. By adding three or four grains of potassium iodide to the water the iodine remains in solution. Such an addition is admissible and should be made.

135.

The solution of bismuth (National Formulary) contains bismuth and ammonium citrate dissolved in water and ammonia water. Wine of pepsin (N. F.) contains hydrochloric acid. If the acid in the wine is in excess of the ammonia bismuth citrate will be precipitated. If the ammonia is in excess of the acid the pepsin is rendered inert. Some extractive matter in the tincture will be precipitated by the water. In filling this prescription the ingredients should be made as nearly neutral to litmus paper as possible before mixing.

136.

When calomel and cocaine hydrochlorate 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 in each pill of the mercuric chloride formed 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 five grains of starch or liquorice-root and a little water a suitable pill-mass can be made, the pepsin giving sufficient adhesive qualities.

137.

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 mixture should not be filtered.

138.

The usual dose of the fluid extract of digitalis is 0.01 to 0.12 Cc. In this prescription it is about 0.24 Cc., which is so largely in excess of the usual dose that the pharmacist should satisfy himself that the physician has made no mistake. The water gives a precipitate with the fluid extracts. If the spirit of nitrous ether is mixed directly with the fluid extracts it reacts with the tannin, giving off fumes of nitric oxide.

139.

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 liquorice-root. The mass should not be rubbed hard and should be kept cool.

140.

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.

141.

In filling this prescription there will be an effervescence, due to the generation of carbon dioxide. It is not caused by the carbolic acid and sodium bicarbonate, as might be supposed. Glycerin in the presence of water decomposes borax, forming sodium metaborate and boroglycerol. Water reacts with the boroglycerol to give glycerin and boric acid. The boric acid with sodium bicarbonate gives sodium borate and carbon dioxide. Other polyhydric alcohols, such as mannitol, dextrose, levulose, and glucose, act like glycerin in decomposing borax.

142.

Carbon dioxide will be generated by the sulphuric 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 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 colors acacia blue.

143.

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 thirteen 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.

144.

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.

145.

The potassium citrate was dissolved in the syrup and the spirit was then added. The two liquids were mixed, producing a turbidity, and on standing separated into two distinct layers. Potassium citrate is hygroscopic, but nearly insoluble in alcohol. The alcohol of the spirit has a tendency to throw the citrate out of solution, but the salt has such an affinity for water that it carries some water with it, forming a solution not miscible with alcohol.

146.

The aromatic spirit of ammonia contains ammonium hydrate and ammonium carbonate, and these act similarly in precipitating the corrosive sublimate as ammoniated mercury (NH_2HgCl). Ammoniated mercury is soluble in solutions of ammonium salts and somewhat soluble in acids, so that the sulphuric acid in the infusion will redissolve it, though not very readily. The precipitation may be prevented by mixing the infusion and spirit together first. Mercuric chloride precipitates the cinchona alkaloids from their aqueous solutions when not too dilute. The oils in the spirit are thrown out of solution by the water of the infusion. The directions are: Mix. Label: Teaspoonful twice a day.

147.

Triturating the alum with the lead acetate produces a moist sticky mass. This is due to the chemical reaction which takes place, forming lead sulphate, aluminum sulphate, potassium acetate, and liberating the water of crystallization which makes the mixture sticky. A mass is obtained when zinc sulphate 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 sulphuric acid, as lead tannate. The other two salts are not so readily precipitated as tannates as the lead. 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.

148.

The difficulty with this prescription is that triturating the salicylic acid with the exalgin produces a soft sticky mass which is unfit for dispensing in powders. Even by mixing all of the other ingredients except the acid and adding it last and then mixing lightly on paper the mixture becomes sticky. By diluting the acid with twice its weight of powdered althea and then with the other ingredients a fair powder can be obtained. Probably the best way would be to put the ingredients into capsules, separating the acid from the exalgin by the phenacetin and cocaine.

149.

This makes a mixture which is very thick at first, but yet can be poured. Allow it to stand for half an hour and it solidifies; by the end of twelve hours it is so firm that it cannot be shaken in the bottle. Even if only one half of the amount of magnesia is used the mixture will solidify so that it cannot be shaken up if allowed to stand undisturbed for a day or two. Magnesium oxide takes up water to form the gelatinous magnesium hydrate. The alkalies all tend to prevent the precipitation of the resinous matter in the tincture by the water.

150.

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 sulphite. 2. The hydrochloric acid of the tincture reacts with the hyposulphite, forming sodium chloride, sulphurous acid, and sulphur. 3. With potassium chlorate, the sulphurous acid thus formed gives potassium sulphate, hydrochloric and sulphuric 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 hyposulphite to a sulphate.

There is not enough water to dissolve all of the chlorate, and after the reactions have taken place there is not enough acid to form a normal ferric salt of all of the iron; a part of it remains as an insoluble oxychloride.

151.

When phenacetin and quinine sulphate are triturated together no change is noticed, but on adding hydrobromic acid the mixture acquires a yellowish-green color. What reaction occurs has not been determined. Phenacetin and hydrobromic acid give a white mixture; quinine sulphate and hydrobromic acid give only a very slight greenish color. Another incompatibility is between the hydrobromic acid and the calomel; a part of the mercurous chloride is reduced to metallic mercury, and a part is oxidized to mercuric chloride, which is much more active than calomel. By adding the calomel last the reaction can be prevented to some extent, but it may even then be considered as a rather dangerous mixture. The directions are: Mix and divide into 10 equal parts and put into gelatin capsules.

152.

Commercial dilute hydrocyanic acid usually contains some free sulphuric 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. (Prescott and Johnson's Qualitative Chemical Analysis, 4th ed., p. 308.) Hydrocyanic acid easily decomposes in water, but in an alkaline solution its decomposition is much quicker.

153.

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 fifteen grains of powdered soap are then added it will make a good mass with water.

154.

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 together a white precipitate of zinc hydrate 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 the 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 sulphide gas through it and getting little or no black precipitate of mercuric sulphide. 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 sulphide 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 considered dangerous for application, since if all of the mercury is redissolved it will be in the proportion of about 1 to 500.

155.

Piperazin is strongly alkaline and when added to an aqueous solution of phenocoll hydrochloride precipitates the insoluble base phenocoll. Under certain circumstances, as when the phenocoll hydrochloride is from fifty to one hundred per cent. in excess of the piperazin, a clear solution is said to be obtained. This prescription was filled by dissolving the phenocoll hydrochloride in the elixir, syrup, and peppermint water, and the piperazin in the water. The two solutions were mixed, making a clear solution, which remained clear for two days. It then happened to be chilled at night and crystallization took place, making an almost solid mass, which remained so even at the ordinary temperature. On warming a solution resulted, which remained clear at the ordinary temperature, but again solidified on being chilled.

156.

The resulting mixture is nearly black and very turbid, due to the tannate of iron formed. There is not enough of ammonia in the ammoniated tincture of guaiac to precipitate the iron unless the tincture of guaiac is made up fresh with fresh aromatic spirit of ammonia and the tincture of chloride of iron is free from excess of acid. Even then the syrup will tend to keep the ferric hydrate in solution. The syrup precipitates the resinous matter from the tincture of aloes and of ammoniated guaiac. A fresh tincture of guaiac gives a blue coloration with tincture of ferric chloride. The tincture of aloes gives a brown-black color with the iron.

157.

The dose of the morphine sulphate is considerably in excess of the amount usually given. The prescriber shows his knowledge and appreciation of this fact by putting three exclamation-points after the ingredient. The prescription should be filled as written. Some physicians when wishing to give unusual doses underscore the ingredient and the quantity. The latter is perhaps a better method, as there is less danger of a mistake. The directions are: Mix. Dispense in 10 capsules. Label: Let one be taken during the night.

158.

On mixing these ingredients a blue-black solution is obtained. This is due to the presence of some ferric sulphate. Ferrous sulphate as found in drug-stores nearly always contains some ferric sulphate. If strictly ferrous sulphate is used tannic acid gives no coloration with it.

This prescription was filled by dissolving the clear crystals of ferrous sulphate in water, adding four grains of sodium hyposulphite and two drops of sulphuric 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 sulphocyanide 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 but not inky in taste. In three days the solution had assumed a green color and in ten days it was blue-black. This change, caused by the oxidation of the iron by the air, would have taken place sooner if the bottle had been opened frequently

159.

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 almonds and then emulsifying it with acacia.

160.

Phosphoric acid with a solution of iron and quinine citrate gives a white precipitate, which is not soluble in the syrup of lemon. This precipitate is probably quinine phosphate, it being soluble in 784 parts of water. It is more soluble in water acidulated with strong mineral acids than with citric acid. The tincture gives the black tannate of iron with the scale salt. Water precipitates extractive matter from the tincture. The final mixture is turbid and of a greenish-black color.

161.

In lightly mixing the first two ingredients when powdered and perfectly dry no change in color is noticed; triturated together with considerable pressure, the powder turns gray. As soon as moisture comes in contact with the mixed powders they become dark gray,—the coloration is due to the formation of metallic mercury,—while at the same time a part of the calomel is changed to mercuric chloride and mercuric cyanide. The prescription should not be dispensed. (See No. 192.) A translation of the latter part of the prescription is: Tragacanth, water, of each a quantity sufficient to make a mass which is to be formed into 30 pills. Label: Take two pills every night.

162.

Soluble metallic salts frequently throw the volatile ingredient of medicated or aromatic waters out of solution. 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.

163.

The Rochelle salt throws some of the camphor out of solution. Then on the addition of the aromatic sulphuric 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 sulphuric acid, the sodium sulphate going into solution and potassium bitartrate being precipitated.

164.

Fowler's solution is alkaline in reaction and has a tendency to precipitate the alkaloids from the fluid extract, but this is prevented by the alcohol in the elixir. The Fowler's solution contains some carbonate and bicarbonate of potassium, which are said to be incompatible with antipyrin. Ammonium iodide generally contains a little free iodine, and iodine combines with antipyrin. Practically, however, this prescription can be filled without difficulty or danger.

165.

Strychnine (free alkaloid) is soluble in 6700 parts of water. There is enough of water and alcohol in the elixir to prevent the aromatic spirit of ammonia from throwing it out of solution. Nor will the ammonia 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 dark-red clear solution would be obtained. This substitution would not be allowable without the prescriber's consent.

166.

All of the ingredients except the syrup can be mixed together without producing much turbidity. But on adding the syrup to this mixture the resinous matter from the fluid extract and tincture is precipitated, and the copaiba, oil of turpentine, and camphor are separated. To make a presentable mixture some emulsifying agent must be used.

167.

' On adding carbolic acid to albumen or to collodion coagulation takes place (difference from creosote)." (U. S. P., 9.) This mixture makes a solid mass and cannot be applied with a brush.

168.

If the Fowler's solution is added to the tincture of nux vomica the alkali in the solution will liberate the free alkaloid strychnine, but it will be held in solution by the alcohol until the infusion is added. With the addition of most infusions the alkaloids would be precipitated, but the infusion of cinchona contains sulphuric acid, which combines with the alkaloids, forming a soluble salt. The water of the infusion will precipitate some of the inert matter from the tincture

169.

Basic lead acetate precipitates acacia from its aqueous solution, making a gelatinous solid. Neutral lead acetate does not have that effect.

170.

The silver nitrate is entirely precipitated by the sodium chloride as silver chloride. It is customary to filter eyewashes, and if this one is filtered there will be only a very weak sodium chloride solution left. These two chemicals cannot be put into the same solution without precipitation.

171.

If concentrated solutions of the first two ingredients are mixed together a reddish-brown salicylate of iron is precipitated. The citric acid in the syrup of lemon precipitates salicylic acid from a concentrated solution of lithium salicylate. By dissolving the iron salt in a part of the water and adding the syrup, then dissolving the salicylate in the balance of the water and mixing the solutions, a clear deep-red-colored solution can be obtained. The deep-red color is due to the ferric salicylate formed.

172.

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.

173.

The maximum dose of santonin, as given by most authorities, is four grains, some giving as high as five 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.

174.

This mixture is far from being a solution. The benzoin and the tolu are only partially soluble in alcohol and the acacia is insoluble. The insoluble matter quickly settles to the bottom of the mixture, forming a layer nearly equal in depth to that of the supernatant liquid. It, however, may be readily diffused through the liquid by agitation. A "Shake well" label is necessary.

175.

This prescription should not be filled, as there is danger of forming the fulminate of mercury, which is highly explosive when dry.

176.

Borax is alkaline in reaction and precipitates nearly all alkaloids from solutions of their salts. It precipitates the cocaine in this prescription, but the difficulty can be prevented by the use of a little glycerin. The glycerin acts chemically on the borax, breaking it up and forming sodium metaborate and boric acid. (See No. 141.) If boric acid were used instead of borax no precipitation would occur.

177.

Both the ammonium carbonate and the ammonium hydrate precipitate the mercuric chloride as nitrogen dihydrogen mercuric chloride, known in commerce as "ammoniated mercury" or "white precipitate." The precipitate settles quickly, but does not leave a clear fluid. The water of the mercuric chloride solution throws the oils of the aromatic spirit out of solution, making a white milky mixture.

178.

Two chemical reactions take place in mixing the above ingredients, whereby such bulky precipitates are formed that the mixture is poured with difficulty. There are two kinds of precipitates, one crystalline and one curdy. The hydrobromic acid liberates the salicylic acid, which is soluble in 450 parts of water and is crystalline. The sodium salicylate precipitates the curdy quinine salicylate.

179.

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.

180.

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 half an hour. The writer 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.

181.

Although the Fowler's solution is alkaline, there is enough of acid in the prescription to prevent any precipitation by it.

The insoluble ferric hypophosphite is, however, precipitated as a white amorphous powder, and perhaps also some calcium phosphate. The mixture can be dispensed with a "Shake well" label.

182.

The National Dispensatory (5th ed., p. 826) says of calomel: "Boiling hydrochloric acid dissolves mercuric chloride and leaves mercury; in the diluted state and heated in contact with air mercuric chloride is slowly dissolved without separation of mercury." And again: "According to Jolly's observations, corrosive sublimate is also formed from calomel in the presence of hydrochloric acid."

It is a somewhat disputed question whether in such a prescription there would be any mercuric chloride formed, and if so whether the amount formed would be sufficient to have any disagreeable physiological effect. If the prescription is to be used up in a short time probably no bad results would follow.

183.

Terpin hydrate dissolves in about 250 parts of water and iodol in about 5000 parts of water. These should be finely powdered before mixing with the other ingredients, and the prescription dispensed with a "Shake well" label. The glycerin and syrup are sufficiently viscid to keep the insoluble substances in suspension for a time.

184.

Each ingredient should be powdered separately and then mixed lightly with the other. If the two are rubbed together with some force slight crackling explosions take place. A sharp blow would probably cause serious results. The patient should be cautioned. With a little care on the part of the pharmacist and patient no ill results will follow from this combination.

185.

Menthol is only slightly soluble in water, although freely soluble in alcohol. There is not enough of alcohol in the tincture to dissolve and keep it in solution. The prescriber should be advised of this fact and asked to direct an oil or glycerin instead of water.

186.

Santonin is soluble in about 40 parts of alcohol, nearly insoluble in water, and not readily soluble in turpentine. The amount prescribed is not all soluble in the mixture. The turpentine does not mix, but floats on top. Extractive matter from the fluid extracts is precipitated. The santonin should be in the form of a fine powder and the mixture made into an emulsion.

187.

The potassium carbonate is deliquescent. It should be powdered with some absorbent powder, such as althea, and then the arsenic, previously triturated with some sugar of milk, added. Next add the mass of iron and if necessary a little water. The pills should be dispensed in a bottle protected from the atmosphere; otherwise they will become soft.

188.

This solution has a much larger proportion of active ingredients than is usually prescribed in an eye-wash. Probably the prescriber meant grains instead of drams. It should not be dispensed without consulting the physician, as it would probably cause intense irritation.

189.

In mixing the first three ingredients together there is danger of forming the explosive nitrosaccharose, or, as it is sometimes called, "vigorite." By diluting the acids with water there would be no danger, nor would the sulphuric acid carbonize the sugar.

190.

Borax is soluble in 16 parts of water, and in this case there is not enough to dissolve it. Boric acid requires 25.6 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.

191.

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 sulphuric acid necessary for the reaction is present in the hydrogen dioxide water, as a small amount is allowed to remain for preservation of the dioxide. The amount of hydrogen dioxide which 20 grains of potassium permanganate would act upon is 10.7 grains. If the dioxide water is official 1 fluid ounce contains about 13.7 grains of hydrogen dioxide, which would be sufficient to reduce all of the permanganate and decolorize the solution. The directions are: Let them be mixed by vigorous shaking. Label: Let it be applied to the affected parts night and morning.

192.

The cherry-laurel water of the Br. P. contains 0.1 per cent. of hydrocyanic acid. It has been proven that calomel with hydrocyanic acid is changed to mercuric chloride, mercuric cyanide, and metallic mercury. Hydrocyanic acid displaces hydrochloric acid in dilute solutions, while in concentrated solutions hydrochloric acid displaces hydrocyanic acid. The pharmacist might be justified in declining to fill this, although there is such a small amount of hydrocyanic acid that there would not be much of the mercuric salts formed.

193.

A mixture of thymol, alcohol, and ammonia is colorless at first, but acquires a decided though not deep green color on standing for a week. If the chlorinated soda solution is added to a mixture of thymol, alcohol, and ammonia a light-green clear solution is formed at once. Within ten minutes this becomes slightly turbid and of a deep-green color. On allowing it to stand a day an oily fluid separates from the dark-green solution in little round globules. These globules are black in appearance, but when broken up into very small ones they are blue-red or purple in color. This oily liquid has nearly the same specific gravity as the aqueous liquid.

194.

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 dilute nitric acid, which converts the alkaloid into a salt, the solution can be mixed with the silver nitrate without any precipitation.

195.

This mixture gives at first a clear solution, but within a few minutes it begins to grow turbid from the production of a light-brown-colored precipitate, which quite rapidly increases and becomes dark brown. This precipitation is due chiefly to the action of the eugenol in the pimenta on the tincture of iron. This is somewhat characteristic of all phenols, and the color varies with the dilution. If the tincture of iron is not so very acid the quinine will precipitate some of the iron.

196.

The quinine sulphate 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. If a large excess of citric acid is used the precipitation does not occur. It is said that the crystals are quinine acid citrate. If a solution of potassium citrate is added to a solution of quinine sulphate in water with a little sulphuric acid a similar precipitation of crystals takes place. The directions are: Mix. Label: A dessertspoonful after meals.

197.

In the presence of moisture this mixture becomes black. According to A. Sneider (Chem. Zeitung, 1893, p. 248), a double salt of the alkaloid and mercuric chloride is formed and some metallic mercury, the latter giving the mixture the dark color. Several of the alkaloids have that property. The directions translated into English are: Mix. Send 8 such powders. Label: Of these powders take one night and morning

198.

There is considerable danger in mixing these ingredients and the directions to " mix cautiously " should be followed. The potassium bichromate was powdered and mixed with the tar. To this the sulphuric acid was added with constant stirring. Heat and acrid fumes were generated. The mixture was a black, soft, granular mass, which after standing a day was scarcely acid to litmus paper. It probably had but little caustic effect.

199.

Sometimes the lime liniment causes a darkening when mixed with citrine ointment. In making the citrine ointment, if the nitric acid be insufficient in amount or the temperature rise too high, the oxidation of the fatty matter is effected in part at the expense of the mercuric nitrate, forming a mercurous nitrate. The calcium hydrate in the lime liniment acts on the mercurous salt, forming the black mercurous oxide. A translation of the directions is: " Make an ointment, to be used as directed."

200.

The usual dose of the fluid extract of gelsemium is from two to three minims. In the above prescription it would be about twice this. When chloral hydrate and antipyrin are brought together in concentrated solutions in the right proportions an oily liquid separates and upon standing forms crystals of monochloral antipyrin, commonly known as hypnal. In this case there is more than enough of chloral for the antipyrin, the proper proportions being 47 Gm. of chloral to 53 Gm. of antipyrin. Possibly there may be some dichloral antipyrin formed in this prescription. At least there is a separation of an oily liquid that does not solidify. The resinous matter from the fluid extracts is precipitated by the water. The prescription should not be dispensed without consulting the prescriber.

201.

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 precipitation of ferric hydrate.

202.

As this prescription is written it would make a dangerous mixture. The solution of potassium arsenite, being alkaline, would precipitate the strychnine. If the solution of arsenous acid were directed instead of Fowler's solution there would be no danger and the physiological effect would be the same.

203.

When the first two ingredients are rubbed together in a mortar chemical reaction takes place with enough violence to amount almost to an explosion, and there is an evolution of a large volume of white fumes. If the two chemicals are powdered separately and then mixed together lightly the change is slower and the mixture gradually turns brown. If mixed with separate portions of the cerate and then these mixed the reaction is retarded, but the ointment ultimately becomes brown. Chloral hydrate and potassium cyanide form dichloro-acetic acid, and in concentrated solutions form a crystalline compound which is not very soluble in water. (Muir and Morley's edition of Watts' Dictionary, vol. II. p. 4.)

204.

The quinine sulphate would not be entirely soluble even though there were no tannic acid in the infusion. The tannic acid converts the quinine sulphate into the less soluble quinine tannate. The oil in the spirit of rosemary is thrown out of solution, as well as some of the inert matter in the tincture. This is a poor combination, even for an external preparation.

205.

By triturating the zinc oxide and carbonate with the petrolatum, and then adding the lime water gradually, a partial emulsion can be effected. By the addition of thirty grains of acacia an emulsion can be made, which soon separates into three layers, the bottom consisting of the zinc salts, the middle chiefly of water, and the top of the emulsified petrolatum. These are readily mixed on agitation. Petrolatum is not saponified or otherwise chemically acted upon by calcium hydrate or other hydrates, as are the organic fixed oils and fatty substances.

206.

Salicylic acid is soluble in 450 parts of water and 60 parts of glycerin; consequently a solution cannot be made unless something else be added. "With half its weight of borax and two and a half times its weight of glycerin a twenty-five per cent solution of salicylic acid may be obtained." (Nat. Dispensatory, 5th ed., p. 89.) This prescription with thirty grains of borax would make a clear solution. But the addition of borax, potassium nitrate, ammonium citrate, or sodium phosphate should not be made without the knowledge of the prescriber. In the absence of the physician this should be dispensed as a "Shake" mixture.

207.

By mixing these ingredients a bright-red precipitate is formed in a few minutes and the iodine color of the liquid is nearly destroyed. In the course of 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.

208.

The trouble with this prescription is to get into and to keep in solution the two alkaloidal salts. Cocaine hydrochlorate is soluble in .48 part of water, 3.5 parts of alcohol, 2800 parts of ether, or 17 parts of chloroform. Morphine sulphate is soluble in 21 parts of water, 702 parts of alcohol, and nearly insoluble in ether or chloroform. The alcohol in the tincture is not present in sufficient amount to dissolve all of the morphine sulphate, and the ether and chloroform would throw out about all that the alcohol dissolves. As a rule, the free alkaloids are much more soluble in ether or chloroform than are their salts, but morphine is an exception. Morphine dissolves in 300 parts of alcohol (not enough in the two ounces of the tincture to dissolve the amount that would correspond to 15 grains of the sulphate), in 4000 parts of ether, or 6000 parts of chloroform. It is impossible to get the morphine sulphate or the free alkaloid into solution. The prescription should not be dispensed.

209.

In neutralizing tincture of ferric chloride by adding ammonia water to it a precipitate is formed, consisting of ferric hydrate 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 hydrate. It is better to add a strong solution of ammonia than a weak one, as the water dilutes the syrup so much that it will not prevent the precipitation.

210.

This makes at first a clear colorless solution, but within a day or two becomes of a dark brownish-red color. On standing a few days there is a slight precipitation, the amount depending on the condition of the salt and the spirit. If the salt is neutral and the spirit strongly acid a small amount of salicylic acid will be thrown out of solution. By neutralizing the acid the precipitation is prevented and the coloration hindered, although care must be used not to make the solution alkaline, as an alkaline solution of a salicylate quite quickly becomes colored. Possibly there is some nitrosalicylic acid formed in this prescription. The directions are: Mix. Label: Dessertspoonful three times a day.

211.

On adding the sulphurous acid to the tincture of iron the mixture becomes of a much darker red color at first and then nearly colorless. The glycerin may now be added and then the potassium chlorate dissolved in the water. There is barely a sufficient amount of water to dissolve the chlorate at the ordinary temperature, and after mixing with the other ingredients some of the salt is thrown out of solution by the alcohol of the tincture. Different chemical reactions take place, depending on the order of mixing. The possible reactions are as follows: 1. Between the ferric iron and the sulphurous acid, forming ferrous sulphate and hydrochloric acid. 2. Between the potassium chlorate and the hydrochloric acid in the tincture, forming chlorine. 3. Between the chlorine and the ferrous sulphate, forming a ferric salt and a chloride. 4. Between the chlorine and the sulphurous acid, forming sulphuric and hydrochloric acids. 5. Between the chlorine and the glycerin. 6. Between the potassium chlorate and the sulphurous acid, forming potassium sulphate and hydrochloric acid.

212.

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 solution.

213.

There is barely enough of water to dissolve the borax, it being soluble in 16 parts of water. Mercuric chloride requires about 16 parts of water, and the twenty grains would require about two thirds of an ounce. If the mercuric chloride is dissolved in part of the water, and the borax is mixed with the balance of the water and then with the corrosive sublimate solution, or if the borax is dissolved in the water and then the mercuric chloride added to this, the result will be about the same. In either case there will be formed a dark reddish-brown precipitate of an oxychloride of mercury, and also a white precipitate of borax or boric acid. The mercury is ultimately entirely precipitated. The directions are: Make a lotion. Use frequently.

214.

The carbonate in the Fowler's solution precipitates the 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.

215.

Piperazin is so deliquescent that it becomes liquefied when exposed to air; consequently it cannot well be dispensed in the form of powders. Probably the best way is to put it into good capsules, and even then it may liquefy. It also absorbs carbon dioxide from the air. The directions are: Let it be triturated well. Let 12 powders be made.

216.

This makes a solution which is nearly neutral to litmus. The upper portion, which is in contact with the air, soon acquires a green color. The color deepens, becoming a dark greenish brown and after some days a reddish brown. According to Allen (Organic Analysis, vol. III. part I. p. 68), this is due to the production of "tanno-melanic acid." The directions are: Mix and make a lotion. Label: Let it be applied in the manner directed.

217.

Crystallized carbolic acid 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. The mass is too soft to make into suppositories, and it is necessary to use some drying-powder or spermaceti to stiffen it. The directions are: Mix carefully. Make 10 suppositories.

218.

Three chemical reactions may take place in mixing these ingredients. One is between the sodium benzoate and the sulphuric acid, forming sodium sulphate and benzoic acid. The benzoic acid is only sparingly soluble in water, but there is enough of alcohol in the elixir to keep it in solution. Another reaction is between the sulphuric acid and the quinine sulphate, making the soluble bisulphate. 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 sulphate in part of the elixir and the benzoate in the remainder and then mixing these solutions. At first it made a clear solution, but soon commenced to precipitate and by the next day it was a solid mass of crystals.

219.

The quinine sulphate 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. It should not be dispensed.

220.

The potassium nitrate and the lead acetate were powdered separately and then mixed with the oil. To this the sulphuric acid was added slowly with constant stirring, avoiding letting the mixture get hot. The carbolic acid was added last. The mixture thus produced was black and thick. Several reactions ensue, depending to some extent upon the order of mixing. 1. Sulphuric acid with lead acetate gives lead sulphate and acetic acid. 2. Sulphuric acid with potassium nitrate forms potassium sulphate and nitric acid. 3. The nitric acid may act on the oil, oxidizing it. 4. The nitric acid may act upon the carbolic acid, forming picric acid. 5. The sulphuric acid forms with carbolic acid sulphocarbolic acid. 6. Sulphuric acid has a carbonizing effect upon the oil.

221.

No matter what order is used in mixing these ingredients a clear solution cannot be obtained. Several chemical reactions are liable 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 sulphate gives the almost insoluble quinine acetate. 3. Sodium bicarbonate precipitates morphine from a solution of its salt. 4. Sodium bicarbonate precipitates ferric hydrate from the tincture of iron. 5. Sodium bicarbonate precipitates the quinine from a solution of the sulphate. 6. The morphine sulphate gives a blue-green solution with the tincture of iron.

222.

The strychnine and the iodoform are insoluble in the syrups. The strychnine sulphate should be used instead of the alkaloid and then it will dissolve in the syrups. The iodoform should be finely powdered before mixing with the other ingredients and a " Shake " label should be put on the bottle. Very frequently syrup of hydriodic acid contains some free iodine, which would precipitate the alkaloids, but by mixing the two syrups together first the iodine is reduced by the hypophosphorus acid in the syrup of hypophosphites. There is perhaps a little danger of the hydriodic acid precipitating the strychnine, as under certain conditions iodides precipitate that alkaloid.

223.

This mixture makes a very stiff liquid, so that it will hardly pour. A reaction takes place between the glycerin and the balsam. On standing exposed to the air the glycerin absorbs moisture, the mixture becomes thinner, the balsam coming to the top.

224.

The vaselin will not dissolve in the bay rum and on being melted and shaken with the bay rum until cold separates in a mass. Acacia cannot be used to emulsify it on account of the alcohol present. The addition of soap or resinous matter in admissible amounts does not help it. The amount of carbolic acid is very large, the mixture being so strong as to quickly make the skin white. The prescriber should be consulted.

225.

If the sodium salicylate is dissolved in a little water and then added directly to the tincture of iron ferric salicylate is precipitated. This can be prevented by diluting the iron with the solution of ammonium acetate. The oil of wintergreen does not dissolve in the glycerin or the mixture of other ingredients. The solution is colored deep red by the ferric salicylate.

226.

Exalgin triturated with camphor makes a damp powder, or with salol it gives a liquid. Salol and camphor triturated together give a liquid. This mixture cannot be dispensed in the form of powders unless a large amount of some absorbing-powder, as slippery elm, is used. Perhaps the best way to dispense this combination would be to get the prescriber's consent to make an emulsion with water and acacia, using some expressed oil of almond to aid the emulsification.

227.

The mercuric chloride with potassium iodide gives the potassium mercuric iodide (Mayer's reagent) which precipitates nearly all alkaloids, quinine not being an exception. The precipitation is prevented to considerable extent by the presence of alcohol, but there is not a sufficient amount here. In filling this prescription Mr. Martindale advises the use of one and a half ounces of glycerin in place of a like amount of water, when no precipitation occurs. His directions are to rub the quinine with the glycerin, then add the iodide, the tincture, the spirit, and lastly the mercuric chloride dissolved in water.

228.

On mixing these two ingredients together a white precipitate of calcium carbonate is formed, the spirit containing ammonium carbonate. The lime water also throws out of solution the oils of the aromatic spirit. Whether the precipitate should be filtered out or not must depend upon the conditions for which the medicine is prescribed.

229.

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.

230.

Camphor requires about .8 part of alcohol for solution and pyrogallol requires one part. There is not enough of alcohol to dissolve both, but the pyrogallol and camphor may be rubbed together to form a liquid, and this will mix with the alcohol. The solution will turn black, however, on account of the oxidation of the pyrogallol by the air.

231.

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 hydrate combined in various proportions. All the lead is precipitated. As it is for external use, it may be dispensed.

232.

This prescription would make pills weighing nearly eight grains each even though no excipient is used, and as two of the ingredients are liquids, it would require a large amount of an absorbent powder to make a mass and the pills would be entirely too large. A smaller amount of excipient can be used, and at the same time a larger amount of medicinal matter can be taken, in the form of capsules than in a pill. This prescription should either be put into capsules or be made into two or three times as many pills as directed, of course increasing the number to be taken at a dose.

233.

Several chemical reactions take place, depending on the order of mixing. The quinine sulphate 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 sulphate 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 of alcohol in the elixir to dissolve it. 3. The quinine is also precipitated as the free alkaloid by the alkali in Fowler's solution. 4. The carbonate in Fowler's solution precipitates the mercury as a red-brown basic salt.

234.

The U. S. Dispensatory (17th ed., p. 716) gives a formula for making the colorless hydrastis, which consists of twenty grains of hydrastine hydrochlorate or sulphate dissolved in a pint of a mixture of glycerin and water. In this prescription we have the borax decomposed by either the honey or the glycerin, forming boric acid and sodium metaborate. The boric 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 also 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.

235.

The compound liniment of camphor contains ammonia, and this with the iodine forms ammonium iodide and a little ammonium iodate. The mixture at first is red-brown, but becomes colorless as the iodine is changed. There is some danger of forming the explosive iodide of nitrogen. (See under IODUM.)

236.

This mixture quickly becomes blue, the color gradually deepening, and a turbidity is produced. The addition of an acid turns it red. Mention is made of this change in Allen's Organic Analysis (vol. II. p. 539), and also in Muir and Morley's edition of Watts' Dictionary (vol. III. p. 832), but no explanation is given nor intimation of the chemical change which takes place.

237.

The result of this mixture is a soft mass, varying in color with the amount of litharge left unchanged. The acetic acid dissolves some of the lead as the acetate or subacetate. The heating of the rice-flour with the acid converts some of the starch into the soluble form.

238.

In Scoville's Art of Compounding the statement is made that sodium bicarbonate with calomel forms corrosive sublimate slowly, the change not taking place within four to six weeks ordinarily, so that, except under unusual conditions, any prescription would be used up before mercuric chloride is formed. It is a very common practice of physicians to direct the use of these two chemicals together.

239.

Sodium bicarbonate requires 11.3 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 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. Carbolic acid does not liberate carbon dioxide from the sodium bicarbonate.

240.

When antipyrin 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 antipyrin is mixed with a solution of resorcin a white precipitate is formed. Acetanilid requires 194 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 without the addition of alcohol or some other solvent

241.

Cocaine hydrochlorate is soluble in 2800 parts of ether or 3.5 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. The free alkaloid should be used and the prescriber notified of the change.

242.

Atropine sulphate is nearly insoluble in fixed oils. The free alkaloid is soluble in 38 parts of olive oil, and this is what should be used in filling this prescription. The physician should be notified of the change.

243.

The chromic acid and cocaine hydrochlorate were dissolved in separate portions of water, using one dram for each, and these solutions were mixed. A yellow precipitate was formed, which dissolved when an equal volume of water was added to it. The pharmacist should get the permission of the prescriber to use a little more water, although the caustic effect of the acid is somewhat weakened.

244.

The spirit of nitrous ether gives a blue color with the tincture of guaiac. The nitrous acid would probably affect the alkaloid colchicine, since it is so easily decomposed. Acids generally give yellow solutions with colchicine, but this change of course would not be noticed here.

245.

The potassium sulphide in the "liver of sulphur" precipitates part of the zinc as the white zinc sulphide. There is left in solution some zinc sulphate, potassium sulphate, and potassium hyposulphite.

246.

The aromatic sulphuric acid was probably added to reduce the bulk of the quinine, but an incompatibility is thereby introduced. The acid will liberate the carbon dioxide from the mass of carbonate of iron, causing the pills to swell and forming ferrous sulphate. The acid should be omitted.

247.

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.

248.

Thymol and menthol liquefy when triturated together. If a powder were used to mass the liquid the required capsule would be entirely too large to swallow. By putting in the menthol, then the guaiacol carbonate, then the thymol, and lastly the eucalyptol, a kind of a mass will be formed, but it will be necessary to seal the capsules.

249.

Benzoic acid is soluble in 500 parts of water and salicylic acid in 450 parts of water. If the directions to make a solution with the aid of heat are followed the acids on cooling will separate out in much larger crystals than at first. A better mixture will be obtained by rubbing the acids well in the mortar and then mixing with the water and cocaine salt in the cold. The acids do not precipitate the alkaloid.

250.

The analysis of antikamnia shows it to contain some sodium bicarbonate, which would react with each of the other ingredients of the prescription if a mass were made of them. The capsules would necessarily be too large even though the ingredients were made into a mass. The dose of strychnine is too large; the usual maximum limit is $\frac{1}{20}$ of a grain, although some authorities give it as high as $\frac{1}{12}$ gr. The prescriber should be consulted.

251.

The oil, chloroform, spirit of camphor, and aromatic spirit of ammonia mixed together make a clear solution, but on the addition of the tincture and the whiskey the oil and chloroform are thrown out of the solution, and on standing the mixture separates into two clear layers the lower one being chloroform and oil. There is no danger of the morphine being precipitated, for, although the free alkaloid is formed by the ammonia, there is enough of alcohol and chloroform to keep it in solution.

252.

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.

253.

The hydrogen dioxide liberates iodine from the hydriodic acid and then converts part of it into iodic acid, the amount depending on the strength of the water used.

254.

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.

255.

The acid of the tincture and of the syrup will decompose the Rochelle salt, combining with the sodium and throwing out of solution the cream of tartar as a crystalline precipitate.

256.

The oil can be emulsified with the acacia, but on adding the borax the acacia is gelatinized and the mixture is changed to a solid. The addition of a little glycerin to the borax before it is added to the emulsion will prevent gelatinization on account of decomposition of the borax. Sugar will also prevent the gelatinization of acacia by borax.

257.

The antipyrin was dissolved in the syrup and added to the syrup of iodide of iron without producing any apparent change at first. After a few days, however, the liquid became darkened 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.

258.

Potassium permanganate oxidizes carbolic acid to oxalic acid and carbon dioxide. (Morley and Muir, vol. III. p. 832.) The permanganate is reduced and precipitated as manganese dioxide, which makes the mixture a semi-solid. There is a large excess of carbolic acid not oxidized.

259.

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, with the ultimate formation of sodium metaborate and boric acid, making an acid solution which does not precipitate the lead.

260.

The iodine is reduced by the tannic acid, but not completely, and a turbid mixture is made. According to the U. S. Dispensatory (p. 101), hydriodic acid is formed and combines with a portion of the tannic acid and remains in solution, while the oxygen of the decomposed water combines with another portion of the tannic acid to form an insoluble compound. This mixture is capable of dissolving iodine.

261.

If the potassium chlorate and the glycerin are rubbed together an explosion is liable to occur. The chlorate and acid react to form a chloride and sulphate. After a day or two no odor of sulphurous 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.

262.

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.

263.

The National Dispensatory (p. 847) states that when the first two ingredients are rubbed together explosion takes place, due to the formation of iodide of nitrogen. By mixing the first two ingredients with separate portions of lard and then mixing these there is but little danger.

264.

When the salol is added to the tincture of iron a dark-green to red mixture is produced. The salol is partially dissolved, but is nearly all precipitated when the syrup is added. According to the U. S. Pharmacopœia, with a dilute solution of iron an alcoholic solution of salol gives a violet color, while a dilute solution of salol added to the iron solution gives a whitish turbidity.

265.

The tincture of iodine and the collodion mix without any trouble or any reduction of the iodine even on standing for several days. But when the ammonia water is added and thoroughly shaken with the mixture it coagulates the collodion, making a thick liquid, the iodine is reduced chiefly to ammonium iodide and a little ammonium iodate, and there is danger of some explosive iodide of nitrogen being formed. The coagulation or thickening of the collodion is caused by the water chiefly, and not the ammonia, since pure water has a similar effect. The spirit of ammonia would be better than the ammonia water.

266.

Shaking the solution of potassium hydrate 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 oleic acid.

267.

This mixture makes a clear solution at first, but soon commences to become turbid and give a light 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.

268.

This ointment, which is nearly white at first, soon becomes darkened and ultimately nearly black. The pyrogallic acid is oxidized and turned 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. (Richter, 695.)

269.

When the first two ingredients are rubbed together a liquid is produced, and this mixed with the lard makes a very thin ointment in warm weather. The prescription was filled by replacing one half the lard by that amount of simple cerate. Rubbing the ingredients with separate portions of lard and then these together seems not to prevent the reaction between the exalgin and naphthol.

270.

The two liquids do not mix to form a clear solution. On allowing the mixture to stand the oil rises to the top. A "Shake well" label is necessary. The two liquids are so thick and viscid that the separation is slow.

271.

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.

272.

If the oil is emulsified and then the borax dissolved 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.

273.

This prescription was filled by dissolving the salts in separate portions of water and then mixing. After a few hours a crystalline precipitate began to appear. The strychnine was liberated from the sulphate by the cyanide solution, which was alkaline. Potassium cyanide is generally more or less alkaline, depending upon its exposure to air. The carbon dioxide of the air decomposes it, liberating hydrocyanic acid. After neutralizing the potassium cyanide with sulphuric acid no precipitation resulted.

274.

While these ingredients make a homogeneous mixture, on allowing it to stand the glycerin separates out. By using three fourths of a dram of lanolin in place of that much of the ointment, and rubbing with it the glycerin and borax and then the ointment, an excellent mass is formed, from which the glycerin does not separate.

275.

The two salts were dissolved in separate portions of the syrup and then mixed. A turbidity resulted, and on filtering out the white precipitate and adding ammonia to it it was darkened, indicating calomel. The tartar emetic reduces the mercuric chloride to mercurous chloride. (Muir and Morley's ed. Watts' Dictionary, vol. IV. p. 643.)

276.

Codeine is strongly basic and liberates ammonia from a solution of ammonium chloride. This can be readily proven by suspending wet red litmus paper in the bottle over the liquid. The National Dispensatory (p. 515) says that 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.

277.

When lime and sulphur are boiled together a red solution is formed. The calcium and sulphur unite to form calcium thiosulphate and calcium disulphide or pentasulphide, depending on the proportions. This is the first reaction in making the official precipitated sulphur.

278.

If the lime water is added to the solution of lead subacetate the lead is partially precipitated as lead hydrate, 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.

279.

There is some danger of causing an explosion in mixing these two chemicals. Even on mixing these in smaller amounts the chemical reaction is quite violent. There are white fumes given off and the mixture is turned brown. The odor of chlorine is soon lost. Chlorine oxidizes glycerin to oxalic and carbonic acids, with intermediate products.

280.

The copper sulphate gives the water a pale-blue color. On heating this solution with the salicylic acid the color is changed to a grass-green, but goes back to the blue on cooling again. What causes the change of color when the solution is heated has not yet been explained. After standing for a considerable time the color becomes of a deeper blue. According to Muir and Morley (Watts' Dictionary, vol. III. p. 680), alkalies do not precipitate copper in the presence of salicylic acid.

281.

Potassium permanganate oxidizes salicylic acid to formic acid and carbon dioxide and oxidizes the ferrous sulphate to ferric sulphate, while it is itself precipitated as manganese dioxide. There not being enough of acid to combine with all of 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 there is left a violet-colored supernatant liquid. The violet color is due to the formation of ferric salicylate. There is not enough of permanganate to oxidize all of the salicylic acid or all of the ferrous sulphate.

282.

The quinine sulphate was dissolved in the tincture of iron, giving a dark-red solution. The syrup of ginger was next added and lastly the ammoniated tincture of guaiac, the first few drops of which gave a green color, that had changed to blue by the time all of the tincture was added. On standing a few minutes it had changed back to a blue-green, and then green, and in a few hours to a dark brown. Guaiac with ferric chloride or other oxidizing agent gives a blue color. The resinous matter of the guaiac and also the oils of the aromatic spirit of ammonia (the menstruum used in making the tincture) were precipitated by the syrup. The ammonia and ammonium carbonate precipitate the quinine and also the iron; the ferric hydrate is somewhat soluble in syrup, but in this case the syrup is too much diluted by the tinctures to keep all of the iron in solution. The precipitated matter is bulky and rather gelatinous.

283.

Potassium permanganate oxidizes quinine sulphate to pyridin tricarboxylic acid, oxalic acid, and ammonia. (Morley and Muir's ed. Watts' Dictionary, vol IV. p. 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.

284.

The strychnine will not dissolve in the glycerin or in the water. The consent of the prescriber to use strychnine sulphate or nitrate (the nitrate is the more common for hypodermic injection) should be obtained. In the absence of the prescriber the nitrate should be dispensed, notifying the prescriber of the change at the earliest possible opportunity.

285.

Carbolic acid and thymol when triturated together form a liquid which can be mixed with the vaselin and cerate, making a homogeneous mass. On allowing it to stand for a time the liquid separates. This can be prevented by using lanolin instead of the vaselin. Substituting one half dram of lanolin for that amount of the vaselin does not entirely prevent the separation.

286.

A light flocculent precipitate is formed which can easily be disseminated through the liquid. The mucilage of acacia is acid in reaction, and may perhaps throw out of solution some of the bismuth citrate, the bismuth and ammonium citrate being decomposed. Neutralizing the mucilage does not prevent precipitation.

287.

Podophyllin gives a black-brown color with the tincture of iron and nearly all is dissolved on warming. Quinine sulphate dissolves in this solution, and when the tincture of rhubarb is added the tannic acid in it precipitates the quinine and with tincture of ferric chloride gives the black tannate of iron The mixture is quite thick from the precipitated matter.

288.

When camphor and carbolic acid are brought together a liquid results. In order to avoid making any more liquid than was necessary the corresponding amount of solid iodine was used in place of the tincture. The iodine dissolved readily in the phenol-camphor liquid and then the powdered lead acetate was added. Kaolin was tried as an absorbent excipient, but the amount required made the pills entirely too large. Starch was then used (together with some glucose syrup), so as to form the easily decomposed iodide of starch. This made the pills very large and they were finally put into capsules.

289.

Potassium iodide in aqueous solution with citric acid is decomposed with the liberation of iodine. This prescription was filled, making a clear solution of a pale-yellow color. By the next morning there was a deposit of crystals, some of which were long, large, prismatic, nearly colorless, and others were much smaller and of a dark-red color. In concentrated solutions potassium iodide precipitates quinine as a double iodide which is colorless. The free iodine formed gives a dark-red precipitate with quinine which is nearly insoluble in water.

290.

Phenacetin is only sparingly soluble in water, but more soluble in alcohol, although there is not enough present in this prescription to dissolve it entirely, and what is dissolved is again thrown out of solution on adding the water. Heating the phenacetin with the tincture dissolves and gives a dark-red color, which is destroyed by the water. The best way to fill this prescription is to powder the phenacetin, mix with a little acacia, and add the water and lastly the tincture of iron. Filled in this way the phenacetin is in a finer powder than when it is first dissolved in the tincture.

291.

The sodium salicylate and benzoate and the carbolic acid 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.

292.

The acid was added to the lime water. At first there was formed a bluish-white precipitate with a tinge of pink. As more of the acid dissolved the mixture became more of a blue and then a greenish blue. After standing for some time the upper portion of the precipitate turned brown. If twice as much acid had been directed a nearly clear greenish-blue solution, turning to a light brown, would have been formed.

293.

The solution of morphine contains some free hydrochloric acid, which reacts with the potassium chlorate, with the formation of a very small amount of chlorine. The chlorine oxidizes a portion of the morphine, giving a pale-brown solution. By dissolving the chlorate in the water and diluting the solution of the morphine with the syrup and then mixing, scarcely any coloration is produced.

294.

The mercuric chloride reacts with the hydriodic acid, forming the red iodide of mercury, and then this combines with more hydriodic acid to form a soluble double compound which precipitates the cinchona alkaloids. Extractive matter in the fluid extract is also precipitated by the water in the syrups and solution. There is such a small amount of mercury precipitated that the mixture is not a dangerous one. It should be dispensed with a "Shake well" label.

295.

The camphor liniment should be mixed with the ammonia water, which partially saponifies it. This should then be added gradually to the ointment with constant stirring. The mixture on standing separates into two layers, the oily ammonia mixture on top and the ointment on the bottom. The mixture can be shaken up without much difficulty. If the ammonia is added directly to the ointment, there is some danger of the fat being saponified and the metallic mercury separating.

296.

The syrup of iodide of iron frequently contains some free iodine, which would precipitate the quinine. By warming the two syrups the iodine is reduced by the hypophosphorus acid in the syrup of hypophosphites. When quinine sulphate dissolved in the phosphoric acid is added to the mixed syrups a white amorphous precipitate is formed which is probably calcium sulphate. Some of the quinine is also precipitated on allowing the mixture to stand.

297.

By dissolving the morphine in a little water and adding it to the tincture of iron a blue solution is 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.

298.

The doses of the first two ingredients are too large. The maximum dose of mercuric chloride is about $\frac{1}{6}$ of a grain and of sodium arsenate about $\frac{1}{9}$ of a grain. The prescription should not be dispensed without first consulting the prescriber. Should it be filled the potassium carbonate will react with the strychnine, the mercury, and the iron salts, but the activity is not increased.

299.

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.

300.

This prescription was filled by dissolving the quinine sulphate 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.

301.

If the directions to use enough of the extract of glycyrrhiza to make a pill-mass be followed, the pills will be entirely too large. The best way is to melt one gram of beeswax, add the balsam and stir till the mixture is cool. Then use enough of powdered liquorice-root to make the mass.

302.

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.

303.

By rubbing the powdered tragacanth with the petrolatum, then adding the glycerin and zinc oxide, a comparatively smooth ointment can be made, but the glycerin separates on standing. The glycerin and tragacanth should be heated together, with the addition of a little water if necessary, so as to make a glycerite of tragacanth, and then mixing this with the other ingredients a smooth permanent ointment can be made.

304.

Potassium iodide is deliquescent in moist air, and on powdering, even in the ordinary atmosphere, it becomes damp. It may be necessary to add some absorbing-powder. The powders should be dispensed in paraffin or wax paper.

305.

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. The U. S. Pharmacopœia directs that it be dissolved in an aqueous solution of potassium iodide, using one fourth as much potassium iodide as iodine and twice as much water as iodide. Lard will hold nearly 10 per cent. of its weight of water.

306.

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. Sulphuric acid liberates chloric acid from the potassium chlorate, and this oxidizes the ferrous iodide, liberating iodine, which precipitates the quinine.

307.

Phenacetin requires 1400 parts of water or 6 parts of alcohol for solution. In filling this prescription the phenacetin 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 phenacetin with about two drams of acacia, then adding the syrup and part of the water, and lastly the tincture and spirit diluted with the balance of the water.

308.

An absorbent excipient is necessary in order to make a pill-mass. To use a powder like liquorice-root or althea would make the pills too large. Freshly calcined magnesia dampened with a little water is the best, as it is only necessary to use six or eight grains. The magnesia combines with the copaibic acid in the balsam to form a solid mass; water aids this reaction.

309.

With bismuth subnitrate salicylic acid forms a series of nitrosalicylates of bismuth, varying in color from a white to a reddish orange. This mixture gives a faint pink color after standing for a time.

310.

Chloral hydrate rubbed with phenacetin gives a liquid· a liquid is also obtained when chloral hydrate is rubbed with quinine sulphate. A large amount of an absorbent powder would be necessary to make this liquid into a mass, and the capsules would necessarily be very large.

311.

The alcohol in the tincture is without any therapeutical value in this case, and only makes the pill-mass too soft. The alcohol should be evaporated before mixing with the other ingredients unless the extract of jalap has become dry and hard, in which case it can be used to soften the extract and then evaporated.

312.

Twenty grains of salicylic acid require nearly nineteen fluid ounces of water for solution, but in this case the acid combines with the calcium hydrate to form a soluble calcium salicylate. The solution is clear and slightly acid.

313.

When the acetanilid is added directly to the tincture of iron and heated 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.

314.

The hydrogen dioxide oxidizes the ferrous iron to a ferric salt and the glycerin to glyceric, oxalic, and tartaric acids, and in an acid solution reduces the bichromate to a green chromic salt. The hydrogen dioxide usually contains some sulphuric acid, which is left in to preserve it. In the presence of free acid the bichromate oxidizes the ferrous sulphate and the glycerin. This prescription gives a heavy brown precipitate, probably of a basic ferric salt.

315.

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.

316.

The trouble with this prescription is that the water breaks up the boroglycerin, liberating boric acid. Boric acid requires about 25 parts of water for solution, and there is not enough to dissolve it. By the substitution of some glycerin for a part of the water no precipitation takes place.

317.

The salicylic acid is not soluble in the water and glycerin; it requires 450 parts of water for solution, and, according to the U. S. Disp. (p. 84), by careful heating it will dissolve in 50 parts of glycerin. Free iodine reacts with the salicylic acid, giving mono-, di-, and tri-iodobenzoic acids and tri-iodophenol. (Muir and Morley's edition of Watts' Dictionary, vol. III. p. 680.) All of the iodine is not changed.

318.

The citrate of iron and quinine was dissolved in a part of the wine, making a clear acid solution. To this was added the carbolic acid dissolved in the balance of the wine. A light-yellow sticky precipitate was formed. The composition of the precipitate was not determined. It was not dissolved by the further addition of the tincture. The tincture darkens the mixture a little and slightly increases the turbidity.

319.

Diuretin is sodium-theobromine salicylate and is readily soluble in water. Acids decompose it, with the precipitation of the theobromine. Theobromine differs from many alkaloids in that it does not readily combine with acids. In this prescription the diuretin was dissolved in the syrup, and then the spirit of nitrous ether 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.

320.

Quinine sulphate makes a sticky mass when rubbed with the chloral hydrate; the antipyrin and the chloral liquefy on being triturated together. Even if the ingredients are powdered separately and mixed lightly, the mixture becomes sticky. By the use of a little drying-powder it can be put into capsules.

321.

The pilocarpine differs from many alkaloids in that it is soluble in water. The hydrochlorate is used much more frequently than the free alkaloid. The terpin hydrate requires about 250 parts of water for solution; consequently only a small portion of it will be dissolved. A " Shake " label is necessary, or a more elegant preparation would be made by emulsifying it.

322.

The potassium bicarbonate precipitates the ferrous iodide as ferrous carbonate. If the iron salt is purely ferrous the carbonate will be white, but it oxidizes in the air, becoming green and after some time yellow-brown, forming a ferric oxide. Potassium iodide sometimes contains a carbonate as an impurity.

323.

An absorbent powder will be necessary to make a mass that can be put into capsules. When pyrocatechin is rubbed with acetanilid or phenacetin a liquid results. Acetanilild and phenacetin do not liquefy.

324.

This combination has perhaps caused more trouble than almost any other one prescription. Pure ferric phosphate is nearly insoluble in water and not so very readily soluble in weak acid solutions. The U. S. P. soluble phosphate of iron is a mixture of ferric phosphate and sodium citrate. Sodium citrate is readily soluble in water, and an aqueous solution of this salt makes a good solution for the ferric phosphate. When phosphoric acid is added to a solution of the soluble ferric phosphate the sodium citrate is decomposed, forming sodium phosphate and citric acid; the ferric phosphate is no longer soluble in this mixture and consequently 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 sulphate is present in a much larger proportion than two 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. There is always some objection to dispensing a "Shake" mixture when it contains such an active agent as strychnine.

325.

In a neutral solution potassium iodide does not react with the tartrate of iron and potassium, but in the presence of the sulphuric acid the ferric salt oxidizes the iodide, liberating iodine. This iodine then combines with the quinine to form an insoluble compound. A "Shake well" label is necessary. If there were much more free iodine than what would combine with the quinine the prescription should not be dispensed.

A TABLE SHOWING THE EFFECT OF RUBBING TOGETHER EQUAL WEIGHTS OF TWO SOLIDS.

	Acetamide.	Acetanilid.	Antipyrin.	Bromal hydrate.	Butyl chloral hydrate.	Camphor.	Camphor, borneol.	Camphor, monobromated.	Carbolic acid.	Chloral alcoholate.	Chloral hydrate.	Diuretin.	Euphorin.	Exalgin.	Lead acetate.	Menthol.	Methacetin.	Naphthalin.	Naphthol, beta.	Phenacetin.	Pyrocatechin.	Pyrogallol.	Resin.	Resorcin.	Salicylic acid.	Salol.	Sodium phosphate.	Sodium salicylate.	Thymol.	Urea.	Urethane.
Acetamide	P	P	P′	L	L	P	P	P	L	L	L	P	P	P	L	P	P	P	P	P	L	L	..	L	P	P	L	P	L	P	L
Acetanilid	P	P	P′	P	P	P	P	P	L	L	L	P	P	P	P	P	P	P	P	P	L	P	P	L	P	P	P	P	L	P	P
Antipyrin	P′	P′	P	P′	P^2	P	P	P	L	L	P′	P	L	P	P	P	P	P	L	P	L	L	P	L	P^2	P′	P	P^2	L	P	L
Bromal hydrate	I	P	P′	P	P	P	L	P	L	P	P	M	L	L	P	L	M	P	P	P	L	P	..	P	P	P	P	P	P	L	L
Butyl chloral hydrate	L	P	P^2	P	P	P^2	P	P	L	P	P	P	P	L	P	L	P	P	P	P	L	P	..	P	P	P	P	P	P^2	P	L
Camphor	P	P	P	P	P^2	P	P	P	L	L	L	P	L	P	P	L	P	P	L	P	L	L	P	L	P	L	P	P	L	P	L
Camphor, borneol	P	P	P	L	P	P	P	P	L	L	L	P	L	P	P	L	P	P	L	P	L	P	..	L	P	L	P	P	L	P	L
Camphor, monobromated	P	P	P	P	P	P	P	P	L	L	L	P	L	P	P	P	P	P	P	P	L	P	P	P	P	L	P	P	L	P	P
Carbolic acid	L	L	L	L	L	L	L	L	P	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	P	L	L	P	L	P	L
Chloral alcoholate	L	L	L	P	P	L	L	L	L	P	P	M	L	L	P	L	L	P	P	P	L	P	..	L	P	L	P	P	L	L	L
Chloral hydrate	L	L	P′	P	P	L	L	L	L	P	P	L	L	L	L	L	L	P	P	L	L	P	P	P	P	L	L	P	L	L	L
Diuretin	P	P	P	M	P	P	P	P	L	M	L	P	P	P	P	P	P	P	P	P	M	M	..	P	P	P	P	P	P	P	P
Euphorin	P	P	L	L	P	L	L	L	L	L	L	P	P	L	P	L	P	P	P	P	L	P	P′	L	P	L	P	P	L	P	L
Exalgin	P	P	P	L	L	P	P	P	L	L	L	P	L	P	P	L	P	P	L	P	L	L	P	L	L	L	P	P	L	P	L
Lead acetate	L	P	P	P	P	P	P	P	L	P	L	P	P	P	P	P	P	P	P	P	M	M		M	L	P	L	M	P	L	P′
Menthol	P	P	P	L	L	L	L	P	L	L	L	P	L	L	P	P	P	P	L	P	L	L	L	L	P	P	P	P	L	P	L
Methacetin	P	P	P	M	P	P	P	P	L	L	L	P	P	P	P	P	P	P	P	P	L	P	P	M	P	P	P	P	P	P	P
Naphthalin	P	P	P	P	P	P	P	P	L	P	P	P	P	P	P	P	P	P	P	P	P′	P	P	P	P	L	P	P	P	P	P
Naphthol, beta	P	P	L	P	P	L	L	P	L	P	P	P	P	L	P	L	P	P	P	P	L	P	P	P	P	P	P	P	P	P	L
Phenacetin	P	P	P	P	P	P	P	P	L	P	L	P	P	P	P	P	P	P	P	P	L	P	P	P	P^2	P	P	P^2	P	P	P
Pyrocatechin	L	L	L	L	L	L	L	L	L	L	L	M	L	L	M	L	L	P′	L	L	P	L	..	P′	P	L	L	P	L	L	L
Pyrogallol	L	P	L	P	P	L	P	P	L	P	P	M	P	L	M	L	P	P	P	P	L	P	P	P	P	P	M	P	P	L	L
Resin	..	P	P	..	..	P	..	P	L	..	P	..	P′	P	..	L	P	P	P	P	.	P	P	P	P	M	P	..	M	..	M
Resorcin	L	L	L	P	P	L	L	P	L	L	P	P	L	L	M	L	M	P	P	P	P′	P	P	P	P	P	P′	P	P	P	L
Salicylic acid	P	P	P^2	P	P	P	P	P	P	P	P	P	P	L	L	P	P	P	P	P^2	P	P	P	P	P	P	L	P	P	P	L
Salol	P	P	P′	P	P	L	L	L	L	L	L	P	L	L	P	P	P	L	P	P	L	P	M	P	P	P	P	P	L	P	L
Sodium phosphate	L	P	P	P	P	P	P	P	L	P	L	P	P	P	L	P	P	P	P	P	L	M	P	P′	L	P	P	P′	P	P	P
Sodium salicylate	P	P	P^2	P	P	P	P	P	P	P	P	P	P	P	M	P	P	P	P	P	P	P	..	P	P	P	P′	P	P	P	P
Thymol	L	L	L	P	P^2	L	L	L	L	L	L	P	L	L	P	L	P	P	P	P^2	L	P	M	P	P	L	P	P	P	P	L
Urea	P	P	P	L	P	P	P	P	P	L	L	P	P	P	L	P	P	P	P	P	L	L	..	P	P	P	P	P	P	P	P
Urethane	L	P	L	L	L	L	L	P	L	L	L	P	L	L	P′	L	P	P	L	P	L	L	M	L	L	L	P	P	L	P	P

L = Soft mass or liquid. M = Stiff mass which dries. P = Dry powder. P′ = Slightly damp powder, quickly drying.
P^2 = Said to liquefy, but the writer obtained a dry powder.

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