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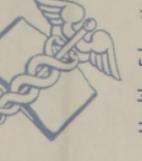
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A MANUAL

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OF

THERAPEUTICS.

BY

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PREFACE.

THIS manual has been prepared especially for students, with the hope that it may serve as an outline of modern therapeutics, to be filled in and extended by systematic study of the larger works. For obvious reasons references have for the most part been omitted. Since a satisfactory classification based on physiological action or therapeutic application is at present scarcely possible, the drugs have been arranged in alphabetical order. Latin titles being commonly employed in prescription-writing, they have been adopted throughout the book, in order that the student may become thoroughly familiar with them.

For the article on "Incompatibility in Prescriptions" the author is indebted to Mr. Joseph W. England.

A. A. S.

PHILADELPHIA, January, 1894.

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STREET

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A

MANUAL OF THERAPEUTICS.

PHYSIOLOGICAL ACTION OF DRUGS.

THE knowledge of the action of drugs upon the human body is obtained in two ways: first, by clinical experiment; and secondly, by a comparative study of their actions on the lower animals.

The treatment of disease without reference to the physiological action of the drugs employed or to the pathological conditions involved constitutes *empirical therapeutics*. Thus the employment of opium in diabetes and of salicylic acid in rheumatism simply because experience has taught that they often do good in these affections is an illustration of empirical therapeutics.

The treatment of disease by drugs which are expected, from a knowledge of their physiological action, to antagonize certain known pathological conditions constitutes *rational therapeutics*. The employment of chloral in the convulsions of tetanus may be cited as an illustration of rational therapeutics, for it is expected that the chloral, through its sedative effect, will counteract the spinal irritation which is manifesting itself in convulsions.

EXPECTORANTS.

Drugs which modify the secretions of the air-passages and facilitate their expulsion are termed *expectorants*. Those which lower the blood-pressure, relieve congestion, and increase secretion are termed *sedative expectorants*; and those which modify and diminish secretion by stimulating the mucous membrane are termed *stimulating expectorants*.

The most important sedative expectorants are—

Tartar emetic,
Vegetable salts of potassium (citrate and acetate),
Ipecac,
Apomorphine,
Lobelia.

Indications.—Sedative expectorants are employed in the early stage of laryngitis and bronchitis, before secretion is fully established.

The most important stimulating expectorants are—

Ammonium chloride,	Tar,
Squill,	Oil of sandalwood,
Senega,	Garlic,
Terebene,	Copaiba.
Eucalyptus,	

Indications.—Stimulating expectorants are employed in subacute and chronic laryngitis and bronchitis.

ESCHAROTICS.

Drugs which are capable of destroying healthy or unhealthy tissue are termed *escharotics*.

The most important are—

Strong acids,	{	Arsenious,
		Chromic,
		Nitric,
		Sulphuric,
		Carbolic.
Strong alkalies,	{	Caustic potash,
		Caustic soda.
Bromine,		
Chloride of zinc,		
Solution of nitrate of mercury.		

Nitrate of silver, burnt alum, and sulphate of copper are also feeble escharotics.

Indications.—Caustics are employed to destroy pathological tissues, such as chancre, lupus, warts, epithelioma, and exuberant granulations, and to destroy the virus in poisoned wounds.

ANTISPASMODICS.

Drugs are frequently employed to act as sedatives upon the entire nervous system. They accomplish this effect in several ways: some by depressing the brain, some by depressing the cord, and many by stimulating the inhibitory centres, thus controlling the production and discharge of nerve-force. Those which act by depressing the brain and cord are of the nature of depresso-motors, while those which act by stimulating inhibition are of the nature of nerve-stimulants. The following drugs are employed as anti-spasmodics:

- | | | |
|-------------------------|---|-------------------|
| Bromides, | } | Depresso-motors. |
| Chloral, | | |
| Cimicifuga. | | |
| Asafœtida, | } | Nerve-stimulants. |
| Sumbul, | | |
| Musk, | | |
| Camphor, | | |
| Belladonna, | | |
| Hoffmann's anodyne, | | |
| Valerian, | | |
| Monobromate of camphor, | | |
| Hops. | | |

Indications.—Nervous excitability, hysteria, neurasthenia, chorea, hiccough, whooping-cough, delirium tremens, epilepsy, and asthma.

THE ACTION OF DRUGS ON TEMPERATURE.

A drug may affect the temperature by its action on the blood, the circulation, the secretion of sweat, or on the nervous mechanism controlling heat-production and heat-dissipation.

The following drugs lower febrile temperature either by lessening heat-production or increasing heat-dissipation:

- | | |
|--------------|-----------------|
| Antipyrine, | Salicylic acid, |
| Antifebrin, | Thallin, |
| Phenacetine, | Quinine (?). |

Indications.—Antipyretics may be employed in acute inflammatory and infectious diseases when associated with

high temperature. Their use is nearly always followed by more or less depression of the circulation, but this is to be attributed rather to the removal of heat from the body than to the effect of the drug on the heart. When it is feasible, however, it is far better to lower temperature by the external application of cold.

THE ACTION OF DRUGS ON NUTRITION.

Tonics.—These are remedies which strengthen the tissues. Some act by furnishing materials which the body needs, as iron in anæmia; a few act by checking tissue-waste, and so conserving energy, as alcohol; and some act by stimulating the digestive organs, and so assist in the assimilation of food, as the mineral acids and vegetable bitters.

The following drugs are used as tonics:

Iron,	Alcohol,
Quinine,	Hypophosphite of sodium and of calcium,
Arsenic,	Hydrochloric acid,
Phosphorus,	Nitrohydrochloric acid,
Strychnia,	Phosphoric acid,
Cod-liver oil,	Gentian,
Malt,	Quassia.

Indications.—Tonics are indicated in local or systemic relaxation.

Drugs which Diminish Tissue-waste.—The action of drugs on tissue-change is determined chiefly by estimating the amount of urea excreted in the urine, the amount of oxygen consumed and of carbonic acid given off when the animal is placed upon a diet of uniform quality and quantity.

The following drugs lessen tissue-waste:

Alcohol,	Caffeine,
Quinine,	Cocaine,
Opium,	Arsenic.

Indications.—Of these remedies, alcohol, quinine, and opium are employed to support the system in low fevers and in wasting diseases.

Drugs which Increase Tissue-waste.—The vegetable salts of potassium, citrate, acetate, etc., diminish the excretion of uric acid and increase the amount of urea by increasing oxidation and thus completing the metamorphosis of tissues.

Indications.—These salts are indicated when uric acid is eliminated in excess, as in lithæmia, rheumatism, and gout.

Fatty Degeneration of Tissues.—Poisonous doses of such minerals as arsenic, copper, phosphorus, antimony, silver, etc. produce widespread fatty degeneration of the tissues.

Absorbents.—These are remedies which have the power of disintegrating and hastening the absorption of newly-formed tissues.

The most important are—

Mercury,
Iodides,
Iodine.

Indications.—These remedies are employed in syphilis to break up the newly-formed cells and to effect their absorption; in inflammations of serous membranes attended with sero-fibrinous exudation, as pleuritis, iritis, pericarditis, etc.; and in the early stage of chronic interstitial inflammations, as cirrhosis of the liver, sclerosis of the spinal cord, and interstitial nephritis.

Alteratives.—These are remedies which favorably modify nutrition, although the method of their action is still undetermined.

The most important remedies of this class are—

Arsenic,	Iodine,
Cod-liver oil,	Iodoform,
Colchicum,	Iodol,
Guaiac,	Corrosive sublimate (in minute
Ichthyol,	doses),
Iodide of potassium,	Sarsaparilla. *

Indications.—Alteratives are employed in diseases which differ very widely in their pathology, and are prescribed, for the most part, without reference to their physiological action—*i. e.* empirically. They are especially employed in

the treatment of phthisis, syphilis, gout, rheumatism, neuralgia, and asthma.

THE ACTION OF DRUGS ON THE BLOOD.

The Number of Red Blood-corpuscles.—The following drugs have a decided tendency to increase the number of red blood-corpuscles :

Iron,
Arsenic,
Bichloride of mercury (minute doses),
Manganese.

Indications.—These drugs are employed especially in anæmia.

The Alkalinity of the Blood.—The vegetable salts of potassium, sodium, and lithium have the power of *increasing* the alkalinity of the blood.

Indications.—Alkalies are employed in disease in which the alkalinity of the blood is apparently diminished, as lithæmia, rheumatism, gout, etc.

The following drugs *decrease* the alkalinity of the blood: boric acid, benzoic and the mineral acids.

Indications.—These acids are employed in cases showing an excess of phosphates in the urine.

Methæmoglobin.—Certain substances, like amyl nitrite and antipyrine, and chlorate of potassium in large doses, impart to the blood a chocolate color which is due to the conversion of oxyhæmoglobin into methæmoglobin, a compound which parts with oxygen much less readily than does oxyhæmoglobin.

Cyanohæmoglobin.—Hydrocyanic acid when added to the blood outside of the body unites with the hæmoglobin and forms cyanohæmoglobin. The administration of the drug, however, does not produce the same result within the body.

CO-hæmoglobin.—Carbonic oxide unites with the hæmoglobin and forms carbonic-oxide hæmoglobin, a compound which is not oxidized in the lungs, and which cannot impart oxygen to the tissues.

THE ACTION OF DRUGS ON THE RESPIRATORY CENTRE.

Respiratory Stimulants.—The following drugs stimulate the respiratory centre :

Ammonia,	Cocaine,
Strychnine,	Atropine.
Caffeine,	

Indications.—Respiratory stimulants are indicated in pulmonary affections associated with marked dyspnœa, such as croupous pneumonia, advanced phthisis, and emphysema, and in poisoning by drugs which depress the respiratory centre, as opium.

Respiratory Depressants.—The following drugs depress the respiratory centre :

Opium.	}	Cardiac depressants in large doses.
Aconite,		
Veratrum viride,		
Tartar emetic,		
Hydrocyanic acid.	}	Spinal depressants in large doses.
Chloral,		
Bromide of potassium,		
Physostigma,		
Gelsemium,		
Lobelia,	}	Anæsthetics in lethal doses.
Tobacco.		
Ether,		
Chloroform.		

There are no indications for using these drugs as respiratory depressants.

THE ACTION OF DRUGS ON THE VASO-MOTOR CENTRES.

A drug may raise the blood-pressure in at least three ways : first, by stimulating the heart ; secondly, by contracting the vessels through a direct action on their walls ; thirdly, by contracting the vessels through stimulation of the vaso-motor centres in the medulla.

If an increase of blood-pressure obtained by the administration of a drug ceases entirely after section of the cord

below the medulla, it is fair to presume that the increase was due to a stimulation of the vaso-motor centres.

If the drug causes a fall in the blood-pressure which cannot be attributed to a failure of cardiac power, and no rise of pressure follows from subsequent stimulation of a sensory nerve, it is fair to presume that the fall was due to a depression or paralysis of the vaso-motor centres.

The following drugs *stimulate* the vaso-motor centres :

Ergot,	Atropine,
Digitalis,	Ether,
Strychnine,	Alcohol.

Indications.—For the purpose of contracting the blood-vessels ergot is employed in internal hemorrhage, in active congestion of organs, especially the brain and spinal cord, and in diabetes insipidus, which probably results from a dilatation of the renal vessels. As a vaso-motor stimulant, atropine is often valuable in poisoning attended with collapse.

The following drugs *depress* or *paralyze* the vaso-motor centres :

Veratrum viride,	} In toxic doses.
Amyl nitrite,	
Nitroglycerin,	
Alcohol,	
Carbolic acid.	

Indications.—In the first stage of croupous pneumonia veratrum viride is employed to quiet the heart and to dilate the vessels throughout the body so that blood shall be attracted from the congested lung to other organs. In fatty degeneration of the heart and in sudden heart-failure the nitrites are often of value by dilating the vessels and thereby diminishing the resistance which the heart has to overcome. The nitrites are likewise efficient in angina pectoris when the cardiac pain is associated with great increase of the blood-pressure, in the high arterial tension of chronic nephritis, and in headaches due to cerebral anæmia.

THE ACTION OF DRUGS ON THE HEART.

The action of a drug on the heart may be ascertained by noting the effect on the force and rapidity of the con-

tractions which follow its direct application to the exposed organ, and by similar observations made after the administration of the drug to an animal whose heart and vessels have been separated from the nerve-centres by section of the spinal cord and vagi.

The following drugs *stimulate* the heart :

Ammonia,	Cactus grandiflorus,
Alcohol,	Sparteine,
Ether,	Caffeine,
Strychnine,	Barium chloride,
Digitalis,	Amyl nitrite (small doses),
Strophanthus,	Adonidin.

Indications—Cardiac stimulants are indicated in all forms of heart-failure, whether it results from some affection of the organ itself, from general disease, or from the action of a poison.

The following drugs *depress* the heart :

Tartar emetic,	Chloral,
Aconite,	Chloroform,
Veratrum viride,	Bromide of potassium,
Hydrocyanic acid,	Pilocarpine.

Indications.—Of the drugs which depress the heart, aconite and veratrum viride are the ones which are generally selected for this special object. Cardiac depressants are employed to quiet the heart in excessive hypertrophy, in the beginning of inflammatory diseases, and in sthenic fevers.

THE ACTION OF DRUGS ON THE INHIBITORY AND ACCELERATOR NERVES OF THE HEART.

Drugs may influence the rapidity of the heart's contractions by acting on the vagi, on the accelerating nerves, or on the ganglia within the heart.

If the injection of a drug is followed by slowing of the heart, and the slowing disappears after section of the vagi, it is fair to presume that the roots of the vagi have been stimulated. If, however, the slowing does not cease after division of the vagi, it is probable that the drug has acted

on the filaments of the vagi within the heart or on the heart itself.

If a drug increases the rapidity of the heart's action, and the increase is not checked by faradic stimulation of the cardiac ends of the cut vagi, it may be concluded that the drug has paralyzed the vagi, or inhibitory nerves.

If the quickening of the heart which naturally follows section of the vagi is made still more apparent by the injection of a drug, and, moreover, if the quickening ceases after section of the cord, it may be concluded that the drug has stimulated the accelerator nerves of the heart.

The following drugs *slow* the heart by *stimulating* the *vagi*:

Aconite,
Veratrum viride (veratroidine),
Digitalis,
Opium (in very large doses).

Indications.—In acute inflammations and infectious diseases *aconite* is sometimes employed to slow the pulse when it is rapid and *strong*; when it is *weak* and rapid *digitalis* should replace *aconite*. In the irritable heart, in exophthalmic goitre, and in tachycardia from various causes *digitalis* may be employed to slow the pulse.

The following drugs *quicken* the heart by *depressing* the *vagi*:

Atropine (peripheral filaments),
Amyl nitrite (centric filaments).

The following drugs *quicken* the heart by *stimulating* the *accelerator nerves*:

Ammonia,
Alcohol (?).

Indications.—Drugs are rarely required simply to quicken the pulse.

ACTION OF DRUGS ON THE BRAIN.

Cerebral Stimulants.—The following drugs stimulate the brain, and in toxic doses cause *cerebral* or *epileptiform convulsions*:

Cocaine,	Salicylic acid,
Quinine,	Tansy,
Camphor,	Santonin.

Cardiac sedatives produce epileptiform convulsions by interfering with the cerebral circulation.

The following drugs in large doses stimulate the *emotional* and *imaginative centres* in the brain:

Alcohol,	Cannabis indica,
Opium,	Cocaine.

In toxic doses they may paralyze the brain and produce coma.

The following drugs apparently stimulate the *reasoning power*:

Caffeine,	Strychnine.
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Cerebral Depressants.—Drugs which lessen the activity of the brain. They may act as somnifacients, producing normal sleep; as general anæsthetics, producing sleep and the abolition of sensation throughout the body; or as analgesics, producing insensibility to pain.

The following drugs are employed as *somnifacients* or *hypnotics*:

Opium,	Paraldehyde,
Chloral,	Sulphonal,
Hyoscine,	Chloralamide,
Bromides,	Somnal.

Indications.—Opium is chiefly employed in insomnia resulting from pain, hyoscine in that resulting from maniacal excitement or delirium, and chloral and the bromides in that due to nervous excitement, anxiety, etc.

The following drugs are employed as *general anæsthetics*:

Nitrous oxide gas,	Chloroform.
Ether,	

Ether and chloroform produce anæsthesia by their direct action on the cerebrum, and nitrous oxide by causing asphyxia.

The following drugs are employed as *analgesics* or *anodynes*:

Opium,	Antifebrin,
Antipyrine,	Chloral.
Phenacetine,	

Anæsthetics in small doses are also employed to lessen pain.

THE ACTION OF DRUGS ON THE SPINAL CORD.

Reflex Action.—A drug may abolish reflex activity by depressing the spinal cord, the peripheral nerves, or the muscles, or by stimulating the reflex inhibitory centres in the brain (Setschenow's centres).

Spinal Depressants.—The following drugs depress the spinal cord :

Physostigma,
Bromides (especially the sensory columns),
Chloral (especially the motor columns),
Nitrites (especially the motor columns),
Gelsemium,
Aconite (especially the sensory columns),
Antimony.

In addition, quinine lessens reflex activity, probably by stimulating the inhibitory centres in the brain.

Indications.—Of this group, physostigma, bromides, chloral, and the nitrites are usually selected as spinal depressants. They are employed in all conditions of spinal excitation, such as tetanus, strychnia-poisoning, etc.

Spinal Stimulants.—The following drugs stimulate the spinal cord :

Strychnine,	Ammonia,
Brucine,	Belladonna.
Caffeine,	

In toxic doses these drugs produce tetanic or spinal convulsion.

Indications.—Of the spinal stimulants, strychnia is the one most frequently employed, and even it is used not so much for its stimulant action on the cord as on the entire nervous system.

THE ACTION OF DRUGS ON THE PERIPHERAL NERVES.

Motor-nerve Depressants.—The following drugs depress or paralyze the motor nerves :

Chloral,	Belladonna,
Conium,	Bromides in large doses.

Sensory-nerve Depressants.—The following drugs depress or paralyze the sensory nerves :

Aconite,	Ether,
Belladonna,	Carbolic acid,
Bromides,	Methyl chloride,
Antipyrine,	Cocaine,
Antifebrin,	Menthol,
Chloroform,	Volatile oils.

Some of these remedies, like antipyrine, antifebrin, and the bromides, must be given internally when a sedative effect on the sensory nerves is required. They are so employed in neuralgia to allay pain, and in convulsions to lessen external irritation. Some must be applied directly to the part to lessen sensibility, and these are employed as *local anæsthetics*. They are—

Cocaine,	Aconite,
Ether spray,	Menthol,
Methyl chloride,	Volatile oils.

Drugs to Check Cough.—Drugs are often employed to check harassing cough, even though they may have no influence on the causal disease. The following drugs are useful for this purpose on account of their sedative effect on sensory nerves :

Opium,	Hyoscyamus,
Hydrocyanic acid,	Cannabis indica,
Chloroform,	Belladonna.

A vapor or spray of one of the following sedatives may be employed to allay cough :

Chloroform,	Creosote,
Carbolic acid,	Menthol.

Drugs to Check Vomiting.—Local anæsthetics are

frequently employed to check vomiting resulting from gastric irritation. The following are the most useful:

Carbolic acid,	Aconite,
Creosote,	Cocaine.
Hydrocyanic acid,	

Other drugs, which cannot be classified as local anæsthetics, are also used for their sedative effect, such as wine of ipecac in minute doses, calomel, bismuth subnitrate, and nitrate of silver.

THE ACTION OF DRUGS ON THE DIGESTIVE TRACT.

Sialagogues, or Sialics.—Drugs which increase the flow of saliva. Many drugs, like strong acids and alkalis, emetics, and anæsthetics, reflexly increase the flow of saliva, but they are never employed for this purpose. The most important sialagogues are pellitory and pilocarpine.

Indications.—They are sometimes employed to increase the saliva when the mouth is excessively dry, as in diabetes and chronic nephritis, and also to lessen congestion and inflammation in toothache, earache, and parotitis.

Anti-sialics.—Drugs which lessen the flow of saliva. Local astringents, like alum, tannic acid and drugs containing it, are often employed as anti-sialics. The most important drug which lessens the salivary secretion by acting on the glands through the circulation is atropine.

Indications.—Anti-sialics are used especially in mercurial ptyalism.

Stomachics.—Drugs which increase the flow of gastric juice:

Alkalis (diluted and taken before meals),	
Alcohol,	
Quassia,	} Bitters.
Gentian,	
Eupatorium,	
Calumba,	
Chirata,	
Cinchona,	
Chamomile,	
Nux vomica.	

Cardamom,	}	Aromatics.
Ginger,		
Pepper,		
Capsicum,		
Cinnamon.		

Indications.—These drugs are especially indicated in atonic dyspepsia associated with lessened gastric secretion. They are contraindicated in indigestion depending upon inflammation.

Digestants.—Drugs which assist digestion by direct chemical action :

Pepsin,	Papain,
Hydrochloric acid,	Diastase.
Pancreatin,	

Emetics.—Drugs which produce vomiting. A drug may cause emesis in one of two ways : by direct action on the stomach (peripheral or mechanical emetics), or by stimulating the vomiting centre in the brain (centric emetics).

The following drugs act as *peripheral emetics* :

Mustard,	Alum,
Sulphate of zinc,	Sulphate of copper.
Turpeth mineral,	

The *centric emetics* are—

Apomorphine,
Ipecac (centric and peripheral),
Tartar emetic (centric and peripheral).

Indications.—Emetics are used for the following purposes :

1. To unload the stomach.
2. To dislodge foreign bodies from the respiratory tract. They are employed for this purpose to expel loose membrane in laryngeal diphtheria and excessive mucus in capillary bronchitis.
3. To check spasm. For this purpose they are sometimes used in asthma, spasmodic croup, and epileptic seizures.
4. To expel bile from the gall-bladder.

They are *contraindicated* in advanced pregnancy, hernia, congestion of the brain, aneurism, and advanced atheroma.

Antacids.—Drugs which lessen gastric acidity :

Liquor potassæ,	Ammonia,
Sodium carbonate,	Magnesia,
Potassium carbonate,	Lime-water,
Potassium bicarbonate,	Chalk.

Indications.—These drugs are given after meals to counteract hyperacidity due either to an excessive secretion of hydrochloric acid or to fermentation and the production of fatty acids.

Carminatives.—Drugs which aid in the expulsion of flatus from the stomach and intestines. They act chiefly by stimulating peristalsis, and the most important remedies of this group are—

Capsicum,	Asafœtida,
Pepper,	Cajuput (oil),
Peppermint (oil),	Chloroform,
Ginger,	Nutmeg (oil),
Cloves (oil),	Cardamom.
Hoffmann's anodyne,	

Indications.—They are used to relieve pain caused by flatulent distension of the stomach and intestines, and as adjuvants to cathartics to assist purgation and to allay griping.

Gastro-intestinal Antiseptics.—Drugs which arrest fermentation in the alimentary canal. The following drugs represent this class :

Carbolic acid,	Beta-naphthol,
Creosote,	Thymol,
Salol,	Corrosive sublimate,
Salicylic acid,	Sulphurous acid,
Benzonaphthol,	Hypochlorite of sodium.

Indications.—These remedies may be employed in dyspepsia, gastric cancer, diarrhœa, dysentery, typhoid fever, and cholera.

Cathartics.—Drugs which produce intestinal evacuations. A drug may produce catharsis in one of two ways: by stimulating peristalsis, or by increasing secretion.

Substances which produce only a slight action are termed **laxatives**.

The following drugs represent this class :

Manna,	Sulphur,
Tamarinds,	Calomel (small doses),
Magnesia,	Cascara sagrada,
Castor oil (small doses),	Citrate of magnesium.

Indications.—They are employed simply to unload the bowel.

Substances which produce a free discharge from the bowels, but which are not poisonous even in large doses, are termed **purges**.

The following are the most important members of this group :

- Castor oil (large doses),
- Calomel (large doses),
- Rhubarb,
- Aloes,
- Senna,
- Epsom salt (magnesium sulphate),
- Rochelle salt (tartrate of sodium and potassium).

The above classifications are simply adopted for convenience. It should be borne in mind that laxatives in large doses become purges, and that purges in small doses become laxatives.

Substances which produce violent action of the bowels, and in large doses serious gastro-intestinal irritation, are termed **drastics**.

They are—

Elaterium,	Jalap,
Colocynth,	Scammony,
Gamboge,	Podophyllum.
Croton oil,	

Indications.—These remedies are employed in full doses chiefly to act as revulsives. They are prescribed in uræmia, apoplexy, and acute cerebral congestion.

Substances which produce a profuse watery secretion from the intestines are termed **hydragogues**.

The most important are—

Magnesium sulphate (especially in concentrated solution),
 Elaterium,
 Jalap,
 Bitartrate of potassium.

Indications.—Hydragogues are employed especially when liquid is to be removed from the body, as in general dropsy and serous effusions. Magnesium sulphate, being unirritating, is often employed to increase intestinal secretion and so relieve the turgid blood-vessels in acute enteritis and peritonitis.

Cholagogues are substances which increase the flow of bile.

The most important are—

Mercury (calomel or blue mass),
 Podophyllin,
 Euonymin,
 Ipecac,
 Sodium salicylate,
 Nitrohydrochloric acid,
 Sodium phosphate.

Indications.—Members of this group are of great value in hepatic congestion (biliousness), and in constipation or diarrhœa associated with offensive clay-colored stools.

Anthelmintics.—Drugs which have the power of killing or expelling worms from the intestine. The most common intestinal worms are tape-worms, round-worms, and thread-worms.

The following remedies are employed against tape-worms :

Filix mas,	Pelletierine,
Pepo, or pumpkin-seed,	Koussou,
Pomegranate,	Thymol.

The following remedies are employed against round-worms :

Santonin,
 Spigelia,
 Chenopodium.

The following remedies are employed by injection against thread-worms :

Quassia,
Tannic acid,
Vinegar.

ACTION OF DRUGS ON THE GENITO-URINARY ORGANS.

Diuretics.—Drugs which increase the flow of urine. The quantity of urine may be increased in at least three ways: 1st. By increasing the blood-pressure in the kidney (digitalis so acts); 2d. By direct action on the kidney (buchu, uva ursi, cubeb, so act); 3d. By affecting the constituents of the blood (calomel possibly acts as a diuretic by increasing the urea in the blood).

The following drugs act as *hydragogue diuretics*, increasing especially the watery elements of the urine :

Water,	Nitrous ether,
Vegetable salts of potassium,	Lithium,
Digitalis,	Scoparius.
Caffeine,	

Indications.—These drugs are especially employed in acute congestion and acute inflammation of the kidneys and in dropsies. The salts of potassium and lithium are sometimes classified as refrigerant diuretics because they are employed to render the urine bland and unirritating in acute inflammations of the genito-urinary tract.

The following drugs act as *stimulating diuretics*. They increase the solid and watery elements of the urine and stimulate the mucous membrane of the genito-urinary tract :

Juniper,	Buchu,
Copaiba,	Turpentine,
Uva ursi,	Oil of sandal-wood,
Cubeb,	Cantharides.

Indications.—These drugs for the most part are used in subacute and chronic inflammations of the genito-urinary tract, such as pyelitis, cystitis, and urethritis.

Aphrodisiacs.—Drugs which increase the sexual appetite. Nux vomica, phosphorus, damiana, and cannabis

indica have been regarded as stimulants to the sexual appetite.

Anaphrodisiacs.—Drugs which lessen the sexual appetite. The most important remedies belonging to this group are—

Hyoscine,	Monobromate of camphor,
Camphor,	Bromides.

Emmenagogues.—Drugs which promote the menstrual flow. A suppressed menstrual flux may be re-established by remedies which increase the constitutional vigor when the latter is reduced, or by remedies which directly stimulate the uterus. The first are tonic and the latter stimulating emmenagogues.

The principal *tonic emmenagogues* are—

Iron,	Myrrh,
Manganese,	Arsenic.

The chief *stimulating emmenagogues* are—

Savine,	Apiol,
Tansy,	Cantharides,
Aloes,	Guaiac,
Rue,	Pennyroyal.

Indications.—Stimulating emmenagogues are employed in atonic amenorrhœa and in menorrhagia from uterine relaxation.

Ecbolics or Oxytocics.—Drugs which increase the contractions of the uterus and assist in the expulsion of its contents. The following drugs act directly on the uterus, and produce more or less tonic contractions:

Ergot,	Cotton-root.
Ustilago,	

Indications.—These remedies are employed in post-partum hemorrhage, in menorrhagia, and in uterine fibroids to contract the uterus and its blood-vessels. On account of the tetanic character of the contractions which they induce, they should not be employed during labor.

In addition to the above drugs, *quinine* acts as an indirect oxytocic by its stimulating constitutional effect. The contractions which follow its use are intermittent and resemble

normal ones. It may be used to overcome uterine inertia during labor.

THE ACTION OF DRUGS ON THE SKIN.

Diaphoretics.—Drugs which increase the secretion of sweat. The remedy which is generally employed to produce a copious flow of sweat is jaborandi or its alkaloid pilocarpine. The same effect may be produced by the external application of heat. The following substances cause gentle perspiration :

Dover's powder (ipecac and opium),	} When the patient is kept warm.
Nitrous ether,	
Spirit of Mindererus,	
Alcohol.	

Indications.—It is desirable to produce copious diaphoresis in general dropsy, uræmia, and acute rheumatism. Mild diaphoretics are employed to abort acute congestion and threatened inflammation, and in muscular rheumatism.

Antihidrotics.—Drugs which lessen the secretion of sweat. The following are the most important :

Atropine,	Ergot,
Picrotoxine,	Agaric acid,
Sulphuric acid,	Camphoric acid.
Gallic acid,	

Indications.—These remedies are employed as anti-hidrotics against the colliquative sweats of phthisis.

Rubefacients.—Drugs which produce redness and congestion of the skin. The most important are—

Turpentine,
Mustard,
Iodine,
Chloroform,
Spices (cloves, ginger, cinnamon, etc.),
Ammonia,
Arnica,
Camphor,
Pitch.

Indications.—Rubefacients are employed to stimulate the nervous system in collapse and shock, and as mild counter-irritants in congestions, superficial inflammations, and painful functional affections like neuralgia and intestinal colic.

Vesicants or **Epispastics** are drugs which produce structural changes in the skin and give rise to vesicles. The most important are—

Cantharides,

Croton oil,

Ammonia fortior,

Certain rubefacients in concentrated form, like mustard and iodine.

Indications.—Epispastics are employed especially to absorb serous and fibrinous exudates, and as severe counter-irritants in inflammations of serous membranes and in deep-seated visceral inflammations like pneumonia. They are *contraindicated* in the very old, young, and debilitated, and should not be employed as counter-irritants over inflamed kidneys.

DRUGS.

ACETANILIDUM.

(Acetanilid, Antifebrin, $C_6H_5NH.CH_3CO.$)

It is a crystalline substance made by the action of glacial acetic acid on aniline. It is only sparingly soluble in water, but freely so in alcohol and ether. The dose is 5 to 10 grains.

Physiological Action.—*Circulatory System.*—Therapeutic doses do not affect the circulation; toxic doses paralyze the heart.

Respiratory System.—Respiration is unaffected by ordinary doses, but large doses kill by paralyzing the respiratory centre.

Nervous System.—Clinical experience indicates that it is a sedative to the sensory nervous system.

Temperature.—In the febrile state it lowers the temperature, probably by lessening heat-production. The fall of temperature is usually associated with free sweating.

Blood.—In toxic doses it lessens the oxygen of the blood, and turns the latter brown by the formation of methæmoglobin.

Elimination.—It is chiefly eliminated by the kidneys in the form of sulphate of paramidophenol.

Toxicology.—Like antipyrine, its use is sometimes followed by symptoms of collapse.

Therapeutics.—It is employed in the same class of cases as antipyrine, acting as an antipyretic, analgesic, and antispasmodic.

Administration.—It may be prescribed in powders, pills, capsules, or alcoholic solution.

ACIDUM ACETICUM.

(Acetic Acid, $\text{HC}_2\text{H}_3\text{O}_2$.)

The official acetic acid is a colorless liquid, of a pungent, vinegar-like odor, acid taste, and acid reaction. It is composed of 36 per cent. of absolute acetic acid and 64 per cent. of water.

PREPARATIONS.

Acidum Aceticum Dilutum (dilute acetic acid), U. S. P. Dose, 1-4 fl. dr.
 Acidum Aceticum Glaciale (glacial acetic acid), U. S. P., nearly absolute acetic acid.
 Acetum, or vinegar.

Therapeutics.—Dilute acetic acid is used internally as a mild refrigerant and as an antiscorbutic. As a local remedy it has been employed to check *hemorrhages*, particularly in *epistaxis* and *menorrhagia*, as an injection against *seat-worms*, as a soothing lotion in *sunburn*, and as an antidote in *poisoning by alkalies* like ammonia. The strong acid is employed exclusively as an escharotic in such affections as *condylomata*, *corns*, and *nasal hypertrophies*.

ACIDUM BENZOICUM.

(Benzoic Acid, $\text{HC}_7\text{H}_5\text{O}_2$.)

It occurs in the form of light, feathery crystals, of an agreeable odor and acid taste. It is soluble in 500 parts of water and 2 parts of alcohol. Dose, 10 to 30 grains.

Physiological Action.—Locally, it acts as an irritant; when taken internally in large amount it produces symptoms of gastric inflammation. It renders the urine acid, being eliminated by the kidneys as hippuric acid. It is distinctly destructive to low organisms.

Therapeutics.—Internally, benzoic acid is a useful remedy in *phosphaturia* and *chronic cystitis* associated with ammoniacal urine. It has also been employed internally in *chronic bronchitis* and *phthisis*. In *obstinate cough* an inhalant made by adding a drachm or two of benzoic acid to a pint of boiling water is often efficacious. Senator has employed it successfully as a substitute for salicylic acid in *acute rheumatism*.

ACIDUM BORICUM.(Boric or Boracic Acid, H_3BO_3 .)

Boric acid appears as transparent, colorless, six-sided plates, soluble in 25 parts of water and in 15 of alcohol. Dose, 10 to 30 grains.

PREPARATION.

Glyceritum Boroglycerini, U. S. P. (Glycerite of Boroglycerin).

Therapeutics.—It is employed locally as an antiseptic and sedative. In *diphtheria*, the various forms of *stomatitis*, and *simple conjunctivitis* a solution of boric acid constitutes a most useful application. In various *skin diseases*, particularly where there is burning or itching, a solution of boric acid is a valuable sedative; thus it is extensively used in *acute eczema*, *erysipelas*, *intertrigo*, *prickly heat*, *pruritus*, etc. A dusting-powder containing boric acid and starch is often very efficient in *excessive sweating of the feet* (hyperidrosis). Tampons of cotton impregnated with the acid are very useful in *offensive leucorrhœa*. In *cystitis* with ammoniacal urine solutions of moderate strength (10 grs. to 1 oz.) may be slowly introduced into the bladder. Internally, it is used to render the urine acid in *chronic cystitis* and *phosphaturia*.

Boroglycerin is made by heating 46 parts of glycerin with 31 parts of boric acid. On cooling, a solid substance is formed, a 50 per cent. solution of which in glycerin constitutes the glycerite of boroglycerin. It is used as an antiseptic in the treatment of *wounds* and *ulcers*, and as an application in *granular ophthalmia*.

ACIDUM CAMPHORICUM.

(Camphoric Acid.)

It is obtained by the action of nitric acid on camphor, and occurs in colorless crystals having a bitter taste and an acid reaction; very sparingly soluble in water, but readily so in alcohol and ether. The dose is 15 grains to 1 drachm.

Therapeutics.—It has been employed locally in *inflammatory affections of the naso-pharynx*, but at present it is

chiefly prescribed against *excessive sweating*. In the *night-sweats of phthisis* it is a very efficient remedy in doses of 20 or 30 grains two or three hours before the secretion begins. It is best prescribed in an alcoholic medium.

ACIDUM CARBOLICUM.

(Carbolic Acid, Phenol, or Phenic Acid, C_6H_5HO .)

It is obtained from the distillation of coal-tar, and occurs in the form of colorless, needle-shaped crystals, of a peculiar odor and sweetish taste. On exposure it is soon converted into a colorless or slightly reddish liquid. It is freely soluble in water, alcohol, and glycerin. Dose, 1 to 5 drops.

PREPARATION.

Glyceritum Acidi Carbolic, U. S. P. (20 per cent. of acid).

Unguentum Acidi Carbolic, U. S. P. (10 per cent. of acid).

Physiological Action.—*Circulatory System.*—Large doses depress the heart and vaso-motor centre; small doses exert no influence on the circulation.

Nervous System.—In toxic doses it first stimulates the spinal cord, increasing the reflexes and inducing spinal convulsions; later it paralyzes the spinal centres. Similar doses act as cerebral depressants.

Respiratory System.—Large amounts first quicken the respiration by stimulating the respiratory centres and peripheral vagi, but subsequently the centres are paralyzed and the respirations become slow and irregular.

Alimentary Canal.—In small doses it acts as a sedative and antiferment; in large amounts it is a corrosive poison.

Temperature.—It has a slight antipyretic action.

Local Action.—When applied to the skin it blanches it and causes a burning sensation; soon, however, the part turns brown and becomes anæsthetic. The prolonged application in concentrated form is followed by the formation of an eschar, which is rarely deep on account of the albuminous coagulum which the acid produces.

Effect on Bacteria.—A 5 per cent. aqueous solution requires five days to destroy the spores of anthrax. A solution of 1 : 500 will prevent the growth of most bacilli; upon

tubercle bacilli a 1 : 100 carbolic solution is more destructive than a 1 : 1000 corrosive-sublimate solution.

Elimination.—When taken in large amounts it imparts to the urine a smoky or brownish color, which is due to a product derived from the oxidation of a small part of the acid. It is chiefly eliminated as a sulphocarbolate and as glyco-uronic acid.

Toxicology.—In lethal doses it causes coma, feeble respiration, collapse, and convulsions. The most characteristic features, however, are the white eschars on the fauces and the odor of carbolic acid which surrounds the patient. When a less amount has been ingested, vomiting, purging, and the excretion of scanty smoky urine are prominent symptoms. When carbolic acid is being used freely in surgical dressings, the urine should be frequently inspected. The treatment of carbolic-acid poisoning consists in the administration of the antidote, which is a soluble sulphate, as sulphate of magnesium; this unites with the acid, forming an insoluble sulphocarbolate. Evacuation of the stomach, the application of external heat, and the administration of mucilaginous drinks and stimulants are also indicated.

Therapeutics.—It is used as a caustic, antiseptic, and local anæsthetic. As a caustic it is sometimes employed against *condylomata* and *chancroids*. Some difference of opinion exists as to the proper place which carbolic acid holds as an antiseptic in general surgery. A comparative study of its effect on resisting spores may prove misleading, since such spores are not the ones to be dreaded in surgical work. Lister still claims that it is a most valuable substance for antiseptic dressings, and for purifying sponges he considers it much superior to corrosive sublimate. Being non-corrosive, it should always be employed for disinfecting instruments. As an internal antiseptic it is useful in *acute diarrhœa* and *flatulent dyspepsia*. In these cases two or three drops may be added to a powder of bismuth. It may be employed in weak solution as a deodorant inhalant in *bronchiectasis*, *pulmonary gangrene*, and *phthisis*. In *diphtheria* and the various forms of *infectious stomatitis* carbolic acid and glycerin makes a valuable application.

Carbuncles and *boils* may be frequently aborted when treated early by several injections of carbolic acid (3–5 minims of a 2 per cent. solution).

As a local anæsthetic it may be employed to allay itching in *eczema*, *pruritus*, and *piles*, and to check *obstinate vomiting* resulting from *gastric irritability*. Carbolized vaselin (5 drops to 1 oz.) makes a soothing application for *burns*. Baccelli and numerous followers claim excellent results in *tetanus* from the hypodermic injection of .01 gramme of carbolic acid every two hours.

ACIDUM CHROMICUM.

(Chromic Acid, CrO_3 .)

Chromic acid appears in the form of small crimson, needle-shaped crystals which are very soluble in water, and which are decomposed in the presence of alcohol.

Physiological Action.—Chromic acid exerts a powerful caustic effect upon all animal tissues. It has a destructive action upon micro-organisms, and from the readiness with which it parts with its oxygen it rapidly decomposes organic matter, and so serves as a disinfectant. It is not employed internally.

Therapeutics.—Chromic acid is used locally as a disinfectant, stimulant, and escharotic. In the strength of two drachms to the fluidounce of water, it is a useful escharotic for destroying *corns*, *warts*, *syphilitic vegetations*, and the like. In *epitheliomatous* and *lupoid growths* and *ringworm* a solution containing a drachm to the fluidounce is sufficiently strong. In affections of the nasopharynx associated with an *overgrowth of tissue* chromic acid is often used as an escharotic.

Lesclure strongly recommends a 20 per cent. aqueous solution as a local application in *diphtheria*.

Incompatibles.—Substances easily oxidized, such as alcohol, glycerin, and spirit of nitrous ether.

ACIDUM CITRICUM.

(Citric Acid, $\text{H}_3\text{C}_6\text{H}_5\text{O}_7 \cdot \text{H}_2\text{O}$.)

Citric acid appears in the form of colorless, deliquescent,

right-rhombic prisms, freely soluble in water, and of an agreeable acid taste. Dose, 10 to 20 grains.

PREPARATIONS.

Succus Limonis (lemon-juice).

Syrupus Acidi Citrici, U. S. P. (syrup of citric acid).

Therapeutics.—Citric acid or lemon-juice is the most efficient remedy against *scurvy*. Various writers have spoken highly of the free use of lemon-juice in *acute rheumatism*. It has been employed in *catarrhal jaundice* and *hepatic congestion*, but it is inferior to other remedies.

ACIDUM GALLICUM.

(Gallic Acid, $\text{HC}_7\text{H}_5\text{O}_5 \cdot \text{H}_2\text{O}$.)

Gallic acid is obtained from the tannic acid contained in galls, and appears in the form of white needles or prisms having an astringent acid taste. It is soluble in 100 parts of water and 4.5 parts of alcohol. Unlike tannic acid, it does not coagulate gelatin or albumin. The dose is 10 to 30 grains.

PREPARATION.

Unguentum Acidi Gallici.

Therapeutics.—As an astringent it acts like tannic acid, but is much less powerful. It is employed in the same class of cases as tannic acid, and as a hæmostatic it should be selected in preference to the latter when it is intended to act not directly, but through the circulation.

Administration.—It may be administered in pills, powders, or capsules. When prompt action is desired it should be given in powder. The ointment is often combined with sedatives like stramonium or hyoscyamus in the treatment of hemorrhoids; thus:

℞ Unguenti acidi gallici,
Unguenti stramonii, āā ʒss.

Sig. Bathe the parts and apply twice daily.

ACIDUM HYDROBROMICUM DILUTUM.

(Diluted Hydrobromic Acid, HBr.)

An odorless, colorless liquid, of acid properties, composed of 10 per cent. of absolute hydrobromic acid. Dose, 1 to 4 fluidrachms.

Physiological Action.—Its action, though less marked, is the same as that of the bromide of potassium and other bromides.

Therapeutics.—In the convulsions of epilepsy and tetanus it is less reliable than the bromide salts. It is especially valuable in *tinnitus aurium* resulting from aural disease or following the administration of quinine. It may also be employed as a sedative in *febrile excitement*, *whooping-cough*, and *nervous headache*.

ACIDUM HYDROCHLORICUM.

(Hydrochloric or Muriatic Acid, HCl.)

The official acid appears as a colorless fuming liquid having a pungent odor and acid taste.

PREPARATION.

DOSE.

Acidum Hydrochloricum Dilutum, U. S. P. 10-30 drops.

Toxicology.—Like other mineral acids, it acts as a corrosive poison, producing intense pain, vomiting, purging, and collapse. Treatment consists in the administration of chalk, soap, soda, or other alkalies and mucilaginous drinks.

Therapeutics.—It is employed internally in the treatment of *dyspepsia* associated with subacidity. In the *continued fevers* it is often very useful, acting as a refrigerant and digestant, the gastric juice in these cases being always deficient. In *intestinal dyspepsia* the acid is very useful in conjunction with strychnia. The strong acid acts as an escharotic, but for this purpose one of the other mineral acids will usually be found more serviceable. In *caries* and *necrosis* the dilute acid is sometimes used to facilitate the removal of dead bone.

Administration.—In *dyspepsia* the acid should be given after meals, well diluted, care being taken to thoroughly rinse the mouth after its exhibition.

It may be prescribed as in the following formula :

℞ Strychninæ sulph.,	gr. xxxij ;
Acid. hydrochlor. dil.,	fʒij ;
Tinct. cardamom. comp.,	fʒss ;
Aquæ,	q. s. ad fʒiv.—M.

Sig. A teaspoonful in water after meals.

ACIDUM HYDROCYANICUM DILUTUM.

(Diluted Hydrocyanic or Prussic Acid, HCN.)

Officially this is a 2 per cent. aqueous solution of pure hydrocyanic acid. It appears as a colorless liquid, of feeble acid reaction, having an odor and taste of bitter almonds. The dose is 1-5 drops.

Physiological Action.—It slows the pulse by stimulating the inhibitory nerves or by direct action on the cardiac ganglia. It first causes a rise of blood-pressure by stimulating the vaso-motor centre, and then a fall from paralysis.

Nervous System.—In sufficient amount it paralyzes all parts of the nervous system.

Respiratory System.—It paralyzes respiratory movements by direct action on the respiratory centre.

Elimination.—Being highly volatile, it is absorbed and eliminated with extreme rapidity.

Toxicology.—Hydrocyanic acid is one of the most quickly acting poisons, death resulting immediately or after the lapse of a few minutes. The characteristic phenomena are slow respirations, cyanosis, coma, protruding eyeballs, dilated pupils, frothing at the mouth, convulsive movements of the muscles, involuntary discharge of urine and feces, and the odor of bitter almonds about the patient.

Therapeutics.—Hydrocyanic acid is used solely to allay irritation of the peripheral nerves. Thus it is employed internally for the cough of *phthisis* and *chronic bronchitis*, for *gastralgia* and *obstinate vomiting*, and externally to subdue the itching in *pruritus*, *eczema*, and *urticaria*.

Administration.—For the cough of *phthisis* and *chronic bronchitis* it is best administered in combination with *morphia* or *codeia*, as in the following formula :

R Codein. sulphat., gr. iij;
 Acid. hydrocyanic. dil., ℥_{xx};
 Syr. tolu., fʒj.—M.
 Sig. A teaspoonful three or four times daily.

ACIDUM LACTICUM.

(Lactic Acid, $\text{HC}_3\text{H}_5\text{O}_3$.)

Lactic acid is obtained from sour milk. The official preparation contains 75 per cent. of absolute lactic acid, and appears as a colorless syrupy liquid having an acid taste and reaction. Dose, 20 to 30 minims.

Therapeutics.—It is employed as a mild caustic, a digestant, and an intestinal antiseptic. It has been used successfully as a slowly-acting caustic in *epithelioma* and *lupus*. It is a very valuable local remedy in *laryngeal tuberculosis* (10 to 80 per cent.), weak solutions being applied first. As an intestinal antiseptic it has been highly recommended in *cholera*, *typhoid fever*, and *simple diarrhœa*. In *infantile diarrhœa* associated with spinach-colored stools it is almost a specific, and may be prescribed as in the following formula :

R Acidi lactic., ℥_{xx};
 Succo limonis, q. s. ;
 Syrupi simplicis, q. s. ad fʒij.—M.
 Sig. ʒj every three hours. (Hayem.)

ACIDUM NITRICUM.

(Nitric Acid, HNO_3 .)

The official acid appears as a colorless fuming liquid, highly destructive to animal tissues.

PREPARATION.

DOSE.

Acidum Nitricum Dilutum, U. S. P. 10-20 min.

Toxicology.—In poisonous doses it produces symptoms of intense gastro-intestinal irritation, the characteristic feature being the deep-yellow staining of the tissues. The treatment consists in the administration of antacids—soap, chalk, lime, etc.—with mucilaginous drinks.

Therapeutics.—Being more astringent than hydrochloric acid, nitric acid may be used instead of the former

in *intestinal dyspepsia* associated with loose stools. In *lithæmia* it is often very efficient. Externally, the strong acid is employed as an escharotic in *venereal warts*, *phagedenic ulcers*, *hospital gangrene*, and the like. As a local application producing inflammatory contractile tissue it is very valuable in the *prolapse of the rectum* observed in children. In these cases, after the parts have been cleansed, the fuming acid is applied to the mucous membrane of the bowel, which is subsequently oiled, returned, and held in position by a pad.

ACIDUM NITROHYDROCHLORICUM.

(Nitrohydrochloric or Nitromuriatic Acid.)

Nitrohydrochloric acid appears as a golden-yellow fuming liquid having the odor of chlorine and strongly acid properties. On standing, it loses its deep-yellow color and the odor of chlorine. It represents 18 parts of nitric acid and 82 parts of hydrochloric acid. Dose, 5 to 10 drops, well diluted.

PREPARATION.

Acidum Nitrohydrochloricum Dilutum, U. S. P. . . . 10-20 min.

DOSE.

Toxicology.—Like other mineral acids, it produces in toxic doses violent gastro-intestinal symptoms. Its antidotes are chalk, lime, soap, etc.

Physiological Action.—In concentrated form it is a powerful escharotic. In therapeutic doses it seems to stimulate the glandular secretions of the alimentary tract, particularly that of the liver.

Therapeutics.—In *indigestion*, especially when intestinal and associated with hepatic congestion, nitrohydrochloric acid is an exceedingly useful remedy. In chronic affections of the liver, as *cirrhosis* and *chronic hepatitis*, its external application in the form of stupes has also been highly recommended. In certain forms of *oxaluria* associated with malassimilation and great mental depression nitrohydrochloric acid is almost a specific.

Administration.—As a rule, the strong acid should be employed, and this should be freshly prepared and kept in a dark bottle, since the old and pale-colored acid is useless.

It should be administered, well diluted, through a tube after meals.

ACIDUM OXALICUM.

(Oxalic Acid.)

Oxalic acid is rarely used in medicine; it is, however, not infrequently swallowed accidentally, when it acts as an intense corrosive poison, producing severe pain in the throat and abdomen, obstinate vomiting and purging, and speedy collapse. In the treatment of oxalic-acid poisoning it should be remembered that potassium and sodium salts are not antidotal, as the oxalates of these metals are also poisonous. The oxalate of calcium being insoluble, chalk or lime should be administered freely.

ACIDUM PHOSPHORICUM.

(Phosphoric Acid, H_3PO_4 .)

It appears as a colorless, odorless liquid, of acid properties.

PREPARATION.

DOSE.

Acidum Phosphoricum Dilutum, U. S. P. 10 min.—1 fl. dr.

Therapeutics.—Its action is similar to that of hydrochloric acid, and bears no resemblance to that of phosphorus. It may be employed to allay the *thirst of febrile diseases* and *diabetes*, and as a substitute for hydrochloric acid in *dyspepsia*.

ACIDUM PYROGALLICUM.

(Pyrogallic Acid, or Pyrogallol.)

This acid is obtained by the action of heat on gallic or tannic acid, and appears in the form of white shining crystals which have an exceedingly bitter taste. It is soluble in $2\frac{1}{4}$ parts of water.

Therapeutics.—It is employed externally as an escharotic and parasiticide. In the form of an ointment or paste (15 to 25 per cent.) it is a useful caustic in *lupus*, *epithelioma*, and *chancroid*.

ACIDUM SALICYLICUM.

(Salicylic Acid, $\text{HC}_7\text{H}_5\text{O}_3$.)

It is a derivative of carbolic acid, and appears in the form of fine, white, acicular crystals having a sweetish, acrid taste. It is soluble in 450 parts of water and 2.5 parts of alcohol. Dose, 10 to 20 grains.

Physiological Action.—*Circulatory System.*—In large doses it depresses the heart.

Respiratory System.—Small doses stimulate the respiratory centres, while large doses prove fatal by paralyzing the centres.

Nervous System.—In moderate amounts it causes cerebral congestion, indicated by headache, confusion of thought, and ringing in the ears. Toxic doses sometimes produce cerebral convulsions.

Alimentary Canal.—In concentrated form it acts as an irritant. In small amount it serves as an antiferment. The intestinal secretions convert it into salicylate of sodium, in which form it enters the circulation.

Temperature.—The temperature in health is very slightly affected by salicylic acid, but in the febrile state it exerts a distinct antipyretic action, which, according to Hare, results from diminished heat-production and increased heat-dissipation.

Effect on Bacteria.—It is an efficient antiseptic.

Elimination.—It is excreted by all the emunctories. In the urine it appears as salicylic acid, salicylate of sodium, indican, and pyrocatechin, the last substance imparting to the urine an olive-green color.

Toxicology.—Poisonous doses produce headache, tinnitus aurium, deafness, paralysis of the ocular muscles, a fall of temperature, free sweating, embarrassed respiration, weak pulse, convulsions, and olive-green urine.

Therapeutics.—Externally, salicylic acid is employed as an antiseptic in the *dressing of wounds*. In a lotion or ointment (30 grains to the oz.) it is a useful application in *erysipelas*. Mixed with starch or zinc oxide, it is extensively used in *excessive sweating of the feet*. Dissolved in collodion, it makes an exceedingly valuable application in *corns* and *callositas*. An ointment of salicylic acid is very

efficient in *subacute* and *chronic eczema* when the latter is associated with much purulent discharge or incrustation. In *stomatitis*, *diphtheria*, and other forms of *infectious pharyngitis* a weak solution (5 grains to 1 fl. oz.) exerts a soothing influence and destroys the fetor.

Internally, salicylic acid is widely employed in *acute rheumatism*, in which disease it is without a rival, although it does not lessen the liability to complications. In gastrointestinal disorders, such as *chronic gastric catarrh*, *diarrhœa*, *entero-colitis*, and *cholera*, it is an efficient antiseptic in doses of 2 to 5 grains.

In *neuritis* and *neuralgia* of rheumatic origin it is useful in relieving pain. When given early, it will often abort *tonsillitis*, especially when the latter is dependent upon the rheumatic diathesis. It is one of the most effectual remedies in *pleurisy* with serous effusion, although the method of its action is unknown. It is often very useful in *diabetes* of gouty origin, and occasionally serviceable in other forms of the disease.

Administration.—To prevent its irritant effect and to disguise its disagreeable taste, it should be given well diluted in some aromatic water, as in the following formula:

℞ Acidi salicylici,	ʒj;
Glycerini,	ʒss;
Aquæ menthæ pip.,	q. s. ad ℥iv.

A tablespoonful in a wineglass of water every two hours.

ACIDUM SULPHURICUM.

(Sulphuric Acid, or Oil of Vitriol, H_2SO_4 .)

The official acid is a colorless, heavy, oily liquid, without odor, but with a strongly acid taste. It has a marked affinity for water, with which it mixes with the evolution of heat. It blackens and destroys most organic substances.

PREPARATIONS.

DOSE.

Acidum Sulphuricum Aromaticum, U. S. P.	5-10 min.
Acidum Sulphuricum Dilutum, U. S. P.	5-10 min.

Toxicology.—Like other mineral acids, when swallowed in concentrated solution it acts as a corrosive poison, producing pain, vomiting, purging, and collapse. The charac-

teristic feature is the black slough on the fauces. The treatment consists in the administration of chalk, soap, or whitewash, with oily or mucilaginous drinks.

Therapeutics.—Internally, sulphuric acid is used as a tonic, astringent, hæmostatic, intestinal antiseptic, and antidote in lead-poisoning. In *serous diarrhœa*, in combination with opium, it is often most useful. In *Asiatic cholera* it has proven of distinct value, and as a prophylactic remedy against the disease it has been highly recommended by several observers. In *acute lead-poisoning* the dilute acid may be used as an antidote, but magnesium sulphate is more efficient, being purgative as well as antidotal. In *night-sweats* it is often useful, being free from the disadvantages of atropine. Locally, the strong acid is employed as an escharotic in *chancre* and *chancroid*.

Administration.—Sulphuric acid should be given well diluted, precautions being taken to prevent its action on the teeth. In serous diarrhœa it may be prescribed as in the following formula :

℞ Ext. hæmatoxyli,	ʒij;
Acid. sulphuric. aromat.,	ʒiij;
Tinct. opii camph.,	ʒiiss;
Syr. zingiberis,	q. s. ad ʒvj.—M.
Sig. A teaspoonful properly diluted.	(Wood.)

In night-sweats a formula like the following is useful :

℞ Acid. sulphuric. aromat.,	ʒj;
Ext. pruni. virgin. fl.,	ʒj;
Glycerini,	ʒss;
Aquæ,	q. s. ad ʒiv.
Sig. A teaspoonful, diluted, as required.	

ACIDUM SULPHUROSUM.

(Sulphurous Acid, SO₂.)

An aqueous solution of sulphurous acid gas, appearing as a colorless liquid with an odor of burning sulphur. The dose is 10 minims to a fluidrachm, well diluted.

Therapeutics.—Sulphurous acid is chiefly employed as a disinfectant and parasiticide. In the gaseous form generated by burning sulphur it is a reliable *disinfectant* for rooms, provided the contact be sufficiently prolonged.

It may be used with advantage as a local application in *diphtheria*, *thrush*, *mucous patches*, and *syphilitic ulcerations of the pharynx*. It is an excellent remedy in the various forms of *ringworm*. Internally, it is sometimes very useful in *gastric catarrh* when flatulence and yeasty vomiting are prominent symptoms.

ACIDUM TANNICUM.

(Tannic Acid, $C_{14}H_9O_9$.)

Tannic acid appears in the form of pale-yellow scales having a strongly astringent taste and acid reaction. It is soluble in 1 part of water, 0.6 part of alcohol, and 1 part of glycerin. With a solution of ferric chloride it produces a bluish-black ink; it precipitates alkaloids and coagulates albumin. Dose, 2 to 10 grains.

PREPARATIONS.

Collodium Stypticum, U. S. P.

Glyceritum Acidi Tannici, U. S. P.

Trochisci Acidi Tannici, U. S. P.

Unguentum Acidi Tannici, U. S. P.

Physiological Action.—The chief effect of tannic acid is that of an astringent, contracting the tissues and checking secretion. When injected into the blood it coagulates the albumin and forms a clot. In the stomach it is converted into gallic acid, in which form it is chiefly eliminated.

Therapeutics.—Tannic acid is employed as an astringent, a styptic, and an antidote. As an astringent it is employed internally in the *diarrhœa of relaxation*, and in *night-sweats*, as a local application, it has a wide range of usefulness. A glycerole of tannin (1 dr. to 1 fl. oz.) is useful in *chronic vaginitis*, *leucorrhœa*, *endometritis*, and *chronic pelvic inflammation*. In *anal fissure* it may be employed as a dusting-powder or as a glycerite on a pledget of lint. In *subacute* and *chronic urethritis* deep injections of a weak solution (5 or 10 grs. to 1 fl. oz.) are often useful. In *subacute* and *chronic inflammation of the pharynx and larynx* a glycerole of tannic acid is frequently employed. In *piles*, suppositories of tannic acid with belladonna or hyoscyamus may be used with advantage.

As a hæmostatic styptic collodion is a useful application in *superficial wounds*. In severe *hemorrhage from the anterior nares* strips of lint spread with cosmoline and tannic acid make excellent tampons. Internally, tannic acid should be employed as a hæmostatic only when it can be brought in direct contact with the bleeding surface, as in *hæmatemesis*; otherwise gallic acid is preferable, since tannic acid must first be converted into that compound before it reaches the seat of hemorrhage.

As an antidote tannic acid is employed in *poisoning* from antimony and all the vegetable alkaloids.

The use of hot injections of a one per cent. solution of tannic acid in *cholera*, long advocated by Cantani, has recently been revived.

Administration.—It may be given internally in pills, powders, or capsules. As an internal hæmostatic or antidote it is best given as a powder (10–20 grains).

Incompatibles.—Salts of iron, lead, antimony, and silver, mineral acids and alkaloids.

ACIDUM TARTARICUM.

(Tartaric Acid, $H_2C_4H_4O_6$.)

It appears as colorless crystals having an acid taste, and which are readily soluble in water and alcohol. Dose, 10–30 grains.

Therapeutics.—Its action is similar to that of the other vegetable acids, and it is rarely used except with sodium or potassium carbonate in the production of effervescent drinks.

ACONITUM.

(Monkshood.)

Official aconite is derived from the root of the *Aconitum Napellus*. The root is conical in shape, two or three inches long, blackish in color, and closely resembles horseradish; from this, however, it may be distinguished by its lack of pungent odor when scraped. When slowly chewed it produces in the mouth a sense of warmth and tingling, soon followed by numbness.

Active Principle.—The most important active principle

of aconite is *aconitine*, a variable alkaloid occurring in both an amorphous and crystalline form. It is feebly soluble in water, but freely so in alcohol and ether. When rubbed on the skin it causes tingling, and finally more or less anæsthesia.

PREPARATIONS.	DOSE.
Extractum Aconiti, U. S. P.	$\frac{1}{4}$ – $\frac{3}{4}$ gr.
Extractum Aconiti Fluidum, U. S. P.	1–2 min.
Tinctura Aconiti, U. S. P.	1–5 gtt.
Ung. Aconiti, B. P. (8 gr. in 1 oz.)	

Physiological Action.—*Circulatory System.*—The dominant action of aconite is on the circulation. It slows the pulse by stimulating the peripheral vagi, and lowers the blood-pressure by directly depressing the heart or its motor ganglia. Toxic doses cause an arrest of the heart in diastole.

Nervous System.—It first irritates and then paralyzes the peripheral ends of both motor and sensory nerves. It is apparently a slight depressant to the sensory side of the cord. Medicinal doses do not affect the vaso-motor centre or the brain, but toxic doses paralyze the vaso-motor centre and excite clonic convulsions, the latter probably resulting from interference with the cerebral circulation.

Respiration.—Medicinal doses slow the respiration by depressing the respiratory centre.

Stomach.—On this organ aconite acts as a sedative, and even toxic doses may fail to induce vomiting.

Temperature.—In the febrile state moderate doses of aconite cause a slight fall of temperature.

On the intestines, kidneys, and muscles the drug has little or no effect.

Toxicology.—Aconite-poisoning is characterized by a tingling sensation throughout the body, a slow weak pulse, finally becoming rapid and irregular, slow, shallow, and irregular respirations, and the usual phenomena of collapse.

Treatment.—The patient should be kept in the recumbent position, with the feet somewhat higher than the head. While in this position the stomach should be thoroughly emptied with the stomach-pump. The temperature should

be kept up by the external application of heat, and such stimulants as digitalis, ammonia, ether, and strychnia should be administered hypodermically for their effect upon the heart and respiration.

Therapeutics.—On account of its sedative effect on the peripheral nerves, aconite may be employed locally with advantage in *neuralgia*; for the same reason it is often serviceable when given internally in *hyperemesis*. The internal administration of aconite for neuralgia has also been highly recommended. In acute inflammations, such as *tonsillitis*, *pharyngitis*, *laryngitis*, *bronchitis*, and *pneumonia*, and in the beginning of the *acute infectious diseases of childhood*, aconite is often very useful by quieting the circulation and lowering the temperature. In excessive *hypertrophy of the heart* the drug acts most favorably. In *nervous palpitation* and in the tachycardia of *exophthalmic goitre* it is sometimes more efficient than digitalis. In *active cerebral congestion* with high arterial tension it may be given in full doses.

Administration.—The tincture is the preparation most commonly employed for internal use; small doses should be given in water, frequently repeated, and the effect watched. Aconitine, on account of its variableness and extremely toxic nature, is rarely employed in internal medicine; its dose is $\frac{1}{200}$ to $\frac{1}{100}$ of a grain. For external use in neuralgia aconitine may be prescribed as follows:

℞ Aconitinæ,	gr. viij;
Glycerini,	ʒiij;
Cerati,	ʒj.—M.

Sig. A small portion, about the size of a pea, to be rubbed in over the affected nerve.

In the application, care should be taken to avoid the eye, as the drug is distinctly irritating. On cutaneous surfaces, provided there are no abrasions, it may be applied with perfect safety.

ADONIDIN.

Adonidin is a glucoside obtained from the *Adonis vernalis*. The dose is $\frac{1}{8}$ to $\frac{1}{3}$ of a grain.

It is used as a cardiac stimulant and diuretic, and, though

less reliable than digitalis, it may be employed in valvular disease when the latter fails.

ÆTHER.

(Ether, Ethyl Oxide, $C_4H_{10}O$.)

Ether is obtained by the action of sulphuric acid on alcohol, and appears as a colorless, volatile, highly inflammable liquid, having a strong characteristic odor. It is freely soluble in alcohol, chloroform, and water. The official preparation contains about 4 per cent. of alcohol.

Physiological Action.—When freely inhaled, ether first causes coughing, choking, and a sense of strangulation from its irritant effect on the mucous membrane of the respiratory tract. Soon the face becomes flushed, the eyes injected, the respirations deep, the pulse rapid and strong, and not infrequently marked emotional excitement develops, characterized by shouting, crying, laughing, erotic dreams, or pugilistic manifestations. These phenomena gradually subside, and are followed by complete unconsciousness. Now, if the anæsthetic be still further pushed, the breathing becomes stertorous from paresis of the palatal muscles, the face pale or deeply cyanosed, the muscles flaccid, the respirations slow and shallow, the pulse rapid and feeble, and finally death results, usually from respiratory failure.

Circulatory System.—In ordinary amounts ether is a quickly-acting heart-stimulant. It raises the blood-pressure by direct action on the heart and by stimulation of the vaso-motor centres. Only in very large amounts does it depress the circulation.

Respiratory System.—It first stimulates and then depresses the respiratory centres. In fatal cases respiration is usually arrested before the cardiac pulsations cease. In the early stage of ether-anæsthesia respiration may suddenly cease from reflex irritation of the trigemini.

Nervous System.—The brain is first affected by ether, the anæsthesia being due to a direct action of the drug on the cerebral hemispheres; subsequently it depresses the sensory side of the spinal cord, then the motor side of the spinal cord, and finally the sensory and motor nerves.

Local Action.—The prolonged application of ether induces local anæsthesia.

Elimination.—It is eliminated chiefly by the lungs and kidneys; on the latter it often exerts an irritant effect, and hence it should not be used as an anæsthetic in uræmic eclampsia.

Therapeutics.—Ether was first employed as an anæsthetic in general surgery by Dr. John C. Warren at the Massachusetts General Hospital in 1846; since that time it has been, in this country, the most extensively used anæsthetic in all operations excepting the most trivial.

It may be employed in the form of spray to produce local anæsthesia preliminary to performing paracentesis, or opening small abscesses, and in neuralgia.

Administered hypodermically (15 to 30 min.), it is a valuable heart-stimulant, on account of the promptness of its action. It may be so employed in *shock*, in *poisoning*, and in the collapse of *cholera* and *low fevers*.

It has been given internally as an anthelmintic against tapeworms, and as a sedative in various forms of colic.

Administration.—As it is a distinct irritant to the fauces, it should be given, when intended for internal use, in capsules or in ice-cold water. When administered as an anæsthetic the following precautions should be observed: No solid food should be taken for several hours before the operation. If there has been nausea or if the patient is very weak, a little brandy may be given prior to the anæsthetic. When given to a female, a third person should always be present. This is necessary on account of the delusions which the drug produces. Before its administration the teeth should be examined, and if false they should be removed.

As an anæsthetic it may be administered from a sponge, a folded towel surrounded by a cone of pasteboard, or from an inhaler made especially for the purpose. At first the inhaler should be held some distance from the nose, to accustom the patient to the irritant effects of the ether, but soon it should be brought close to the nose, so that the anæsthetic may be taken in concentrated form. Insensibility of the conjunctivæ and muscular relaxation are the

indications that the patient is properly prepared for the operation. When the production of anæsthesia is slow it is well to advise forcible expiration; if the advice is taken the inspiration will necessarily be deep.

The presence of a cardiac murmur will not contraindicate the use of ether provided the heart is in fairly good condition. Acute nephritis and advanced atheroma, however, should be regarded as contraindications.

As the vapor of ether is highly inflammable, and since it is heavier than air, the light should always be above the operator. In using the actual cautery special care is necessary to prevent ignition.

The throat and waist should be freed from tight clothing, but the patient should not be exposed, as inflammation of the lungs is liable to follow when this precaution is unheeded.

If the respiration ceases, the ether should be suspended, the lower jaw protruded, gentle pressure applied to the base of the chest, and to increase reflex stimulation a little ether poured on the epigastrium. If these measures fail, artificial respiration (Sylvester's method) should be resorted to, and respiratory stimulants like ammonia and strychnia be administered hypodermically. Alcohol, on account of its resemblance to ether, should not be employed.

Occasionally life is endangered from heart-failure. In these cases the face is pale and the pulse feeble. If this accident should occur, the head must be lowered, heat applied to the body, and diffusible heart-stimulants administered hypodermically.

ÆTHYL BROMIDUM.

(Ethyl Bromide, Hydrobromic Ether, C_2H_5Br .)

An unofficial preparation made by the action of bromine on alcohol in the presence of phosphorus. It appears as a colorless, highly volatile, non-inflammable liquid, having a sweetish taste and the odor of chloroform. On exposure to light it liberates free bromine.

Therapeutics.—Bromide of ethyl was introduced into this country by Levis of the Pennsylvania Hospital as a safe and reliable substitute for chloroform. In its action it

resembles chloroform more than it does ether; it is, however, more prompt than the former. Its use is not entirely void of danger, as several deaths have resulted from it, some from cardiac and some from respiratory paralysis. In minor operations requiring brief anæsthesia it may be employed with advantage. It is essential that the preparation should be free from impurities, and likewise fresh, since it deteriorates on standing. Recently, Montgomery has employed it satisfactorily in nearly five hundred cases, chiefly in obstetrical and gynecological practice, and in only five per cent. were there disagreeable after-effects such as nausea, vomiting, and malaise. Its administration is, however, followed by a disagreeable garlicky odor of the breath which often lasts for several days.

Like ether, it should be administered in concentrated form, the air being excluded. The amount required to produce anæsthesia varies from a drachm to half an ounce.

The drug has also been employed in the form of a spray as a local anæsthetic, and as an inhalant in *obstinate cough*.

ÆTHYL CHLORIDUM. ✓

(Ethyl Chloride, C_2H_5Cl .)

An unofficial compound produced by the action of hydrochloric acid on alcohol. It appears as a colorless, highly volatile, inflammable liquid, having a strong ethereal odor. As it boils at 50° F., it is usually kept in glass tubes capable of holding a couple of drachms; one end of the tube is drawn to a point, so that it can be readily broken and the ethyl chloride expelled as a spray by the heat of the hand. When locally applied it produces intense cold by its rapid evaporation, the part first becoming red, and then perfectly white, and while this appearance lasts there is complete anæsthesia.

Under certain restrictions it is a safe and convenient local anæsthetic, and as such may be employed in *neuralgia*, *sciatica*, *migraine*, and in *minor operations*, like extracting teeth, removing ingrowing nails, opening small abscesses, and tapping liquid effusions.

Grave symptoms, indicating respiratory failure, may follow its inhalation, so that, when used about the mouth and

nose, it is best applied on a pledget of cotton held over the part until anæsthesia is produced. On account of its highly inflammable nature, it must not be used near a gas-jet or other flame. Prolonged application is to be avoided, since it may cause severe inflammation and sloughing.

ÆTHYL IODIDUM.

(Ethyl Iodide, Hydriodic Ether, C_2H_5I .)

An unofficial preparation made by the action of iodine on alcohol in the presence of phosphorus. It appears as a colorless, volatile, non-inflammable liquid, having a strong ethereal odor. It is insoluble in water, but soluble in alcohol and ether. On exposure to light it undergoes decomposition, liberating free iodine.

Therapeutics.—It is employed almost exclusively by inhalation as an antispasmodic and alterative in *diseases of the respiratory tract*. In *asthma* the inhalation of 10 to 20 drops from a tumbler or respirator is often of great value in subduing the dyspnœa and aborting the paroxysm. It is also useful in *chronic bronchitis*, especially when complicated with emphysema. In *catarrhal affections* it acts not only as a sedative but as an alterative through the iodine which it contains.

AGARICIN.

(Agaric or Agaricinic Acid.)

It is a white crystalline substance obtained from the *Polyporus officinalis*, touchwood, or punk. The dose is 1 to 2 grains in pill form. It has been recommended in the night-sweats of phthisis, but it is an unreliable remedy.

ALCOHOL.

(Ethyl Alcohol, C_2H_5HO .)

Ethyl alcohol is obtained from the distillation of fermented saccharine material. The official preparation contains 91 per cent. by weight of absolute alcohol, and appears as a colorless, inflammable liquid, having a pungent odor and a burning taste.

PREPARATIONS.

Alcohol Absolutum, U. S. P. (99 per cent. alcohol).

Alcohol Deodoratum, U. S. P. (92.5 per cent. of alcohol).

Alcohol Dilutum, U. S. P. (41 per cent. absolute alcohol).

Spirits :

Spiritus Frumenti, U. S. P., or whiskey (44 to 50 per cent. of alcohol), distilled from fermented grain.

Spiritus Juniperi Compositus, U. S. P., equivalent to gin (about 60 per cent. alcohol).

Spiritus Vini Gallici, U. S. P., or brandy (39 to 47 per cent. of alcohol), distilled from fermented grapes.

Malt Liquors :

Ale,
Beer,
Porter, } obtained from the fermentation of malted grain, and contain from
3 to 6 per cent. of alcohol.

Wines :

Vinum Album, U. S. P., or white wine (10 to 12 per cent. of alcohol).

Vinum Rubrum, U. S. P., or red wine (10 to 12 per cent. of alcohol).

Vinum Portense, or port wine (30 to 40 per cent. of alcohol).

Vinum Xericum, or sherry wine (20 to 35 per cent. of alcohol).

The official wines are made by fermenting the unmodified juice of the grape.

Physiological Action.—*Circulatory System.*—In moderate doses it increases the force and rapidity of the pulse, probably by direct action on the heart. Large doses paralyze the heart.

Nervous System.—It first stimulates and then paralyzes all parts of the nervous system.

Alimentary Canal.—Small doses of alcohol stimulate the flow of gastric juice. By its presence it retards digestion, but its stimulant effect on the gastric mucous membrane more than counterbalances this retardation.

Temperature.—Large doses cause a fall in temperature, which is chiefly brought about by an increase of radiation.

Elimination.—When taken in excess, it is partially eliminated by all the emunctories; small quantities, however, are completely oxidized in the system.

Effect on Metabolism.—Alcohol serves as a food, since its own oxidation or combustion retards tissue-metabolism.

Toxicology.—The ingestion of large quantities of alcohol produces the following symptoms: mental excitement, flushing of the face, quickening of the pulse and respiration, then incoherent speech, loss of co-ordination, vomiting, delirium, subnormal temperature, dilated pupils, and

finally stupor and coma. Not infrequently the coma is interrupted by convulsive seizures. In most cases recovery follows in a day or two, but sometimes the coma deepens into death.

Care must be taken to distinguish acute alcoholism from uræmia, opium-poisoning, and apoplexy. The urinous odor of the breath, the accentuation of second aortic sound, the small pupils, and the presence of albumin in the urine will serve to distinguish *uræmia*. The small pupils, slow respiration, and slow pulse will indicate *opium-poisoning*. The unequal pupils, hemiplegia, and elevated temperature will separate *apoplexy* from alcoholism.

Treatment.—The stomach should be emptied by the stomach-pump, a stimulating emetic, or the hypodermic injection of apomorpha (gr. $\frac{1}{10}$). If the pulse weakens, stimulants like strychnia, ammonia, or digitalis should be administered hypodermically.

Chronic alcoholism is characterized by disturbed sleep, fine tremors, mental impairment, injection of the eyes, redness of the nose, and the symptoms of gastro-intestinal catarrh. When the habit is long-continued, degenerative changes in the heart, blood-vessels, liver, and kidneys are apt to develop. A common complication of chronic alcoholism is *delirium tremens*, which generally follows a protracted debauch or is excited by an injury or some intercurrent disease. It is manifested by great mental excitement, insomnia, incoherent speech, tremors, disordered intellect, and terrifying hallucinations of sight or hearing. The pulse is rapid and feeble, the appetite is lost, the bowels are constipated, and the temperature slightly elevated. In favorable cases convalescence follows in a few days, but not infrequently typhoid symptoms develop and the attack ends in death.

Among other complications of dipsomania may be mentioned pneumonia, chronic meningitis, multiple neuritis, epilepsy, parietic dementia, and various psychoses.

Treatment of Delirium Tremens.—As there has usually been a complete abstinence from food during the debauch which led to the delirium, nutritious foods are always necessary, and the best are highly-seasoned beef tea and milk

with lime-water. Sleep must be secured by chloral (gr. xx), hyoscine (gr. $\frac{1}{100}$), bromide of potassium (ʒj), paraldehyde (ʒj), or sulphonal (gr. xxx.). Active catharsis should be encouraged. When the pulse is weak strychnia cautiously administered will be found a useful stimulant. In most cases physical restraint will be required: it may be secured by strapping the patient to the bed with sheets.

Therapeutics.—Alcohol is employed in medicine as a quickly-acting stimulant and as a food. In all forms of sudden heart-failure, as in *syncope*, *shock*, *snake-bite*, and *acute febrile disease*, alcohol is an invaluable stimulant. In the continued fevers, like *typhoid*, it fills a triple rôle: it serves as a food, as a general stimulant, and as a promoter of digestion. In these cases, however, it is well to withhold it until the pulse flags or the heart-sounds indicate a weakening of the circulation. In chronic diseases like *phthisis*, *obstinate atonic dyspepsia*, and *valvular affections of the heart* it often does good, but it should be administered tentatively, with due regard for the danger of producing chronic alcoholism.

Administration.—When a prompt action is desired the spirits should be selected. They may be given by the mouth (ʒss to ʒj) or hypodermically (ʒss to ʒij). In the low fevers the wines or spirits may be selected according to the urgency. As a rule, they should be given with food, so as to assist in the digestion of the latter and to diminish the number of administrations of food and medicine. When, however, very large quantities are being taken, an exception may be made to the rule. In the majority of cases three or four ounces of brandy or whiskey in the twenty-four hours will be found sufficient, but sometimes three or four times that amount will be required. The condition of the pulse, skin, and tongue will serve as a guide to the amount needed. Gin, being more diuretic than the other spirits, may be selected when such an action is desired. In chronic diseases the wines and malt liquors will usually be found more serviceable than the spirits.

ALLIUM.

(Garlic.)

It is the bulb of the *Allium sativum*. Its peculiar odor is due to an irritating volatile oil.

PREPARATION.

DOSE.

Syrupus Allii, U. S. P. 1-4 fl. dr.

Therapeutics.—It has been employed as a gastric tonic, carminative, rubefacient, nervous stimulant, and stimulating expectorant. In the form of a poultice it is useful in the *acute bronchitis of children*. Internally, it is sometimes very efficient in *suffocative catarrh* of children and in *chronic bronchitis* of adults.

ALOE.

(Aloes.)

It is the inspissated juice of the leaves of the *Aloe Socotrina* and other species of aloe. It appears in the form of yellowish-brown resinous masses having a bitter taste and a disagreeable odor. The active principle of the drug is *aloin*, which generally occurs as a yellowish amorphous or crystalline powder. Its dose is $\frac{1}{2}$ to 2 grains.

PREPARATIONS.

The most important preparations of aloes are :

	DOSE.
Aloe Purificata, U. S. P.	2-10 grs.
Extractum Aloes, U. S. P.	$\frac{1}{2}$ -5 grs.
Tinctura Aloes, U. S. P.	1-2 fl. dr.
Tinctura Aloes et Myrrhæ, U. S. P.	1-2 fl. dr.
Pilulæ Aloes (gr. ij), U. S. P.	1-3 pills.
Pilulæ Aloes et Asafœtidæ, U. S. P. (gr. $\frac{1}{3}$ of each) .	2-5 pills.
Pilulæ Aloes et Ferri, U. S. P. (gr. j each of aloes and sulphate of iron)	1-3 pills.
Pilulæ Aloes et Mastiches, U. S. P. (Lady Webster's pill : aloes, gr. ij ; mastich, gr. ss)	1-3 pills.
Pilulæ Aloes et Myrrhæ, U. S. P. (aloes, gr. ij ; myrrh, gr. j)	2-5 pills.

Physiological Action.—The most important action of aloes is on the alimentary canal. In the stomach it exerts a tonic effect, and in the intestine it acts as a cathartic by stimulating peristalsis and increasing intestinal secretion.

As it chiefly affects the lower bowel, it is a slowly-acting laxative. As it is said to cause congestion of the pelvic organs, particularly the uterus and rectum, it should be avoided in pregnancy, irritable hemorrhoids, and dysentery. In ordinary doses aloes does not influence the secretion of the liver.

Therapeutics.—In *constipation* resulting from intestinal atony aloes is a valuable drug. It is best given in pill form and in combination with strychnia or belladonna. The following formulæ will illustrate the method of prescribing it:

℞ Pulv. aloes,	gr. xij;
Pulv. rhei,	gr. xxiv;
Ext. belladonnæ,	gr. j.—M.

Ft. in pil. No. xii.
Sig. One or two pills as required.

℞ Aloin,	
Ext. nucis vom.,	āā gr. iv;
Ext. belladonnæ,	gr. ij.—M.

Ft. in pil. No. xx.
Sig. One pill at bedtime.

ALUMEN.

(Alum, $K_2Al_2(SO_4)_4 \cdot 24H_2O$.)

Alum is a double sulphate of potassium and aluminium, but not infrequently the latter metal is replaced by ammonium. It occurs in the form of colorless octahedral crystals, having a sweetish astringent taste, soluble in 10.5 parts of water and insoluble in alcohol. The dose as an astringent is 10 to 20 grains; as an emetic, a teaspoonful for a child, a tablespoonful for an adult.

PREPARATION.

Alumen Exsiccatum, U. S. P., or dried alum.

Therapeutics.—It is employed as an astringent, styptic, emetic, and antidote in *lead-poisoning*. Dried alum is used solely as an exsiccant and mild caustic. In *mercurial stomatitis*, *pharyngitis*, *tonsillitis*, *laryngitis*, and *leucorrhœa* a solution of alum makes an efficient astringent application. As it is somewhat destructive to the teeth, its use in the mouth should not be protracted. A lotion

of alum and whiskey is very useful in preventing *bed-sores* and in checking *colliquative sweats*. *Alum curd* is made by adding powdered alum to milk or white of egg until a curd is formed; it is used to prevent discoloration after injury to the eyelids. A spray of alum-water may be of service in *bronchorrhœa*.

As a styptic alum is useful only when the bleeding comes from a superficial lesion or wound; thus it may be employed to arrest the *bleeding of piles*, *leech-bites*, and of the *gums* after the extraction of teeth.

It is a very useful stimulating emetic, particularly in children, to whom teaspoonful doses may be administered in syrup every 15 minutes until vomiting is induced.

It has been employed to some extent as an antidote in *acute* and *chronic lead-poisoning*, but in the former it is inferior to Epsom salt, and in the latter to potassium iodide.

AMMONIUM.

(NH₄.)

Ammonium is not found in the free state; its salts are derived from ammonia, a colorless gas having an intensely pungent odor and acrid taste, and chiefly obtained as a by-product in the manufacture of coal-gas.

AMMONIA.

(NH₃.)

PREPARATIONS.	DOSE.
Aqua Ammonia, U. S. P. (contains 10 per cent. of gas) .	10-30 min.
Aqua Ammonia Fortior, U. S. P. (contains 28 per cent. of gas).	
Linimentum Ammonia, U. S. P.	
Spiritus Ammonia, U. S. P.	20-60 min.
Spiritus Ammonia Aromaticus, U. S. P. (also contains ammon. carb.)	20-60 min.

Physiological Action.—*Circulatory System.*—Moderate doses of ammonia increase both the strength and rapidity of the pulse, and this effect is produced by a direct stimulation of the heart and its accelerator nerves. When injected directly into the jugular vein, the blood-pressure falls from cardiac paralysis.

Nervous System.—In full doses ammonia stimulates the

spinal cord and excites the reflexes. Toxic doses first produce tonic convulsions of spinal origin, but subsequently paralyze the spinal cord and motor nerves.

Respiratory System.—Moderate doses increase the depth and rapidity of the respirations by stimulating the respiratory centre.

Alimentary Canal.—In the stomach weak solutions of ammonia, like other alkalies, stimulate the flow of gastric juice. Toxic doses produce violent gastro-intestinal inflammation. It is said that ammonia stimulates the glyco-genic function of the liver.

Local Action.—Locally, it acts as a decided irritant, and in concentrated solution speedily produces vesication.

Elimination.—The action of ammonia is extremely evanescent, the drug being soon converted into urea and nitric acid. As a result of its oxidation, it rather increases than diminishes the acidity of the urine.

Toxicology.—Ammonia-poisoning is characterized by severe burning pain in the abdomen, persistent vomiting and purging, a rapid, thready pulse, hurried breathing, and the symptoms of collapse. The mind may remain clear until the end, but coma often precedes death. The violent inflammation of the throat may cause œdema of the larynx, so that death may result in a few minutes from asphyxia.

Treatment.—The alkali in the stomach should be neutralized by some weak acid such as vinegar. Subsequently the inflammation should be allayed by demulcents and opium. Asphyxia from laryngeal œdema will indicate the performance of tracheotomy.

Therapeutics.—Ammonia is employed in medicine as a quickly-acting cardiac and respiratory stimulant, as an antacid, and as a counterirritant.

In *shock, syncope, various poisonings, snake-bite, collapse of infectious diseases*, and in *sudden heart-failure* from any cause ammonia is an invaluable stimulant. For its antacid property it is employed in *acid dyspepsia* and to neutralize the poison in the *bites of certain insects*. As a rubefacient it is used in *sprains, myalgia, and muscular rheumatism*.

Administration.—Aqua ammoniæ may be employed hypodermically, externally in liniments as a rubefacient,

and as a stimulating inhalation in threatened syncope. Aqua ammoniæ fortior is rarely used as a prompt vesicant. The spirits should be selected for internal administration.

The following liniment, official in the British Pharmacopœia, is a useful rubefacient:

℞ Liquor ammoniæ, $\frac{f\text{ʒj}}$;
Olei olivæ, $\frac{f\text{ʒiij}}$.—M.

AMMONII ACETAS.

(Ammonium Acetate, $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$.)

Acetate of ammonium is official as Liquor ammonii acetatis, or Spirit of Mindererus. It is employed as a mild diaphoretic in doses of 2 to 4 fluidrachms.

AMMONII BENZOAS.

(Ammonium Benzoate, $\text{NH}_4\text{C}_7\text{H}_5\text{O}_2$.)

Benzoate of ammonium is employed as a diuretic in the *phosphatic diathesis* and in *inflammations of the genito-urinary tract* associated with alkaline urine. Its dose is 10 to 20 grains.

AMMONII BROMIDUM.

(Ammonium Bromide, NH_4Br .)

Bromide of ammonium occurs in the form of white crystals or as a yellowish-white powder having a disagreeable salty taste. It dissolves in $1\frac{1}{2}$ parts of water and 150 of alcohol. Its dose is 10 to 30 grains well diluted.

Physiological Action.—The dominant action of ammonium bromide, like the corresponding potassium salt, is on the nervous system. It depresses the brain and spinal cord, the sensory side of the latter being especially affected. It differs in its action from the bromide of potassium in not affecting the peripheral nerves or muscles, in being more irritating to the stomach, and in being less depressing to the heart.

Therapeutics.—It is used principally to allay *convulsions*, both cerebral and spinal, to lessen *nervous* and *sexual excitement*, and to *produce sleep*. Bromide of potassium is

generally more efficient, but when it fails or causes marked depression the ammonium salt may be substituted.

Incompatible.—Spirit of nitrous ether.

AMMONII CARBONAS.

(Ammonium Carbonate, $\text{NH}_4\text{NH}_2\text{CO}_2$.)

Carbonate of ammonium occurs in the form of white, translucent, crystalline masses having an extremely pungent odor and acrid taste. When exposed to the air it breaks up into a white powder—bicarbonate of ammonium. It is soluble in 4 parts of water. Its dose is 5 to 10 grains.

Physiological Action.—It is a quick and powerful cardiac and respiratory stimulant.

Therapeutics.—It is used principally in two conditions: first, as a stimulant in *low fevers* like typhoid; and secondly, in *acute pulmonary diseases* associated with cardiac and respiratory weakness, such as croupous pneumonia, catarrhal pneumonia, and capillary bronchitis. Its transient effects and its irritant action on the stomach unfit it for use in chronic diseases.

Administration.—To guard against its irritant properties, it is generally prescribed in mucilage or syrup of acacia, as in the following formula:

℞ Ammonii carbonatis,	ʒij;
Pulv. acaciæ et sacchari,	aa q. s.;
Spirit. lavandulæ comp.,	ʒij;
Aquæ,	q. s. ad ʒiij.—M.

Sig. A teaspoonful in water every two or three hours.

Incompatibles.—Acids, acid salts, and preparations containing acids, such as syrup of squills.

AMMONII CHLORIDUM.

(Ammonium Chloride, NH_4Cl .)

Chloride of ammonium, or sal-ammoniac, occurs in the form of colorless, translucent, fibrous masses, of a saline taste, but without odor. It is soluble in 4 parts of water. Its dose is 5 to 10 grains.

Physiological Action.—The dominant action of ammonium chloride is on the mucous membranes, particu-

larly those of the respiratory and gastro-intestinal tracts. It modifies the secretion and exerts a favorable influence on subacute and chronic catarrhal processes. Unlike the carbonate, it has no influence on the heart or respiratory centre. In toxic doses it produces severe gastro-intestinal inflammation.

Therapeutics.—It is of great value as a stimulating expectorant in *catarrhal bronchitis*, particularly after the symptoms of the initial stage have passed. It is most efficient in *bronchitis* associated with thick, tenacious sputum; the latter it renders less viscid and more easily expelled. It is also useful in *subacute and chronic pharyngitis* and *laryngitis*. In *catarrh of the bile-ducts* and in *biliousness* or *hepatic congestion* it is of decided value. It is often very efficient in that form of *chronic gastro-intestinal catarrh of childhood* known also as “mucous disease,” and characterized by inanition, a flabby, teeth-indented tongue, fetid breath, capricious or insatiable appetite, marked tympanites, colic, and constipation with the passage of lumpy, mucus-covered stools. In *acute muscular rheumatism* 10 grains of ammonium chloride four times daily will often give prompt relief. It has also been recommended in *neuralgia*, especially of the *ovarian* variety, and locally as an evaporating lotion in *sprains* and *bruises*.

Administration.—It is generally given in aqueous solution to which licorice is added to disguise its disagreeable taste, or else in compressed tablets.

℞ Ammonii chloridi,	ʒij;
Ext. glycyrrhizæ fl.,	fʒiij;
Aquæ destillatæ,	q. s. ad fʒiij.—M.
Sig. A teaspoonful every three hours in bronchitis.	

AMMONII VALERIANAS.

(Ammonium Valerianate, $\text{NH}_4\text{C}_5\text{H}_9\text{O}_2$.)

Valerianate of ammonium occurs in the form of colorless quadrangular plates having the odor of valerianic acid and a sharp, sweetish taste. It is freely soluble in water and alcohol. Its dose is 5 to 10 grains in the form of an elixir.

Therapeutics.—It is employed as a nerve-sedative and as an antispasmodic in the various manifestations of *hysteria*.

AMYL NITRIS.

(Amyl Nitrite, $C_5H_{11}NO_2$.)

It appears as a yellowish, highly volatile liquid having a strong ethereal odor. The dose is 2 to 3 drops, although it is rarely employed internally.

Physiological Action.—*Circulatory System.*—The inhalation of nitrite of amyl is speedily followed by flushing of the face, fulness in the head, quickening of the pulse, and a fall of the blood-pressure. The flushing is due to dilatation of the arterioles, brought about partly by depression of the vaso-motor centres and partly by direct action on the blood-vessel walls. The quickening of the pulse results from a depression of the cardiac inhibitory centres in the medulla. The fall of blood-pressure is mainly due to dilatation of the vessels. Upon the heart the drug acts primarily as a stimulant, but in large amounts it soon acts as a cardiac depressant.

Nervous System.—The ringing in the ears, throbbing, and headache which follow its inhalation are due to cerebral congestion. It is a powerful and quickly-acting depressant to the motor side of the spinal cord.

Respiratory System.—Small doses quicken the respiration; toxic doses kill by paralysis of the respiratory centres.

Blood.—Even in small amounts it converts the hæmoglobin into methæmoglobin.

Local Action.—In concentrated form it is a paralyzant to all highly-organized tissues.

Elimination.—Part is eliminated through the lungs and kidneys, part is oxidized in the system. Its escape through the kidneys is often attended with glycosuria and polyuria.

Therapeutics.—Nitrite of amyl is employed to meet three indications: 1. To stimulate the heart; 2. To check spasm; 3. To dilate the peripheral vessels.

Cardiac Stimulant.—In sudden heart-failure it is a most valuable remedy, and may be given by inhalation or hypodermically. In these cases, however, nitroglycerin, being

more readily handled, is best substituted for the nitrite of amyl.

Antispasmodic.—It is used extensively to check spasm, both local and general. In the severe paroxysms of whooping-cough and asthma inhalations of the drug often prove very efficient. It is employed to arrest the convulsions of epilepsy, tetanus, uræmia, and strychnia-poisoning. When the epileptic seizures are preceded by an aura the patient may carry the remedy in a small bottle containing the exact dose, or in “pearls” made especially for the purpose. In puerperal eclampsia it is sometimes dangerous by causing flooding through dilatation of the uterine vessels.

Dilator of Blood-vessels.—As it dilates the peripheral vessels, and thus lessens resistance, it is of great value in fatty degeneration of the heart, although nitroglycerin is generally preferable. The same action has led to its employment in malaria, to cut short the first stage of the paroxysm. In the attacks of angina pectoris, especially when there is high arterial tension, the drug is invaluable. It sometimes does good in migraine when the pain is associated with constriction of the cervical vessels.

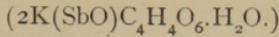
Administration.—It is generally administered by inhalation, three or four drops being placed on a handkerchief held near the nose. It may be given by the mouth or hypodermically, but in these cases it is generally best to substitute nitroglycerin.

ANTIMONIUM.

(Antimony, Sb.)

The following preparations of antimony are official: Tartar emetic (*antimonii et potassii tartras*), sulphide of antimony (*antimonii sulphidum*), purified sulphide of antimony (*antimonii sulphidum purificatum*), sulphurated antimony (*antimonium sulphuratum*), compound pills of antimony, or Plummer's pills (*pilulæ antimonii compositæ*), each containing $\frac{1}{2}$ gr. of calomel, $\frac{1}{2}$ gr. of sulphurated antimony, and 1 gr. of guaiac, and antimonial or James's powder (*pulvis antimonialis*), which is composed of about $\frac{1}{3}$ oxide of antimony and $\frac{2}{3}$ phosphate of calcium. Of these preparations, tartar emetic is the only one in common use.

ANTIMONII ET POTASSII TARTRAS.



Tartar emetic occurs in the form of colorless transparent crystals, or as a white granular powder having a sweetish metallic taste. It is soluble in 20 parts of cold water, and sparingly so in alcohol. Its dose as a diaphoretic is $\frac{1}{16}$ to $\frac{1}{12}$ of a grain; as an emetic, $\frac{1}{2}$ to 1 grain.

PREPARATIONS.

DOSE.

Syrupus Scillæ Compositus, U. S. P. ($\frac{3}{4}$ grain in 1 oz.) 5 min.—1 fl. dr.

Unguentum Antimonii Tartarati, B. P. (1 part in 5).

Vinum Antimonii, U. S. P. (2 grs. in 1 oz.) . . . 5 min.— $\frac{1}{2}$ fl. oz.

Physiological Action.—*Circulatory System.*—Tartar emetic lessens the rate and force of the pulse by directly depressing the heart. The fall of blood-pressure is probably also in part due to the action of the drug on the vaso-motor nerves.

Nervous System.—Large doses paralyze the spinal cord, especially the sensory columns.

Respiratory System.—Toxic doses greatly embarrass the respiration and produce extreme irregularity of rhythm. This effect is due to the depressant action of the drug on the respiratory centre, and indirectly to the pulmonary congestion incident to the heart-failure.

Alimentary Canal.—Small doses excite a sensation of warmth in the stomach; large doses cause nausea and vomiting; and lethal doses produce gastro-enteritis with serous discharges from the stomach and intestines. The emesis is partly due to the irritant action of the drug on the stomach, and partly to its action on the vomiting centre in the medulla oblongata.

Local Action.—Applied to the skin, tartar emetic acts as an irritant, and its prolonged application in concentrated form is followed by the appearance of papules, vesicles, pustules, and even sloughs.

Elimination.—Its elimination is effected through all the mucous membranes, but especially through the stomach and intestines.

Toxicology.—In toxic doses tartar emetic causes intense burning in the œsophagus and stomach, followed by per-

sistent vomiting and purging of serous or "rice-water" material, painful cramps, not only in the stomach, but in the muscles of the extremities, and all the symptoms of collapse—thready pulse, suppressed voice, shallow respiration, subnormal temperature, pinched features, cold sweats, and scanty urine. The mind may be clear until the close, but frequently death is preceded by delirium, convulsions, and coma.

Post-mortem examination reveals gastro-enteritis, engorgement of the venous system, and widespread fatty degeneration of the tissues.

From the resemblance of antimony-poisoning to Asiatic cholera and other choleraic diseases, care must be exercised in the diagnosis, which must rest on the history and the chemical examination of the discharges.

Treatment.—Tannic acid should be administered as the chemical antidote, and the stomach emptied by means of the pump. The temperature should be kept up by the external application of heat, and stimulants like ether, alcohol, and strychnia will be required to combat the heart-failure. To check the vomiting and to relieve the irritation, opium may be given hypodermically and demulcents by the mouth.

Therapeutics.—As a remedy tartar emetic is fast falling into disuse, its place having been largely filled by other drugs whose action is more prompt and less depressing. It is, however, employed as an emetic, diaphoretic, sedative expectorant, cardiac depressant, and counterirritant.

Its slowness of action and depressing effects render it less valuable as an emetic than ipecac, alum, sulphate of zinc, or apomorphia. As a diaphoretic and cardiac depressant it is occasionally employed in the beginning of acute sthenic inflammatory diseases like *bronchitis*, *pneumonia*, *pleurisy*, *pericarditis*, and *acute rheumatism*. As a sedative expectorant it is of great value at the onset of *acute bronchitis*, when there is much cough, little expectoration, and the chest is full of sonorous and sibilant râles.

The ointment of tartar emetic has been employed to produce a persistent counterirritant effect in deep-seated inflammations, such as *chronic arthritis* and *chronic meningitis*.

Administration.—The wine of antimony (a teaspoonful to a tablespoonful), the compound syrup of squill (10 drops to a teaspoonful for a child), or tartar emetic ($\frac{1}{2}$ to 1 gr.) may be employed as an emetic. In acute bronchitis the wine of ipecac or the compound syrup of squill may be given in combination with other expectorants and opium; thus:

℞ Vini antimonii, $\frac{f\text{ʒij}}$;
 Tincturæ opii camphoratæ, $\frac{f\text{ʒj}}$;
 Liquor ammonii acetatis, q. s. ad $\frac{f\text{ʒij}}$.—M.
 Sig. Teaspoonful in water every two or three hours.

Incompatibles.—Tartar emetic is incompatible with tannic acid and drugs containing it, other acids, and alkalies.

ANTIPYRINE.

(Dimethyl-oxy-chinicine, $C_{11}H_{12}N_2O$.)

Antipyrine is a non-official preparation obtained from the destructive distillation of coal-tar. It appears as a whitish crystalline powder, of a bitter taste, and freely soluble in water and alcohol. The dose is 5 to 20 grains.

Physiological Action.—*Circulatory System.*—Moderate doses cause a slight rise of the blood-pressure; toxic doses lower the pressure, probably by directly paralyzing the heart.

Respiratory System.—Moderate doses do not affect the respiration.

Nervous System.—Large doses sometimes produce epileptiform convulsions, and these, according to Hare, result from the action of the drug on the cerebrum. In therapeutic doses it probably acts as a sedative to the sensory nerves and sensory side of the spinal cord.

Temperature.—In health it exerts but little influence on the temperature, but in the febrile state it has a decided antipyretic effect, and the latter is generally accompanied with free sweating. How the drug lowers temperature has not been determined, but it probably does it by direct action on the thermogenic centres.

Elimination.—It is chiefly eliminated by the kidneys, most of it escaping from the body within twelve hours after its ingestion.

Effect on Metabolism.—In minute amounts it probably lessens tissue-waste.

Toxicology.—Among the outward effects following the administration of antipyrine may be mentioned various skin eruptions, such as macules, papules, and erythema. Sometimes its use in large doses is followed by collapse, dyspnoea, and intense cyanosis; these symptoms, although alarming, usually pass off upon the application of external heat and the free use of stimulants.

Therapeutics.—It fills three important offices: 1. It lowers temperature; 2. It allays pain; 3. It checks convulsions and the manifestation of motor excitation.

Antipyretic.—It may be employed to lower temperature in any affection associated with high fever, such as typhoid fever, rheumatism, pneumonia, scarlet fever, and sunstroke. In these cases it should be given cautiously, and preferably in connection with cold sponging.

Analgesic.—Of late, antipyrine has been used more extensively to allay pain than for any other purpose. It is a valuable remedy in nervous headache, migraine, neuralgia, dysmenorrhœa, crises of locomotor ataxia, and even in severe labor-pains. In rheumatism it lowers temperature and allays pain, but does not seem to exert any special influence on the disease. In the form of a spray a four per cent. solution has been found to be an efficient anæsthetic in diseases of the throat, especially laryngeal tuberculosis. In neuralgia, sciatica, and lumbago it may be employed hypodermically for its analgesic effect.

Antispasmodic.—In idiopathic epilepsy antipyrine ranks next to the bromides in efficiency. It is best given in combination with the bromide of ammonium. It is sometimes of value in chorea, asthma, and whooping-cough, particularly the last, in which, in doses of from 5 to 20 grains a day, it seems to decidedly lessen the severity and frequency of the paroxysms.

Other Uses.—It has been serviceable in some cases of diabetes mellitus and insipidus. A 20 per cent. solution has been highly recommended as a hæmostatic, especially in bleeding from cancerous growths.

Administration.—It may be given internally in the

form of capsules, tablets, powders, or solution. In epilepsy Dr. Wood prescribes it as follows:

R Ammon. brom.,	ʒvj;
Antipyrin.,	ʒj;
Liq. potass. arsenit.,	ʒj;
Aq. menthæ pip.,	q. s. ad ʒʒvj.—M.

Sig. A tablespoonful in water night and morning.

In *headache* or *neuralgia* it may be conveniently given in powder, in combination with caffeine or a bromide salt.

Incompatibles.—Tannic acid and substances containing it, spirits of nitrous ether, mercuric chloride, and ferric salts.

APIOL.

This is a greenish-yellow liquid obtained from *Petroselinum sativum*, or common parsley. The dose is 5 to 10 minims in capsules. It was formerly recommended in *malaria* as a substitute for quinine, but it proved of little value. It is sometimes used as an emmenagogue in *dysmenorrhœa* and *atonic amenorrhœa*.

APOMORPHINÆ HYDROCHLORAS.

(Apomorphine Hydrochlorate, $C_{17}H_{17}NO_2HCl$.)

It is the hydrochlorate of an artificial alkaloid, the latter being obtained by the action of sulphuric acid on morphia. It occurs in the form of fine whitish, needle-shaped crystals, which rapidly turn green on exposure to light and air. It is soluble in 45 parts of water and 45 parts of alcohol. The emetic dose is from $\frac{1}{12}$ to $\frac{1}{6}$ of a grain in fresh solution hypodermically. As a sedative expectorant it may be given by the mouth in doses of $\frac{1}{40}$ to $\frac{1}{16}$ of a grain.

Physiological Action.—*Circulatory System.*—Small doses quicken the pulse; large doses paralyze the heart.

Respiratory System.—Small doses stimulate the respiratory centre and increase the bronchial secretion; toxic doses paralyze the respiratory centre.

Stomach.—Apomorpha is a prompt and powerful emetic, but the emesis results not from the action of the drug on the stomach, but from its direct action on the vomiting centre in the medulla.

Nervous System.—It first stimulates the brain and cord, and then paralyzes them. In toxic doses it is a muscle-poison.

Therapeutics.—In *narcotic poisoning*, as from alcohol or opium, apomorphia is an invaluable emetic. When the circulation is weak it must be given cautiously. It is a useful expectorant in the dry stage of *acute bronchitis*, and in *chronic bronchitis* when the expectoration is viscid and scanty.

ARGENTUM.

(Silver, Ag.)

The following preparations of silver are official: Cyanide of silver (*argenti cyanidum*), iodide of silver (*argenti iodidum*), nitrate of silver (*argenti nitras*), diluted nitrate of silver (*argenti nitras dilutus*), moulded nitrate of silver, or lunar caustic (*argenti nitras fusus*), oxide of silver (*argenti oxidum*). The nitrate of silver is by far the most important of these preparations.

ARGENTI NITRAS.

(Silver Nitrate, AgNO_3 .)

Nitrate of silver occurs in the form of colorless tabular, rhombic crystals, of a strongly metallic taste, soluble in 0.8 part of water and 26 parts of alcohol. It turns dark on exposure to light. Its dose is $\frac{1}{6}$ to $\frac{1}{2}$ grain.

Physiological Action.—When administered internally in medicinal doses, the dominant action of nitrate of silver is upon the alimentary canal, where it exerts a soothing astringent effect. On account of its ready decomposition, its action is chiefly expended on the mucous membrane of the stomach.

Local Action.—When applied to mucous membranes in dilute form its effect is that of an unirritating astringent. When applied undiluted to the skin it acts as a superficial escharotic, leaving a white mark which subsequently becomes black on exposure.

Elimination.—Nitrate of silver is eliminated from the system very slowly, and when given continuously over long

periods it sometimes produces an incurable dark discoloration of the skin (*argyria*) which results from the deposition in the tissues of the oxide of silver.

Toxicology.—In toxic doses nitrate of silver acts as an irritant poison, producing violent pains in the abdomen and obstinate vomiting and purging. The characteristic phenomena are the white curded appearance of the vomit, which turns dark when exposed to the light, and the white eschars on the lips and mouth, which also turn black.

Treatment.—The chemical antidote is common salt, which should be given freely, well diluted, along with opiates and mucilaginous drinks.

Therapeutics.—At the present time nitrate of silver is used chiefly for its action on *ulcerated surfaces* and *inflamed mucous membranes*. In *chronic ulcers* a solution of nitrate of silver (15 to 50 grains to the fl. oz.) or the solid stick may be employed as a stimulating application. As a superficial caustic it is also useful in *ulcers with exuberant granulations*. Its employment in *poisoned wounds*, especially the punctured variety and those resulting from the bites of rabid animals, is to be condemned, on account of its superficial action and the premature closure of the orifice.

The application of a strong solution of nitrate of silver over *erysipelatous patches*, as suggested by Higginbottom, seems to be of little value. In *erysipelas ambulans*, however, the production of an eschar with the solid stick a short distance beyond the inflamed area sometimes arrests its spread.

A strong solution (30 grains to 1 fl. oz) painted on the finger will often abort a *felon*. In *acute epididymitis* a useful method of securing counterirritation is by drawing a stick of lunar caustic several times along the posterior surface of the scrotum. As a local application in *chronic conjunctivitis* the drug is invaluable. The chronicity of the affection and the time it is allowed to remain in contact with the inflamed surface will determine the strength of the solution. A solution containing five to ten grains to the ounce is most commonly employed. In *gonorrhæal ophthalmia* and *ophthalmia neonatorum* the remedy is also use-

ful. In *subacute* and *chronic cystitis*, after the bladder has been washed out with a warm antiseptic solution, the injection of silver nitrate solutions (4 to 10 grains to the ounce) will be found most efficient. In *subacute* and *chronic gonorrhœa*, as a local remedy, nitrate of silver is invaluable. In *acute inflammations of the fauces, pharynx, and larynx* weak solutions (5 to 40 grains to the ounce) are serviceable. According to Seiler, stronger solutions (60 grains to the ounce) exert an anæsthetic effect and are more efficient. In *chronic inflammation of the larynx and naso-pharynx* nitrate of silver is probably more extensively used than any other remedy. The strength of the solutions varies from 5 to 40 grains to the ounce, and to ensure success the parts must first be thoroughly cleansed of mucus with an alkaline spray and the remedy persistently applied. When the throat is very sensitive, an application of cocaine may be made prior to the use of silver.

In internal medicine nitrate of silver is employed chiefly for its action on the gastro-intestinal tract. It is very useful in *chronic gastric catarrh, ulcer of the stomach, enteritis, and dysentery*. In the last affection it is best administered by injection. In acute dysentery the injections should be small and weak ($\frac{1}{2}$ grain to the ounce of thin starch-water). In chronic cases stronger and more copious injections may be employed. The bowel having been first cleansed with warm antiseptic enemata, from half a pint to four pints of the fluid should be slowly injected from a fountain syringe into the bowel through an oiled tube. The amount injected will depend upon the location of the inflammatory trouble, and the strength upon its chronicity. A solution containing 10 to 20 grains to the pint will be generally efficient, but in obstinate cases a drachm to the pint may be employed.

Formerly, nitrate of silver was extensively used in *epilepsy* and the *scleroses of the spinal cord*, but its employment in these affections has now been almost abandoned.

Its use in *typhoid fever* has been highly recommended by Pepper. He believes that in some degree it helps to prevent the development of serious symptoms and intestinal complications.

Administration.—In stomachic affections the drug should be given in pill form, half an hour before meals. Opium or hyoscyamus is generally used as an adjuvant. When intended to act on the intestinal canal it should be made into hard pills.

In gastric catarrh it may be prescribed in the following formula :

℞ Argenti nitratis, gr. v ;
 Ext. hyoscyami, gr. x.—M.
 Ft. pil. No. xx.
 Sig. One thrice daily, half an hour before meals.

In typhoid fever Pepper recommends—

℞ Argenti nitratis, gr. vj ;
 Ext. opii,
 Ext. belladonnæ, āā gr. ij ;
 Mannæ, q. s.—M.
 Div. in pil. xxiv.
 Sig. One pill three times daily, soon after food.

ARNICA.

Arnica is official as the flowers (*Arnicæ flores*) and as the rhizome and rootlets (*Arnicæ radix*) of *Arnica montana*. It contains inulin, a volatile oil, and a resinous substance, arnicin.

PREPARATIONS.

DOSE.

Extractum Arnicæ Radicis, U. S. P.	5–10 gr.
Extractum Arnicæ Radicis Fluidum, U. S. P.	10–30 min.
Tinctura Arnicæ Florum, U. S. P.	10–30 min.
Tinctura Arnicæ Radicis, U. S. P.	20–30 min.

Therapeutics.—It has been employed in *rheumatism*, *amenorrhœa*, *malaria*, and *dysentery*, but its use in internal medicine may be discarded, since it is practically valueless. The tincture may be used externally as a rubefacient in *sprains* and *bruises*.

ARSENIIUM, As.

The metal arsenic is not used in medicine, but the following derivatives are official :

PREPARATIONS.	DOSE.
Acidum Arsenosum, U. S. P.	$\frac{1}{50}$ – $\frac{1}{20}$ gr.
Liquor Potassii Arsenitis, U. S. P. (Fowler's solution)	1–5 min.
Liquor Sodii Arsenatis, U. S. P.	1–5 min.
Arseni Iodidum, U. S. P.	$\frac{1}{20}$ – $\frac{1}{10}$ gr.
Liquor Arseni et Hydrargyri Iodidi (Donovan's solution), U. S. P.	2–10 min.

ACIDUM ARSENIOSUM.

(Arsenic, As_2O_3 .)

Arsenous acid appears as an opaque white powder, soluble in 30 to 80 parts of water, and lacks both odor and taste. When thrown on hot coals it volatilizes without melting and emits a strong garlicky odor.

PREPARATION.	DOSE.
Liquor Acidi Arsenosi, U. S. P.	1–5 min.

Physiological Action.—*Circulatory System.*—In therapeutic doses, with the exception of a slight increase in the pulse, arsenic exerts very little influence on the circulation, but in toxic doses it lessens the frequency of the pulse and lowers the blood-pressure, the fall of pressure being due to a depressant action on the heart and vaso-motor nerves, especially those of the abdomen.

Nervous System.—In medicinal doses it serves as a cerebro-spinal stimulant, but in toxic doses it paralyzes the spinal cord, especially the sensory side.

Alimentary Canal.—Small doses increase the appetite and stimulate digestion, but toxic doses produce violent gastro-intestinal inflammation.

Effect on Metabolism.—In small doses it diminishes tissue-waste, and in large doses increases it.

Local Action.—In concentrated form it is a powerful irritant and escharotic.

Elimination.—While it escapes in all the secretions, the kidneys are the avenues through which it is chiefly eliminated.

Toxicology.—When arsenic is being administered in full doses, the first indications of its toxic effect are usually colicky pains in the stomach, looseness of the bowels, or perhaps swelling or puffiness under the eyelids, especially

noticeable in the morning. The last symptom is due to cellulitis, which may become general if the drug is pushed.

After a single large dose of arsenic the patient is seized with obstinate vomiting and purging of serous and bloody material, severe abdominal pain, and the associated symptoms of collapse. In some cases a remission occurs about the third day; in others various cutaneous symptoms appear; in others grave nervous symptoms, such as tremors, convulsions, and coma, develop, and occasionally the symptoms resemble closely acute yellow atrophy of the liver.

Post-mortem examination reveals marked inflammatory changes throughout the gastro-intestinal tract and widespread fatty degeneration of the tissue.

Treatment.—The obstinate vomiting usually renders the stomach-pump unnecessary. The best chemical antidote is the freshly-prepared hydrated sesquioxide of iron, administered in water, in doses of two or three tablespoonfuls every fifteen or twenty minutes. This salt of iron may be prepared by adding an alkali to the tincture of the chloride. The precipitate obtained by the addition of magnesia is to be preferred on account of its twofold antidotal properties. In addition to using the antidote, the temperature should be maintained and demulcents with opium administered.

Therapeutics.—It is used externally as an escharotic, especially in deep-seated but localized lesions like *lupus* and *epithelioma*. When employed in these cases, it should be used in concentrated form, so that the destruction of the part shall be speedy and absorption be prevented. Internally, it is used as an alterative in *diabetes*, *chronic rheumatism*, *rheumatoid arthritis*, *phthisis*, and *asthma*. In the simple *chorea of childhood* it is almost a specific, and is certainly the best single remedy in the various forms of *neuralgia*. In *malaria* it ranks next to quinine in efficiency, and in *anæmia* next to iron. It is employed in a great variety of *skin diseases*, and as it may do harm, even though apparently indicated, it should always be employed tentatively. It is most apt to be of service in the chronic, dry, scaly forms, especially *psoriasis* and *eczema*. In the *gastric neuroses*, like *nervous vomiting* and *gastralgia*, arsenic is often of great value.

Administration.—As patients vary considerably as regards their susceptibility to arsenic, it is always well to begin with small doses and gradually increase them. For pills arsenous acid is generally selected, and for solutions liquor potassii arsenitis. When it is prescribed for its constitutional effect, it should be taken after meals.

Incompatibles.—Magnesia, lime, and solutions containing salts of iron or tannic acid.

The following formulæ will illustrate the methods of prescribing arsenic :

℞ Sodii salicylat.,	ʒiij;
Liquor potass. arsenitis,	fʒj;
Glycerini,	fʒj;
Aq. cinnamom.,	ad fʒiij.—M.
Sig. A dessertspoonful three times daily.	(<i>Diabetes mellitus</i>).

℞ Acidi arsenosi,	gr. j;
Ferri sulphat. exsicc.,	ʒij;
Pulv. pip. nigr.,	ʒj;
Pil. aloes et myrrhæ,	ʒj.—M.
Div. in pil. No. xl.	(Fothergill.)
Sig. One twice daily, after meals.	(<i>Anæmia</i> and <i>chlorosis</i> .)

ASAFÆTIDA.

(Asafetida.)

Asafætida is an inspissated juice obtained by incising the roots of several large umbelliferous plants of the genus *Ferula* (*F. narthex* and *F. scorodosma*) which abound in Persia and Afghanistan. It appears in the form of irregular masses or tears of a yellowish-brown color, and has a persistent garlicky odor and an acrid taste. It consists of resin, gum, and an essential oil which is rich in sulphur. The oil is its most active ingredient.

PREPARATIONS.

DOSE.

Emulsum Asafœtidæ, U. S. P. (4 per cent. watery emulsion)	½–2 fl. oz.
Pilulæ Aloes et Asafœtidæ, U. S. P. (1½ gr. of each)	1–3 pills.
Pilulæ Asafœtidæ, U. S. P. (3 gr.)	1–3 pills.
Tinctura Asafœtidæ, U. S. P.	½–1 fl. dr.

Physiological Action.—On the circulatory and nervous systems it acts as a mild stimulant; on the alimentary canal, as a carminative.

Therapeutics.—Asafœtida is chiefly employed as an antispasmodic and as a carminative. As the former it is used in *nervous excitement*, *whooping-cough*, and *hysteria*, and as the latter it is administered by enema for *colic* and *excessive tympanites*. It is sometimes a valuable drug in *infantile convulsions* and the *restlessness of low fevers*; in those cases it is best employed in the form of suppositories. The drug has also been employed as an anthelmintic and as a stimulating expectorant in *chronic bronchitis*.

Administration.—For continued use, as in hysteria, nervous excitement, etc., the drug is best administered in pill form. In infantile convulsions, colic, tympanites, and the restlessness of febrile diseases it should be administered in the form of suppository or as an enema of the emulsion of asafœtida (1–3 fl. oz.). In whooping-cough and in the extreme restlessness and insomnia observed in the various febrile affections of childhood the following suppositories are often very valuable :

℞ Pulv. asafœtidæ,	ʒj;
Quininæ sulph.,	gr. xxx;
Ol. theobromatis,	q. s.
Ft. suppos. No. xii. (for a child of 5 years).	
Sig. One every three or four hours.	

ASPIDIUM.

(Filix Mas, or Male Fern.)

It is the rhizome of *Dryopteris Filix mas* and of *Dryopteris marginalis*. The active principle, according to Poulsen, is filicic acid.

PREPARATION.	DOSE.
Oleoresina Aspidii, U. S. P.	½–1 dr.

Therapeutics.—Aspidium is used in the form of the oleoresin solely as an anthelmintic against *tapeworm*.

Administration.—It may be prescribed in capsules or as in the following formula :

℞ Oleoresin. aspidii,	fʒss;
Pulv. acaciæ et sacchar.,	āā q. s.;
Aquæ cinnamomi,	q. s. ad fʒj.—M.
Sig. One tablespoonful, repeated if required.	

Fasting should precede, and a laxative follow, its administration.

BALSAMUM PERUVIANUM and BALSAMUM TOLUTANUM.

The balsams of Peru and Tolu are obtained respectively from *Toluiifera Pereiræ* and *Toluiifera balsamum*. The dose of the former is 10 to 30 minims; of the latter, 10 to 20 grains.

PREPARATIONS.	DOSE.
Syrupus Tolutanus, U. S. P.	1-4 fl. dr.
Tinctura Tolutana, U. S. P.	1-2 fl. dr.

Therapeutics.—Balsam of Peru is employed locally as a sedative and parasiticide. Combined with sulphur, as in the following formula, it is a useful remedy in *scabies*:

℞ Sulphur præcip.,		
Balsam Peruv.,	aa	ʒiv.;
Adipis,		
Petrolati,	aa	ʒiss.—M. (Stelwagon.)

It is sometimes used to allay itching in *prurigo* and *pruritus* of the genitals. Internally, it may be employed as an expectorant in *chronic bronchitis*.

Balsam of Tolu has the same therapeutic properties as the balsam of Peru, but, on account of its pleasant flavor, it is chiefly employed as an excipient in cough mixtures.

BELLADONNA.

Belladonna is official as the leaves (*Belladonnæ folia*) and as the root (*Belladonnæ radix*) of *Atropa belladonna*. The active principle is *atropine* or *atropia*, which is official as *atropina* and *atropinæ sulphas*. The former is sparingly soluble in water, the latter in 0.4 part of water and 6.5 parts of alcohol. The dose of either is $\frac{1}{200}$ to $\frac{1}{50}$ of a grain.

PREPARATIONS.	DOSE.
Extractum Belladonnæ Foliorum Alcoholicum, U. S. P.	$\frac{1}{2}$ — $\frac{1}{4}$ gr.
Tinctura Belladonnæ Foliorum, U. S. P.	5-30 min.
Emplastrum Belladonnæ, U. S. P.	
Extractum Belladonnæ Radicis Fluidum, U. S. P.	1-2 min.
Unguentum Belladonnæ, U. S. P.	

Physiological Action.—When taken internally in large doses it produces dryness of the throat, dilatation of the pupils, quickening of the pulse, and sometimes talkative delirium and an erythematous rash on the face and neck resembling that of scarlatina, but lacking the characteristic punctations of the latter.

Circulatory System.—Medicinal doses quicken the pulse and raise the arterial pressure. The quickening of the pulse results from depression of the inhibitory nerves and stimulation of the accelerators. The increased blood-pressure is due to stimulation of the vaso-motor centres and the heart itself. Toxic doses paralyze the heart.

Respiratory System.—Large doses stimulate the respiratory centre; toxic doses paralyze it.

Nervous System.—Large doses stimulate the brain and spinal cord, and sometimes produce tetanic spasms. The cause of the spinal convulsions has not been determined. It acts as a depressant to the motor and sensory nerves, the former being especially affected.

Alimentary Canal.—Small doses increase peristalsis by paralyzing the inhibitory fibres of the splanchnic; large doses arrest peristalsis.

Secretion.—By an inhibitory influence on the nerves supplying the various secretory glands, belladonna lessens nearly all secretions except that from the kidneys.

Local Action.—In concentrated form it acts as a depressant to all highly-organized tissues.

Eye.—It dilates the pupil by paralyzing the peripheral ends of the oculo-motor nerves and by stimulating the ends of the sympathetic.

Elimination.—It escapes from the body chiefly through the kidneys.

Toxicology.—The characteristic phenomena of belladonna-poisoning are dryness of the throat, dilated pupils, quickened pulse and respiration, restlessness, talkative delirium, an erythematous rash, and, finally, paralysis and the symptoms of collapse.

The urine of patients suffering from belladonna-poisoning when dropped in the eye of an animal causes dilatation of the pupil.

Treatment.—Tannic acid should be given freely and the stomach emptied by an emetic or the stomach-pump. Collapse must be met by the use of heart-stimulants.

Therapeutics.—Belladonna is employed in medicine chiefly to relax spasm, to check excessive secretion, to stimulate the vaso-motor centres, to stimulate peristalsis, to allay peripheral irritation, to dilate the pupil, and to antagonize certain poisons.

To Relax Spasm.—In general convulsions it is of little value, though it may be tried in *epilepsy* when bromides and antipyrine fail. In the various *local spasms* belladonna renders much service. Thus it is useful in *whooping-cough*, *laryngismus stridulus*, *urethral* and *rectal spasm*. In *asthma* it may be given internally, although inhalation of the smoke of the leaves often gives better results. In the various forms of *colic*, renal, intestinal, and biliary, atropine is a most valuable adjunct to opium, and should be given freely to guard the latter and to relax spasm. When *incontinence of urine* is due to vesical hyperæsthesia and spasm of the sphincter, as it frequently is in children, belladonna proves a very reliable remedy. In obstinate *torticollis* or *wry-neck* injections of atropine into the muscles are often followed by prompt recovery.

To Check Excessive Secretion.—For this purpose it is employed in the night-sweats of *phthisis*, *ptyalism*, *hyperidrosis*, *bronchorrhœa*, and *serous diarrhœa*. In *mastitis* the application of an ointment of belladonna often speedily arrests the secretion of milk and thus relieves the tension.

To Stimulate Vaso-motor Centres.—In *shock* and *collapse* atropia is a valuable remedy. For its vaso-motor effect it has also been recommended in the late stage of *cholera*.

To Stimulate Peristalsis.—For this purpose it is a useful adjunct to other laxatives in *chronic constipation*.

To Allay Peripheral Irritation.—In the form of an ointment or plaster it is very useful in *muscular rheumatism* (pleurodynia, lumbago, wry-neck), in *rheumatic arthritis*, *adenitis*, *orchitis*, and the *præcordial distress of endo- or pericarditis*. In these cases it is often advantageously combined with an ointment of iodine or mercury.

To Dilate the Pupil.—As a mydriatic it is extensively

employed in *deep-seated inflammation of the eye*, especially *iritis*. In the latter a solution (4 grains to 1 oz.) should be instilled early in the eye, so as to prevent or break up adhesions between the iris and the capsule of the lens. It is also employed as a mydriatic to facilitate ophthalmoscopic examination, but homatropine and cocaine may be substituted with less inconvenience to the patient. As it increases intraocular tension, it is contraindicated in glaucoma.

To Antagonize Certain Poisons.—It is a useful antidote in *poisoning by opium, physostigma, muscarin* (poisonous principle of toadstools), *hydrocyanic acid, aconite, jaborandi, and chloroform*.

In addition to the foregoing affections, belladonna is often useful in *nervous or functional palpitation, acute pharyngitis, and exophthalmic goitre*.

BENZOINUM.

(Benzoin.)

It is a balsamic resin obtained from *Styrax benzoin*. It contains about 14 per cent. of benzoic acid, a trace of volatile oil, and a large amount of amorphous resins. Dose, 10–30 grains.

PREPARATIONS.

DOSE.

Adeps Benzoinatus, U. S. P. (benzoinated lard).	
Tinctura Benzoini, U. S. P.	½–1 fl. dr.
Tinctura Benzoini Composita, U. S. P. (Friar's balsam)	½–1 fl. dr.

Therapeutics.—As the active principle of benzoin is benzoic acid, it is used internally in the same class of affections as the latter, viz. *chronic bronchitis, phosphaturia, and cystitis* with ammoniacal urine. Externally, the tinctures are employed as antiseptics and protectants. Alone or in combination with iodoform it is useful in *retaining dressings* on small wounds. In *chapped nipples, hands, or lips* a combination of four parts of glycerin and one of compound tincture of benzoin makes an efficient application.

BISMUTHUM.

(Bismuth, Bi.)

Of the insoluble salts of bismuth, two are official—the subcarbonate (*bismuthi subcarbonas*) and the subnitrate (*bismuthi subnitras*). These are equivalent in their therapeutic value, the dose of each being from 5 to 30 grains. The salicylate and the subgallate of bismuth, or dermatol, though not official, are also employed in medicine.

BISMUTHI SUBNITRAS. $(\text{BiONO}_3 \cdot \text{H}_2\text{O})$

It occurs as a heavy white powder, free from odor and taste, and insoluble in water or alcohol.

Therapeutics.—It is used externally as a sedative and exsiccant, and internally as a sedative and astringent. In the form of a dusting-powder, bismuth alone or in combination with starch makes an excellent dressing in *chafing*, *erythema*, *acute eczema*, and *burns*. Used as an injection or in the form of a urethral suppository, it is sometimes very efficient in *subacute* and *chronic urethritis*. Internally, it is an invaluable remedy in both *acute* and *chronic inflammations of the gastro-intestinal tract*; thus it may be employed in *acute* and *chronic gastric catarrh*, *ulcer of the stomach*, *diarrhœa*, and *dysentery*. In vomiting due to *gastric irritation* bismuth is very efficient.

Administration.—As a gastro-intestinal sedative it should be given in large doses, not less than 20 to 30 grains, and it may be advantageously combined with an antiseptic like carbolic acid, creosote, or salicylate of sodium. It may be prescribed in powders, compressed pills, or suspended in mucilage of acacia. When used freely it imparts an odor of garlic to the breath and blackens the stools. The following formula will illustrate its use in acute gastro-intestinal inflammation:

℞ Morphinæ sulph.,	gr. j;
Bismuthi subnitratis,	ʒ ^{ss} ;
Creosoti,	gtt. vj.—M.
Ft. in chart. No. xii.	
Sig. One every two or three hours.	

BISMUTHI SALICYLAS.

This preparation contains 76 per cent. of the oxide of bismuth and 23 per cent. of salicylic acid. It is insoluble in ordinary menstrua. The dose is 5 to 15 grains.

Therapeutics.—It may be employed externally as a stimulant, antiseptic, and astringent in *ulcers, wounds*, etc. Internally, it is useful in *gastro-intestinal inflammation*, but, as it is distinctly more irritating than the subnitrate, it must be given in smaller doses. A small amount may be combined advantageously with the subnitrate.

BROMOFORM.

(Tribromomethane, CHBr_3 .)

It is made by the action of hypobromite of sodium on acetone, or bromine on a solution of methyl alcohol and caustic potash. It appears as a clear, colorless liquid, having a pleasant odor and a sweetish taste. It is sparingly soluble in water, but freely so in alcohol and glycerin. The dose is 2 to 6 minims.

Therapeutics.—It has been employed as an anæsthetic, antispasmodic, analgesic, and antizymotic. As a general anæsthetic it resembles chloroform, but it possesses no advantage over the latter. Lately it has been used quite extensively in the treatment of *whooping-cough*, and in many cases it seems to lessen decidedly the severity and frequency of the paroxysms. Solis Cohen has recommended it as an analgesic and antiseptic application in *ozæna* and in *tuberculous* and other *ulcers of the larynx*.

Administration.—It is best given in water to which a little alcohol has been added to effect its solution. The following formula will be found useful in *whooping-cough*:

℞ Bromoform.,	ʒj;
Alcohol.,	ʒxxx;
Glycerin.,	ʒj;
Aquæ destil.,	q. s. ad ʒij.—M.

Sig. A teaspoonful every three hours to a child of two years.

BROMUM.

(Bromine, Br.)

A dark-red volatile liquid, emitting irritating fumes and having a caustic taste. It is soluble in 33 parts of water,

and very soluble in chloroform, ether, and alcohol, the last two of which it gradually decomposes.

Therapeutics.—It is employed almost exclusively as a caustic in *hospital gangrene*, *phagedenic ulcers*, and *sloughing chancroids*.

BUCHU.

The dried leaves of the *Barosma betulina* and other species of the same genus.

PREPARATION.	DOSE.
Extractum Buchu Fluidum, U. S. P.	20 min.—1 fl. dr.

Therapeutics.—It is employed almost exclusively as a stimulating diuretic in *subacute* and *chronic inflammations of the genito-urinary tract*, as *pyelitis*, *cystitis*, and *urethritis*. The following formula illustrates its use in subacute pyelitis and cystitis :

℞ Ext. buchu fl.,	℥j;	
Potass. citrat.,	ʒij;	
Spt. æther. nitros.,	℥ss;	
Syr. limonis,	q. s. ad ℥ij.	—M. (Wood.)
Sig. Teaspoonful every three hours.		

CACTUS GRANDIFLORUS.

This plant, known as *Cereus grandiflora*, or *night-blooming cereus*, though unofficial, has been employed medicinally for a number of years on account of its stimulating effect on the heart. It is said to contain a proximate principle which is known as *cactina*. The tincture and fluid extract are available preparations, the dose of the former being 20 to 30 minims; of the latter, 5 to 10 minims.

Physiological Action and Therapeutics.—On the heart it acts like digitalis, increasing the energy of systole and diminishing the number of cardiac pulsations. It also exerts a diuretic effect, probably in the same manner as digitalis. Unlike the latter, it has no tendency to disturb the stomach, and appears to be free from cumulative properties. It may be employed with advantage in *functional affections of the heart*, in *simple dilatation*, and in *valvular disease* with failing compensation when digitalis is not well borne or is not followed by favorable results.

CAFFEINA.

(Caffeine, $C_8H_{10}N_4O_2 \cdot H_2O$.)

It is obtained from the dried seeds of the *Coffea Arabica* and the dried leaves of *Camellia thea*. The alkaloid from the latter plant is in reality *theine*, but it is frequently sold as caffeine, with which it is chemically identical. It appears as colorless, fine, silky crystals, having a bitter taste and a neutral reaction, and soluble in about 75 parts of water. The addition of a benzoate or salicylate to the water renders the alkaloid freely soluble. Dose, 1 to 5 grains.

Physiological Action.—*Circulatory System.*—Ordinary doses cause an increase in the frequency of the pulse and a slight rise in the blood-pressure.

Nervous System.—Caffeine exerts a stimulant effect upon the entire nervous system. Even in small doses it brightens the intellect and causes sleeplessness. Large doses produce great cerebral excitement, exaggerate the reflexes, and sometimes induce convulsions. The latter seem to be of spinal origin, since section of the cord high up in animals does not prevent them. The drug has no effect on the peripheral nerves.

Respiratory System.—It increases the respiration by its stimulant action on the medulla.

Kidneys.—It frequently, though not invariably, increases the flow of urine by directly stimulating the renal cells.

Tissue-metabolism.—It probably lessens in some degree tissue-waste.

Elimination.—In ordinary doses it is destroyed in the system; in toxic doses it is eliminated, in part unchanged, by the kidneys.

Therapeutics.—It is used as a cardiac stimulant in the same class of cases in which digitalis is used, although its action is generally inferior to digitalis and strophanthus. In *cardiac* and *renal dropsy* it is sometimes an efficient diuretic, but frequently the results are disappointing. As a respiratory stimulant it is valuable in *poisoning from opium* and other drugs which depress the respiratory centre. Alone or in combination with antipyrine or the bromides, it is often useful in *nervous headache* and *migraine*.

Contraindication.—It is contraindicated in all conditions associated with insomnia; and even when indicated, on account of its tendency to produce wakefulness, it is best not to administer it late in the day.

Administration.—The citrate of caffeine, being more soluble than the alkaloid itself, is generally selected for internal administration. When a prompt action is desired the drug should be given hypodermically; and, since caffeine is decomposed in the presence of water, it should be given in combination with a salicylate or benzoate, the double salt thus formed being more stable than the alkaloid itself. The following formulæ will illustrate the method of prescribing it:

- | | |
|---|--------------|
| ℞ Caffeinæ citrat., | gr. xij; |
| Phenacetin, | ʒj; |
| Sacchar. alb., | ʒss.—M. |
| Ft. in chart. No. xii. | |
| Sig. One every hour until relieved (in <i>nervous headache</i>). | |
| | |
| ℞ Caffein., | ʒj; |
| Sodii benzoat., | ʒiss.—M. |
| Ft. in chart No. xii. | |
| Sig. One every two or three hours (in <i>pulmonary œdema</i>). | |
| | |
| ℞ Caffein., | gr. xx; |
| Sodii salicylat., | gr. xviiiss; |
| Aquæ destil., | ʒj. |
| Sig. 3 minims = 1 grain of caffeine (for <i>hypodermic use</i>). | |

CALCIUM.

The metal calcium is unofficial, but is the source of a number of official salts.

CALCII BROMIDUM.

(CaBr₂.)

A white, granular, deliquescent salt, having a pungent saline taste. It is soluble in 0.7 part of water and 1 part of alcohol. Dose, 1/2 to 1 drachm.

Therapeutics.—It is employed as a nervous sedative and hypnotic in exactly the same class of cases in which the bromide of potassium is employed. It is said to be less depressing than the corresponding potassium salt.

CALCII CARBONAS PRÆCIPITATUS.(Precipitated Carbonate of Calcium, CaCO_3 .)

A fine white insoluble powder, free from odor and taste. Dose, 10 to 30 grains.

Therapeutics.—It is employed internally as a mild astringent and antacid, quite free from irritating properties. It may be employed in *acute inflammatory diarrhœa* in the same manner as bismuth subnitrate. As an antacid it is generally inferior to the sodium salts, but when the acidity is associated with relaxation of the bowels it is very efficient. It is a useful antidote in *oxalic-acid poisoning*. It is much used as a tooth-powder.

Externally, it is employed as a dusting-powder in *erythematous eczema* and *intertrigo*. It is particularly useful in the *chafing of the genitalia and buttocks* of young children from the irritation of urine.

CALCII CHLORIDI.(CaCl₂.)

It appears in colorless, translucent, friable masses, very deliquescent, and having a sharp saline taste and a neutral reaction. It is soluble in 1.5 parts of water and 8 parts of alcohol. The dose is 5 to 20 grains. As it is distinctly irritating to the stomach, it should be given well diluted.

Therapeutics.—It has been strongly recommended in *scrofulous enlargement of the cervical glands* in children and in other tuberculous affections, but the lactophosphate and hypophosphites are less irritating, and have to a large extent taken the place of the chloride. Crombie claims to have given it with good results in *croupous pneumonia*. Wright and Mayo Robson have found that its continuous use is followed by a marked increase in the coagulability of the blood, and therefore recommend it in repeated *hemorrhages, aneurism, and hæmophilia*.

CALCII HYDRAS.(Calcium Hydrate, or Slaked Lime, $\text{Ca}(\text{HO})_2$.)

Slaked lime is not official, but its saturated solution forms the liquor calcis of the Pharmacopœia. The dose of lime-water is $\frac{1}{2}$ to 2 fluidounces.

PREPARATIONS OF LIME-WATER.

Linimentum Calcis, U. S. P. (lime liniment, or Carron oil), contains equal volumes of lime-water and linseed oil.

Lotio Hydrargyri Flava (yellow wash) contains ℥ss of corrosive sublimate to a pint of lime-water.

Lotio Hydrargyri Nigra (black wash) contains ℥j of calomel to a pint of lime-water.

Therapeutics.—Lime-water is employed extensively as an *antacid*. In all affections, either in children or adults, in which cow's milk is the chief article of diet, it may be added to the latter with advantage for the purpose of preventing the development of hard coagula. In the *diarrhœa of children* and in *typhoid fever* it is especially useful prescribed in this way. It is often very efficient in *obstinate vomiting*, particularly when the latter is due to a high degree of acidity or to inflammatory affections of the stomach.

In the form of a spray it is frequently used as a solvent of the false membrane in *diphtheria*, although it is too feeble to be of much service. To accomplish the same effect, lime is often slaked in the room in which the patient is being treated. When employed as a solvent it may be prescribed as follows :

℞ Acidi carbolici,	℥xij;
Glycerini,	℥j;
Liquor calcis,	q. s. ad ℥iv.—M.

Sig. Apply with an atomizer every hour.

As an alkaline astringent it is sometimes employed as an injection in *vaginitis*, *leucorrhœa*, and *urethritis*. It may be used as an injection in *seat-worms*, although it is inferior to an infusion of quassia. Carron oil is used as a dressing for *burns* or *scalds*. It has received its name from being so extensively employed by the workmen in the foundries at Carron.

Black wash and yellow wash are preparations of the black and yellow oxide of mercury respectively. Black wash makes an invaluable dressing for all forms of *acute eczema*. Yellow wash is more stimulating, and makes a useful application for *syphilitic* and *chancroidal ulcers*.

**CALCII HYPOPHOSPHIS and CALCII PHOSPHAS
PRÆCIPITATUS.**

(Calcium Hypophosphite, $\text{Ca}(\text{PH}_2\text{O}_2)_2$, and Precipitated Calcium Phosphate, $\text{Ca}_3(\text{PO}_4)_2$.)

The dose of either salt is 10–20 grains.

PREPARATIONS.	DOSE.
Syrupus Hypophosphitum, U. S. P. (hypophosphites of calcium, potassium, and sodium)	1–4 fl. dr.
Syrupus Calcii Lactophosphatis, U. S. P.	1–4 fl. dr.

Therapeutics.—They are useful remedies in *rickets*, in which affection they not only supply the much-needed lime, but also serve to improve the general nutrition. In the *anæmia* and *nervous prostration* brought about by overwork, frequent child-bearing, or excessive menstruation these salts of calcium are extremely efficacious. In the early stage of *phthisis* they are excellent tonics, and may be exhibited in combination with cod-liver oil.

CALX.

(Lime, CaO .)

Official lime is obtained by burning white marble, oyster-shells, or the purest varieties of calcium carbonate. It appears in the form of hard whitish masses, which in the presence of water evolve heat and form calcium hydrate or slaked lime.

PREPARATIONS.

Potassa cum Calce, U. S. P. (potassa with lime, Vienna paste), contains equal parts of lime and caustic potash.
Syrupus Calcis, U. S. P. Dose, $\frac{1}{2}$ to 2 fl. dr.

Therapeutics.—Unslaked lime and potassa with lime are used as caustics. The syrup of lime may be given with milk as a substitute for lime-water when dilution of the former is undesirable. It is also an efficient antidote for *poisoning by mineral acids, oxalic acid, and chloride of zinc.*

CALX CHLORATA.

(Chlorinated Lime.)

A preparation, often improperly called “chloride of lime,” made by the action of chlorine on slaked lime.

The official product should contain not less than 35 per cent. of available chlorine. It appears as a grayish powder, having a strong odor of chlorine and a disagreeable saline taste. It is only partially soluble in water and alcohol.

Therapeutics.—Chlorinated lime is never used internally, but, as it is a powerful germicide and deodorizer, it is a valuable *disinfectant*, when freely used, for the stools of typhoid and kindred diseases, water-closets, privies, sewers, drains, etc.

CALX SULPHURATA.

(Sulphurated Lime, Crude Calcium Sulphide.)

A mixture containing at least 60 per cent. of pure calcium sulphide and variable amounts of calcium sulphate and carbon. It appears as a grayish powder, emitting the odor of sulphuretted hydrogen, slightly soluble in water, insoluble in alcohol. Dose, $\frac{1}{10}$ to $\frac{1}{2}$ a grain in pill.

Therapeutics.—Internally, sulphurated lime is often useful in *acne*, *boils*, *carbuncles*, etc. to prevent suppuration, or, if the latter has already occurred, to hasten maturation and the expulsion of the pus. In *pustular acne* $\frac{1}{10}$ of a grain every three or four hours is often decidedly beneficial, but it not infrequently deranges digestion and produces flatus.

In *psoriasis* and the various forms of *ringworm* it is a useful application in the form of Vlemingckx's solution:

R	Calcis,	$\frac{z}{3}$ ss;
	Sulphuris sublimati,	$\frac{z}{3}$ j;
	Aquæ,	f $\frac{z}{3}$ x.
	Coque ad f $\frac{z}{3}$ vj, deinde filtra.	

As it is irritating, it should be well diluted at first.

CRETA PRÆPARATA.

(Prepared Chalk.)

A white amorphous powder, free from odor and taste, and insoluble in water and alcohol. Dose, 20–60 gr.

PREPARATION.	DOSE.
Pilulæ Catharticæ Compositæ (for composition, see <i>Coccyth</i>)	1-2 pills.

Physiological Action and Therapeutics.—Gamboge acts as an irritating drastic cathartic, producing copious watery stools with much griping. In toxic doses it causes violent gastro-enteritis with mucous and bloody discharges. It is rarely prescribed alone, but in combination with other less active cathartics. It is only indicated in very obstinate *chronic constipation*.

CAMPHORA.

(Camphor, $C_{10}H_{16}O$.)

A whitish, translucent, volatile substance, having a penetrating odor and a pungent taste, and obtained by distilling the wood of an Oriental tree—*Cinnamomum camphora*. It dissolves freely in all ordinary menstrua except water, in which it is only sparingly soluble. The dose is 1 to 5 grains in pill form.

PREPARATIONS.	DOSE.
Aqua Camphoræ, U. S. P.	1-4 fl. dr.
Linimentum Camphoræ, U. S. P.	
Spiritus Camphoræ, U. S. P.	10-20 min.

It also enters into *Linimentum Saponis* and *Tinctura Opii Camphorata*.

Physiological Action.—In large amounts camphor produces cerebral excitation, vertigo, tinnitus aurium, the symptoms of severe gastro-intestinal irritation, and collapse. In small doses it serves as a stimulant to the nervous system and as a mild carminative, producing a sensation of warmth in the stomach, increasing peristalsis, and expelling flatus. Medicinal doses produce an anaphrodisiac effect.

Therapeutics.—It is employed as an antispasmodic, carminative, and rubefacient.

Antispasmodic.—It is a valuable sedative in the restlessness, excitement, and delirium of *low fevers*. It is also of service in *nervous prostration, hysteria, nervous vomiting, hiccough, whooping-cough, dysmenorrhœa, and morbid sexual excitement*.

Carminative.—As such it is often efficient in *tympanites*, *intestinal colic*, *cholera morbus*, and *serous diarrhœa*.

Rubefacient.—In the form of a liniment it is much used as a mild counterirritant in *sprains*, *bruises*, etc.

CAMPHORA MONOBROMATA.

(Monobromated Camphor, $C_{10}H_{15}BrO$.)

It is obtained from the union of bromine and camphor in the presence of heat, and occurs as colorless prismatic needles or scales, having a mild camphoraceous odor and taste. It is only sparingly soluble in water and glycerin, but freely soluble in alcohol, ether, and chloroform. Dose, 3 to 5 grains in pill.

Physiological Action.—In small doses it acts as a sedative to the nervous system. Toxic doses have been followed by tremors, muscular relaxation, epileptiform convulsions, slowing of the pulse, embarrassed respiration, and coma.

Therapeutics.—It is employed as an antispasmodic, hypnotic, and anaphrodisiac. It sometimes proves an efficient sedative in *nervous excitement*, *hysteria*, *chorea*, and *delirium tremens*. It is often exceedingly useful in *abnormal sexual excitement*, *chordee*, *spermatorrhœa*, etc.

CANNABIS INDICA.

(Indian Hemp.)

The flowering tops of an East Indian plant, *Cannabis sativa*.

PREPARATIONS.

DOSE.

Extractum Cannabis Indicæ, U. S. P.	$\frac{1}{4}$ – $\frac{1}{2}$ gr.
Extractum Cannabis Indicæ Fluidum, U. S. P.	5–20 min.
Tinctura Cannabis Indicæ, U. S. P.	10 min.—1 fl. dr.

Physiological Action.—In full doses it produces a condition of mental exhilaration associated with hallucinations and disordered consciousness of time, locality, and personality. This stage of excitement finally gives way to sleep, which may last several hours. Sensation is perverted and benumbed, and before sleep is induced there is often more or less general anæsthesia.

Upon the circulatory and respiratory systems the drug has little influence.

Therapeutics.—As a sedative and soporific it may be used instead of opium when for any reason the latter is unavailable. For this purpose it is often highly efficient in the persistent cough of *chronic bronchitis* and *phthisis*, in the dyspnoea of *asthma*, and in the restlessness and insomnia of *chronic nephritis*. As an analgesic it is very valuable in certain forms of *neuralgia*, especially *migraine*, in which affection it is not only useful between, but also during, the paroxysms. In some forms of *dysmenorrhœa* and *menorrhagia* it proves serviceable. In combination with the bromide of potassium it is often very useful in *mania* and *delirium tremens*.

Sée and Suckling have strongly recommended it in painful affections of the stomach, such as *gastralgia* and *gastric ulcer*.

CANTHARIS.

(Cantharides, Spanish Flies.)

The dried body of the beetle, *Cantharis vesicatoria*, found chiefly in the South of Europe. The active principle is *cantharidin*, a tasteless, odorless substance, almost insoluble in water and alcohol, but uniting with caustic alkalies and forming soluble salts.

PREPARATIONS.

DOSE.

Ceratum Cantharidis, U. S. P.

Collodium Cantharidatum, U. S. P. (cantharidal collodion).

Emplastrum Picis Cantharidatum, U. S. P. ("warming plaster.")

Tinctura Cantharidis, U. S. P. 1-5 min.

Physiological Action.—In small doses it acts as a stimulant to the kidneys and causes some increase in the urine. Toxic doses produce the symptoms of gastroenteritis—pain, nausea, vomiting and purging of bloody material; the symptoms of severe genito-urinary irritation—pain in the loins, difficult micturition, priapism, and suppression of urine, the latter often containing albumin and blood; and finally coma, convulsions, and asphyxia.

When applied to the skin it produces redness, burning, and vesication, and if its action is continued it may lead to pustulation, ulceration, and sloughing.

Therapeutics.—Externally it is employed as a vesicant, and internally as a stimulant to the genito-urinary tract.

Vesicant.—In deep-seated inflammations, like *pleurisy*, *pneumonia*, *pericarditis*, *meningitis*, *neuritis*, *synovitis*, and *periostitis*, cantharides is the most useful vesicant.

Genito-urinary Stimulant.—In *Bright's disease*, after the acute symptoms have subsided and the urine still contains a little albumin and blood, cantharides, one or two drops three or four times daily, is often very efficient. It is also serviceable in *chronic pyelitis*, *cystitis*, and *urethritis*.

In those *atonic conditions of the bladder* associated with frequent painless micturition, and frequently observed in middle-aged women and old people, cantharides (1-3 drops thrice daily) often affords prompt relief. In the *incontinence of urine* observed in children it is sometimes useful, but is generally inferior to belladonna.

The tincture of cantharides is frequently used in conjunction with other remedies as a local application in the treatment of *alopecia* and *seborrhœa*.

Recently, Liebreich and others have recommended the subcutaneous use of cantharides in combination with alkalis in the treatment of *tuberculosis*. While the value of this method is still undetermined, the accumulated testimony gives little encouragement for its employment in this affection.

Contraindications.—In the old, young, and debilitated, blisters should be used with extreme caution. In acute nephritis cantharides should not be employed either externally or internally.

Administration.—For internal use the tincture is the only preparation employed. When a blister is employed, the part may be painted with cantharidal collodion or covered with a rag spread with the cerate. Cantharides requires from 6 to 10 hours to draw a blister, the time varying with the locality and the condition of the skin. It is, however, much better to remove the blister at the end of four or five hours, when the part is bright red and shows

slight vesication, and to complete the process by the application of a flaxseed poultice.

Cantharidal pitch plaster, or "warming plaster," is used as an active rubefacient.

A blister may be prescribed in the following manner :

℞ Cerat. cantharidis, q. s.
Ft. emplastrum ii × iii unc.
Sig. Apply as directed.

CAPSICUM.

(Cayenne Pepper, African Pepper.)

The dried fruit of *Capsicum fastigiatum*. Its active principle is *capsicin*, which appears as a reddish, volatile, acrid liquid. The dose of the powdered drug is 2 to 3 grains.

PREPARATIONS.	DOSE.
Emplastrum Capsici, U. S. P.	
Extractum Capsici Fluidum, U. S. P.	2-5 min.
Oleoresina Capsici, U. S. P.	1/8-1/2 gr.
Tinctura Capsici, U. S. P.	5-10 min.

Physiological Action and Therapeutics.—Externally applied, capsicum causes heat, redness, and, on all delicate skins, vesication. When taken internally in small doses it produces a sense of warmth in the epigastrium, quickens the appetite, and stimulates digestion. It also excites peristalsis and assists in the expulsion of flatus. In large doses it produces all the symptoms of gastro-enteritis. It is employed chiefly as a rubefacient, stomachic, and carminative. In the form of a liniment it is sometimes an excellent remedy in *wry-neck*, *muscular rheumatism*, and *sprains*. The capsicum plaster is an efficient counterirritant in *pleurodynia*, *bronchitis*, and *superficial inflammations* generally. A drachm of the tincture in half a pint of water has been much employed in *sore throat* with a relaxed uvula, but the remedy is inferior to many others, and in severe inflammations is calculated to do harm.

In the *subacute gastric catarrh* following an alcoholic debauch, and characterized by fetid breath, complete anorexia, nausea, vomiting, and a sinking sensation in the

stomach, tincture of capsicum in ten-drop doses is invaluable.

In *obstinate constipation* due to deficient peristalsis a small amount of the oleoresin may be advantageously added to a cathartic pill.

CARBO.

(Carbon, Charcoal.)

Charcoal is official in the following forms :

Carbo Animalis (prepared from bone).

Carbo Animalis Purificatus (purified by boiling in dilute hydrochloric acid).

Carbo ligni (prepared from soft wood).

Therapeutics.—Charcoal is employed as an absorbent of foul gases, as a deodorant and disinfectant. Administered internally, it is useful in affections of the gastro-intestinal tract associated with hyperacidity and flatulent distension. It may be given with advantage in *chronic gastric catarrh, cancer, intestinal dyspepsia, and diarrhœa* when flatulence is a prominent symptom. The dose is 10 to 20 grains. It is sometimes used as a tooth-powder, but it is much more apt to scratch the enamel than preparations of chalk.

In the form of a poultice made by mixing one part of charcoal with three parts of flaxseed-meal it makes an excellent dressing for *gangrenous and sloughing ulcers*.

Administration.—For internal use it may be prescribed in pill form, or in powders, as in the following formula for flatulent dyspepsia :

℞ Pulv. carbonis ligni,
Magnesiæ ponderosæ,
Bismuthi salicylatis,

āā ʒij;
gr. lxx.—M.

Ft. in chart. No. xxiv.
Sig. One before meals.

CARBONEI DISULPHIDUM.

(Carbon Bisulphide, CS₂.)

It appears as a colorless, inflammable liquid, having a strong characteristic odor and an aromatic taste. It is

almost insoluble in water, but freely so in alcohol, ether, and chloroform. Dose, $\frac{1}{2}$ to 2 drops.

Therapeutics.—It has been employed externally as a counterirritant and anæsthetic in *neuralgia* and *enlarged lymphatic glands*, and internally as an antiseptic. As the latter it has been highly recommended by Dujardin-Beaumez in *typhoid fever*, and in obstructive jaundice to prevent putridity of the stools. He prescribes it as follows:

℞ Carbon. disulphid.,	ʒvj;
Spirit. menthæ piperitæ,	℥xv;
Aquæ,	Oj.

M. Shake the mixture and allow to settle; decant off the clear solution when needed, and renew the water. Give five or six tablespoonfuls of the carbon-disulphide water in milk every day.

CARDAMOMUM.

(Cardamom.)

The fruit of *Elettaria repens*. It contains an aromatic volatile oil, a fixed oil, and a camphor.

PREPARATIONS.

DOSE.

Pulvis Aromaticus, U. S. P.	10-20 grs.
Tinctura Cardamomi, U. S. P.	30-60 min.
Tinctura Cardamomi Composita, U. S. P.	1-2 fl. drs.

Therapeutics.—It is used as an agreeable aromatic for disguising the taste of other drugs, and as a carminative in *flatulent dyspepsia*.

CARYOPHYLLUS.

(Cloves.)

The dried unexpanded flowers of *Eugenia aromatica*. It contains tannic acid, gum, resin, and a large amount of a volatile oil which is official as *oleum caryophylli*. The dose of the oil is 1 to 3 drops.

Therapeutics.—It is used as a mild counterirritant, as a carminative, and as a local anæsthetic.

As a rubefacient it may be used in a liniment in *muscular rheumatism* and *neuralgia*. It is one of the active ingredients of the *spice poultice*, which consists of: Powdered cloves, ginger, and cinnamon, each, one or two teaspoonfuls; flour, a tablespoonful; whiskey, enough to make a

mass moist enough to spread on soft flannel. In this form it is a useful counterirritant for applying to the abdomen of children suffering with *diarrhæa*.

As a carminative it makes a useful addition to laxative pills, and aids materially in preventing *gripping*. In *intestinal colic* brought on by exposure a drop or two of oil of cloves in a teaspoonful of paregoric, repeated at short intervals, often gives speedy relief.

In *neuralgia* it may be used as a local anæsthetic, being rubbed in along the course of the painful nerve. A pledget of cotton containing oil of cloves, placed in the cavity of the tooth, is a valuable anodyne application in *toothache*.

CASCARA SAGRADA.

(*Rhamnus Purshiana*.)

The dried bark of the *Rhamnus purshiana*, growing on the Pacific coast.

PREPARATION.

DOSE.

Extractum Rhamni Purshianæ Fluidum, U. S. P. . . . ½-1 fl. dr.

Therapeutics.—It is used exclusively as a tonic laxative, and in *habitual constipation* due to deficient peristalsis it is a most reliable remedy. It possesses the great advantage of not readily losing its effect, and, indeed, in most cases the dose can be gradually lessened and still prove efficient.

Administration.—In most cases half a drachm of the fluid extract at bedtime will afford relief, but sometimes small doses (20 drops) taken after each meal give better results. It may be prescribed alone, with aromatic elixir, or as in the following formula:

℞ Ext. rhamni purshianæ fl.,	ʒi;
Spt. aurantii comp.,	ʒij;
Alcohol.,	ʒij;
Syrupi,	ʒiv;
Aquæ cinnamomi,	q. s. ad ʒiv.—M.

Sig. One or two teaspoonfuls at night.

CATECHU.

An extract of the wood of *Acacia catechu*, a native of Southern Asia. It contains a large amount of tannic acid,

which renders it a valuable astringent. Dose, 20 to 30 grains in powder.

PREPARATIONS.	DOSE.
Tinctura Catechu Composita, U. S. P. (contains also cin- namon)	1-3 fl. dr.
Trochisci Catechu (contain nearly 1 gr. each).	

Therapeutics.—It is used solely as an astringent, and as a therapeutic agent is equivalent to kino and krameria. In *diarrhœa* characterized by copious serous discharges it may be given alone or in combination with other astringents. In *ptyalism* and *spongy gums* a small piece may be held in the mouth and allowed to dissolve. An infusion of the drug is sometimes an efficient local remedy in *leucorrhœa*, decidedly lessening the amount of secretion. The tincture may be a useful application in *chapped nipples*. The troches are occasionally employed in *sore throat* with relaxation of the uvula.

CERII OXALAS.

(Cerium Oxalate, $Ce(C_2O_4)_3 + 9H_2O$.)

It occurs as a white, odorless, and tasteless powder, insoluble in ordinary menstrua. The dose is 2 to 5 grains.

Therapeutics.—It has been chiefly used for *excessive vomiting*, especially when it occurs in pregnancy. It has also been recommended in certain chronic nervous affections, such as *chorea* and *epilepsy*.

CHENOPODIUM.

(American Wormseed.)

The fruit of *Chenopodium ambrosioides*. The active principle is a bitter volatile oil which is official as *oleum chenopodii*. The dose of the oil is 5 to 10 minims, in capsules, emulsion, or on sugar.

Therapeutics.—It is an efficient vermifuge against the *round-worm*.

CHIMAPHILA.

(Pipsissewa.)

The leaves of *Chimaphila umbellata*. It contains tannic acid and several neutral principles.

PREPARATION.	DOSE.
Extractum Chimaphilæ Fluidum, U. S. P.	1 fl. dr.

Therapeutics.—It has a diuretic and astringent action, and may be employed as a substitute for uva ursi in the treatment of chronic inflammations of the genito-urinary tract, such as *pyelitis* and *cystitis*.

CHIRATA.

(Chiretta.)

The dried plant *Swertia chirata*, growing in India. It contains a bitter principle, *chiratin*, and ophelic acid, which is also intensely bitter, but it is free from tannic acid.

PREPARATIONS.	DOSE.
Extractum Chiratæ Fluidum, U. S. P.	½-1 fl. dr.
Tinctura Chiratæ, U. S. P.	1-2 fl. dr.

Therapeutics.—It is a useful bitter and cholagogue, and is especially indicated in *atonic dyspepsia* and in *constipation* dependent upon hepatic torpor.

CHLORALAMIDE.

(Chloral Formamide.)

A synthetic compound obtained by the union of chloral with formamide. It occurs in the form of colorless crystals, having a slightly bitter taste, and imperfectly soluble in water, but freely so in alcohol. The dose is 10 to 30 grains.

Physiological Action.—The dominant action of chloralamide is on the cerebrum, which it depresses, causing natural sleep. Unlike chloral, it is only a feeble depressant to the spinal cord, is a powerful stimulant to the respiratory centre, and has little effect on the circulation. In toxic doses, however, it depresses the heart and paralyzes the respiratory centre.

Therapeutics.—Chloralamide is a pure hypnotic, less depressing and less irritating to the stomach than chloral, but at the same time less active and less prompt in its action. It is an excellent somnifacient in *chronic heart, lung, and kidney disease*, in *hysteria, neurasthenia, delirium*

tremens, *senility*, and *acute fevers*. When wakefulness is due to pain, opium is a far better remedy. As a rule, no bad after-effects are noted, and patients do not become readily accustomed to the drug.

It has also been highly recommended as a sedative in *cardiac asthma*, and, in combination with potassium bromide, as a superior remedy in *sea-sickness*.

Administration.—It may be given in simple syrup to which a few drops of hydrochloric acid have been added, or in aromatic elixir, as in the following formula:

℞ Chloralamide,	gr. lxxx;
Elixir aromatic.,	fʒij.—M.
Sig. A teaspoonful in water, repeated in two hours if necessary.	

CHLORAL.

(Chloral Hydrate, $C_2HCl_3O.H_2O$.)

Chloral, U. S. P., or chloral hydrate, is obtained from the union of water with tri-chlor-aldehyde, the latter being a product of the action of chlorine on alcohol. It appears in the form of colorless transparent crystals, having a bitterish, caustic taste and a neutral reaction. It is freely soluble in water, alcohol, ether, and chloroform. Dose, 10 to 20 grains.

Physiological Action.—*Circulatory System.*—In large doses it lowers the blood-pressure by depressing the heart and vaso-motor centre.

Nervous System.—The dominant action of chloral is on the nervous system. It exerts a powerful depressant effect on the spinal cord, especially the motor columns, and induces sleep by a direct sedative influence on the cerebrum.

Respiratory System.—Ordinary doses do not affect the respiration, but toxic doses paralyze the respiratory centre.

Temperature.—Large doses cause a distinct lowering of the body-temperature.

Local Action.—Upon mucous membranes and raw surfaces it is a powerful irritant.

Action on Lower Organisms.—It is destructive to lower organisms, and prevents decomposition.

Elimination.—Chloral circulates in the blood as chloral,

and is eliminated by the kidneys as urochloralic acid. When taken in excess it escapes in the urine unchanged. It should be borne in mind that the urine of patients taking chloral responds to Fehling's test for sugar.

Toxicology.—The ingestion of a toxic dose produces sleep which soon deepens into coma; the pulse becomes feeble and thready, the respiration embarrassed, the surface cold and clammy, the pupils at first contracted and then dilated, and finally death results from cardiac and respiratory paralysis.

Treatment.—The temperature must be maintained by the external application of heat. Brunton and Stricker found that animals would stand much larger doses of chloral when their temperatures were kept up artificially than when left exposed. The patient should be aroused by friction, flagellation, douches, etc., but should not be shaken or forcibly made to walk, as in opium-poisoning, on account of the danger of heart-failure. Cardiac and respiratory stimulants like strychnia, atropia, ammonia, and digitalis should be given freely. Artificial respiration should be resorted to early, before the development of asphyxia.

Therapeutics.—Chloral is chiefly used to produce sleep and to check spasm.

Somnifacient.—It is a valuable hypnotic, producing quiet and refreshing sleep. It is especially indicated in the *insomnia* of overwork, excitement, fever, delirium tremens, mania, and chronic nephritis.

Antispasmodic.—It may be employed with advantage to arrest *uræmic* and *puerperal convulsions*. In conjunction with the bromide of potassium it is perhaps the best sedative in the *convulsions of tetanus* and *strychnia-poisoning*. In grave cases of *epilepsy*, in *whooping-cough* attended with violent paroxysms, and in *chorea gravior* chloral is often useful, but in the milder manifestations of these diseases it should not be selected, on account of the depressing effect which follows its continued use.

As an antiseptic it has been employed as a wash for *foul ulcers*, as a vaginal douche in *cancer of the uterus*, and as a local application in *diphtheria*, but at present it is rarely used as an antizymotic except in preventing the decompo-

sition of urine. It may be employed to preserve urine for microscopic examination or to purify the urinals of paraplegics.

When equal parts of chloral and camphor are rubbed together a clear syrupy liquid is formed, which is termed *chloral camphor*. It is used as a local anæsthetic in *neuralgia* and *toothache*. In the form of an ointment, 10 to 15 grains to the ounce, it is useful in *pruritus*.

Contraindications.—Marked cardiac and respiratory weakness are contraindications to its use. In the chronic neuroses it must be given with considerable caution, on account of the danger of producing the “chloral habit.”

Administration.—It should be given, well diluted, in some agreeable syrup, as in the following formula:

℞ Chloralis,	ʒj;
Syrupi,	ʒj;
Mucilag. acaciæ,	ʒss;
Aquæ,	q. s. ad ʒij.—M.
Sig. A tablespoonful at bed-time (in <i>insomnia</i>).	

Incompatibles.—All alkalies.

CHLOROFORMUM.

(Chloroform, Chloroformum Purificatum, CHCl_3 .)

A heavy, colorless, non-inflammable liquid obtained by the action of chlorine on alcohol. It is soluble in 200 times its volume of water, and in all proportions in alcohol, oils, and ether.

PREPARATIONS.	DOSE.
Aqua Chloroformi, U. S. P.	½–2 fl. oz.
Emulum Chloroformi, U. S. P. (4 parts of chloroform in 100)	½–1 fl. oz.
Linimentum Chloroformi, U. S. P.	
Spiritus Chloroformi, U. S. P.	20–60 min.

Physiological Action.—When freely inhaled, it produces a set of phenomena which may be grouped under three stages. The first stage is characterized by excitement, muscular rigidity, and lessened sensibility; the second, by anæsthesia and muscular relaxation; and the third, by stertorous breathing, abolition of reflexes, profound narcosis, and absolute muscular relaxation.

Circulatory System.—The dominant effect of chloroform on the heart is that of a depressant. When death occurs during anæsthesia, it generally results from heart-failure, although in some instances it is due to respiratory paralysis.

Nervous System.—It depresses the nervous system in the following order: first, the brain; next, the sensory side of the cord; next, the motor side of the cord; next, the reflex centres in the medulla; and finally, the respiratory centre, although death generally results from heart-failure before the last is affected.

Respiratory System.—In large amounts it acts as a respiratory paralyzant.

Alimentary Canal.—It stimulates the mucous membrane of the stomach and increases peristalsis.

Elimination.—It escapes from the body rapidly through the lungs and kidneys.

Its Action Compared with Ether.—Ether is more irritating than chloroform, and hence its inhalation is attended with more coughing and choking than the latter induces. The first stage of chloroform-anæsthesia is usually shorter than that of ether. Chloroform is a more powerful anæsthetic than ether, hence less is required to produce narcosis. Ether is a cardiac stimulant, while chloroform depresses the heart from the beginning. As a rule, ether kills by failure of respiration; chloroform, by failure of circulation. Death rarely results during the administration of ether without due warning; such is not the case with chloroform. Nausea and vomiting are less apt to follow the administration of chloroform than that of ether.

Therapeutics.—As a general anæsthetic ether is to be preferred, on account of its safety, to chloroform. When, however, a very prompt effect is required, or when the patient is afflicted with Bright's disease, the preference should be given to chloroform.

A few whiffs of chloroform may be employed to allay motor excitation in *puerperal eclampsia*, *tetanus*, and *chorea gravior*, and to allay spasm in asthma and severe attacks of *renal* and *biliary colic*.

In *intestinal colic* and in *serous diarrhœa* spirit of chloroform by the mouth is sometimes very useful.

In the obstinate cough of *phthisis* the addition of chloroform to the usual cough-mixture is often advantageous. It has also been recommended in *tapeworm*, in *neuralgia*, and as an antizymotic in *typhoid fever*.

CHRYSAROBINUM.

(Chrysarobin.)

An impure neutral principle obtained from Goa powder, a substance found in the wood of *Andira araroba*. It appears as a yellowish-brown crystalline powder, free from odor and taste. It is insoluble in water and alcohol, but freely so in solutions of alkalis, ether, and acids. It contains much free chrysophanic acid, into which it is readily oxidized. The same acid is also found in rhubarb. Dose, $\frac{1}{8}$ to $\frac{1}{4}$ of a grain.

Therapeutics.—It is employed externally in *parasitic skin diseases*, and as a stimulating application which is especially useful in *psoriasis*. It presents, however, certain disadvantages, such as staining the clothes and skin, and occasionally produces severe inflammation of the parts, particularly when used about the scalp and eyes. It should never be used over a large surface, since it may produce a toxic effect by absorption. It may be applied in ointment or in flexible collodion in the strength of 10 grains to 1 drachm to the ounce.

CIMICIFUGA.

(Black Snakeroot, *Actæa Racemosa*.)

The dried rhizome and rootlets of *Cimicifuga racemosa*. It contains a resin, a bitter neutral substance, and a volatile oil.

PREPARATIONS.

DOSE.

Extractum Cimicifugæ, U. S. P.	$\frac{1}{2}$ –1 gr.
Extractum Cimicifugæ Fluidum, U. S. P.	20 min.–1 fl. dr.
Tinctura Cimicifugæ, U. S. P.	30 min.–2 fl. dr.

Physiological Action.—In large doses it causes nausea, vomiting, vertigo, headache, tremors, muscular relaxation,

slowing and weakening of the pulse, anæsthesia from paralysis of the sensory side of the spinal cord, and finally paralysis of respiration.

Therapeutics.—Cimicifuga is a valuable remedy in *simple chorea*, ranking next to arsenic in efficiency. It should be given in doses of 10 minims of the fluid extract three times a day, after meals, and gradually increased to half a drachm or a drachm. It is sometimes of service in chronic rheumatic affections of the nerves and muscles, like *myalgia*, *pleurodynia*, *sciatica*, and *lumbago*, but in articular rheumatism it is of little value. It is said to be useful in *atonic amenorrhœa*, *menorrhagia*, and *sudden cessation of the menses* from cold or nervous shock. It has been used in labor to stimulate uterine contractions, its action resembling quinine rather than ergot. Ringer strongly recommends it in combination with gelsemium for the distressing symptoms attending the menopause; and, according to Simpson, it is highly beneficial in the *mental disturbances* which sometimes follow pregnancy. It has also been used as an expectorant in *bronchitis* and *phthisis*.

CINNAMOMUM.

The inner bark of an undetermined species of cinnamomum growing in China—*Cinnamomum cassia*, or cassia cinnamon—and of *Cinnamomum Zeylanicum*, or Ceylon cinnamon, growing in Ceylon. It contains tannic acid and a volatile oil which yields cinnamic aldehyde.

PREPARATIONS.

DOSE.

Aqua Cinnamomi, U. S. P.	½-1 fl. dr.
Oleum Cinnamomi, U. S. P.	1-3 min.
Pulvis Aromaticus, U. S. P. (contains also cardamom, ginger, and nutmeg)	10-30 gr.
Spiritus Cinnamomi, U. S. P.	5-10 min.
Tinctura Cinnamomi, U. S. P.	½-1 fl. dr.

Therapeutics.—Cinnamon is chiefly used as a carminative, and, on account of its pleasant flavor, to disguise the taste of other remedies. In *serous diarrhœa* it is often a good plan to combine the water of cinnamon or the aromatic powder with active astringents. The drug has also been used with asserted success in *uterine hemorrhage*.

Cinnamic aldehyde or cinnamic acid has been employed recently by Landerer and others as an antiseptic in the various forms of *tuberculosis*, with encouraging results.

CINCHONA.

(Peruvian Bark.)

The dried bark of several species of *Cinchona*. To be up to the official standard, they must contain at least 2.5 per cent. of the alkaloid *quinine*. Besides quinine, cinchona contains *cinchonine*, *cinchonidine*, and *quinidine*, and the artificial alkaloids *quinicine* and *cinchonicine*.

PREPARATIONS.	DOSE.
Extractum Cinchonæ, U. S. P.	5-10 gr.
Extractum Cinchonæ Fluidum, U. S. P.	30-60 min.
Infusum Cinchonæ, U. S. P.	½-1 fl. oz.
Tinctura Cinchonæ, U. S. P.	1-2 fl. dr.
Tinctura Cinchonæ Composita, U. S. P.	1-4 fl. dr.

The following alkaloids and their preparations are also employed medicinally:

	DOSE.
Cinchonina, U. S. P.	3-4 gr.
Cinchoninæ Sulphas, U. S. P.	3-4 gr.
Cinchonidinæ Sulphas, U. S. P.	5-10 gr.
Cinchonidinæ Salicylas	2-5 gr.
Quinina, U. S. P. as a tonic, 1-3 gr.; as an antipyretic,	20-30 gr.
Quininæ Sulphas, U. S. P.	1-3 gr.
Quininæ Bisulphas, U. S. P.	1-3 gr.
Quininæ Hydrochloras, U. S. P.	1-3 gr.
Quininæ Hydrobromas, U. S. P.	1-3 gr.
Quininæ Valerianas, U. S. P.	1-3 gr.
Quinidinæ Sulphas, U. S. P.	1-3 gr.
Chinoidinum (quinoidin, a mixture of amorphous alkaloids)	2-5 gr.

Quininé is the most important alkaloid, and represents to a great extent the active properties of the bark.

QUININA.

It occurs in the form of a fine white, silky, amorphous powder, or as minute snowy crystals, having an alkaline reaction and a persistent bitter taste. It is very sparingly soluble in pure water, but freely so in acidulated water.

Physiological Action.—In large therapeutic doses (10

gr.) it causes fulness in the head, headache, ringing in the ears, and some deafness—symptoms indicative of cerebral congestion.

Circulatory System.—In very large doses it depresses the heart, lessening the force and frequency of its pulsations; small doses do not materially influence the circulation.

Nervous System.—In large doses it causes congestion of the brain and acts as a cerebral excitant; moderate doses lessen reflex activity by stimulating Setschenow's inhibitory centre; toxic doses permanently abolish the reflexes by depressing the spinal cord and peripheral nerves.

Respiratory System.—Small doses exert no influence; toxic doses paralyze the respiratory centre.

Alimentary Canal.—Upon the stomach it acts as a bitter tonic, increasing the appetite and stimulating digestion.

Uterus.—In labor it has the power of increasing the uterine contractions. These contractions are intermittent and simulate the natural ones, and result not from a direct action of the drug on the uterus, but probably from its stimulant effect on the entire body. Although quinine exerts this influence in labor, it does not seem capable, even in large doses, of inducing abortion.

Blood.—By lessening the amœboid movements of the white blood-corpuscles it serves to check their diapedesis in inflammation. It increases the number of red corpuscles and diminishes their power of yielding oxygen.

Temperature.—In health the bodily temperature is not influenced by quinine, but in the febrile state the drug acts as a powerful antipyretic when the dose is sufficiently large.

Tissue-metabolism.—In moderate doses it lessens tissue-change and diminishes the amount of nitrogenous products which the body eliminates.

Action on Lower Organisms.—Even in weak solution it possesses marked antiseptic properties.

Elimination.—While it is eliminated through all the emunctories, it escapes chiefly through the kidneys.

Toxicology.—In toxic doses it causes tinnitus, severe headache, deafness, blindness, delirium, convulsions, and collapse.

Therapeutics.—Quinine is employed as an antipyretic,

as an antiperiodic, as a tonic, as a stimulant to overcome uterine inertia during labor, as an antiseptic, and as a depresso-motor.

Antipyretic.—Before the introduction of antipyrine and antifebrine quinine was extensively used to lower temperature in *pneumonia*, *septicæmia*, and the *continued fevers*; but the new drugs, being more reliable and less disagreeable to the taste, have almost displaced it as an antipyretic. To be of service it must be given in large doses.

Antiperiodic.—In the various manifestations of malaria, such as *intermittent*, *remittent*, and *pernicious malarial fevers* and *malarial cachexia*, it is almost a specific. In ordinary intermittent 20 grains will generally offset a paroxysm if given in divided doses so arranged that the last one is taken two hours before the expected chill. The administration of a laxative dose of calomel as a preliminary measure decidedly increases the effectiveness of the quinine. The antiperiodic should be continued in full doses until the paroxysms fail to appear, and then gradually withdrawn over a period of several weeks. During convalescence it is well to associate arsenic with the quinine.

In malarial districts it may be employed in daily doses of 3 to 5 grains as a prophylactic.

In *pernicious malarial fever* large doses (50 to 60 grains) may be necessary to offset the paroxysm; and, as this disease often proves speedily fatal, the remedy should be given hypodermically.

In the chronic manifestations of malaria—*anæmia*, *neuralgia*, *hæmaturia*, etc.—quinine is best given in conjunction with iron and arsenic.

The value of the drug in malaria depends upon the distinctive influence which it exerts on the *plasmodium* of Laveran.

Tonic.—As a tonic and stimulant it is extensively employed in *anæmia*, *neuralgia*, *atonic dyspepsia*, *pneumonia*, *septicæmia*, the *continued fevers*, and local inflammations like *tonsillitis*, *pharyngitis*, and *bronchitis*.

Antiseptic.—In the form of a spray it has been employed in *whooping-cough*, *hay fever*, *ozæna*, and *diphtheria*. Its internal administration is often useful in these affections,

especially in whooping-cough, but here its good effect is probably due to its tonic, and not its antiseptic, properties.

Uterine Stimulant.—During the first stage of labor, when the uterine contractions become enfeebled from fatigue or exhaustion, quinine in doses of 10 to 20 grains is often a very useful stimulant.

Depresso-motor.—Recently, Wood and others have recommended quinine (10 to 30 grains a day) in *chorea*, basing its employment upon the assumption that the disease is due to a diminution of the reflex inhibitory power of the spinal cord. In acute cases it rarely fails to check the movements, but unless tonic treatment is instituted they are liable to return.

Contraindications.—It is contraindicated in acute inflammatory affections of the brain, eyes, and ears.

Administration.—It may be prescribed by the mouth, by the rectum, or subcutaneously. Under ordinary circumstances it is best administered by the mouth in the form of capsules or pills, the latter being covered with sugar or gelatin. Young children cannot swallow pills, and to them it may be given in solution, disguised with chocolate, licorice, or syrup of yerba santa, or else made into chocolate lozenges.

When the stomach is irritable it may be given by suppository, twice the amount being required by the rectum as by the mouth.

For hypodermic use a very soluble preparation should be selected, as the bisulphate, hydrobromate, or hydrochlorate. When the bisulphate is chosen the solution should be slightly acidulated with tartaric or sulphuric acid to prevent precipitation of the alkaloid by the alkaline juices of the tissues. The following formulæ will illustrate the methods of prescribing the drug :

R	Quininæ sulph.,	gr. xl;
	Sat. sol. acid. tartar.,	℥ ^{ss} xlviij;
	Aquæ destil.,	q. s. ad ℥ij.—M.
Sig.	℥ ^{xxx} = gr. x.	

R	Quininæ sulph.,	gr. xxiv;
	Pulv. acaciæ,	℥ ^{ss} ;
	Syrupi yerba santi,	℥ij.—M.
Sig.	A teaspoonful for a child of two years.	

Incompatibles.—Alkalies, iodine preparations, and spirit of nitrous ether.

COCA.

(Erythroxyton.)

The dried leaves of the *Erythroxyton coca*. It contains several alkaloids, the most important being *cocaine*, which is official in the form of cocaine hydrochlorate (cocainæ hydrochloras). The dose of the latter is $\frac{1}{5}$ to $\frac{1}{2}$ a grain.

PREPARATION.

Extractum Cocæ Fluidum, U. S. P. 1-2 fl. dr.

DOSE.

Physiological Action.—*Circulatory System.*—In full doses it acts as a cardiac stimulant, quickening the pulse and raising the arterial pressure.

Nervous System.—Moderate doses induce a state of mental exhilaration, which after lethal doses is followed by insensibility with cerebral convulsions. Therapeutic doses do not affect the spinal cord or peripheral nerves, but in poisoning both are depressed, the sensory columns and sensory nerves being chiefly affected.

Respiratory System.—It acts as a powerful respiratory stimulant, increasing the depth and rapidity of the respirations. Toxic doses induce respiratory paralysis.

Kidneys.—It has little or no effect on the amount of urine excreted.

Tissue-metabolism.—As most of the drug is oxidized in the system, and under its influence the elimination of urine is lessened, it must to some extent diminish tissue-waste.

Local Action.—The most important physiological property of cocaine is its power, when locally applied, of producing anæsthesia of the part by paralyzing the sensory nerves. The action on the sensory nerves is especially noted when application is made to mucous surfaces; on cutaneous surfaces the drug has little effect unless it is injected subcutaneously. In addition to anæsthesia, it causes a blanching of the part which is subsequently followed by congestion. The primary ischæmia is probably due to a powerful constriction of the peripheral blood-vessels.

Eye.—The instillation into the eye of a few drops of a

three per cent. solution of cocaine causes, within ten to fifteen minutes, marked anæsthesia, dilatation of the pupil, slight impairment of accommodation, and a decrease in the intraocular tension. The dilatation results from a stimulation of the sympathetic nerve.

Toxicology.—Cocaine-poisoning is characterized by vertigo, headache, restlessness, mydriasis, hurried breathing, elevation of temperature, coma, and convulsions. Nitrite of amyl, caffeine, atropine, and ammonia may be employed as physiological antidotes. In susceptible people the local application of the drug to the eyes or nose may produce untoward symptoms, such as nausea, vomiting, blindness, and syncope.

Therapeutics.—Cocaine is employed as a local anæsthetic, mydriatic, and general stimulant.

As a local anæsthetic cocaine has a very wide range of usefulness. In the various operations on the eye, nose, throat, urethra, and rectum it is indispensable. In minor surgical operations, like amputation of the fingers, removal of small neoplasms, and opening of abscesses, it may also be employed with advantage. In these latter instances care must be taken to prevent the undue absorption of the drug, and to effect this the circulation may be controlled by the application of a tight rubber band to the proximal side of the part to be operated on. A four per cent. solution may be injected to the extent of a drachm with safety. The capillary oozing following the operation should not be checked immediately, as it serves to carry off the cocaine.

In *inflammations* and *ulcerations of the nose, pharynx, and larynx* the drug may be employed alone or in combination with antiseptic sprays or powders. In *acute coryza* and *hay fever* it gives great relief by lessening the sensibility and constricting the turgid tissues.

In *laryngeal tuberculosis* it is invaluable for the relief of the intense pain and dysphagia. It may be given in insufflation in combination with iodoform, iodol, or morphine. As a local anæsthetic it is also used internally to relieve the pain of *gastric ulcer* and to check *excessive vomiting*.

As a mydriatic it is not so generally useful as atropine,

since it only slightly impairs accommodation; but, as its effect passes off in a few hours, it is a convenient mydriatic for retinal examinations. As a general stimulant to the nervous system it is sometimes of value in the *opium habit*, and for the same effect it may be employed in the convalescence of *acute diseases*.

Administration.—As a local anæsthetic, it is used in the form of a 2, 3, 4, or 6 per cent. aqueous solution. In pharyngeal and laryngeal affections it may be used in the form of a spray, insufflation, or in lozenges containing $\frac{1}{12}$ to $\frac{1}{6}$ of a grain each. In sea-sickness, gastric ulcer, gastralgia, or hyperemesis the following solution is often efficient:

℞ Cocainæ hydrochloratis,	gr. iij;
Aquæ laurocerasi,	fʒvj;
Aquæ,	q. s. ad fʒiij.—M.

Sig. A dessertspoonful from time to time.

COCAINÆ PHENAS.

(Phenate of Cocaine.)

A compound of phenol and cocaine which is soluble in alcohol, but insoluble in water. This last property, combined with its power of coagulating albumin, renders it less toxic than the hydrochlorate, and it may therefore be employed on cut surfaces with safety, as the coagulum limits absorption. The time required to produce anæsthesia is longer than with the hydrochlorate, but the effect is more permanent. In addition to its anæsthetic properties, the solution is a powerful antiseptic. It may be employed in 4 to 6 per cent. solutions, the latter being obtained from alcoholic solutions.

COLCHICUM.

(Meadow Saffron.)

The corm and seed of *Colchicum autumnale*. The former is official as *colchici radix*, and the latter as *colchici semen*. It contains an alkaloid, *colchicine*, oil, tannic acid, starch, and gum. Colchicine is rarely used; its dose is $\frac{1}{120}$ to $\frac{1}{20}$ of a grain.

PREPARATIONS.	DOSE.
Extractum Colchici Radicis, U. S. P.	1-2 gr.
Extractum Colchici Radicis Fluidum, U. S. P.	2-4 min.
Vinum Colchici Radicis, U. S. P.	10-15 gtt.
Extractum Colchici Seminis Fluidum, U. S. P.	2-5 gtt.
Tinctura Colchici Seminis, U. S. P.	20-90 min.
Vinum Colchici Seminis, U. S. P.	20-90 min.

Physiological Action.—In full therapeutic doses it causes nausea, vomiting, colicky pains, purging, muscular relaxation, and some slowing of the pulse. In small doses it probably acts as a stimulant to all the excretory organs, especially those of the alimentary canal.

Colchicum-poisoning is characterized by the symptoms of severe gastro-enteritis and collapse. Authorities differ as to the effect of the drug on the urine, some contending that it increases the quantity of water and of urea, while others hold contrary views.

Treatment of Poisoning.—If necessary, evacuate the stomach, give tannic acid as an antidote, and white of egg diluted with water as a demulcent; combat collapse with stimulants and the external application of heat.

Therapeutics.—It is employed almost exclusively in the treatment of *gout*, *rheumatism*, and allied disorders. In *acute gout* it rapidly relieves the pain, lessens the swelling, and shortens the attack. Its effect is enhanced by combining it with an alkali or potassium iodide. Although a most valuable remedy in this affection, it must be given with some caution, since large doses are occasionally followed by a cessation of the symptom in the joint and the development of grave visceral symptoms. The term *retrocedent gout* has been applied to this peculiar invasion of the internal organs.

The drug is also useful in *headache*, *neuralgia*, *bronchitis*, and *asthma* in gouty subjects, and in *chronic rheumatism* it may be advantageously added to an aperient pill. In rheumatoid arthritis it is of no service.

Administration.—In acute gout it may be given alone or in combination with an alkali, as in the following formula :

℞ Potassii iodidi,	ʒj;
Potassii bicarb.,	ʒiij;
Vini colchici rad.,	fʒj;
Aquæ camphoræ,	q. s. ad fʒvj.—M.

Sig. A tablespoonful in a wineglassful of water after meals.

COLLODIUM.

(Collodion.)

A solution of pyroxylon, or gun-cotton, in alcohol and ether. It appears as a colorless, highly inflammable liquid, having a strong ethereal odor.

PREPARATIONS.

Collodium Flexile, U. S. P. (contains 3 per cent. of castor oil and 5 per cent. of Canada turpentine).

Collodium Cantharidatum, U. S. P. (cantharidal or blistering collodion).

Collodium Stypticum, U. S. P. (contains tannic acid).

Therapeutics.—Collodion is a useful protectant for *abrasions*, and affords a reliable means of securing gauze dressings on small wounds, especially those of the face and scalp. It may be rendered antiseptic by incorporating with each ounce a drachm of iodoform. Flexible collodion to which a little benzoin has been added makes an excellent application for *fissured nipples*, *chapped hands*, etc.

Styptic collodion is sometimes applied to small wounds to check capillary oozing. For blistering purposes cantharidal collodion will be found a convenient substitute for cantharides cerate.

COLOCYNTHIS.

(Colocynth.)

The dried peeled fruit of *Citrullus colocynthis*. It contains a bitter glucoside, *colocynthin*, and a resin, *citrullin*. Dose, 2 to 5 grains in pill.

PREPARATIONS.

DOSE.

Extractum Colocynthis, U. S. P.	1-5 gr.
Extractum Colocynthis Compositum, U. S. P. (contains 16 parts of ext. colocynth, 50 parts of aloes, 6 parts of cardamom, 14 parts of resin of scammony, and 14 parts of soap)	5-20 gr.
Pilulæ Catharticæ Compositæ, U. S. P. (each contains about 1¼ gr. of compound ext. of colocynth, 1 gr. of calomel, ½ gr. of ext. of jalap, and ¼ gr. of gamboge).	1-2 pills.
Pilulæ Catharticæ Vegetabilis, U. S. P. (each contains about 1 gr. of compound ext. of colocynth, ½ gr. of ext. of hyoscyamus, ½ gr. of ext. of jalap, ¼ gr. of ext. of leptandra, and ¼ gr. of resin of podophyllum) . . .	2-3 pills.

Physiological Action.—The chief action of colocynth is on the gastro-intestinal tract. In full doses it produces large watery stools accompanied with considerable griping. In toxic doses it causes violent gastro-enteritis with mucous and bloody stools. It is classified as a drastic.

Therapeutics.—It is rarely used alone, on account of the severity of its action and the griping which attends its use, but is generally prescribed in combination with other laxatives, as in the above official pills. It is generally selected for *obstinate chronic constipation*.

CONIUM.

(Hemlock.)

The fruit of the *Conium maculatum*, gathered while yet green. It contains a volatile oil and a yellowish, oily, liquid alkaloid, *coniine*, which represents the active properties of the drug.

PREPARATIONS.	DOSE.
Extractum Conii, U. S. P.	1 gr.
Extractum Conii Fluidum, U. S. P.	1-5 min.
Tinctura Conii	½-1 fl. dr.

Physiological Action.—Toxic doses of conium produce loss of power, muscular relaxation, tremors, vertigo, ptosis and dilatation of the pupils (from paresis of the oculo-motor nerve), and failure of circulation. Consciousness is preserved.

Nervous System.—The dominant action of conium is on the peripheral motor nerves, which it paralyzes. On the spinal cord and sensory nerves it acts as a feeble depressant. On the brain it exerts no influence.

Circulatory and Respiratory Systems.—Respiration and circulation are not affected except by very large doses, which exert a depressing influence on both.

Therapeutics.—Conium has been used as an antispasmodic in *chorea*, *paralysis agitans*, *asthma*, and *whooping-cough*, but in these affections it is of less value than other remedies. In the form of vapor it is sometimes useful in allaying the cough of *bronchitis*. Spitzka and others strongly recommend it in the mental and physical excitement of

acute mania. On account of the uncertain strength of the preparations, it is necessary to give the drug in small doses rapidly increased until some effect is produced.

Added to poultices, it makes a useful sedative for *painful ulcers, cancers, etc.*

CONVALLARIA.

(Lily of the Valley.)

The rhizome and rootlets of *Convallaria majalis*. It contains two glucosides, *convallarin* and *convallamarin*. The chief value of the drug is in the latter, since convallarin acts simply as a purgative. The dose of convallamarin is from $\frac{1}{2}$ to 3 grains.

PREPARATIONS.

DOSE.

Extractum Convallariæ Fluidum, U. S. P. 10-30 min.

Physiological Action and Therapeutics.—The results obtained in the study of the physiological action of the drug are somewhat conflicting, though clinical experience indicates that it acts much like *digitalis*, strengthening the heart and increasing the flow of urine. It has the advantages of not being cumulative and of not disturbing the stomach. Most observers, however, agree that in the majority of cases its action is inferior to *digitalis*, but that it sometimes gives excellent results when the latter fails. Its best results are seen in the *dropsy of heart-failure*.

COPAIBA.

(Balsam of Copaiba.)

An oleoresin obtained from the *Copaifera Langsdorffii* and other species of *Copaifera* growing in South America. It appears as a yellow, transparent, viscid liquid, having an aromatic odor and a bitter taste. Dose, 5 to 30 minims in capsule or emulsion.

PREPARATIONS.

DOSE.

Massa Copaibæ, U. S. P. (copaiba 94 and magnesia 6 parts). 10-30 gr.
 Oleum Copaibæ, U. S. P. 10-20 min.
 Resina Copaibæ, U. S. P. 5-10 gr.

Physiological Action.—In therapeutic doses it acts as a stimulant to the mucous membrane of the respiratory and genito-urinary tracts. Large doses produce the symptoms of gastro-intestinal inflammation and renal irritation. Even in ordinary doses it is apt to cause an erythematous or hive-like rash. It is eliminated by the lungs and kidneys, chiefly the latter, and the urine after its administration gives the test for albumin with nitric acid and the test for sugar with copper.

Therapeutics.—It is employed as a stimulant diuretic and expectorant.

Stimulant Diuretic.—In inflammations of the genito-urinary tract, such as *pyelitis*, *cystitis*, and *urethritis*, copaiba is an invaluable remedy; but, as it is a powerful stimulant, it must not be employed in the acute stages of these disorders. In *gonorrhœa*, after the acute symptoms have subsided, it is more extensively used than any other stimulant diuretic. In the *dropsy of hepatic cirrhosis* the resin has been highly recommended for its diuretic properties; in the *dropsy of chronic cardiac and renal disease* it is of less value.

Stimulant Expectorant.—In *subacute* and *chronic bronchitis* copaiba is a useful expectorant, but has the disadvantage of being an irritant to the stomach.

Administration.—The oleoresin or oil may be prescribed in capsule or emulsion. The following formula illustrates the method of prescribing the drug in emulsion:

℞ Balsam. copaibæ,	
Spt. æth. nitrosi,	aa fʒj;
Liq. potassæ,	fʒij;
Ext. glycyrrhizæ,	ʒss.
M. et ad.	
Ol. gaultheriæ,	gtt. xvj;
Syr. acaciæ,	fʒvj.—M. (Bumstead.)

Sig. One tablespoonful three times a day in subacute gonorrhœa.

CREOLIN.

Creolin is an unofficial substance, a liquid cresol, obtained from the distillation of coal-tar. It appears as a dark-brown liquid having an alkaline reaction, and forms with water a milk-like emulsion. It mixes in all propor-

tions with alcohol, ether, and chloroform. The dose is 1 to 5 minims in capsules.

Therapeutics.—It is a powerful antiseptic, superior to carbolic acid, and, though quite safe, is not entirely void of toxic properties. In some instances nausea, vomiting, restlessness, and syncopal attacks have followed vaginal injections of the drug in pregnancy. It possesses the advantages of being a deodorizer as well as a disinfectant, of being unirritating, and of being free from astringent effects. Its solution has the disadvantages of being opaque and somewhat unstable.

In pregnancy and in inflammations of the genito-urinary passages creolin is a valuable *disinfectant*. It has been employed with considerable success as an injection in *cystitis* (1 per cent. gradually increased to 2 per cent.) and in *leucorrhœa* (2 to 3 per cent.). In the form of an enema ($\frac{1}{2}$ –1 drachm to the pint) it is said to be serviceable in *dysentery*, particularly the amœbic variety. A fresh four per cent. emulsion has been highly recommended as an antiseptic spray in *diphtheria*.

It has been used to some extent as an internal antiseptic in *chronic gastric catarrh*, *dysentery*, and *typhoid fever*.

CREOSOTUM.

(Creosote.)

A product obtained from the distillation of wood-tar. The best preparation is made from beechwood, and is known as "beechwood creosote." It appears as a yellow, oily, inflammable liquid, having a strong smoky odor and a caustic taste. It is soluble in 80 parts of water, and in all proportions in alcohol, ether, and chloroform. Its active ingredients are guaiacol and creosol. Although chemically identical with carbolic acid, and often counterfeited by the latter, it has therapeutic properties peculiar to itself. In toxic doses it produces unconsciousness, stertorous breathing, cardiac depression, and collapse. Its antidote is a soluble sulphate. As it is distinctly destructive to lower organisms, it is a useful antiseptic. The dose is 1 to 5 minims.

PREPARATION.

DOSE.

Aqua Creosoti (1 per cent. solution), U. S. P. 1-4 fl. dr.

Therapeutics.—Creosote is used chiefly as an anti-septic and a local anæsthetic.

Antiseptic.—Creosote-water is sometimes used as a disinfectant lotion for *sloughing ulcers, uterine cancer, gangrenous stomatitis*, etc. Internally, it is a valuable anti-septic in *chronic gastric catarrh* with flatulence, in *diarrhœa*, and in *dysentery*. It is extensively used in the treatment of *phthisis*, and is given by inhalation, by the mouth, hypodermically, or by intrapulmonary injection. Although in no sense a specific, creosote or its derivative, guaiacol, is one of the best remedies we have in this dread disease. Under its influence the weight often improves, the fever declines, the expectoration diminishes, and night-sweats cease. It should be given in small doses gradually increased, due regard being paid to stomachic tolerance. In some cases as much as a drachm a day may be administered with advantage. Its use should be prolonged. In *chronic bronchitis, bronchiectasis, and pulmonary gangrene* the remedy is also of value.

Local Anæsthetic.—Inhalations of creosote are often very useful in checking the cough of *acute and chronic bronchitis* and *phthisis*. Ten drops of creosote added to eight ounces of boiling water forms an efficient inhalation in *acute bronchitis*. It sometimes gives speedy relief in the *obstinate vomiting* of organic affections of the stomach, such as *ulcer, cancer, and chronic catarrh*. In *toothache* a drop or two on a pledget of cotton may be inserted into the cavity of the tooth. It is sometimes used in the form of a lotion or ointment (10 grains to the ounce) to allay itching in *chilblains, pruritus, prurigo, and chronic eczema*.

Administration.—There is often considerable difficulty in obtaining a good preparation of creosote. In the author's hands Morsen's beechwood creosote has proved reliable. For internal use in *phthisis* it may be given in capsules or with milk, cod-liver oil, or wine. For hypodermic or intrapulmonary injection it is best prescribed in almond oil; 10 minims of a 50 per cent. solution may be employed subcutaneously, or the same amount of a 3 per

cent. solution may be injected directly into a pulmonary cavity. Ordinarily, it is just as efficient and much safer when administered by the mouth. In diarrhœa it may be given conveniently rubbed up in a powder of bismuth and morphia, as in the following formula :

℞ Morphinæ sulph.,	gr. j;
Creosoti (Morsen's),	gtt. vj;
Bismuth. subnitrat.,	ʒss.—M.
Ft. in chart. No. xii.	
Sig. One every two or three hours.	

As a sedative for the cough of phthisis an inhalation may be prescribed as follows :

℞ Creosoti,	
Spt. chloroformi,	
Alcoholis,	aa ʒij.—M.
Sig. Ten to twenty drops in the inhaler several times daily.	

CUBEBA.

(Cubeb.)

The dried unripe fruit of the *Piper cubeba*, growing in Java. It contains a volatile oil, cubebic acid, and an unimportant neutral principle, cubebin. The dose of the powdered drug is 20 grains to 2 drachms.

PREPARATIONS.

DOSE.

Extractum Cubebæ Fluidum, U. S. P.	5-20 min.
Oleoresina Cubebæ, U. S. P.	2-10 min.
Oleum Cubebæ, U. S. P.	5-20 min.
Tinctura Cubebæ, U. S. P.	20 min.—½ fl. oz.
Trochisci Cubebæ, U. S. P. (½ gr. of oleoresin) . . .	1-3.

Therapeutics.—It is employed for its stimulant effect upon the mucous membrane of the respiratory and genito-urinary tracts. In *subacute* and *chronic pyelitis*, *cystitis*, and *urethritis* it is a useful stimulant diuretic. It is less active than copaiba, but may be used as a substitute when the latter fails. It is sometimes employed as a stimulant expectorant in *chronic bronchitis*. The troches are often of service in *subacute pharyngitis*. In the form of smoke or snuff the drug sometimes gives prompt relief in *acute coryza* after secretion has been established.

CUPRUM.

(Copper, Cu.)

The only official salt of copper is the sulphate.

CUPRI SULPHAS.(CuSO₄·5H₂O.)

Sulphate of copper occurs as blue, translucent, prismatic crystals, of an astringent, metallic taste, freely soluble in water and insoluble in alcohol. Dose as an astringent, ½ to 2 grains; as an emetic, 5 to 10 grains.

Physiological Action.—Upon mucous surfaces a solution of sulphate of copper acts as a powerful astringent; in the powdered form it serves as a mild caustic. In full doses it produces emesis by its direct action on the stomach.

Toxicology.—Acute copper-poisoning is characterized by severe abdominal pain, a metallic taste in the mouth, and violent vomiting and purging, the ejecta often being mucous and bloody. The blue or greenish color of the vomit may serve to distinguish it from other corrosive poisons.

After death the gastro-intestinal tract is found to be intensely inflamed, and the liver the seat of fatty degeneration.

Treatment.—The antidotes are soap, sodium carbonate, magnesia, and the yellow prussiate of potash, the last forming with the copper an insoluble compound. Demulcents like milk and eggs should be given freely with opium to relieve the pain.

Therapeutics.—It is sometimes employed as an emetic, but it is more irritating and less prompt than the sulphate of zinc, and when administered without effect it is best not to repeat it. In phosphorus-poisoning it is useful not only as an emetic, but as a chemical antidote.

In *indolent ulcers*, *granular conjunctivitis*, and *ulcerative stomatitis* the application of the solid crystal is often very useful for its astringent and stimulating qualities. In *gonorrhœa*, after the acute symptoms have subsided, an injection containing 2 grains to the ounce of water, gradually increased in strength, is often quite efficient.

It is sometimes of service in *chronic diarrhœa*, especially

when dependent upon intestinal ulceration, and in such cases it is best given in pill form in combination with opium.

CUSSO.

(Kouso, Brayera.)

It is derived from the *Hagenia Abyssinica* (*Brayera anthelmintica*), growing in Abyssinia. It contains tannic acid, a volatile oil, and an active principle, *kosin*. The dose of the leaves is half an ounce, and of *kosin* 20-40 grains.

PREPARATIONS.	DOSE.
Extractum Cusso Fluidum, U. S. P.	½ fl. oz.
Infusum Cusso	4-8 fl. oz.

Therapeutics.—Cusso is a safe and efficient remedy against *tapeworm*, but has the disadvantage of producing nausea, vomiting, and abdominal distress. As it seems capable of producing abortion, it should not be selected as an anthelmintic during pregnancy.

DIGITALIS.

(Foxglove.)

The dried leaves of *Digitalis purpurea*. It contains several principles, all of which are probably of the nature of glucosides, the most important being *digitoxin*, *digitalin*, *digitalein*, *digitonin*, and *digitin*. The first three have a decided action on the heart, and represent imperfectly the virtues of digitalis. Digitin and digitonin have no influence on the circulation. As not one of these principles fully represents the action of the crude drug, the latter or one of its official preparations should always be selected for practical purposes. The dose of the powdered leaves is ½ to 1 grain in pill.

PREPARATIONS.	DOSE.
Extractum Digitalis, U. S. P.	¼-½ gr.
Extractum Digitalis Fluidum, U. S. P.	1-2 gtt.
Infusum Digitalis, U. S. P.	1-4 fl. dr.
Tinctura Digitalis, U. S. P.	5-20 gtt.

Physiological Action.—*Circulatory System.*—The dom-

inant action of digitalis is on the circulation. In therapeutic doses it slows the pulse and raises the blood-pressure. The slowing of the pulse results from a prolongation of the diastole, and this, in turn, is due to *stimulation of the vagi, or inhibitory nerves* of the heart. The increased blood-pressure is due to a powerful *stimulant effect on the heart*, and to a *contraction of the arterioles*, resulting indirectly from *stimulation of the vaso-motor centre*, and directly from the *action of the drug on the vessel-walls*. It will be seen, therefore, that suitable doses of digitalis allow the ventricles to become perfectly filled by prolonging the diastole, and again allow them to completely empty themselves by increasing the force of their contractions, the result being a perfect adjustment of the arterial and venous flow. Moreover, the arterioles being contracted by the drug, the forcible systole drives more blood into the coronary arteries, and thus the nutrition of the heart is improved.

Toxic doses quicken the pulse by paralyzing the vagi, and lower the arterial pressure by causing such powerful systolic contraction that the diastole becomes too imperfect to permit of complete filling of the ventricles. After such doses it often happens that the pulse is quite slow while the patient is in the recumbent posture, when a change to an erect position makes it rapid and feeble. In such cases it is probable that a point has been reached when the powerful systole is about to overcome the diastolic rest, and the change to an erect position adds enough stimulus to cause such violent systolic contraction that the diastolic pause becomes very short and incomplete.

Nervous System.—Therapeutic doses have no effect on the nervous system, but toxic doses lessen the reflexes, first by stimulating Setschenow's inhibitory centres, and later by depressing the spinal cord.

Respiratory System.—Only in poisoning are the respirations affected, and then they are somewhat slowed.

Alimentary Canal.—Large doses occasionally produce nausea, vomiting, and diarrhœa.

Kidneys.—In health digitalis has little or no diuretic action, but when the urine is diminished from embarrassment of the circulation it produces free diuresis. This

action of the drug must, therefore, be mainly attributed to its effect on the heart and vessels, and not to a direct influence on the secreting structure of the kidney.

Temperature.—Normal temperature is not influenced by the drug, but febrile temperatures are somewhat reduced by it. Brunton and Cash have shown that high fever depresses the vagi, so that in this condition digitalis may fail to slow the pulse.

Toxicology.—Digitalis-poisoning is characterized by obstinate vomiting, diarrhœa, headache, severe pain in the back and limbs, and a very slow full pulse, which, when the patient sits up, may become rapid and feeble. Later, even in recumbency, the pulse becomes rapid, thready, and irregular, the surface cold, the urine suppressed, and the mind stuporous. Intelligence, however, is not lost until shortly before death. Occasionally, convulsions develop during the last stage.

The continuous use of the drug for a protracted period is sometimes followed by the abrupt appearance of toxic symptoms; this untoward effect is attributed to the *cumulative action* of the drug, and such an accident is more apt to occur when there is no diuretic effect or when digitalis is given after the removal of serous effusions. In the first instance elimination is interfered with, and in the second absorption is effected with undue rapidity. When a prolonged use of the remedy is required, it should be suspended at intervals for a definite period, so as to allow complete elimination.

Treatment of Poisoning.—Evacuate the stomach if necessary; keep up the external temperature; keep the patient in a recumbent posture; administer tannic acid and cardiac stimulants like alcohol and ammonia. When the pulse is full and strong aconite may be administered as a physiological antidote.

Therapeutics.—Digitalis fills three important offices: it serves as a powerful cardiac stimulant; it slows the heart and regulates its rhythm; and it acts as a diuretic.

Cardiac Stimulant.—It may be employed in all forms of *cardiac weakness*. It is useful in *syncope*, in *collapse* from various causes, and in *poisoning* by cardiac depressants; in

dilatation of the heart, whether simple or from valvular disease, it is well-nigh invaluable.

It may be used in any form of *valvular disease*, irrespective of the lesion, when there is evidence of failing compensation. *Dyspnœa*, *dropsy*, and a *feeble pulse* are its chief indications in this class of diseases. When cardiac hypertrophy overbalances dilatation and the symptoms of arterial hyperæmia appear, digitalis does harm.

In *mitral stenosis* it does good by prolonging the diastole, thus allowing a longer time for the blood to flow into the ventricle through the contracted orifice; and again, by stimulating the contractions of the right ventricle, it tends to prevent pulmonary stasis.

In *mitral regurgitation* it is productive of good by allowing the over-distended auricle a longer time to empty its contents into the ventricle, and by securing a more perfect closure of the mitral orifice through a more vigorous contraction of the muscles surrounding that orifice.

In *aortic stenosis*, when symptoms of heart-failure appear, digitalis is of service by stimulating the contractions of the left ventricle. Some hold that the drug is contraindicated in *aortic regurgitation*, since it prolongs diastole and thus favors a backward flow of blood through the incompetent valves into the ventricle; but clinical experience fails to support this view, and digitalis may be used with advantage in this affection as soon as the symptoms of venous congestion appear. The strengthened systolic contractions induced by the drug more than compensate for the prolonged diastole, and, moreover, force more blood into the coronary arteries, and thus tend to improve the nutrition of the heart-muscle.

In *simple dilatation* of the heart resulting from overwork it is exceedingly efficient. In *fatty degeneration* of the heart it is sometimes useful, but if the metamorphosis is much advanced it is not so valuable as strychnia.

One disadvantage of digitalis is its tendency to contract the arterioles and to increase the peripheral resistance; to offset this effect it may sometimes be advantageously combined with nitroglycerin.

In *pneumonia*, when the right heart begins to fail from

its efforts to drive blood into a partially consolidated lung, digitalis causes a marked improvement in the dyspnœa, cyanosis, fever, and pulse-rate.

In the *cardiac weakness of low fevers*, typhoid, diphtheria, and the like, it may do good, but it often fails, and generally, in these cases, it is inferior to *nux vomica*.

Inhibitory Stimulant.—In *exophthalmic goitre* it sometimes quiets the heart and lessens the pulse-rate, but generally its action is inferior to that of *strophanthus*. In *nervous palpitation* and in the *irritable heart* resulting from overwork it is often extremely useful.

Diuretic.—In the dropsy of visceral disease and in the serous accumulations of inflammatory origin digitalis is often of service. Its best results are seen in the dropsy of cardiac disease and subacute nephritis.

Other Uses of Digitalis.—It has been used to some extent as an antipyretic, but as such it is of little value except in the *hectic fever of phthisis*, when a combination of quinine and digitalis is often of real service. Many authorities speak highly of the drug in *spermatorrhœa*. It has been used considerably in *hemorrhage*, but, with the exception of certain types of phthisis in which moderate fever, an excited pulse, and repeated slight attacks of hæmoptysis are prominent features, it cannot be recommended.

Contraindications.—Aneurism and decided atheroma of the vessels contraindicate the use of digitalis.

Administration.—For general use the tincture is the best preparation. When it is desirable to give the drug in pill form, the powdered leaves will be found convenient and reliable. In dropsy the tincture or the infusion may be advantageously combined with an alkaline diuretic like the bitartrate of potassium, or the drug may be given in the form of Niemeyer's pill:

℞ Pulv. digitalis,
 Pulv. scillæ,
 Mass. hydrargyri, aa gr. xij.—M.
 Ft. in pil. No. xii.
 Sig. One thrice daily after meals.

When the stomach is irritable, diuresis may be secured

by a poultice made from an ounce or an ounce and a half of the leaves placed on the abdomen of the patient. In sudden heart-failure the tincture should be administered hypodermically. The glucosides of the drug are uncertain in their action, and should not be employed.

Incompatibles.—Preparations containing tannic acid. With iron salts it forms an inky mixture.

DIURETIN.

(Sodio-theobromine Salicylate.)

A double compound of sodium theobromine and sodium salicylate, containing approximately 50 parts of theobromine and 38 parts of salicylic acid. It appears as a white powder, freely soluble in warm water, and remaining in solution on cooling. The dose is 10 to 20 grains.

Physiological Action and Therapeutics.—Owing to the theobromine entering into its composition, it stimulates the renal epithelium and causes a considerable increase in the quantity of urine. It has an advantage over theobromine in being freely soluble. It is a pure diuretic, exerts little influence on the heart or nervous system, and may be given with perfect safety. It is sometimes very useful in *general dropsy*, particularly when the latter is dependent upon cardiac or hepatic disease, but, unfortunately, it not infrequently fails even when the conditions seem most favorable for its employment. In renal dropsy it is of little value.

It may be prescribed in capsules or in aromatic water warmed sufficiently to thoroughly dissolve the drug.

DUBOISINE.

An alkaloid obtained from *Duboisia myoporoides*, a native of Australia. The sulphate is the salt generally used. The dose is $\frac{1}{120}$ to $\frac{1}{50}$ of a grain.

Physiological Action and Therapeutics.—When given internally in sufficient dose, it acts as a powerful sedative and hypnotic. Large doses produce vertigo, mydriasis, dryness of the throat, quickening of the pulse, and an unsteady gait.

When instilled in the eye it dilates the pupil, but this effect is more prompt and less prolonged than that of atropine. As a mydriatic a two-grain solution is sufficient, since stronger solutions sometimes induce toxic symptoms.

Recently, the drug has been used with excellent results as a sedative in *mania*, *hystero-epilepsy*, and *paralysis agitans*, and as a hypnotic in *insomnia* dependent upon restlessness and great motor excitement.

ERGOTA.

(Ergot of Rye.)

The sclerotium of *Claviceps purpurea*, a parasitic fungus investing the grain of *Secale cereale*, or rye. Several principles have been discovered in ergot, but to which one its virtues are to be attributed is still undetermined. Ergotinine, ergotinic acid, sclerotinic acid, sphacelinic acid, and cornutine are some of the substances which have been isolated by different investigators. A substance known as *ergotin* is in common use, but this, however, is not an alkaloid, but a purified extract, and may be employed in doses of 5 to 10 grains.

PREPARATIONS.

DOSE.

Extractum Ergotæ, U. S. P.	5-20 gr.
Extractum Ergotæ Fluidum, U. S. P.	1-2 fl. dr.
Vinum Ergotæ, U. S. P.	2-4 fl. dr.

Physiological Action.—*Circulatory System.*—In ordinary doses ergot causes a distinct increase in the blood-pressure by stimulating the vaso-motor centres. Toxic doses are followed by a fall of blood-pressure from depression of the heart and vaso-motor centres.

Nervous and Respiratory Systems.—Therapeutic doses do not affect either of these systems.

Alimentary Canal.—It increases peristalsis by stimulating the unstriped muscular fibre of the intestines.

Uterus.—It exerts a powerful influence on the uterus, especially in parturition, increasing the force of the contractions by stimulating the unstriped fibre of the uterus, and probably also by stimulating the uterine centres in the spinal cord. On the pregnant but non-parturient uterus it

has less effect, but is certainly capable, if given in sufficient dose, of acting as an abortifacient. The contractions induced by the drug are not *intermittent*, like those occurring in normal labor, but are *continuous* or *tetanic* in character.

Muscle.—It causes contraction of all unstriated muscular fibre, as noted in its action on the uterus and intestines.

Toxicology.—Chronic ergotic poisoning, or *ergotism*, has been noted especially in Germany, where rye is much used; here outbreaks have frequently occurred from the use of meal contaminated with the ergot fungus. Two forms have been noted—the *gangrenous* and the *nervous*. In the former dry gangrene develops, the extremities being commonly involved; in the latter various nervous symptoms present themselves, such as violent cramps of the muscles, paresis, delirium, and convulsions. The nervous type of ergotism is sometimes followed by the development of locomotor ataxia.

Therapeutics.—The most important uses of ergot are to contract the uterus and to contract the blood-vessels.

As an Oxytocic.—Formerly, it was much used in labor to overcome uterine inertia and to hasten delivery; but it is a drug to be avoided, since it causes tetanic spasm of the uterus, contracts the cervix, and seriously interferes with the circulation of the child. It is absolutely contra-indicated when there is any mechanical obstruction to delivery, such as an undilated os or contracted pelvis, for in such cases it may rupture the uterus or asphyxiate the child. After delivery, however, it is of great value in preventing or checking *post-partum hemorrhage*. In abortion it may be employed to assist in the expulsion of the membranes. In *menorrhagia* it is often efficient, and in *uterine fibroids* hypodermic injections of ergotin not only serve to check hemorrhage, but, when continued, may effect a cure by contracting the vessels of the uterus, thus cutting off the blood-supply of the growths. It is sometimes of service in subinvolution of the uterus when the latter is not due to retained material.

As a Vaso-motor Stimulant.—Ergot is extremely useful in the treatment of *internal hemorrhages*, as hæmaturia, hæmoptysis, and enterorrhagia from typhoid or other

ulcers. On account of its influence on the blood-vessels, it has been recommended in *acute meningitis* and *myelitis* and in the *splenic enlargements* of leucæmia and malaria, but in these affections it is generally useless. In *acute cerebral congestion* it may be given with advantage. In *diabetes insipidus* which probably depends on a vaso-motor paresis of the renal vessels it is often very beneficial, but in *diabetes mellitus* it is without effect. Many writers highly recommend it in *colliquative diarrhœa* and *dysentery*. It has been employed with good results in *exophthalmic goitre*.

Administration.—As an oxytocic the fluid extract is a convenient and reliable preparation. In hemorrhage the drug is best given hypodermically, in the form of the official extract dissolved in glycerin and water, or in glycerin and alcohol, as in the following formula :

℞ Extracti ergotæ,	gr. xx;
Alcoholis,	
Glycerini,	aa fʒj.—M.
Sig. One minim equals $\frac{1}{6}$ of a grain of extract of ergot.	

In hemorrhage 30 minims of the above solution may be used, and, to avoid irritation, it is best injected deeply into the muscles. Bonjean's ergotin is often selected for hypodermic use, but it is inferior to the official extract.

ERIGERON.

(Fleabane.)

The flowering herb *Erigeron Canadense*, growing in North America. The plant itself is not official, but it contains a volatile oil which is official as *oleum erigerontis*. The dose of the oil is 10 to 20 minims.

Therapeutics.—It is an exceedingly useful hæmostatic, especially in *passive hemorrhage* from the nose, lungs, intestine, and uterus. It has, however, the disadvantage of being somewhat irritating to the stomach. It is best given in capsules.

EUCALYPTUS.

The leaves of *Eucalyptus globulus*, a native of Australia, but now cultivated in many countries on account of its

property of absorbing and evaporating large quantities of water, thereby rendering swampy grounds dry and healthy. It contains a volatile oil from which is distilled a neutral body, *eucalyptol*. The latter appears as a colorless liquid having an aromatic odor and a camphoraceous taste, sparingly soluble in water, but freely so in alcohol. Its action is similar to that of the oil, but it is preferable for topical use.

PREPARATIONS.

DOSE.

Extractum Eucalypti Fluidum, U. S. P.	½-2 fl. dr.
Oleum Eucalypti, U. S. P.	3-5 drops.

Physiological Action.—Upon the skin the oil acts as an irritant, producing redness and burning. Doses of 15 or 20 drops, taken internally, cause a feeling of warmth in the stomach, and some mental exhilaration which in turn is followed by a calmative effect. Larger doses cause nausea, vomiting, and the discharge of loose stools having the odor of the oil. Toxic doses depress the spinal cord, brain, and heart, and finally kill by paralyzing the respiration. The drug is eliminated by all the emunctories, and, like turpentine, imparts the odor of violets to the urine.

Eucalyptol and the oil are powerful antiseptics.

Therapeutics.—Eucalyptus was first used as an anti-periodic in *malaria*; but, while it has a decided influence on this disease, it is much inferior to quinine; it may be employed, however, when quinine fails or for some cause cannot be taken.

In *subacute* and *chronic bronchitis* attended with copious expectoration eucalyptus is an exceedingly useful expectorant.

Its volatile nature unfits it as an antiseptic in general surgery, but as a disinfectant and deodorant for *offensive suppurating cavities* it is invaluable. In *diphtheria*, *small-pox*, and *scarlet fever* the oil or eucalyptol makes a useful local application for the throat. Few remedies equal eucalyptol in destroying the fetid odor of *ozæna*.

An inhalant made by adding a drachm of the oil to an ounce of liquid cosmoline is an efficient sedative and antiseptic in *phthisis*, *bronchiectasis*, *whooping-cough*, and *pul-*

monary gangrene. A vaginal tampon containing the oil and glycerin may be employed with advantage in *cancer of the uterus.*

Administration.—In bronchitis the oil is the preparation most commonly employed; it may be given in emulsion or in capsules, after meals. The addition of two or three drops of terebene to each capsule often enhances its value as an expectorant. As a disinfectant application for the throat it may be prescribed as follows:

℞	Olei eucalypti <i>vel</i> eucalyptol,	fʒj;
	Terebene,	fʒij;
	Alcoholis,	q. s. ad fʒij.—M.

Sig. Use as a spray.

EUROPHEN.

(Di-isobutylortho-cresol Iodide.)

Europphen appears as a yellow, amorphous powder, having a peculiar aromatic odor, insoluble in water and glycerin, but freely so in alcohol, ether, chloroform, and fixed oils.

Therapeutics.—Europphen closely resembles iodoform in its action, and, like the latter, liberates free iodine in the presence of heat and moisture. As it is lighter in weight than iodoform, a given quantity will cover a much larger surface than a similar amount of the older antiseptic. It possesses advantages over iodoform in being free from odor and less toxic.

Care must be taken not to confound europphen with *euphorin*, a new antipyretic and analgesic.

Europphen may be used in the same class of cases as iodoform, and may be employed in powder or as an ointment containing from 5 to 10 per cent. of the drug.

EXALGINE.

(Methyl-acetanilide, $C_6H_5N(CH_3)CH_3CO.$)

A synthetic compound produced by heating together monomethylanilide and acetyl chloride. It appears in the form of delicate acicular crystals, imperfectly soluble in water, but freely so in alcohol. The dose is 1 to 5 grains.

Physiological Action and Therapeutics.—Exalgine

resembles antifebrin in its action, but it is more powerful and far less safe. Small doses (less than 3 grains) have frequently been followed by serious symptoms, such as unconsciousness and collapse. It should never be employed as an antipyretic. In severe *neuralgia*, *headache*, *migraine*, and the lancinating pains of *locomotor ataxia* it is often very efficient, but it should always be given cautiously. In the dose of 3 to 5 grains daily it has proved very efficient in *chorea*.

As it is only sparingly soluble in water, it is best prescribed in pills, powders, or in an alcoholic solution like the following:

℞ Exalgini,	gr. xxiv ;
Spt. vini gal.,	fʒiij.—M.
Ft. in sol. et adde	
Syrup. aurantii,	
Aquæ,	āā fʒiss.—M.

Sig. A teaspoonful to a dessertspoonful every hour until four or five doses have been taken.

FERRUM.

(Iron, Fe.)

Iron is official in the form of fine bright, non-elastic wire.

Physiological Action.—As iron is a constituent of the normal body, it may be regarded as a food as well as a medicine. When taken in therapeutic doses it acts upon the alimentary canal as an astringent, producing more or less constipation. Only a small amount is absorbed, the larger portion being converted while in the bowel into a sulphuret and tannate, and so discharged, imparting to the stools an inky-black color. It enters the blood chiefly as an alkaline albuminate which quickly unites with the protoplasm of the red corpuscles. In continuous doses it not only increases the number of corpuscles, but also the percentage of hæmoglobin in each, thereby adding to the ozonizing power of the blood.

Both soluble and insoluble preparations of the metal are employed internally, but, since the former are largely precipitated by the gastric juice, they possess no advantage over the latter.

Therapeutics.—The most important indication for the use of the drug is as a hæmatinic in *anæmia*, whether primary as in chlorosis, or secondary as in malaria, syphilis, or chronic nephritis. Some of its salts are also used as *astringents* and *styptics*.

FERRI CARBONAS SACCHARATUS.

(Saccharated Ferrous Carbonate.)

This is a mixture of sugar and carbonate of iron containing about 15 per cent. of the latter. It appears as a grayish powder having a sweetish, slightly chalybeate taste, and comparatively free from astringency. It may be conveniently prescribed in pill form in the dose of 3-5 grains.

FERRI CHLORIDUM.

(Chloride of Iron, Ferric Chloride, $\text{Fe}_2\text{Cl}_6 \cdot 12\text{H}_2\text{O}$.)

Chloride of iron is rarely used except in the form of *tinctura ferri chloridi* of the Pharmacopœia. The latter preparation contains, in addition to the sesquichloride of iron, alcohol, hydrochloric acid, and a little nitrous ether, and appears as a yellowish-red, highly astringent liquid. Its dose is 10 to 30 drops.

PREPARATION.

Liquor Ferri et Ammonii Acetatis, U. S. P. (Basham's mixture)

DOSE.

$\frac{1}{2}$ -1 fl. oz.

Therapeutics.—In addition to being one of the most astringent liquid preparations of iron, it possesses peculiar diuretic properties which render it useful in certain forms of renal disease. In *anæmia* it may be employed when a liquid preparation is desirable; but, being astringent, it tends to induce constipation. It has been generally regarded as a specific in *erysipelas*; but, while such a claim for it cannot be substantiated, it is true that it is a valuable remedy in this disease. To be of service it must be given in large doses—20 to 30 drops every two hours. Next to the mercurials, it is the most efficient internal remedy in *diphtheria*. The tincture, or better Basham's mixture, is a good chalybeate diuretic in *Bright's disease*.

The tincture makes a very useful local application in *acute pharyngitis, tonsillitis, diphtheria, and scarlet fever.* In these affections it acts as an astringent, antiseptic, and alterative. It is generally prescribed in glycerin and water, to which potassium chlorate may be added with advantage, as in the following formula :

R Potass. chlorat.,	3ss;
Tinct. ferri chloridi,	
Glycerin.,	aa ℥j;
Aquæ,	q. s. ad ℥ij.—M.

Sig. Paint the throat every two hours.

Administration.—As it is injurious to the teeth, it is best taken, well diluted, through a tube.

Incompatibles.—Alkalies, tannic acid and the vegetable astringents containing it.

FERRI CITRAS, FERRI PHOSPHAS, and FERRI TARTRAS.

These salts are soluble, and are known as the scale preparations of iron, because the solutions formed in their production are allowed to dry on plates of glass, so that the salts may be obtained in scales. The following are official :

PREPARATIONS.	DOSE.
Ferri Citras, U. S. P. (ferric citrate)	3-5 gr.
Ferri et Ammonii Citras, U. S. P. (iron and ammonium citrate)	3-5 gr.
Ferri et Ammonii Tartras, U. S. P. (iron and ammonium tartrate)	3-5 gr.
Ferri et Potassii Tartras, U. S. P. (iron and potassium tartrate)	3-5 gr.
Ferri et Quininæ Citras, U. S. P. (iron and quinine citrate)	5-10 gr.
Ferri et Quininæ Citras Solubilis, U. S. P. (a very soluble preparation)	5-10 gr.
Ferri et Strychninæ Citras, U. S. P. (iron and strychnine citrate)	2-3 gr.
Ferri Phosphas Solubilis, U. S. P. (soluble ferric phosphate) .	3-5 gr.
Ferri Pyrophosphas Solubilis, U. S. P. (soluble ferric pyrophosphate)	3-5 gr.

From iron and quinine citrate Bitter Wine of Iron (*Vinum Ferri Amarum*, U. S. P.) is prepared, and from iron and ammonium citrate Wine of Ferric Citrate (*Vinum Ferri Citratis*, U. S. P.) is prepared. These are useful liquid preparations of iron, either of which may be employed in *anæmia*, in the dose of 1 to 2 fluidrachms.

FERRI IODIDUM.(Ferrous Iodide, FeI_2 .)

Iodide of iron is official as saccharated ferrous iodide (*ferrum iodidum saccharatum*) and as syrup of ferrous iodide (*syrupus ferrum iodidi*). The dose of the former is 3 to 5 grains; of the latter, 10 to 30 drops.

Therapeutics.—Iodide of iron is prescribed when it is desirable to combine an alterative with a chalybeate. It is a very useful preparation in the *anæmia of scrofulous children*, in *ricketts*, *phthisis*, and *syphilis*. As the syrup is injurious to the teeth, it should be taken well diluted, and the mouth carefully rinsed after its exhibition.

FERRI LACTAS.(Ferrous Lactate, $\text{Fe}(\text{C}_3\text{H}_5\text{O}_3)_2 \cdot 3\text{H}_2\text{O}$.)

An official preparation, slowly soluble in water, and employed in the dose of 3 to 5 grains. It is contained in the syrup of hypophosphites with iron (*Syrupus Hypophosphitum cum Ferro*, U. S. P.), the dose of which is $\frac{1}{2}$ to 1 fluidrachm.

FERRI OXIDUM HYDRATUM and FERRI OXIDUM CUM MAGNESIA.

(Ferric Hydrate and Ferric Hydrate with Magnesia.)

These preparations are used almost exclusively as antidotes in *arsenical poisoning*. The former may be precipitated from any soluble preparation of iron by adding to it an alkali; the latter, by adding magnesia. Ferric hydrate with magnesia is preferable, since magnesia itself is antidotal. They should be freshly prepared and given freely, a tablespoonful every 5 or 10 minutes.

FERRI SUBSULPHAS.(Ferric Subsulphate, Monsel's Salt, $\text{Fe}_4\text{O}(\text{SO}_4)_5$.)

This salt is official as liquor ferri subsulphatis, or Monsel's solution. It is chiefly employed as a powerful, quickly-acting styptic. When, however, it is applied freely to wounded surfaces, it produces dense black clots, which may serve to conceal deep-seated hemorrhage and ma-

terially interfere with complete antiseptis. It should never, therefore, be poured into the wound, but applied directly to the bleeding point on a pledget of cotton. In *hæmatemesis* a few drops in water may prove efficient, but large doses produce in the stomach firm, indigestible coagula. It may be used in a spray for *hæmoptysis*, and on a vaginal tampon for *uterine hemorrhage*.

FERRI SULPHAS.

(Ferrous Sulphate, Green Vitriol, Copperas, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$.)

The salt appears in the form of greenish efflorescent prisms having a styptic taste and an acid reaction. The dose is 2 to 3 grains.

PREPARATIONS.

DOSE.

Ferri Sulphas Exsiccatus, U. S. P. (dried ferrous sulphate) .	2-3 gr.
Ferri Sulphas Granulatus, U. S. P. (granulated ferrous sulphate)	2-3 gr.

Therapeutics.—Sulphate of iron has been employed as a rectal injection in *prolapse of the bowel* and *bleeding piles*, but in these affections there are more efficient remedies. As it is an astringent as well as a chalybeate, it is especially useful in *anæmia* associated with a relaxed condition of the bowels. The dried sulphate should be selected for pills.

FERRI VALERIANAS.

(Ferric Valerianate, $\text{Fe}_2(\text{C}_5\text{H}_9\text{O}_2)$.)

It appears as a dark-red amorphous powder, having the odor of valerianic acid. It is a useful combination of an antispasmodic with a chalybeate, and may be prescribed with advantage in *anæmia* associated with *nervous excitement* or *hysteria*. The dose is 1 to 3 grains in pill form. The following tonic and antispasmodic pill of three valerianates is frequently prescribed:

℞ Ferri valerianatis,
 Zinci valerianatis,
 Quininæ valerianatis, āā gr. xx.
 M. et. div. in pil. No. xx.
 Sig. One three times a day.

FERRUM DIALYSATUM.

(Dialyzed Iron.)

This is an unofficial preparation of chloroxide of iron from which acidulous matter has been removed by dialysis. It appears as a dark-red, tasteless, neutral liquid, quite free from astringency. Being very unstable, it probably undergoes a rapid decomposition in the stomach, but the form in which it is absorbed is unknown. It is an extremely feeble chalybeate, but a useful antidote in arsenical poisoning.

The dose as a chalybeate is 10 to 30 drops; as an antidote, a tablespoonful frequently repeated.

FERRUM REDUCTUM.

(Reduced Iron, Quevenne's Iron.)

This preparation appears as a fine, grayish-black, insoluble powder. When pure it is quite free from irritating properties, and, being the least astringent form of iron, it has little tendency to produce constipation. It may be given as a hæmatinic in pills or lozenges in the dose of 1 to 5 grains.

GALLA.

(Nutmall.)

Nutgalls are excrescences formed on *Quercus lusitana* by the deposit of the ova of *Cynips gallæ tinctoriæ*. Their virtues depend on the large amount of tannic acid which they contain.

PREPARATIONS.	DOSE.
Tincturæ Gallæ, U. S. P.	1-2 fl. dr.
Unguentum Gallæ, U. S. P.	

Therapeutics.—The tincture is occasionally employed internally as an astringent. The ointment makes a useful application for *external hemorrhoids*, especially when combined with stramonium ointment.

GAULTHERIA.

(Wintergreen.)

The leaves of *Gaultheria procumbens*. The drug is official as *oleum gaultheriæ* and *spiritus gaultheriæ*. The active principle is *salicylate of methyl*, of which the oil con-

tains about 90 per cent. The dose of each preparation is 10 to 20 minims.

Methyl salicylate produced synthetically is official as *methyl salicylas*; it has the same properties, physical and therapeutic, as the oil of gaultheria, and may be employed in the same dose.

Therapeutics.—It is used to disguise the taste of unpalatable drugs, and as a substitute for the salicylates in *rheumatism*. In the latter it is sometimes well borne by the stomach when salicylic acid or its salts cannot be tolerated. As an external application to the joints it is often useful in subduing the pain.

Administration.—For internal use it may be prescribed in capsules or emulsion; as a liniment it may be prescribed as follows:

℞ Æther,
Alcohol.,
Olei gaultheriæ, aa fʒj;
Liniment. saponis, q. s. ad Œj.—M.

GELSEMIUM.

(Yellow Jasmine.)

The rhizome and roots of *Gelsemium sempervirens*. It contains an alkaloid, *gelsemine*, and *gelseminic acid*.

PREPARATIONS.

DOSE.

Extractum Gelsemii Fluidum, U. S. P.	5-10 min.
Tinctura Gelsemii, U. S. P.	10-20 min.

Physiological Action.—*Circulatory System.*—Therapeutic doses do not affect the circulation. Toxic doses lessen the force and frequency of the pulse, probably by a direct depressant action on the heart.

Nervous System.—It is a marked depressant to the spinal cord, and in toxic doses produces paralysis.

Respiratory System.—The drug kills by paralyzing the respiratory centres.

Eye.—Its instillation into the eye causes marked dilatation of the pupil, probably from paralysis of the oculomotor nerve.

Toxicology.—Gelsemium-poisoning is characterized by vertigo, disordered vision, dilatation of the pupils, ptosis,

dropping of the jaw, extreme muscular weakness, slow respiration, a weak, thready pulse, and, finally, the symptoms of collapse. Consciousness is usually preserved until near the close of life.

Therapeutics.—Gelsemium has been employed as an antispasmodic in *laryngismus stridulus*, *whooping-cough*, *asthma*, and *chorea*, but in these affections there are far more efficient remedies. At one time gelsemine was recommended as a *mydriatic*, but homatropine and atropine are superior, being more prompt and less dangerous. To-day the drug is chiefly used in *spasmodic affections of the muscles* like *torticollis*, and in *obstinate neuralgia*, especially the reflex variety of the trifacial nerve. On account of the variability of the preparations, they should be given in small doses gradually increased until such symptoms as vertigo or dimness of vision appear. In cases of protracted *wry-neck* the fluid extract may be injected directly into the muscle.

GENTIAN.

The root of *Gentiana lutea*. It contains an extremely bitter glucoside, *gentio-picrin*, and *gentianic acid*, which is inert.

PREPARATIONS.	DOSE.
Extractum Gentianæ, U. S. P.	2-5 gr.
Extractum Gentianæ Fluidum, U. S. P.	½-1 fl. dr.
Tinctura Gentianæ Composita, U. S. P. (contains also bitter-orange peel and cardamom)	1-4 fl. dr.

Therapeutics.—Gentian is used exclusively as a bitter tonic. In *atonic dyspepsia* it increases the appetite and stimulates digestion. It is a useful tonic in the *convalescence of acute fevers*.

GERANIUM.

The rhizome of *Geranium maculatum*. Its virtues depend on the large amount of tannic and gallic acids which it contains.

PREPARATION.	DOSE.
Extractum Geranii Fluidum, U. S. P.	½-1 fl. dr.

Therapeutics.—It is a mild astringent, and may be

employed with advantage in the *diarrhœas of children*, since it is comparatively free from taste.

GLYCERINUM.

(Glycerin, $C_3H_5(OH)_3$.)

A colorless, transparent, hygroscopic fluid obtained by the decomposition of fats and fixed oils. It has a syrupy consistence, a sweetish taste, a neutral reaction, and is without odor. It is freely soluble in water and alcohol, but insoluble in ether, chloroform, and oils.

PREPARATIONS.

Glyceritum Acidi Carbolici, U. S. P., or glycerite of carbolic acid (20 per cent. of acid).

Glyceritum Acidi Tannici, U. S. P., or glycerite of tannic acid (20 per cent. of acid).

Glyceritum Amyli, U. S. P., or glycerite of starch.

Glyceritum Boroglycerini, U. S. P., or glycerite of boroglycerin (see *Acidum Boricum*).

Glyceritum Hydrastis, U. S. P., or glycerite of hydrastis.

Glyceritum Vitelli, U. S. P., or glycerite of yolk of egg (glyconin).

Suppositoria Glycerini, U. S. P.

Physiological Action.—When taken continuously in small doses it is in part oxidized in the body, and so in a slight degree acts as a food. Large doses ($f\bar{3}j$) act as a laxative by attracting serum from the intestinal vessels. When large doses are injected directly into the circulation of an animal they cause vomiting, muscular weakness, bloody urine, a fall of temperature, weak pulse and respiration, convulsions, and coma.

Therapeutics.—Externally, it is used in various forms as an emollient. In the form of an ointment or as glycerite of starch it is very useful in *chapped hands*, *fissured nipples*, etc. It is highly recommended as a preventive against *bed-sores*. The parts should be bathed twice daily with warm water, carefully dried, and gently rubbed with the glycerin. In the various *acute inflammations of the fauces*—stomatitis, tonsillitis, and pharyngitis—it makes an excellent vehicle for carrying other drugs. Being hygroscopic, it not only depletes the turgid vessels, but also serves to spread the medicant over the entire surface. In

uterine congestion, subinvolution, and endometritis tampons containing glycerin, with or without tannic acid, afford an efficient means of securing local depletion. Suppositories or enemata of glycerin (ʒj-ʒss) may be employed with advantage in unloading the bowel in *obstinate constipation*. The injection of sterilized glycerin (fʒiij) between the membranes and uterine wall has been used with very satisfactory results in the *induction of premature labor*.

Internal Use.—It was formerly recommended as a nutrient in place of cod-liver oil; as such, however, it has found but few adherents. It may be employed as a substitute for sugar in *diabetes*, but patients, as a rule, soon tire of it. It has been highly recommended by Ferrand, Hermann, and others, in large doses (1–2 fl. oz.), in *nephrolithiasis*.

GLYCYRRHIZA.

(Licorice-root.)

The root of *Glycyrrhiza glabra*. It contains sugar, starch, and also a sweet neutral principle, *glycyrrhizin*. The latter is official as ammoniated glycyrrhizin, which is made by adding sulphuric acid to the powdered root in the presence of ammonia-water.

PREPARATIONS.	DOSE.
Extractum Glycyrrhizæ, U. S. P. (licorice)	1–2 dr.
Extractum Glycyrrhizæ Fluidum, U. S. P.	1–2 fl. dr.
Extractum Glycyrrhizæ Purum, U. S. P.	1–2 fl. dr.
Glycyrrhizinum Ammoniatum, U. S. P.	5–10 gr.
Mistura Glycyrrhizæ Composita, U. S. P. (brown mixture), contains also wine of antimony, peregoric, and spirit of nitrous ether	2–6 fl. dr.
Pulvis Glycyrrhizæ Compositus, U. S. P. (compound licorice powder), contains also sulphur and senna) . . .	1–4 dr.
Trochisci Glycyrrhizæ et Opii, U. S. P.	

Therapeutics.—Licorice is much used, on account of its pleasant flavor, to disguise the taste of unpalatable remedies. Brown mixture (*mistura glycyrrhizæ*) is a useful sedative in mild cases of *bronchitis*. Compound licorice powder (*pulvis glycyrrhizæ compositum*) is very extensively employed as a gentle and agreeable laxative.

GOSSYPIUM.

(Cotton.)

Cotton is obtained from *Gossypium herbaceum*. The bark of the root is official as *gossypii radice cortex*, and the hairs of the seed as *gossypium purificatum*. The latter is used extensively as an absorbent and a protectant in the dressing of wounds, and also in the manufacture of pyroxylin, or soluble gun-cotton, which, dissolved in ether and alcohol, forms collodion.

GOSSYPII RADICIS CORTEX.

(Cotton Root-bark.)

Cotton-root has been highly extolled by Southern physicians as an oxytocic and emmenagogue. The fluid extract (*extractum gossypii radice fluidum*) is official, and may be employed in doses of a fluidrachm in *atonic amenorrhœa*, *menorrhagia*, *subinvolution*, and *uterine fibroids*. Its action is similar to that of ergot, but less powerful.

GRANATUM.

(Pomegranate.)

The bark of *Punica granatum*, growing in Southern Europe. It contains tannic acid and several alkaloids, the most important of which is *pelletierine*. Pure pelletierine is a liquid, but its salts are crystalline. It is most commonly prescribed as a tannate, the dose of which is 5 grains.

Therapeutics.—Pomegranate is used solely as a vermicide against *tapeworm*. In order that it shall prove an efficient tæniacide, the patient should abstain from solid food on the day of its administration, and a laxative should follow its exhibition. A decoction may be made by macerating two ounces of the bark in a pint of water for twenty-four hours, and boiling the liquid down to one-half. The whole of this should be taken at once. The tannate of pelletierine is a much more elegant preparation, and may be given in capsules.

GRINDELIA.

The leaves and flowering tops of *Grindelia robusta*. It is said to contain an oil, a resin, and a crystalline alkaloid.

PREPARATION.

DOSE.

Extractum Grindeliæ Fluidum, U. S. P. $\frac{1}{2}$ -1 fl. dr.

Physiological Action.—The dominant action of grindelia is on the nervous system. It depresses the peripheral nerves and spinal cord, especially the sensory nerves and columns. Toxic doses produce paralysis and coma.

Therapeutics.—It has been highly recommended in *asthma* and *chronic bronchitis*, and while it sometimes does good, it more often fails. The fluid extract should be given internally, and the fumes of the burning leaves inhaled. As a stimulating injection it has been used with asserted success in *leucorrhœa*, *gonorrhœa*, and *cystitis*. As a lotion the fluid extract is valuable in *acute eczema*, *rhus-poisoning*, and *erysipelas*.

GUAIACOL.

(Methylpyrocatechin, $C_6H_4OHOCH_3$.)

An unofficial liquid preparation obtained from the distillation of beechwood creosote, of which it is said to contain from 60 to 90 per cent. It is soluble in 85 parts of water, and in all proportions in alcohol and ether. A carbonate of guaiacol is also in use, and appears as a tasteless, odorless, insoluble powder.

Therapeutics.—Guaiacol and its derivatives are useful remedies in the treatment of *phthisis*, *fetid bronchitis*, and *bronchiectasis*. Like creosote, they frequently diminish the cough, perspiration, fever, and expectoration, but can rarely be said to effect a cure. Guaiacol is often better borne by the stomach than creosote, and the carbonate of guaiacol seems to be still more acceptable.

Administration.—The drug may be administered internally, subcutaneously, or by inhalation. The dose by the mouth is 5 minims, gradually increased, if well borne, to 30 minims. It may be given in an emulsion of cod-liver oil, in capsules, in wine, or as in the following formula:

R Guaiacol, ℥j;
 Glycerini, ℥iiss;
 Spt. aurantii, q. s. ad ℥iij.—M.

Sig. A teaspoonful to a dessertspoonful in water after meals.

For hypodermic use 1 to 5 grains of guaiacol may be mixed with half a drachm to a drachm of sterilized olive oil and slowly injected into the supraspinous fossa once or twice a day.

GUAIACUM.

(Lignum Vitæ.)

Guaiacum is obtained from *Guaiacum officinale*, and is official as the heart-wood, *guaiaci lignum*, and as the resin, *guaiaci resina*. The resin is the form in which the drug is now medicinally employed. It appears in the form of irregular masses, of a reddish-brown color, but turning greenish on exposure to the air. It is soluble in alcohol and alkaline fluids, but insoluble in water. The dose is 10 to 20 grains.

PREPARATIONS.

DOSE.

Tinctura Guaiaci, U. S. P. ½-1 fl. dr.
 Tinctura Guaiaci Ammoniata, U. S. P. ½-1 fl. dr.

Therapeutics.—Guaiacum, both locally and internally, is sometimes very useful in acute *tonsillitis*, especially the herpetic variety. It may be prescribed in the form of lozenges (gr. ij), which are to be slowly dissolved in the mouth, or as the tincture, to be taken internally. The latter is best given in milk. In the various manifestations of *chronic rheumatism* and *gout* it is sometimes of service. It may be employed with advantage not only in the articular form, but also in *chronic bronchitis*, *sciatica*, and *lumbago* when dependent upon the rheumatic or gouty diathesis.

HÆMATOXYLON.

(Logwood.)

The heart-wood of *Hæmatoxylon Campechianum*, growing in Central America. It contains tannic acid and a crystalline coloring principle, *hæmatoxylin*.

PREPARATION.

DOSE.

Extractum Hæmatoxyli, U. S. P. 10-30 gr.

Therapeutics.—Logwood is used as a mild astringent, and, on account of its agreeable taste, is very useful in the *serous diarrhœa* of children. It has the disadvantage, however, of imparting to the diaper a deep-red color, which may be mistaken for blood by one who is unacquainted with its properties.

HAMAMELIS.

(Witch Hazel.)

The leaves of *Hamamelis Virginica*. Apart from tannic acid and a bitter principle, the drug is not known to contain any active principle.

PREPARATION.

Extractum Hamamelidis Fluidum, U. S. P. $\frac{1}{2}$ -2 fl. dr.

DOSE.

Therapeutics.—It is used as a hæmostatic and a local sedative. In *passive hemorrhage* from the various organs—lungs, stomach, kidneys, bladder, nose, and uterus—it is exceedingly efficacious. As the strength of the fluid extracts sold in the shops is very variable, it is well to begin with a small dose (20 min.) and rapidly increase the amount until the desired effect is produced. In *bleeding piles* the insertion into the rectum of a pledget of cotton soaked in the fluid extract acts most happily.

Internally, this drug may prove serviceable also in *varicose veins*.

Locally, it is a useful sedative in *sprains, bruises, urticaria, rhus-poisoning, and phlegmasia dolens*. In these cases the fluid extract may be applied pure or mixed with one-third its volume of glycerin.

HOMATROPINE.

An artificial alkaloid obtained as a by-product in the manufacture of atropine. It is usually employed in the form of the hydrobromate, which is freely soluble in water. It is an excellent mydriatic for ophthalmoscopic purposes, the dilatation of the pupil lasting only one-fourth as long as that produced by atropine. An aqueous solution containing 4 to 6 grains to the ounce should be instilled in the eye several times at intervals of ten to fifteen minutes.

HUMULUS.

(Hops.)

The strobiles of *Humulus lupulus*. The glandular powder separated from the strobiles is also official as *lupulinum* (lupulin). Hops contain tannic acid, a volatile oil, a liquid alkaloid, and a bitter principle. The dose of lupulin is 3 to 5 grains.

PREPARATIONS.

DOSE.

Tinctura Humuli, U. S. P.	$\frac{1}{2}$ -2 fl. oz.
Extractum Lupulini Fluidum, U. S. P.	$\frac{1}{2}$ -2 fl. dr.
Oleoresina Lupulini, U. S. P.	10 min.-1 fl. dr.

Therapeutics.—Hops are used as mild hypnotics and antispasmodics. In *nervous excitement*, the *restlessness of fevers*, and *delirium tremens* they are sometimes useful sedatives. They may prove efficient in *priapism*, *vesical irritation*, and *perverted sexual appetite*. In the form of a poultice made by macerating the tops in hot water they are useful in relieving the pains of *acute inflammation*.

HYDRARGYRUM.

(Mercury, Quicksilver, Hg.)

Mercury appears as a heavy fluid having a silvery lustre and free from odor and taste.

PREPARATIONS.

DOSE.

Emplastrum Ammoniaci cum Hydrargyro, U. S. P.	
Emplastrum Hydrargyri, U. S. P.	
Hydrargyrum cum Cretæ, U. S. P. (honey, chalk, and metallic mercury)	1-8 gr.
Massa Hydrargyri, U. S. P. (blue mass, blue pill)	1-20 gr.
Oleatum Hydrargyri, U. S. P.	
Unguentum Hydrargyri, U. S. P. (blue ointment).	

Physiological Action.—When small doses of an unirritating preparation of mercury are given continuously for a certain length of time, the first effects are observed in the mouth. There is increased flow of saliva, fetor of the breath, soreness of the teeth when the jaws are brought forcibly together, and redness of the gums near the insertion of the teeth. If the drug is not withdrawn salivation becomes excessive, the gums become swollen and spongy, the teeth loosen and fall out, the tongue and parotid glands

enlarge—the former sometimes to such an extent that it protrudes from the mouth—and finally the soft tissues become ulcerated and the bones necrosed. The term *ptyalism* is applied to this group of symptoms. In addition to these symptoms, the patient loses flesh, becomes pale, and an examination of the blood reveals an excess of the watery elements and a diminution of fibrin and corpuscles.

The protracted use of very *minute* doses of mercury, instead of reducing the vitality, seems to exert an opposite effect, and acts as a tonic by increasing the number of blood-corpuscles. The manner in which mercury is absorbed is still undetermined, but it is generally believed that it enters the circulation as an albuminate. It is eliminated through all the emunctories—the urine, saliva, sweat, and milk.

An important property of the drug in therapeutic doses is its power of increasing the secretions, notably the saliva, bile, intestinal fluids, and urine. Upon non-purulent inflammatory products it has a decided influence, aiding materially in their solution and reabsorption.

Toxicology.—Chronic mercurial poisoning is observed in makers of thermometers, mirrors, and scientific instruments, and is characterized by anæmia, loss of flesh and strength, tremors similar to those of paralysis agitans, motor palsies, gastro-intestinal disturbance, fetid breath, stomatitis, and salivation.

Treatment.—After removing the patient from the influence of the metal, potassium iodide should be given for its eliminative effect, and tonics to overcome the cachexia.

Therapeutics.—Mercury is used as an antisyphilitic, antiphlogistic, antiseptic, absorbent, laxative, diuretic, and local stimulant. Each of these uses will be considered in discussing the various salts and preparations of the drug.

The plaster of mercury (*emplastrum hydrargyri*) is used as an absorbent and counterirritant over *chronic inflammatory swellings, glandular enlargements, syphilitic nodes*, etc.

Mercurial ointment, or blue ointment (*unguentum hydrargyri*), and the oleate of mercury (*oleatum hydrargyri*) are used for the same purpose as the plaster. They are also

extensively employed in the treatment of *syphilis* by inunctions. This method may be adopted in conjunction with the internal use of the protiodide or bichloride when it is desirable to bring the patient speedily under the influence of the drug. A small amount of the ointment or oleate should be rubbed into the different parts of the body each day, so as to prevent undue irritation. The groins, axillæ, and inner side of the arms and thighs are the surfaces usually selected. In congenital syphilis a piece of the ointment the size of a hickory-nut may be spread on an abdominal binder and renewed daily. In *synovitis*, *bursitis*, *rheumatic arthritis*, *glandular enlargements*, and *syphilitic nodes* mercurial ointment is a valuable absorbent. In painful swellings an equal amount of belladonna ointment may be added to the blue ointment for its sedative effect. In *pediculosis pubis* a very small amount of the oleate rubbed into the affected parts is sufficient to destroy the parasites.

Blue mass (*massa hydrargyri*) is employed as a cholagogue, laxative, and diuretic. In "biliousness" its effect is magical. As a laxative it may be employed to unload the bowels without irritating them in the beginning of *acute diseases*. In combination with powdered squill and digitalis it is an efficient diuretic in the *dropsy* of chronic heart and liver disease:

℞ Massæ hydrargyri,
 Pulv. scillæ,
 Pulv. digitalis, āā gr. xx.—M.
 Ft. in pil. No. xx.
 Sig. One pill thrice daily.

Mercury and chalk (*hydrargyrum cum cretæ*) is used in the same class of cases as calomel. It is particularly useful in the *diarrhœa* of children when the tongue is heavily coated, the breath fetid, and the stools greenish or clay-colored.

HYDRARGYRI AMMONIATUM.

(Ammoniated Mercury, White Precipitate, NH_2HgCl .)

White precipitate is made by the action of ammonia on corrosive sublimate, and appears as a white insoluble powder, free from odor and taste.

PREPARATION.

Unguentum Hydrargyri Ammoniaci, U. S. P. (10 per cent.).

Therapeutics.—Ammoniated mercury is employed externally as a stimulant or parasiticide; as such it is a useful application in *ringworm*, *chronic eczema*, and *psoriasis*. The official ointment is too strong for ordinary use, 10 to 20 grains to the ounce being quite sufficient.

HYDRARGYRI CHLORIDUM CORROSIVUM.

(Bichloride of Mercury, Mercuric Chloride, Corrosive Sublimate, $HgCl_2$.)

This appears in the form of colorless, odorless crystals, having a strongly metallic taste, and soluble in 16 parts of water and in 3 parts of alcohol. Dose, $\frac{1}{100}$ to $\frac{1}{2}$ of a grain.

Toxicology.—Acute poisoning by corrosive sublimate is characterized by intense pain in the œsophagus, stomach, and abdomen, vomiting and purging of mucous and bloody material, scanty albuminous urine, and all the phenomena of collapse. The *treatment* consists in evacuating the stomach by the aid of the stomach-pump, unless vomiting has rendered this procedure unnecessary; the administration of egg-albumin in large quantities as an antidote; the application of external heat; and the hypodermic injection of diffusible stimulants.

Therapeutics.—Corrosive sublimate is employed as an antiseptic, an antiparasitic, an antisiphilitic, an absorbent, and a tonic.

Antiseptic.—It is a superior antiseptic. In a .005 per cent. solution it destroys the micro-organisms of pus, and even in so weak a solution as 1 to 40,000 it destroys the spores of most bacilli. It is frequently employed as an antiseptic in making up surgical dressings, and is extensively used in irrigating wounds. On account of its corrosive action on metals, it cannot be used for disinfecting instruments. Tartaric acid is often incorporated with the bichloride of mercury to prevent the precipitation of the latter as an albuminate in the presence of albuminous fluids. Compressed tablets, each containing tartaric acid and $7\frac{1}{4}$ grains of corrosive sublimate, are in common use.

One of these added to a pint of water makes a solution of 1 : 1000. In *diphtheria*, *scarlet fever*, *small-pox*, and other diseases associated with infectious pharyngitis a weak solution, 1 : 1000, proves an efficient local antiseptic. Internally, minute doses, $\frac{1}{200}$ to $\frac{1}{80}$ of a grain, are often of great service in the *diarrhœa* of children and adults when the stools are mixed with considerable mucus.

Antiparasitic.—In *pediculosis* and the various forms of *ringworm* bichloride of mercury is a useful remedy, and may be employed in lotion or ointment in the strength of 1 to 4 grains to the ounce.

Antisyphilitic.—Mercurials and potassium iodide are the remedies relied on to combat syphilis. In the secondary stage mercury is generally given in preference to the iodide; in the tertiary stage it is not without effect, and is especially indicated when a very prompt action is desired, as in syphilitic affections of the brain. The bichloride of mercury may be given by the mouth or hypodermically. In late syphilis the drug may be combined with potassium iodide for internal administration, as in the following formula :

R Potassii iodidi,	ʒiiss-iv;
Hydrarg. chlor. corros.,	gr. j-iss;
Syrup. sarsaparillæ co.,	fʒj;
Aquæ,	q. s. ad fʒij.—M.

Sig. A teaspoonful three times a day.

The drug may be given hypodermically when the cutaneous eruption is so extensive as to prevent inunctions, and when the stomach is too irritable to permit the internal administration. For hypodermic use it may be prescribed as follows :

R Hydrarg. chlor. corros.,	gr. vj;
Sodii chlorid.,	gr. xxxvj;
Aquæ destillat.,	fʒx.—M.

Sig. Inject daily five to eight drops hypodermically.

Absorbent.—In *diphtheria* and *membranous croup* bichloride of mercury or calomel is one of the most useful internal remedies in aiding the resorption of the false membrane. Children bear the drug remarkably well in these affections. If the bichloride is selected, it may be given

to a child of five years in the dose of $\frac{1}{40}$ of a grain every two hours, gradually increased, if well borne, to $\frac{1}{20}$ of a grain. Corrosive sublimate is sometimes useful, though generally inferior to potassium iodide, in *arterio-sclerosis* and *chronic interstitial inflammation* of the organs, such as contracted kidney and cirrhosis of the liver.

Tonic.—Minute doses of bichloride of mercury, $\frac{1}{100}$ to $\frac{1}{50}$ of a grain, are often very efficient in *anæmia*.

Incompatibles.—Corrosive sublimate is incompatible with most substances; it may, however, be given with the tincture of the chloride of iron, liquor acidi arsenosi, and solutions of potassium iodide; with the last it forms a double salt which is held in solution.

HYDRARGYRI CHLORIDUM MITE.

(Mild Mercurous Chloride, Calomel, Hg_2Cl_2 .)

Calomel appears in the form of a white, odorless, tasteless powder, insoluble in all ordinary menstrua. Dose, $\frac{1}{10}$ to 8 grains.

Physiological Action.—In addition to the properties possessed by all mercurial preparations, calomel acts as a decided laxative, increases the amount of bile in the intestine, and has, to some extent, a diuretic effect. Whether the drug actually increases the biliary secretion by stimulating the hepatic cells, or whether it simply assists in the expulsion of the bile from the liver to the bowel, is still undetermined. It is, however, generally believed that the secretion is increased. The manner in which calomel is absorbed is also a matter of conjecture; a very minute portion is probably converted by the hydrochloric acid of the stomach into corrosive sublimate, while a larger portion is decomposed by the alkaline juices of the intestines into a black oxide which is held in solution by fatty materials present in the alimentary canal.

Therapeutics.—Calomel is used internally as an anti-syphilitic, as an antiphlogistic, as a laxative, as a gastric sedative, as a cholagogue, and as a diuretic, and externally as a stimulant and desiccant.

Antisyphilitic.—Calomel may be given internally to combat syphilis, but the protiodide and bichloride are generally

preferable, since they do not produce salivation so quickly as the former. It is, however, a suitable substance for volatilization when the patient is to be treated by fumigation.

Antiphlogistic.—In *inflammatory diseases of the serous membranes* calomel is often of service in preventing the outpouring of exudation. For this purpose it may be used in iritis, meningitis, pleuritis, and pericarditis. Like the bichloride, it is also of value in hastening the solution of the false membrane in *diphtheria* and *membranous croup*.

Laxative.—In the beginning of *acute diseases* like the infectious fevers calomel will be found a superior laxative for unloading the bowels without producing irritation. It should be given in small doses ($\frac{1}{6}$ – $\frac{1}{4}$ gr.) repeated until the desired effect is accomplished. In the *diarrhœa of children*, when the stools are light-colored, it is well to begin treatment by the administration of a few laxative doses of the mild chloride. In *habitual constipation* associated with “biliousness” occasional courses of calomel are very useful.

Gastric Sedative.—In small doses calomel is frequently of service in checking the *obstinate vomiting* of acute gastritis; and in *chronic gastric catarrh* the combination of calomel ($\frac{1}{10}$ gr.) with bismuth subnitrate often accomplishes much good.

Cholagogue.—In the condition known as *biliousness*, characterized by a thickly-coated tongue, fetid breath, heavy urine, headache, and depression of spirits, a course of calomel will usually cut short the attack. It also proves useful, in small doses, in *catarrh of the bile-ducts*—not by increasing the flow of bile, but by its favorable action upon the mucous membrane of the entire digestive tract. In *biliary* or *hypertrophic cirrhosis of the liver* marked improvement sometimes follows an interrupted course of the drug.

Diuretic.—In certain forms of *dropsy*, especially hepatic and cardiac, calomel is sometimes a useful diuretic. It may be given alone or in a pill containing squill and digitalis. The diuretic dose is 1 grain.

External Use.—In *subacute* and *chronic eczema* calomel and zinc ointment makes an excellent application. It may be employed in the strength of 10 to 15 grains to the

ounce. In *corneal ulcers* and *phlyctenular conjunctivitis* it is a most useful remedy; it should be dusted into the eye by gently tapping a camel's-hair brush loaded with the powder.

Administration.—For internal administration the drug is generally prescribed in powder or triturates. Sodium bicarbonate, by lessening gastric acidity and thereby aiding the conversion of the calomel into the oxide, becomes a useful vehicle. For children it may be prescribed with sugar.

Incompatibles.—Hydrochloric acid, iodides, and bromides.

HYDRARGYRI IODIDUM FLAVUM.

(Yellow Mercurous Iodide, Hydrargyri Iodidum Viride, Protiodide of Mercury, Hg_2I_2 .)

Protiodide of mercury appears in the form of a yellow, amorphous, insoluble powder, free from odor and taste. Dose, $\frac{1}{10}$ to $\frac{1}{2}$ grain.

Therapeutics.—This is a milder mercurial than the bichloride, and is frequently substituted for the latter in the treatment of *syphilis*. It should be prescribed in pill form.

HYDRARGYRI IODIDUM RUBRUM.

(Red Mercuric Iodide, Biniodide of Mercury. HgI_2 .)

It appears as a bright-red amorphous powder, free from odor and taste, practically insoluble in water, and soluble in 130 parts of alcohol. Dose, $\frac{1}{50}$ to $\frac{1}{12}$ of a grain.

PREPARATION.

DOSE.

Liquor Arseni et Hydrargyri Iodidi, U. S. P. (Donovan's solution) 2-10 min.

Therapeutics.—In its effect and strength the biniodide of mercury closely resembles the bichloride. It is frequently prescribed in *syphilis*, and may be given in pill form or in a solution of potassium iodide, as in the following formula:

℞ Hydrarg. iodid. rub.,	gr. j;
Potass. iodid.,	ʒiv;
Syr. sarsaparillæ co.,	ʒij;
Aquæ,	q. s. ad ʒiv.—M.
Sig. A teaspoonful three times a day after meals.	

Liquor arseni et hydrargyri is used internally as an alterative in *chronic rheumatism, phthisis, scrofula, and chronic skin diseases.*

HYDRARGYRI NITRAS.

(Mercuric Nitrate, $\text{Hg}(\text{NO}_3)_2$.)

The salt is official in two forms :

Liquor Hydrargyri Nitratis, U. S. P. (solution of mercuric nitrate), contains 60 per cent. of mercuric nitrate and 11 per cent. of free nitric acid.

Unguentum Hydrargyri Nitratis, U. S. P. (citrine ointment).

Therapeutics.—This salt of mercury is used externally as a powerful caustic in *gangrenous, syphilitic, and epitheliomatous ulcers.* Citrine ointment is sometimes used to stimulate *indolent ulcers.*

HYDRARGYRI OXIDUM.

(Mercuric Oxide, HgO .)

Two oxides of mercury are official :

Hydrargyri Oxidum Flavum, U. S. P.

Hydrargyri Oxidum Rubrum, U. S. P. (red precipitate).

From these, two official ointments are prepared :

Unguentum Hydrargyri Oxidi Flavi, U. S. P. (10 per cent. of mercury).

Unguentum Hydrargyri Oxidi Rubri, U. S. P. (10 per cent. of mercury).

The yellow oxide also enters into the oleate of mercury (Oleatum Hydrargyri, U. S. P.).

Therapeutics.—The oxides of mercury are used externally for their stimulant and alterative effect. In various *chronic inflammatory affections of the eye, phlyctenular conjunctivitis, keratitis, and blepharitis marginalis,* an ointment of the yellow oxide is very useful. In the last affection, characterized by incrustation of the lashes, it is particularly efficacious when applied at night to the margins of the lids in the strength of one grain to a drachm of cosmoline. In *chronic eczema* an ointment containing 10 to 20 grains to

the ounce is often serviceable. The ointments are sometimes used as stimulating applications in *indolent chancroids* and *syphilitic ulcers*. In *simple adenitis* one of the official ointments may be employed to reduce the swelling. The red oxide is used in the same class of cases as the yellow oxide, but is less desirable on account of its crystalline character.

HYDRARGYRI SUBSULPHAS FLAVUS.

(Yellow Mercuric Sulphate, Turpeth Mineral, $\text{Hg}(\text{HgO})_2\text{SO}_4$.)

It appears as a lemon-yellow, odorless, tasteless powder, sparingly soluble in water. Dose, 2 grains, repeated once.

Therapeutics.—Turpeth mineral has been employed almost entirely as a stimulating emetic for children, but, as it is distinctly poisonous, and is highly irritating to the stomach, it is rapidly falling into disuse.

HYDRASTIS.

(Golden Seal.)

The rhizome and roots of *Hydrastis Canadensis*. It contains three alkaloids: *hydrastine*, which appears as colorless prismatic crystals; *berberine*, which appears as a yellow powder having an intensely bitter taste; and *canadine*, which appears as white acicular crystals.

An artificial alkaloid, *hydrastinine*, is derived from hydrastin, and is official as the hydrochlorate (*hydrastinine hydrochloras*), which may be employed in the dose of $\frac{1}{12}$ to $\frac{1}{2}$ grain.

PREPARATIONS.

DOSE.

Extractum Hydrastis Fluidum, U. S. P.	10–30 min.
Glyceritum Hydrastis, U. S. P.	
Tinctura Hydrastis, U. S. P.	1–2 fl. dr.

Therapeutics.—Hydrastis has been highly extolled as a hæmostatic in *uterine hemorrhage* from various causes, but in most cases its action is inferior to that of ergot or ergeron. It has been used with asserted good results as a local remedy in *leucorrhœa*, *uterine ulcerations*, *ulcerative stomatitis*, and *nasal catarrh*.

HYDROGENII PEROXIDUM.(Hydrogen Peroxide, Hydrogen Dioxide, H_2O_2 .)

Hydrogen peroxide is made by the action of sulphuric acid on hydrated peroxide of barium. It appears in commerce as a two or three per cent. solution containing more or less free hydrochloric acid. It rapidly bleaches organic substances, and causes effervescence in pus, blood, mucus, and cerumen. It is highly destructive to lower organisms.

Therapeutics.—It is used externally as an antiseptic, detergent, and solvent of *sloughs* and *false membranes*. It makes a useful injection for cleansing *suppurating cavities*, *sinuses*, and *fistulous tracts*. In combination with glycerin it makes an excellent mouth-wash for all forms of *infectious pharyngitis*. In *diphtheria* and *membranous croup* a spray of hydrogen peroxide rapidly dissolves the false membrane. As it is somewhat irritating in full strength, it is well to dilute it with an equal volume of water.

When given internally, it is said to increase the proportion of hydrochloric acid in the stomach, and to act favorably in *dyspepsia* associated with subacidity.

HYOSCYAMUS.

(Henbane.)

The leaves and flowering tops of *Hyoscyamus niger*, growing in North America. Two alkaloids are present in the leaves—*hyoscyamine* and *hyoscine*.

PREPARATIONS.

DOSE.

Extractum Hyoscyami, U. S. P.	$\frac{1}{2}$ –2 gr.
Extractum Hyoscyami Fluidum, U. S. P.	5–10 min.
Tinctura Hyoscyami, U. S. P.	$\frac{1}{2}$ –1 fl. dr.

Physiological Action.—In full doses hyoscyamus acts like belladonna, causing dilatation of the pupils, dryness of the throat, and quickening of the respirations; but, unlike the latter drug, instead of causing mental excitement, it tends to produce drowsiness and a sedative effect upon the cerebrum. Its hypnotic influence is due to the alkaloid hyoscine.

Therapeutics.—Like belladonna, it is used to check *spasm* and to allay *irritation*. It may be employed in the

obstinate cough of *bronchitis* when opium is contraindicated, in *pertussis*, and in *incontinence of urine* due to vesical irritation. It is often a useful vesical sedative in *acute cystitis*. It may be added with advantage to cathartic pills to allay griping.

HYOSCYAMINE.

This alkaloid of *hyoscyamus* is official as *hyoscyaminæ hydrobromas* and *hyoscyaminæ sulphas*. The dose of either is $\frac{1}{150}$ to $\frac{1}{40}$ of a grain.

Therapeutics.—Hyoscyamine is almost equivalent as a therapeutic agent to atropine. Like atropine, it dilates the pupil, but its action is much less prolonged. In *painless facial spasm* and *torticollis* it is sometimes extremely useful. Dana has recommended it in the *chorea of childhood*. It may afford temporary relief in the tremors of *paralysis agitans* and *disseminated sclerosis*.

HYOSCINE.

This alkaloid of *hyoscyamus* is official as *hyoscine hydrobromas*. Its dose is $\frac{1}{150}$ to $\frac{1}{60}$ of a grain.

Physiological Action.—In the main, the action of hyoscine resembles that of atropine, but, unlike the latter, it quiets the brain, acting as a powerful hypnotic, and rather depresses than stimulates the respiratory centre. In full doses it has a tendency to produce paresis of the throat-muscles, and for this reason is contraindicated in affections involving the throat, like diphtheria and scarlet fever.

Therapeutics.—Hyoscine hydrobromate is used as a hypnotic, a nerve-sedative, and anaphrodisiac. It is an efficient hypnotic in *insomnia* associated with great mental or emotional excitement; thus it may act admirably in *mania*, *delirium tremens*, *melancholia agitata*, and the active delirium of *low fevers* like typhoid. It is sometimes very useful in arresting the violent movements of *grave chorea*. It occasionally exerts a temporary effect on the tremors of *paralysis agitans* and *disseminated sclerosis*. It is one of the best remedies we have in *spermatorrhœa*, *erotomania*, and kindred perversions of the sexual appetite.

Administration.—It may be given hypodermically or

internally in pills, granules, or aqueous solution. As some people are unusually susceptible to the drug, the first dose should always be small. For hypodermic use it may be prescribed thus :

℞ Hyoscinae hydrobromatis,	gr. ss;
Aquæ destil.,	fʒj.
Solve.	

One minim = gr. $\frac{1}{960}$. Dose, 6 to 12 minims.

ICHTHYOL.

(Ichthyol, Sulphonate of Ammonium.)

Ichthyol is obtained from the distillation of a bituminous mineral, rich in fossil fish, found in the Tyrol. The commercial product represents various salts of sulph-ichthyolic acid, the latter being obtained by treating the oily distillate with concentrated sulphuric acid. It appears as a dark-red, oily liquid, having a bituminous odor and taste, quite freely soluble in water, but only feebly so in pure alcohol and ether. It mixes with fats in all proportions. It contains nearly 15 per cent. of sulphur, and to this ingredient, no doubt, its therapeutic properties are largely to be attributed. Sodium ichthyolate is generally selected for internal use, and may be given in the dose of 2 to 10 grains. It is best prescribed in pills or capsules.

Therapeutics.—Ichthyol is extensively used in external medicine as an antiseptic and alterative. In *erysipelas* an ointment of ichthyol and vaseline or lanolin (30 to 40 per cent.) often acts most happily. In *rheumatism* a 50 per cent. ointment rubbed into the joints will be found very useful in diminishing the pain and swelling. A combination of ichthyol with mercurial and belladonna ointments is sometimes very efficient in the latter disease. It has been used successfully in the removal of *lymphatic enlargements*. It is sometimes of service in *bruises*, *sprains*, and *chilblains*. It has been highly extolled in many *skin diseases*, notably chronic urticaria, eczema, acne, furunculosis, and simple sycosis.

It may be employed with advantage, in the form of an ointment, in the various inflammatory affections of the female genital organs—*ovaritis*, *endometritis*, and *para-*

metritis. In *chronic nasal catarrh*, especially *ulcerative rhinitis*, it is often extremely useful. The remedy has been prescribed internally in many diseases; it seems to be of real service in *chronic rheumatism* and certain chronic skin diseases, such as *eczema*, *acne rosacea*, *prurigo*, and *urticaria*.

IODINUM.

(Iodine, I.)

A non-metallic element obtained from the ashes of seaweed and mineral iodides and iodates. It appears in laminar crystals having a metallic lustre and a peculiar odor, and emits on heating a violet-colored vapor. It is soluble in 5000 parts of water, and freely so in alcohol, ether, and solutions of iodide of potassium.

PREPARATIONS.

DOSE.

Liquor Iodi Compositus, U. S. P. (Lugol's solution), contains 5 per cent. of iodine and 10 per cent. of potassium iodide	5-10 gtt.
Tinctura Iodi, U. S. P.	5-10 gtt.
Unguentum Iodi, U. S. P.	

Physiological Action.—Locally applied, iodine acts as an irritant, and in concentrated form produces vesication. Taken internally in small doses, it acts as an alterative, improves nutrition, and aids in the absorption of any existing inflammatory products. It is eliminated as iodine in the urine, saliva, and mucus of the respiratory and gastrointestinal tracts. In large dose it produces the symptoms of severe gastro-enteritis, salivation, and collapse. Chronic poisoning, or *iodism*, may follow the protracted use of small doses; it is characterized by persistent coryza with frontal headache, a metallic taste in the mouth, increased flow of saliva, gastric irritation, and a diffuse acne rash. In some instances extreme cachexia, atrophy of the mammæ or testicles, blindness, and paralysis have been noted.

Therapeutics.—Iodine is a useful counterirritant where a persistent moderate effect is required. It may be applied externally in *pleurisy*, *bronchitis*, *laryngitis*, *synovitis*, *arthritis*, *neuritis*, *muscular rheumatism*, and similar inflammatory affections. As a local remedy it is also useful in assisting in the absorption of inflammatory products; for

this purpose it may be employed over *pleural effusions*, *serous effusions in the joints*, and *swollen lymph-glands*.

In chronic serous effusions the remedy may be injected into the cavity after the evacuation of the fluid. In this way it is employed in *hydrocele*, *housemaid's knee*, *ganglion*, and *meningocele*. Injections (5 to 10 drops of the tincture every four or five days) are highly recommended by Agnew in *cystic goitre*. The tincture is sometimes employed as a parasiticide in the various forms of *ringworm*. In chronic inflammatory affections of the endometrium the official tincture or Churchill's tincture makes an excellent application. It may be introduced on a cotton swab wrapped around the end of an aluminium probe. The following is the formula for Churchill's tincture :

℞ Iodi,	gr. lxxv;
Potassii iodidi,	ʒiiss;
Alcohol.,	fʒij.

Internally, iodine is used chiefly for its alterative effect. In *scrofulous enlargement of the lymph-glands* and in *phthisis* the remedy is sometimes of service. It has been recommended in *arthritis deformans*, but it is rarely of any positive advantage. In the simple *hypertrophy of the thyroid gland* not infrequently seen in the young it is valuable both internally and externally. In *exophthalmic goitre* it is useless. Lugol's solution (2 or 3 drops) is sometimes useful in *obstinate vomiting*.

Administration.—Either the tincture or Lugol's solution may be prescribed for internal use. They should be given well diluted.

IODOFORMUM.

(Iodoform, CHI_3 .)

It appears in the form of lemon-yellow crystalline scales having a persistent penetrating odor and an unpleasant sweetish taste. It is feebly soluble in water, soluble in 52 parts of alcohol, and freely so in ether and chloroform. The dose is 1–3 grains.

PREPARATION.

Unguentum Iodoformi, U. S. P. (10 per cent.).

Physiological Action.—When iodoform is applied freely to wounded surfaces, it is rapidly absorbed, and very soon iodine may be detected in any of the secretions. In substance or concentrated solution it acts as a local anæsthetic. The too free absorption of the drug is not infrequently followed by toxic symptoms; these generally resemble cerebral meningitis, and include headache, stupor, delirium, coma, contracted pupils, hurried breathing, and rapid pulse. An erythematous or papular rash may accompany the intoxication. Extensive fatty degeneration of the tissues is found after death. Iodoform itself is but feebly germicidal, but in the presence of the warmth and moisture of wounds free iodine is liberated, which is distinctly germicidal.

Therapeutics.—Externally, iodoform is used as a germicide, protectant, anæsthetic, and alterative. In various *ulcers*—chancroidal ulcers, syphilitic ulcers, epitheliomatous ulcers, tuberculous ulcers, and bed-sores—iodoform makes an excellent dressing. A saturated ethereal solution is often useful in *diphtheritic pharyngitis*, *follicular tonsillitis*, *thrush*, and *aphthous stomatitis*. Suppositories of iodoform are often of service in painful *hemorrhoids* and *fissure of the anus*.

Very satisfactory results have followed injections of the drug in *tuberculous* affections, such as *cold abscesses*, *gelatinous arthritis*, and *scrofulous glands*. Sterilized olive oil or glycerin is used as the vehicle, and to this 10 per cent. of iodoform is added. It is essential that the latter drug also should be sterilized by repeated washings in bichloride solution.

Many substances have been recommended to disguise the disagreeable odor of iodoform; among such agents may be mentioned menthol, tar, camphor, thymol, and terpineol. The following combination is said to be satisfactory:

Carbolic acid,	1 part;
Peppermint oil,	2 parts;
Iodoform,	197 parts.

Internally, iodoform has been employed with asserted

good results in *phthisis*, *syphilis*, *chronic rheumatism*, and *leucæmia*.

IODOL.

(Tetra-iodo-pyrrol, $C_4I_4NH.$)

It appears as a yellowish-brown, tasteless, odorless powder. It is sparingly soluble in water, but freely so in alcohol, ether, and oils. The dose is 3 to 5 grains.

Therapeutics.—Iodol is used externally as a substitute for iodoform. It has an advantage over the latter in being free from odor. It may be employed in powder or in a solution like the following:

Iodol,	1 part;
Alcohol,	16 parts;
Glycerin,	34 parts.

Its internal use has been recommended highly in *tertiary syphilis*, *scrofula*, and *diabetes mellitus*.

IPECACUANHÆ.

(Ipecac.)

The dried root of *Cephaëlis ipecacuanhæ*, a native of Brazil. It contains the alkaloid *emetine*, and ipecacuanhic acid. The dose of emetine as an emetic is $\frac{1}{300}$ to $\frac{1}{120}$ of a grain; of powdered ipecac, 20 to 30 grains.

PREPARATIONS.

DOSE.

- Extractum Ipecacuanhæ Fluidum, U. S. P. 20 min. (emetic dose).
- Pulvis Ipecacuanhæ et Opii, U. S. P. (Dover's powder), 10 grains contain 1 grain each of opium and ipecac 5-10 gr.
- Syrupus Ipecacuanhæ, U. S. P. 4-6 fl. dr. (emetic dose).
- Trochisci Ipecacuanhæ, U. S. P. (contain gr. $\frac{1}{3}$).
- Trochisci Morphinae et Ipecacuanhæ, U. S. P. (contain morph., gr. $\frac{1}{36}$; ipecac, gr. $\frac{1}{12}$).
- Vinum Ipecacuanhæ, U. S. P. 4-6 fl. dr. (emetic dose).

Physiological Action.—When applied to the skin or mucous membrane in concentrated form, it is decidedly irritating, and is capable of producing erythema and vesication. The ingestion of a full dose of ipecac is followed in a short time by emesis, the latter resulting not only from

the action of the drug on the stomach, but also from its action on the vomiting-centre in the medulla. Small doses have the power of increasing and modifying the secretions of the respiratory and gastro-intestinal mucous membrane. In some people the respiratory mucous membrane is so sensitive to the drug that the inhalation of an extremely small quantity of the powder is sufficient to cause coryza and a paroxysm of asthma.

Therapeutics.—Ipecac is used as an emetic, anti-emetic, sedative expectorant, cholagogue, antidysenteric, and hæmostatic.

Emetic.—Ipecac, though not very prompt in its action, is a certain and safe emetic. It is especially useful in children, in whom it is frequently employed to unload the stomach of irritating material. In *capillary bronchitis* of children, when the bronchial tubes become filled with mucus, ipecac may be given to produce emesis, with the hope of thereby forcibly expelling the secretion. In poisoning more prompt emetics, like sulphate of zinc or apomorphia, are preferable.

Anti-emetic.—Ipecac in minute doses is often of great service in checking *obstinate vomiting*. According to Ringer, it is especially indicated in the vomiting of pregnancy, in vomiting occurring at the menstrual epochs, in the morning vomiting of drunkards, in vomiting occurring in convalescence from acute diseases, in the vomiting in children with acute gastric catarrh, in the vomiting of whooping-cough, and in a species of vomiting occurring after meals, without nausea, discomfort, or pain. The wine is the best preparation to use as an anti-emetic; it should be given in doses of one-half to one drop, repeated every half hour.

Sedative Expectorant.—Ipecac is an excellent expectorant in *acute bronchitis* before secretion is established, and in *chronic bronchitis* associated with abundant tenacious sputum. In the form of a spray the wine of ipecac diluted with twice its bulk of water is often of great service in *chronic bronchial catarrh* and *bronchitic asthma*.

Cholagogue.—In *chronic constipation* associated with recurring attacks of “biliousness” ipecac in combination

with other cathartics often acts admirably. It may be prescribed in a pill like the following :

R	Extracti euonymi,	gr. xl ;
	Pulv. aloes,	gr. xxx ;
	Pulv. ipecac.,	gr. x.—M.
	Ft. in pil. No. xx.	
	Sig. One at bedtime.	

Antidysenteric.—Ipecac is efficacious in *acute dysentery*. In the bilious and malignant types a large dose (30 to 40 gr.) should first be given to induce vomiting, and after this has occurred smaller doses (5 grains) should be given at intervals of three hours. To ensure the retention of the latter doses, ten drops of laudanum should be administered fifteen minutes before each dose of ipecac. A successful result is indicated within twelve hours by the appearance of large tarry stools. In *simple catarrhal dysentery* small doses of ipecac with mercury and opium often prove useful :

R	Pulv. ipecac.,	gr. xij ;
	Hydrargyri chloridi mit.,	gr. vj ;
	Extracti opii,	gr. iij ;
	Syrupi,	q. s.—M.
	Ft. in pil. No. xii.	
	Sig. One every three or four hours.	

Hæmostatic.—Trousseau was the first to recommend ipecac as a hæmostatic, and since his time many have spoken highly of the value of the drug in *internal hæmorrhages*. It seems to be especially efficacious in *hæmoptysis*, although the method of its action is unknown.

Administration.—For producing emesis the wine, syrup, or fluid extract may be selected ; in children the syrup, one to two teaspoonfuls, is preferable. In bronchitis the wine or the syrup is most commonly used, the former in the dose of 5 to 10 minims, and the latter in the dose of 5 to 30 minims. In dysentery the powdered drug should be employed.

JALAP.

The tuberous root of *Ipomœa jalapa*, a native of Mexico. It contains two resins—*convolvulin*, which is insoluble in ether, and *gammaresin*, which is soluble in ether. The dose of the powdered drug is 10 to 20 grains.

PREPARATIONS.	DOSE.
Extractum Jalapæ Alcoholicum, U. S. P.	5-15 gr.
Pulvis Jalapæ Compositus, U. S. P. ($\frac{1}{3}$ jalap, $\frac{2}{3}$ potassium bitartrate)	20-40 gr.
Resina Jalapæ, U. S. P.	2-5 gr.

Physiological Action and Therapeutics.—In moderate doses jalap acts as a hydragogue cathartic, producing copious watery discharges. In overdoses it produces the phenomena of gastro-enteritis.

Jalap is never employed in simple constipation, but it may be prescribed with advantage in *general dropsy* when a hydragogue action is desired. It is best given in combination with potassium bitartrate, as in the official compound jalap powder.

JAMBUL.

Jambul is an unofficial drug obtained from *Eugenia Jambolana*. It is generally prescribed in the form of the powdered seeds, which may be given in the dose of 20 to 30 grains.

Therapeutics.—While many French and German observers have spoken highly of the value of the remedy in *diabetes mellitus*, there is considerable diversity of opinion in regard to its true merits. No doubt much of the conflicting testimony has arisen from the use of impure preparations of the drug. It has given the best results in the mild forms of the disease.

JUNIPERUS.

(Juniper.)

The fruit of *Juniperus communis*. It contains a volatile oil, which is official, and a non-crystallizable principle, *juniperin*.

PREPARATIONS.	DOSE.
Oleum Juniperi, U. S. P.	2-5 min.
Spiritus Juniperi, U. S. P. (5 per cent. of oil of juniper) .	$\frac{1}{2}$ -1 fl. dr.
Spiritus Juniperi Compositus, U. S. P. (equivalent to gin) .	2-4 fl. dr.

Physiological Action and Therapeutics.—In the stomach juniper produces a sensation of warmth and serves

as a stimulant to digestion. It is eliminated chiefly through the kidneys, causing a decided increase in the flow of urine and producing a stimulating effect on the entire genito-urinary tract.

The spirit of juniper, or gin, is a valuable diuretic in the *passive congestion of the kidneys* resulting from chronic heart disease. Its combination in this condition with potassium bitartrate enhances its effect. It is also of service in chronic inflammatory affections of the genito-urinary tract, such as *nephritis*, *pyelitis*, and *cystitis*, but in the acute stages of these diseases it is absolutely contraindicated.

KINO and KRAMERIA.

Kino is the inspissated juice of *Pterocarpus marsupium*. It contains kino-tannic acid, which renders it useful as an astringent. The dose of the powdered drug is 10 to 20 grains.

PREPARATION.	DOSE.
Tinctura Kino, U. S. P.	$\frac{1}{2}$ –I fl. dr.

Krameria is the root of *Krameria triandra*. Like kino, its virtues depend on the tannic acid which it contains. The drug itself is not employed medicinally.

PREPARATIONS.	DOSE.
Extractum Krameriaë, U. S. P.	5–10 gr.
Extractum Krameriaë Fluidum, U. S. P.	10–20 gtt.
Syrupus Krameriaë, U. S. P.	$\frac{1}{2}$ –I fl. oz.
Tinctura Krameriaë, U. S. P.	$\frac{1}{2}$ –I fl. dr.
Trochisci Krameriaë, U. S. P. (contain I gr. each).	

Therapeutics.—As therapeutic agents these drugs are equivalent to catechu, and, like the latter, are very useful in *serous diarrhæa*. The troches of krameria are sometimes employed in *acute pharyngitis* with relaxation of the uvula.

LACTUCARIUM.

The concrete milk-juice of *Lactuca virosa*. The active principle is *lactucin*, which appears in the form of white scales.

PREPARATIONS.	DOSE.
Syrupus Lactucarii, U. S. P.	1-2 fl. dr.
Tinctura Lactucarii, U. S. P.	½-1 fl. dr.

Therapeutics.—Lactucarium is employed as a mild hypnotic and nerve-sedative. It is much inferior to opium, but is not followed by the unpleasant after-effects of the latter, and may be prescribed when the more powerful hypnotic is contraindicated. Added to a cough-mixture, it makes an excellent sedative for *acute bronchitis* of children.

LANOLIN.

Lanolin, which is official as *adepts lanæ hydrosus*, is the purified fat of sheep's wool mixed with not more than 30 per cent. of water. It appears as an unirritating, non-decomposable fatty substance, insoluble in water, but miscible with twice its weight of the latter, without losing its ointment-like property. Its bland character, its freedom from decomposition, and its power of rapidly penetrating the skin make it a useful ointment base for holding various topical remedies. The only objection to the use of lanolin is its stickiness, and this can be offset by having incorporated with it one-third of its weight of vaseline.

LEPTANDRA.

(Culver's Root.)

The rhizome and roots of *Veronica virginica*. It contains a glucoside, *leptandrin*, which may be employed in the dose of 1 to 3 grains.

PREPARATIONS.	DOSE.
Extractum Leptandræ, U. S. P.	2-6 gr.
Extractum Leptandræ Fluidum, U. S. P.	10-30 min.

Physiological Action and Therapeutics.—In moderate doses the drug acts as a laxative and stimulates the secretion of bile. It makes a useful addition to cathartic pills when the *stools are light colored* or when "*biliousness*" is associated with *constipation*.

LITHIUM.

The following salts of lithium are employed medicinally:

carbonate, citrate, benzoate, bromide, and salicylate. Of these, all are official except the bromide.

LITHII BENZOAS.

(Lithium Benzoate, $\text{LiC}_7\text{H}_5\text{O}_2$.)

A white amorphous powder, or fine crystalline scales, without odor, and of a sweetish, cooling taste. It is soluble in 4 parts of water and in 12 parts of alcohol. Dose, 10 to 30 grains.

LITHII BROMIDUM.

(Lithium Bromide, LiBr .)

A white, granular, deliquescent salt, odorless, and of a sharp bitter taste. It is freely soluble in water and alcohol. Dose, 10 to 30 grains.

LITHII CARBONAS.

(Lithium Carbonate, Li_2CO_3 .)

A fine white powder, free from odor and of an alkaline taste. It is soluble in 80 parts of water, and insoluble in alcohol. Dose, 5 to 10 grains.

LITHII CITRAS.

(Lithium Citrate, $\text{Li}_3\text{C}_6\text{H}_5\text{O}_7$.)

A white, deliquescent, odorless powder, having a faintly alkaline taste. It is soluble in 2 parts of water, and insoluble in alcohol. Dose, 5 to 10 grains.

The salt is also official as *lithii citras effervescentes* (effervescent lithium citrate), the dose of which is 10 to 20 grains.

LITHII SALICYLAS.

(Lithium Salicylate, $\text{LiC}_7\text{H}_5\text{O}_3$.)

A white, deliquescent, odorless powder, having a sweetish taste and an acid reaction. It is freely soluble in water and alcohol. Dose, 20 to 30 grains.

Therapeutics.—The salts of lithium are of special value in promoting the solution of uric acid. Since lithium unites

with uric acid to form a more soluble salt than does either sodium or potassium, it will be found preferable in the treatment of all affections characterized by an excess of uric acid in the blood. In *gout*, *lithæmia*, *chronic rheumatism*, and *nephrolithiasis* the lithium salts accomplish much good. There are many natural lithia waters in the market, but the amount of the metal which they contain is so small that the good effects attributed to them are no doubt due to the increased diuresis which the water itself produces.

A combination of lithium carbonate and sodium arsenate has been highly extolled in the treatment of *diabetes mellitus*; while the results are often disappointing, they are sometimes excellent when the disease is associated with the gouty diathesis. Five minims of liquor sodii arsenatis and 5 to 10 grains of lithium carbonate may be taken in effervescing water two hours after each meal.

Lithium bromide is used for the same purpose as potassium bromide.

LOBELIA.

The leaves and tops of *Lobelia inflata*. It contains lobelic acid and a liquid alkaloid, *lobeline*.

PREPARATIONS.

DOSE.

Extractum Lobeliæ Fluidum, U. S. P.	1-5 min.
Tinctura Lobeliæ, U. S. P.	½-1 fl. dr.

Physiological Action.—Toxic doses produce severe burning pain in the œsophagus and stomach, obstinate vomiting, purging, weakening of the pulse, cold sweats, great prostration, and finally death from paralysis of the respiratory centre. Moderate doses depress the heart, vaso-motor centres, and peripheral vagi. Poisoning by lobelia should be treated by the free administration of tannic acid, diffusible stimulants, and by the external application of heat.

Therapeutics.—Formerly, lobelia was used as an *emetic*, but as such it has been latterly displaced by less depressing drugs. At present it is used as an antispasmodic in *asthma* and *bronchitis* associated with spasmodic dyspnoea. In the

former disease it is necessary to give the drug in increasing doses until slight nausea is produced. Sulphate of lobeline in doses of 1 to 5 grains is said to be efficient in *asthma* without producing nausea.

LYSOL.

Lysol is a preparation obtained by dissolving in fat, and subsequently saponifying with the addition of alcohol, that portion of tar-oil which boils between 100° and 200°. It appears as a brown oily liquid with a feebly creosote-like odor. It contains about 50 per cent. of cresols, and mixes with water to form a clear, saponaceous, frothy liquid. It also forms clear solutions with alcohol, chloroform, and glycerin.

It is a powerful germicide, being in this respect superior to carbolic acid and creolin. A 1 : 200 solution destroys streptococci in fifteen minutes. It is a suitable disinfectant for the hands and instruments, and possesses the advantages of being cheap and much less poisonous than the antiseptics in common use. For general surgical work it may be employed in solutions of the strength of 3 to 5 per cent. ; as a vaginal douche in gynecological or obstetrical work, a 1 to 2 per cent. solution is sufficiently powerful.

MAGNESIUM.

(Mg.)

Magnesium itself is not employed medicinally, but the following derivatives are official : *Magnesium oxide*, or *magnesia* ; *magnesium carbonate* ; *magnesium citrate* ; and *magnesium sulphate*.

MAGNESIA.

(Magnesium Oxide, MgO.)

Magnesium oxide is official in two forms :

Magnesia, light or calcined magnesia ;
Magnesia Ponderosa, or heavy magnesia.

Both forms occur as white insoluble powders, the only difference being in their weight. The dose of each is 10 grains to 2 drachms.

Therapeutics.—Magnesia^z is used as an antacid, as a laxative, and as an antidote in arsenical poisoning. In *gastric hyperacidity* it is a useful remedy when given an hour after meals. It may be used as a laxative in the *diarrhœa of children*, especially when there is increased acidity of the stomach. The dose for young children is 10 to 20 grains. It forms with *arsenic* insoluble compounds, and may be prescribed in *poisoning* by the latter drug as *ferri oxidum hydratum cum magnesia* (q. v.).

MAGNESII CARBONAS.

(Magnesium Carbonate, $(\text{MgCO}_3)_4 \cdot \text{Mg}(\text{OH})_2 + 5\text{H}_2\text{O}$.)

It appears as light white, friable masses or as a light white powder, insoluble in water. The dose is 10 grains to 2 drachms. It may be used in the same class of cases as the oxide.

MAGNESII CITRAS.

(Magnesium Citrate, $\text{Mg}_3 2\text{C}_6\text{H}_5\text{O}_7 \cdot 14\text{H}_2\text{O}$.)

This salt is official as—

Liquor Magnesii Citratis;
Magnesii Citras Effervescens.

The first preparation is an effervescing solution of magnesium citrate containing free citric acid and sugar; it may be employed as a laxative in the dose of 5 to 10 fluidounces. The second preparation is a white, granular, deliquescent salt which effervesces on the addition of water. The dose as a laxative is 1 to 3 teaspoonfuls, taken while effervescing.

Citrate of potassium is an agreeable but rather irritating laxative, and should not be employed when there is any inflammation of the gastro-intestinal tract.

MAGNESII SULPHAS.

(Magnesium Sulphate, Epsom Salt, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$.)

It appears as colorless rhombic prisms or acicular crystals having a disagreeable bitter taste. It is soluble in 1.5 parts of water, and insoluble in alcohol. The dose is a drachm to an ounce.

Physiological Action.—In sufficient dose Epsom salt acts as a hydragogue cathartic, producing copious watery stools. This result is accomplished not by irritating the bowel nor by increasing peristalsis, but by attracting serum from the intestinal vessels. The hydragogue effect is especially pronounced when the drug is given in concentrated solution.

Therapeutics.—Since magnesium sulphate is unirritating, it is an excellent cathartic for unloading the bowels in acute inflammatory diseases of the intestinal canal, like *enteritis*, *colitis*, and *dysentery*. Since it acts as a derivative, and does not increase peristalsis, it may be employed with success in *acute peritonitis* and *typhlitis*. As it decidedly increases the intestinal secretions, it is a useful cathartic in *fæcal impaction*. In *dropsy* and *serous pericarditis* or *pleurisy* it assists absorption by depleting the intestinal vessels; in these conditions it is best given in the manner suggested by Hay, which is to give the salt in concentrated solution before breakfast and to restrict the use of liquids.

Epsom salt is also valuable as an antidote in *acute poisoning* by acetate of lead and carbolic acid; with the former it forms an insoluble sulphate, and with the latter an innocuous sulphocarbolate.

MANGANUM.

(Manganese, Mn.)

Two derivatives of manganese are official: the black oxide or dioxide (*mangani dioxidum*), and the sulphate (*mangani sulphas*). The dose of the former is 3 to 5 grains; of the latter, 2 to 3 grains.

Therapeutics.—Manganese has been recommended as a substitute for iron in *anæmia*, but as a hæmatinic it is of little value. The dioxide has also been employed with asserted success in *functional amenorrhœa*, and instead of bismuth subnitrate in *pyrosis* and *gastrodynia*.

MANNA.

Manna is the concrete juice obtained by incising the stems of *Fraxinus ornus*. It occurs in the form of yel-

lowish-white friable masses having a faint honey-like odor and a sweetish taste. It contains from 50 to 80 per cent. of *mannite*, a saccharine principle differing from ordinary sugar in not undergoing vinous fermentation. The dose of manna is $\frac{1}{2}$ to 2 ounces.

Therapeutics.—Manna is a mild laxative; it is rarely given alone, but, on account of its pleasant taste, it may be advantageously combined with more active drugs. It enters into the official *infusum senna compositum*, which contains also senna and Epsom salt, and is employed in the dose of 2 to 3 ounces.

MASTICHE.

(Mastic.)

Mastic is a concrete resinous exudation obtained from the bark of *Pistacia lentiscus*. It appears in the form of small yellowish globular tears having a balsamic odor and taste. It contains about 90 per cent. of *mastichic acid*, and a resinous principle, *masticin*.

PREPARATION.

Pilulæ Aloes et Mastiches, U. S. P. 1-3 pills.

DOSE.

Therapeutics.—Mastic is used as a temporary filling in *carious teeth* and to check hemorrhage in *leech-bites*. It is also mixed with aloes to render the pills less soluble, so that an action may be obtained on the lower bowel.

MENTHOL.

(Peppermint Camphor.)

A stearopten obtained from the essential oil of peppermint. It appears in the form of colorless prismatic or acicular crystals having the odor of mint and a camphoraceous taste. It is sparingly soluble in water, but freely so in alcohol, ether, and chloroform. The dose is 1 to 3 grains, in pills or alcoholic solution.

Therapeutics.—Menthol is employed as a local anæsthetic and antiseptic. It makes a useful application in *frontal headache* and *neuralgia of the superficial nerves*. For use in these affections it is best dissolved in chloro-

form or ether. When equal parts of chloral and menthol are heated together in a water-bath an oily liquid is formed (chloral-menthol) which is very serviceable in *neuralgia* and *toothache*. One part of menthol to ten of olive oil makes a soothing application for *burns*. The inhalation of menthol in the form of a vapor or spray gives speedy relief in *acute coryza*. A 5 to 10 per cent. solution in liquid petrolatum is extensively used as a sedative, disinfectant, and detergent lotion or spray in *chronic nasal catarrh*. A 20 to 30 per cent. solution in olive oil makes an excellent local application for relieving the pain and dysphagia of *tuberculous laryngitis*. A 10 per cent. solution in liquid petrolatum, used as a spray, is of great service in checking the cough of *chronic laryngitis*, *tracheitis*, *bronchitis*, and *phthisis*.

Internally, it is sometimes of service in arresting *obstinate vomiting* and in allaying the pain of *gastralgia*.

METHYL CHLORIDUM.

(Methyl Chloride, Monochloromethane, CH_3Cl .)

Methyl chloride is obtained by the action of hydrochloric acid on alcohol, and appears as a gaseous substance, which for therapeutic purposes is converted into a liquid by subjection to a pressure of 5 or 6 atmospheres.

Therapeutics.—When a spray of methyl chloride is directed for a few seconds on a part, it produces local anæmia and anæsthesia, this result being accomplished by the rapid absorption of heat which attends the conversion of the substance from a liquid to a gaseous state. As a local anæsthetic it may be employed in minor surgical operations and to allay *pruritus*, *spinal irritation*, and *neuralgia*. It has two advantages over the ether spray in being non-inflammable and more rapid in its effect.

METHYLAL.

($\text{CH}_2(\text{OCH}_3)_2$.)

A colorless volatile liquid having a peculiar ethereal odor and a burning taste. It is freely soluble in water,

ether, chloroform, and oils. The dose is $\frac{1}{2}$ to 2 fluid-drachms, in syrup of acacia, after meals.

When taken internally it is rapidly absorbed and rapidly eliminated. It depresses the cerebrum, producing sleep; at the same time it quickens the pulse and respiration, lowers the temperature, and increases the secretions. Unpleasant after-effects have not been observed, but tolerance of the drug is soon established.

It has been used as a sedative and hypnotic in *delirium tremens* and various forms of *insanity*. It has also been employed as a local anæsthetic in *neuralgia*.

METHYLENE BLUE.

(Tetramethylthionine Chloride.)

An aniline product appearing in the form of a bluish powder with a bronze-like lustre. It is sparingly soluble in pure water, but more so in water containing a little alcohol. The dose is 2 to 5 grains in capsules.

Therapeutics.—Methyl blue was first employed as a stain, and its affinity for the axis-cylinders of nerves and the hæmatozoa of malaria suggested its use in neuralgic affections and malarial fever. In *trifacial neuralgia* and *headache* it has proved useful in the dose of $\frac{1}{15}$ to $\frac{1}{5}$ of a grain every hour or two. While it is not without effect in *malarial fever*, it is inferior to quinine, and should only be employed when for any reason the older antiperiodic cannot be taken. As a local remedy it has been used with asserted good results in *diphtheria*. When given internally, it has the disadvantage of coloring all the excretions.

MEZEREUM.

The bark of *Daphne mezereum* and other species of *Daphne*.

PREPARATION.

Extractum Mezerei Fluidum, U. S. P.

It also enters into decoctum sarsaparillæ compositum and extractum sarsaparillæ fluidum compositum.

Therapeutics.—Internally, it is used in combination with sarsaparilla as an alterative in *scrofula*, *phthisis*, *chronic*

rheumatism, and *syphilis*. Externally, it has been employed as an irritant.

MOSCHUS.

(Musk.)

The dried secretion from the preputial follicles of *Moschus moschiferus*. It appears as reddish-black unctuous grains having a peculiar penetrating odor and a bitter taste. The dose is 10 to 20 grains, preferably by the rectum, in suppository or suspended in mucilage.

PREPARATION.

DOSE.

Tinctura Moschi, U. S. P. 1-2 fl. dr.

Therapeutics.—Musk is used as an antispasmodic and stimulant. In the nervous exhaustion of *low fevers*, characterized by stupor, muttering delirium, and subsultus, musk is often an excellent stimulant. It is also of service in *hysterical seizures*, *obstinate hiccough*, and the *convulsions of children*. The great drawbacks to the use of musk are its costliness and the difficulty of obtaining an unadulterated article.

MYRRHA.

(Myrrh.)

A resinous exudation obtained from *Commiphora myrrha*. It appears in the form of brownish-red irregular-shaped tears having an agreeable aromatic odor and a bitter acrid taste.

PREPARATIONS.

DOSE.

Mistura Ferri Composita, U. S. P. ½-1 fl. oz.
 Pilulæ Aloes et Myrrhæ, U. S. P. 2-5 pills.
 Pilulæ Rhei Compositæ, U. S. P. 2-4 pills.
 Tinctura Aloes et Myrrhæ, U. S. P. 1-2 fl. dr.
 Tinctura Myrrhæ, U. S. P. 10-20 min.

Therapeutics.—Myrrh is employed as a stimulant to mucous membranes, as an expectorant, and as an emmenagogue. The tincture, diluted with water or with a solution of potassium chlorate, is extensively used in *ptyalism*, *ulcerative stomatitis*, *spongy gums*, and *acute pharyngitis*. As an expectorant it is never prescribed alone, but it is sometimes given with other remedies in *chronic bronchitis*.

In combination with aloes and iron it is often very efficient in *functional amenorrhœa*.

NAPHTALINUM.

(Naphthalin, Naphthalene, $C_{10}H_8$.)

A hydrocarbon product obtained from coal-tar. It appears as colorless rhomboidal plates having a strong odor of coal-tar and a burning taste. It is insoluble in water, soluble in 15 parts of alcohol, and in all proportions in ether and chloroform. It is sold in the shops, under the name of "tar-camphor," as a disinfectant and as a preservative of clothing against moths and other insects. The dose for a child is $\frac{1}{8}$ to $\frac{1}{2}$ of a grain; for an adult, 5 to 10 grains.

Therapeutics.—It has been recommended in powders of bismuth or sugar as an antiseptic in *diarrhœa*, but in this affection there are far more agreeable and efficient remedies.

NAPHTOL.

(Beta-naphtol, $C_{10}H_7HO$.)

A phenol obtained by the action of concentrated sulphuric acid on naphthalin. It appears as colorless, shining, crystalline plates or as a white crystalline powder, having a phenol-like odor and a pungent taste. It is feebly soluble in water, but freely so in alcohol, ether, and chloroform. The dose is 2 to 15 grains.

Therapeutics.—Beta-naphtol is an efficient antiseptic, and may be employed as such in the dressing of wounds and ulcers. It has been highly recommended as a stimulant and parasiticide in certain chronic skin diseases, such as *ringworm*, *psoriasis*, *scabies*, and *eczema*; in these affections it may be employed in an ointment containing 30 to 60 grains to the ounce.

Internally, beta-naphtol is an excellent intestinal antiseptic, and may be employed with advantage in *diarrhœa*, *dysentery*, *typhoid fever*, and *cholera*.

Among other derivatives of naphthalin which have similar properties to beta-naphtol may be mentioned hydro-naphtol, alpha-naphtol, and benzonaphtol.

NITRO-GLYCERINUM.

(Nitro-glycerin, Glonoin, Trinitrin, $C_3H_5(NO_3)_3$.)

Nitro-glycerin is official in the form of a 1 per cent. alcoholic solution (*Spiritus Glonoini*, U. S. P.), the dose of which is 1 to 2 drops, cautiously increased.

Physiological Action.—The ingestion of a few drops of the spirit of nitro-glycerin is speedily followed by fulness in the head, headache, flushing of the face, vertigo, tinnitus aurium, throbbing of the carotids, quickened respiration, and a marked acceleration of the pulse. A decided fall in the arterial pressure accompanies the increased pulse-rate, and this is due to the dilatation of the arterioles which results from the direct action of the drug on the vessel-walls, and possibly, to a less degree, from its action on the vaso-motor centre. The primary effect of the drug on the heart is one of stimulation, but overdoses speedily cause paralysis. In large doses it acts as a depressant to the spinal cord, especially the motor columns, causing paralysis and abolition of the reflexes. Under the influence of nitro-glycerin the blood assumes a chocolate color, this appearance being due to the conversion of hæmoglobin into methæmoglobin. In fatal poisoning by nitro-glycerin death results from paralysis of the respiratory centre. It will be observed that its action is similar to that of amyl nitrite and the other nitrites, the only difference being that its effect is more lasting than that of amyl nitrite, and less lasting than that of sodium nitrite.

Therapeutics.—Nitro-glycerin is exceedingly useful in certain forms of cardiac disease. In *sudden heart-failure* the hypodermic injection of one or two drops of the spirit stimulates the heart, dilates the arterioles, and often promptly re-establishes the circulation. In *fatty degeneration of the heart* it is a useful remedy, since it dilates the vessels and thus diminishes the peripheral resistance. In the treatment of *chronic valvular disease* it is sometimes of advantage to combine it with digitalis in order to counteract the tendency of the latter drug to constrict the vessels. The disease in which nitro-glycerin is most frequently employed is *angina pectoris*, and when the paroxysms are associated

with high arterial tension it is often very efficient in relieving the pain; but the long-continued use of the remedy seems to exert a depressing influence on the heart and vessels, and generally more permanent relief will be obtained in such cases by the use of cardiac stimulants, and absorbents like potassium iodide, coupled with great care in diet and suitable regimen. No remedy equals nitroglycerin in relieving the high arterial tension and dyspnoea of *chronic nephritis*.

It may be given with advantage in *headache* dependent upon cerebral anæmia, and in *migraine* associated with pallor of the face and constriction of the vessels.

As an antispasmodic it is useful in *whooping-cough*, *asthma*, *uræmic convulsions*, *tetanus*, and *strychnine-poisoning*.

Administration—It may be given in the form of the official spirit, or in the tablets commonly found in the market, and which contain from $\frac{1}{200}$ to $\frac{1}{100}$ of a grain each. On account of extreme variation in susceptibility, very small doses should be administered at first, and these gradually increased until the tolerance of the patient is determined. In some instances as much as 10 minims of the official spirit can be taken three times a day with advantage.

NITROUS OXIDE.

(Nitrogen Monoxide, N₂O.)

Nitrous oxide is obtained from the distillation of ammonium nitrate, and appears as a colorless, odorless gas having a somewhat sweetish taste. By pressure it is converted into a liquid, and in this form is stored in iron cylinders for subsequent use.

Physiological Action.—When freely inhaled, nitrous oxide produces a feeling of warmth, a sense of exhilaration, ringing in the ears, and flushing of the face; in a minute or two these symptoms are followed by complete unconsciousness. Great excitement, laughter, or a pugilistic tendency is frequently induced by inhalation of the gas when the supply of air is not completely cut off. It

is a perfectly safe anæsthetic, and is comparatively free from bad after-effects; occasionally, however, its use is followed by glycosuria, albuminuria, languor, or vertigo.

Therapeutics.—As an anæsthetic nitrous oxide is especially suitable for minor surgical operations requiring but a short period of unconsciousness.

Administration.—The gas should be conducted through a rubber tube from the iron reservoir to a large rubber bag to which is attached a face-piece furnished with an expiration valve whereby the expired gas is prevented from re-entering the bag.

NUX VOMICA.

The seed of *Strychnos nux vomica*. It contains two alkaloids, *strychnine* and *brucine*. The latter resembles the former in its action, but is less powerful. The dose of strychnine sulphate is $\frac{1}{40}$ to $\frac{1}{20}$ of a grain.

PREPARATIONS.	DOSE.
Extractum Nucis Vomicae, U. S. P.	$\frac{1}{8}$ – $\frac{1}{4}$ gr.
Extractum Nucis Vomicae Fluidum, U. S. P.	1–5 gtt.
Tinctura Nucis Vomicae, U. S. P.	10–30 gtt.

STRYCHNINÆ SULPHAS.

Strychnine sulphate appears as white prismatic crystals, odorless, and of an intensely bitter taste. It is soluble in 50 parts of water and 109 parts of alcohol.

Physiological Action.—*Circulatory System.*—In moderate dose strychnine stimulates the heart, increasing the force and rate of the pulse. It also raises the arterial pressure by stimulating the vaso-motor centre in the medulla.

Nervous System.—The dominant action of the drug is on the nervous system; it is a powerful stimulant to the spinal cord, especially the motor columns, and in toxic doses produces spinal or tetanic convulsions. Full doses stimulate the peripheral nerves, but toxic doses paralyze the afferent or motor fibres. Small amounts stimulate the brain and increase the mental powers.

Eye.—The nervous mechanism of the eye shares in the general nervous stimulation induced by the drug, and vision becomes more acute.

Respiratory System.—It is a powerful stimulant to the respiratory centre, quickening and deepening the respiratory movements.

Alimentary Canal.—In small doses it increases the appetite, quickens digestion, and stimulates peristalsis.

Blood.—When mixed with blood it lessens oxidation, but there is no evidence that it produces such an effect when taken internally.

Elimination.—It is eliminated by the kidneys as strychnine and a product of oxidation, strychnic acid.

Toxicology.—The first evidences of the toxic effects of strychnine are restlessness, anxiety, twitching and starting of the muscles, and stiffness of the neck. If the dose has been sufficiently large, spinal convulsions speedily develop, throwing the patient into a position of opisthotonos, so that he rests on his head and his heels. The convulsions are for the most part clonic or intermittent, and are repeated under the slightest external irritation. The pupils are dilated, the vision is hyperacute, the mind is unaffected, and the stomach is usually retentive. In fatal cases the convulsions become more rapid and severe, and finally death results from asphyxia due to spasm of the respiratory muscles, or more rarely from exhaustion.

The history of the case, the absence of a wound, the intermittent character of the convulsions, and the late involvement of the muscles of the jaw (trismus) will serve to distinguish strychnine-poisoning from tetanus.

The history of the case, the emotional excitement, the closed eyes, and the persistent opisthotonos will serve to distinguish hysteria.

Treatment.—The treatment consists in evacuating the stomach by means of the pump, in the administration of copious warm draughts of a solution of tannic acid, in the use of nitrite of amyl or chloroform to arrest the spasms, in the maintenance of artificial respiration, and in the free exhibition of chloral and potassium bromide as physiological antidotes.

Therapeutics.—Strychnine or nux vomica is used chiefly as a stomachic, as a tonic, as a cardiac and respi-

ratory stimulant, and as an excito-motor in atony or paralysis.

Stomachic.—Nux vomica is extremely useful in *chronic dyspepsia*, especially when the latter is dependent upon atony of the stomachic coats or a low grade of catarrh. In these cases the chief symptoms are a thickly-coated tongue, anorexia, fulness and distress some time after eating, heart-burn, flatulence, constipation, and a dull pain or a sensation of weight at the top of the head. In such a condition four or five drops of the tincture, with or without hydrochloric acid, given before meals, often act most happily. In acute inflammatory dyspepsia the drug is contraindicated.

Tonic.—As a tonic strychnine is useful in the convalescence of *acute diseases*, in *anæmia*, and in debilitated states of the system dependent upon *nervous exhaustion*. There is a condition of reduced nervous tone resulting from overwork and continued excitement in which nux vomica is extremely valuable, but unless its use is coupled with sufficient rest it only serves to stimulate the patient to renew his efforts until perfect neurasthenia is developed.

Cardiac Stimulant.—In the weak heart of *low fevers* strychnine makes an excellent adjunct to alcohol, and in this respect is much superior to digitalis. In failure of the circulation from degeneration or dilatation of the heart it may be combined advantageously with digitalis, or, if the latter is not well borne, exhibited in its stead. In the *weak heart* of the old, strychnine is a better remedy than digitalis.

Respiratory Stimulant.—Nux vomica is of service in all diseases of the lungs associated with enfeeblement of the respiration, such as *pneumonia*, *chronic bronchitis*, *phthisis*, and *asthma*; in *emphysema* it is superior to any other single remedy.

In *poisoning* by drugs which paralyze the heart or respiratory centre strychnine is invaluable; hence, in poisoning by opium, chloral, veratrum viride, chloroform, or ether, it should be given hypodermically in full doses.

Excito-motor.—When paralysis results from complete destruction of nerve-cells or fibres, strychnine, like all

other remedies, must prove futile; but when the loss of power results from the exhaustion or depression which follows as a sequel to disease of the nervous apparatus, the drug may prove decidedly efficacious. Thus it may be of service in the *hemiplegia* following apoplexy, after the acute symptoms have subsided, by restoring tone to the nerve-fibres which have been exhausted by the stroke. Its employment, however, in this disease after the development of contractures is useless. In *lead-palsy*, in *crutch-palsy*, in *infantile paralysis*, and in the *paralysis following neuritis* strychnine may be used with considerable advantage. It is absolutely contraindicated in these affections while symptoms of inflammation or irritation exist. It often affords relief in *incontinence of urine* from atony of the bladder—a condition frequently met with in old people. It is likewise very useful in *constipation* dependent upon atony of the intestinal walls.

Other Uses.—In *toxic amaurosis* from tobacco, lead, or alcohol, strychnine often gives good results. In the *vomiting of pregnancy* and in other forms of hyperemesis the tincture of nux vomica, a couple of drops every hour or two, alone or with minute dose of wine of ipecac ($\frac{1}{2}$ gtt.), is often efficient. It has been used with success in *spermatorrhœa* and *impotence*. It has been recommended by Murrell and Brunton to lessen the *night-sweats* of phthisis.

Administration.—Strychnine sulphate and the extract of nux vomica are both suitable preparations for use in pills. When a liquid preparation is desired, the tincture of nux vomica will be found convenient and reliable. In paralysis the remedy may be given by the mouth, but it is preferable to inject it directly into the substances of the affected muscles, and for this purpose it may be prescribed as follows:

℞ Strychninæ sulphatis,	gr. j;
Aquæ destil.,	℥j.
Solve (warm until perfect solution is obtained).	
Sig. 10 min. = gr. $\frac{1}{48}$. Dose, 10 to 20 minims.	

Incompatibles.—Strychnine is incompatible with tannic acid, bromides, chlorides, iodides, and alkalies.

OLEUM CADINUM.

(Oil of Cade.)

An oil obtained from the destructive distillation of *Juniperus oxycedrus*. It appears as a dark-brown liquid having a tarry odor and a burning, somewhat bitter taste.

Therapeutics.—Oil of cade is used as a stimulating application in certain chronic diseases of the skin, such as *psoriasis* and *eczema*.

OLEUM CAJUPUTI.

(Oil of Cajuput.)

A volatile oil distilled from the leaves of *Melaleuca leucadendron*. It appears as a thin bluish-green liquid having a camphoraceous odor and an aromatic taste. The dose is from 3 to 5 minims.

Therapeutics.—It has been used externally as a parasiticide in certain diseases of the skin like *ringworm*, and as a stimulating application in *rheumatism*. Internally, it is a useful carminative in *intestinal colic* and *nervous diarrhœa*; in these affections it may be combined advantageously with opium.

OLEUM CARYOPHYLLI.

(Oil of Cloves.)

A volatile oil distilled from cloves. It appears as a colorless or yellow liquid having an aromatic odor and a pungent, spicy taste. Dose, 1 to 3 minims.

Therapeutics.—Oil of cloves is used externally as an irritant and anæsthetic, and internally as a carminative. A drop or two on a pledget of cotton placed in the cavity of the tooth will frequently relieve *toothache*. In *intestinal colic* a couple of drops of the oil in a little whiskey and paregoric often affords prompt relief. Added to laxative pills, it tends to prevent *gripping*.

OLEUM MORRHUÆ.

(Cod-liver Oil.)

A fixed oil obtained from the fresh livers of *Gadus morrhua* (cod-fish) and other species of *Gadus*. It appears

as a thin, yellow, oily liquid having a peculiar fishy odor and taste. In addition to fatty principles, it contains biliary salts and traces of iodine, bromine, phosphorus, phosphoric and sulphuric acid, and iron. The dose is a drachm to an ounce.

Physiological Action.—As a food cod-liver oil is superior to other fats because it is more digestible, and not because it contains substances of peculiar nutritive value. Its ready assimilation is probably in large part due to the biliary matters which it contains, and which favor its passage through animal membranes. All attempts to isolate an active principle have been signal failures. In moderate doses it improves nutrition, strengthens the system, increases the fat in the body, and enriches the blood.

Therapeutics.—Cod-liver oil, provided its absorption can be secured, is indicated in all conditions of the system in which malnutrition is a prominent feature; thus it is very useful in *scrofula*, *phthisis*, *strumous enlargement of the glands*, *rickets*, *anæmia*, *chronic rheumatism*, and *tertiary syphilis*. In the early stage of phthisis it is superior to all other remedies combined, and its timely use in those of a strumous diathesis, whose respiratory tract is so sensitive that the slightest exposure excites cold, will materially aid in preventing the development of tuberculosis.

Administration.—While cod-liver oil is an excellent nutrient, its administration must be dispensed with when it disturbs digestion. It is well to begin with small doses and gradually increase them as the tolerance of the patient permits. A single dose at bedtime may be well borne when the stomach will not tolerate it during the day. As it is digested in the intestine, and not in the stomach, it is best given two or three hours after meals, when gastric digestion is about completed. On account of its disagreeable taste, many plans have been suggested for its administration: it may be floated on the top of some whiskey and water and quickly swallowed; it may be taken in ketchup or the tincture of orange-peel; but it is generally best to prescribe it in a well-made emulsion or in flexible gelatin capsules. The following formula illustrates its use in emulsion:

℞ Ol. morrhuae,	fʒiv;
Ol. gaultheriæ,	gtt. xij;
Calcii et sodii hypophos.,	āā gr. i;
Acaciæ,	q. s.;
Aquæ,	q. s. ad fʒviij.—M.

Ft. emuls.
Sig. A tablespoonful three times a day, after meals.

When the oil cannot be taken by the mouth, inunctions may be employed; a couple of ounces may be rubbed into the skin just before retiring. A warm bath facilitates the absorption of the oil. In young children this method is useful and convenient.

OLEUM MYRISTICÆ.

(Oil of Nutmeg.)

A volatile oil distilled from nutmeg. It appears as a colorless or yellowish oil having an aromatic odor and a warm, spicy taste. The dose is 2 to 3 minims.

Therapeutics.—The oil of nutmeg is employed as a carminative. Like oil of cloves, it may be added to laxative pills to prevent *gripping*. In large amounts it acts as a narcotic, producing delirium, stupor, and coma, and finally death from respiratory paralysis.

OLEUM OLIVÆ.

(Olive Oil, Sweet Oil.)

A fixed oil expressed from the ripe fruit of *Olea Europæa*. It is a yellowish oily liquid having a slight odor and a bland, oleaginous taste. It contains *olein*, *palmitin*, and other fatty compounds.

Therapeutics.—Externally, olive oil is extensively used as an emollient. Carbolyzed oil (5 to 10 per cent. of carbolic acid in sweet oil) makes a soothing dressing for *burns* and *pruritus ani*. Sweet oil affords a useful means of removing crusts and scales in *diseases of the skin* prior to the application of more potent remedies. In the eruptive fevers like *measles* and *scarlatina* frequent inunctions of oil are useful in allaying irritation and in preventing the spread of the contagium.

In *fecal accumulation* an enema of five or six ounces of

warm olive oil softens the mass and assists in its expulsion.

The internal administration of large doses of olive oil in *biliary colic* has been highly extolled by European physicians. Five or six ounces of the oil with a little brandy are administered at once, and it is claimed that its ingestion is speedily followed by a cessation of the pain. Smaller doses are given at regular intervals between the paroxysms. Employed in this way, it probably acts as a cholagogue, inviting a free flow of bile into the bowel.

OLEUM RICINI.

(Castor Oil.)

A fixed oil expressed from the seed of *Ricinus communis*. It appears as a pale-yellow or colorless viscid liquid, having a faint odor and a nauseous taste. The seeds contain several fatty acids, notably ricinoleic acid, and a poisonous acrid principle of which only a small portion is found in the oil. The dose for an adult is $\frac{1}{2}$ to 1 ounce; for a child, 1 to 2 drachms.

Physiological Action.—In sufficient dose castor oil acts as a mild but rather slow purgative, producing copious semi-liquid stools. This effect is accomplished in four or five hours without irritation. That part of the oil is absorbed is indicated by the fact that when it is administered to nursing women it imparts a laxative quality to the milk. It does not increase the flow of bile, nor to a great extent the secretions of the intestinal canal, but excites catharsis by stimulating the muscular coat of the bowel.

Toxicology.—The oil is free from toxic properties, and only in large doses is the purging associated with vomiting and prostration; on the other hand, the seeds, on account of the acrid principle which they contain, are highly poisonous, and even in small quantities produce vomiting and purging of mucous and bloody material, intense abdominal pain, and all the phenomena of collapse.

Therapeutics.—On account of its bland qualities, castor oil is a valuable laxative for use in *acute inflammatory affections of the bowel*. In acute enteritis, entero-colitis,

and dysentery it is generally desirable to unload the bowel of all irritating material before using astringents, and in these cases castor oil is very efficient. The addition of a few drops* of laudanum to each dose of the oil serves to allay all griping. Castor oil is much used as a *laxative* in *pregnancy*, in *fissure of the anus*, and in *painful hemorrhoids*. It is not at all suited for continued use in chronic constipation, since its secondary effect is to produce a torpid state of the bowel.

It is said that the leaves of *Ricinus communis* possess decided galactagogue properties, and that when made into a poultice and applied to the breasts they serve to stimulate the secretion of milk.

Administration.—Many substances have been suggested to disguise the disagreeable taste of the drug, which is the only objection to its employment; those in common use are oil of peppermint, oil of cinnamon, oil of gaultheria, and oil of bitter almonds. It may be administered conveniently in the froth of sarsaparilla or porter. Wood speaks highly of a combination of equal parts of glycerin and castor oil flavored with a drop or two of one of the above-mentioned oils. It may be prescribed in emulsion, but in this form it loses much of its effect. The most elegant method of administering it is in flexible capsules containing from $\frac{1}{2}$ to 1 drachm.

OLEUM SANTALI.

(Oil of Santal, Oil of Sandal-wood.)

A volatile oil distilled from the wood of *Santalum album*. It appears as a pale-yellow liquid, having a strongly aromatic odor and a pungent, spicy taste. The dose is 5 to 10 drops in capsules.

Therapeutics.—Oil of santal is a useful stimulating expectorant in *chronic bronchitis*, and a stimulating diuretic in *chronic pyelitis*, *cystitis*, and *urethritis*. It closely resembles copaiba in its therapeutic properties.

OLEUM TIGLII.

(Croton Oil.)

A fixed oil expressed from the seeds of *Croton tiglium*.

It appears as a yellow, slightly viscid liquid, having a faint odor and an acrid, burning taste. The dose is $\frac{1}{2}$ to 2 drops in pill or in a small amount of glycerin or olive oil.

Physiological Action.—In therapeutic doses croton oil is a rapidly-acting hydragogue cathartic. Toxic doses produce all the phenomena of severe gastro-enteritis, namely, severe abdominal pain, obstinate vomiting and purging, great prostration, and collapse. When applied to the skin it acts as an irritant, producing a papular and pustular eruption. This vesicating action has been attributed to an irritant substance contained in the oil and known as *crotonol*.

Therapeutics.—Externally, it is applied as a counter-irritant in *bronchitis*, *neuritis*, *rheumatism*, and *ovaritis*. Internally, it is used as a prompt hydragogue cathartic and revulsive in *acute cerebral congestion*, *apoplexy*, and *uræmia*. In these cases it not only causes general depletion, but also a rapid efflux of blood from the brain. Minute doses, $\frac{1}{20}$ to $\frac{1}{10}$ of a drop, are sometimes added to cathartic pills in *obstinate constipation*.

OPIUM.

An inspissated juice obtained by incising the unripe capsules of *Papaver somniferum*. To be up to the official standard, it should not contain less than 9 per cent. of crystallized morphine. It appears in the form of irregular lumps, having a dark-brown color, a gummy consistence, a peculiar narcotic odor, and a bitter taste. In addition to *meconic acid* and a neutral principle, *meconin*, it contains numerous alkaloids, the most important of which are *morphine*, *codeine*, *thebaine*, *papaverine*, *narcotine*, and *narceine*.

PREPARATIONS.	DOSE.
Acetum Opii, U. S. P. (vinegar of opium, or black drop) . . .	3-5 min.
Extractum Opii, U. S. P. (18 per cent. of morphine) . . .	$\frac{1}{4}$ -1 gr.
Opii Deodoratum, U. S. P. (13 to 15 per cent. of morphine) . . .	1-2 gr.
Opii Pulvis, U. S. P. (13 to 15 per cent. of morphine) . . .	1-2 gr.
Opium, U. S. P. (9 per cent. of morphine)	1-3 gr.
Pilulæ Opii, U. S. P. (contain 1 gr. each of powdered opium)	1-2.
Pulvis Ipecacuanhæ et Opii, U. S. P. (Dover's powder), 1 gr. of opium and 1 gr. of ipecac in every 10 grs.	5-10 grs.
Tinctura Ipecacuanhæ et Opii, U. S. P.	5-15 min.

PREPARATIONS.	DOSE.
Tinctura Opii, U. S. P. (laudanum)	10-30 gtt.
Tinctura Opii Camphorata, U. S. P. (paregoric), contains also camphor, benzoic acid, and oil of anise	1-8 fl. dr.
Tinctura Opii Deodorati, U. S. P.	10-30 gtt.
Trochisci Glycyrrhizæ et Opii, U. S. P.	1-3 gtt.
Vinum Opii, U. S. P.	5-10 gtt.

The following alkaloids and their preparations are also official :

Morphina, U. S. P.	$\frac{1}{8}$ - $\frac{1}{2}$ gr.
Morphinæ Acetas, U. S. P.	$\frac{1}{8}$ - $\frac{1}{2}$ gr.
Morphinæ Hydrochloras, U. S. P.	$\frac{1}{8}$ - $\frac{1}{2}$ gr.
Morphinæ Sulphas, U. S. P.	$\frac{1}{8}$ - $\frac{1}{2}$ gr.
Pulvis Morphinæ Compositus, U. S. P. (Tully's powder), contains also camphor, licorice, and calcium carbonate	5-10 gr.
Trochisci Morphinæ et Ipecacuanhæ, U. S. P.	1-2.
Codeina, U. S. P. (codeine)	$\frac{1}{4}$ -2 gr.

Morphine is the most important alkaloid, and represents to a great extent the active properties of the drug.

MORPHINA.

(Morphia, Morphine.)

It appears in the form of white prismatic or acicular crystals, free from odor and of a bitter taste. As morphine is practically insoluble in water and alcohol, one of its salts, like the sulphate or hydrochlorate, is usually selected for medicinal purposes.

Physiological Action.—*Circulatory System.*—Moderate doses of opium have little effect upon the circulation ; large doses, however, stimulate the inhibitory nerves centrally and peripherally, and thus slow the pulse ; at the same time the latter becomes full and strong from stimulation of the heart or its contained ganglia, and possibly also from stimulation of the vaso-motor centres in the medulla. Toxic doses finally paralyze both the heart and vagi and produce a rapid feeble pulse.

Nervous System.—In man the dominant action of opium is on the brain, which it soon depresses, causing sleep. When the dose has not been large, a stage of mental and emotional exhilaration often precedes the narcosis.

In the higher animals the action of the drug on the

spinal cord is not pronounced, but in the frog (whose spinal cord is relatively more highly developed than the brain) large doses excite the reflexes and induce tetanic spasms.

Respiratory System.—Opium is a powerful respiratory depressant, and in fatal cases of poisoning by the drug death usually results from paralysis of the respiratory centre in the medulla.

Alimentary Canal.—Opium checks the intestinal secretions, and in moderate doses arrests peristalsis by stimulating the inhibitory nervous apparatus; on account of this double action it has a decided tendency to produce constipation. Toxic doses paralyze the inhibitory nerves and stimulate peristalsis.

Secretions.—All the secretions, excepting the sweat, are diminished by opium.

Eye.—Large doses contract the pupil by stimulating the oculo-motor centre. In poisoning, the pupil sometimes dilates just before death, probably from paralysis of the oculo-motor centre.

Tissue-metabolism.—In moderate doses it lessens tissue-change and diminishes the amount of nitrogenous products which the body eliminates.

Elimination.—Morphine is eliminated, in part as morphine, by the various excretories, especially the stomach and kidneys; much, however, of that which is ingested is oxidized in the system.

The Action of Opium and Morphine Compared.—Morphine differs from opium in being a more powerful hypnotic and a less active sudorific; it is also less apt than opium to constipate and to produce disagreeable after-effects.

Untoward Effects.—Distressing symptoms often follow the use of opium even in therapeutic doses; the most important after-effects are headache, languor, depression, vertigo, nausea, vomiting, anorexia, and constipation. Occasionally it produces general pruritus, an erythematous rash, or more rarely maniacal excitement.

Conditions Modifying the Action of Opium.—Certain symptoms and diseases counteract the narcotic effect of opium, and when these are present the drug can be used

in much larger doses than those generally prescribed ; thus, in diabetes, acute peritonitis, renal and biliary colic, patients frequently take with advantage doses that under other circumstances would produce a profound narcotic effect. On the other hand, when there are evidences of nephritis it must be used with great caution, since small doses not infrequently produce lethal effects.

Age and sex modify its action. Children, on account of the sensitiveness of their nervous systems, are peculiarly susceptible to opium, so that it must be given in smaller doses than their ages would naturally indicate. A drop of laudanum has produced a fatal result in a child under six months. Its action is more pronounced on women than on men, and in the former it is more apt to cause disagreeable after-effects. On opium habitués its action is more feeble and less pronounced.

Toxicology.—Unless the dose has been very large, there is at first a stage of excitement in which the imagination is stimulated and the feelings exalted. This stage is soon followed by depression ; the patient becomes stupid and drowsy, and finally falls asleep. The sleep deepens into coma, the pulse becomes slow and full, the pupils contracted, the respirations slow and heavy, and the face suffused. At this time it is still possible to arouse the patient by a loud noise, flagellation, or shaking. In the third stage the coma becomes absolute, the pulse rapid and feeble, the breathing shallow and irregular, the skin moist, the muscles relaxed, the pupils dilated, and finally death results from paralysis of the respiration.

Treatment.—The stomach should be emptied by the stomach-pump or a stimulating emetic like sulphate of zinc or mustard-flour ; strong coffee should be given freely. The patient should be aroused by flagellation, douching, forced walking, or the electric brush. The physiological antidotes—*atropine* and *strychnine*—should be given hypodermically in full doses, their effect being carefully watched. The temperature should be maintained by the external application of heat. Artificial respiration may prove useful.

Chronic Opium-poisoning (Morphinism, Morphio-

mania).—The symptoms resulting from the habitual use of opium are anæmia, sallow complexion, an irresistible craving for the drug, tremors, loss of appetite, gastric disturbance, insomnia, mental impairment, and a complete perversion of the moral nature.

Therapeutics.—Opium is used internally to produce sleep, to relieve pain, to lessen nervous excitement, to check secretion, to promote diaphoresis, to check hemorrhage, and to support the system. Externally, it is used as a sedative.

To Produce Sleep.—There are but few forms of *insomnia* which opium will not relieve, but it is especially suitable in the wakefulness resulting from *pain*. It is also a useful hypnotic in *exhaustion*, in the *continued fevers*, in certain forms of insanity, especially *melancholia*, and in the various *chronic affections of the viscera*. Chloral as a hypnotic is superior to opium in the *insomnia of nervous excitement*. Good effects are often obtained from a combination of these two powerful hypnotics.

To Relieve Pain.—Opium is by far the best analgesic that we possess. It is often invaluable in *traumatism*, *acute rheumatism*, *peritonitis*, *pleurisy*, *neuralgia*, various forms of *colic* (renal, biliary, and intestinal), and the crises of *ataxia*. In functional disorders like *neuralgia* it must be given with great caution on account of the danger of producing the opium-habit. In *painful spasms*, such as occur in renal and biliary colic, it is well to combine atropine with the morphine, not only to aid in allaying the spasm, but also to guard the morphine, which is often required in large amounts.

To Lessen Nervous Excitement.—For this purpose opium is often of service in the *continued fevers*, in certain forms of *insanity*, and in *delirium tremens*. It often acts most happily in the dyspnœa, cough, anxiety, and restlessness of *chronic heart disease*.

For relieving the cough of *bronchitis* and *phthisis* it is superior to all other remedies; in *obstinate vomiting* it often succeeds when other remedies fail; and it rarely fails to afford prompt relief in *spasmodic asthma*. In *acute peritonitis* it does good by checking peristalsis and relieving

pain; it is essential, however, to give it in large doses, its effect being carefully watched.

To Check Secretion.—For this purpose the drug is extensively employed in the various inflammatory affections of the bowel, such as *enteritis*, *entero-colitis*, *dysentery*, and *cholera*.

In *diabetes mellitus* it often does more good than any other remedy; and, as the disease establishes a tolerance for the drug, it should be given in ascending doses until it produces favorable or untoward results. In *diabetes insipidus* the remedy is of little value.

To Promote Diaphoresis.—In *muscular rheumatism* and the beginning of “*colds*” opium is often useful for its sudorific effect. In these cases Dover’s powder is the best preparation, the ipecac which it contains aiding in promoting the diaphoretic effect.

To Check Hemorrhage.—It is a common practice to combine opium with hæmostatics in the various hemorrhages, such as *hæmoptysis*, *hæmatemesis*, and *enterorrhagia*. The good which it accomplishes is probably the result of its calmative influence on the nervous system.

To Support the System.—Opium may often be used with advantage in *wasting diseases* and the various functional disorders incident to *old age*.

External Use.—In the form of a liniment it makes an efficient sedative application in *sprains*, *bruises*, *rheumatism*, *erysipelas*, *myalgia*, and the like. In such case it is commonly combined with acetate of lead, as in the following formula:

℞ Plumbi acetat., Tinct. opii, Aquæ,	$\frac{ʒj}{ʒix}$; q. s. ad Œj.—M.
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Contraindications.—Opium should be avoided in acute cerebral congestion, in organic diseases of the lungs associated with weak respiration, and in chronic nephritis. In very young children it must be used with utmost caution.

Administration.—When a prompt analgesic effect is required, one of the salts of morphine should be selected in preference to opium, and should be administered hypodermically. When large doses are required, it is well to

combine atropine sulphate (gr. $\frac{1}{120}$) with each injection of opium. The deodorized opium and the extract of opium are suitable preparations for pill form. Dover's powder is the most active preparation for producing diaphoresis. The most important liquid preparations are the deodorized tincture and paregoric; the former is much less apt to cause disagreeable after-effects than laudanum or tincture of opium. In susceptible people the addition of a full dose of potassium bromide to each dose of opium often prevents disagreeable sequences. Paregoric, on account of its pleasant taste and the small amount of opium which it contains (2 gr. to 1 oz.), is an elegant preparation for children. Dover's powder should not be prescribed for children, as its ingredients are sometimes not perfectly mixed.

Incompatibles.—Preparations containing tannic or gallic acid, alkaline carbonates, and ammonia.

CODEINA.

(Codeine.)

This alkaloid appears in the form of colorless octahedral crystals, free from odor and of a faintly bitter taste. It is soluble in 80 parts of water and in 3 of alcohol. The dose is $\frac{1}{2}$ to 2 grains.

Physiological Action and Therapeutics.—While codeine possesses feeble hypnotic powers, it exerts a sedative influence similar to that of opium. According to Brunton, its most marked effect is on the nerves of the abdominal viscera. It is an excellent sedative in the cough of *chronic bronchitis* and *phthisis*. Codeine (gr. $\frac{1}{2}$ increased to gr. vj a day) has been thought to be superior in diabetes to opium, but, according to the chemical experiments of Bruce, Frazer, and Osler, morphine is much more reliable. In the restlessness, cough, and dyspnoea of *cardiac disease* it is sometimes serviceable, but in such cases it is generally inferior to morphine.

OXYGEN.

(O.)

For medicinal purposes oxygen is generally prepared by heating to redness in an iron retort a mixture of 5 parts

of potassium chlorate and 1 part of black oxide of manganese. The gas is subsequently freed from chlorine and other impurities by being passed through water-bottles. It may be inhaled from a rubber bag to which is attached an ivory mouthpiece.

Therapeutics.—Inhalations of oxygen are especially indicated in *diseases of the heart and lungs* associated with great dyspnoea. In *croupous pneumonia* its use is promptly followed by a disappearance of the cyanosis and a marked improvement in the breathing and pulse. It should be given early, and repeated whenever symptoms of asphyxia threaten. It is also efficacious in *membranous croup, capillary bronchitis, catarrhal pneumonia, asthma, and emphysema* with dilatation of the right heart. In *poisoning by noxious gases* like coal-gas and carbon monoxide the timely use of oxygen may save life.

PANCREATINUM.

(Pancreatin.)

A mixture of enzymes naturally existing in the pancreas of warm-blooded animals, and usually obtained from the fresh pancreas of the hog. It appears as a yellowish-white amorphous powder, having a faint odor and meat-like taste. The dose is 10 to 20 grains.

In the presence of an alkali pancreatin has the power of emulsifying fats and of converting proteids into peptones and starch into sugar. In the presence of an acid it soon becomes inert. It is extensively used for peptonizing milk and other foods, the process being as follows: Mix 5 grains of pancreatin and 20 grains of sodium bicarbonate in a small teacupful of cool water, and pour into a bottle containing a pint of fresh milk. Place the bottle in water so hot that the hand can be held in it without discomfort for a minute. As thoroughly digested milk has an unpleasant bitter taste, it is well to arrest digestion at the end of fifteen or twenty minutes by raising the milk for a few seconds to the boiling-point or by placing the bottle on ice.

Pancreatin may be advantageously given with food in

atonic dyspepsia, gastric catarrh, gastric dilatation, and other affections of the stomach associated with subacidity. It should always be combined with sodium bicarbonate and administered immediately after meals, so that its peptonizing power can be exercised in the stomach before the contents become acid.

PAPAYOTIN.

(Papain, Papoid.)

Papayotin is a ferment obtained from *Carica papaya*, or papaw tree, growing in South America. It appears in the form of a grayish-white amorphous powder, having a faint odor and the taste of pepsin. It is quite soluble in glycerin and water, but insoluble in alcohol, ether, and chloroform. As it is an extremely unstable ferment, care must be taken to secure a good preparation. The dose is 5 to 10 grains.

Papayotin is an active solvent of albumin, and acts the same in alkaline or slightly acid media. It has been successfully employed in *chronic gastric catarrh, dilatation of the stomach*, and *gastric cancer*. Jacobi has highly extolled its solvent action on the false membrane of diphtheria, and in this disease it may be prescribed as follows:

℞ Papayotin,	ʒj;
Aquæ,	ʒiv;
Glycerini,	ʒj.—M.

Sig. Apply locally to the membrane at frequent intervals.

A glycerole of papayotin has also been used in various *skin diseases* for removing redundant tissues.

PARALDEHYDUM.

(Paraldehyde, $C_6H_{12}O_3$.)

Paraldehyde is a product obtained by treating aldehyde with dilute sulphuric or nitric acid. It appears as a colorless liquid, having a strong ethereal odor and a sharp, pungent taste. It is soluble in 8.5 parts of water, and is miscible in all preparations with alcohol, ether, chloroform, and oils. The dose is $\frac{1}{2}$ to 2 fluidrachms.

Physiological Action.—The dominant action of paral-

dehyde is on the cerebrum, which it depresses, causing sleep. Like chloral, it also depresses the spinal cord, but, unlike that drug, it does not paralyze the heart. Unlike opium, it does not impair digestion, check the secretions, and leave behind distressing sequences. Toxic doses produce coma, feeble breathing, great muscular relaxation, abolition of the reflexes, and finally death from paralysis of the respiratory centre. Its long-continued use is sometimes followed by various cutaneous eruptions.

Therapeutics.—Paraldehyde is a safe and reliable hypnotic, the only objections to its use being its persistent disagreeable odor and taste. It may be employed with advantage in the *insomnia of mania, delirium tremens, hysteria, the continued fevers, and heart disease.*

Administration.—It may be prescribed in capsules or in some aromatic syrup. The following mixture is not unpleasant:

℞ Chloroformi,	℥xxiv;
Paraldehyd.,	ʒiv;
Ol. cinnamomi,	℥x;
Ol. amygdalæ express., q. s. ad	ʒij.—M.

Sig. A tablespoonful every half hour until effective.

PAREIRA.

(Pareira Brava.)

The root of *Chondrodendron tomentosum*, growing in South America.

PREPARATIONS.

DOSE.

Extractum Pareiræ Fluidum, U. S. P.	½-2 fl. dr.
Infusum Pareiræ (ʒj-Oj)	½-2 fl. oz.

Therapeutics.—Pareira acts as a stimulating diuretic and a mild laxative. It has been especially used in *chronic pyelitis, cystitis, and urethritis.*

PENTAL.

(Trimethylethylene, $(\text{CH}_3)_2\text{C}.\text{CH}.\text{CH}_3$.)

Pental is prepared by distilling fusel oil with zinc chloride, purifying the product thus obtained by shaking with dilute sulphuric acid, and redistilling. It appears as a colorless volatile liquid, highly inflammable, insoluble in water, but

miscible in all proportions with alcohol, ether, and chloroform.

Physiological Action—The inhalation of a few drachms of pental is quickly followed by general anæsthesia, muscular relaxation, dilatation of the pupils, slowing of the pulse, a fall in the arterial pressure, and quickening of the respirations. Large amounts quicken the pulse, embarrass the respiration, and kill, usually by paralyzing the heart. The primary slowing of the pulse is probably due to stimulation of the vagi, and the subsequent quickening to paralysis of the latter. The reduction in the blood-pressure is due to the depressant action of the drug on the heart. The inhalation causes but little irritation, and is rarely followed by unpleasant after-effects. As an anæsthetic pental resembles chloroform more than ether, but is not as efficient as the former, and probably not as safe. It is a feeble local anæsthetic.

Therapeutics.—Pental should be administered like chloroform, three or four drachms being quite sufficient to produce narcosis. On account of the short duration of its effect, it has been especially employed in *minor surgical operations*. Its influence on the heart makes it a dangerous anæsthetic, and one that cannot be recommended for general use.

PEPO.

(Pumpkin-seed.)

The seed of *Cucurbita pepo*. The active principle is probably a *resin* contained in the envelope surrounding the embryo. Dose of the seeds, 1 to 2 ounces. They should be decorticated, powdered in a mortar, and made into an emulsion.

Therapeutics.—Pumpkin-seed is a safe and efficient anthelmintic against *tapeworms*. It should be administered after an unsubstantial breakfast, and followed in a couple of hours by a full dose of castor oil.

PEPSINUM.

(Pepsin.)

A proteolytic ferment obtained from the glandular layer of fresh stomachs from healthy pigs. To be up to the

official standard, it should be capable of digesting, under certain conditions, 3000 times its own weight of freshly-coagulated and disintegrated egg-albumin. It appears as a yellowish-white amorphous powder, or as yellow translucent scales, having a faint odor and a slightly saline taste. It is soluble in about 100 parts of water, more so in water containing hydrochloric acid, and insoluble in alcohol. The dose is 5 to 10 grains.

PREPARATIONS.	DOSE.
Pepsinum Saccharatum, U. S. P.	$\frac{1}{2}$ -1 dr.
Liquor Pepsini (saccharated pepsin, glycerin, hydrochloric acid, and water)	1-2 fl. dr.

Therapeutics.—Clinical evidence strongly indicates that pepsin is a useful remedy in chronic affections of the stomach associated with indigestion, such as *chronic catarrh, dilatation, atrophy of the glands,* and *cancer*. It should be given in full doses, freely acidulated with hydrochloric acid, after meals. Most substances destroy its proteolytic action, especially alcohol and alkalies.

PHENACETINE.

(Para-acetphenetidine.)

A coal-tar product closely allied to antifebrin, and appearing in the form of white, shiny, laminar crystals, free from odor and taste. It is sparingly soluble in water and glycerin, but more so in alcohol. The dose is 5 to 10 grains in powders or capsules.

Physiological Action.—Phenacetine closely resembles antipyrine and antifebrin in its action; like these two drugs, it lowers temperature and relieves pain. It does not seem to be quite as powerful an antipyretic as antipyrine, but is fully equal to the latter as an analgesic. With the exception of free perspiration, unpleasant symptoms rarely attend its use in moderate doses. Large doses depress the heart and render the blood dark by converting oxyhæmoglobin into methæmoglobin. Pure phenacetine is a safe remedy, but the commercial product is not infrequently contaminated with paraphenetidine, which is an active irritant to the kidneys.

Therapeutics.—Like antipyrine, it may be used to lower temperature in diseases associated with high fever, such as *typhoid fever*, *scarlet fever*, *rheumatism*, and *pneumonia*. As an analgesic it is an extremely valuable remedy in *neuralgia*, *headache*, *migraine*, *influenza*, *rheumatism*, and the crises of *locomotor ataxia*. It has been used with success as an antispasmodic in *whooping-cough*.

PHENOCOLL.

A new antipyretic closely allied to phenacetine and anti-febrin, occurring in the form of a white crystalline powder having a bitter taste. It differs from the former antipyretics in being quite soluble in water. It is usually employed in the form of the hydrochlorate of phenocoll, the dose of which is 5 to 15 grains in solution, powders, or capsules.

Like other drugs of its class, it causes, in addition to a fall of temperature, free diaphoresis. Its antipyretic effect is of short duration. Unpleasant symptoms have rarely attended its use. It has been given with good results in *acute rheumatism*, and might be employed when the salicylates have failed. It appears to be an efficient anodyne in *neuralgia*, *migraine*, and *influenza*.

PHOSPHORUS.

(P.)

A translucent, yellow, wax-like substance obtained from bones. It has a garlicky odor and a disagreeable taste, and on exposure to the air emits white fumes which become luminous in the dark. It is insoluble in water, soluble in 50 parts of fatty oils, and very soluble in chloroform. The dose is $\frac{1}{100}$ to $\frac{1}{30}$ of a grain.

PREPARATIONS.	DOSE.
Elixir Phosphori, U. S. P.	$\frac{1}{2}$ –2 fl. dr.
Oleum Phosphoratum, U. S. P. (1 per cent. of phosphorus)	1–5 min.
Pilulæ Phosphori, U. S. P. ($\frac{1}{100}$ of a grain)	1–3 pills.
Spiritus Phosphori, U. S. P.	20–60 min.

Physiological Action.—Wegner found that when phosphorus was given in small doses to growing animals it rendered the bones more dense, diminished the cancellous tissue, and finally caused more or less obliteration of the

marrow-cavity. That these changes were due to the stimulation of tissue-growth, and not to the deposition of an excess of phosphates, was shown by the fact that in animals fed with phosphorus but deprived of phosphates the same condensation in the bony structures resulted, but that the latter were soft instead of hard. Clinical evidence has abundantly proven that the drug improves the nutrition of other parts, especially the nervous system.

The manner in which phosphorus is absorbed has been a matter of some dispute; it probably enters the blood as phosphorus, absorption of the drug being facilitated by its solution in the intestinal fats. Artisans exposed to the fumes of phosphorus frequently suffer from necrosis of the jaw; this condition must result from the local action of the drug, since it only occurs in those who have carious teeth.

Toxicology.—Toxic doses of phosphorus produce, after the lapse of a few hours, a garlicky taste in the mouth, thirst, intense abdominal pain, obstinate vomiting, restlessness, and prostration. The ejected materials contain mucus, bile, and occasionally disintegrated blood, and are luminous in the dark. At the end of twenty-four or thirty-six hours the symptoms gradually subside and the patient feels comparatively comfortable, but soon jaundice develops, the vomiting and pain return, the liver becomes enlarged and painful, the urine contains albumin, bile, hypophosphoric acid, and crystals of leucin and tyrosin. The tongue is coated, the breath offensive, the belly distended, the bowels either constipated or loose, and the stools clay-colored and sometimes phosphorescent. Death is generally preceded by grave nervous symptoms, such as headache, delirium, convulsions, stupor, and coma. When recovery follows, convalescence is protracted and tedious. After death from phosphorus-poisoning examination reveals inflammation of the stomach and bile-ducts and advanced fatty degeneration of the organs, especially the liver and kidneys.

Treatment.—The stomach should be emptied by a full dose of sulphate of copper, which in this case not only serves as an emetic, but also as an antidote, since it forms with phosphorus an insoluble phosphide of copper. It

has been recently shown by Antal and Thornton that potassium permanganate in excess ($\frac{1}{2}$ to 1 per cent. aqueous solution) is a valuable antidote, since it forms with phosphorus the black oxide of manganese, phosphoric acid, and phosphates. French oil of turpentine, which is rich in ozone, has been repeatedly recommended, but it cannot be obtained in this country, and ordinary turpentine is useless.

Therapeutics.—Phosphorus is chiefly used as a tonic in certain affections of the nervous system dependent upon exhaustion rather than organic changes, and in diseases of the osseous system dependent upon defective nutrition. It is often of value in *neurasthenia*, *neuralgia*, threatening *cerebral softening*, and *impotence* from sexual excesses. It is useful in *rickets* and *osteomalacia*. It has also been employed with asserted good results in certain chronic skin diseases like *acne*, *psoriasis*, and *furunculosis*.

Administration.—The elixir, pills, and oil are suitable preparations; the last may be given in emulsion or in capsules. As people vary in their susceptibility to phosphorus, it is well to begin with small doses and gradually increase them.

PHYSOSTIGMA.

(Calabar Bean.)

The seed of *Physostigma venenosum*, a native of Africa. It contains two alkaloids, *physostigmine* or *eserine*, and *calabarine*; the latter is less important than the former, and resembles strychnine in its action.

PREPARATIONS.

DOSE.

Extractum Physostigmatis, U. S. P.	$\frac{1}{8}$ – $\frac{1}{4}$ gr.
Tinctura Physostigmatis, U. S. P.	10–30 min.

PHYSOSTIGMINA.

(Eserine.)

This alkaloid fairly represents the active properties of calabar bean. It appears as colorless or slightly pinkish crystals, sparingly soluble in water, but readily so in alcohol and dilute acids. The dose is $\frac{1}{80}$ to $\frac{1}{15}$ of a grain. Two salts are official, both of which are soluble:

PREPARATIONS.	DOSE.
Physostigminæ Sulphas	$\frac{1}{100}$ — $\frac{1}{50}$ gr.
Physostigminæ Salicylas	$\frac{1}{100}$ — $\frac{1}{50}$ gr.

Physiological Action.—*Circulatory System.*—Small doses do not affect the circulation; large doses slow the pulse, probably by stimulating the peripheral vagi, and raise the arterial pressure by stimulating the heart or its contained ganglia, and probably also by stimulating the vaso-motor centres. Lethal doses paralyze the heart.

Nervous System.—The dominant action of the drug is on the spinal cord, which is depressed by large doses. The peripheral nerves are not affected by ordinary doses; in poisoning they are partially paralyzed.

Respiratory System.—Therapeutic doses do not affect respiration, but toxic doses kill by paralyzing the respiratory centre.

Muscles.—In toxic doses it acts as an irritant to voluntary muscles, causing fibrillary tremors and tetanoid contractions.

Alimentary Canal.—It increases peristalsis, probably by directly stimulating the unstriped muscle-fibres of the bowel.

Secretions.—It increases the secretion of the salivary, sweat-, lachrymal, intestinal, and mammary glands.

Eye.—Physostigmine powerfully contracts the pupil, the myosis resulting from stimulation of the peripheral fibres of the oculo-motor nerve and from paralysis of the peripheral filaments of the sympathetic nerve. It diminishes intra-ocular tension.

Toxicology.—Physostigmine-poisoning is characterized by vertigo, great muscular relaxation, tremors and twitchings of the muscles, diminished reflexes, contraction of the pupils, a feeble pulse, and often vomiting and purging.

Treatment.—Evacuate the stomach unless vomiting has already occurred. Administer atropine as a physiological and tannic acid as a chemical antidote. Combat cardiac and respiratory failure with diffusible stimulants like ether and ammonia.

Therapeutics.—Physostigmine has a very limited range of usefulness; it is chiefly employed to depress the spinal

cord, to contract the pupil, and to stimulate involuntary muscles, especially those of the intestine.

It has been used to depress the spinal cord in *tetanus*, *strychnine-poisoning*, and *chorea*, but in these maladies we have remedies which are more reliable.

The extract sometimes makes a useful addition to cathartic pills designed for the relief of *constipation* associated with flatulence and dependent upon atony of the intestinal walls. Ringer has recommended it in *chronic bronchitis* with dyspnoea due to weakness of the bronchial muscles.

Eye Affections.—The sulphate or salicylate of physostigmine is used to counteract the *mydriasis* produced by atropine, to lessen intra-ocular tension in the early stages of *glaucoma*, and sometimes, alternately with atropine, to break up adhesions in *iritis*. It is sometimes efficient in *suppurative inflammations of the cornea*. The strength of the solutions varies from $\frac{1}{8}$ of a grain to 4 grains to the ounce of distilled water.

PICROTOXINUM.

(Picrotoxin.)

A neutral principle derived from *Anamirta cocculus*, or *Cocculus Indicus*. It appears in the form of colorless needles, having a bitter taste, sparingly soluble in water, but freely so in alcohol. The dose is $\frac{1}{100}$ to $\frac{1}{20}$ of a grain.

Therapeutics.—It has been highly recommended by Murrell in the *night-sweats of phthisis*. An ointment of picrotoxin or a tincture made from the crude drug will be found a useful remedy in *pediculosis capitis*. The remedy has also been used with asserted success in *epilepsy*.

PILOCARPUS.

(Jaborandi.)

The leaves of *Pilocarpus selloanus* and of *Pilocarpus jaborandi*. They contain a volatile oil and two alkaloids, *pilocarpine* and *jaborine*. Jaborine is less important than pilocarpine, and somewhat resembles atropine in its action.

PREPARATION.	DOSE.
Extractum Pilocarpi Fluidum, U. S. P.	$\frac{1}{2}$ -1 fl. dr.

PILOCARPINÆ HYDROCHLORAS.

(Pilocarpine Hydrochlorate.)

The hydrochlorate of pilocarpine is official, and represents the physiological and therapeutic properties of the crude drug. It appears as small white deliquescent crystals, odorless, having a slightly bitter taste, and freely soluble in water and in alcohol. The dose is $\frac{1}{20}$ to $\frac{1}{3}$ of a grain.

Physiological Action.—*Circulatory System.*—In man, moderate doses of pilocarpine quicken the pulse and depress the heart. In the lower animals it slows the pulse, and first increases the blood-pressure and then decreases it. The slowing of the pulse probably results from stimulation of the inhibitory ganglia in the heart or from a depressant effect upon the cardiac muscle. The rise in the arterial pressure has been attributed to the convulsions induced by the drug; the subsequent fall, to vaso-motor paralysis.

Nervous System.—Therapeutic doses of pilocarpine have but little influence on the nervous system; toxic doses first stimulate the spinal cord, causing violent tetanic spasms, and subsequently depress it, causing paralysis and abolition of reflexes.

Respiratory System.—Respiration does not seem to be directly affected by the drug, but large doses sometimes cause marked dyspnœa from the pulmonary œdema which they induce.

Alimentary Canal.—Large doses stimulate the contractions of the stomach and intestines, and not infrequently provoke vomiting.

Uterus.—On the non-gravid uterus pilocarpine has no effect, but in pregnancy it exerts a feeble abortifacient influence.

Secretions.—The chief effect of the drug in therapeutic doses is to greatly increase the quantity of sweat and saliva by stimulating the peripheral filaments of the excito-secretory nerves, and probably also the glandular cells.

Other secretions are also increased, such as the tears, bronchial mucus, stomachic and intestinal juices, milk, and urine. The bile is not increased.

Temperature.—Coincident with the profuse diaphoresis which the drug produces, and probably dependent upon it, there is a distinct fall of temperature.

Eye.—It contracts the pupil, probably by stimulating the peripheral oculo-motor filaments. As a myotic it is less irritating and less powerful than physostigmine.

Hair.—It seems to have a peculiar influence on the hair, and when given for an extended period it makes the latter darker, thicker, and coarser.

Pilocarpine and Atropine.—Pilocarpine antagonizes atropine in all particulars, and in poisoning by the latter it is a very useful antidote when given in large doses.

Therapeutics.—Pilocarpine is used chiefly as a diaphoretic, sialagogue, and hair-stimulant.

Diaphoretic.—In *general dropsy*, *Bright's disease*, and *uræmia*, where an increased action of the skin is demanded, it will be found a most serviceable diaphoretic. In local effusions such as *hydrothorax* and *hydropericardium* it is less useful.

It has been used with advantage in certain chronic affections of the skin characterized by dryness and harshness, such as *eczema*, *prurigo*, and *ichthyosis*.

Sialagogue.—Lozenges containing a small amount of the alkaloid are sometimes useful in relieving *dryness of the throat* resulting either from inflammation or some constitutional disease like diabetes. Its use has been highly extolled in *laryngeal diphtheria* and *membranous croup*, with the view of increasing the secretion of mucus and thus aiding in the detachment of the false membrane; it should not be employed if the heart is weak. Minute doses of pilocarpine have also been recommended in *mumps*.

Hair-stimulant.—Locally and internally, the remedy is sometimes of service in *premature alopecia*.

Contraindications.—The chief contraindication to the use of pilocarpine is cardiac weakness; when this is present, symptoms of collapse or of pulmonary œdema are prone to develop.

Administration.—When a gentle continuous diaphoretic action is required, as in acute Bright's disease uncomplicated with uræmia, the fluid extract of jaborandi or the sulphate of the alkaloid may be given by the mouth, the former in doses of 20 minims, the latter in doses of $\frac{1}{20}$ of a grain, every three or four hours. When copious perspiration is desired, as in uræmia or general dropsy, it is preferable to give the drug hypodermically in the dose of $\frac{1}{6}$ to $\frac{1}{4}$ of a grain, at the same time encouraging diaphoresis by the external application of heat and supporting the heart by the exhibition of a small quantity of whiskey. In diphtheria it may be prescribed as follows:

℞	Pilocarpin. hydrochlor.,	gr. $\frac{1}{3}$;
	Spt. vin. gall.,	fʒiv;
	Syrup. aurant.,	fʒj;
	Aquæ,	q. s. ad fʒiij.—M. (Hirschfeld.)

Sig. One teaspoonful every two hours for a child of six years.

PIPERAZINE.

(Di-ethyl-di-amine, $C_4H_{10}N_2$.)

A synthetic compound produced by the action of ammonia on ethylene bromide or chloride. It appears as white, odorless, tasteless, deliquescent crystals, freely soluble in water. The dose is 5 grains in solution three times a day.

Physiological Action and Therapeutics.—Interest in piperazine centres around the property which it possesses of uniting with uric acid to form an unusually soluble compound. Its solvent properties in concretions of uric acid seem to have been exaggerated, and the good which it accomplishes is probably dependent upon its power of uniting with uric acid in the blood and escaping with it in the urine. It is frequently of value in *gout* and the *uric-acid diathesis*, and the negative results which have followed its use have been due in some instances, no doubt, to the employment of an inferior preparation. Its costliness is the chief obstacle to its use.

PIPERINUM.

(Piperin.)

A neutral principle obtained from *Piper nigrum*, or black pepper. It appears as colorless prismatic crystals, odorless, and at first tasteless, but soon producing a sharp biting sensation. It is insoluble in water. The dose is 1 to 10 grains.

Therapeutics.—Piperin is chiefly used for its carminative effect as an adjuvant to other remedies in *atonic dyspepsia* associated with flatulence.

PIX BURGUNDICA.

(Burgundy Pitch.)

A resinous exudation obtained from *Abies excelsa*. It appears as a hard, shining, brittle, brownish-red substance, having an aromatic taste and a terebinthinate odor.

PREPARATION.

Emplastrum Picis Liquidæ, U. S. P.

Emplastrum Picis Cantharidatum, U. S. P.

It also enters into the official emplastrum ferri and emplastrum opii.

Therapeutics.—Pitch plasters are used as rubefacients in *muscular* and *articular rheumatism*, *bronchitis*, *phthisis*, and *chronic dry pleurisy*.

PIX LIQUIDA.

(Tar.)

An oleoresin obtained from the destructive distillation of *Pinus palustris* and other species of *Pinus*. It appears as a thick brownish-black liquid, having a terebinthinate odor and a sharp empyreumatic taste. It is only sparingly soluble in water, but freely so in alcohol, oil, and alkaline solutions. The dose is 5 to 10 grains.

PREPARATIONS.

DOSE.

Aqua Picis Liquida (made by shaking together 1 part of tar and 4 parts of water frequently for 24 hours, decanting, and filtering) 4-8 fl. oz.

PREPARATIONS.

DOSE.

Oleum Picis Liquidæ, U. S. P.

Syrupi Picis Liquidæ, U. S. P.

Vinum Picis Liquidæ (tar, ℥xvj; glycerin, white wine, and honey, of each, ℥viii; acetic acid, ℥j; boiling water, Ovj. Keep in a closed vessel at a temperature of 160° for a couple of hours, frequently shaking the mixture, then allow to macerate for several days, strain, and filter). ½-3 fl. oz.

Therapeutics.—Tar is used as a stimulating expectorant, and as a stimulant to the skin in certain chronic inflammatory diseases. In *chronic laryngitis*, *chronic bronchitis*, *bronchiectasis*, and *fibroid phthisis* it is an excellent expectorant, rendering the secretions less viscid, and thereby allaying cough. It may be given in pills or capsules, or in the form of the syrup or wine. The inhalation of tar-water may also prove a valuable adjunct to internal medication in these affections. A combination of tar, apomorphine, and wild cherry often acts admirably in *chronic bronchitis*:

R	Apomorphinæ hydrochlor.,	gr. ⅓;
	Tinct. opii camph.,	℥iv;
	Syrupi prun. virgin.,	℥ij;
	Syrupi picis liquidæ,	q. s. ad ℥vj.—M.
	Sig. A tablespoonful every three or four hours.	

In *chronic eczema* and *psoriasis*, when the lesions are sluggish, an ointment of tar makes a useful application; the official ointment is generally too strong, ½ to 2 drachms to the ounce of lard being quite sufficient in the majority of cases. The internal administration of tar in these diseases sometimes gives good results.

PLUMBUM.

(Lead, Pb.)

The metal itself is obtained from a native sulphide, and is not official; the following preparations, however, are recognized by the United States Pharmacopœia: acetate, carbonate, iodide, nitrate, oxide, and subacetate.

Physiological Action.—When a small dose of a soluble preparation of lead is taken internally, it produces a

sweetish metallic taste in the mouth, and exerts an astringent but non-irritating effect upon the whole alimentary canal. In the stomach it is converted by the albuminous fluids into an albuminate, in which form it enters the blood; a portion generally passes into the bowel, where it is transformed into the black sulphide, and as such escapes in the feces. Toxic doses produce the lesions and symptoms of gastro-enteritis.

Lead is eliminated from the body chiefly in the bile and urine, but to some extent in the sweat, saliva, milk, and intestinal mucus.

Chronic Lead-poisoning.—The continuous absorption of small quantities of lead is sooner or later followed by the symptoms of chronic poisoning, or plumbism. This condition may be brought about by drinking soft water which has passed through lead pipes or which has been stored in cisterns lined with lead, by continually handling the metal or pigments containing it, or by the habitual use of cosmetics containing lead.

Symptoms.—Anæmia; sallow complexion; severe colicky pains centring around the umbilicus and associated with retraction and rigidity of the abdominal walls; constipation; a blue line on the gums near the insertion of the teeth, due to the deposition of a sulphuret of lead; headache; neuralgic pains in the joints; and paralysis. The last generally involves the extensor muscles of both forearms and gives rise to the well-known wrist-drop. In advanced cases the muscles atrophy and yield the reactions of degeneration. Sensation is not affected. Unless the patient be removed from further contamination, the arteries and the kidneys become the seat of sclerotic changes.

In some instances the chief manifestations are cerebral (encephalopathies), and consist of convulsions, coma, delirium, intense headache, or blindness from atrophy of the optic nerves.

Pathology.—Paralysis is usually due to inflammatory and degenerative changes in the peripheral nerves, but in some instances the ganglionic cells of the spinal cord are likewise affected.

Treatment.—Prophylaxis consists in absolute cleanliness,

the use of respirators in lead-factories, the avoidance of eating in an atmosphere laden with the dust of the metal, and in the occasional use of Epsom salt.

The curative treatment consists in the administration of potassium iodide (gr. v-x thrice daily) and the use of sulphur-baths. Constipation should be relieved by Epsom salt. The colic may require the hypodermic injection of morphine and atropine and the application of hot fomentations to the abdomen. The paralysis generally yields to massage, the persistent use of electricity, and hypodermic injections of strychnine.

Acute Poisoning.—This usually results from the ingestion of a large dose of one of the soluble preparations of lead, like the acetate, and is characterized by a metallic taste in the mouth, obstinate vomiting of white matters (lead chloride formed in the stomach), severe pains in the abdomen, great thirst, black stools, and collapse. The blue line on the gums may appear in acute poisoning.

Treatment.—Evacuation of the stomach is usually rendered unnecessary by the persistent vomiting. A soluble sulphate like Epsom or Glauber's salt is the chemical antidote, forming with the lead an insoluble sulphate; it should be given in excess, so that a purgative action will be secured. The resulting gastro-enteritis should be treated by the external application of warm fomentations and the internal use of opium and demulcent drinks.

PLUMBI ACETAS.

(Lead Acetate, Sugar of Lead, $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$.)

This salt appears as colorless, heavy, efflorescent, prismatic crystals or crystalline masses, having a sweetish, astringent, and metallic taste and an acetous odor. It is soluble in 2.3 parts of water and in 21 parts of alcohol. Dose, 1 to 5 grains in pill.

Therapeutics.—A weak solution of lead acetate is extensively used externally as an astringent and sedative application in *bruises, sprains, erysipelas, and acute inflammatory skin diseases.* Although it is chemically incompatible with opium, it is generally prescribed with laudanum,

forming a mixture known as *lead-water and laudanum* (lead acetate, $\bar{z}j$; laudanum, $\bar{z}j$; water, Oj). A solution containing 2 grains to the ounce makes a useful injection in *gonorrhœa* after secretion is fully established.

Internally, lead acetate is an efficient astringent in *sub-acute* and *chronic diarrhœa*; it may be conveniently combined with powdered opium, thus:

℞ Plumbi acetas,	gr. xl;
Pulv. opii,	gr. xx.—M.
Ft. in pil. No. xx.	
Sig. One thrice daily.	

A similar combination is often of value in recurrent attacks of *hæmoptysis*.

PLUMBI CARBONAS.

(Lead Carbonate, White Lead ($PbCO_3$)₂Pb(OH)₂.)

A heavy white opaque powder, tasteless and odorless, and insoluble in ordinary menstrua.

PREPARATION.

Unguentum Plumbi Carbonatis, U. S. P. (10 per cent.).

Therapeutics.—An ointment of lead carbonate is sometimes used as a sedative and protective dressing for *small ulcers, burns, and scalds*. Care must be taken not to use it over large surfaces, on account of the danger of absorption and poisoning.

PLUMBI IODIDUM.

(Lead Iodide, PbI₂.)

A heavy, bright-yellow powder, odorless and tasteless, and sparingly soluble in water and alcohol.

PREPARATION.

Unguentum Plumbi Iodidi, U. S. P. (10 per cent.).

Therapeutics.—The ointment makes a useful resolvent application in *scrofulous* and other *enlargements of the lymph-glands*.

PLUMBI NITRAS.(Lead Nitrate, $\text{Pb}(\text{NO}_3)_2$.)

Lead nitrate appears as white, translucent, octahedral crystals, odorless, having a sweetish, astringent, and metallic taste, and soluble in 2 parts of water.

Therapeutics.—A solution containing a drachm to the ounce of water was formerly used as a disinfectant under the name of *Ledoyen's disinfectant solution*. As a caustic it is sometimes applied in the form of a powder dusted on the part in *malignant onychia*.

PLUMBI OXIDUM.(Lead Oxide, Litharge, PbO .)

A heavy, reddish-yellow powder, odorless and tasteless, and insoluble in ordinary menstrua.

PREPARATION.

Emplastrum Plumbi, U. S. P. (diachylon plaster), made by boiling together lead oxide, olive oil, and water.

Therapeutics.—Lead oxide is rarely employed except in the form of the official lead plaster, which is much used as a protectant for *superficial ulcers* and *bed-sores*. An ointment composed of equal parts of lead plaster and cosmoline makes an efficient application in *subacute eczema* and *hyperidrosis*. In the latter affection, after the parts have been cleaned and dried, the ointment should be applied on strips of muslin, and renewed twice daily for two or three weeks, instructions being given to avoid washing the feet in water during the progress of the treatment.

PLUMBI SUBACETAS.(Lead Subacetate, $\text{Pb}_2\text{O}(\text{C}_2\text{H}_3\text{O}_2)_2$.)

This salt is official in two forms—*liquor plumbi subacetatis* (Goulard's extract) and *liquor plumbi subacetatis dilutus* (lead-water). The latter contains 3 per cent. of the former, and is frequently prescribed with laudanum as a local sedative in *sprains*, *bruises*, and *superficial inflammations*, but it is too weak to be efficient.

PODOPHYLLUM.

(May-apple.)

The rhizome and roots of *Podophyllum peltatum*, growing in North America. It contains a resin, *podophyllin*, which represents the active properties of the drug, and an alkaloid, *berberine*, which is found also in other drugs.

PREPARATIONS.

DOSE.

Extractum Podophylli, U. S. P.	2-5 gr.
Extractum Podophylli Fluidum, U. S. P.	2-30 gtt.
Resina Podophylli, U. S. P.	$\frac{1}{20}$ - $\frac{1}{2}$ gr.

Physiological Action.—In full doses podophyllum is a powerful but rather slowly-acting purgative, producing copious liquid stools. That it acts by being absorbed is indicated by the fact that, when given hypodermically, it produces catharsis as well as when given by the mouth. In small doses it exerts a decided cholagogue effect, increasing the flow of bile. Toxic doses produce the symptoms of gastro-enteritis and collapse.

Therapeutics.—Podophyllum is an excellent laxative in *constipation* associated with “biliousness” or hepatic congestion. Since it tends to produce griping when employed alone, it is best given with other cathartics and with small doses of extract of hyoscyamus or belladonna, as in the following formula :

℞ Resinæ podophylli, gr. iij-iv;
 Pulv. aloes, gr. xxx;
 Ext. nucis vomicæ,
 Ext. belladonnæ, aa gr. iv.—M.
 Ft. in pil. No. xxiv.
 Sig. One pill night and morning.

POTASSIUM.

(K.)

The metal potassium is not used medicinally; many of its salts, however, are valuable therapeutic agents. They are obtained from the ash which remains after the combustion of plants, from the native nitrate (saltpetre) found extensively in India, or from argol (potassium bitartrate), which is precipitated from grape-juice in the process of fermentation.

Physiological Action.—In large doses potassium salts depress the heart by a direct action on the cardiac muscle. In cold-blooded animals they act as depressants to the cerebro-spinal centres; indeed, according to Ringer, in concentrated form they destroy the vitality of all tissues. In ordinary doses they increase the flow of urine and favor the oxidation of nitrogenous products, so that under their influence more uric acid and urea are eliminated. Sodium salts resemble potassium salts in their action, but they do not have the same effect on tissue-metamorphosis.

POTASSA.

(Potassium Hydrate, Caustic Potash, KOH.)

Caustic potash appears as hard white pencils or fused masses, deliquescent, strongly alkaline, and corrosive. It is soluble in 0.5 part of water and 2 parts of alcohol.

PREPARATIONS.

DOSE.

Liquor Potassæ, U. S. P. (5 per cent. solution)	10–20 min.
Potassa cum Calce, U. S. P. (Vienna paste), equal parts of lime and potassa.	

Physiological Action.—When applied to a part in concentrated form, it quickly acts as an escharotic, turning the part ashy gray and forming a soft eschar. This corrosive action is due to the abstraction of water and the saponification of fats.

It is used internally as an antacid.

Therapeutics.—As a caustic the action of potassa is very painful and somewhat difficult to control; it may be used, however, to destroy chancroids, small epitheliomata, malignant pustules, and the exuberant granulations surrounding ingrowing toe-nails. As it destroys both healthy and diseased tissues, the surrounding skin should be protected by lead plaster or oil. It has been recommended by Agnew for cauterizing the wounds produced by rabid animals.

Antacid.—Internally, liquor potassæ may be employed with advantage in *gastric hyperacidity*, in *acute cystitis* to render the urine alkaline, and in *gout* and *lithæmia* to

diminish the acidity of the blood and to hasten the oxidation of nitrogenous products. For these purposes it should be given, well diluted, after meals.

Potassa cum Calce.—This preparation is a weaker caustic than pure potassa, and is sometimes employed in the form of a paste spread upon kid to destroy superficial growths, such as *lupus* and *epithelioma*. The surrounding parts must be protected, since it acts on both healthy and diseased structures.

POTASSII ACETAS.

(Potassium Acetate, $KC_2H_3O_2$.)

A white deliquescent powder, odorless, and of a sharp saline taste. It is freely soluble in water and alcohol. Dose, $\frac{1}{2}$ to 1 drachm.

Physiological Action and Therapeutics.—Potassium acetate, in common with all the vegetable salts of potassium, increases oxidation, lessens the acidity of the blood and urine, and acts as a diuretic. It is eliminated as a carbonate.

Next to the salicyl compounds, the vegetable salts of potassium are the best remedies we have in *acute rheumatism*. If the acetate is selected, $\frac{1}{2}$ to 1 drachm may be given every two hours. These salts do good by favoring oxidation and by rendering the blood less acid. It is a good plan to combine alkalies with salicylates in the treatment of this disease.

Since it renders the urine less acid, it is useful in acute inflammations of the genito-urinary tract, such as *pyelitis*, *cystitis*, and *urethritis*.

In *general dropsy* it may be given alone or in combination with other diuretics to increase the flow of urine, as in the following formula:

℞ Potass. acetatis,	℥ $\frac{3}{4}$ ss;
Syrup. aurantii,	f℥ $\frac{3}{4}$ ss;
Infusi digitalis,	q. s. ad f℥iv.—M.
Sig. A tablespoonful every three hours.	

POTASSII BICARBONAS.(Potassium Bicarbonate, KHCO_3 .)

Colorless prismatic crystals, odorless, and of a slightly saline taste. Soluble in 3.2 parts of water, and almost insoluble in alcohol. Dose, $\frac{1}{2}$ to 1 drachm.

Therapeutics.—It is more irritating to the stomach than the acetate, but it is used in the same class of cases.

POTASSII BITARTRAS.(Potassium Bitartrate, Cream of Tartar, $\text{KHC}_4\text{H}_4\text{O}_6$.)

Colorless rhombic crystals or a white gritty powder, having a pleasant acid taste. Soluble in 201 parts of water, and almost insoluble in alcohol. Dose, $\frac{1}{2}$ to 1 drachm.

PREPARATION.

DOSE.

Pulvis Jalapæ Compositus, U. S. P. 20-40 gr.

Therapeutics.—It is the most active, but one of the least irritating, of the alkaline diuretics, and may be given with advantage in *acute catarrhal nephritis*. In *chronic catarrhal nephritis* it is frequently prescribed in combination with infusion of juniper.

In half-ounce doses it has been employed as a purgative. Compound jalap powder is a useful hydragogue cathartic in *general dropsy*.

POTASSII BROMIDUM.

(Potassium Bromide, KBr.)

This salt appears as colorless cubical crystals, having a pungent saline taste. It is soluble in 1.6 parts of water and in 200 parts of alcohol. Dose, $\frac{1}{2}$ to 2 drachms.

Physiological Action.—The dominant action of potassium bromide is on the nervous system; it depresses first the sensory columns of the spinal cord and sensory nerves, then the brain and motor columns of the spinal cord, and finally the motor nerves. In moderate amounts it does not affect the circulation, but in large doses it depresses the heart. Even in moderate doses it distinctly

lessens the sexual appetite. It is eliminated rather slowly in all the secretions.

Bromism.—The continuous administration of the bromides for a prolonged period is followed by a group of symptoms to which the term *bromism* is applied. This condition is characterized by anæmia, fetor of the breath, gastric disturbance, diminution of the reflexes, unsteady gait, impairment of tactile sensibility, abolition of sexual function, mental depression, failure of memory, somnolence, and a general eruption of acne.

Therapeutics.—It is used to arrest convulsions, to allay nervous excitement, to relieve certain types of neuralgia, and to produce sleep.

To Arrest Convulsions.—The bromides—especially the bromide of potassium—are by far the best remedies that we possess in the treatment of *epilepsy*. They exert a sedative influence on the cerebral cortex, and by their action on the sensory columns of the spinal cord and afferent nerves impede the transmission of peripheral irritation. They rarely effect a cure of the disease, but they usually lessen materially the frequency of the paroxysms. The amount required varies with the severity of the case and the susceptibility of the individual, and must be determined experimentally in each instance. The daily doses usually range between 1 and 3 drachms; when larger doses than these are required, it is better to try the combination of other remedies with the bromide than to depend on the latter alone. Frequently, small doses of potassium iodide or moderate doses of antipyrine, or if the pulse is feeble, of digitalis, will serve to lessen the amount of bromide required. The addition of a drop or two of Fowler's solution to each dose of the bromide will often prevent the outbreak of acne.

The drug is of considerable value in other *convulsive disorders* besides epilepsy, such as whooping-cough, puerperal eclampsia, uræmia, infantile convulsions, asthma, chorea, tetanus, and strychnine-poisoning.

To Allay Nervous Excitement.—The bromides are excellent sedatives in the excitement of *overwork*, *anxiety*, and *fatigue*, and also in that which attends *hysteria* and the

infectious fevers. They are of little value in fully-developed *delirium tremens*, but in the stage of excitement which precedes the latter they are very efficient. No remedies equal the bromides in relieving the varied nervous phenomena which attend the menopause. They have been used with great success in *nocturnal emissions* and other manifestations of undue *sexual excitement*.

To Relieve Neuralgia.—Bromides are useful in *migraine*, *trifacial neuralgia*, and the headache of *cerebral congestion*. In these affections they may be given alone or in combination with antipyrine, phenacetine, caffeine, or chloral.

To Produce Sleep.—As pure hypnotics the bromides are feeble compared to chloral and opium, but in insomnia due to nervous excitement they frequently produce refreshing sleep.

Other Uses.—They are sometimes useful in *sea-sickness*, *vomiting of pregnancy*, *dysmenorrhœa*, and *diabetes*. DaCosta found that 30 to 60 grains of potassium bromide administered an hour before a dose of opium will generally prevent the development of the disagreeable after-effects which the latter often produces.

Administration.—Bromides should be given in solution, well diluted, after meals.

POTASSII CHLORAS.

(Potassium Chlorate, KClO_3 .)

Colorless crystalline plates or a white powder, having a cooling saline taste. Soluble in 16.7 parts of water, and insoluble in alcohol.

PREPARATION.

Trochisci Potassii Chloratis, U. S. P. (about 5 grains each).

Physiological Action.—Upon mucous surfaces a solution of potassium chlorate of moderate strength produces a stimulating and alterative effect; concentrated solutions, however, act as irritants. When taken internally it does not, as was formerly believed, impart its oxygen to the blood, but passes out of the body unchanged, most of it escaping through the kidneys. After its use in large

amounts the blood becomes chocolate-colored from the conversion of hæmoglobin into methæmoglobin. Toxic doses produce abdominal pain, vomiting and purging, intense dyspnœa, cyanosis, heart-failure, scanty albuminous and bloody urine, jaundice, and death, the latter being usually preceded by convulsions and coma. Post-mortem examination reveals the evidences of inflammation of the gastro-intestinal tract and kidneys, marked degeneration of the blood, and staining of the organs brown from the liberation of blood-pigment.

Therapeutics.—Potassium chlorate makes an excellent local application in inflammatory affections of the mouth and throat. Thus it is valuable in the various forms of *stomatitis*, in *acute pharyngitis*, and in *diphtheria* and *scarlet fever*. In these affections it may be employed in the strength of 10 to 20 grains to the ounce. In acute pharyngitis tannic acid or some preparation containing it is frequently added to the solution. In diphtheria and scarlet fever the addition of tincture of ferric chloride increases its usefulness:

℞	Potassii chloratis,	gr. xl;
	Tinct. ferri chloridi,	fʒij-iiij;
	Glycerini,	fʒj;
	Aquæ,	q. s. ad fʒiv.—M.

Sig. Use as a spray or gargle.

To secure the local effect of the above combination in young children, it is sometimes directed to be taken in teaspoonful doses and swallowed; but this is not desirable, since the chlorate acts as an irritant to the kidneys, and in the affections for which the combination is usually prescribed these organs are always more or less congested.

POTASSII CITRAS.

(Potassium Citrate, $K_3C_6H_5O_7 \cdot H_2O$.)

Transparent crystals or a white powder, deliquescent, of a saline taste, and very soluble in water. Dose, $\frac{1}{2}$ to 1 drachm.

PREPARATIONS.

DOSE.

Liquor Potassii Citratis, U. S. P. (neutral mixture) . . .	$\frac{1}{2}$ –1 fl. oz.
Potassii Citras Effervescens, U. S. P.	$\frac{1}{2}$ –1 dr.

Physiological Action and Therapeutics.—Like the other vegetable salts of potassium, the citrate is eliminated as a carbonate, acting as a diuretic and increasing the quantity of urine. It has a more agreeable taste than the acetate, and may be used instead of the latter in *acute articular rheumatism* and in *acute inflammations of the genito-urinary tract*. Neutral mixture is an excellent refrigerant diuretic for *mild febrile affections*, especially of children. Potassium citrate is a most efficient sedative expectorant for use in the beginning of *acute bronchitis*, before secretion is established.

Administration.—It should be prescribed in solution, and the latter may be made more agreeable and efficient by the addition of lemon-juice. In acute bronchitis it may be prescribed as follows :

℞ Potass. citrat.,	ʒij;
Syr. ipecac.,	
Tinct. opii camph.,	aa fʒss;
Succi limonis,	fʒj;
Syr. simp.,	q. s. ad fʒiv.—M.

Sig. A tablespoonful in water every three hours.

POTASSII CYANIDUM.

(Potassium Cyanide, KCN.)

An intensely poisonous salt of potassium, appearing as a white powder or as white, opaque, amorphous pieces, having an odor of bitter almonds and a sharp alkaline taste. It is soluble in 2 parts of water. Dose, $\frac{1}{12}$ to $\frac{1}{10}$ of a grain.

Therapeutics.—It is converted by the acids of the stomach into hydrocyanic acid, and may be used as a substitute for the latter. It has the same toxic properties as the acid from which it is derived, but is somewhat slower in its action.

POTASSII ET SODII TARTRAS.

(Potassium and Sodium Tartrate, Rochelle Salt, $\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$.)

Rochelle salt appears as colorless, transparent, prismatic crystals or as a white powder, having a cooling saline taste. It is soluble in 1.4 parts of water. Dose, $\frac{1}{2}$ to 2 ounces.

PREPARATION.

DOSE.

Pulvis Effervescens, U. S. P. (Seidlitz powder) . . . 1-2 powders.

(One paper contains 120 grains of Rochelle salt and 40 grains of sodium bicarbonate; the other, 35 grains of tartaric acid. They should be dissolved separately, the two solutions mixed, and the whole taken while effervescing.)

Therapeutics.—Rochelle salt is used as a hydragogue cathartic in the same class of cases in which Epsom salt is prescribed; it is more pleasant than the latter, but also less active.

Seidlitz powder is an efficient mild laxative for occasional use.

POTASSII IODIDUM.

(Potassium Iodide, KI.)

This salt appears as colorless transparent or translucent cubical crystals or as a white granular powder, having a pungent saline taste. It is soluble in 0.75 part of water and in 18 parts of alcohol. The dose in most diseases is 3 to 10 grains, but in syphilis it is often necessary to give four or five times this amount.

PREPARATION.

Unguentum Potassii Iodidi, U. S. P. (contains 12 per cent. of potassium iodide and 1 per cent. of sodium hyposulphite).

Physiological Action.—Potassium iodide resembles iodine in its physiological action, but it is not so irritating as the latter. It is absorbed rapidly, and may be detected in the urine fifteen minutes after its administration by the mouth; its elimination also is effected rapidly through all the emunctories, but chiefly the kidneys. In small doses it acts as an alterative, stimulates the lymphatic system, and thus aids in the absorption of any existing inflammatory products. The protracted use of the drug is followed by a condition termed *iodism*, which is characterized by lachrymation, coryza, frontal headache, a metallic taste in the mouth, sore throat, increased flow of saliva, gastric irritation, and a diffuse acne rash. In some instances extreme

cachexia, atrophy of the mammæ or testicles, blindness, and paralysis have been noted. Individuals vary considerably in their susceptibility to iodides, and continuous use establishes a tolerance for them. When there is a syphilitic taint large doses can be taken for long periods without the development of iodism.

Therapeutics.—Potassium iodide is one of the most reliable remedies that we possess in *subacute* and *chronic rheumatism*. In *syphilis*, during the late secondary or the tertiary manifestations, it is very useful, alone or with a mercurial. It is often successfully used as an absorbent in the serous or fibrinous exudations following *inflammation of the serous membranes*. There are various opinions as to the value of the iodides in chronic interstitial inflammations like *cirrhosis of the liver*, *interstitial nephritis*, *arterio-sclerosis*, and *sclerosis of the spinal cord*; when the condition is far advanced they certainly can be of little use, but in the early stages, before the new tissue has become well organized, small doses well diluted, over a long period, oftentimes seem to accomplish much good. Iodides often act beneficially in *aortic aneurism*, although the method by which they prove effective is not understood. Even when they do not arrest the progress of the disease they may decidedly lessen the pain. In *idiopathic asthma* potassium iodide (gr. x thrice daily) with belladonna often lessens the frequency and severity of the paroxysms. In *chronic bronchitis*, when the expectoration is thick, tenacious mucus, iodides in combination with expectorants often do good. *Goitre* is sometimes successfully treated by the internal use of potassium iodide and the external application of iodine. In *tuberculous enlargement of the lymph-glands* (scrofula), before caseation has resulted, a course of iodides with iron and cod-liver oil proves beneficial. In *chronic metallic poisoning*, as by lead and mercury, potassium iodide is invaluable.

Administration.—It may be prescribed in compound syrup of sarsaparilla, and taken, well diluted, after meals. On account of variations in susceptibility, it should be given in small doses gradually increased, the effect being carefully noted.

POTASSII NITRAS.(Potassium Nitrate, Saltpetre, KNO_3 .)

Saltpetre appears as colorless, transparent, rhombic prisms or as a crystalline powder, having a cooling saline taste. It is soluble in 3.8 parts of water, and sparingly soluble in alcohol. Dose, 10 to 20 grains, well diluted.

PREPARATION.

Charta Potassii Nitratis, U. S. P.

Physiological Action and Therapeutics.—In sufficient dose saltpetre acts as an irritant poison, producing severe abdominal pain, vomiting and purging of mucus and blood-stained materials, and finally the phenomena of collapse. Like the vegetable salts of potassium, it depresses the heart and acts as a diuretic. It is eliminated by the kidneys unchanged. As a local remedy it is sometimes used in *acute pharyngitis*. It has been successfully employed in *acute articular rheumatism*, but it has no advantage over the vegetable salts, and possesses the disadvantage of being irritating to the gastro-intestinal tract. The fumes of burnt nitre are of considerable value in aborting the paroxysms of *asthma*. The official potassium-nitrate paper may be burned in a closed room, or may be wrapped around belladonna- or stramonium-leaves and smoked as a cigarette.

POTASSII PERMANGANAS.(Potassium Permanganate, KMnO_4 .)

This salt appears as dark-purple, slender, prismatic crystals, having a sweetish astringent taste. It dissolves in 16 parts of water, forming a deep violet-red solution, the color, however, being rapidly dissipated in the presence of organic matter. Dose, 2 to 3 grains in pill.

Therapeutics.—Potassium permanganate has distinct germicidal properties, but, since it is at once decomposed in the presence of organic matter, it is not an efficient antiseptic; on the other hand, it is an excellent deodorizant and detergent in *sloughing ulcers*, *fætid sore throat*, *cancer of the uterus*, and offensive sweating of the feet (*bromidrosis*).

In the presence of phosphorus it forms phosphoric acid and phosphates and an insoluble black oxide of manganese; on account of this reaction it has been highly extolled by Antal and Thornton as an antidote in *phosphorus-poisoning*. It should be given well diluted ($\frac{1}{2}$ to 1 per cent.) and in excess.

It has been recommended by Ringer and Murrell in *functional amenorrhœa*; to be of service, it must be given three or four days before the period.

Administration.—It should be administered in pills or compressed tablets with copious draughts of water, the latter precaution being necessary on account of its irritating effect on the stomach.

Incompatibles.—Alcohol and all organic compounds.

PRUNUS VIRGINIANA.

(Wild Cherry.)

The bark of *Prunus serotina*. It contains tannic acid, bitter extractive, amygdalin, and emulsin, the last two uniting in the presence of water to form hydrocyanic acid.

PREPARATIONS.

DOSE.

Extractum Pruni Virginianæ Fluidum, U. S. P.	30-60 min.
Infusum Pruni Virginianæ, U. S. P.	$\frac{1}{2}$ -2 fl. oz.
Syrupus Pruni Virginianæ, U. S. P.	1-4 fl. dr.

Therapeutics.—Since it possesses an agreeable taste, wild cherry is much used as a vehicle for less palatable remedies. On account of the hydrocyanic acid which it contains it has been used especially as a sedative in *cough mixtures*, but the amount of acid present is too small to be of distinct therapeutic value.

PYOKTANIN.

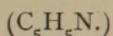
(Methyl-violet.)

An aniline dye appearing in the form of a blue odorless powder, soluble in 75 parts of water.

It is a moderately efficient antiseptic, which is not coagulated by albumin, but which has the disadvantage of staining the tissues blue. It was introduced by Stilling as a

deeply-penetrating antiseptic, and in certain disorders it apparently establishes this claim, but the testimony bearing on its therapeutic value is quite conflicting. In solutions of 1 : 2000 to 1 : 1000 it has been used with asserted good results in *ulcerative keratitis*, *purulent ophthalmia*, and *iritis*. Solutions of the same strength have been employed for flushing out the pleural sac in *empyema*. Many observers have spoken highly of it in *diphtheria* and other forms of *infectious pharyngitis*. Deep injections of the drug are claimed to have been serviceable in circumscribed malignant growths—*sarcoma* and *carcinoma*.

PYRIDINE.



A colorless volatile liquid, having a peculiar unpleasant penetrating odor and an acrid taste. It may be obtained from bone-oil or coal-tar.

Therapeutics.—Pyridine has been recommended by Séc and others as an antispasmodic in the paroxysms of *asthma*. The patient is placed in a small chamber tightly closed, and a drachm or two of pyridine poured in a warm saucer and allowed to volatilize. The inhalation of the fumes quickly arrests the paroxysm, but the disagreeable odor of the drug often calls forth great objection to its use. It has also been recommended in *whooping-cough*, *emphysema*, and *angina pectoris*.

QUASSIA.

The wood of *Picræna excelsa*, growing in the West Indies. It contains a neutral bitter principle, quassin, but no tannic acid.

PREPARATIONS.

DOSE.

Extractum Quassiæ, U. S. P.	1-3 gr.
Extractum Quassiæ Fluidum, U. S. P.	½-1 fl. dr.
Tinctura Quassiæ, U. S. P.	1-2 fl. dr.

Therapeutics.—Internally, it acts as a bitter stomachic, increasing the appetite and stimulating digestion. In large doses it is an irritant to the stomach. It is especially indicated in *atonic dyspepsia*.

The rectal injection of an infusion made by adding a couple of ounces of quassia-chips to a pint of water is very destructive to *seat-* or *thread-worms*, provided the bowel has first been emptied by a soap-and-water enema.

QUERCUS ALBA.

(White Oak.)

The bark of *Quercus alba*. Its virtues depend on the tannic acid which it contains in abundance. It is employed in the form of an infusion as an astringent wash for *relaxed mucous membranes*; thus it is useful in *pharyngitis* with relaxed uvula, *prolapsus ani*, and *leucorrhœa*.

RESORCINUM.

(Resorcin, Resorcinol, $C_6H_4(OH)_2$.)

A phenol derivative, appearing as colorless or faintly reddish prisms or needles, having a slightly urinous odor and a sweetish, pungent taste. It is freely soluble in water and alcohol. The dose is 3 to 5 grains well diluted.

Physiological Action.—When applied to a mucous membrane or a raw surface in weak solution it acts as a stimulant, antiseptic, and feeble analgesic. Concentrated solutions act as mild caustics. Internally, in small doses, it serves to check fermentation and flatulence. Large doses produce vertigo, ringing in the ears, tremors, epileptiform convulsions, quickening of the pulse and respiration, unconsciousness, and collapse. The dominant action is on the nervous system, which it first stimulates and then depresses. Large doses paralyze the heart. After its administration the urine becomes olive-green in color. In health it exerts but little effect on the temperature, but in the febrile state it causes a fall of several degrees which is attended with profuse perspiration.

Therapeutics.—Locally, resorcin is used as an antiseptic, and as a stimulant in *chronic inflammatory diseases of the skin*. A 5 to 10 per cent. solution makes a useful antiseptic application in *diphtheria*, *ozæna*, *pharyngitis*, *whooping-cough*, tuberculous and other ulcerative forms of *laryngitis*.

In *suppuration of the middle ear* an insufflation of resorcin and boric acid (1 : 10) is very useful. Weak injections (2-3 per cent. aqueous solution) have also been serviceable in *subacute* and *chronic urethritis* and *cystitis*. An ointment of resorcin (20-60 grains to the ounce) is efficacious in certain chronic inflammatory skin diseases, especially *eczema* and *psoriasis*.

RHAMNUS PURSHIANA.

(See *Cascara Sagrada*.)

RHEUM.

(Rhubarb.)

The root of *Rheum officinale*, a native of Asia. It contains chrysophanic acid, a purgative resin, phaeoretin, and rheo-tannic acid. Dose, 5 to 20 grains.

PREPARATIONS.	DOSE.
Extractum Rhei, U. S. P.	5-10 gr.
Extractum Rhei Fluidum, U. S. P.	10-30 min.
Mistura Rhei et Sodæ, U. S. P. (rhubarb, sodium bicarb., and ipecac)	½-3 fl. oz.
Pilulæ Rhei, U. S. P. (3 grains in each)	1-3
Pilulæ Rhei Compositæ, U. S. P. (rhubarb, gr. 2; aloes, gr. ½; myrrh, gr. 1)	1-3
Pulvis Rhei Compositus, U. S. P.	20-30 gr.
Syrupus Rhei, U. S. P.	1-4 fl. dr.
Syrupus Rhei Aromaticus, U. S. P.	1-4 fl. dr.
Tinctura Rhei, U. S. P.	1-2 fl. dr.
Tinctura Rhei Aromatica, U. S. P. (rhubarb, cinnamon, cloves, and nutmeg)	½-2 fl. dr.
Tinctura Rhei Dulcis, U. S. P. (sweet tincture of rhubarb)	2-3 fl. dr.
Vinum Rhei, U. S. P.	2-3 fl. dr.

In moderate doses rhubarb acts as a stomachic and purgative. On account of the tannic acid which it contains it is somewhat astringent, and therefore constipation not infrequently follows the primary effect of the drug. It probably increases to some extent the flow of bile, though it cannot be classed as a reliable cholagogue. It is eliminated in the various secretions—sweat, milk, and urine—and imparts to them a yellowish color.

Therapeutics.—Rhubarb is an efficient cathartic in

chronic constipation dependent upon atony of the gastro-intestinal tract. In *summer diarrhœa of children* a few doses of the aromatic syrup with magnesia or sodium bicarbonate often promptly effect a cure :

℞ Syr. rhei aromat.,	fʒvj;
Sodii bicarb.,	fʒij;
Tinct. opii deod.,	℥xxxvj;
Aquæ menth. piper.,	q. s. ad fʒiij.—M. (Starr.)

Sig. One teaspoonful every three hours for a child from four to six years.

RHUS GLABRA.

(Sumach.)

The fruit of the *Rhus glabra*. Its active principle is tannic acid.

PREPARATION.

Extractum Rhois Glabræ Fluidum, U. S. P. 1-2 fl. dr.

DOSE.

Therapeutics.—It is a pure astringent, and makes an efficient gargle in *acute pharyngitis*. It is frequently combined with potassium chlorate, as in the following formula :

℞ Extracti rhois glabræ fl.,	fʒiij;
Potassii chloratis,	ʒj;
Aquæ,	q. s. ad fʒvj.—M.

Sig. Use as a gargle.

RUTA.

(Rue.)

The leaves of *Ruta graveolens*. The active principle is a volatile oil (*oleum rutæ*). Neither the leaves nor the oil is official.

Physiological Action and Therapeutics.—Externally, the oil is a powerful irritant. Internally, toxic doses produce gastro-intestinal inflammation, strangury, and convulsions. In pregnant women it causes abortion.

It is employed as an emmenagogue in *atonic amenorrhœa*. It is, however, absolutely contraindicated in suppression of the menses due to congestion or inflammation of the uterus or ovaries. It is sometimes useful in *menorrhagia* due to a relaxed condition of the uterus. It has also been recommended as a carminative in *flatulent colic*.

SABINA.

(Savine.)

The tops of *Juniperus sabina*. The active principle is a volatile oil.

PREPARATIONS.	DOSE.
Extractum Sabinæ Fluidum, U. S. P.	5-20 min.
Oleum Sabinæ, U. S. P.	5-10 gtt.

Physiological Action.—Externally, it acts as a powerful irritant. Internally, in sufficient dose, it produces abdominal pain, vomiting and purging of bloody material, scanty albuminous and bloody urine, embarrassed breathing, a rapid pulse, epileptiform convulsions, coma, and death. Post-mortem examination reveals the evidences of gastro-intestinal inflammation and congestion of the brain.

Therapeutics.—In small doses it is a useful emmenagogue in *atonic amenorrhœa*. As it causes congestion of the pelvic viscera, it should not be employed in suppression of menstruation resulting from inflammatory diseases. It is also serviceable in *menorrhagia* dependent upon uterine relaxation. It should never be used as an abortifacient.

An ointment of savine is sometimes applied to blistered surfaces to prolong the counterirritant effect.

Administration.—The oil is the best preparation; it may be prescribed in capsules or emulsion.

SACCHARINUM.

(Saccharin.)

Saccharin is an acid compound capable of uniting with bases to form salt, and resembles sugar only in taste. It appears as a white powder, having a faint almond-like odor and an intensely sweet taste. It is sparingly soluble in cold water, but quite freely so in boiling water, alcohol, and glycerin. Dose, 5 to 20 grains or more.

Physiological Action and Therapeutics.—Beyond retarding to a slight extent the action of the gastric and intestinal ferments, saccharin has no action on the system. It is eliminated by the kidneys unchanged. It is possessed of feeble antiseptic properties, and when added to urine is

capable of preventing fermentation and decomposition. On account of its intensely sweet taste it is used as a substitute for sugar in *diabetes mellitus*.

SALICINUM.

(Salicin, $C_{13}H_{18}O_7$.)

Salicin is a neutral principle obtained from several species of *Salix* (willow) and *Populus* (poplar). It appears as colorless, odorless, silky crystals, having an intensely bitter taste. It is soluble in 28 parts of water and 30 parts of alcohol. Dose, $\frac{1}{2}$ to 2 drachms.

Physiological Action and Therapeutics.—Salicin possesses properties analogous to salicylic acid, although it is far less active than the latter. When taken internally it is rapidly absorbed, partially decomposed, and appears in the urine partly as salicin and partly as saligenin and salicylic acid. Like its congener, it is somewhat antipyretic, antiseptic, and antirheumatic.

It may be employed in *acute rheumatism*, in doses of 15 to 20 grains every three hours, as a substitute for salicylic acid when the latter is not well borne. It has been successfully used as an antiferment in *diarrhœa* and *chronic gastric catarrh*.

SALIPYRIN.

(Antipyrine Salicylate.)

This new compound represents about 58 parts of antipyrine and 42 parts of salicylic acid. It appears as a white crystalline powder, odorless, and of a sweetish taste. It is sparingly soluble in water, but freely so in alcohol. Dose, 10 to 20 grains, in powders or capsules.

Therapeutics.—Like its components, it is antipyretic, analgesic, and antirheumatic. It may be used as a substitute for salicylic acid in *acute articular rheumatism*, and as a substitute for antipyrine in *neuralgia*, *migraine*, and the *pains of influenza*.

SALOL.

(Phenyl Salicylate, $C_6H_5C_7H_5O_3$.)

A white crystalline powder, tasteless, and of a faintly aromatic odor. It represents 60 parts of salicylic acid and

40 parts of carbolic acid. It is nearly insoluble in water, but freely so in alcohol, ether, and chloroform. Dose, 5 to 30 grains.

Physiological Action.—It was formerly thought that the decomposition of salol was effected entirely by the intestinal and pancreatic juices, but this is doubtful, since after its administration a small amount of salicylic acid can be recovered from the gastric contents. In the intestine its separation into carbolic and salicylic acids is completed. After its exhibition in full doses the urine becomes dark-green or smoky in appearance from the escape of carbolic-acid derivatives. In the intestinal canal it acts as an antiseptic and checks flatulent distension. Toxic symptoms resembling those of carbolic-acid poisoning have been noted after its free use in patients afflicted with serious renal disease.

Therapeutics.—Salol is an excellent internal antiseptic, and quite free from irritating properties. It often proves very useful in *diarrhœa*, *dysentery*, *typhoid fever*, and *cholera*, and, since the products of its decomposition are eliminated by the kidneys, it is also efficacious in *cystitis* and *urethritis*.

It has been given with encouraging results in *catarrhal jaundice*, and in *biliary colic* resulting from inspissated bile or calculi. Its happy effect in these conditions is said to be due to its power of liquefying the bile.

It is a useful remedy in *acute rheumatism*, but generally less decided in its action than salicylic acid or sodium salicylate. Like the latter, it also does good in *diabetes* dependent upon a rheumatic or gouty diathesis.

Rheumatic pains are not the only ones to yield to salol, for the latter often gives excellent results in *migraine*, *neuralgia*, *lumbago*, and the pains of *influenza*. In these affections it may be advantageously combined with antipyrine or phenacetine.

Administration.—It may be prescribed in pills, powders, capsules, or emulsion.

SALOPHEN.

(Para-amido-phenol Salicylate.)

A synthetic compound containing about 51 per cent. of salicylic acid. It appears in crystalline scales, odorless, tasteless, and insoluble in water. The dose is 15 grains, in powders or capsules.

Therapeutics.—In the intestine salophen breaks up into salicylic acid and acetyl-paramidophenol, the latter escaping in the feces and urine unchanged. It is an excellent remedy in *acute articular rheumatism*, equally efficient but less irritating than salol or salicylic acid. It does not disturb the stomach, and may be given for a long period without deleterious results. Like other salicyl preparations, it is less efficient in chronic rheumatism. It is likewise a useful analgesic, and may be employed as a substitute for phenacetine and antipyrine in *migraine*, *neuralgia*, *headache*, and the *pains of influenza*.

SANGUINARIA.

(Bloodroot.)

The rhizome of *Sanguinaria Canadensis*. It contains an alkaloid, *sanguinarine*, to which it owes its medicinal properties.

PREPARATIONS.

DOSE.

Extractum Sanguinariæ Fluidum, U. S. P.	1-5 min.
Tinctura Sanguinariæ, U. S. P.	½-1 fl. dr.

Physiological Action.—Full doses of sanguinaria produce a sensation of heat in the stomach, nausea, vomiting, and diarrhœa. Toxic doses weaken the heart and paralyze the respiratory centre.

Therapeutics.—Sanguinaria was formerly used as an emetic, but it has been displaced by more efficient and less depressing drugs. It is sometimes of service as a stimulating expectorant in *subacute* and *chronic bronchitis*.

SANTONINUM.

(Santonin.)

A neutral principle derived from *Levant wormseed*, or *Santonica*. It appears as colorless prismatic crystals, odor-

less, and of a bitter taste, nearly insoluble in water, and soluble in 40 parts of alcohol. The dose for an adult is 2 to 5 grains; for a child, $\frac{1}{4}$ to $\frac{1}{2}$ a grain.

PREPARATION.

Trochisci Santonini, U. S. P. (contain $\frac{1}{2}$ gr. each).

Physiological Action.—Toxic doses of santonin affect chiefly the nervous system, and produce vertigo, tremors, epileptiform convulsions, dimness of vision, coma, and collapse. Vision is peculiarly perverted, so that all objects appear yellow (xanthopsia or chromatopsia)—a condition, according to Hare, resulting from staining of the humors of the eye by the drug. The urine is increased in quantity, and becomes yellowish (or, after large doses, purplish-red) in color from the escape of products of oxidation.

Therapeutics.—Santonin is used almost entirely as a vermifuge against *round-worms*.

Administration.—It is best given in a single dose, in capsule or lozenge, after fasting or a very light meal, and followed in three or four hours by a mercurial purge. Crystallized santonin is preferable to the powdered drug, since it is less apt to be absorbed and cause toxic effects. Sodium santoninate, which was formerly official, should not be used, as it is a soluble preparation, and therefore readily absorbed.

SARSAPARILLA.

The root of *Smilax officinalis* and other species of *Smilax*. It is said to contain an alkaloid, smilacine.

PREPARATIONS.

DOSE.

Decoctum Sarsaparillæ Compositum, U. S. P.	2-4 fl. oz.
Extractum Sarsaparillæ Fluidum, U. S. P.	1-2 fl. dr.
Extractum Sarsaparillæ Compositum Fluidum, U. S. P. (sarsaparilla, mezereum, licorice, and glycerin)	1-2 fl. dr.
Syrupus Sarsaparillæ Compositus, U. S. P. (sarsaparilla, licorice, senna, and aromatics)	4-8 fl. dr.

Therapeutics.—Sarsaparilla is used as a vehicle to disguise the taste of unpalatable drugs, and as an alterative in certain constitutional diseases. Clinical testimony speaks

favorably of its value in *scrofula*, *phthisis*, *chronic rheumatism*, *anæmia*, and *syphilis*. In the last disease the compound syrup of sarsaparilla makes an excellent vehicle for potassium iodide.

SCAMMONIUM.

(Scammony.)

A resinous exudation obtained from *Convolvulus scammonia*, a native of Syria. The active principle of the drug is a *resin*, which is official as *Resina scammonii*. The dose of the latter is 3 to 5 grains.

Therapeutics.—Scammony is a powerful hydragogue cathartic closely resembling jalap in its action, but even more irritating than the latter. It may be used in combination with other cathartics in *obstinate constipation*. It enters into the compound extract of colocynth.

SCILLA.

(Squill.)

The bulb of *Urginea maritima*, a native of Southern Europe. It contains several principles, none of which represents the medicinal properties of the crude drug. The dose of powdered squill is 1-3 grains.

PREPARATIONS.

DOSE.

Acetum Scillæ, U. S. P.	10-20 min.
Extractum Scillæ Fluidum, U. S. P.	1-5 min.
Syrupus Scillæ, U. S. P.	½-1 fl. dr.
Syrupus Scillæ Compositus, U. S. P. (squill, senega, and tartar emetic)	10m-1 fl. dr.
Tinctura Scillæ, U. S. P.	10-20 min.

Physiological Action.—In small doses squill acts as a diuretic, expectorant, and cardiac stimulant. The scillitoxin which it contains acts like digitalis in slowing the pulse and raising the arterial pressure. Toxic doses cause abdominal pain, vomiting and purging, scanty albuminous and bloody urine, slowing of the pulse, and collapse.

Therapeutics.—In *general dropsy* or in *local serous accumulations* squill is an efficient diuretic, especially when combined with digitalis or calomel. It is contra-

indicated, however, whenever there is any irritation or inflammation of the kidneys. In *acute bronchitis*, when the expectoration is profuse but brought up with difficulty, squill is a valuable expectorant.

Compound syrup of squill (Coxe's hive syrup) may be used not only as an expectorant, but also as an emetic. The emetic dose for a child of five years is half a drachm.

SCOPARIUS.

(Broom.)

The tops of *Cytisus scoparius*. It contains a neutral crystalline body, *scoparin*, and an oily liquid alkaloid, *sparteine*. The latter is official in the form of *sparteinæ sulphas*, and appears as white prismatic crystals or a granular powder, very soluble in water and alcohol. The dose of the sulphate of sparteine is $\frac{1}{2}$ to 3 grains.

PREPARATIONS.	DOSE.
Extractum Scoparii Fluidum, U. S. P.	1-2 fl. dr.
Decoctum Scoparii (1 oz. in 1 pint of water for 10 minutes, and strain)	1-2 fl. oz.

Physiological Action.—In therapeutic doses the chief effect of scoparius is to produce free diuresis. It is said also to influence the heart and vessels in a manner similar to digitalis, but such an action is rarely observed clinically. Toxic doses produce vomiting, purging, tremors, convulsions, and death from respiratory paralysis.

Therapeutics.—It is an efficient diuretic in *general dropsy* resulting from chronic renal or cardiac disease.

SENEGÆ.

The root of *Polygala senegæ*. It contains polygalic acid, which is said to be identical with the glucoside saponin found in soap-bark.

PREPARATIONS.	DOSE.
Extractum Senegæ Fluidum, U. S. P.	10-15 gtt.
Syrupus Senegæ, U. S. P.	$\frac{1}{2}$ -1 fl. dr.
Syrupus Scillæ Compositus, U. S. P. (squill, senegæ, and tartar emetic)	10m-1 fl. dr.

Therapeutics.—Senega is a useful expectorant in *sub-acute* and *chronic bronchitis* associated with profuse purulent expectoration.

SENNÆ.

The leaflets of *Cassia scutifolia* and of *Cassia angustifolia*, the former coming from Egypt and the latter from Southern India. It contains a purgative glucoside, *cathartic acid*.

PREPARATIONS.

DOSE.

Confectio Sennæ, U. S. P.	1-2 dr.
Extractum Sennæ Fluidum, U. S. P.	2-4 fl. dr.
Infusum Sennæ Compositum, U. S. P. (black draught), contains manna, senna, and Epsom salt	1-3 fl. oz.
Pulvis Glycyrrhizæ Compositus, U. S. P.	30-60 gr.
Syrupus Sennæ, U. S. P.	1-4 fl. dr.

Therapeutics.—Senna is a brisk cathartic, producing in three or four hours after its ingestion copious watery stools. It acts by increasing both peristalsis and the intestinal secretions. It is absorbed, and is capable of imparting its purgative property to the milk of nursing women. It is generally given with other cathartics or with aromatics, since alone it is apt to cause considerable griping. Compound licorice powder is a mild and agreeable laxative for *habitual constipation*.

SERPENTARIA.

(Virginia Snakeroot.)

The rhizome and roots of *Aristolochia serpentaria*. It contains an essential oil, a resin, a bitter principle, and tannic acid.

PREPARATIONS.

DOSE.

Extractum Serpentariæ Fluidum, U. S. P.	10-20 gtt.
Tinctura Cinchonæ Composita, U. S. P.	1-4 fl. dr.
Tinctura Serpentariæ, U. S. P.	1-2 fl. dr.

Therapeutics.—It is used as a bitter in *atonic dyspepsia*.

SINAPIS ALBA and SINAPIS NIGRA.

(White Mustard and Black Mustard.)

The former is the seed of *Brassica alba*, and the latter the seed of *Brassica nigra*. They both contain an irritating volatile oil, *oleum sinapis volatile*, U. S. P.

Therapeutics.—Mustard-flour is a prompt mechanical emetic, and as such it may be employed to unload the stomach in *narcotic poisoning*. The dose is a tablespoonful in half a pint of warm water, repeated once or twice if necessary. It is contraindicated when there is much gastric irritation.

Externally, mustard is much used in the form of a plaster as a counterirritant in various inflammatory affections, such as *bronchitis*, *pleurisy*, *pneumonia*, *gastritis*, *enteritis*, etc. The plaster is made by mixing equal parts of mustard-flour and ground flaxseed, and adding tepid water until a paste is formed. The latter should be spread on muslin and covered with the same material; it should remain on the affected part until the skin is bright red. If allowed to remain longer it causes vesication, but this is not desirable, since blisters produced by mustard are difficult to heal. When a very mild rubefacient effect is required, it may be secured by sprinkling a little mustard on the surface of a flaxseed poultice.

A mustard foot-bath (ʒj to the gallon of hot water) makes an excellent revulsive in *congestive headache*, "*colds*," *suppressed menstruation*, etc.

SODIUM.

(Na.)

The element sodium is not used medicinally, but many of its salts are official, and these are obtained from native rock-salt (sodium chloride), Chili saltpetre (sodium nitrate), or borax (sodium borate), or from the evaporation of seawater.

SODA.

(Sodium Hydrate, Caustic Soda, NaOH.)

Caustic soda appears as white translucent pencils or fused masses, odorless, of an acrid caustic taste and an intensely alkaline reaction. It is very soluble in water and alcohol.

PREPARATION.

Liquor Sodæ, U. S. P. (5 per cent. solution).

Therapeutics.—Sodium hydrate is a powerful caustic, but, being less hygroscopic than potassium hydrate, it is

not so penetrating as the latter, and is not so apt to involve adjacent parts.

SODII BENZOAS.

(Sodium Benzoate, $\text{NaC}_7\text{H}_5\text{O}_2$.)

A white amorphous powder, odorless or having a faint odor of benzoin, and of a sweetish astringent taste. It is soluble in 1.8 parts of water and in 45 parts of alcohol. Dose, 10 to 20 grains.

Therapeutics.—Sodium benzoate has been recommended in *gout*, *lithæmia*, *rheumatism*, and allied disorders, but it is generally inferior to the salts of lithium and potassium. Its internal use in *diphtheria* has been highly extolled by certain European physicians; it may be prescribed as follows:

R Sodii benzoatis,	ʒiiss;
Syrupi aurantii,	fʒv;
Aquæ menthæ pip.,	fʒiiij;
Aquæ,	q. s. ad fʒvj.—M. (Yeo.)

Sig. A dessertspoonful every hour (for a child of three years). The dose increases with the age of the child.

It sometimes acts very favorably in *follicular tonsillitis*, in which disease it may be given in doses of 10 to 20 grains every 2 hours.

SODII BICARBONAS.

(Sodium Bicarbonate, NaHCO_3 .)

A white opaque powder, odorless, and having a cooling, faintly alkaline taste. It is soluble in 11.3 parts of water, and insoluble in alcohol. Dose, 10 to 20 grains.

PREPARATIONS.

DOSE.

Mistura Rhei et Sodæ, U. S. P. ½-1 fl. oz.

Pulvis Effervescens, U. S. P. (see *Potassium and Sodium Tartrate*).

Trochisci Sodii Bicarbonatis, U. S. P. (contain 3 grains each).

Therapeutics.—Sodium bicarbonate is sometimes used externally as a sedative dressing in *superficial burns*. It is employed as a detergent in many washes designed for *chronic affections of the naso-pharynx*, and is an ingredient

of the well-known Dobell's solution, which may be prescribed as follows :

R	Sodii boratis,	aa	ʒj;
	Sodii bicarbonatis,		gr. xxx;
	Acid. carbol.,		fʒj;
	Glycerini,		Oij.—M.
	Aquæ,		

Internally, it is much used in *dyspepsia* as an antacid. When given a short time before meals it stimulates the flow of gastric juice and thus hastens digestion; when given an hour or so after meals it serves to neutralize fatty acids which are the products of faulty digestion. In *chronic gastric catarrh* and *ulcer of the stomach* it may be employed with advantage in combination with sodium chloride and sodium sulphate :

R	Sodii sulphatis,	ʒv;
	Sodii bicarbonatis,	ʒij;
	Sodii chloridi,	ʒj.—M.

Sig. ʒj to ʒij in half a pint or a pint of water a half hour before breakfast.

In the *chronic gastro-intestinal catarrh of childhood*, characterized by capricious appetite, tympanites, eructations, troubled sleep, and hard, lumpy, mucous stools, sodium bicarbonate in combination with a mild laxative and bitter often gives excellent results. In threatening *diabetic coma* large doses of the salt may be employed to neutralize the toxic acids in the blood—diacetic and oxybutyric acids.

SODII BORAS.

(Sodium Borate, $\text{Na}_2\text{B}_4\text{O}_7$.)

Borax occurs as colorless, transparent, prismatic crystals or a white powder, odorless, and having a sweetish alkaline taste. It is soluble in 16 parts of water, and insoluble in alcohol. * Dose, 20 to 30 grains.

Therapeutics.—Borax is employed in the same class of cases as boric acid (*q. v.*). It has also been recommended as a substitute for the bromides in *nocturnal epilepsy*, and, as it has given good results in some cases, it may be employed when the older remedy fails. In epilepsy the daily dose should be a drachm to a drachm and a half. It has a great disadvantage in disturbing the stomach.

SODII CHLORIDUM.

(Sodium Chloride, Table-salt, NaCl.)

This salt occurs in the form of colorless, transparent, cubical crystals or a white crystalline powder, odorless, and having a purely saline taste. It is soluble in 2.8 parts of water, and almost insoluble in alcohol.

Therapeutics.—A bath may be made more stimulating for debilitated patients by the addition of a few ounces of salt to the water. An enema containing one or two table-spoonfuls of salt to the pint of water is sometimes used effectively against *thread-worms*.

The subcutaneous or intravenous injection of a $\frac{6}{10}$ per cent. solution of sodium chloride has proved of marked benefit in *cholera*, *uræmia*, and *acute anæmia from hemorrhages*. In cholera from a pint to a quart of this fluid may be injected under the skin from a fountain syringe every two hours. When collapse is not far advanced it usually requires about 20 to 30 minutes to introduce a quart.

SODII ETHYLAS.

(Sodium Ethylate, C_2H_5NaO .)

This compound is prepared by the action of absolute alcohol on metallic sodium, and generally appears as a 50 per cent. alcoholic solution.

Therapeutics.—By contact with the water of the tissues it is converted into sodium hydrate and ethylic alcohol, and so acts as a caustic. It is chiefly employed for the removal of *nævi* and *telangiectases*. The part having been anæsthetized by cold, a 25 per cent. solution should be applied by means of a glass rod on two or three successive days.

SODII HYPOSULPHIS.

(Sodium Hyposulphite, $Na_2S_2O_3 \cdot 5H_2O$.)

Colorless, transparent, prismatic crystals, odorless, and of a cooling, somewhat bitter taste. Very soluble in water, and insoluble in alcohol.

Therapeutics.—It is chiefly used as a parasiticide in *tinea favosa*, *tinea circinata*, *tinea sycosis*, and *tinea versicolor*, in which affections it is of decided value. It is ap-

plied in the form of a lotion containing a drachm to the ounce of water.

SODII NITRIS.

(Sodium Nitrite, NaNO_2 .)

White, opaque fused masses or colorless transparent crystals, odorless, and having a mild saline taste. Soluble in 1.5 parts of water, and sparingly soluble in alcohol. Dose, 2 to 5 grains.

Therapeutics.—Sodium nitrite is used for the same purpose as nitro-glycerin, its effect being a little more lasting.

SODII PHOSPHAS.

(Sodium Phosphate, $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$.)

Large, colorless, prismatic crystals, odorless, and having a cooling saline taste. Soluble in 5.8 parts of water, and insoluble in alcohol. Dose, 30 grains to $\frac{1}{2}$ an ounce.

Therapeutics.—Phosphate of sodium is a useful remedy for children who are ill-nourished and whose stools are habitually white or pale green. A few grains may be dissolved in the milk and given several times a day. In doses of $\frac{1}{2}$ an ounce it has been used as a mild purgative. It has been highly recommended by Bartholow and others in *catarrhal jaundice* and *cholelithiasis*.

SODII SALICYLAS.

(Sodium Salicylate, $\text{NaC}_7\text{H}_5\text{O}_3$.)

A white amorphous powder, odorless, and of a sweetish saline taste. It is soluble in 0.9 part of water and 6 parts of alcohol. Dose, 10 to 20 grains.

Therapeutics.—Sodium salicylate has the same properties and uses as salicylic acid, but it is more acceptable to the stomach than the latter.

SODII SULPHAS.

(Sodium Sulphate, Glauber's Salt, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$.)

Large, colorless, transparent prisms or granular crystals, odorless, and of a bitter saline taste. Soluble in 2.8 parts

of water, and insoluble in alcohol. Dose, 1 drachm to $\frac{1}{2}$ an ounce.

Therapeutics.—Glauber's salt is a powerful purgative, producing watery stools and considerable griping. Epsom salt, being far less irritating, has largely superseded it.

SPIGELIA.

(Pinkroot.)

The rhizome and roots of *Spigelia marilandica*. It contains a bitter principle, a volatile oil, and tannic acid.

PREPARATION.

DOSE.

Extractum Spigeliæ Fluidum, U. S. P. 1-4 fl. dr.

Physiological Action.—According to Hare, toxic doses of spigelia produce dilatation of the pupils, exophthalmia, loss of co-ordination, muscular weakness, hurried breathing, stupor, coma, and death from simultaneous arrest of the heart and respiration.

Therapeutics.—Spigelia is used exclusively as a vermifuge against the *round-worm*. It is an efficient remedy, and is agreeable to the taste. Its administration should be followed by a laxative.

SPIRITUS ÆTHERIS COMPOSITUS.

(Compound Spirit of Ether; Hoffmann's Anodyne.)

Hoffmann's anodyne is a colorless inflammable liquid having an ethereal odor and taste. It consists of ether, alcohol, and ethereal oil, the last being obtained by the action of sulphuric acid on alcohol. The dose is $\frac{1}{2}$ to 2 fluidrachms.

Physiological Action and Therapeutics.—Hare concludes, from a careful study of the compound, that its carminative effects are due to the ether which it contains, rather than the ethereal oil, and that each of its ingredients stimulates the system—the ether the most, and the ethereal oil the least powerfully. It is used as an antispasmodic in *asthma*, *angina pectoris*, and obstinate *hiccough*. In painful *tympanites* it acts as a prompt and efficient carminative.

SPIRITUS ÆTHERIS NITROSI.

(Spirit of Nitrous Ether, Sweet Spirits of Nitre.)

The official preparation is an alcoholic solution of ethyl nitrite, yielding when freshly prepared not less than 11 times its own volume of nitrogen dioxide. It is a clear, volatile, inflammable liquid, having a pale-yellowish or greenish-yellow tint, a pleasant ethereal odor, and a sharp, burning taste. The dose for an adult is 1 fluidrachm to $\frac{1}{2}$ a fluidounce; for a child, 10 to 30 minims.

Physiological Action and Therapeutics.—In medicinal doses nitrous ether acts as a mild diuretic, diaphoretic, and nervous sedative. When the patient is kept well covered after its administration its diaphoretic effect is more pronounced than its diuretic effect, and the reverse is true when the patient is lightly covered. Toxic doses produce symptoms resembling poisoning by amyl nitrite and other nitrites. Sweet spirits of nitre is an excellent remedy in the *febrile affections of children*; it is best given in small doses, well diluted, at frequent intervals.

Incompatibles.—Antipyrine, tincture of guaiacum, and most carbonates.

STRAMONIUM.

(Jamestown Weed, Thorn-apple.)

The drug is official as the leaves (*stramonii folia*) and the seed (*stramonii semen*) of *Datura stramonium*. The active principle is an alkaloid, *daturine*, which is almost identical with atropine.

PREPARATIONS.	DOSE.
Extractum Stramonii Seminis, U. S. P.	$\frac{1}{4}$ – $\frac{1}{2}$ gr.
Extractum Stramonii Seminis Fluidum, U. S. P.	1–4 min.
Tinctura Stramonii Seminis, U. S. P.	10–20 min.
Unguentum Stramonii, U. S. P. (contains 10 per cent. of the extract).	

Therapeutics.—Stramonium is a therapeutic equivalent of belladonna, and may be employed in the same class of diseases in which the latter is prescribed. It has a special reputation in *asthma*, in which disease it may be used in the form of cigarettes made of the dried leaves. Ointment

of stramonium with an equal amount of ointment of galls makes a useful application for *hemorrhoids*.

STRONTIUM.

(Sr.)

Three salts of strontium are official—bromide, iodide, and lactate.

STRONTII BROMIDUM.

(Strontium Bromide, $\text{SrBr}_2 \cdot 6\text{H}_2\text{O}$.)

Colorless, deliquescent, hexagonal crystals, odorless, and of a bitter saline taste; readily soluble in water and alcohol. Dose, 30 to 60 grains.

Therapeutics.—Strontium bromide possesses all the properties of the other bromides, but appears to be less depressing, and, instead of disturbing the stomach, it rather tends to allay gastric irritation. It may be used as a succedaneum for potassium and ammonium bromide in the various diseases in which the latter are indicated. Germain Sée and others speak highly of its value in *gastralgia* and *acid dyspepsia*.

STRONTII IODIDUM.

(Strontium Iodide, $\text{SrI}_2 \cdot 6\text{H}_2\text{O}$.)

Colorless, deliquescent, hexagonal plates, odorless, and of a bitterish saline taste; freely soluble in water and alcohol. Dose, 5 to 20 grains.

Therapeutics.—Its action is similar to that of potassium iodide, so that it might be used with advantage in the same class of cases in which the latter remedy would prove serviceable.

STRONTII LACTAS.

(Strontium Lactate, $\text{Sr}(\text{C}_3\text{H}_5\text{O}_3)_2 \cdot 3\text{H}_2\text{O}$.)

A white granular powder, odorless, and of a slightly bitter saline taste; soluble in water and alcohol. Dose, 10 to 30 grains.

Therapeutics.—It has been recommended by Dujardin-Beaumetz, Paul, and others in *chronic nephritis*. It is

claimed that it acts as a diuretic and lessens decidedly the amount of albumin eliminated.

STROPHANTHUS.

The seed of *Strophanthus hispidus*, a native of Africa. It contains a glucoside, *strophanthin*, which represents the active properties of the drug. The dose of the glucoside is $\frac{1}{100}$ to $\frac{1}{50}$ of a grain.

PREPARATION.

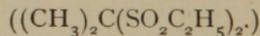
Tinctura Strophanthi, U. S. P. 3-10 min.

DOSE.

Physiological Action.—Strophanthus closely resembles digitalis in its physiological action; like the latter, it stimulates the heart, slows the pulse, and contracts the peripheral vessels. It also possesses diuretic power, but to a less degree than digitalis. In concentrated form it acts as a muscle-poison, causing paralysis and a tonic contraction of the fibres. It is said to have no cumulative effect. In ordinary doses it is less apt to disturb the stomach than digitalis, but in large amounts it causes epigastric distress, nausea, and vomiting.

Therapeutics.—Strophanthus is a valuable cardiac tonic, and may be employed in the class of cases in which digitalis is indicated; as a rule, it is less reliable than the latter, but it may be employed whenever the older remedy fails or is not well borne, or when an alternate is desired.

SULPHONAL.



A compound obtained by the oxidation of a mixture of ethyl-mercaptan and acetone. It occurs as a colorless crystalline powder, free from odor and taste, and sparingly soluble in cold water, but quite freely so in hot water. The dose is 15 to 30 grains.

Physiological Action.—According to Kast, the drug is very slowly soluble in the gastric juice—only 1 in 200 at the temperature of the body—and is, moreover, rapidly eliminated in the urine. In moderate doses it is a pure hypnotic, producing sleep by a direct action on the cere-

brum. When administered in the ordinary way it is slow in its effect, and not infrequently after a late dose sleep is delayed until the following day. In ordinary amounts it does not influence the respiration or circulation, and rarely the digestion. Drowsiness, headache, vertigo, mental confusion, and cutaneous rashes have not infrequently been noted after its use. It may be regarded as a safe hypnotic which seldom produces serious symptoms. Neisser reports the case of a person who took a tablespoonful of the drug, and slept in consequence four days and nights, and then rapidly convalesced; and another patient, aged 15 years, who took three ounces and was unconscious for five days, recovering entirely in eight days.

Sulphonal also possesses moderate sedative properties, rendering it serviceable in diseases associated with motor excitation.

Therapeutics.—It is an excellent hypnotic in the *insomnia* of mental disease, of nervous excitement, of certain visceral diseases, especially phthisis; in the last it not only serves to secure sleep, but also to check colliquative sweats. When a rapid action is desired it should be dissolved in a cupful of hot milk or water and taken as hot as can be borne. S. Weir Mitchell and others have found it useful in *epilepsy*, but less efficient than the bromides. In doses of 30 grains a day it is said also to lessen the glycosuria, thirst, and diuresis of *diabetes mellitus*.

SULPHUR.

(S.)

This element is official in three forms:

Sulphur Lotum;
Sulphur Præcipitatum;
Sulphur Sublimatum.

Of the first there are two official preparations:

	DOSE.
Pulvis Glycyrrhizæ Compositus, U. S. P.	30-60 gr.
Unguentum Sulphuris, U. S. P. (30 per cent. of sulphur).	

Physiological Action.—When sulphur is taken in-

ternally, a considerable portion of it passes out unchanged; some is converted in the intestine into sulphuretted hydrogen, which is the cause of much offensive flatus; and a small amount is absorbed, and subsequently escapes in the milk, sweat, and urine. While in the intestine it excites peristalsis and increases the secretion, and so acts as a mild laxative.

Therapeutics.—It may be employed as a *laxative* when a very mild effect is desirable, as in *pregnancy*, *hemorrhoids*, *fissure of the anus*, and *prolapse of the bowel*. The laxative dose is 1 to 3 drachms in some syrup or molasses. Sulphur has a long-standing reputation in *chronic articular rheumatism* and other diseases dependent upon a rheumatic diathesis, such as *sciatica* and *lumbago*; in these affections it is not only useful as an internal remedy, but also as an external application.

Externally, sulphur is much used as a stimulant and parasiticide in diseases of the skin. It is often useful in *eczema*, *comedo*, *acne*, *psoriasis*, and *impetigo*, and may be employed in an ointment containing $\frac{1}{2}$ to 2 drachms to the ounce, the strength ranging with the chronicity of the disease. It is absolutely contraindicated in the acute stages of these disorders. In the parasitic skin diseases—*scabies* and the various forms of *ringworm*—sulphur is a most efficient remedy.

SUMBUL.

(Musk-root.)

The root of *Ferula sumbul*, a native of Central Asia.

PREPARATION.

Tinctura Sumbul, U. S. P. $\frac{1}{2}$ -1 fl. dr.

DOSE.

Therapeutics.—Sumbul is used as an antispasmodic in *hysteria* and allied neuroses.

TAMARINDUS.

(Tamarind.)

The preserved pulp of the fruit of *Tamarindus indica*, growing in the East and West Indies. It contains tartaric,

citric, and acetic acids and grape-sugar. Dose, $\frac{1}{2}$ to 1 ounce.

PREPARATION.

DOSE.

Confectio Sennæ, U. S. P. 1-2 dr.

Therapeutics.—Tamarind is employed as a gentle and agreeable laxative. Tamarind-whey, made by adding 4 parts of the pulp to 100 of boiling milk, straining, and filtering, is a pleasant refrigerant in *mild febrile affections*.

TANACETUM.

(Tansy.)

The leaves and tops of *Tanacetum vulgare*. The active principle is an irritating volatile oil.

Tansy is a powerful emmenagogue and abortifacient, but it has been displaced by less dangerous remedies, so that it is not used at the present time except occasionally in *atonic amenorrhœa*. Toxic doses are followed by abdominal distress, vomiting, epileptiform convulsions, coma, and death.

TARAXACUM.

(Dandelion.)

The root of *Taraxacum officinale*. It contains a bitter principle, taraxacin.

PREPARATIONS.

DOSE.

Extractum Taraxaci, U. S. P. 30-60 gr.

Extractum Taraxaci Fluidum, U. S. P. $\frac{1}{2}$ -2 fl. dr.

Therapeutics.—It is used as a mild bitter and cholagogue in *dyspepsia* with *hepatic torpor*, and as an adjuvant to cathartics in *habitual constipation*.

TEREBENUM.

(Terebene, $C_{10}H_{16}$.)

A compound produced by the action of concentrated sulphuric acid upon oil of turpentine. According to the Pharmacopœia, it should consist chiefly of pinene, and

should contain not more than very small proportions of terpinene and dipentene. It is a light-yellow liquid, having a pleasant pine-like odor and an aromatic, somewhat terebinthinate taste. It is almost insoluble in water, but soluble in an equal volume of alcohol. Dose, 5 to 10 minims, in emulsion or capsules, after meals.

Therapeutics.—Terebene is employed as an antiseptic and as a stimulating expectorant. As an antiseptic it has been used in a 5 per cent. solution in the *dressing of wounds*, and with equal parts of olive oil on a tampon in the treatment of *cancer of the uterus*.

Internally, it is an excellent expectorant in *subacute* and *chronic bronchitis*, especially when the latter is associated with *emphysema*. It is also useful as an inhalation, 20 to 30 minims in a respirator, or a drachm in a pint of hot water, inhaled for ten minutes several times a day. Its chief disadvantage when administered internally is its tendency to disturb the stomach.

TEREBINTHINA.

(Turpentine.)

A concrete oleoresin obtained from *Pinus palustris*, growing in the Southern States. When subjected to distillation it yields a volatile oil, *Oleum Terebinthinæ*, U. S. P., and a solid residue, *Resina*, U. S. P.

OLEUM TEREBINTHINÆ.

(Oil of Turpentine, Spirit of Turpentine.)

A limpid, colorless, highly inflammable liquid, having a characteristic odor and taste.

PREPARATIONS.

DOSE.

Linimentum Terebinthinæ, U. S. P. (oil of turpentine
35 parts, and resin cerate 65 parts).

Oleum Terebinthinæ Rectificatum, U. S. P. 5-10 min.

Physiological Action.—When applied to the skin it acts as an irritant, producing redness and a burning sensation, and, if the contact is prolonged, vesication. Internally, in moderate doses, it causes a sense of warmth in the stomach, mental excitement, quickened respiration, and an in-

crease in the arterial tension and pulse-rate. It escapes from the body in the breath, sweat, and urine, and imparts to the last a pleasant odor resembling that of violets. In large doses it produces abdominal pain, nausea, vomiting, a rapid feeble pulse, embarrassed breathing, excitement, delirium, great muscular relaxation, scanty bloody urine, slight fever, dilated pupils, free perspiration, and finally complete unconsciousness. Although the symptoms of poisoning are alarming, they rarely lead to a fatal termination in adults.

In moderate doses turpentine may be regarded as a cardiac and vaso-motor stimulant. It possesses, to a certain extent, antiseptic properties, and is capable, even in dilute form, of preventing fermentation and putrefaction.

Therapeutics.—Externally, it is used as a rubefacient in various inflammatory affections, such as *bronchitis*, *pleurisy*, *pneumonia*, *gastritis*, and *enteritis*. It is best applied in these cases in the form of a stupe made by sprinkling freely with the oil a piece of flannel which has first been soaked in boiling water and then wrung dry. It may be allowed to remain on the affected part from ten to twenty minutes, according to the sensitiveness of the skin. Turpentine liniment makes an excellent application in *muscular rheumatism* and *chilblains*.

An enema containing two ounces of castor oil, half an ounce of oil of turpentine, and a pint of soapy water is very efficient in *fecal accumulations* and in *tympanitic distention*.

In *low fevers* complicated with the *typhoid state*—dry, brown, and fissured tongue, weak pulse, and muttering delirium—turpentine is an invaluable stimulant. It should be given freely in these cases as an adjunct to alcohol. In *typhoid fever* it is particularly useful when the above symptoms are present, when there is much tympanites, or when the diarrhœa is persistent; in this disease it acts not only as a stimulant, but probably also as an intestinal antiseptic.

It sometimes acts favorably as a stimulating diuretic in chronic affections of the genito-urinary tract, such as *pyelitis*, *cystitis*, and *urethritis*. It has been used in large doses

(ʒss-ʒij) with castor oil as a vermifuge against *tape-worm*, but there are other remedies more efficient and less disagreeable. It is a valuable stimulating expectorant in *chronic bronchitis* when the secretion is copious and purulent.

In *passive hemorrhage* from the stomach, lungs, bowel, kidneys, or uterus, turpentine is undoubtedly useful.

The French oil of turpentine, which is rich in ozone, is antidotal to *phosporus-poisoning*, but the American oil is absolutely useless.

Contraindications.—It must be avoided in acute inflammatory affections of the gastro-intestinal and genito-urinary tracts.

Administration.—For internal use the rectified oil should always be employed; it may be given on sugar, in capsules, or in an emulsion like the following:

℞ Olei terebinthinæ,	ʒss;
Olei caryophylli,	gtt. vj;
Glycerini,	
Mucil. acaciæ,	aa ʒss;
Syr. et aquæ,	q. s. ad ʒij.
M. ft. mist.	(H. C. Wood.)

Sig. A dessertspoonful every two hours during the day (in *typhoid fever*).

RESINA.

A hard, transparent, amber-colored substance remaining after distilling off the volatile oil from turpentine.

PREPARATIONS.

Ceratum Resinæ, U. S. P. (resin 35 parts, yellow wax 15 parts, and lard 50 parts).

Emplastrum Resinæ, U. S. P. (resin 14 parts, lead plaster 80 parts, and yellow wax 6 parts).

Therapeutics.—Resin cerate is chiefly employed as a stimulating application for *indolent ulcers*. Resin plaster or lead adhesive plaster is commonly used for the fixation of surgical dressings. As it is less irritating to the skin than the rubber adhesive plaster, it is to be preferred to the latter for strapping the chest in fracture of the ribs and pleuritic pains, and for making compression over indolent leg-ulcers.

TERPINI HYDRAS.(Terpin Hydrate, $C_{10}H_{18}(OH)_2 \cdot H_2O$.)

Terpin hydrate is obtained by the interaction of turpentine, alcohol, and nitric acid. It occurs in the form of colorless rhombic prisms, odorless, and of a slightly aromatic taste. It is sparingly soluble in water, but more so in alcohol. The dose is 2 to 5 grains, in syrup or alcoholic solution.

Therapeutics.—It has been highly recommended by Lépine and Murrell as an expectorant in *subacute* and *chronic bronchitis* and *bronchiectasis*. It may be prescribed as follows:

℞ Terpin hydratis, Alcoholis, Glycerini,	gr. lx-lxxx; ℥v; q. s. ad ℥ij.—M.
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Sig. A teaspoonful thrice daily.

Terpinol is the product of weak acids on terpin hydrate, and appears as a colorless oily liquid, insoluble in water, but soluble in alcohol. The dose is 10 to 20 minims, in capsules or pills. It is used for the same purposes as terpin hydrate.

THALLIN.(($C_{10}H_{13}NO_2$) $H_2SO_4 \cdot 2H_2O$.)

A synthetic compound, capable of uniting with acids to form salts, and appearing at ordinary temperatures as an oily liquid, which on cooling forms a yellowish-white crystalline powder. It has a bitter saline taste, and an odor resembling that of coumarin bean. For medicinal purposes one of the salts is always selected, especially the sulphate, which is soluble in 7 parts of water. It may be given in doses of 1 to 4 grains.

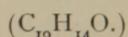
Physiological Action and Therapeutics.—Thallin is a powerful antipyretic, causing in the febrile state, usually within an hour of its administration, a decided fall in the temperature. The effect, however, is much more transient than that obtained by antipyrine or antifebrin, and consequently the dose has to be frequently repeated. Like similar antipyretics, it causes free perspiration. In ordinary doses it has little action on the circulation, but it not infre-

quently causes nausea and vomiting. It is of no value as an analgesic, but has considerable power as an antiseptic. Toxic doses weaken the pulse by depressing the heart and vaso-motor centre, decompose the blood, and irritate the kidneys. It may be employed in the same class of cases as antipyrine, but on the whole its action is less satisfactory.

THIOL.

This compound is obtained by heating brown-colored paraffin oils with sulphur. It appears in two forms—as a brown syrupy liquid and as a fine brown powder. It is freely miscible with water, especially when the latter contains a little glycerin. Thiol closely resembles ichthyol in its action, but lacks the latter's disagreeable odor. A 30 to 40 per cent. ointment may be used as an absorbent in *rheumatic arthritis* and *swollen lymph-glands*. A similar ointment makes a serviceable antiseptic and protectant in *erysipelas* and *frost-bite*. Vaginal tampons containing 10 to 20 per cent. in glycerin have been used successfully in various *inflammatory affections of the uterus*. Thiol, while cheaper than ichthyol, is generally not as efficient.

THYMOL.



A phenol obtained from the volatile oil of thyme (*Thymus vulgaris*) and certain other volatile oils. It appears in the form of large colorless crystals, having the odor of thyme and an aromatic pungent taste. It is almost insoluble in water, but freely so in alcohol and in fixed and volatile oils. The dose is 1 to 3 grains.

Physiological Action.—When applied to the skin or a mucous membrane it acts as an irritant and anæsthetic. In large doses it produces a sense of warmth in the stomach, nausea, vomiting, sometimes diarrhœa, free sweating, a fall of temperature, headache, ringing in the ears and deafness, and dark-greenish-colored urine. It is chiefly eliminated by the kidneys and lungs. Toxic doses cause slowing of the respiration, delirium, coma, collapse, and death from respiratory paralysis. It will be observed that

in its action it resembles both carbolic and salicylic acids. Like the latter compounds, it is a powerful antiseptic.

Therapeutics.—Thymol has been used as an antiseptic in the dressing of *wounds*, but its aromatic odor soon becomes disagreeable to the patient, and, moreover, is apt to attract flies. . It makes an excellent disinfectant wash in *diphtheria*, *mercurial stomatitis*, *cancrem oris*, and *chronic rhinitis*. In these affections the following solution may be employed as a spray :

℞ Thymolis,	gr. i-ij;
Alcoholis,	℥ _{xx} ;
Glycerini,	fʒij;
Aquæ,	q. s. ad fʒij.—M.

An ointment of thymol (5 to 30 grains to the ounce) has been employed with success as a substitute for tar in *chronic eczema* and *psoriasis*.

Internally, thymol is one of the most efficient antiseptics that we possess. It may be given to check fermentation in *chronic gastric catarrh*, *gastric cancer*, *dilatation of the stomach*, and *typhoid fever*. In the last affection Henry has very strongly advocated its use, giving as much as 30 grains in the twenty-four hours. As an internal remedy it is best given in pills, as in the following formula :

℞ Thymolis,	gr. xx;
Pulv. saponis,	gr. xl;
Alcoholis,	q. s.—M.
Div. in pil. No. xx.	
Sig. One three times a day, after meals.	

In large doses (5 to 10 grains) it has been recommended as a tæniacide against *tape-worm* and *anchylostomum duodenale*.

ARISTOL.

(Dithymol-diiodide.)

A light-brown, amorphous, inodorous powder, insoluble in water and glycerin, freely soluble in ether and fatty oils, and slightly soluble in alcohol.

Therapeutics.—Aristol is an antiseptic similar in its action to iodoform, but less toxic and less powerful than the latter. It has an advantage over iodoform in being free from odor. It is employed in the same class of cases as

the older antiseptic. A 10 per cent. solution in ether makes an excellent disinfectant wash in *chronic nasal catarrh*.

Incompatibles.—As aristol is an unstable preparation which readily parts with its iodine, it should not be combined with substances having a strong affinity for the latter, such as alkalis, carbonates, metallic oxides, corrosive sublimate, and starch. It should be used alone or in fats, ether, or collodion.

TRIONAL AND TETRONAL.

These are two new hypnotics closely allied in their composition and action to sulphonal. Beyond the fact that they are somewhat more prompt in their effect, they seem to possess no advantages over the older hypnotics. Tetronal is probably more reliable than trional. The dose of either is 30 to 40 grains.

URETHAN.

(Ethyl Urethan, Ethyl Carbamate, $\text{NH}_2\text{CO.OC}_2\text{H}_5$.)

This compound is made by the interaction of ethyl alcohol and nitrate of urea, and appears as colorless tabular crystals, odorless, and of a cooling saline taste. It is readily soluble in water, alcohol, ether, and chloroform. Dose, 15 to 45 grains.

Therapeutics.—Urethan is a pure hypnotic, not affecting in ordinary doses the respiration or circulation. Toxic doses are followed by coma, a fall of temperature, weakness of the pulse, abolition of reflexes, and death from respiratory paralysis. Unlike opium, it has no analgesic effect, and, unlike chloral, it does not depress the heart. It is a comparatively safe hypnotic, and may be employed successfully in the *insomnia* of nervous excitement, insanity, and visceral disease.

UVA URSI.

(Bearberry.)

The leaves of *Arctostaphylos uva ursi*. It contains tannic and gallic acids and a bitter extractive, *arbutin*. The latter appears as long colorless crystals, soluble in 8 parts

of water and in 16 parts of alcohol, and is employed in doses of 5 to 10 grains.

PREPARATIONS.

DOSE.

Extractum Uvæ Ursi, U. S. P.	30-60 gr.
Extractum Uvæ Ursi Fluidum, U. S. P.	2-4 fl. dr.

Therapeutics.—Uva ursi is employed as an antiseptic and stimulating diuretic in chronic inflammatory affections of the genito-urinary tract, such as *pyelitis*, *cystitis*, and *urethritis*. The arbutin contained in the leaves is in part converted in the body into hydrochinone, which makes its escape in the urine, imparting to the latter a greenish color. Hydrochinone, being an innocuous antiseptic, contributes considerably to the therapeutic value of the drug.

VALERIANA.

(Valerian.)

The rhizome and roots of *Valeriana officinalis*. The active principle is a *volatile oil*, from which is obtained valerianic acid.

PREPARATION.

DOSE.

Extractum Valerianæ Fluidum, U. S. P.	½-1 fl. dr.
Tinctura Valerianæ, U. S. P.	2-3 fl. dr.
Tinctura Valerianæ Ammoniata, U. S. P. (made by macerating valerian in aromatic spirit of ammonia).	

Physiological Action.—In moderate doses valerian acts as a sedative to the brain and spinal cord. Toxic doses produce a sense of warmth in the stomach, nausea, vomiting, quickening of the pulse, vertigo, headache, and mental exhilaration.

Therapeutics.—It is used as an antispasmodic in *hysteria*, *nervous excitement*, *whooping-cough*, and the *delirium of low fevers*.

VERATRINA.

(Veratrine.)

A mixture of alkaloids obtained from the seeds of *Asa-græa officinalis*. It is a grayish-white, amorphous, odorless, and extremely irritating powder, causing repeated sneezing

when inhaled in the smallest quantity, and having a disagreeable acid taste.

PREPARATIONS.

Oleatum Veratrinæ, U. S. P. (contains 2 per cent. of veratrine and 98 per cent. of oleic acid).

Unguentum Veratrinæ, U. S. P. (contains 4 per cent. of veratrine).

Physiological Action.—When rubbed into the skin it acts as an irritant, causing redness, tingling, and finally numbness. The ingestion of a large dose provokes abdominal pain, vomiting and purging, a slow pulse which soon becomes rapid and thready, a fall of temperature, tremors, tonic muscular spasms, and death from respiratory paralysis.

Veratrine is a powerful cardiac, respiratory, and muscle poison. Since it has but little action on the brain and spinal cord, the spasms which it induces are probably of muscular origin.

Therapeutics.—Veratrine is rarely employed internally. Externally, the ointment is sometimes a useful rubefacient in *neuralgia*. It should not be used over large surfaces or where there are any abrasions. In employing it about the face great care must be exercised to prevent it from entering the eye, since it causes violent ophthalmia.

VERATRUM VIRIDE.

(American Hellebore.)

The rhizome and roots of *Veratrum viride*, a native of North America. It contains several alkaloids, but the most important are *jervine* and *veratroidine*.

PREPARATIONS.

DOSE.

Extractum Veratri Viridis Fluidum, U. S. P. 1-3 gtt.

Tinctura Veratri Viridis, U. S. P. 3-6 gtt.

Physiological Action.—The dominant action of *veratrum viride* is on the circulatory system: it lessens in a marked degree the force and rate of the cardiac pulsations. The lowered arterial tension results from depression of the vaso-motor centre and of the heart itself; the slowing of the pulse, from stimulation of the inhibitory nerves of the heart and from weakening of the cardiac muscle. The drug is irritating to the stomach, and moderate doses often cause

nausea and vomiting. Large doses depress the respiratory centre, spinal cord, and peripheral nerves and muscles.

Action of the Alkaloids.—The action of *veratrum viride* represents the sum of the actions of the alkaloids. According to Wood, veratroidine causes the slowing of the pulse by stimulating the vagi, and also the vomiting; jervine depresses the vaso-motor centre; and both in large doses depress the respiratory centre, spinal cord, and peripheral nerves and muscles.

Toxicology.—*Veratrum-viride*-poisoning is characterized by nausea, vomiting, a slow weak pulse, which on exertion often becomes extremely rapid, great muscular relaxation, vertigo, impaired vision, partial unconsciousness, and collapse.

On account of the vomiting which follows the ingestion of large doses, *veratrum viride*, although a powerful drug, is not so dangerous a poison as aconite.

Treatment.—This consists in keeping the patient in the recumbent posture, in favoring emesis by copious draughts of warm water, in keeping up the temperature by the external application of heat, and in the administration hypodermically of full doses of diffusible cardiac and respiratory stimulants, such as ammonia, alcohol, and strychnine.

Veratrum Viride and Aconite Compared.—Aconite differs in its action from *veratrum viride* in not influencing, except in toxic doses, the vaso-motor centre; in allaying gastric irritability, instead of exciting nausea and vomiting; and in depressing especially the sensory nerves, thereby causing numbness and tingling.

Therapeutics.—In *excessive hypertrophy of the heart*, with or without valvular lesions, *veratrum viride* is a useful sedative. In *aneurism*, when the pulse is full and strong, it is often efficient in conjunction with potassium iodide and enforced rest.

It is often of great service in aborting acute inflammatory affections in robust patients; for this purpose it may be used in the first stages of *pneumonia*, *pleurisy*, and *peritonitis*. It is not only useless but harmful in these diseases after exudation has taken place.

Contraindications.—Cardiac and systemic weakness are the great contraindications to its use.

Administration—It should be given alone, in small doses at frequent intervals, the amount being gradually increased until the pulse is distinctly affected. To prevent emesis, a few drops of laudanum may be given ten minutes before the administration of the *veratrum viride*.

ZINCUM.

(Zinc, Zn.)

Metallic zinc is official in the form of thin sheets, or in irregular granulated prisms, or moulded into thin pencils, or in a state of fine powder. The metal itself is not used medicinally.

ZINCI ACETAS.

(Zinc Acetate, $\text{Zn}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 2\text{H}_2\text{O}$.)

Thin, colorless, six-sided plates, having a pearly lustre, an acetous odor, and an astringent metallic taste.

Therapeutics.—A solution of zinc acetate ($\frac{1}{2}$ to 3 grains to the ounce) is used as an astringent application in *conjunctivitis*. Stronger solutions (3 to 5 grains to the ounce) are efficient in gonorrhœa after the acute symptoms have subsided.

ZINCI CARBONAS PRÆCIPITATUS.

(Precipitated Zinc Carbonate, $(\text{ZnCO}_3)_2 \cdot 3\text{Zn}(\text{HO})_2$.)

A white, odorless and tasteless powder, insoluble in water or alcohol.

Therapeutics.—It is used as a sedative astringent in acute inflammatory affections of the skin, such as *eczema*, *erythema*, and *intertrigo*.

ZINCI CHLORIDUM.

(Zinc Chloride, ZnCl_2 .)

A white granular powder, or white opaque masses, deliquescent, having an astringent metallic taste and intensely caustic properties. Freely soluble in water and alcohol.

PREPARATION.

Liquor Zinci Chloridi, U. S. P. (a 50 per cent. aqueous solution of zinc chloride).

Therapeutics.—It is used as an astringent, antiseptic, and caustic. It is a painful caustic, but it is sometimes employed successfully in destroying new growths like *lupus* and *epithelioma*. In these cases Duhring recommends chloride of zinc with an equal part of chloride of antimony, and sufficient hydrochloric acid to dissolve the zinc chloride, and enough powdered licorice added to make a paste. Applied as a plaster, it produces an eschar in twelve to twenty-four hours.

In *chronic laryngitis* and *chronic follicular pharyngitis* a solution containing 15 to 30 grains to the ounce makes a useful stimulating application. An injection containing $\frac{1}{2}$ a grain gradually increased to 2 grains to the ounce is serviceable in *subacute* and *chronic gonorrhœa*. A 10 per cent. solution has been recommended as an antiseptic for cleansing *wounds* and *ulcerated surfaces*. The official solution of zinc chloride is employed as a disinfectant.

ZINCI OXIDUM.

(Zinc Oxide, ZnO.)

An amorphous white powder, free from odor and taste, and insoluble in water and alcohol. Dose, $\frac{1}{2}$ to 5 grains.

PREPARATION.

Unguentum Zinci Oxidi, U. S. P. (contains 20 per cent. of zinc oxide).

Therapeutics.—Zinc oxide is extensively used externally as a mild astringent and sedative in *burns*, *acute ulcers*, and *acute inflammatory skin diseases*. In these affections it may be employed as a dusting-powder or an ointment.

Internally, it has been recommended as an antispasmodic in *epilepsy*, *whooping-cough*, *hysteria*, and *asthma*, and as an antihidrotic in the night-sweats of *phthisis*; but in these diseases there are far more efficient remedies.

ZINCI PHOSPHIDUM.

(Zinc Phosphide, Zn_3P_2 .)

A grayish-black, gritty powder, having a faint odor and taste of phosphorus, and insoluble in water and alcohol. Dose, $\frac{1}{20}$ to $\frac{1}{10}$ of a grain, in pill.

Therapeutics.—It is employed in the same class of cases in which phosphorus is indicated.

ZINCI SULPHAS.

(Zinc Sulphate, $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$.)

Colorless, transparent rhombic crystals, odorless, and of an astringent metallic taste. Soluble in 0.6 part of water, and insoluble in alcohol. The dose as an emetic is 20 to 30 grains; as an astringent, 1 to 2 grains.

Therapeutics.—In weak solutions sulphate of zinc is an excellent astringent; in concentrated solutions it is an irritant and caustic. A solution containing $\frac{1}{2}$ a grain gradually increased to 3 or 4 grains to the ounce makes an excellent injection in *gonorrhœa* after the subsidence of the acute symptoms. In *subacute* and *chronic conjunctivitis* solutions containing $\frac{1}{2}$ to 2 grains to the ounce are very useful.

In *narcotic poisoning* it may be employed as a prompt emetic, and the dose may be repeated two or three times when necessary. Pills containing 1 or 2 grains of the salt are sometimes used in *chronic diarrhœa* and *dysentery*.

Toxicology.—Toxic doses of zinc sulphate produce intense abdominal pain, violent vomiting and purging, and collapse. The treatment consists in the free exhibition of alkalies or their carbonates and demulcents like eggs and milk.

ZINGIBER.

(Ginger.)

The rhizome of *Zingiber officinale*, growing in the tropics. It contains a *volatile oil* and a *resin*.

PREPARATIONS.

DOSE.

Extractum Zingiberis Fluidum, U. S. P.	5-10 gtt.
Oleoresina Zingiberis, U. S. P.	$\frac{1}{2}$ -2 min.
Pulvis Aromaticus, U. S. P.	10-20 gr.
Pulvis Rhei Compositus, U. S. P.	30-60 gr.
Tinctura Zingiberis, U. S. P.	$\frac{1}{2}$ -3 fl. dr.

Therapeutics.—Ginger is chiefly used as a vehicle, as an adjuvant to cathartics to lessen griping, and as a carminative in *flatulent dyspepsia*.

REMEDIAL MEASURES OTHER THAN DRUGS.

ANTISEPSIS AND DISINFECTION.

Antiseptics are substances which have the power of preventing the growth of micro-organisms, without necessarily destroying them. Disinfectants, or germicides, are substances which have the power of killing micro-organisms.

Deodorants are substances capable of destroying foul odors; they may be neither disinfectant nor antiseptic in their action.

The following are the most efficient antiseptics:

Bichloride of Mercury.—This is the most valuable of all the antiseptics. Solutions of 1 : 1000 to 1 : 4000 will destroy the spores of most bacilli. As corrosive sublimate is converted into an insoluble and inert compound in the presence of albuminous material, it is customary to add an acid, like tartaric acid, to the solution to prevent this tendency:

℞ Hydrarg. chlor. corr.,	ʒij;
Acid. tartar.,	ʒv;
Aquæ,	q. s. ad ʒiv.—M.
Sig. fʒss in water Oj = 1 : 1000.	

Solutions of the strength of 1 : 1000 to 1 : 2000 are employed externally, the former on the skin, and the latter on wounded surfaces. Bichloride of mercury cannot be used for disinfecting instruments, on account of its corrosive action.

Its irritating and toxic properties render it unfit for use in irrigating large cavities like the pleura, pericardium, and peritoneum.

Carbolic Acid.—This is not so powerful an antiseptic as corrosive sublimate, but is quite destructive to such spores as are to be dreaded in surgical work. Lister claims

that it is most valuable for antiseptic dressings, and for purifying sponges he considers it superior to corrosive sublimate. Being non-corrosive, it is commonly employed for disinfecting instruments. A solution of 1 : 20 may be used for sponges, instruments, etc., and a solution of 1 : 40 for irrigating wounds.

Creolin.—This antiseptic has many properties to recommend it: it is powerful, unirritating, free from astringency, and quite safe. Its chief disadvantage is that when mixed with water it forms an opaque emulsion. It may be employed in a 2 to 4 per cent. emulsion.

Iodoform.—This substance in itself is not germicidal—indeed, micro-organisms seem to thrive on it—but in the presence of the warm fluids of the tissues it is decomposed, and the products of its decomposition are distinctly germicidal. Before using iodoform as an antiseptic it is well to render it sterile by washing it repeatedly in a strong solution of corrosive sublimate.

Aristol.—This compound is frequently used as a substitute for iodoform; it is not so powerful as the latter, but it is odorless and quite free from toxic properties.

Peroxide of Hydrogen.—This is an excellent detergent and antiseptic for injecting into sinuses or suppurating cavities. It is odorless and innocuous. It may be employed undiluted (15-volume solution), or diluted to a 50 per cent. solution.

Boric Acid.—This acid is unirritating and possesses considerable antiseptic power. Solutions containing 15 grains to the ounce of water are very useful for applying to mucous surfaces, and a solution of 12 : 1000 of hot water may be employed for irrigating the large serous sacs.

DISINFECTION.

The great disinfectant is *heat*. Moist heat is better than dry heat. According to Billings, exposure to hot air at 220° F. for one hour will kill micrococci and bacilli, but not spores, which, however, may be killed by five hours' exposure to this temperature. Such temperatures are very liable to injure the texture of the infected articles, especially if they be woollen. A lower temperature of moist

heat proves destructive to micro-organisms in a less time. Thorough boiling proves destructive to all germs, and is a very practicable way of rendering sterile sheets, towels, clothing, etc. Steaming is a very efficient method, and may be employed when disinfection must be carried out on a large scale, as is frequently the case in the municipal service.

Chlorinated lime is an excellent disinfectant for rendering harmless infected sputa, feces, urine, etc. A tablespoonful of the lime with a couple of ounces of water should be placed in the spit-cup before it is used. The stools of patients suffering with typhoid fever or other infectious disease can be rendered innocuous by adding to them a quart of a solution containing an ounce of chlorinated lime to a gallon of water, and allowing it to remain in the vessel at least two hours before emptying.

How to thoroughly disinfect a room is a question not easily answered. It is certain that the fumes of burning sulphur are entirely inadequate for the purpose. It is perhaps best accomplished by scrubbing the walls, floors, windows, and doors with a solution of corrosive sublimate (1 : 1000) to which a little tartaric or hydrochloric acid has been added, and following this with free and prolonged ventilation.

BLOODLETTING.

Bloodletting is employed both as a local and a general remedial measure. As a local measure it may be practised by cupping or by leeching, and as a general measure by venesection or phlebotomy.

Cupping.—There are two methods of cupping—the dry and the wet. In dry cupping no blood is abstracted from the body: it is simply diverted from the affected part to the cellular tissue of the skin, where its collection produces a temporary bluish-red discoloration. The air in the cup is exhausted by a pump or a gum ball, and the partial vacuum thus produced causes the blood to flow from the inflamed area toward the cup. In wet cupping the blood, in the same manner, is sucked out of numerous small incisions which have been made by a scarificator. As the

cicatrices made by the latter are permanent, it should not be applied upon exposed parts.

Dry cups are not as efficient as wet ones, but may be employed when the patient's strength will not warrant an absolute loss of blood.

Leeching.—Leeches accomplish the same purposes as wet cups, but on account of their size and shape they can be applied to parts which are not accessible to cups, as over the spermatic cord or in the region of the anus. They should be applied in the neighborhood of the inflamed part, not directly over it; and parts which are abundantly supplied with loose areolar tissue, like the eyelids and the scrotum, should be avoided. The eye may be depleted from the temple, and the testicle from the perineum. Excessive bleeding may be arrested by compresses saturated with alum-water or Monsel's solution, or if necessary by the thermo-cautery.

Therapeutics.—Local bloodletting may be practised with advantage in the early stages of many acute inflammations, such as *pneumonia, nephritis, hepatitis, orchitis*, etc. In acute inflammations of serous membranes—*pleuritis, iritis, peritonitis, pericarditis, and meningitis*—the early application of cups or leeches is of the greatest value in preventing copious exudation.

Venesection.—The general abstraction of blood is accomplished by incising a vein. The patient having been placed in a semi-recumbent position, the arm should be constricted three or four inches above the elbow by a few turns of a roller or a twisted handkerchief; if this is not sufficient to render the veins prominent, the arm may be rubbed for a few minutes from below upward. A large vein having been selected, it should be incised by a thumb-lancet or spring-lancet in a direction oblique to the long axis of the vessel. The amount of blood abstracted will depend entirely upon the pulse, which should be carefully observed during the operation, and when it lessens in force and becomes more compressible the bleeding must be suspended. The loss of blood required to afford relief varies from a few ounces to one or two pints.

Therapeutics.—Venesection is indicated in the following

conditions, provided the pulse is full and strong: *apoplexy*, *uræmia*, *sunstroke*, and the initial stage of certain inflammatory diseases, notably *croupous pneumonia*.

In *apoplexy* bleeding cannot undo the damage already done, but by relieving the cerebral congestion it may prevent a renewed outpouring.

In *aortic aneurism* attended with severe pain, dyspnœa, and a bounding pulse, free bleeding often affords great relief.

COLD.

Cold is used externally as a local sedative. It may be applied in the form of cloths wrung out of cold water, an ice poultice, an ice-bag, or Leiter's tubes. An ice poultice is made by basting between flannel a mixture of well-drained cracked ice and sawdust, and covering the whole with oiled silk. A cheap and convenient ice-bag may be made by filling a pig's bladder with cracked ice, closing it securely, and covering it with flannel. Leiter's tubes are usually made of flexible rubber, and are arranged in forms to fit the head, trunk, or abdomen. One end of the tube is connected with a reservoir containing ice-water placed a little above the patient, and the flow started by a siphon action; having traversed the tube, the water escapes into a receptacle placed under the bed.

In the early stage of acute inflammation, particularly that resulting from traumatism, a cold-water dressing often acts most happily. In acute cerebral congestion or apoplexy the application of cold to the head by one of the methods suggested above is a valuable adjuvant to other remedial measures. In diphtheria and scarlet fever no external application to the throat gives so much relief as an ice-bag. In croupous pneumonia when the temperature is high and the pulse strong an ice-bag or an ice poultice adjusted over the affected lung lowers the temperature and materially aids in relieving the severe pleuritic pains. In neuralgia the local employment of dry cold often affords temporary relief; and the same is true of its use in painful thoracic aneurisms. In paroxysmal tachycardia the application of an ice-bag to the præcordia often proves useful in quieting the heart.

Prior to the performance of acupuncture or paracentesis, or to using the actual cautery, local anæsthesia may be secured by holding over the part for a few minutes a small block of ice the end of which has been dipped in salt. An ice-bag applied over the affected part is useful in arresting internal hemorrhages.

The employment of cold water externally in the treatment of the infectious fevers, which originated with Currie and which has been highly extolled by Brand, Ziemssen, and Liebermeister, is now regarded as the most satisfactory method at our command for lowering high temperature and for warding off the serious nervous symptoms with which the latter is commonly attended. In mild cases simply sponging the body frequently with cool water to which a little alcohol or vinegar has been added is all that is necessary. In more severe cases the *cold pack* may be employed: The bed is protected by a rubber cloth, and the patient wrapped in a sheet wet with cold water (60° – 65° F.), and this temperature maintained by sprinkling the sheet at frequent intervals with more cold water. During the pack the whole body should be subjected to gentle friction.

When it is feasible, continued high fever is best controlled by the use of the cold bath, which consists in immersing the body up to the neck in water of 70° F. A bath-tub half full of water of 70° F. is kept in readiness at the bedside of the patient, and whenever the mouth-temperature rises above 102.2° F. his clothes are removed, he is enveloped in a sheet, and carefully lifted into the water. While in the bath cold affusions should be applied to the head, and the body should be constantly subjected to gentle friction and massage, so as to bring new relays of blood to the surface. A stimulant is often necessary to counteract the shock. After remaining in the water fifteen to twenty minutes, he is placed in a dry sheet and covered with a light blanket. When the body is dry the damp sheet should be removed. When the patient is considerably debilitated it is best to place him at first in water of 90° F. and to gradually lower the temperature to 70° ; in this way much shock is avoided. In typhoid fever the systematic use of cold baths has given excellent results.

Perforation, copious hemorrhage, and extreme prostration are to be regarded as contraindications.

In thermic fever, or sunstroke, the patient should be rubbed with ice or placed in water of 50°–60° F. until the temperature in the mouth falls to within a couple of degrees of the normal.

Cold bathing is frequently employed for its invigorating effect; it is indicated in states of depression rather than in states of exhaustion. When the patient has been accustomed to taking warm baths, the change should be effected very gradually by lowering the temperature of the water a little each day. If relaxation instead of exhilaration follows its use, it is doing harm rather than good. The addition of a cupful of salt to the water renders the bath more stimulating.

COUNTERIRRITATION.

By counterirritation is meant the application of an irritant to the surface of the body for the purpose of affecting favorably a neighboring or remote morbid process. Counterirritants act by producing congestion of the surface and reflexly influencing the circulation of the internal organs. They are employed to deplete inflamed and congested organs, to relieve pain, to assist in the absorption of inflammatory exudations, and to arouse the system in states of depression.

Rubefacients.—These are drugs which produce simply redness and congestion. They are comparatively superficial in their action, and may be employed with advantage in acute congestion of the internal organs, inflammatory affections of a mild type, and in functional pains. Thus they are useful in acute bronchitis, gastritis, enteritis, gastralgia, intestinal colic, muscular rheumatism, and neuralgia of the superficial nerves. When applied over large surfaces they also serve as general stimulants, and as such may be employed to arouse the system in collapse, shock, and narcotic poisoning.

The best rubefacients are turpentine, diluted ammonia, chloroform, iodine, mustard, and capsicum. For the method of using these drugs the reader is referred to the descrip-

tions which have been given of them under their official titles.

Epispastics.—These are drugs which are irritating enough to produce blisters. Their effect is more prolonged and more deeply felt than that of the rubefacients. They are employed in severe inflammatory affections, such as pleuritis, meningitis, pneumonia, pericarditis, peritonitis, arthritis, iritis, prostatitis, etc., to relieve the pain in obstinate neuralgia, and to hasten the absorption of non-purulent inflammatory exudations such as frequently remain after pericarditis, pleuritis, iritis, etc. When an absorbent effect is desired, it is best obtained by the application of a succession of small blisters ("flying blisters") over the affected part.

Some preparation of cantharides is usually selected for producing vesication. Blisters are contraindicated in the very young, old, and debilitated, since in these patients they not infrequently cause serious sloughing. Cantharidal blisters and others containing renal irritants should never be employed when there exists acute congestion or acute inflammation of the kidneys.

Thermo-cautery.—This is the most powerful means of producing counterirritation that we possess. It may be applied by means of irons of various shapes heated to redness, or, better still, by the Paquelin cautery, an instrument containing in its tip platinum sponge, which when heated is brought to incandescence by the vapor of naphtha or rhigolene. In very obstinate chronic inflammations of deep-seated structures, especially in chronic meningitis, cerebral or spinal, and sciatica, a few light touches of the thermo-cautery prove more efficacious than blisters. The surface should first be anæsthetized by ice and salt or a spray of rhigolene, and the application of the cautery followed by a dressing of carbolized oil.

Acupuncture.—An operation consisting of the insertion of fine needles into the tissues. It has been practised for ages for the relief of pain, and in lumbago and sciatica it often gives brilliant results. The needles should be four or five inches long and about the thickness of a bonnet-pin. Having been sterilized, they should be thrust into

the most painful parts a distance of two or three inches, and allowed to remain about ten minutes. In obstinate sciatica the needles may be allowed to pierce the nerve.

ELECTRICITY.

The true nature of electricity is still unknown; like the other great forces of nature, it must be studied in the light of its various manifestations. Gilbert first employed the term to designate the phenomena of attraction and repulsion which result when amber (electrum) and similar substances are briskly rubbed. Electricity produced in this simple way—by the rubbing together of certain substances—is termed *frictional* or *static electricity*, or franklinism, and is rarely used in medicine.

When two dissimilar metals like copper and zinc are placed in a corrosive fluid and united outside by a loop of wire, the resulting chemical action is attended with the production of an electric current, and to this manifestation of electricity the term *galvanism* is applied. The vessel, its contained fluid, and connected elements together constitute a *galvanic cell*. The union of several cells forms a *battery*. The force which starts the electric current is termed the *electro-motive force*, and it is always the same in quantity for the same metals at the same temperature, and is entirely independent of the size of the plates, their distance apart, and the character of the fluid in the cell. The current is generated at the surface of the element or plate more easily corroded, which in the above illustration is the zinc, and passes through the fluid to the element or plate less affected—that is, the copper—and from the external end of the copper it passes through the wire loop back again to the external end of the zinc, thus completing a *closed circuit*. As the external end of the copper is constantly giving off electricity, it is termed the *positive pole*, or *anode*; and as the external end of the zinc is constantly receiving electricity, it is termed the *negative pole*, or *cathode*.

It is evident that the electro-motive force will more than represent the strength of the current, for all substances offer more or less resistance to the passage of electric-

ity. The resistance within the cell is termed the *internal resistance*, and that without the cell the *external resistance*. The amount of internal resistance will depend upon the character of the intervening fluid, the size of the plates, and their proximity. The larger the plates and the closer they are to each other, the less becomes the internal resistance. The external resistance depends upon the length, diameter, and character of the conductor. The unit of resistance is termed an *ohm*; it is about equal to the resistance offered by a copper wire 1000 feet long and $\frac{1}{10}$ of an inch in diameter. The *current-strength* may be estimated by the law of Ohm: The strength of an electric current passing a section of the conductor in a unit of time is proportional to the whole electro-motive force, and inversely proportional to the sum of all the resistances in the circuit. Representing the current-strength by C , the electro-motive force by E , the internal resistance by Ir , and the external resistance by Er , the law may be expressed by the following formula:

$$C = \frac{E}{Er + Ir}.$$

The unit of electro-motive force is the volt; it is the amount of electricity required to overcome an ohm of resistance. The unit of current-strength is the ampère, but as this is too large a unit for medicinal purposes, $\frac{1}{1000}$ of an ampère, or a milliampère, is employed instead.

The current-strength of a battery can be increased in three ways: (1) by diminishing the external resistance; (2) by diminishing the internal resistance; and (3) by increasing the number of cells. When the external resistance is a fixed quantity, which is often the case, the current-strength can still be increased in one of the two remaining ways; but when the external resistance is very great, as in the case of the human body, in which it is about 3000 ohms, the gain secured by enlarging the plates and lessening the distance between them is but trifling, and the current-strength must therefore be increased by multiplying the number of cells.

When the external resistance is slight, as in the galvano-

cautery, in which the current has only to render a piece of wire incandescent, the internal resistance becomes highly important, and much is gained by reducing it to a minimum. It follows, therefore, that a battery designed for such a purpose should consist of a few small cells, with large plates placed very near one another. The same principles likewise apply to the construction of batteries intended for electrolytic work.

Of the accessories to the galvanic battery, the most important are the galvanometer, rheostat, and electrodes.

A galvanometer is an instrument for measuring the current-strength.

A rheostat, or resistance-coil, is an appliance for placing in the circuit a known resistance; by it the external resistance can be increased to any extent and kept uniform.

Electrodes are appliances placed at the pole-ends so that the current can be conveniently transferred to the body. They are made of various shapes and sizes, and are usually tipped with sponge, which should be moistened at the time of their application.

Faradism, or Induced Electricity.—This manifestation of electrical force depends upon the power which a galvanic current possesses, while passing through one conductor, of inducing momentarily a current in an overlying conductor. The induced current is instantaneous, and appears only at the making or breaking of the galvanic current. Moreover, it flows in a direction opposite to that of the galvanic current when the latter is made, and in the same direction when it is broken. By rapidly making and breaking the primary current a powerful to-and-fro current is induced in the overlying conductor. A faradic battery consists of a cell for generating the galvanic current; a *primary coil*, consisting of a few turns of coarse insulated wire enclosing a coil of soft iron; a *secondary coil*, composed of many turns of very fine wire surrounding the primary coil, but not touching it; and a mechanical device for slowly or rapidly making or breaking the current in the primary circuit.

The current derived from the primary coil is termed the *primary current*; like the galvanic, it flows in one direc-

tion, and affords a positive and a negative pole. It differs, however, from the galvanic current in being reinforced by the turns of the coil. The current derived from the secondary coil is termed the *secondary current*, and, since it is ever changing the direction of its flow, it cannot furnish negative and positive poles.

Physiological Action of Electricity.—When a strong uninterrupted current is applied to the body, it produces at the points of contact severe burning pain, redness, and finally, under the negative pole, vesication. These phenomena are the result of electrolytic changes induced by the current. Muscular contraction results from the application of the galvanic current only during the opening and closing of the circuit.

When the negative pole, or cathode, is placed over the nerve supplying a muscle, and the positive pole, or anode, over some indifferent point, as the sternum, a contraction of the muscle occurs on closing the circuit; but with currents of ordinary strength no contraction occurs on breaking the current. When the positive pole is placed over the nerve and the negative over the sternum, and a somewhat stronger current is employed than in the first instance, a contraction occurs when the circuit is broken. With a still stronger current a contraction also occurs when the circuit is closed.

The following table represents the relative strengths of the various contractions in normal muscles, 1 being the strongest:

1. Cathodal closing contraction (CaClC).
2. Anodal opening contraction (AnOC).
3. Anodal closing contraction (AnClC).
4. Cathodal opening contraction (CaOC) (never occurs).

When one pole is placed over the sternum and the other over the *motor point* of the muscle—*i. e.* the point of entrance of its motor nerve—contractions are obtained with weaker currents and the reactions are somewhat changed, the anodal closing contraction becoming stronger than the anodal opening contraction.

The Effect of the Faradic Current.—When a strong

induced current is applied to a part, it causes tingling followed by numbness, and a continuous or tetanic contraction of the muscles which lasts until the current ceases to flow.

The Reaction of Diseased Nerves and Muscles to Electric Currents.—When a galvanic current is applied to a paralyzed part, the reactions may be normal, they may be altered quantitatively—*i. e.* increased or diminished—or they may be altered qualitatively.

If the muscles of a paralyzed part respond normally to galvanic and faradic currents, the nerves supplying the part must be free from disease, and the lesion must be situated somewhere above that portion of the spinal cord from which those nerves arise. Thus in transverse myelitis of the dorsal region, while the muscles of the legs are paralyzed, their reaction to electric currents is normal.

An increased response to both currents without quantitative change indicates a state of irritation or hypersensitiveness of the part, and may be observed in the recent hemiplegia of apoplexy, in the very early stage of neuritis, and even of myelitis.

A diminished response to both currents without quantitative change is observed in progressive muscular atrophy, pseudo-muscular hypertrophy, and sometimes neuritis after the very early stage, and before much degenerative change has developed in the nerve-trunks or muscles. After the development of decided degenerative changes, as in lesions of the nerves or gray matter of the spinal cord, if the electrode is placed directly over the *motor nerve* supplying the affected muscle, there will be a complete loss or a diminution of electric excitability without qualitative change. The preservation of faradic contractility after the loss of galvanic contractility is strongly indicative of hysterical paralysis.

Reaction of Degeneration.—This consists in a qualitative change in the electric reaction, a reversal of that occurring in normal muscle. It is obtained only with the *galvanic current* when the electrode is placed over the *muscle*—not its motor nerve or motor point—and is observed in paralyzed muscles which are in certain stages

of degeneration on account of a lesion of their supplying nerves or of that portion of the spinal cord from which those nerves have their origin; or, in other words, when the muscles are cut off from the trophic influences which emanate from the ganglionic cells in the gray matter of the spinal cord. In such cases the muscles first fail to respond to a rapidly-interrupted faradic current, then a rapidly-interrupted galvanic current, and then a slowly-interrupted galvanic current. A little later the sensitiveness to the galvanic current returns, and with it certain qualitative changes which constitute the reactions of degeneration. These reactions may be expressed as follows:

The anodal closing contraction (AnClC) equals or is greater than the cathodal closing contraction (CaClC).

The anodal opening contraction (AnOC) is equal to or less than the cathodal opening contraction (CaOC).

When the degeneration is complete the reactions are no longer obtainable.

Therapeutics.—Electricity is employed to give tone to muscle, to stimulate the nervous system, to relieve certain sensory disturbances by directly influencing the peripheral nerves, to coagulate the blood in aneurismal sacs, to effect the solution of certain inflammatory or degenerative products, and, in the form of the galvano-cautery, to excise or destroy hypertrophied tissues or morbid growths.

It is of great value in *paralysis* when the exciting cause has ceased to act and the damage done is not irreparable.

In the *hemiplegia following apoplexy* electric treatment should not be instituted until all evidences of cerebral irritation have subsided, which will usually be in the course of four to six weeks. Both currents should be tried, and the one which induces the greater contraction with the less amount of annoyance to the patient should be selected. While the muscular contractility is diminished there is always some hope of improvement; none, however, is to be expected after the development of contractures.

In paralysis from lesions of the peripheral nerves, such as *neuritis*, if the damage to the nerve has not been too great, much may be hoped for from the use of electricity. It should not be employed, however, until all symptoms

of irritation have disappeared. A slowly-interrupted faradic current is generally the most efficient; one pole should be placed over the nerve-trunk and the other over the muscle, and no greater strength of current should be employed than will cause a moderate contraction.

In *acute poliomyelitis* or *infantile paralysis* electricity sometimes renders valuable service. It should be instituted after the lapse of one or two weeks, and persevered in for several weeks, even though the muscles fail to respond to either current. A slowly-interrupted or slowly-reversed galvanic current usually accomplishes the most good.

The application of mild, slowly-interrupted faradic currents to each muscle exerts a tonic influence in *neurasthenia*, *hysteria*, and the various *sclerotic affections of the spinal cord*.

Galvanism is often a useful local agent in intractable forms of *neuralgia*.

The cure of *aortic aneurism* has been accomplished by the introduction into the sac of several needles attached to the positive pole of a galvanic battery. The treatment, however, can be sanctioned only in exceptional cases, for the clots thus formed are apt to be soft, subjecting the patient to the danger of embolism.

Galvanism has been employed with indifferent success in the reduction of *goitres*, *uterine fibroids*, *tonsillar hypertrophies*, etc.

HEAT.

As a therapeutic agent heat is employed in two forms—dry and moist. Dry heat may be applied locally or to the entire body. In *neuralgia*, *colic*, and various *acute inflammatory affections* dry heat, applied by means of flannel, bran-, salt-, or water-bags, or water-bottles, is often very useful, although it is not generally as efficient as moist heat.

Hot air may be applied to the entire body by conveying under the bed-clothes, through a tin pipe, the heat produced by a spirit-lamp placed on the floor near the patient. Dry heat is also used in the Turkish bath, in which the individual is conducted through a series of heated apart-

ments, the first having a temperature of 95° F., and the last 150° F. The chief object of these high temperatures is to secure through the skin a more free elimination of water or effete matters. They are extremely beneficial in *nephritis*, *chronic rheumatism*, and *general dropsy*.

Moist heat is also applied as a local and a general remedial measure. Its local application may be made by cloths wrung out of hot water or by poultices, and will prove useful in a great variety of acute inflammatory and painful functional diseases. Moist heat may be applied to the general surface of the body by placing the patient in a water-bath having a temperature of 95° to 105° F., or by exposing him to the vapor of hot water, as in the Russian bath. The latter may be imitated by conducting steam from a tea-kettle under the bed-clothes, or by enveloping the body in sheets wrung out of hot water and then covering with blankets. Moist heat serves a useful purpose in "*colds*," *rheumatism*, *uræmia*, *nephritis*, and *collapse*.

LAVAGE.

Lavage is the process of cleansing the stomach by the injection and subsequent ejection of fluid through a stomach-tube. It is accomplished in the following manner: A flexible tube about 38 inches long is moistened with water and passed into the stomach, and a large glass funnel is attached to its free end. The stomach is now filled with water, which is subsequently withdrawn by removing the funnel, lowering the free end of the tube, and establishing a siphon action. The escape of the fluid is further facilitated by the application of gentle pressure to the epigastrium. The process should be repeated until the water returns clear. The therapeutic effects of the washing are enhanced by the addition of a little sodium bicarbonate or of an antiseptic (sodium salicylate, resorcin, or benzoic acid) to the water.

Lavage is often very efficacious in *obstinate chronic gastritis*, *pyloric obstruction*, *cancer*, and *dilatation of the stomach*. It is contraindicated in gastric ulcer, and in cancer when there is a tendency to hemorrhage.

MASSAGE.

This term is applied to the methodical rubbing, kneading, and percussion of the body. The one who practises massage is known as a *masseur* if a male, and as a *masseuse* if a female.

The operator begins at one of the extremities—a foot or hand—and, grasping the tissues with his whole hand, makes regular movements toward the centre of the body, at the same time applying firm pressure by approximating the ball of the thumb and the terminal phalanges of the fingers. Subsequently the individual muscles and muscle-masses are subjected to systematic squeezing, rolling, and pinching. Percussion consists in rapidly tapping the muscles with the tips of the fingers, the sides of the hand, or an instrument devised for the purpose. When the skin is unnaturally sensitive it is advisable for the manipulator to apply a little grease to the fingers before carrying out the various movements. At first the séances should not last longer than fifteen or twenty minutes, but later the time may be prolonged to an hour.

Physiological Action.—Massage acts as a direct muscle- and nerve-stimulant, quickens the lymph- and blood-circulation, and assists in the removal of waste products. Under its influence the patient gains in weight and color, the strength increases, the appetite improves, and the nerves become less sensitive.

Therapeutics.—It is employed both as a local and as a general remedial measure.

In the *paralysis* following apoplexy, neuritis, poliomyelitis, etc. massage is of great value in restoring tone to the affected muscles; even when power is hopelessly lost it serves to prevent or retard the development of contractures. It is often very useful in hastening the absorption of persistent inflammatory exudations, particularly when the latter are in the neighborhood of joints, as in *synovitis*, *rheumatic arthritis*, *sprains*, *fractures*, etc. Its application to the abdomen is beneficial in *chronic constipation* resulting from deficient peristalsis. In *neuralgia*, especially *sciatica*, it may prove serviceable.

As a general measure it may be employed with advantage in *neurasthenia*, *hysteria* accompanied by *nervous exhaustion*, *anæmia*, and the so-called "*irritable spine*." It plays an important part in the "rest-cure" devised by S. Weir Mitchell for the above cases, and which also includes absolute rest, over-feeding, isolation, and faradism.

TRANSFUSION.

Transfusion consists in the introduction into the veins of a patient of living blood, defibrinated blood, or liquids intended as substitutes for blood-serum.

In *immediate* transfusion the blood is conveyed directly from the veins of a donor to the patient's circulation. In *mediate* transfusion the blood is received in a suitable vessel, where it is defibrinated by whipping and straining before it is injected. Warm solutions containing six-tenths of one per cent. (ziss to a quart) of common salt are frequently employed instead of blood, and possess all the advantages of the latter without the attending disadvantages.

Therapeutics.—Transfusion is indicated in the *acute anæmia* resulting from *hemorrhage* and in the collapse of *cholera*. In *uræmia*, after venesection has been practised, the intravenous injection of a normal salt solution—that is, one having the strength above mentioned—is often beneficial. In *diabetic coma* an injection of a 3 per cent. solution of sodium bicarbonate has been found to be temporarily useful.

Hypodermoclysis.—This term has been applied by Cantani to the subcutaneous injection of saline fluids in the algid stage of cholera. From a pint to a quart of normal salt solution having a temperature of 104° F. may be slowly injected from a fountain syringe into the flanks, inner aspect of the thighs, axillæ, or buttocks.

APPLIED THERAPEUTICS.

ACUTE INFECTIOUS DISEASES.

TYPHOID FEVER.

As soon as there is a suspicion that a patient has typhoid fever, he should be confined to bed. The bed-pan must be used from the beginning until convalescence is fully established. The stools should be rendered innocuous by pouring them into a vessel containing about a quart of a solution of chlorinated lime (a pound to a gallon of water), and allowing the mixture to stand at least two hours before disposing of it. Soiled bed-clothes should be thoroughly boiled. Even in the mildest cases an attendant should be constantly at hand, for accidents resulting from sudden delirium are not uncommon. The diet must be liquid, and preferably milk. From two to four pints should be given in the twenty-four hours, so divided that the patient receives a small amount every two hours, day and night. When it causes eructations or flatulence or is discharged undigested, it may be mixed with lime-water or be predigested. Koumiss and junket are often acceptable. Meat broths may be given to vary the monotony of a milk diet, but should not be relied upon exclusively, as they are but sparingly nutritious and are good media for the development of bacteria. Cool water or ice will be required to allay thirst, and even if the latter is absent it is well to give one or the other at regular intervals.

Stimulants.—Many writers advise the use of alcohol in all cases from the very beginning of the attack, but it seems to the author far better to delay its use until the first sound of the heart becomes indistinct and the pulse soft. It should be given at first tentatively, its effects being carefully noted. It is desirable in most cases to give the stim-

ulant with the milk to assist in its digestion, and at the same time to diminish the number of administrations of food and medicine. In the beginning 2 or 3 ounces of brandy or whiskey in the twenty-four hours may be all that is required, but later it may be necessary to increase this amount to 12 or 24 ounces. The quantity must be determined in each case by the general effect.

When the tongue becomes dry and brown, the belly much distended, and low nervous symptoms develop, turpentine will prove an invaluable adjuvant to alcohol; 5 to 10 minims may be given in capsule or emulsion every two or four hours.

When the heart is exceptionally weak strychnine is often very efficacious; from $\frac{1}{40}$ to $\frac{1}{20}$ of a grain may be given every three or four hours. To tide over periods of great prostration it may be necessary to use ether or ammonia hypodermically.

Special Remedies.—Antiseptics like thymol, salol, zinc, sulphocarbolate, iodoform, sulphites, α -naphthol, β -naphthol, calomel, and chlorine-water are not required in many cases, but when there is much flatulence or diarrhœa they are decidedly useful. Thymol and chlorine-water are probably the most efficient and the least irritating; the former may be given in doses of 2 or 3 grains every two hours with the food, and the latter in doses of 1 or 2 fluidrachms in a wineglassful of water every three hours.

Pepper strongly advocates the use of silver nitrate, believing that it exerts a favorable influence on the inflammatory process present in the bowel. He prescribes it according to the following formula:

R Argenti nit.,	gr. vj;
Ext. opii,	
Ext. belladonnæ,	āā gr. ij;
Mannæ,	q. s.
M. et div. in pil. No. xxiv.	

Sig. A pill three times a day, soon after food. If diarrhœa develop, the belladonna may be omitted and the opium be increased; if constipation be present, the opium may be dropped and ext. nuc. vomicæ, gr. $\frac{1}{5}$, be added to each pill.

The employment of hydrochloric acid has been urged by many writers; while its routine use is not to be com-

mended, it is certainly of unquestionable value when the digestive powers are much impaired.

Fever.—High temperature is best controlled by the cold bath or the cold pack; these measures not only reduce the fever, but also act as powerful stimulants which serve to prevent the development of severe nervous symptoms. Brilliant results have been obtained by using the cold bath throughout the attack as often as the temperature in the mouth rises to 102.5° F. (See *Cold*.) In a series of over 1000 cases treated by this method the mortality, according to Brand, was only one per cent. When cold bathing is not feasible, fever must be kept within safe limits by sponging with cool water to which alcohol or vinegar may be added, and by the administration of moderate doses of antipyrine (gr. v–x), phenacetine (gr. v–x), or antifebrin (gr. v–x). Quinine (gr. xx–xl) may also be used, but it is not so powerful as the former drugs, and in such doses no less depressing.

Diarrhœa.—When the diarrhœa exceeds more than two or three stools a day, it should be checked. In mild cases an opium suppository (gr. j powd. opium) at night will be all that is required. If it be troublesome, bismuth subnitrate or nitrate of silver may be given by the mouth :

℞ Morph. sulph.,	gr. j;
Creosoti,	gr. vj;
Bismuth. subnit.,	℥ss.—M.
Ft. in chart No. xii.	
Sig. One every two or three hours.	

Or,

℞ Argenti nit.,	gr. iij;
Pulv. opii,	gr. vj;
Ft. in pil. No. xii.	
Sig. One every three hours.	

In very obstinate cases copper sulphate with opium in pill proves useful.

Constipation.—This is best overcome by diet. Beef tea or strained oatmeal gruel may be alternated with the milk. When more than dietetic change is necessary, an enema or glycerin suppository should be tried before resorting to remedies by the mouth. In obstinate cases

small doses of calomel, castor oil, or Epsom salt may be given at frequent intervals until the desired effect is secured.

Tympanites.—Excessive flatulence may be a troublesome symptom. It is sometimes entirely overcome by employing only predigested milk. It is often relieved by the external application of turpentine stupes and the administration of turpentine or one of the intestinal antiseptics. An enema of turpentine or of an emulsion of asafœtida is often efficient. In obstinate cases a tube of soft rubber may be passed as far as possible into the bowel.

Hemorrhage.—This complication should be combated by the application of an ice-bag over the right iliac fossa, and the internal administration of turpentine, gallic acid, or tannic acid. Opium, by lessening peristalsis, is very useful. When the bleeding is copious morphine (gr. $\frac{1}{8}$) and ergotine (gr. v-x) should be given hypodermically.

Delirium, Restlessness, Insomnia, etc.—Severe nervous symptoms may be due to one of three causes: enfeebled circulation, high temperature, or toxins in the blood. When one of the first two causes is operative the indications are apparent. When toxins are responsible for the nervous disturbance, such sedatives as hyoscine hydrobromate (gr. $\frac{1}{100}$), musk (gr. xv), sulphonal (gr. xx-xxx), codeine (gr. $\frac{1}{4}$), morphine (gr. $\frac{1}{8}$), or asafœtida (gr. iv in suppository) may afford relief.

Headache is rarely persistent. When severe, an ice-bag may be applied to the head, and small doses of potassium bromide (gr. xx) or of antipyrine (gr. vj) given internally.

Perforation.—This complication is almost invariably fatal. Absolute rest and extremely restricted diet, warm applications to the abdomen, and full doses of opium are the therapeutic measures indicated. While laparotomy is rarely warrantable during the attack, on account of the extreme prostration of the patient and the extensive ulceration of the bowel, it may be practised when the accident occurs during convalescence.

Hypostatic Congestion of the Lungs.—Frequent change of position and the timely use of cardiac stimulants may prevent serious pulmonary congestion. When

severe enough to embarrass the respiration and circulation, stupes or dry cups should be applied externally, and strychnine or ammonium carbonate given internally. In critical cases oxygen inhalations sometimes prove useful.

Bed-sores.—This complication can often be prevented by absolute cleanliness, by frequently changing the position of the patient, and by the application of whiskey or whiskey and alum to parts most subjected to pressure. When actually developed, bed-sores may be dusted with iodoform and then covered with soap plaster or stiff zinc ointment. An air- or water-bed will greatly facilitate their healing.

TYPHUS FEVER.

As typhus fever is a contagious disease, the patient must be isolated and every precaution taken to prevent the spread of the contagion. There is no specific treatment. Quinine and mineral acids are useful tonics. Pyrexia, nervous phenomena, heart-failure, and pulmonary congestion will require the same treatment as in typhoid fever.

RELAPSING FEVER.

As in all contagious fevers, the patient should be isolated, kept at absolute rest, and restricted to the use of liquids. The chief indications are to control the fever, support the heart, quiet the stomach, and relieve the intense pains in the head, back, and limbs.

Fever.—On account of the short duration of the febrile paroxysms and the comparative absence of cerebral symptoms, high temperature is not so serious as it is in typhoid and typhus fevers. When, however, the pyrexia is unusually severe and protracted, it may be controlled by the use of cold baths, or, when these are not feasible, by sponging with cold water and the internal administration of anti-pyrine, phenacetine, or antifebrin.

Heart-failure.—Such remedies as alcohol, strychnine, ammonia, and ether are generally called for at some period of the disease.

Vomiting.—This symptom may be so troublesome as to require the local application of heat or cold to the

stomach, and the exhibition of cracked ice or small doses of bismuth (gr. x), calomel (gr. $\frac{1}{8}$), dilute hydrocyanic acid (gtt. j), or wine of ipecac (gtt. j).

Pains.—These may be so severe as to demand frequent injections of morphine. Antipyrine, phenacetine, and similar analgesics are worthy of trial. Rubefacient liniments are useful. For the relief of the aching pain in the back no application is so efficient as a large hot-water bag.

CEREBRO-SPINAL FEVER.

Cerebro-spinal fever, or cerebro-spinal meningitis, is not contagious, but distinctly infectious; hence discharges, bed-linen, etc. should be thoroughly disinfected. The diet must be liquid or semi-liquid, and given at regular and frequent intervals. In sthenic cases the application of wet cups over the back, from the nape of the neck to the sacrum, is certainly useful. Ice-bags may be applied to the head and along the spinal column. Pain and restlessness are best relieved by morphine and atropine, which may be injected along the course of the most painful nerves. When the pulse weakens, stimulants should be given freely. Ergot, mercury, quinine, and physostigma have been recommended by different writers, but they are of doubtful efficacy. High fever may be controlled by sponging with cold water, by the cold pack, or by the internal use of phenacetine or antipyrine.

During convalescence tonics, blisters, or applications of the actual cautery to the spine, and potassium iodide as an absorbent, are indicated. If paralysis remain, massage and electricity should be applied to the affected muscles, and strychnine cautiously administered by the mouth.

MALARIAL FEVER.

Malarial intoxication may manifest itself as intermittent fever, remittent fever, pernicious malarial fever, or chronic malarial cachexia. As prophylactic measures, persons living in malarial districts should avoid the night and early morning air, and should take quinine (gr. iij-v a day) during the seasons in which the disease is most prevalent.

Intermittent Fever.—During the cold stage of the paroxysms it is well to cover the patient with warm blankets and to apply hot cans or bottles to the feet. When the chill is severe and prolonged morphine is very useful; it is best given hypodermically. Hoffmann's anodyne (ʒss) by the mouth may be employed as a substitute. Inhalations of nitrite of amyl cause dilatation of the superficial blood-vessels, and in this way serve to shorten the chill. During the hot stage much relief is afforded by frequently sponging the body with cold water, and, if the symptoms are severe, by administering small amounts of phenacetine or antipyrine. In the interval it is well to begin the treatment by the use of a laxative, and calomel or blue mass may be selected. This should be followed by quinine, 15 to 20 grains in the twenty-four hours, so divided that the last dose is taken about two hours before the expected paroxysm. To children quinine may be given in lozenges made with chocolate and sugar; to adults in fresh pills or capsules. The doses referred to should be continued until the paroxysms disappear, when the amount may be gradually diminished.

Arsenic is another remedy of value in malarial fevers; it cannot replace quinine during the acute stage of the disorder, but it is a valuable adjunct during convalescence. Among antiperiodics of less value may be mentioned eucalyptus, salicin, antipyrine, Warburg's tincture, and methylene blue.

Remittent Fever.—In this type quinine (gr. xx-xxx) should be given in divided doses at regular intervals during the day. A laxative dose of calomel enhances the effect of the antiperiodic. When the stomach is irritable calomel and soda may be given by the mouth, and the quinine by the rectum or hypodermically. In some cases Warburg's tincture is useful; half an ounce undiluted may be given, and repeated in two or three hours. After its administration the patient should be thoroughly covered with blankets, so as to favor free diaphoresis.

Pernicious Malarial Fever.—In this form of malarial infection no time should be lost in cinchonizing the patient, since the second or third paroxysm not infrequently termi-

nates fatally. Ten to twenty grains of quinine in solution with a little tartaric acid should be given every two hours:

℞ Quininæ sulph.,	gr. xl;
Sat. sol. acid. tartar.,	℥xlviij;
Aquæ destil.,	q. s. ad ℥ij.—M.
Sig. ℥xxx = gr. x.	

When the pulse weakens, such stimulants as whiskey, ammonia, and strychnine may be given freely. High temperature is best controlled by the external application of cold. In the algid form heat should be applied externally, and opium given by the mouth or hypodermically. In the hemorrhagic form opium is also useful, and may be associated with hæmostatics like turpentine, erigeron, or hamamelis.

Chronic Malarial Cachexia.—In this condition a change of scene, rigid hygiene, and a carefully regulated diet, coupled with the administration of iron, quinine, and arsenic, are of great value.

SCARLET FEVER.

The patient must be isolated. Every precaution is necessary to prevent the spread of the contagion. The room should be well ventilated, but free from draught. The diet should be liquid. It is a good plan to anoint the surface of the body two or three times daily with cold cream, cocoa-butter, or carbolized vaseline, to allay irritation. Refrigerant drinks like lemonade or carbonic-acid water are useful. Gastric irritability may call for small doses of calomel, bismuth, or nitrate of silver. When the stomach will bear it, the tincture of the chloride of iron seems to be of some value. It may be given with dilute hydrochloric acid, as in the following formula:

℞ Tinct. ferri chlor.,	℥ij;
Acid. hydrochlor. dil.,	℥ij;
Syr. limonis,	℥ij;
Aquæ,	q. s. ad ℥ij.—M.
Sig. A teaspoonful in water every two or three hours.	

Throat Symptoms.—External applications to the throat are often needed; an ice poultice or warm fomentations may be selected, according to the feelings of the patient.

The fauces and pharynx should be kept clean by antiseptic washes or sprays, such as Dobell's solution, peroxide of hydrogen (1 part to 3 parts of water), or dilute listerine. In many cases the following application is useful:

R Tinct. ferri chlor.,	fʒij;
Potassii chlorat.,	gr. xxx-xl;
Glycerini,	fʒss;
Aquæ,	q. s. ad fʒiij.—M.

Sig. Paint or spray the throat every two or three hours.

High fever is best controlled by sponging, by the cold pack, or by the graduated cold bath.

Nervous Symptoms.—Headache, insomnia, restlessness, etc., when not due to pyrexia, should be treated by the application of an ice-bag to the head and the internal administration of chloral, bromide, or opium. The first is particularly useful, and may be given to children in doses of 2 or 3 grains repeated once or twice.

In **acute otitis media** nothing gives so much relief as filling the ear with hot water. The application of a leech behind the ear is also useful. When the tympanic membrane bulges, indicating the presence of pent-up pus, the latter may be evacuated by puncture. A discharging otitis media is well treated by insufflations of dry boric acid.

The urine should be examined daily for evidence of **nephritis**, and, if the latter develop, the diet should be cut down to skimmed milk or buttermilk. Dry cups or warm fomentations over the loins are useful. Catharsis should be encouraged by small amounts of Epsom salt, and diaphoresis by warm baths or small doses of jaborandi. Alkaline diuretics and digitalis may be of service when the urine becomes very scanty.

Cardiac weakness will call for stimulants like alcohol, ammonia, and strychnine.

MEASLES.

The treatment of measles is purely symptomatic. As it is a contagious disease, the patient ought to be isolated. Although it is apparently mild in its manifestations, serious

complications are liable to develop, and therefore absolute rest in bed, a liquid diet, and rigid hygiene are essential. The room should be kept dark. Refrigerants like sweet spirits of nitre and liquor ammonia acetatis are useful, and may be combined with a little aconite :

R Tinct. aconit., gtt. v;
 Spt. æther. nitrosi, fʒj;
 Liq. ammon. acetat., q. s. ad fʒij.—M.

Sig. A teaspoonful in water every two hours for a child of five years.

When the **bronchial catarrh** is troublesome it may require the application of a cotton jacket and the administration of an expectorant and sedative :

R Ammon. chlorid.,
 Ammon. bromid., aa ʒj;
 Spt. æther. nit., fʒss;
 Syr. pruni. virg., q. s. ad fʒij.—M.

Sig. A teaspoonful every three hours.

Severe cough may be checked by a little paregoric or Dover's powder.

If **broncho-pneumonia** develop, ammonium carbonate and whiskey may be requisites.

Gastric irritability will call for bismuth, minute doses of calomel with soda, or silver nitrate. **High fever** is best controlled by sponging with tepid water. During **desquamation** it is well to anoint the skin with cocoa-butter, cold cream, or carbolized vaseline. During convalescence nutrients like cod-liver oil and malt, and tonics like iron, quinine, and strychnine, are indicated.

INFLUENZA.

No specific has yet been discovered for this disease. The hygienic measures called for are absolute rest in bed, a carefully selected diet, pure air without draught, and attentive nursing.

Quinine is a useful stimulant, and if well borne may be given in small doses throughout the attack. The severe pains call for special remedies. Hot-water bags may be applied to the head and spine. Morphine, phenacetine or antipyrine, and the salicyl compounds are the best anal-

gesics. Combinations like the following generally afford relief:

℞ Salol, ℥^{ss};
 Phenacetin., gr. xlviij.—M.
 Ft. in chart No. xii.
 Sig. One every two hours.

Or,

℞ Quinin. salicylat., gr. xl;
 Phenacetin., ℥j.—M.
 Ft. in capsul. No. xx.
 Sig. One every two hours.

Or,

℞ Salicin., ℥iij;
 Phenacetin., gr. xvj;
 Olei gaulther., gtt. xv;
 Syr. acaciæ, ℥^{vij}—M.
 Sig. A teaspoonful every hour or two. (Curtin and Watson.)

High temperature is best controlled by sponging with cold water and the use of antipyrine or phenacetine in small amounts. **Heart-failure** should be combated by alcohol and strychnine. **Bronchial catarrh** will require the remedies indicated in simple bronchitis. Sleep may be induced by opium, sulphonal, or chloralamid.

WHOOPING-COUGH.

The treatment of whooping-cough is purely symptomatic. Woollen underclothing, protection from changes of weather, and a nutritious but easily assimilable diet are essential. Counterirritants like iodine applied to the chest seem useful. Of the numerous antispasmodics which have been advocated from time to time, the best are probably belladonna, potassium or sodium bromide, antipyrine, bromoform, and asafoetida. These remedies are in no sense specifics, but they lessen to some extent the severity and frequency of the paroxysms. A combination of belladonna and a bromide is often serviceable:

℞ Sodii bromidi, ℥^{iss};
 Tinct. belladonnæ, ℥j;
 Glycerini, ℥^{ss};
 Aquæ, q. s. ad ℥^{ij}—M.
 Sig. A teaspoonful every three or four hours.

Antipyrine may be prescribed as follows :

℞ Antipyrin.,	gr. xl;
Syr. toltan.,	fʒj;
Aquæ,	q. s. ad fʒij.—M.

Sig. A teaspoonful every two or three hours.

Much testimony bearing on the value of bromoform in pertussis has accumulated in the last few years. A colorless preparation should always be selected, since the presence of color indicates decomposition. It may be given in doses of 3 to 5 drops several times a day to children of five years.

Asafoetida is a valuable remedy, but its odor and taste are objectionable. Five grains in suppository, however, if administered on retiring, will often secure a night's rest. Quinine is a reliable tonic, and may be employed through the disease. When the paroxysms are very severe the inhalation of 2 or 3 drops of nitrite of amyl from a handkerchief will often abort them.

Sprays or inhalations of solutions containing sedatives or antiseptics often afford considerable relief. For use in this way carbolic acid, cocaine, resorcin, chloroform, quinine all have had their advocates. The author's preference is for menthol dissolved in liquid vaselin; thus :

℞ Menthol,	gr. xx;
Liq. vaselin,	fʒj.—M.

Sig. Spray the naso-pharynx and inhale several times daily.

In very young children a solution of menthol may be inhaled from a cloth held under the chin.

Convalescence should be guarded. Iron, arsenic, strychnine, and cod-liver oil are useful restoratives.

VARICELLA.

In this disease the therapeutic measures are rest, liquid diet, refrigerant drinks, and the application of some sedative lotion or ointment to allay itching and prevent scratching.

ERYSIPELAS.

Erysipelas is contagious. Puerperal and surgical patients are particularly liable to be infected when exposed to the

contagion. Isolation, thorough disinfection, absolute rest, and a liquid diet are general therapeutic measures which should not be neglected.

Internal Treatment.—Tincture of the bichloride of iron, while in no sense a specific, seems to exert a beneficial influence on this disease. When the stomach will tolerate it, it should be given in doses of 20 to 30 minims every two hours. Restlessness, delirium, and insomnia will call for chloral, bromide, or opium. Stimulants are frequently indicated. When typhoid symptoms are present turpentine (5 min. every two hours) is very useful.

Local Treatment.—Of the various local applications which have been recommended, the best, perhaps, are antiseptic lotions, lead-water and laudanum, and an ointment of ichthyol. The application of cloths wrung out of a solution of corrosive sublimate (1 : 5000) or a saturated solution of boric acid is preferred by many. Ichthyol is very useful; it may be prescribed as follows:

R Ichthyol, $\frac{3}{4}$ ss;
 Vaseline, $\frac{3}{4}$ ij.—M.
 Sig. Spread thickly on lint and apply to the affected parts.

Koch recommends—

R Creolin, $\frac{3}{4}$ j;
 Iodoform, $\frac{3}{4}$ iv;
 Lanolin, $\frac{3}{4}$ x.—M.
 Sig. Apply a thin layer to the affected surface.

The application of firm bandages or of caustics and the injection of antiseptic solutions around the inflammatory patch, with the view of preventing its spread, are very painful and rarely efficacious.

RUBELLA, or RÖTHELN.

Rubella is such a mild disease that treatment is rarely required; when it is necessary the indications are the same as those of measles.

SMALL-POX.

Prophylaxis consists in vaccination, isolation, and disinfection. The incubation stage of vaccinia being shorter

100
3
33
250

than that of small-pox, the severity of the latter is sometimes lessened by prompt vaccination after exposure to the infection. The diet must be liquid or semi-liquid, and may consist of milk, broth, eggs, gruel, etc. The free use of water, lemonade, or soda-water is to be encouraged.

The severe **lumbar pains** which characterize the initial stage of the disease will require opium, antipyrine, or phenacetine, and the application of hot-water bags. The **initial fever** is best controlled by hydrotherapy, but when this is not feasible recourse may be had to antipyrine or phenacetine. The **secondary fever** resulting from the suppuration of the cutaneous lesions may resist the usual antipyretic measures; in such cases it is well to support the patient by giving full doses of quinine. Alcoholic stimulants are frequently required. It is important to secure thorough disinfection of the naso-pharynx. This may be accomplished by sprays of dilute peroxide of hydrogen, Dobell's solution, or dilute carbolic acid (2 or 3 grains to the ounce). The eyes must be kept clean by the frequent application of washes of boric acid (15 grains to the ounce) or corrosive sublimate (1:6000). Severe **nervous symptoms** may call for opium, bromide, chloral, hyoscine, or sulphonal.

The Prevention of Pitting.—The room should be darkened and the face covered with cloths soaked in dilute carbolic acid (10 drops to the ounce) or bichloride of mercury (1:5000 to 1:10,000), or with ointments spread on masks. Ointments are not generally so useful as antiseptic lotions. Dujardin-Beaumez speaks highly of an ointment composed of 4 parts of sodium salicylate to 100 parts of cold cream. Hebra has employed continuous warm baths with considerable success. In discrete small-pox it is a good plan to open the vesicles and lightly touch their bases with a stick of silver nitrate. Despite the best efforts, when the lesions are numerous and are deeply situated pitting almost invariably follows. The separation of scabs may be facilitated by inunctions with vaselin or glycerin and the use of warm baths.

YELLOW FEVER.

Sternberg recommends the following preventive measures during epidemics of yellow fever: (*a*) exclusion of the exotic germ of the disease by the sanitary supervision, at the port of departure, of ships sailing from infected ports, and thorough disinfection at the port of arrival when there is evidence or reasonable suspicion that they are infected; (*b*) isolation of the sick on shipboard, at quarantine stations, and, so far as is practicable, in recently-infected places; (*c*) disinfection of excreta and of the clothing and bedding used by the sick, and of localities into which cases have been introduced or which have become infected in any way; (*d*) depopulation of infected places—*i. e.* the removal of all susceptible persons whose presence is not necessary for the care of the sick.

There is no specific for yellow fever, and hence the disease cannot be aborted. Absolute rest in a well-ventilated room, perfect cleanliness, and careful nursing are essential. On account of the irritability of the stomach the diet should consist of small quantities, at frequent intervals, of iced milk, barley-water, albumin-water, and frozen beef tea or chicken broth. Unless the bowels have been recently moved, it is well to begin the treatment by administering a gentle laxative.

Obstinate vomiting must be combated by the application to the epigastrium of an ice-bag or warm fomentations, and the internal use of blocks of ice, carbonated waters, chloroform, cocaine, bismuth, carbolic acid, or silver nitrate. In severe cases it will be necessary to give morphine hypodermically or by the bowel. Bemiss has obtained good results with the following mixture:

R Sodii bicarb.,	gr. xx;
Morphinæ sulph.,	gr. ss;
Aquæ laurocerasi,	
Aquæ menth. pip.,	āā ℥iv.—M.
Sig. A teaspoonful after every act of emesis.	

Gastric hemorrhage is a serious complication. The ordinary hæmostatics—gallic acid, acetate of lead, turpentine, and ergot—are rarely useful. The tincture of the chloride of iron is sometimes of service, although it fre-

quently fails. Such stimulants as whiskey, ammonia, ether, and strychnine are often required, and when the stomach is intolerant they may be given hypodermically. **Suppression of urine** will call for dry cupping over the loins and the use of alkaline diuretics. **High temperature** is best controlled by the external application of cold. **Restlessness, insomnia, and delirium** may be relieved by opium, hyoscine, duboisine, or sulphonal.

DIPHTHERIA.

Diphtheria being highly contagious, the utmost care should be taken to prevent the spread of the infection. The preventive measures are isolation, absolute cleanliness, and disinfection. The diet must be nutritious but easily assimilable; it may consist of milk, koumiss, broths, and eggs.

There are two internal remedies of considerable value—iron and mercury. From 3 to 5 drops of the tincture of the chloride of iron may be given every three or four hours to a child of five years. Potassium chlorate is sometimes given in solution with the iron, but, since its action is purely local and its internal administration may cause irritation of the kidneys, its use in this way is objectionable. Mercury may be given in the form of calomel or of corrosive sublimate. If calomel be selected, it may be prescribed as follows :

℞ Hydrarg. chlor. mit.,	gr. ij;
Sodii bicarb.,	gr. xxiv;
Pulv. aromat.,	gr. vj.—M.
Ft. in chart. No. xii.	
Sig. One powder every hour to a child of three years.	

Corrosive sublimate may be given in doses of $\frac{1}{40}$ to $\frac{1}{30}$ of a grain every two hours. A combination of iron and the bichloride often acts favorably :

℞ Hydrarg. chlor. corros.,	gr. j;
Tinct. ferri chlor.,	
Spt. vini rect.,	aa fʒij;
Syr. limonis,	
Aquæ,	aa fʒij.—M.

Sig. A teaspoonful every two or three hours for a child of five years.

Children affected with diphtheria bear mercury extremely well, and salivation is very rare, even when large doses are employed. Pilocarpine has been extolled by Guttmann and others. It seems to be most useful in laryngeal diphtheria, but it should never be employed when the heart is weak. Stimulants like alcohol and strychnine are requisite in most cases, on account of the great tendency to heart-failure.

The atmosphere of the room should be rendered moist by slaking lime, by evaporating water on a stove or over a spirit-lamp, or by means of a steam-atomizer. Oil of turpentine or eucalyptol may be added to the water with advantage.

Local Treatment.—Efforts should be made to dissolve the false membrane or to destroy by germicides its infectious character. Lactic acid and pepsin, lime-water, a solution of papayotin, and peroxide of hydrogen are the most reliable solvents. The last two are the best. Papayotin may be prescribed as follows

℞ Papayotin.,	ʒj;
Aquæ,	ʒiv;
Glycerini,	ʒviii.—M.
Sig. Apply locally to the false membrane.	(Jacobi.)

Peroxide of hydrogen is tasteless, innocuous, and rapid in its action, and when applied properly diluted is quite free from irritant properties. The 15-volume solution found in the markets should be diluted about one-fourth.

Antiseptic sprays or douches are of great value. Dobell's solution, bichloride of mercury, eucalyptol, boric acid, sodium benzoate, chloride of iron, carbolic acid, iodoform, and thymol have all had their advocates. For all but the youngest children a solution of bichloride (1 : 3000) is very efficient. In the nasal form Starr recommends—

℞ Acid. boric.,	āā ʒss;
Sodii borat.,	gr. xx;
Sodii chlor.,	Oss.—M.
Aquæ,	
Sig. Inject a teaspoonful, warm, in each nostril every two hours.	

The swelling of the cervical glands and the accompanying soreness outside of the throat are best relieved by an

ice poultice, warm fomentations, or iodine. When the swelling of the glands is marked the following application is very useful :

℞ Ichthyol.,	ʒij;
Ung. belladonnæ,	ʒiv;
Ung. hydrargyri,	ʒj.—M.

In laryngeal diphtheria, as soon as the symptoms of obstruction (dyspnœa, cyanosis, aphonia, sinking in of the suprasternal notch and epigastrium) become marked, intubation or tracheotomy should be performed. The percentage of recoveries after either operation is about the same—25 per cent. Diphtheria is not infrequently followed by paralysis, which is due to toxic neuritis, and which most commonly affects the pharyngeal muscles. It should be treated by rest, tonics, and the application of electricity. Strychnine is quite useful.

Convalescence must be managed with special care. The danger of sudden death from heart-failure at this time requires the exercise of great caution in preventing the slightest physical strain.

MUMPS.

The patient should be confined to bed and protected from draughts. Mild refrigerants may be given internally. Locally, lead-water and laudanum or some rubefacient liniment like the following may be employed :

℞ Tinct. iodi.,	
Tinct. aconit.,	
Tinct. opii,	āā ʒij;
Liniment. chloroform.,	q. s. ad ʒiij.—M.

If **orchitis** develop, the testicle should be elevated and covered with lint saturated with lead-water and laudanum. After the acute symptoms have subsided an ointment of mercury and belladonna will be found useful in reducing the swelling.

CHOLERA.

The prophylactic treatment of cholera includes isolation of the sick; absolute cleanliness; the disinfection of excreta, soiled clothing, etc.; the thorough boiling of all

water that is to be used for drinking purposes; the use of a bland, easily digestible diet; the avoidance of overwork, exposure to cold and wet, and undue excitement; and the prompt treatment of any gastro-intestinal disturbance that may arise.

When vomiting is obstinate, it is useless to administer food. As soon as the stomach becomes tolerant, the diet should consist of light broths, iced milk with carbonated water, champagne, wine-whey, thin gruel, blocks of frozen beef tea, which must be given in small amounts at frequent intervals. Thirst is best assuaged by cracked ice *ad libitum* and acidulated drinks.

The painful **muscular cramps** call for hypodermic injections of morphine. Rubbing with camphorated liniment or warm oil, gentle kneading, and warm fomentations are also recommended. Sansom recommends inhalations of chloroform alternating with inhalations of amyl nitrite.

For the **vomiting** a mustard poultice may be applied to the epigastrium, and champagne, carbolic acid, cocaine, or dilute hydrocyanic acid may be given internally.

Among the special remedies which have been found useful may be mentioned salol, lactic acid, sulphuric acid, sulphurous acid, bismuth salicylate, and benzo-naphthol. Sulphuric acid has many advocates; it may be given with a few drops of laudanum or chlorodyne. Brunton has recommended the combination of atropine with morphine, with the view of antagonizing the influence of the ptomaines formed in the bowel. Cantani and numerous followers have obtained good results from hot rectal injections containing 1 per cent. of tannic acid and 20 to 30 drops of laudanum. From 3 to 4 pints of this liquid, at a temperature of 140° F., should be injected every two or three hours. The object of the hot enemata is to ward off collapse and to remove toxic material from the bowel.

Collapse will call for hot blankets or, better, immersion in hot water; the hypodermic injection of diffusible stimulants like alcohol, ether, and ammonia; hot-water enemata; and subcutaneous saline injections. The last are very useful. From 1 to 3 pints of warm water (104° F.) containing $\frac{6}{10}$ per cent. of sodium chloride may be injected in the

region of the floating ribs or in the flanks from a fountain syringe. Unless collapse is very marked, from half to three-quarters of an hour will be required to effect the absorption of a quart of the fluid.

CONSTITUTIONAL DISEASES.

RHEUMATISM.

Acute Articular Rheumatism.—Rest in bed is essential. The room must be well ventilated, but free from draught. To guard against chilling of the body, the patient should lie between blankets. The nourishment should consist of milk, beef tea, broths, and gruel. The free use of lemonade or mineral waters is to be encouraged.

Two remedies have considerable power in controlling the disease—salicyl compounds and the alkaline salts of potassium. These remedies may be given separately or in combination. The salicylates relieve the pain, but do not prevent relapses or cardiac complications; the alkalies apparently lessen the tendency to endocarditis. Ten to twenty grains of sodium salicylate may be given every two hours:

℞ Sodii salicylat.,	ʒij;
Tinct. cardamom. comp.,	ʒiv;
Glycerini,	ʒss;
Aquæ,	q. s. ad ʒiv.—M.

Sig. A tablespoonful every two hours.

The oil of gaultheria (℥x every two hours) is another valuable salicyl compound. If alkalies are employed, a drachm of the citrate, acetate, or bicarbonate of potassium may be given every two hours until the urine becomes distinctly alkaline. It is a good plan to combine alkalies with salicylates; thus:

℞ Sodii salicylat.,	ʒij;
Potass. citrat.,	ʒij;
Glycerini,	
Tinct. cardamom. comp.,	aa ʒss;
Aquæ,	q. s. ad ʒv.—M.

Sig. A tablespoonful every two hours.

When sodium salicylate is not well borne, salophen (gr. xv to xx) will be found an excellent substitute. Usu-

ally, the salicylates are sufficient to relieve the pain, but when this is not the case recourse may be had to opium, preferably in the form of Dover's powder, acetanilid, or phenacetine. The last two remedies not only act as analgesics, but also favorably influence the disease.

When there is much weakness and anæmia, quinine, iron, and strychnine are useful tonics. The occurrence of hyperpyrexia is a grave feature, and should be treated promptly by the cold bath. For the treatment of cardiac complications the reader is referred to the article in which those subjects are specially considered.

Local Treatment.—The joints may be painted with iodine and wrapped in cotton-wool. In severe cases small blisters are of great utility. Chloroform liniment, aconite liniment, and lead-water and laudanum are also efficient remedies. The salicyl preparations when applied locally often relieve the pain better than any other remedies. The following mixture may be employed:

R Æther.,	
Alcohol.,	
Ol. gaultheriæ,	āā fʒj;
Liniment. saponis,	q. s. ad Oj.—M.

An ointment of ichthyol and belladonna is often very serviceable:

R Ichthyol.,	ʒij;
Ext. belladonnæ,	ʒj;
Vaselín.,	ʒij.—M.
Sig. Apply locally.	

Fuller recommends—

R Tinct. opii,	fʒj;
Potass. carb.,	ʒss;
Glycerini,	fʒij;
Aquæ,	q. s. ad fʒxij.—M.
Ft. lotio. To be applied by means of lint.	

Chronic Rheumatism.—Espécial attention must be given to hygiene, particularly as regards diet, bathing, clothing, exercise, and occupation. A change of residence to a dry, warm, equable climate may effect a cure. As the tone of the system is often reduced, tonics like iron, quinine, strychnine, and arsenic may be of considerable value.

The special remedies are potassium iodide, guaiac, sulphur, salicylic acid, colchicum, and alkalies like the salts of potassium and lithium. Combinations like the following often prove useful :

℞ Pulv. guaiaci resin.,	
Potass. iodidi,	aa ℥j ;
Tinct. colchici sem.,	f℥iij ;
Syrupi,	f℥ij ;
Aquæ cinnamomi,	q. s. ad f℥vj.—M.

Sig. A dessertspoonful to a tablespoonful twice daily.

Or,

℞ Liq. potass. arsenitis,	f℥ij ;
Potass. iodidi,	℥ij ;
Syrupi,	f℥iij.—M.

Sig. A teaspoonful three times a day in water, after meals. (DaCosta.)

Or,

℞ Potass. iodidi,	℥iij ;
Vini colchici sem.,	
Tinct. opii camph.,	aa f℥ij ;
Tinct. stramonii,	f℥vj ;
Tinct. cimicifugæ,	f℥iij.—M.

Sig. A teaspoonful in water thrice daily.

Local Treatment.—Iodine, small blisters, and rubefacient liniments are useful applications. An ointment of ichthyol, mercury, and belladonna well rubbed into the affected part is very valuable. Massage, electricity, and steam-baths are remedies well worthy of trial in obstinate cases.

Muscular Rheumatism.—Under this head are included lumbago, torticollis, and pleurodynia of rheumatic origin. The general measures referred to in discussing the treatment of articular rheumatism are applicable here. The affected muscles should be put at arrest. In pleurodynia this is best accomplished by strapping the affected side as for fracture of the ribs. In lumbago a large piece of adhesive plaster may be applied from the floating ribs to the iliac crests. In mild cases the thorough application of liniments containing chloroform, aconite, belladonna, and laudanum will be all that is required. In other cases prompt relief often follows the injection of morphine (gr. $\frac{1}{8}$ – $\frac{1}{4}$) with atropine (gr. $\frac{1}{125}$) directly into the muscle. The continuous current is sometimes useful. The introduction of

needles, three or four inches long, deeply into the muscles (acupuncture) sometimes gives brilliant results.

The internal remedies are the same as in chronic articular rheumatism. Gelsemium pushed to its physiological limit has been successful when other remedies have failed.

GOUT.

Acute Gout.—The most efficient remedy is colchicum; 10 to 20 drops of the wine, well diluted, should be given every two hours, and stopped as soon as the symptoms subside. Alkalies are valuable adjuncts, and the salts of potassium or of lithium may be given with the colchicum. The free use of water should be encouraged, and one of the natural lithia waters may be recommended. Constipation should be relieved by a full dose of blue mass or a saline draught. Opium may be required for the relief of pain. The diet should be light and non-stimulating.

The affected part should be elevated and wrapped in cotton-wool or covered with cloths soaked in lead-water and laudanum.

Chronic Gout.—The diet must be restricted, and carefully arranged for each patient. Light meats, fish, eggs, and oysters may be used in moderation; sweet fruits should be avoided; starches and sugars must be limited in amount, and the use of liquors interdicted. The condition of the tongue, stomach, and urine will indicate the value of this or that dietary. Mineral waters are often serviceable. To the water itself rather than the small amount of saline matter which they contain is to be attributed their efficacy. Their utility will be enhanced by the addition of a teaspoonful of some effervescing salt of lithium to each potation. Free secretion of the skin is to be encouraged by frequent bathing followed by friction. In some cases the Turkish bath may be employed with advantage. The bowels should be kept regular by salines or by the occasional use of a mercurial laxative. Graduated exercise holds a prominent place in the therapy of gout. When the digestive powers are particularly weak, mineral acids with strychnine will prove useful. General tonics are sometimes indicated.

The special remedies are colchicum, lithium, and potassium iodide :

℞ Vini colchici sem.,	fʒss;
Potass. iodidi,	ʒij;
Liq. potass.,	fʒiss;
Tinct. zingiber.,	fʒij.—M.
Sig. A teaspoonful twice daily in hot water.	(Hodgson.)

Residence in a dry, warm, and equable climate is always desirable, especially during the changeable seasons of the year.

The arthritic condition is best treated by massage, friction, shampooing, and warm sulphur-baths.

RHEUMATOID ARTHRITIS.

The most that can be expected from treatment in rheumatoid arthritis is amelioration of the symptoms. The remedies relied upon in rheumatism and gout are practically useless in this disease. Tonics like iron, quinine, arsenic, phosphorus, and cod-liver oil are useful. The most good is to be expected from local treatment which consists of massage, electricity, steam-baths, and inunctions of preparations containing mercury or iodine.

RICKETS.

The general nutrition must be improved by placing the child under the best hygienic conditions. The diet should be nutritious, and adapted to the age of the patient and the state of the stomach. The most useful remedies are iron, cod-liver oil, phosphorus, and phosphates. Doses of $\frac{1}{300}$ to $\frac{1}{200}$ of a grain of phosphorus may be given in granules three or four times daily. The following combinations are efficient :

℞ Syr. ferri iodid.,	fʒiss;
Mist. ol. morrhue et lactophos. calcis,	q. s. ad fʒij.—M.
Sig. From one-half to a teaspoonful three times a day.	(Starr.)

Or,

℞ Ol. morrhue,	fʒiv;
Aq. calcis,	
Syr. calcis lactophos.,	aa fʒij.—M.

Sig. One teaspoonful four or five times a day to a child of one year.

DIABETES MELLITUS.

The treatment of diabetes mellitus is dietetic, hygienic, and medicinal.

Dietetic Treatment.—Sugars and starches must be restricted. Since the patient's appetite is often inordinate, it is necessary to regulate the character and quantity of those foods which are recognized as admissible. The following foods may be included in the dietary :

Animal Foods.—Meats of various kinds (except liver), game, light broths and soups, fish, and eggs.

Vegetables.—Celery, lettuce, tomatoes, cauliflower, string beans, young onions, mushrooms, olives, water-cress, and spinach.

Beverages.—Buttermilk, skim milk, sour wines (Rhine wines), carbonated waters, and coffee and tea without sugar.

Relishes.—Nuts of all kinds (except chestnuts), cream cheese, and pickles.

Bread.—Bread made of gluten, bran-flour, or almond-flour. It should be borne in mind that all gluten flours are rich in starch. W. Hale White has recently obtained good results from soya beans ground up and made into bread and biscuits.

Fruits.—Cranberries, sour cherries, limes, lemons, and red currants.

Substitutes for Sugar.—Saccharin and glycerin.

The following foods should be avoided: liver, oysters, wheat-bread, biscuits, pastry, potatoes, beets, carrots, peas, turnips, parsnips, sweet fruits, rice, barley, tapioca, corn-starch, corn-meal, chocolate, cocoa, syrups, preserves, and most liquors.

Hygienic Treatment.—This consists in graduated exercise, frequent bathing with salt water followed by friction, the use of flannel underclothing, plenty of rest and sleep, and, if possible, a change of scene.

Medicinal Treatment.—Tonics like iron, arsenic, and strychnine are often indicated. The most useful special remedies are opium or its alkaloids—morphine and codeine—bromide of arsenic, antipyrine, sodium salicylate, and alkalies. Of these, opium is generally the most efficient; it should be given in small doses gradually increased until

the patient takes eight to ten grains daily. Codeine (gr. $\frac{1}{2}$ increased to gr. vj daily) has been thought preferable to either opium or morphine, but, according to the clinical experiments of Bruce and Osler, morphine is much more reliable. Morphine sulphate may be employed in doses of $\frac{1}{4}$ of a grain three or four times daily. Bromide of arsenic is sometimes of decided value; it may be given in the form of Clemens's solution:

℞ Liq. arsenici bromid., ℥j.
Sig. Two to five drops, well diluted, after meals.

Lithium carbonate, sodium salicylate, and alkaline mineral waters are often very efficacious when the disease is associated with a gouty diathesis. Five grains of the lithium salt and 15 to 20 grains of the salicylate may be given several times daily. In some cases antipyrine (gr. v to x thrice daily) gives good results when other remedies fail. Jambul (ʒiiss to ʒiij of the powder daily) has many advocates in France and Germany.

Marked cerebral symptoms should be regarded as the forerunners of diabetic coma, and should be treated by the internal administration of large doses of sodium bicarbonate. When fully developed, diabetic coma is always fatal, but intravenous injections of a 3 per cent. solution of sodium bicarbonate may give a few hours' respite in which consciousness returns.

DIABETES INSIPIDUS.

The hygienic treatment suggested for diabetes mellitus is applicable in this disease. No benefit is derived from cutting off the amount of water drunk. The remedies recommended are ergot, strychnine, opium, valerian, and nitric acid. Galvanism—one pole applied to the neck and the other to the loins—has given good results. When syphilis is suspected, the mercurials and iodides may be administered freely with good hopes of a successful issue.

DISEASES OF THE DIGESTIVE TRACT.

STOMATITIS.

As stomatitis, particularly in children, is frequently dependent upon errors in diet, the correction of the latter is

the first indication. Nursing children should be fed at regular intervals. Absolute cleanliness is essential. The mouth should be frequently washed with some mild anti-septic solution like the following:

℞ Acid. boric., gr. x-xx;
Glycerini, fʒss;
Aquæ, q. s. ad fʒij.—M.

(Potassium chlorate (gr. x-xx) may be substituted for the boric acid.)

Or,

℞ Acid. carbol., gr. ij;
Sodii salicylat.,
Sodii borat., aa gr. xxx;
Glycerini, fʒij;
Aquæ rosæ, q. s. ad fʒij.—M. (Starr.)

In ulcerative stomatitis the ulcers may be lightly touched with silver nitrate. In gangrenous stomatitis the ulcer should be promptly cauterized with the solid stick of nitrate of silver or strong nitric or sulphuric acid, and the parts frequently and thoroughly cleansed with one of the above solutions or with dilute peroxide of hydrogen. In severe forms of stomatitis, like ulcerative and gangrenous, stimulants and tonics are generally indicated.

TONSILLITIS.

When the patient is seen early, an effort should be made to abort the disease by administering at frequent intervals full doses of sodium salicylate (gr. xx every three hours). Unless a distinct improvement follows under this plan of treatment inside of twelve hours, it should be discontinued and other remedies substituted. The ammoniated tincture of guaiacum (ʒij every two hours) is an old and efficient remedy. Sodium benzoate often gives excellent results; it may be prescribed as follows:

℞ Sodii benzoat., ʒj-ʒiv;
Glycerini,
Elix. calisay., aa fʒj.—M.
Sig. A teaspoonful every hour or two.

In children, quinine with small doses of the tincture of aconite and the tincture of belladonna is very useful.

In severe cases opium will be required to relieve pain

and to produce sleep. During convalescence iron and quinine may be prescribed with advantage.

Local Treatment.—Pellets of ice held in the mouth give much relief. The following remedies are also reliable: solution of silver nitrate, dry sodium bicarbonate, guaiac lozenges (gr. ij), a saturated ethereal solution of iodoform, or—

℞ Potass. chlor.,	gr. xx-xxx;
Tinct. ferri chlor.,	
Glycerini,	āā f̄ss.
Aquæ,	q. s. ad f̄ij.—M.

Sig. Apply several times daily with a camel's-hair brush.

When the glands are very much swollen, scarification will lessen the pain and often shorten the attack. When fluctuation can be detected, the tonsil should be incised with a guarded bistoury.

Externally, an ice-bag to the neck serves to check the tendency to suppuration, but when the latter is inevitable warm applications may be employed to hasten the process.

PHARYNGITIS.

Acute Pharyngitis.—In mild cases a light diet, avoidance of exposure, and a gargle containing potassium chlorate will be the only requisites:

℞ Ext. rhois glabræ fl.,	f̄ij;
Potass. chlorat.,	gr. xl;
Aquæ,	q. s. ad f̄iv.—M.

Sig. Use as a gargle three or four times daily.

Hot drinks followed by Dover's powder (gr. v-x) and a saline purge will sometimes abort it.

In severe attacks tincture of aconite (gtt. ij) with tincture of belladonna (gtt. v) every two hours is sometimes useful. When it is dependent upon the rheumatic diathesis, salicylate or benzoate of sodium will be found very efficient.

Local Remedies.—Sajous, Seiler, and others recommend the application of strong solutions of silver nitrate (40-60 grains to the ounce) once daily. Generally, however, much weaker solutions than these are more efficient. Pellets of ice, a gargle of potassium chlorate, dry sodium bicarbonate, lozenges of cocaine, ammonium chloride, or potassium chlorate, are suitable local remedies.

Chronic Pharyngitis.—Chronic pharyngitis does not result so much from excessive use of the voice as from its improper use, and until this is corrected no treatment will be successful. Patients should be instructed to expel sounds by the aid of the diaphragm and abdominal muscles, instead of the muscles of the throat and larynx. The habit of hawking and scraping to clear the throat must be rigidly interdicted. The patient should guard against mouth-breathing. Sponging the neck night and morning, first with tepid, then with cold water, will render the throat less sensitive. The general health will require attention, and such tonics as iron, quinine, and strychnine may be very useful.

Local Treatment.—The naso-pharynx should be kept clean by frequent spraying or douching with some antiseptic solution like the following:

℞ Sodii bicarb.,	
Sodii biborat.,	āā gr. xx;
Acid. carbol.,	gtt. vj;
Glycerin.,	fʒvj;
Aquæ,	q. s. ad fʒvj.—M. (Dobell.)

The nasal chambers should be inspected, and any existing disease treated.

Stimulating applications are often of service; the best are silver nitrate (40 grains to the ounce), zinc sulphate (5 grains to the ounce), tannic acid (1 drachm to the ounce of glycerin), and iodine (1 drachm to the ounce of glycerin). Lymphatic hypertrophies should be removed by the galvano-cautery.

ŒSOPHAGEAL SPASM.

Careful search should be made for the exciting cause of the spasm. In the majority of cases the affection is an expression of hysteria, and the treatment is therefore largely dietetic, hygienic, and moral. Tonics like iron, arsenic, and quinine are often indicated, and may be combined with such antispasmodics as valerian, asafœtida, and sumbul. The systematic passage of a bougie may be of great value. Good results are sometimes obtained by the application of a mild electrical current through the bougie.

ORGANIC ŒSOPHAGEAL OBSTRUCTION.

The treatment of this affection will vary with the cause. When it is dependent upon a thoracic aneurism, prolonged rest, a dry diet, and the administration of potassium iodide, and, possibly, of cardiac sedatives, will constitute the treatment. When it is due to cicatricial contraction following the healing of an ulcer, systematic dilatation with graduated bougies will be indicated. When obstruction results from cancer of the œsophagus, the passage may be kept open for some time by the cautious passage of bougies. In advanced cases the patient may be fed through a tube, and when this is no longer possible life may be prolonged for a short time by rectal alimentation or by feeding through a gastric fistula.

ACUTE GASTRITIS.

Absolute rest is essential. If the stomach has not been completely emptied, an emetic such as ipecac may be employed. Locally, a mustard plaster or a turpentine stupe will aid in relieving the distress. In severe cases no food should be given by the mouth until the stomach becomes retentive. Thirst should be allayed with cracked ice; later, milk with lime-water (a teaspoonful of each); and this may be followed by light broths in similar quantities.

Persistent vomiting may be relieved by the administration at frequent intervals of one of the following drugs: calomel (gr. $\frac{1}{10}$), bismuth subnitrate (gr. v-x), carbolic acid (gtt. $\frac{1}{2}$), or wine of ipecac (gtt. j).

℞ Hydrarg. chlor. mit., Bismuth. subnit., Ft. in chart. No. xij. Sig. One every hour.	gr. j; ʒj.—M.
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Or,

℞ Creosoti, Bismuth. subnit., Ft. in chart. No. xij. Sig. One every hour.	gtt. iij; ʒj.—M.
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Or,

℞ Vin. ipecac., Tinct. nucis vom., Sig. Two drops in water every two hours.	aa fʒj.—M. (Pepper.)
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Severe pain and obstinate vomiting often yield to opium in the form of suppositories; thus:

℞ Pulv. opii,	gr. vj;
Ol. theobrom.,	q. s.—M.
Ft. in suppos. No. vj.	
Sig. One every three hours.	

Toxic gastritis will require, in addition, the early administration of appropriate antidotes.

DYSPEPSIA.

In the treatment of all forms of dyspepsia, atonic, nervous, and catarrhal, good hygienic conditions and a carefully regulated diet are essential to success. Rich and heavy foods must be rigidly interdicted, and a special dietary arranged for each individual. In severe cases an absolute milk diet may be requisite. Avoidance of excitement and excessive mental work must be enjoined. An extended voyage often effects a cure. In brain-workers the value of regular physical exercise and frequent bathing followed by friction of the skin cannot be overestimated. On the other hand, the anæmic and exhausted may require the "rest-cure." Tonics like iron, quinine, and arsenic are often indicated. Mineral acids with pepsin are useful aids to digestion; the former are far more important than the latter. Irritating purgatives should be avoided, and constipation relieved, when possible, by diet, mineral waters, enemas, or suppositories.

In atonic dyspepsia strychnine and the bitters are especially valuable. They may be conveniently combined with acids, as in the following formula:

℞ Quininæ sulph.,	gr. xxxij;
Strychninæ sulph.,	gr. ss;
Acid. hydrochlor. dil.,	fʒij;
vel Acid. phosphor. dil.,	fʒij;
Tr. cardamom. comp.,	fʒij;
Aquæ,	q. s. ad fʒiv.—M. Filter.
Sig. A teaspoonful after meals.	(Pepper.)

In nervous dyspepsia, arsenic, in the form of sodium arsenate or Fowler's solution, is often very efficient. In the catarrhal type, which is by far the most common form

of dyspepsia, the best remedies are silver nitrate, bismuth subnitrate, and dilute salines. Nitrate of silver should be given in pill form about half an hour before meals, and may be prescribed as follows:

R Argenti nitrat.,	gr. vj;
Ext. hyoscyam.,	gr. xij.—M.
Ft. in pil. No. xxiv.	
Sig. One thrice daily, half an hour before meals.	

Bismuth subnitrate may be given in powders or in the form of compressed pills.

Salines are best exhibited in a copious draught of hot water half an hour before breakfast. Rochelle salt (ʒss-ʒj), Epsom salt (ʒss-ʒj), or the following artificial Carlsbad salt may be employed:

R Sodii sulph.,	ʒv;
Sodii bicarb.,	ʒij;
Sodii chlorid.,	ʒj.—M.
Sig. ʒj in half a pint of hot water, half an hour before breakfast. (Welch.)	

Administered in this way, these salts rid the stomach of thick mucus and act as gentle aperients.

In obstinate cases lavage is invaluable. Pure or slightly alkaline water may be employed in the process, but when there is much fermentation a one per cent. solution of salicylic acid is desirable. Irrigation should be practised daily or every other day, preferably before breakfast, and the tube should not be withdrawn until the escaping fluid is quite clear.

When flatulence is a troublesome symptom antiseptics like salol, creosote, sodium salicylate, or benzo-naphthol will be found serviceable. Yeo speaks very favorably of thymol as an antiferment; he prescribes it as follows:

R Thymol.,	gr. xx;
Pulv. saponis,	gr. xl;
Spt. vini rect.,	q. s.—M.
Ft. in pil. No. xx.	
Sig. One twice or three times a day, immediately after food.	

Acid eructations and "heartburn," when not prevented by digestants and antiferments, may be relieved by the administration of sodium bicarbonate two hours after meals.

GASTRALGIA.

As this is generally a manifestation of nervous dyspepsia, what has already been said concerning the treatment of the latter is applicable here. During the attack hot fomentations should be applied locally, and Hoffmann's anodyne (ʒss), chloroform (gtt. x), dilute hydrocyanic acid (gtt. ij in hot water), or the following mixture may be given internally:

℞ Spt. vini gal.,	
Tinct. opii camph.,	aa fʒss;
Ol. caryoph.,	gtt. x.—M.
Sig. A teaspoonful in water.	

In severe cases morphine will be required.

In the interval special attention must be given to the hygiene, diet, rest, exercise, etc. Change of scene may be extremely valuable. Neurasthenics may require the "rest-cure." Tonics are often indicated.

When the pain is associated with hyperacidity, sodium bicarbonate or aromatic spirit of ammonia after meals may be very serviceable. Arsenic, valerian, and dilute hydrocyanic acid are remedies of special value:

℞ Sodii arsenat.,	gr. ss;
Ext. cannabis ind.,	gr. ij.—M.
Ft. in pil. No. xx.	
Sig. One three times a day.	(DaCosta.)

GASTRIC ULCER.

In this disease dietetic treatment is of the utmost importance. When the symptoms are not grave the diet may consist of predigested milk, koumiss, milk and lime-water, buttermilk, broths, soft-boiled eggs, and strained gruels. This restricted diet should be continued for eight or ten weeks, and the return to solid food should be quite gradual. Rest must be enjoined. In grave cases the patient should be confined to bed and nourished through the rectum. Lavage is contraindicated, but the stomach may be cleaned by the sipping of hot alkaline water in the morning before breakfast. The special remedies are bismuth subnitrate and silver nitrate; they should be given

when the stomach is empty. The following formulæ are useful:

℞ Argenti nitrat.,	gr. v;
Pulv. opii,	gr. x.—M.
Ft. in pil. No. xx.	
Sig. One pill thrice daily, half an hour before meals.	

Or,

℞ Bismuth. subnit.,	ʒvj-ʒj;
Creosoti,	gtt. x;
Morphinæ sulph.,	gr. j-ij.—M.
Ft. in chart. No. xx.	
Sig. One powder before meals.	

When the pain is very severe, cocaine (gr. $\frac{1}{8}$) may be substituted for the morphine in the above prescription.

Hemorrhage will require absolute rest, an ice-bag to the stomach, pellets of ice and tannic acid (gr. v-x) by the mouth, and morphine and fluid extract of ergot hypodermically.

GASTRIC CANCER.

The treatment of this disease is for the most part palliative. The diet must usually be liquid or semi-liquid. Hydrochloric acid is generally indicated. Flatulence and eructations will call for antiferments such as salol, thymol, benzo-naphthol, carbolic acid, creosote, or resorcin. Pain will call for opium. When the stomach is dilated, lavage may give relief. Operative interference is scarcely warrantable.

DILATATION OF THE STOMACH.

The treatment of gastrectasis will depend considerably upon its cause. In all cases the diet should be light and nutritious, but not bulky, and should be given in small amounts at frequent intervals. Lavage practised several times weekly is of great value. When the cause is pyloric cancer, the treatment will be palliative. Fibroid thickening and cicatricial constriction of the pylorus are frequently amenable to surgical interference. Loreta's operation, forcible dilatation of the pylorus, and the establishment of a gastro-duodenal fistula have been fairly successful.

In dilatation dependent upon gastric catarrh the latter must receive the first attention. Tonics, especially strychn-

nine, are often valuable adjuncts. Electricity, particularly applied to the interior of the stomach by means of a bipolar stomachal electrode, sometimes gives excellent results. An abdominal support serves to relieve some of the distressing symptoms.

HÆMATEMESIS.

While certain remedial measures are applicable during the attack, in all cases of hæmatemesis the ultimate treatment must necessarily depend upon the cause of the hemorrhage. Absolute rest is essential. No food should be administered by the mouth. An ice-bag may be applied to the stomach, and ice may be given to the patient to swallow. Internally, astringents like tannic acid or dilute sulphuric acid are useful. Fluid extract of ergot (ʒss) with morphine (gr. $\frac{1}{8}$) may be given hypodermically. After profuse hemorrhages subcutaneous injections of normal salt solutions (a $\frac{6}{10}$ per cent. solution of common salt) may be practised with advantage.

ENTERITIS; DIARRHŒA.

In children, success in treatment will depend to a great extent upon careful attention to hygiene and diet. Perfect cleanliness must be insisted on. A change of air is always desirable. If the child be bottle-fed, the milk must be sterilized and given at regular intervals. In severe cases milk should be abandoned and the child fed for a few days on egg-albumin, beef-juice, or beef-peptonoids. A flannel binder may be applied to the abdomen. When there is much colic, and the stools are small and frequent, indicating the retention in the bowel of irritating material, a mild cathartic will be called for. Castor oil (ʒj) with a few drops of paregoric or the following may be selected:

℞ Hydrarg. chlor. mit.,	gr. j;
Bismuth. salicylat.,	gr. xxxvj;
Pulv. zingiber.,	gr. xij.—M.
Ft. in chart. No. xij.	
Sig. One every hour.	

Or,

℞ Sodii bicarb.,	gr. xij;
Syr. rhei aromat.,	ʒss;
Aquæ menth. pip.,	ʒiiss.—M.
Sig. ʒj every two hours.	(Starr.)

After the bowels have been unloaded astringents and intestinal antiseptics may be employed:

℞ Sodii salicylat., gr. xij;
 Bismuth. subnit., gr. xxxvj;
 Pulv. aromat., gr. vj.—M.

Ft. in chart. No. xij.
 Sig. One every two hours.

℞ Sodii salicylat., gr. xxiv;
 Bismuth. subnit., ℥ij;
 Tinct. opii camph., f℥ijj;
 Mist. cretæ, f℥iiss;
 Aquæ cinnamomi, q. s. ad f℥ijj.—M.

Sig. One to two teaspoonfuls every two hours.

Irrigation of the bowel once a day with a pint or more of tepid water containing one per cent. of sodium benzoate or salicylic acid is very useful.

When the disease occurs in adult life the patient should be confined to bed and restricted to a liquid diet. It is well to begin the treatment with a mild laxative such as calomel or castor oil, to secure the removal from the bowel of all irritating material:

℞ Hydrarg. chlor. mit., gr. ij;
 Sodii bicarb., ℥j.—M.

Ft. in chart. No. xij.
 Sig. One every hour until five or six have been taken.

Or,

℞ Ol. ricini,
 Syr. rhei aromat., aa f℥ss;
 Tinct. opii, gtt. x-xv.—M.
 Repeat if necessary.

When the bowel has been thoroughly emptied, opium, astringents, and intestinal antiseptics will be required.

℞ Bismuth. subnit., ℥ss;
 Morphin. sulph., gr. j;
 Creosoti, gtt. vj.—M.

Ft. in chart. No. xij.
 Sig. One every two hours.

Or,

℞ Bismuth. subnit.,
 Cretæ præpar., aa ℥ij;
 Tinct. opii camph., f℥iiss;
 Tinct. kino, f℥ij;
 Pulv. acaciæ, q. s.;
 Aquæ cinnamomi, q. s. ad f℥vj.—M.

Sig. A tablespoonful every three hours.

In chronic diarrhœa rest and the regulation of diet are no less important factors in the treatment than in the acute forms of the disease. A change of scene is often desirable. The special remedies include antiseptics and astringents. Of the former, the best are thymol, salol, benzo-naphthol, and creosote; of the latter, bismuth subnitrate, silver nitrate, lead acetate, iron sulphate, and copper sulphate.

CHRONIC CONSTIPATION.

Chronic constipation is often the outcome of sedentary habits and a faulty diet, so that in many cases the treatment will be purely hygienic and regiminal. A regular time for defecation should be observed. Systematic exercise, abdominal massage, and electricity are valuable aids. The free use of water, bran-bread, green vegetables, and stewed fruits should be encouraged. In mild cases a glass of water or an orange before breakfast will suffice. Enemata of water or glycerin (ʒj-ʒiv), or suppositories of glycerin or of gluten, may be required.

Mineral waters like Friedrichshall, Hunyadi, or Carlsbad are useful, but possess no special advantage over the saline laxatives when the latter are taken in small amounts well diluted.

In obstinate cases mild laxatives must be employed. Cascara sagrada is one of the best: half a drachm to a drachm of the fluid extract may be administered at bedtime. Combinations of aloes and rhubarb with belladonna or nux vomica are often useful. When "biliousness" or hepatic congestion is associated with constipation, cholagogues like podophyllum, ipecac, blue mass, or euonymin may be added to aperient pills with advantage. The following combinations are frequently useful:

℞ Aloin,	gr. iv;
Strychninæ sulph.,	gr. $\frac{1}{3}$;
Ext. belladonnæ,	
Pulv. ipecac.,	aa gr. ij.—M.
Ft. in pil. No. xx.	

Sig. One or two as required.

℞ Podophylli resinæ,	gr. j;
Ext. aloes,	
Ext. rhei,	aa gr. x;
Ext. taraxaci,	gr. xv.—M.

Ft. in pil. No. x.

Sig. One, two, or three at bedtime.

(Nothnagel.)

℞ Pulv. rhei,	gr. xl;
Pulv. aloes,	gr. xx;
Ext. physostig.,	gr. iij;
Ol. caryophylli,	gtt. iij.—M.
Ft. in pil. No. xx.	
Sig. One or two as required.	

ENTERO-COLITIS.

This affection is to be separated from the simple diarrhœa of childhood by higher fever, greater prostration, and the character of the stools, which are mucous, streaked with blood, and contain a greenish material resembling spinach.

The hygienic and dietetic treatment is the same as in enteritis. Laxatives followed by astringents and antiseptics are also indicated. Weak stupes or spice poultices may be applied to the abdomen. Stimulants are frequently required. The irrigation of the bowel once a day with a pint or more of tepid water containing one per cent. of sodium benzoate or salicylic acid gives excellent results. In obstinate cases the irrigation may be followed by the injection of an ounce of water containing silver nitrate (gr. $\frac{1}{2}$ -1).

DYSENTERY.

In the acute form of the disease absolute rest in bed is imperative. The diet should consist of liquids and semi-liquids. Externally, the application to the left iliac region of hot fomentations, mustard poultices, or leeches affords relief to the severe pain. A mild laxative such as sulphate of magnesia or castor oil with laudanum is called for at the onset of the disease. Of the internal remedies, bismuth subnitrate is perhaps the most generally useful; it may be combined with morphine and an intestinal antiseptic, as in the following formula :

℞ Morphin. sulph.,	gr. j;
Bismuth. subnit.,	ʒij;
Creosoti,	gtt. vj.—M.
Ft. in chart. No. xij.	
Sig. One every two hours.	

Musser recommends—

℞ Quininae sulph.,	gr. xl;
Ext. opii,	gr. v;
Mass. hydrarg.,	gr. x.—M.
Ft. in pil. No. xx.	
Sig. One or two every two or three hours.	

In some cases, particularly in those associated with bilious symptoms, ipecacuanha in large doses (gr. xx-xxx repeated every three or four hours) is very serviceable. To prevent emesis, twenty drops of laudanum should be given half an hour before the administration of the ipecacuanha.

Topical treatment should never be omitted. In mild cases opium suppositories will prove very beneficial; in severe cases enemata of thin starch-water with laudanum (gtt. xx-xxx) should be substituted for the suppositories. H. C. Wood highly recommends the use of ice suppositories, one every two to five minutes for half an hour, followed by suppositories of ergot and iodoform:

R	Ext. ergot.,	gr. lxxij;
	Iodoform.,	ʒ ^{ss} ;
	Ol. theobrom.,	q. s.—M.

Ft. in suppos. No. vj.

Sig. One every two hours until four or five have been taken.

Astringent injections of silver nitrate or lead acetate are less useful in acute than in subacute or chronic cases.

When typhoid symptoms develop, stimulants should be used freely; turpentine is particularly efficacious.

Copious injections of warm solutions of quinine (1 : 5000 to 1 : 1000) have been employed in amœbic dysentery with advantage (Osler). Creolin (ʒj to Oj) has also given good results in similar cases.

Chronic Dysentery.—The dietetic, hygienic, and climatic treatment is far more important than the administration of drugs. Astringents and antiseptics by the mouth are often useful. Excellent results are often obtained by the injection of strong solutions of silver nitrate into the bowel, after the manner recommended by Wood. In beginning the treatment one or two pints (gr. xx to the pint) may be injected from a fountain syringe through a tube passed up the bowel; later, the amount may be increased to three or four pints, and the strength to 30 grains to the pint. The injections may be employed once or twice weekly.

CHOLERA MORBUS.

The early onset of purging usually renders the administration of a laxative unnecessary. The severe pain must

be relieved by hot applications to the abdomen and the hypodermic injection of morphine (gr. $\frac{1}{4}$) with atropine (gr. $\frac{1}{100}$). When the pain is not so severe, opium may be given by the mouth or rectum. Ice is soothing and relieves the thirst. When vomiting is troublesome, bismuth will be serviceable; it may be prescribed in the following combination:

R Morph. sulph.,	gr. j;
Creosoti,	gtt. vj;
Bismuth. subnit.,	ʒij.—M.
Ft. in chart. No. xij.	
Sig. One every hour.	

Prostration will require the prompt use of stimulants like aromatic spirits of ammonia or brandy.

In many cases the following mixture is all that will be required:

R Tinct. opii camph.,	ʒss;
Spt. ammonii aromat.,	ʒj;
Magnes. optim.,	ʒj;
Aq. menth. piperitæ,	q. s. ad ʒiv.—M.
Sig. A teaspoonful every twenty minutes.	(Hartshorne.)

CHOLERA INFANTUM.

If possible, the child should be removed to the country or sea-shore. It should be kept in the open air. Cleanliness is essential to success, and frequent bathing with cold water is desirable. A spice plaster or a weak stupe may be applied to the abdomen.

The nourishment must be of the lightest kind; it may consist of barley-water, beef-juce, wine-whey, chicken-broth, or blocks of frozen beef tea, which should be given in small quantities at frequent intervals. Pellets of ice may be given to allay thirst. Obstinate vomiting will call for small doses of calomel, carbolic acid, bismuth subnitrate, or silver nitrate:

R Argent. nit.,	gr. ss-j;
Syr. acaciæ,	ʒj;
Aquæ,	ʒij.—M.
Sig. A teaspoonful every two hours.	

For the diarrhœa, laudanum (gtt. ij-iiij) with warm starch-water (ʒj) may be given every three or four hours

by the rectum; or the following may be given by the mouth:

℞	Liquor. morph. sulph.,	fʒj;
	Acid. sulph. aromat.,	℥xxiv;
	Elix. Curaçœæ,	fʒss;
	Aquæ,	q. s. ad fʒiij.—M.

Sig. One teaspoonful every two hours for a child six months old.

When vomiting and purging seem uncontrollable, morphine (gr. $\frac{1}{150}$ — $\frac{1}{120}$) hypodermically may be of service.

Irrigation of the stomach and bowel with warm water sometimes gives excellent results.

Of late, intestinal antiseptics—salol, benzo-naphthol, carbolic acid, sodium benzoate, β -naphthol, and resorcin—have been given a prominent place in the therapy of cholera infantum, and bid fair to displace the older treatment by narcotics and astringents.

Collapse must be combated by the use of the hot bath, to which a little mustard or red pepper may be added, and the free administration of stimulants.

APPENDICITIS.

Appendicitis is by far the most common inflammatory affection of the right iliac fossa. The patient must be confined to bed and the diet restricted to milk. The lower bowel may be emptied by enemata. Opium will be required to relieve pain and quiet peristalsis. In the initial stage salines cautiously administered sometimes yield excellent results; Epsom salt (ʒij) may be given every two hours until two or three watery stools are produced.

Local Treatment.—At the onset of the disease an ice-bag may be placed over the ileo-cæcal region, but if there is much tenderness the application of a few leeches followed by poulticing is to be preferred.

Unless distinct amelioration of the symptoms follow this method of treatment, surgical aid must be invoked. Increasing tenderness and induration, a stable or rising temperature, persistent vomiting, obstinate constipation, or increasing abdominal tympany, will each demand operative interference.

Patients subject to recurrent attacks must be scrupu-

lously careful as regards hygiene and diet; they should be habitually clothed in flannel, and should wear an abdominal protector. Residence in a dry and equable climate sometimes secures immunity. A formal operation for the removal of the appendix may be considered in these cases.

INTESTINAL OBSTRUCTION.

In all cases of acute obstruction, excepting external hernia and congenital atresia, whether the cause is apparent or not, the following rules should be observed:

1. Relieve pain by the administration of opium and the application of hot fomentations to the abdomen.

2. Restrict the diet to liquids in small quantities. Nutritive enemata should be employed in the weak.

3. Avoid purgatives.

4. Distend the intestine by elevating the buttocks and allowing from two to six quarts of tepid water to flow from a reservoir placed several feet above the patient through a tube introduced as high as possible into the bowel. The age will determine the height of the reservoir and the amount of fluid.

5. When the stomach and upper bowel are distended by gas, washing out of the stomach is useful (Küssmaul, Liebermeister).

6. After failure in these methods, laparotomy should not be delayed; the earlier its performance the greater the chance of success.

Fecal impaction will call for the administration of salines and the injection of water or oil. Electricity is sometimes useful. Rectal accumulations may be removed by the fingers or a suitable scoop.

Strictures will require division or dilatation by means of graduated bougies.

INTESTINAL PARASITES.

Tape-worm.—The most efficient anthelmintics against this parasite are pepo (2–3 ounces of the decorticated seeds), oleoresin of aspidium (ʒj–ʒij), pelletierine tannate (gr. v), kooso (ʒss), and turpentine (ʒj):

℞ Oleores. aspidii, ʒj;
 Pulv. acaciæ et sacchar., aa q. s.;
 Aquæ cinnamomi, q. s. ad fʒij.—M.
 Sig. One tablespoonful, repeated if necessary.

The anthelmintics should be given after a period of fasting or after an unsubstantial breakfast, and should be preceded and followed by a laxative. The treatment is successful only when the head of the worm is discharged.

Round-worm.—Santonin (gr. $\frac{1}{4}$ —gr. iij), oil of worm-seed (gtt. x in capsule or on sugar), and fluid extract of spigelia (ʒj—ʒij) are efficient remedies :

℞ Santonini, gr. vj;
 Hydrarg. chlor. mit., gr vj;
 Sacchari, gr. xxiv.—M.
 Ft. in chart. No. xij.
 Sig. One powder morning and evening. (Starr.)

Seat-worm or Thread-worm.—This parasite is usually quickly destroyed by an injection of water followed by an injection of two or three ounces of an infusion of quassia-chips (ʒij—ij to the pint).

PERITONITIS.

Acute Peritonitis.—The treatment of this affection will depend to some extent upon the cause. In all cases the patient should be kept absolutely quiet and restricted to a liquid diet. Opium will be required to check peristalsis and to relieve pain. In severe cases the drug may be pushed until the respirations have been reduced to twelve per minute. Externally, the application of leeches to the abdomen offers the best means of relieving the internal congestion. After leeching the abdomen may be covered with a light poultice; in some cases, however, cold cloths are more grateful than warm applications.

In non-perforating cases salines such as Epsom or Rochelle salt (ʒij) may be given until the bowels move freely. These salts, while not increasing peristalsis, attract serum from the turgid blood-vessels, and so relieve congestion. Under this plan of treatment pain may so quickly subside as to render the use of opium unnecessary.

Obstinate vomiting should be combated with small doses

of dilute hydrocyanic acid, cocaine, silver nitrate, or carbolic acid. Stimulants are often required to maintain strength.

In perforating cases—and these are the most frequent—the question of laparotomy must always be considered; in the large majority of cases it offers the only hope of cure. When the condition of the patient renders operative interference unwarrantable, recourse must be had to opium in full doses and the external application of heat. Under no circumstances should the salines be employed in this form of peritonitis.

Chronic Peritonitis.—Chronic diffuse inflammation of the peritoneum is usually tuberculous or cancerous. Tuberculous peritonitis, while always grave, is not altogether hopeless; the cancerous variety is always fatal. The diet should be nutritious and easily assimilable. Nutrient tonics like malt and cod-liver oil are useful. Iodine or mercurial ointment may be applied externally as an absorbent. When the effusion is great paracentesis will be required. In the tuberculous form laparotomy followed by drainage often yields excellent results, although the method of its action is unknown.

GALL-STONES.

The treatment of cholelithiasis may be discussed under two heads—the paroxysm and the interval.

The Paroxysm.—During the attack of biliary colic the first indication is to relieve pain. For this purpose morphine (gr. $\frac{1}{8}$ – $\frac{1}{2}$) with atropine (gr. $\frac{1}{100}$) may be given hypodermically, and hot fomentations applied externally. In aggravated cases anæsthetics will be required.

European authorities speak highly of the use of olive oil, both during the attack and in the interval. It probably acts by inviting a flow of bile into the intestine. During the paroxysm it is given in a single dose of 6 to 8 ounces, and in the interval the same amount is given *per diem*. When the stomach rebels it may be given by the rectum. In this country the results obtained by the olive-oil treatment have not been very encouraging.

Ferrand considers glycerin an excellent cholagogue in

cholelithiasis. During the attack he administers 20 to 30 grammes of glycerin with a similar quantity of chloroform-water during the twenty-four hours. Between the attacks he prescribes 1 to 3 teaspoonfuls of glycerin in a glass of alkaline water, to be taken each morning.

Yeo recommends large draughts of hot water containing 60 grains of sodium bicarbonate and 20 grains of sodium salicylate.

The Interval.—The dietetic and hygienic treatment is of the first importance. The diet should be largely vegetable. Systematic exercise is useful. The flow of bile should be encouraged by the use of alkaline mineral waters, sodium phosphate, sodium succinate, sodium salicylate, podophyllin, or euonymin. Catarrh of the ducts should be relieved, so that the stones can more readily escape.

In impaction the same treatment is indicated, with counterirritation, and the use of some intestinal antiseptic such as salol, naphthol, or bismuth salicylate to replace the antiseptic elements of the bile. In aggravated cases an exploratory incision should be made, when a stone may be removed from the common duct (*choledochotomy*) or from the gall-bladder (*cholecystotomy*), or the gall-bladder removed (*cholecystectomy*).

CATARRHAL JAUNDICE.

In the majority of cases catarrhal jaundice is the result of an extension of inflammation from the stomach or intestine, and therefore the diet should be restricted to liquids and semi-liquids. External rubefacient applications such as turpentine or nitrohydrochloric-acid stupes may be applied over the hepatic region.

Mild laxatives are often indicated; calomel may be selected:

℞ Hydrarg. chlor. mit.,	gr. ij;
Sodii bicarb.,	ʒj.—M.
Ft. in chart. No. xij.	
Sig. One every hour until a laxative effect is secured.	

Special remedies must also be directed to the coexisting gastro-intestinal catarrh. The most useful are silver nitrate (gr. $\frac{1}{4}$ t. i. d.), ammonium chloride (gr. x t. i. d.), or sodium

phosphate (ʒj-ij t. i. d.). Intestinal antiseptics are called for in chronic cases to check putrefactive changes in the bowel resulting from the absence of bile. In persistent cases of catarrhal jaundice the daily irrigation of the bowel with cold water (1-2 quarts) has been highly recommended; these injections stimulate peristalsis and thus favor the expulsion of mucus and bile from the ducts.

HYPERÆMIA OF THE LIVER.

Active hyperæmia of the liver from dietetic errors usually responds to a restricted diet, the application of counter-irritants over the right hypochondrium, and the administration of laxative doses of calomel; the latter may be prescribed thus:

℞ Hydrarg. chlor. mit.,	gr. iij;
Sodii bicarb.,	ʒj.—M.
Ft. in chart. No. xij.	
Sig. One every hour until the desired effect is secured.	

Laxative doses of sodium phosphate, Carlsbad salt, or Rochelle salt are also useful. In recurring attacks of active congestion or biliousness, in addition to hygienic and dietetic treatment, the following often proves useful:

℞ Mass. hydrarg.,	gr. v;
Pulv. rhei,	
Ext. gentian.,	aa ʒss;
Ol. caryophyll.,	gtt. iv.—M.
Div. in pil. No. xx.	

Sig. One or two occasionally, as directed; to be continued, if required, thrice daily for several days. (Hartshorne.)

In passive congestion, which usually results from obstruction to the circulation, as by chronic heart and lung disease, treatment must be directed to the primary affection. In mild cases the mineral waters do well (Carlsbad, Congress, and Friedrichshall). A mercurial laxative may be used from time to time. In severe cases concentrated solutions of Epsom salt may be employed as purgatives, and wet cups applied over the liver.

CIRRHOISIS OF THE LIVER.

As hepatic cirrhosis is almost invariably associated with gastric catarrh, the latter condition is the first to demand

The application of wet or dry cups or hot fomentations to the loins accomplishes a useful purpose. To secure vicarious action of the skin, vapor-baths or small doses of pilocarpine (gr. $\frac{1}{8}$ — $\frac{1}{16}$) may be employed. Concentrated solutions of Epsom or Rochelle salt may be given to secure watery discharges from the bowels. When the salines are not well borne compound jalap powder (gr. xx) may be substituted. Stimulating diuretics should be avoided, and diuresis encouraged by alkaline waters and the infusion of digitalis. Uræmia will call for its appropriate treatment.

Severe cases in pregnancy will require the induction of abortion or premature labor. Marked effusions into the serous cavities will sometimes demand aspiration. On account of the danger of relapse, convalescence should be especially guarded. The resulting anæmia usually calls for some preparation of iron, such as Basham's mixture.

CHRONIC NEPHRITIS.

The treatment of this disease is largely dietetic and hygienic. Residence in a dry, warm, and equable climate may prolong life or effect a cure. Rest is an essential element in the treatment. The underclothing should be woollen or silk. The diet should be non-nitrogenous, and in severe cases an exclusively milk diet may be of extreme value. The bowels should be kept active by natural mineral waters or saline laxatives. When the urine is scanty digitalis, strontium lactate, caffeine, or one of the vegetable salts of potassium may prove an efficient diuretic. Basham's mixture may be employed as a chalybeate and a diuretic.

Dropsy.—This condition will call for hydragogue cathartics, such as Epsom salt or compound jalap powder, and measures to promote diaphoresis, such as the hot-air bath or hypodermic injections of pilocarpine. The following combination is often very efficient in troublesome dropsy :

℞ Mass. hydrarg.,	gr. xxiv ;
Pulv. digitalis,	
Pulv. scillæ,	aa gr. xij ;
Ext. nucis vom.,	gr. vj.—M.
Ft. in pil. No. xxiv.	
Sig. One pill two or three times a day.	

Acute exacerbations should be treated as primary attacks of acute nephritis.

In chronic interstitial nephritis absorbents like potassium iodide, strontium iodide, and bichloride of mercury are frequently recommended, but they are of doubtful utility. Tonics are often indicated. Nitroglycerin in one-minim doses gradually increased is often useful in relieving the high arterial tension.

URÆMIA.

In this condition the chief indication is to secure the elimination of the poison through the various emunctories—bowel, skin, and kidneys. Sweating should be promoted by hot-air or vapor baths or the hypodermic injection of pilocarpine. Croton oil (1 drop in a drachm of olive oil) or a concentrated solution of Epsom salt may be employed to secure prompt catharsis. When the pulse is strong venesection will be of paramount importance. After free bloodletting the subcutaneous injection of a normal salt solution (1-3 pints of $\frac{6}{10}$ per cent. solution of common salt) sometimes gives excellent results. When the pulse is weak stimulants like alcohol, strychnine, digitalis, and ammonia will be called for.

In convulsive seizures, in addition to the above treatment, chloral (gr. xxx-xl) may be given by the rectum, and amyl nitrite or chloroform by inhalation.

RENAL CALCULUS.

The Attack.—Morphine with atropine should be employed hypodermically, and warm poultices applied to the loins. The free use of water should be encouraged. In severe cases chloroform or ether may be inhaled in sufficient quantity to obtund the sensibility of the patient.

The Interval.—Dietetic and hygienic treatment is of prime importance. When the reaction of the urine indicates an acid stone, the salts of lithium or the vegetable salts of potash may be employed in large doses over long periods. A drachm of the citrate of potassium or 5 to 10 grains of the carbonate of lithium may be given, well diluted, several times a day. One of the natural lithia

waters may be employed with advantage, and its palatableness and efficiency may be increased by the addition of a teaspoonful of some effervescing preparation of lithium to each potation.

When an alkaline stone is indicated, benzoic acid or boric acid may be employed in a similar manner.

In severe and persistent cases the stone may be excised (*nephrolithotomy*); and if the operation should reveal a badly-damaged kidney, its removal (*nephrectomy*) would be indicated.

PYELITIS.

The treatment of pyelitis will depend largely on the cause. Calculous pyelitis will require the treatment indicated for renal calculus. In simple catarrhal pyelitis the patient should be kept in bed and restricted to liquid food. Warm fomentations may be applied over the region of the kidneys. In the early stage alkaline diluents and sedatives are called for. The following combination will be found useful :

℞ Potass. bromid., Sodii bicarb., Ext. belladonnæ, Ext. buchu fl., Syr. sarsaparill. comp.,	āā gr. clx; gr. iv; $\frac{ij}{3}$; q. s. ad $\frac{ij}{3}$ iv.—M.
Sig. A teaspoonful three times daily.	
(Pepper.)	

In chronic pyelitis stimulating diuretics, such as eucalyptus, oil of sandalwood, copaiba, or cubebs, will prove serviceable.

HYDRONEPHROSIS.

When the distention is moderate the treatment is expectant. Large accumulations should be removed by aspiration. Early re-accumulation will call for the establishment of a renal fistula or the removal of the organ.

DISEASES OF THE CIRCULATORY SYSTEM.

PERICARDITIS.

On account of the gravity of this disease, the patient should be kept at perfect rest. The diet should be light

and nutritious. Opium is usually required to ensure quiet and to relieve pain. When the action of the heart is rapid and irregular, either aconite or digitalis may be administered, according to the strength of the pulse.

Local Treatment.—In severe cases a few wet cups or leeches may be applied to the præcordia. In other cases an ice-bag, a blister, or a poultice may afford relief.

Pericardial Effusion.—When the effusion is slight, efforts should be made to effect its absorption. Small blisters may be applied over the præcordia. Potassium iodide (gr. v-x) is a useful absorbent. Diuresis should be encouraged with digitalis or caffeine, and catharsis with concentrated saline draughts.

Paracentesis is indicated—(1) when the effusion is very large; (2) when it creates much disturbance, such as dyspnoea, cyanosis, and the like; (3) when its absorption cannot be accomplished by internal remedies; (4) when it is purulent. The needle should be introduced in the fifth interspace, a little to the right of the point of the normal apex-beat. When the effusion is purulent a free incision offers a slight, and the only, chance of cure.

In adherent pericardium the outlook is grave. The treatment consists in the application of small blisters over the præcordia and the administration of potassium iodide. Symptoms of heart-failure must be combated with digitalis and similar cardiac tonics.

ACUTE ENDOCARDITIS.

The treatment of this affection is in part that of the causal condition. Prolonged and complete rest is essential. Locally, blisters, mustard poultices, leeches, or ice-bags may be applied to the præcordia. When the pulse is weak and irregular digitalis may be employed with advantage; on the other hand, when the pulse is rapid and strong aconite will be found more useful. Absorbents like potassium iodide are of little value.

CHRONIC ENDOCARDITIS.

When compensation is perfect the treatment is purely hygienic. It is well to inform the patient of his condition,

so that he may guard himself against undue excitement and physical strain.

When compensation is lost from gradual dilatation of the heart, the patient should be kept at absolute rest and the diet restricted to light and easily assimilable foods. In these cases digitalis (10–20 drops of the tincture three or four times daily) is the most generally useful cardiac tonic. When it is not well borne by the stomach, or when prolonged usage impairs its effect, strophanthus (20–30 drops every three or four hours) will be found a reliable substitute. A mercurial laxative (5–10 grains of blue mass) followed by a saline unloads the congested portal vessels, and thus materially assists in the absorption of the digitalis or strophanthus. Among other cardiac tonics of value may be mentioned caffeine citrate (gr. ij–iij), nitroglycerin (gr. $\frac{1}{150}$ – $\frac{1}{100}$), tinct. cactus grandiflorus (Mx–xx), sparteine sulphate (gr. $\frac{1}{4}$ – $\frac{1}{2}$), and strychnine sulphate (gr. $\frac{1}{40}$ – $\frac{1}{20}$). The last is particularly useful when there are indications of fatty degeneration of the heart. When there is anæmia iron is indicated, and it may be given with digitalis and strychnine, as in the following pill:

℞ Strychninæ sulph.,	gr. j;
Pulv. digitalis,	
Ferri reduct.,	aa gr. xx.—M.
Ft. in pil. No. xx.	
Sig. One thrice daily.	

Marked engorgement of the right side of the heart, indicated by extreme dyspnœa, cyanosis, feeble pulse, and scanty albuminous urine, is often quickly relieved by venesection. After the abstraction of a few ounces of blood remedies which previously proved futile may act most happily.

For the **insomnia** which often attends cardiac disease the best hypnotics are opium, sulphonal, chloralamide, and hyoscine.

Præcordial distress is often relieved by the application of a large belladonna plaster and the internal administration of nitroglycerin.

Dropsy.—The special measures for the relief of this condition consist in the administration of hydragogue

cathartics (Epsom salt in concentrated solution, or compound jalap powder, gr. xx-xxx) and diuretics (infusion of digitalis, f̄3ss-f̄3j; caffeine citrate, gr. ij-ijj; sparteine, gr. $\frac{1}{4}$ - $\frac{1}{2}$; or diuretin, gr. x-xx in capsules). Niemeyer's pill of blue mass, digitalis, and squill is often very efficient. In obstinate cases Tyson recommends a diet of milk reduced to the minimum that will sustain life—not more than two ounces every two hours, and that only during the waking hours. To this dietetic treatment he adds a daily morning dose of Epsom salt and a combination of digitalis and nitroglycerin.

Large accumulations of fluid in the serous sacs will call for aspiration.

Dyspnœa and Cough.—In addition to other general measures already alluded to for improving the circulation, special treatment is often indicated for these troublesome symptoms. Opium or its alkaloid codeine is perhaps the most serviceable drug. Expectorants are generally useless. The application of dry cups or mustard poultices to the chest frequently gives temporary relief. In severe paroxysms of coughing inhalations of nitrite of amyl are useful. The internal administration of Hoffmann's anodyne is also worthy of trial.

In **sudden heart-failure**, indicated by orthopnœa, cyanosis, and collapse, hot fomentations should be applied to the præcordia and diffusible stimulants administered hypodermically: spirit of ammonia (20-30 minims), whiskey (30-40 minims), strychnine sulphate (gr. $\frac{1}{30}$ repeated once or twice), and especially nitroglycerin (1-2 drops of the official alcoholic solution), may be so employed. Venesection is often of great value in these cases.

In **excessive hypertrophy** in valvular disease, indicated by præcordial distress, a bounding pulse, and perhaps nose-bleed, aconite or veratrum viride often proves efficient.

FATTY HEART.

This term is applied to two conditions: fatty infiltration and fatty degeneration. In the former the treatment is largely dietetic, hygienic, and regiminal. The use of fats,

starches, and sugars should be restricted. Graduated exercise should be enjoined. The Turkish bath under supervision is frequently useful. In advanced cases cardiac tonics like digitalis and strychnine are sometimes indicated.

The treatment of fatty degeneration of the heart is not very satisfactory. Rest of mind and of body is an important factor. The diet should be light but nutritious. Tonics are sometimes indicated. Digitalis may prove useful, but it often completely fails to afford relief. The most useful remedies are strychnine and nitroglycerin. Restlessness, præcordial distress, and insomnia will call for morphine. In angina hot fomentations should be applied to the præcordia and nitrite of amyl administered by inhalation.

ANGINA PECTORIS.

As this condition is most commonly associated with fatty degeneration of the heart, the treatment of the latter is applicable here. Between the attacks potassium iodide (gr. x three or four times daily) is sometimes of decided value. It probably exerts an absorbent effect on the sclerosed coronary arteries. Nitroglycerin (gr. $\frac{1}{100}$ — $\frac{1}{50}$), when well borne, is sometimes extremely useful in warding off the attacks. Cardiac tonics like digitalis and strychnine, and general tonics like iron and arsenic, are often indicated.

The Attack.—A few whiffs of amyl nitrite usually give instant relief, especially when the pain is associated with high arterial tension. When this treatment fails, morphine with atropine may be administered hypodermically and hot fomentations applied to the præcordia.

AORTIC ANEURISM.

Mechanical treatment by ligation of distal arteries, acupuncture, and electrolysis has not only been unsatisfactory, but has often shortened life.

The treatment commonly employed is a modification of Tufnell's method, and consists in absolute rest in bed for from eight to twelve weeks, with a dry diet, and the administration of iodide of potassium, which is used empiri-

cally in doses of ten to twenty grains thrice daily. Since Wright and other observers have found that calcium chloride (gr. v-vj three or four times daily) distinctly increases the coagulability of the blood, it is quite possible that this drug might prove useful in aneurism. When there is much dyspnœa and pain and the pulse is strong, free venesection often affords great relief. Cardiac sedatives like aconite and veratrum viride are also useful, but not nearly so efficient as bloodletting. Severe pain will call for the local application of an ice-bag and the administration of morphine.

ARTERIO-SCLEROSIS.

When advanced, arterio-sclerosis is incurable, but in its early stages much can be done to retard its progress and to ameliorate the symptoms. The dietetic and hygienic treatment is of the first importance. Stimulants must be rigidly interdicted. Potassium or strontium iodide has been recommended for its absorbent effect. Nitroglycerin (gr. $\frac{1}{100}$ thrice daily, cautiously increased) is often valuable in overcoming the high arterial tension and in temporarily relieving the distressing symptoms. When dyspnœa and cyanosis are marked, venesection is very useful.

DISEASES OF THE RESPIRATORY SYSTEM.

ACUTE NASAL CATARRH; CORYZA.

In the early stage a cold in the head can frequently be aborted by the use of hot drinks, a laxative, moderate doses of Dover's powder with quinine, and the application of menthol to the nasal chambers. Some crystals of menthol may be placed in a wide-mouthed bottle, and their vapor inhaled for from ten to fifteen minutes several times during the day. A spray of menthol is also useful:

℞ Menthol., ʒj;
 Petrolat. liq., ℥ʒij.—M.
 Sig. Spray into the nose several times daily.

Cocaine is often very efficient in allaying the fulness and distress; a 4 per cent. solution may be sprayed into the

nose. When the symptoms are severe, Dover's powder (gr. v) may be given with quinine (gr. v) thrice daily.

CHRONIC NASAL CATARRH.

The naso-pharynx must be kept clean by means of anti-septic sprays or douches; one like the following may be employed:

R	Sodii borat.,	
	Sodii bicarb.,	āā ʒj;
	Acid. carbol.,	gr. xxx;
	Glycerini,	fʒj;
	Aquæ,	Oij.—M. (Dobell.)

In the hypertrophic form mild astringent sprays are often useful, and sulphate of zinc or copper (5-10 grains to the ounce) may be selected for this purpose. To effect a cure the naso-pharynx must be unobstructed: hypertrophies and exostoses must be removed, and deviations of the septum corrected by surgical means.

In the atrophic form a complete cure is rarely attainable, but the distressing symptoms can be considerably ameliorated. Crusts must be removed, and the nasal chambers kept clean with antiseptic sprays or douches. The application of strong solutions of nitrate of silver to small areas at each sitting is often useful. Light applications of the electro-cautery to the diseased mucous membrane are efficient stimulants. A 30 per cent. solution of lactic acid is also advocated. Ebstein employs tampons soaked in balsam of Peru. When there is much purulent discharge a 20 per cent. mixture of ichthyol in cosmoline is very efficient.

In both forms of rhinitis general tonics like iron, cod-liver oil, hypophosphites, and iron and arsenic are often indicated.

ACUTE CATARRHAL LARYNGITIS.

The patient should be confined to his room, and preferably to bed. The temperature of the room should be 70° or 75°, and the atmosphere should be moistened by the generation of steam. Iodine, or in severe cases an ice-bladder, may be applied to the throat. Inhalations of

medicated vapors are decidedly useful, and one of the following may be employed:

	R Menthol.,	
	Camphor.,	aa gr. v.
M. et add.	Petrol. liq.,	fʒij.—M.
Or,		
	R Vin. ipecac.,	fʒj;
	Aquæ,	fʒij.—M.
Or,		
	R Cocain. hydrochlor.,	gr. iv;
	Potass. chlorat.,	gr. lxxv;
	Aquæ laurocerasi,	ʒlxxv;
	Ess. menth. pip.,	ʒij;
	Aquæ,	q. s. ad fʒviiij.—M.

Internal Treatment.—A saline laxative may be administered at the beginning of the treatment, and followed by some sedative mixture such as Dover's powder (gr. v) with quinine (gr. v) thrice daily, or—

R	Potassii citratis,	
	Potassii bromid.,	aa ʒij;
	Apomorph. hydrochlor.,	gr. ss;
	Aquæ et syr. sarsaparillæ comp.,	aa fʒiss.—M.
Sig.	A teaspoonful every two hours for a child of five years.	

Or one of the following tablets, devised by Dr. Seiler:

R	Potass. chlorat.,	
	Potass. bromid.,	
	Pulv. ext. glycyrrhizæ,	aa ʒj;
	Tinct. ferri chlor.,	fʒss;
	Sacchar., etc.,	q. s.—M.
Ft.	in trochisci No. xx.	
Sig.	One every three or four hours for an adult.	

Œdema of the larynx, indicated by extreme dyspnoea, will require scarification of the mucous membrane or tracheotomy.

CHRONIC CATARRHAL LARYNGITIS.

The patient must learn to use the voice properly; sounds should be expelled by the aid of the abdominal muscles and diaphragm, and not the muscles of the throat. Flannel protectors should be avoided, and the application of cool water to the neck, night and morning, instituted in

their stead. Tonics are generally indicated. Expectorants which are eliminated by the respiratory mucous membrane are useful, and one of the following may be employed: terebene (gtt. v in capsule), oil of eucalyptus (gtt. v in capsule), oil of sandal-wood (gtt. v in capsule), or oleoresin of cubeb (gtt. v-x in capsule).

Change of climate is of great benefit; a mild dry climate is to be preferred.

Topical Treatment.—A faradic current to the neck is often beneficial. Medicated solutions should be applied to the larynx by means of a brush or atomizer. The following remedies are useful: potassium chlorate (gr. v-xx to the ounce), silver nitrate (gr. v to the ounce, gradually increased), ferric alum (gr. iij-v to the ounce), ferric chloride (gr. xxx-lx to the ounce), zinc sulphate (gr. iij to the ounce, gradually increased), carbolic acid (ʒss-ʒj to ounce of glycerin, applied by brush), or—

℞ Liq. iodi comp.,	ʒss;
Glycerin.,	ʒiij;
Aquæ,	ʒx.—M.
Sig. Use as an inhalant.	(Allen.)

TUBERCULOUS LARYNGITIS.

As this affection is usually secondary to pulmonary tuberculosis, remedies must be directed to the latter disease. Local applications are useful in relieving the pain and even in healing the ulcers. Powders of iodoform or morphine may be dusted on the ulcers, or a solution of silver nitrate, cocaine, or menthol may be applied by means of a laryngeal brush.

SYPHILITIC LARYNGITIS.

The system should be rapidly brought under the influence of antisyphilitic remedies; for this purpose mercurial inunctions may be employed, and iodides and mercurials given internally:

℞ Hydrarg. chlor. corros.,	gr. j;
Potass. iodid.,	ʒij-ʒiv;
Syr. sarsaparillæ comp.,	ʒiss;
Aquæ,	q. s. ad ʒiij.—M.
Sig. A teaspoonful thrice daily, after meals.	

Local applications carefully applied by the aid of the laryngeal mirror are also required. Iodoform or acid nitrate of mercury (1 to 5 drops in water) may be selected for this purpose.

When the laryngeal movements interfere with healing, tracheotomy may be performed. The same operation or gradual dilatation is sometimes required for the resulting cicatricial stenosis.

SPASMODIC CROUP; FALSE CROUP.

A sponge moistened with hot water may be applied to the throat, or the child may be placed in a hot bath. If these simple measures fail, an emetic will almost invariably bring relief. Wine of ipecac (ʒj) or powdered alum (a teaspoonful in warm water) may be selected. Subsequent treatment should be directed to the laryngeal catarrh.

MEMBRANOUS CROUP; TRUE CROUP.

(See *Laryngeal Diphtheria*.)

LARYNGISMUS STRIDULUS.

The Paroxysm.—Cold water may be dashed on the face and head, or a few drops of nitrite of amyl or chloroform may be inhaled from a handkerchief.

The Interval.—Careful search should be made for some exciting cause: the gums may require lancing, or the gastro-intestinal tract may demand attention. The child should be placed under the best hygienic conditions. Tonics like cod-liver oil, malt, hypophosphites, and arsenic are generally indicated. The bromide of potassium is an efficient antispasmodic, and may be advantageously combined with antipyrine:

℞ Antipyrin.,	gr. xxiv–xlviij;
Potass. bromid.,	ʒiiss–ʒij;
Syr. aurant. cort.,	fʒj;
Aquæ,	q. s. ad fʒiiij.—M.

Sig. A teaspoonful thrice daily.

ACUTE BRONCHITIS.

The abortive treatment consists in the use of hot foot-baths, a mustard plaster to the chest, the internal adminis-

tration of hot drinks, and a full dose of Dover's powder (gr. x), with which quinine may be advantageously combined. This method is only applicable in the initial stage and to those patients who are willing to remain in-doors for the following twenty-four hours.

The young, old, and enfeebled should be confined to bed. A turpentine stupe, mustard plaster, or iodine may be applied to the chest.

In the early stage, when there is substernal pain with little or no expectoration, sedative expectorants like ipecac, the vegetable salts of potassium, antimony, and apomorphia are indicated, and it is well to combine with them an opiate to check the harassing cough :

R Potass. citrat.,	℥ss;
Apomorphin. hydrochlor.,	gr. j;
Syr. ipecac.,	f℥ss;
Succi limonis,	f℥ij;
Syr. simplicis,	q. s. ad f℥iv.—M.
Sig. A dessertspoonful in water every three hours.	(Wood.)

Or,

R Vin. ipecac.,	f℥ij;
Liq. potass. citrat.,	f℥iv;
Tinct. opii camph.,	
Syr. acaciæ,	aa f℥j.—M.
Sig. A tablespoonful thrice daily.	(DaCosta.)

In severe cases with dyspnœa, inhalations from a steam-atomizer often give relief. Wine of ipecac (with twice its volume of water), tincture of lobelia, or tincture of conium may be employed for this purpose.

In the later stages, when expectoration has been established, stimulating expectorants are indicated; chloride of ammonium, squills, senega, terebene, tar, or eucalyptus may be selected :

R Ammon. chlor.,	gr. xl;
Syr. scillæ,	
Tinct. opii camph.,	
Ext. pruni virgin. fl.,	aa f℥ss;
Syr. acaciæ et aquæ,	aa f℥iss.—M.
Sig. A tablespoonful every three hours.	

Or,

R Tinct. opii camph.,	f℥ij;
Syr. prun. virgin.,	f℥iss;
Syr. picis liquid.,	q. s. ad f℥iv.—M.
Sig. A tablespoonful thrice daily.	

Or,

R Tereben., m.c.
 Ft. in capsul. No. xx.
 Sig. One, three or four times daily.

CHRONIC BRONCHITIS.

Special attention must be given to diet, clothing, bathing, exercise, etc. Bronchitis dependent on heart or kidney disease will require remedies directed to those organs. The general vitality is frequently reduced, and tonics like cod-liver oil, hypophosphites, iron, quinine, and strychnine are often valuable adjuncts to the special treatment. Change of climate often secures permanent relief. In this country the extreme southwestern territory, including New Mexico, Arizona, and Southern California, possesses many atmospheric advantages. Alteratives like potassium iodide are often serviceable in chronic bronchitis with little expectation.

Counterirritants—blisters, tincture of iodine, or croton oil—prove useful.

Stimulating expectorants—ammonium chloride, terebene, tar, eucalyptus, oil of sandal-wood, and copaiba—are indicated:

R Ammon. chlor., āā ʒij;
 Ext. glycyrrhizæ, āā q. s. ad ʒvj.—M.
 Syr. lactucar. et aquæ,
 Sig. A tablespoonful thrice daily.

Or,

R Copaibæ, ʒij;
 Acaciæ et sacchar., āā q. s.;
 Spt. lavandulæ comp., ʒj;
 Aquæ, q. s. ad ʒvj.—M.
 Sig. A tablespoonful thrice daily.

Or,

R Apomorphin. hydrochlor., gr. ss;
 Syr. prun. virgin., ʒij;
 Syr. picis liq., ʒiv.—M.
 Sig. A tablespoonful thrice daily. (Murrell.)

Or,

R Tereben., m.c.
 Ft. in capsul. No. xx.
 Sig. One every three or four hours.

The method of treating chronic bronchitis by inhalations, which has been so ably advocated by Dr. Murrell of London, is extremely useful, especially in patients with weak stomachs, in whom syrups should be avoided.

Wine of ipecac (with twice its volume of water), terebene (with equal parts of benzoinol or liquid vaseline), creosote, or carbolic acid may be so employed:

℞ Acid. carbol.,	gr. xxx;
Tinct. opii camph.,	ʒij.—M.
Sig. A fluidrachm with half a pint of hot water in the inhaler, thrice daily.	
	(N. S. Davis.)

An inexpensive inhaling apparatus is made by Codman & Shurtleff of Boston.

CAPILLARY BRONCHITIS.

The patient must be confined to bed. The temperature of the room should be kept uniformly at 70° or 75°. The atmosphere should be rendered moist by the generation of steam. Turpentine stupes may be applied to the chest, or in children a cotton jacket. The diet must be light and nutritious. Stimulants are frequently indicated. Quinine may be given in suppository to support the system. Ammonium carbonate is an invaluable cardiac and respiratory stimulant in these cases; it may be prescribed as follows:

℞ Ammon. carb.,	gr. xv;
Pulv. acaciæ et sacchar.,	aa q. s.;
Spt. lavandulæ comp.,	ʒij;
Aquæ,	q. s. ad ʒij.—M.
Sig. A teaspoonful every two hours to a child of two or three years.	

When the dyspnœa is marked, an emetic is useful in mechanically expelling mucus from the bronchi. Wine of ipecac (ʒss-ʒj for a child) may be selected.

When the fever is high, it should be reduced by sponging with cool water or by the cold bath.

BRONCHIECTASIS.

Tonics are often indicated. Stimulant and antiseptic expectorants like turpentine, terebene, eucalyptus, oil of sandal-wood, and tar are sometimes useful.

Inhalations of terebene, carbolic acid, or dilute peroxide of hydrogen lessen cough and destroy the fetid odor of the breath. Codeine (gr. $\frac{1}{4}$) may be employed to allay cough.

ASTHMA.

The Attack.—Prompt relief often follows the inhalation of nitrite of amyl (5 or 6 drops in a glass or on the handkerchief), iodide of ethyl (20 to 30 drops), or a few whiffs of chloroform. Smoking cigarettes of belladonna- and stramonium-leaves wrapped in nitre-paper—paper which has been soaked in a saturated solution of saltpetre and dried—will often suffice in mild attacks. Nitre-paper may be burned in the room and the fumes inhaled.

The application of dry cups or thin poultices to the chest is often a valuable adjunct to the treatment. Morphine (gr. $\frac{1}{8}$ — $\frac{1}{4}$) with sulphate of atropine (gr. $\frac{1}{120}$) will often cut short an attack. Internally, sedatives like Hoffmann's anodyne (ʒss), tincture of lobelia (℥xx), and bromide of potassium (gr. xxx) are sometimes useful :

R Potass. bromid.,	ʒiij;
Tinct. lobeliæ,	℥iij;
Spt. æther. comp.,	ʒj;
Ext. grindeliæ rob. fl.,	ʒss;
Syr. sarsaparillæ comp.,	q. s. ad ℥iv.—M.

Sig. A dessertspoonful in water every two hours.

The Interval.—Careful search should be made for some reflex irritation, especially in connection with the nasopharynx. An easily assimilable diet must be selected; in nocturnal asthma the evening meal should be very light. Graduated exercise and frequent bathing followed by friction of the skin will add to the general vigor. A change of climate is desirable, but there is no fixed rule in the selection of the locality. Many asthmatics do well in the city, but a dry atmosphere and a high altitude are better suited to the majority.

Busey claims excellent results from the habitual wearing of an oil-skin jacket in asthma associated with bronchitis. Among the remedies, arsenic and potassium iodide hold a high place as alteratives; the latter remedy (gr. x-xx

thrice daily) in conjunction with belladonna is often very useful. Fowler's solution (3 drops, gradually increased to 10 or more, thrice daily) may be administered over long periods. Nitroglycerin (gr. $\frac{1}{100}$) or nitrite of sodium (gr. iij-v thrice daily) often gives immunity for long periods.

HAY ASTHMA.

Careful search should be made for chronic nasal disease, and if found appropriate treatment instituted.

A change of climate during the period of susceptibility exempts most patients. A sea-voyage or a sojourn in some high-mountain district like the White Mountains, Adirondacks, Catskills, or Alleghanies may be recommended.

Tonics are usually indicated, and quinine, arsenic, and strychnia are often very useful when administered before and during an attack. To allay itching and lachrymation the eyes may be washed with a solution of boric acid (gr. x to $\bar{3}$ j) or sulphate of zinc (gr. i-ij to $\bar{3}$ j). Sneezing, nasal fulness, and discharge are often relieved by medicated sprays. A solution of cocaine or the following may be employed:

R Menthol, $\bar{3}$ j- $\bar{5}$ ij;
 Ol. amygd. dulc. *vel* benzoinol, f $\bar{3}$ ij.—M.
 Sig. Spray into the nose and throat every few hours.

EMPHYSEMA.

The remedies advocated in chronic bronchitis and asthma are often applicable here. The patient should be placed under the most favorable hygienic conditions. Iodide of potassium (gr. x thrice daily) is often used empirically, and sometimes relieves the dyspnœa and cough. Iron is indicated in the anæmic. Strychnia (gr. $\frac{1}{40}$ to $\frac{1}{30}$) is a valuable respiratory and cardiac stimulant, and may be combined with digitalis when there are symptoms of heart-failure:

R Strychnin. sulph., gr. ss;
 Pulv. digitalis,
 Pulv. scillæ,
 Ferri reduct., aa gr. xx.—M.
 Ft. in pil. No. xx.
 Sig. One thrice daily.

Inhalation of oxygen or the inspiration of compressed air followed by expiration into rarefied air is sometimes a useful measure.

HÆMOPTYSIS.

Absolute rest and the avoidance of excitement should be enjoined. The shoulders should be elevated. An ice-bag may be placed on the chest, and pieces of ice may be held in the mouth and slowly swallowed. Morphine is a useful sedative, and may be given hypodermically with the fluid extract of ergot (℥x-xx). Gallic acid (gr. x-xx) may be given by the mouth. Astringent sprays are useless. A saline purge may act beneficially by inviting blood away from the congested organ. A firm ligature around one or both legs retards the flow of venous blood, and so aids in arresting the hemorrhage.

When the bleeding is not profuse, but frequently repeated, the following internal remedies are efficient: lead acetate (gr. ij with powdered opium gr. $\frac{1}{4}$), gallic acid (gr. x-xx), fluid extract of hamamelis (ʒj-ij), turpentine (gtt. x), oil of erigeron (℥v), or—

℞ Acid. gallic.,	ʒij;
Acid. sulph. aromat.,	ʒiiss;
Ext. prun. virgin. fl.,	
Glycerini,	āā ʒiiss;
Aquæ,	q. s. ad Ōss.—M.
Sig. A tablespoonful as required.	

CROUPOUS PNEUMONIA.

In the management of croupous pneumonia the dietetic and hygienic treatment is of paramount importance. The room should be well ventilated and kept uniformly at a temperature of 65° or 70° F. The diet should be liquid or semi-liquid, and may include milk, koumiss, eggs, broths, and beef-juice. The patient's chest should be enveloped in a cotton jacket covered with oiled silk.

Although pneumonia is an infectious disease which produces a widespread disturbance in the economy, the immediate danger is generally obstruction to the pulmonary circulation; so that in the stage of congestion, if the pulse

be full and strong, veratrum viride (℥ij–iij of the fluid extract every hour until the pulse softens) is a valuable remedy. It depresses the heart, dilates the systemic vessels, and thus invites blood away from the engorged lung. In the very robust, venesection may be substituted for veratrum viride.

In consolidation the right ventricle is subjected to severe strain, and there is great danger of heart-failure; hence in this stage cardiac stimulants should be given freely. The tincture of digitalis (gtt. v–x every two hours, being guided by the pulse) may be given by the mouth; when the stomach is irritable the drug should be administered hypodermically. Recently, Petresco has strongly advocated the use of very large doses of digitalis—1 to 2 ounces of the tincture daily—and claims a mortality of only 1.22 per cent. in a series of 755 cases thus treated. Strychnine (gr. $\frac{1}{40}$ – $\frac{1}{20}$ every two hours) is also of great value as a cardiac and respiratory stimulant. Ammonia is useful in some cases, and either the aromatic spirits or the carbonate of ammonium may be employed.

As a general stimulant and food, alcohol is often indicated. In typhoid pneumonia turpentine (℥v) may be associated with the alcohol.

Quite recently the treatment of croupous pneumonia by the injection of blood-serum from a patient who is convalescing from the disease, or from an animal rendered immune to the infection, has attracted considerable attention. The results obtained by this treatment in Europe have been sufficiently encouraging to warrant a thorough trial of it in this country.

Pain may be relieved by opium and by the application of wet cups, dry cups, or hot fomentations. In robust patients the application of an ice-bag serves not only to lessen the pain, but to lower the temperature.

Delirium.—This symptom will call for an ice-bag to the heart and the administration of a nerve-sedative, such as potassium bromide, hyoscine, musk, or camphor. When the delirium is associated with high fever a cold pack or tepid bath will often control it.

Dyspnœa and Cyanosis.—These symptoms must be

combated by the free use of cardiac and respiratory stimulants. Inhalations of oxygen frequently practised are sometimes very efficacious.

Pyrexia.—High temperature is best controlled by sponging, the cold pack, or, when feasible, by the cold bath. Phenacetine (gr. v–vij) is a safe and efficient antipyretic.

Convalescence should be guarded, and such tonics as iron, quinine, strychnine, and cod-liver oil will be found useful restoratives.

In delayed resolution small blisters may be applied over the affected areas and potassium iodide administered internally; thus:

℞ Potass. iodid.,	ʒj;
Ammon. chlor.,	ʒiiss;
Mist. glycyrrhizæ comp.,	fʒvj.—M.
Sig. A tablespoonful four times a day.	(DaCosta.)

CATARRHAL PNEUMONIA.

This disease can often be prevented by carefully protecting patients suffering with bronchitis and infectious fevers. The sick-room should be well ventilated, but free from draught, and the temperature should be kept uniformly at 70°. A moist atmosphere is desirable, and an apparatus for producing steam may be improvised. Tincture of iodine may be applied over the affected areas and the chest enveloped in a cotton jacket. The diet should consist of milk, junket, koumiss, broths, gruels, eggs, and beef-juice. Stimulants—wine or brandy—are usually required to combat the extreme prostration. At the onset, if there be constipation, a laxative dose of calomel may be prescribed with advantage. Stimulating expectorants are nearly always required, and ammonium chloride, ammonium carbonate, squill, terebene, or wine of tar may be employed:

℞ Ammon. chlor.,	gr. 1;
Spt. æther. nitros.,	fʒss;
Syr. senegæ,	fʒiiss;
Tinct. cardamom. comp. et aquæ,	aa q. s. ad fʒij.—M.
Sig. A teaspoonful every two or three hours to a child of three years.	

Or,

℞ Ammon. carb.,	gr. xxiv;
Syr. toltutan.,	℥vj;
Spt. vin. gal.,	℥iij;
Syr. senegæ,	℥iiss;
Syr. acaciæ,	q. s. ad ℥iij.—M.
	(Goodhart and Starr.)

Strychnine is an invaluable respiratory and cardiac stimulant; for an adult, gr. $\frac{1}{30}$ may be given every three or four hours.

The accumulation of mucus in the bronchial tubes, indicated by extreme cyanosis, a weak pulse, and bubbling râles, will call for an emetic; wine of ipecac (ʒj-ʒss) or apomorphine (for an adult gr. $\frac{1}{12}$) may be selected. Nervous symptoms—restlessness, delirium, etc.—will often be relieved by a cold pack or by a cold bath. Hyoscine, bromide of potassium, or chloral in small doses may be required. In children the following suppository is often very efficient:

℞ Pulv. asafœtidæ,	ʒj;
Quininæ sulph.,	gr. xxx;
Ol. theobromæ,	q. s.—M.
Ft. in suppos. No. xij (child's size).	

Sig. One every three or four hours for a child of five years. (Pepper.)

In delayed resolution counterirritants should be applied to the affected areas and iodide of potassium administered internally.

Convalescence must be guarded; tonics like cod-liver oil, iron, arsenic, and hypophosphites are useful restoratives. A change of scene is desirable.

GANGRENE OF THE LUNG.

Nutritious food, and quinine, strychnine, and alcoholic stimulants, will be required to support the system.

The offensive odor of the breath may be destroyed by carbolic acid (gr. j every four hours) internally, or by inhalations of carbolic acid or creosote. Turpentine (℥v every three hours) has been recommended as a stimulant and antiseptic. When the patient's strength will permit, surgical interference offers the best chance of cure.

CEDEMA OF THE LUNGS.

When there is much cyanosis, and the patient's strength will permit it, the application of wet cups to the chest or bleeding from the arm is of great value. Hot fomentations should be applied to the chest. Hydragogue cathartics are indicated. Epsom salt in concentrated solutions or elaterium (gr. $\frac{1}{8}$) may be selected. Cardiac stimulants like ether, alcohol, ammonia, digitalis, and especially strychnine, are required, and may be given hypodermically:

R Strychnin. sulph.,	gr. j;
Aquæ destillat.,	℥j.

Solve et sig. 15 minims hypodermically every three or four hours.

Caffeine is a useful diuretic and cardiac and respiratory stimulant:

R Caffein.,	ʒj;
Sodii benzoat.,	ʒiss.—M.

Ft. in chart. No. xij.
Sig. One every two or three hours.

PULMONARY TUBERCULOSIS.

Preventive Measures.—Recognizing the infectious nature of the disease, the following prophylactic measures should be observed: Sputa of consumptives should be received in suitable vessels containing antiseptic solutions, and subsequently destroyed. Cattle should be rigidly inspected, and tuberculous meat and the milk of tuberculous cows declared unmarketable. Phthisical mothers should not nurse their offspring. The healthy should not sleep in apartments occupied by those affected.

Personal Hygiene.—This includes good food, fresh air, frequent bathing, avoidance of exposure, graduated exercise, residence in an elevated locality, a dry, well-ventilated house, and plenty of sleep and recreation.

Curative Treatment.—This involves two objects: (1) the strengthening of the patient's vitality and resisting power; (2) the destruction or disabling of the tubercle bacilli.

General Health.—The diet should be carefully regulated. Nutrients like cod-liver oil (ʒij–ʒiv two hours after meals), malt, and hypophosphites are often very useful. Mineral acids and bitters may be required to stimulate digestion. Iron, quinine, and arsenic are sometimes indicated; the last, when well borne, often exerts a decidedly favorable influence. Alcohol in many cases is of great value, but the danger of inducing the habit must be borne in mind. Beer, porter, ale, and wine are usually the most desirable preparations. So long as alcohol stimulates the appetite, lowers the temperature, and strengthens the pulse, it does good. Its results should be carefully noted, and any untoward effects will call for its immediate withdrawal.

Change of Climate.—This offers to many patients the greatest hope of cure. As a rule, a high altitude should be selected; the atmosphere should be dry and the temperature equable. Personal experience must decide the question of temperature; generally, patients who feel better in summer will do well in a warm climate, and *vice versâ*. The physician should have some knowledge of the locality, which should afford ordinary convenience without being too crowded with sufferers similarly afflicted.

In selected cases a sea-voyage is often very useful. According to Douglas Powell, it is most suitable to patients in the early stages, who have been previously healthy, who have overworked nervous systems, and in whom the disease is more or less quiescent.

Patients in advanced phthisis should not be sent far from home.

Specific Treatment.—The injection of iodine, carbolic acid, etc. into phthisical lungs, as recommended by Mosler, Thompson, and Pepper, has not given encouraging results. The rectal injection of sulphide of hydrogen, as recommended by Bergeon, has fallen into disuse. Koch's tuberculin has, for the most part, been negative or deleterious in its effect. Of all the special remedies, creosote alone continues to hold its prominent position in the therapy of phthisis. It may be given in doses of 1 to 5 minims, in pill, in emulsion of cod-liver oil, or with wine:

℞ Creosoti, ℥xv;
 Olei morrhuæ, fʒij;
 Calcii et sodii hypophos., ʒss;
 Olei gaultheriæ, ℥xx;
 Acaciæ, q. s.;
 Aquæ, fʒvj.—M.
 q. s. ad
 Sig. A tablespoonful two hours after meals.

Or,

℞ Creosoti, ℥xv;
 Tinct. gentian., ℥xij;
 Spt. vini rect., fʒvj;
 Vini xerici, fʒvj.—M.
 Sig. A tablespoonful thrice daily. (Fraentzel.)

Creosote is often valuable in inhalations :

℞ Creosoti,
 Spt. chloroformi,
 Alcoholis, aa ʒss.—M.
 Sig. 10 to 20 drops in the inhaler several times daily.

Symptomatic Treatment.—Cough.—Syrups should be avoided as far as possible, and cough alleviated by inhalations of wine of ipecac, creosote, benzoin, or terebene.

Tar, terebene, and eucalyptus may be employed internally. Cough associated with the expectoration of much offensive material should not be checked.

A cold bed often leads to cough and a wakeful night; in these cases the bed should be warmed before it is occupied. Hot applications to the chest and a hot drink on retiring sometimes ensure rest.

The following mixture is very efficient in the cough of phthisis :

℞ Codeinæ sulph., gr. iv;
 Acid. hydrocyanic. dil., ℥xxxij;
 Syr. tolu., fʒij.—M.
 Sig. A teaspoonful three or four times daily. (DaCosta.)

Sweating.—Atropine (gr. $\frac{1}{100}$), picrotoxin (gr. $\frac{1}{80}$ — $\frac{1}{50}$), gallic acid (gr. x), agaricinic acid (gr. $\frac{1}{7}$ — $\frac{1}{3}$), sulphonal (gr. ij—viij), or—

℞ Atropin. sulph., gr. $\frac{1}{4}$;
 Acid. sulph. aromat., ʒij;
 Aquæ rosæ, q. s. ad fʒj.—M.
 Sig. 20 to 30 drops at bedtime, repeated if necessary.

Sponging with alum and whiskey is sometimes very efficacious.

Hæmoptysis.—When profuse, ice may be held in the mouth and swallowed slowly. The fluid extract of ergot (gtt. xx–xxx) and morphine (gr. $\frac{1}{8}$) should be given hypodermically. The internal administration of gallic acid and other astringents is of little value. The application of a temporary ligature to one or more of the members hinders the flow of blood in the veins and may materially aid in checking the bleeding.

When the hemorrhage is more or less continuous, but not profuse, the fluid extract of hamamelis (ʒij–ʒiij) and pills of acetate of lead and opium are efficient remedies.

Diarrhœa.—This symptom will require rest, a liquid diet, and the use of subnitrate of bismuth in large doses or pills of nitrate of silver and opium:

℞ Bismuth. subnit.,	ʒvj;
Salol.,	gr. xxiv;
Morphin. sulph.,	gr. j.—M.
Ft. in chart. No. xij.	
Sig. One powder every three hours.	

Pyrexia.—The patient must rest. Continuous high fever will call for quinine, antipyrine, antifebrin, or thallin. Sponging with alcohol and cool water, equal parts, is a desirable method of reducing fever.

Pain.—When severe, administer opium and apply to the affected side adhesive straps, hot applications, dry cups, or iodine.

PLEURISY.

The treatment of the primary stage of pleurisy is chiefly symptomatic. The patient should be strictly confined to bed. The diet should be light and easily assimilable. When the temperature is high and the pulse rapid, aconite may be administered in small doses. Quinine (gr. v thrice daily) seems to exert a favorable influence. Pain may be so severe as to require morphine hypodermically.

Local Applications.—When the pain is very severe, the application of leeches or wet cups, followed by strapping of the chest, often gives much relief. In other cases

iodine, mustard plasters, ice-bags, or hot fomentations will be found serviceable local remedies.

Serous Effusion.—When the fluid is only moderate in amount and is not producing distressing symptoms, efforts should be made to promote its absorption. To effect this a series of small blisters may be applied externally, and diuretics and cathartics given internally. The best diuretics are digitalis, caffeine, and the vegetable salts of potassium, such as the acetate and citrate :

℞ Potass. acetat., $\bar{\text{z}}_{\text{ss}}$;
 Infus. digitalis, $\text{f}\bar{\text{z}}_{\text{ij}}$.—M.
 Sig. Two teaspoonfuls every three or four hours.

The best cathartics are Epsom salt and compound jalap powder :

℞ Magnesii sulphat., $\bar{\text{z}}_{\text{iv-vj}}$.
 Div. in chart. No. viij.

Sig. One powder in two tablespoonfuls of water before food, abstaining from liquids for some time afterward.

Of late, considerable attention has been drawn to the value of the salicylates in the treatment of pleural effusions. Dock, from a review of the subject, draws the following conclusions :

(1) Salicylic acid and its salts are among the most effective agents in the treatment of pleurisy with effusion.

(2) In effective doses the remedy is harmless, and with proper care in the selection of the preparation and its administration causes little or no discomfort to the patient.

(3) Salicylates act most promptly in pleurisies with serous effusion of recent origin or of long standing, but they are efficient in simple dry pleurisy, and often act favorably in secondary pleurisy.

(4) There is no evidence that they are useful in suppurative cases.

(5) The drug acts as a diuretic, but may have an effect on the pathological process or on the cause of the disease.

(6) Salicylates have a more marked action on pleurisy than have the diuretics commonly so called.

(7) The duration of treatment with salicylic preparations is less than with diuretics, common salt, or roborant medication.

(8) The remedy can be used at the earliest period, and favorably affects all symptoms.

(9) The drug may be given in the form of the acid or any of its salts, in doses of a drachm of the former or one to two drachms of a salt daily. In ordinary cases it is not necessary to give the large doses, and 60 to 90 grains of sodium salicylate or of salol may be considered full beginning doses, to be diminished one-third or one-half if the effect is manifest.

(10) The ordinary precautions must be observed in giving the drugs, and during their administration the total amount of urine should be measured daily.

The effusion will require aspiration under the following conditions: (1) When it excites much dyspnoea; (2) when it is very large—beyond the third rib; (3) when it is purulent; (4) when it remains unabsorbed after three or four weeks of careful treatment; (5) when it is bilateral and the total amount is sufficient to fill one cavity.

The Operation.—Anæsthetize a point in the seventh interspace near the posterior axillary line, and introduce the needle with a quick stroke along the upper border of the rib. The effusion should be drawn off slowly and one or two pints removed, according to the amount present. Coughing during the operation is an indication for the withdrawal of the needle.

Pyothorax.—In children recovery sometimes follows after one or two aspirations, but in adults such a result cannot be hoped for unless free drainage is established. To accomplish this an incision should be made in the fifth or sixth interspace, outside of the mammary line, and the pus evacuated through a drainage-tube. The latter should be retained until the discharge ceases. In some cases the excision of one or two ribs facilitates retraction and the obliteration of the pleural sac, which is essential to a cure. Washing out the pleural sac after incision is not to be commended unless the discharge is fetid, in which case the cavity may be irrigated with a solution of boric acid, 10:1000, or a 20 to 30 per cent. solution of peroxide of hydrogen.

LEUKÆMIA.

Recovery from leukæmia is extremely rare, death usually resulting within a period of two or three years. Rest of body and mind and a nutritious diet are indicated. The remedies which have proven most serviceable are arsenic in large doses, oxygen inhalations, phosphorus, quinine, and iron. According to Osler, excision of the spleen has been performed twenty-four times in leukæmia, with one recovery.

HODGKIN'S DISEASE.

The prognosis and indications for treatment are the same as in *Leukæmia*.

ADDISON'S DISEASE.

The successful treatment of Addison's disease is beyond the resources of medical art. Rest and a nutritious diet are general indications. Iron, strychnine, phosphorus, and arsenic are useful tonics. Nausea and vomiting must be combated with bismuth, wine of ipecac (gtt. j), hydrocyanic acid, or carbolic acid.

HÆMOPHILIA.

The treatment of the affection is chiefly protective and palliative. Bleeding will call for cold compresses, styptics, and such internal hæmostatics as ergot, hamamelis, and erigeron. The resulting anæmia will be benefited by iron.

SCURVY.

The most important therapeutic measure is the addition of fresh vegetables and sour fruits to the dietary. One to two ounces of lemon- or lime-juice may be administered daily. The resulting anæmia will call for iron. Weak solutions of potassium chlorate or nitrate of silver may be applied to the bleeding and spongy gums.

PURPURA HÆMORRHAGICA.

In many instances a favorable termination follows in the course of one or two weeks without special treatment, while others rapidly end in death in spite of all medication.

The most useful remedies are tincture of chloride of iron, lead acetate, turpentine, hamamelis, ergot, and sulphuric and gallic acids.

MYXEDEMA.

Until recently this disease was thought to be incurable, but since the introduction of thyroid grafting, the injection of the juice of the thyroid glands of sheep, and the internal administration of fresh glands, numerous recoveries have been reported. Murray, who first suggested the treatment, recommends a mixture containing equal parts of thyroid juice, glycerin, and a 0.5 per cent. solution of carbolic acid. A drachm and a half of this solution corresponds to one sheep's thyroid. He first injects 25 minims hypodermically, and if this causes local irritation he reduces the amount to 15 minims. For internal use he employs equal parts of thyroid juice and glycerin. Four times the subcutaneous dose is required when the remedy is given by the mouth. Excellent results have also followed the daily ingestion of the raw gland, half a sheep's thyroid being an average daily dose.

DISEASES OF THE NERVOUS SYSTEM.

ACUTE CEREBRAL MENINGITIS.

The patient should be placed in a quiet, dark, well-ventilated room. An ice-bag may be applied to the head. Constipation should be relieved by enemata. For the headache, restlessness, insomnia, and convulsions, chloral and potassium bromide are useful. Nerve-sedatives may sometimes be conveniently given by the rectum:

℞ Moschi,	gr. iij;
Camphoræ,	gr. xv;
Chloral.,	gr. viiss;
Vitelli ovi,	No. j;
Aq. destil.,	f℥iv.—M.

Sig. Wash out the rectum with a simple enema, and inject two ounces.
(Simon.)

The administration of ergot and iodide of potassium, and, in the tuberculous form, inunctions of iodoform to the

shaved scalp, have been recommended, but generally prove useless.

CEREBRAL HYPERÆMIA.

Acute Hyperæmia.—The patient should be placed in a darkened and well-ventilated room. An ice-bag should be applied to the head. Local bloodletting by leeches or wet cups is very useful. Sedatives like potassium bromide and aconite are frequently called for. Ergot may be employed for its power to contract the vessels. Constipation should be relieved by a brisk saline purge.

Chronic Hyperæmia.—The cause should be ascertained and, if possible, removed. The habits of the patient must be regulated. The diet should be light and nutritious. Saline laxatives are frequently called for to relieve constipation. Insomnia will call for potassium bromide, sulphonal, or chloralamid.

CEREBRAL ANÆMIA.

In acute cases diffusible stimulants like ammonia, whiskey, and nitroglycerin are indicated. In chronic cases the cause should be ascertained and, if possible, removed. When it is due to general anæmia, iron, arsenic, and quinine are useful remedies. When dependent upon valvular disease, rest and the use of digitalis, strophanthus, or strychnine are the remedial measures.

CEREBRAL HEMORRHAGE.

Prophylaxis.—Patients predisposed to apoplexy should lead a quiet life, free from mental and physical excitement. The diet should be nutritious, but easily digestible. Constipation should be relieved by the occasional use of a saline laxative. To secure a free return of the blood from the brain, the clothes at the neck should be loose.

The Attack.—The head and shoulders should be slightly elevated and an ice-bag applied to the head. Croton oil (gtt. j–iij) in a little glycerin or olive oil may be placed on the back of the tongue to secure prompt catharsis. If the pulse be strong, venesection is indicated,

and should be continued until the pulse softens. Bleeding cannot undo the damage already done, but by relieving congestion it may prevent a renewed outpouring. On the other hand, when the face is pale and the pulse feeble the hypodermic injection of diffusible stimulants like ammonia and strychnine is indicated. When collections of mucus interfere with breathing, the patient should be gently turned on his side and the mucus removed.

To prevent the formation of bed-sores, the position should be frequently changed and the parts subjected to pressure should be thoroughly cleansed.

Subsequent Treatment.—As other attacks are liable to occur, the prophylactic treatment already referred to is applicable here. Iodide of potassium (gr. v-x thrice daily) may be administered with the hope of absorbing the clot. After the primary rigidity has disappeared, galvanism, massage, and passive movements should be applied to the affected muscles. Strychnine by the mouth or injected directly into the muscles is often very useful. Even when the paralysis remains, contractures may be prevented to a considerable extent by massage.

HYDROCEPHALUS.

The treatment is unsatisfactory. Counterirritation and the use of diuretics and absorbents exert no influence on the disease. In the majority of cases, beyond dietetic and hygienic measures and the occasional use of tonics, little can be recommended. In cases where the pressure-symptoms are marked, tapping offers some hopes of temporary relief. After the operation compression of the skull should be made by the application of concentric bands of adhesive plaster.

ACUTE SPINAL MENINGITIS.

An ice-bag, leeches, or cups may be applied to the spine. Sedatives like chloral, bromides, and morphine are usually required. Warm baths relieve the pain and lessen the rigidity. Ergot is sometimes recommended, but is of doubtful utility.

If the acute symptoms subside, iodide of potassium may

be administered internally; blisters and mercurial inunctions may be applied to the spine, and massage and electricity to the affected muscles.

ACUTE MYELITIS.

If possible, the patient should be placed on a water-bed. To delay the formation of bed-sores extreme cleanliness is essential. Both in retention and incontinence of urine the catheter should be used twice daily. In incontinence of urine and feces the discharges should be received on cotton-wool or oakum, which should be frequently renewed and the parts thoroughly cleansed. In the beginning an ice-bag or wet cups may be applied to the spine. Such remedies as ergot, belladonna, quinine, and mercury are frequently employed, but they seem to exert little influence. If recovery should follow, massage, electricity, and strychnine may be employed with the hope of restoring power to the paralyzed muscles.

CHRONIC MYELITIS.

The patient should be put at rest. Tonics are often indicated. Counterirritation to the spine by repeated blisters or by applications of the actual cautery often yields good results. The frequent use of tepid baths is also beneficial. The special remedies which have been recommended are arsenic, strychnine, phosphorus, nitrate of silver, mercury, and iodide of potassium. When there is a suspicion of syphilis, the last two remedies should be given a thorough trial.

SCLEROSIS OF THE SPINAL CORD.

Locomotor Ataxia.—The patient should be placed under the best hygienic conditions. Rest is desirable. In the early stage a prolonged voyage may produce excellent results. The diet should be nutritious, but easily assimilable. Excesses of all kinds must be rigidly prohibited. Tonics are frequently indicated. When there is a suspicion of syphilis, iodide of potassium in small doses, mercury, and arsenic are the most reliable remedies. The following pill may prove useful:

℞ Sodii arsenat.,
 Zinc phosphid., aa gr. ij;
 Hydrarg. iodid. rub., gr. j.—M.
 Ft. in pil. No. xxx.
 Sig. One, three times daily, after meals.

Counterirritation to the spine is useful, and may be made with small blisters or the actual cautery.

The Pains.—When very intense, morphine will be required; in other cases antipyrine, phenacetine, and cannabis indica are sometimes efficient:

℞ Antipyrin., ℥j;
 Syr. zingiber., ℥j;
 Aquæ, q. s. ad ℥iv.—M.
 Sig. A teaspoonful every one to four hours for three to six doses.
 (Germain Sée.)

The *laryngeal crises* may be relieved by the inhalation of chloroform or amyl nitrite.

Lateral Sclerosis.—The general treatment is the same as in locomotor ataxia. For the spasmodic condition of the muscles, rubbing, warm baths, and the following remedies are recommended: bromide of potassium, calabar bean, and belladonna.

Multiple Sclerosis.—Apart from the treatment already recommended for the other scleroses, bromides, hyoscine, duboisine, hyoscyamine, and belladonna are sometimes useful in controlling the tremors.

ACUTE ANTERIOR POLIOMYELITIS; INFANTILE PARALYSIS.

During the acute stage the child should be confined to bed. To relieve the congestion, dry cups may be applied to the spine and ergot may be given internally. The affected members should be wrapped in flannel.

After the lapse of two or three weeks electrical treatment should be instituted; the faradic current may be employed when it induces contraction of the affected muscles, but when it excites no response the galvanic current must be substituted. Massage is a very valuable adjunct to the electrical treatment. Internally, strychnine (gr. $\frac{1}{100}$ to a

child of two years) gradually increased is a useful muscular stimulant. Massage and the adjustment of mechanical appliances will be required to combat deformity from contractures.

NEURALGIA.

The Attack.—The patient should be kept in a quiet, cool, well-ventilated room. Local applications are useful; hot cloths, stimulating liniments, an ointment of aconitia, a small blister, or a hypodermic injection of cocaine, chloroform, or morphine and atropine, may be employed. One of the following applications will prove serviceable:

R Aconitinæ,	gr. iv;
Veratrinæ,	gr. xv;
Glycerini,	ʒij;
Cerati,	ʒvj.—M.

Sig. To be rubbed over the parts. Do not apply to any abrasion of the skin. (DaCosta.)

Or,

R Chloral hydrat.,	
Pulv. camphor.,	aa ʒss.—M.
Sig. Apply with a camel's-hair brush.	

Internally, antipyrine, phenacetine, cannabis indica, bromide of potassium, butyl chloral, and exalgine are efficient remedies. Morphine is sometimes required, but the danger of inducing the habit should always be borne in mind.

The Interval.—Careful search should be made for an exciting cause, which, if found, must be removed. The teeth, eyes, nose, gastro-intestinal tract, urine, and blood should be carefully examined.

In anæmia, iron and arsenic are indicated; in syphilis, iodide of potassium; in rheumatism, salicylate of sodium or iodide of potassium; in malaria, quinine and arsenic; in gout, colchicum and lithium; in lead-poisoning, iodide of potassium.

Tonics like iron, quinine, strychnine, cod-liver oil, and phosphorus are frequently indicated. Among the special remedies may be mentioned arsenic, valerian, hyoscyamus, aconitia, gelsemium, cannabis indica, oxide of zinc, nitro-glycerin, and asafœtida. The following pill, devised by Dr. S. D. Gross, is often very useful:

℞ Quinin. sulph., ʒi;
 Morph. sulph.,
 Acid. arsenosi, aa gr. iss;
 Ext. aconiti, gr. xv;
 Strychnin. sulph., gr. j.—M.
 Ft. in pil. No. xxx.
 Sig. One, thrice daily.

Local treatment in the interval may accomplish much. Electricity, acupuncture, or repeated blisters may be employed.

In obstinate cases surgical interference may be required to secure relief. Three operations have been performed: nerve-stretching; neurotomy, or section of the nerve; and neurectomy, or removal of a portion of the nerve.

MIGRAINE.

The Attack.—Rest in a darkened, quiet, and well-ventilated room; antipyrine, caffeine, bromide of potassium, salol, and morphine with atropine are useful remedies:

℞ Antipyrin., ʒi;
 Syr. aurant. cort., ʒj;
 Aquæ, q. s. ad ʒiij.—M.
 Sig. A tablespoonful every two hours.

Or,

℞ Caffein. citrat., gr. xij;
 Phenacetin., gr. xvij;
 Sodii bromid., ʒj.—M.
 Ft. in chart. No. vj.
 Sig. One powder every hour.

Or,

℞ Salol, ʒi;
 Caffein. citrat.,
 Phenacetin., aa gr. xvij.—M.
 Ft. in chart. No. vj.
 Sig. One every two hours.

The Interval.—Careful search should be made for some exciting cause, and, when found, it should be removed if possible. The habits of the patient must be regulated. Overwork and the use of alcohol, strong tea, and coffee must be interdicted. Systematic exercise and frequent bathing followed by friction are valuable adjuncts. The diet must be adapted to the condition of the stomach and the

needs of the system. Internally, arsenic, iodide of potassium, bromide of potassium, valerianate of zinc, and cannabis indica are the most reliable remedies. Cannabis indica is often very efficient, and a quarter to half a grain of the extract may be given for a prolonged period. Little recommends—

℞ Sodii arsenat.,	gr. ij;
Ext. cannabis indicæ,	gr. iv;
Ext. belladonnæ,	gr. viij.—M.
Ft. in pil. No. xxiv.	
Sig. One, twice daily.	

HEADACHE.

In the interval between the attacks careful search should be made for the cause, which, if possible, must be removed. In the reflex headache of eye-strain the adjustment of proper glasses is often all that is required. In gastric headache the associated catarrh of the stomach must be treated by a light diet and the use of such remedies as bismuth and nitrate of silver. In the headache of anæmia a nutritious diet, with iron, arsenic, and other tonics, will be required. In headaches of uræmic origin a milk diet, with measures calculated to increase the action of the skin, bowels, and kidneys, will often afford considerable relief. In malarial headache quinine in large doses with arsenic will effect a cure.

The Attack.—In headache dependent upon gastric acidity, after unloading the stomach with a non-irritating emetic, bromides with antacids will prove useful; thus:

℞ Sodii bromid.,	ʒij;
Spt. ammon. aromat.,	ʒij;
Aquæ,	q. s. ad ʒiij.—M.
Sig. A tablespoonful every hour or two.	

In headache of acute cerebral congestion the feet should be soaked for ten or fifteen minutes in very hot water, an ice-bag placed on the head, and some sedative like the following administered:

℞ Phenacetin.,	ʒj;
Sodii bromid.,	ʒss.—M.
Ft. in chart. No. xij.	
Sig. One powder every hour or two until relieved.	

When the attack is very severe, aconite (gtt. j-ij) may be given every hour or two.

In cerebral anæmia good temporarily follows the use of antipyrine or phenacetine, especially in combination with caffeine; thus:

℞ Phenacetin.,	ʒij;	8
Caffein. citrat.,	gr. xxiv.—M.	
Ft. in chart. No. xij.		
Sig. One as required.		

In rheumatic headache salol is very useful; it may be combined with antipyrine:

℞ Salol,	ʒss;
Antipyrin.,	ʒj.—M.
Ft. in chart. No. x.	
Sig. One every hour or two until relieved.	

In uræmic headache the diet should be restricted to milk, action of the bowels secured by a saline draught, and diuresis encouraged by digitalis, caffeine, or the vegetable salts of potassium:

℞ Potass. citrat.,	ʒij;	(Day.)
Spt. juniperi.	fʒvj;	
Spt. æther. nitros.,	fʒij;	
Infus. scoparii,	fʒvj.—M.	
Sig. A wineglassful thrice daily.		

NEURITIS.

The cause should be ascertained and, if possible, removed. In rheumatism, alkalies and salicylates are indicated. In syphilis, iodide of potassium should be administered in large doses. The part should be put at rest. For the pain, sedative lotions (lead-water and laudanum), warm fomentations, or small blisters may be applied to the affected parts, and morphine administered hypodermically. When morphine is contraindicated, salicylate of sodium or phenacetine may be employed in its stead. After the subsidence of acute symptoms iodide of potassium may be given for its absorbent effect, and small blisters applied locally. Restoration of power will be assisted by massage and electricity, and by the administration of strychnine internally or hypodermically.

inflammation of the peripheral filaments of the facial nerve, blisters should be applied near the stylo-mastoid foramen, and, as it often appears to be an expression of rheumatism salicylates may be given internally. Later, a course of iodide of potassium will be useful, and restoration of power may be materially assisted by massage, electricity, and local injections of strychnine.

EPILEPSY.

Preventive Measures.—Careful search should be made for the cause which excites the paroxysms; this will often be found in some disturbance of the gastro-intestinal tract. The diet should be light and, as a rule, largely vegetable. Constipation must be relieved by diet, exercise, or the use of mild laxatives. Undue mental and physical excitement should be avoided. Systematic exercise and frequent bathing followed by friction of the skin lessen the sensitiveness of the nervous system. The most reliable drugs are the bromides; 1 or 2 drachms of a combination of the bromides of sodium, potassium, and ammonium may be given daily. The tendency to acne may be considerably lessened by the addition of a drop or two of Fowler's solution with each dose. A small amount of antipyrine often lessens the dose of bromide required to check the convulsions.

℞ Ammon. bromid.,	ʒvj;
Antipyrin.,	ʒj;
Liq. potass. arsenitis,	ʒj;
Aq. menth. pip.,	q. s. ad ʒvj.—M.
Sig. A tablespoonful in water night and morning. (Wood.)	

When the bromides fail, one of the following remedies may be employed: sulphonal, oxide of zinc (gr. vj–xv a day), picrotoxin (gr. $\frac{1}{100}$ thrice daily), borax, or belladonna.

When an *aura* gives warning of a seizure, the inhalation of nitrite of amyl may abort it.

Surgical interference is indicated in Jacksonian epilepsy and in those cases in which the convulsion begins in one member and subsequently becomes generalized.

The Attack.—Injury of the tongue may be prevented by placing a piece of cork between the teeth; as the seizure is of short duration, no special medication is required.

In the *status epilepticus* chloroform or nitrite of amyl may be administered by inhalation, and hyoscin (gr. $\frac{1}{100}$) or morphine given hypodermically.

MENIÈRE'S DISEASE.

The middle ear should be carefully examined, and any existing disease treated. Severe counterirritation by blisters or the actual cautery applied behind the ear may be of some service. Bromide of potassium or large doses of hydrobromic acid may give temporary relief. Charcot recommends quinine in sufficient doses to cause cinchonism.

HYSTERIA.

Careful search should be made for some exciting cause, which, if found, should be removed as far as possible. The physical condition is generally reduced, and careful study must be given to the diet, exercise, amusement, clothing, etc., with the view of improving it. Tonics like iron, arsenic, strychnine, hypophosphites, cod-liver oil, and malt are often indicated, and they may be advantageously combined with nerve-sedatives like valerian, asafœtida, sumbul, and the like; in the milder manifestations the following pill may prove useful:

℞ Acid. arsenosi,	gr. $\frac{1}{2}$;
Ferri sulph. ex.,	
Ext. sumbul,	āā gr. xx;
Asafœtidæ,	gr. xl.—M.
Ft. in pil. No. xx.	
Sig. One after each meal.	(Goodell.)

Or,

℞ Quinin. valerianat.,	
Zinci valerianat.,	
Ferri valerianat.,	āā gr. xxiv.—M.
Ft. in pil. No. xxiv.	
Sig. One, thrice daily.	

The more thoroughly the physician is able to inspire confidence and to control his patient, the more likely is he to effect a cure. Firmness tempered with kindness and encouragement is essential to success.

While hypnotism appears to have been somewhat useful in France, in this country, although employed but to a

limited extent, it has not given encouraging results, and, moreover, in the event of failure, seems capable of aggravating the hysterical condition.

In long-continued convulsive seizures cold water may be dashed on the face and chest or hyoscine administered hypodermically. In obstinate cases an anæsthetic should be employed. In the various forms of paralysis electricity is often useful. In some cases static electricity, no doubt from the profound mental effect which it has induced, has given excellent results.

In aggravated cases the "rest-cure" introduced by S. Weir Mitchell is often applicable. It consists in isolation from sympathizing friends and relatives; abundant feeding, especially with milk; and complete rest of body and mind, with passive exercise obtained by massage and electricity.

NEURASTHENIA.

The treatment is largely hygienic and dietetic, and will vary considerably in different cases. When there has been inactivity, regulated physical exercise will be of great value; on the other hand, the weak and anæmic will require rest. In the latter case the plan of treatment introduced by S. Weir Mitchell, and known as the "rest-cure," often gives brilliant results. In all cases careful attention must be given to the diet, bathing, and clothing, and the patient assured that he is suffering from no incurable disease. Frequent bathing with salt water followed by friction of the skin will often add to the general vigor. Tobacco and alcohol must be interdicted, and tea and coffee used very sparingly. Tonics like iron, arsenic, quinine, strychnine, and phosphorus are often indicated.

CHOREA.

Rest of body and mind is an essential element of the treatment. The child should be taken from school and placed under the most favorable hygienic conditions. Careful search should be made for reflex irritation, such as adherent prepuce, intestinal parasites, eye-strain, etc. All excitement must be avoided. Amusement in the open air

when the weather is fine is to be recommended. As the child is generally anæmic, iron is indicated in the majority of cases. Among the special remedies, arsenic holds the first place. Fowler's solution may be given in doses of 2 drops thrice daily, gradually increased to 8 or 10 drops thrice daily. Among other remedies may be mentioned the fluid extract of cimicifuga (℥x, increased to ʒj, thrice daily), hyoscyamine (gr. $\frac{1}{150}$ — $\frac{1}{100}$), quinine (gr. iv—vj q. i. d.), and antipyrine (gr. vj t. i. d.).

In *chorea insaniens* forced feeding should be resorted to. Morphine and other sedatives may be employed hypodermically. Chloroform may be required to control temporarily the movements. Severe cases of chorea complicating pregnancy will call for the induction of premature labor.

PARALYSIS AGITANS.

Measures intended to improve the tone of the system are indicated; these are—a regulated diet, rest of body and mind, frequent bathing followed by friction of the skin, and the use of such tonics as iron, arsenic, and phosphorus. The rigidity and tremors are sometimes improved by massage and electricity. Among the remedies recommended for the tremors are bromide of potassium, hyoscyamine (gr. $\frac{1}{100}$), duboisine (gr. $\frac{1}{100}$), and hyoscine (gr. $\frac{1}{125}$), but the improvement following their use is only slight and temporary.

EXOPHTHALMIC GOITRE.

The general nutrition must be improved by rest, a liberal diet, and the use of such tonics as iron, quinine, and arsenic. The application of mild galvanic currents to the neck is often very useful. When the palpitation is marked, prompt relief often follows absolute rest and the application of an ice-bag to the præcordia. The most reliable internal remedies are strophanthus, digitalis, belladonna, and ergot. Bromide of potassium is sometimes useful in controlling the nervous symptoms.

Operative Interference.—Ligation of the arteries and extirpation of the gland cannot be recommended.

ALCOHOLISM.

Acute Alcoholism.—The stomach should be emptied by the stomach-pump, a stimulating emetic, or the hypodermic injection of apomorphine (gr. $\frac{1}{10}$ – $\frac{1}{8}$). If the coma persists and the pulse weakens, cardiac stimulants like ammonia, strychnine, and digitalis should be administered hypodermically. Douching and flagellation may also be employed to arouse the patient.

Delirium Tremens.—Alcohol must be withheld unless the pulse is very weak. It is essential that the patient should receive sufficient nourishment, for usually little food has been taken during the debauch which led to the delirium. Highly-seasoned beef tea and milk with lime-water are the best foods. Sleep must be secured by chloral (gr. xx), bromide of potassium (ʒss–ʒj), hyoscine (gr. $\frac{1}{100}$), chloralamide (gr. xxx), morphine (gr. $\frac{1}{4}$, and repeated once or twice), or paraldehyde (ʒj). When the pulse is weak, strychnine (gr. $\frac{1}{30}$, repeated, watching the effect) is often of great value. In most cases physical restraint is essential; it is best secured by strapping the patient to the bed in sheets.

Chronic Alcoholism.—It is necessary that alcohol shall be withdrawn; the rapidity with which this can be accomplished will depend on the circumstances. In most cases the temptation to drink is so strong that confinement in an inebriate asylum is essential to the success of the treatment. Various substitutes have been recommended for alcohol, among which may be mentioned bromide of potassium, chloral, cocaine, hyoscine, and cannabis indica. As a rule, they accomplish little beyond quieting the patient and occasionally securing sleep. The diet should be nutritious and carefully adapted to the condition of the stomach, which is usually the seat of chronic catarrh. Tonics like iron and strychnine are often indicated. Graduated physical exercise is sometimes of decided value.

MORPHINE-HABIT.

Confinement in an asylum is nearly always necessary. The opium should be withdrawn gradually. Such substi-

tutes as cocaine, chloral, hyoscine, paraldehyde, and sulphonal may be employed temporarily. Respiratory stimulants like strychnine, and cardiac stimulants like digitalis, are often indicated. In the vast majority of cases the habit is only suspended, not broken.

CHRONIC LEAD-POISONING.

Prophylaxis consists in absolute cleanliness; the use of respirators in lead-factories; the avoidance of eating in an atmosphere laden with the dust of the metal; and in the occasional use of Epsom salt.

The curative treatment consists in the administration of iodide of potassium (gr. v-x thrice daily) and the use of sulphur-baths. Constipation should be relieved by Epsom salt. The colic may require the hypodermic injection of morphine and atropine and the application of hot fomentations to the abdomen. The paralysis generally yields to massage, the constant current, and hypodermic injections of strychnine.

THERMIC FEVER; SUNSTROKE.

The patient should be promptly placed in a bath of ice-water and should be rubbed with ice. Ice-water enemata are also useful. Antipyrine has been administered subcutaneously with good results. When the pulse is full and strong, venesection may be a valuable adjunct to the antipyretic treatment.

INCOMPATIBILITY IN PRESCRIPTIONS.

By JOSEPH W. ENGLAND, PH. G.

INCOMPATIBILITY in a prescription has been defined as that condition in which there exists either "a chemical decomposition, a pharmaceutical dissociation, or a therapeutical opposition" of its constituents. The term is thus susceptible of three meanings. A prescription is chemically incompatible where chemical change results; it is pharmaceutically incompatible where there is violation of correct pharmaceutical procedure; and there is therapeutical incompatibility where there is antagonism in physiological action. Now, accepting these definitions, a prescription may be chemically incompatible, and yet be just what the physician wants. It may be pharmaceutically incompatible, and yet be desirable for the same reason. But it is never desirable when a change of chemical composition or pharmaceutical character results in the formation of new products having totally different therapeutical effects than those obviously intended. And this view—the intended therapeutical action of the prescription—the pharmacist should ever bear in mind.

Every new prescription is largely a law unto itself until tried. Expertness in pharmaceutical manipulation, of which prescription work is the highest type, is a matter of individual ability, which can be acquired only in the largest and best measure by personal experience. The subject of incompatibles is not a formidable one if there primarily exists a clear knowledge of the chemical or pharmaceutical properties of the substances used, so that any deviation from the right standard may be detected; but here is the puzzling question, How are we to know but that, in the event of some chemical or pharmaceutical change, the physician does not mean just such a change, and nothing else?

At first glance it seems strange, but there are some most successful physicians who, every now and then, write, pharmaceutically and chemically, the most incompatible prescriptions. Yet they have success; and their happy results can only be due to the formation of certain new products or an alteration in pharmaceutical character of old ones. It does not follow that all prescriptions thus written are of the highest therapeutical value. Far from it. The tendency of the times is steadily in the direction of greater simplicity in prescription-writing.

It is to be regretted that the physician often depends in large measure upon the pharmacist for detecting any chemical or pharmaceutical incompatibility, and that the pharmacist depends solely and alone upon the physician for recognizing any therapeutical incompatibility. A physician, with his many duties, cannot be expected to have at his command the vast detail of pharmaceutical facts, nor can the pharmacist be considered negligent in not possessing an extended acquaintance with the application of drugs in medicine; but it is clear that some elementary knowledge as to how drugs act and for what purposes they may be employed would be of great practical value to the pharmacist in affording him a clear idea of the therapeutical intent of the prescriber, and the ability to detect any deviation through a chemical or pharmaceutical error. An argument for therapeutical knowledge is not a step in the direction of counter-prescribing. It is only a plea for broader education—for elementary therapeutics on distinctly pharmaceutical lines. With therapeutics pure and simple the pharmacist has nothing whatever to do. That is solely the province of the physician. Medicine and pharmacy are making rapid scientific progress—not in the same way, but upon certain definite lines of work and study, yearly becoming more distinct and widely separated, rendering each the more dependent on the other.

To render a knowledge of the solubilities and insolubilities of inorganic compounds readily accessible, the following table is presented, based almost wholly upon Professor Attfeld's "Statement of the Solubilities and Insolubilities of Salts," which expresses, directly or by inference, nearly

500 soluble and insoluble compounds of the following inorganic basylous radicals: aluminum, ammonium, antimony, barium, bismuth, cadmium, calcium, chromium, cobalt, copper, ferric, ferrous, gold, lead, lithium, magnesium, manganese, mercuric, mercurous, nickel, potassium, silver, sodium, stannic, stannous, strontium, and zinc.

In using this table it is only needful to remember the well-known chemical law that when a solution of a compound is brought in contact with a solution of another compound, and, by an interchange of radicals, an insoluble compound is rendered possible that compound will be precipitated.

Acetates are soluble.

Arsenates are insoluble, except those of the alkali metals.

Arsenites are insoluble, except those of the alkali metals.

Bromides are soluble, except mercurous and silver; those of antimony and bismuth are decomposed by water to form oxysalts.

Carbonates are insoluble, except those of the alkali metals.

Chlorides are soluble, except those of lead (*s*),* mercurous, and silver.

Citrates are soluble, except those of manganese, mercurous, silver, and strontium, aluminum (*s*), barium (*s*), bismuth (*s*), cadmium (*s*), calcium (*s*), lead (*s*), zinc (*s*).

Cyanides are insoluble, except the mercuric and those of the alkaline metals and earths.

Hydrates are insoluble, except those of barium, strontium, calcium (*s*), and lead (*s*) and the alkali metals.

Iodides are soluble, except those of antimony, bismuth, gold, lead (*s*), mercuric, mercurous, platinum (*s*), and silver.

Nitrates are soluble.

Oxalates are insoluble, except those of antimony (*s*), chromium, ferric (*s*), ferrous (*s*), stannic, and the alkali metals.

Oxides are insoluble, except those of barium, strontium, calcium (*s*), and the alkaline metals.

Phosphates (ortho) are insoluble, except those of the alkali metals.

* (*s*) means sparingly soluble.

Sulphates are soluble, except those of barium, strontium, calcium (*s*), antimony, lead, mercurous (*s*), and silver (*s*).

Sulphides are insoluble, except those of barium, calcium (*s*), strontium, and the alkali metals.

Sulphites are soluble, except those of aluminum, antimony, barium, bismuth, calcium (*s*), cobalt (*s*), copper, ferrous (*s*), lead, manganese (*s*), nickel (*s*), silver, stannous, strontium, and zinc (*s*).

Tartrates are soluble, except those of antimony, barium, bismuth, cadmium (*s*), calcium (*s*), copper (*s*), ferrous (*s*), lead, manganese (*s*), mercuric, mercurous, nickel (*s*), silver, strontium (*s*), and zinc (*s*).

Acids decompose hydrates, carbonates, and acid carbonates to form salts; the stronger acids, which are largely inorganic, set free the weaker acids, which are largely organic; or, brought in contact with alcohol or alcoholic solutions, form ethers; alkaline hydrates, carbonates, and acid carbonates neutralize free acids, decompose some glucosides, and precipitate all alkaloids, some of which precipitates are soluble in excess of the precipitant, or in alcohol, if that liquid be present in sufficient amount to dissolve them.

Oxidizing agents such as nitric, hydrochloric, nitrohydrochloric, picric, and chromic acids, and potassium bichromate and permanganate, with readily oxidizable substances, such as carbohydrates, alcohols, ethers, sulphur, phosphorus, sulphides, and organic matter in general, form explosive compounds. Potassium permanganate, if ordered in pill form, can best be made with cacao butter and cosmoline in very small quantity, and enclosed in gelatin capsules. Silver nitrate is reduced by organic matter to oxide, with the exception, it is said, of opium and extract of hyoscyamus. A very good way of making pills of it is with cacao butter and cosmoline, etc., as mentioned above under potassium permanganate; syrup of ferrous iodide and potassium chlorate form a poisonous compound, and potassium iodide and potassium chlorate form a mixture which yields the poisonous iodate on being taken internally.*

Iodine and the iodides yield precipitates with the alka-

* *Am. Jour. Phar.*, 1876, p. 277.

loids; bromides precipitate morphine and strychnine salts on standing, but a few drops of dilute hydrochloric acid added, after the addition of the alkaloid, prevents the change. Sodium biborate precipitates morphine and cocaine salts, but on the addition of a small quantity of boric acid, or with boric acid alone, precipitation does not take place. Mercuric chloride with acidulated solutions of the alkaloids forms crystalline double salts; potassium-mercuric iodide precipitates alkaloidal solutions. Solutions of quinine salts with those of the alkaline acetates, or with Basham's mixture, precipitate the sparingly soluble quinine acetate. Morphine solutions give the phenol reaction if mixed with tincture of ferric chloride.

Glucosides are decomposed by free acids and precipitated by tannin; tannic and gallic acids precipitate alkaloids, albumen, gelatin, and the majority of metallic salts, and yield inks with iron solutions.

Resinous tinctures and fluid extracts prescribed with aqueous solutions should always be emulsified with acacia; tinctures and fluid extracts made of stronger alcohol, mixed with those made of diluted alcohol, become turbid and precipitate, since the special solvent power of alcohol or of water for a substance diminishes in proportion to the quantity of the other liquid present. A "shake" label should always be used.

When for internal use, fixed and volatile oils and oleoresins and aqueous solutions should always be emulsified, whether ordered or not, and to better emulsify the volatile oils they should have mixed with them, prior to emulsification, an equal volume of olive, almond, or cotton-seed oil.

Tincture of ferric chloride gelatinizes mucilage of acacia; free acids separate insoluble carminic acids from compound tincture of cardamom; free acids precipitate glycyrrhizin from fluid extract of licorice.

Commercial spirit of nitrous ether liberates iodine from solutions of iodides, decomposes antipyrine solutions to form a green nitro-derivative, and precipitates mucilage of acacia, but if it be well diluted with water it can usually be added last without precipitating. Tincture of guaiac and spirit of nitrous ether are stated to be pharmaceutically

incompatible by Potter, although they are often prescribed together; likewise infusion of wild cherry with compound infusion of gentian, infusion of cinchona with compound infusion of gentian, and infusions with metallic salts generally.

Sodium salicylate in solution precipitates the sparingly soluble salicylic acid if mixed with acids, and yields, if dispensed in powders with potassium acetate, the very deliquescent potassium salicylate. Sodium salicylate in strong solution is decomposed by tincture of ferric chloride, but if well diluted first changes only into ferric salicylate. Sodium-benzoate solution is decomposed by acids to yield the sparingly soluble benzoic acid.

Mercuric chloride is decomposed by solution of potassium arsenite, but if the alkaline solution has first added to it, in slight excess, diluted hydrochloric acid, no precipitation will take place on the addition of the mercurial salt. Pyrophosphate and phosphate of iron solutions precipitate with dilute phosphoric acid. The National Formulary recommends the usage of dilute metaphosphoric acid in place of the official "ortho" variety, as yielding a permanently clear solution.

In conclusion, the writer would say that in this brief article he has endeavored to present, not an exhaustive list of special incompatibles, but simply a general expression of those liable to occur in the every-day routine of prescription work.

TABLE OF DOSES.

THE following doses are intended for adults. The dose for a child may be obtained approximately by Young's rule: Add **12** to the age and divide by the age, and the quotient will be the denominator of a fraction the numerator of which is **1**. Thus, for a child of four years, $\frac{4 + 12}{4} = 4$, and the dose is $\frac{1}{4}$ that for an adult. This rule does not apply to powerful narcotics like opium, the dose of which is very much less than this proportion.

Acetanilidum	5-10 gr.	Adonidin	$\frac{1}{8}$ - $\frac{1}{3}$ gr.
Acetum opii	3-5 min.	Æther	15-30 min.
scillæ	10-20 min.	Agaricin	1-2 gr.
Acidum aceticum dilutum	1-4 fl. dr.	Aloe purificata	2-10 gr.
arsenosum	$\frac{1}{50}$ - $\frac{1}{20}$ gr.	Aloin	$\frac{1}{2}$ -2 gr.
benzoicum	10-30 gr.	Alumen	10-20 gr.
boricum	10-30 gr.	Ammonii benzoas	10-20 gr.
camphoricum	15-60 gr.	bromidum	$\frac{1}{2}$ -1 dr.
citricum	10-30 gr.	carbonas	5-10 gr.
gallicum	10-30 gr.	chloridum	5-10 gr.
hydrobromicum dilutum	1-4 fl. dr.	valerianas	5-10 gr.
hydrochloricum	5-10 gtt.	Amyl nitris	2-3 gtt.
dilutum	10-30 gtt.	Antimonii et potassii tar-	
hydrocyanicum dilutum	1-5 gtt.	tras	$\frac{1}{16}$ -1 gr.
lacticum	20-30 min.	Antipyrine	5-20 gr.
nitricum dilutum	10-20 min.	Apiol	5-10 min.
nitrohydrochloricum	5-10 gtt.	Apomorphinæ hydrochlo-	
dilutum	10-20 min.	ras	$\frac{1}{40}$ - $\frac{1}{6}$ gr.
phosphoricum dilutum	10-60 min.	Aqua ammoniæ	10-30 min.
salicylicum	10-20 gr.	camphoræ	1-4 fl. dr.
sulphuricum	2-5 min.	chlori	1-4 fl. dr.
aromaticum	5-10 min.	chloroformi	$\frac{1}{2}$ -2 fl. oz.
dilutum	5-10 min.	creosoti	1-4 fl. dr.
sulphurosum	10-60 min.	laurocerasi	5-30 min.
tannicum	2-10 gr.	picis liquida	4-8 fl. oz.
tartaricum	10-30 gr.	Arbutin	5-10 gr.
Aconitina	$\frac{1}{400}$ - $\frac{1}{200}$ gr.	Argenti nitras	$\frac{1}{6}$ - $\frac{1}{2}$ gr.

Argenti oxidum	$\frac{1}{2}$ –2 gr.	Chloralamide	10–30 gr.
Arseni iodidum	$\frac{1}{20}$ – $\frac{1}{10}$ gr.	Chrysarobin	$\frac{1}{8}$ – $\frac{1}{4}$ gr.
Asafoetida	2–10 gr.	Cinchonidinæ salicylas	2–5 gr.
Atropina	$\frac{1}{200}$ – $\frac{1}{50}$ gr.	sulphas	5–10 gr.
Atropinæ sulphas	$\frac{1}{200}$ – $\frac{1}{50}$ gr.	Cinchonina	3–4 gr.
Auri et sodii chloridum	$\frac{1}{30}$ – $\frac{1}{15}$ gr.	Cinchoninæ sulphas	3–4 gr.
Balsamum Peruvianum	10–30 min.	Cocainæ hydrochloras	$\frac{1}{5}$ – $\frac{1}{2}$ gr.
Tolutanum	10–20 gr.	Codeina	$\frac{1}{4}$ –2 gr.
Basham's mixture	$\frac{1}{2}$ –1 fl. oz.	Colchicine	$\frac{1}{120}$ – $\frac{1}{20}$ gr.
Belladonnæ folia	1–10 gr.	Colocynthis	2–5 gr.
radix	1–5 gr.	Compound licorice powder	1–4 dr.
Benzoinum	10–30 gr.	Confectio sennæ	1–2 dr.
Berberinæ sulphas	5–10 gr.	Coniina	$\frac{1}{60}$ – $\frac{1}{30}$ gr.
Bismuthi salicylas	5–15 gr.	Convallamarin	$\frac{1}{2}$ –3 gr.
subcarbonas	5–30 gr.	Copaiba	5–30 min.
subnitras	5–30 gr.	Corrosive sublimate	$\frac{1}{100}$ – $\frac{1}{12}$ gr.
Blue mass	1–20 gr.	Creolin	1–5 min.
Borax	20–30 gr.	Creosotum	1–5 min.
Bromoform	2–6 min.	Creta præparata	20–60 gr.
Brown mixture	2–6 fl. dr.	Croton chloral	1–6 gr.
Brucinum	$\frac{1}{50}$ – $\frac{1}{20}$ gr.	Cubeba	$\frac{1}{2}$ –2 dr.
Caffeina	1–5 gr.	Cupri acetas	$\frac{1}{4}$ –1 gr.
citras	1–5 gr.	sulphas	$\frac{1}{2}$ –10 gr.
Calcii bromidum	30–60 gr.	Curare	$\frac{1}{30}$ – $\frac{1}{10}$ gr.
carbonas præcipitatus	10–30 gr.	Cusso	20–40 gr.
chloridum	5–20 gr.	Daturine	$\frac{1}{100}$ – $\frac{1}{50}$ gr.
hypophosphis	10–20 gr.	Decoctum sarsaparillæ com-	
iodidum	1–3 gr.	positum	2–4 fl. oz.
phosphas præcipitatus	10–20 gr.	scoparii	1–2 fl. oz.
Calomel	$\frac{1}{10}$ –8 gr.	Digitalis	$\frac{1}{2}$ –1 gr.
Calx sulphurata	$\frac{1}{10}$ – $\frac{1}{2}$ gr.	Diuretin	10–20 gr.
Cambogia	1–5 gr.	Donovan's solution	2–10 min.
Camphora	1–5 gr.	Dover's powder	5–10 gr.
monobromata	3–5 gr.	Duboisine	$\frac{1}{20}$ – $\frac{1}{50}$ gr.
Cantharis	$\frac{1}{2}$ –2 gr.	Elaterinum	$\frac{1}{80}$ – $\frac{1}{10}$ gr.
Capsicum	2–3 gr.	Elixir phosphori	$\frac{1}{2}$ –2 fl. dr.
Carbo	10–20 gr.	Emetine	$\frac{1}{300}$ – $\frac{1}{120}$ gr.
Carbonei disulphidum	$\frac{1}{2}$ –2 gtt.	Emulsum asafoetidæ	$\frac{1}{2}$ –2 fl. oz.
Castoreum	5–15 gr.	chloroformi	$\frac{1}{2}$ –1 fl. oz.
Catechu	20–30 gr.	Epsom salt	1–8 dr.
Cerii oxalas	2–5 gr.	Ergota	$\frac{1}{2}$ –2 dr.
Chinoidinum	2–5 gr.	Ergotin	5–10 gr.
Chloral	10–20 gr.	Eserine	$\frac{1}{80}$ – $\frac{1}{20}$ gr.

Exalgine	1-5 gr.	Extractum erythroxyli flu-	
Extractum aconiti	$\frac{1}{4}$ - $\frac{3}{4}$ gr.	idum	$\frac{1}{2}$ -2 fl. dr.
fluidum	1-2 min.	eucalypti fluidum	$\frac{1}{2}$ -2 fl. dr.
aloes	$\frac{1}{2}$ -5 gr.	euonymi	1-5 gr.
arnicæ radicis	5-10 gr.	fluidum	15-60 min.
fluidum	10-30 min.	eupatorii	30-60 min.
aspidii fluidum	1-2 fl. dr.	frangulæ fluidum	$\frac{1}{2}$ -2 fl. dr.
azedarach fluidum	15-60 min.	gallæ fluidum	$\frac{1}{2}$ -2 fl. dr.
belladonnæ foliorum al-		gelsemii fluidum	5-10 min.
coholicum	$\frac{1}{2}$ - $\frac{1}{4}$ gr.	gentianæ	2-5 gr.
radicis fluidum	1-2 min.	fluidum	$\frac{1}{2}$ -1 fl. dr.
boldi fluidum	5-20 min.	geranii fluidum	$\frac{1}{2}$ -1 fl. dr.
brayeræ fluidum	2-4 fl. dr.	glycyrrhizæ	1-2 dr.
buchu fluidum	20-60 min.	purum	1-2 dr.
calumbæ fluidum	15-30 min.	gossypii radicis fluidum	$\frac{1}{2}$ -1 fl. dr.
cannabis indicæ	$\frac{1}{4}$ - $\frac{1}{2}$ gr.	granati radici cort. flui-	
fluidum	5-20 min.	dum	$\frac{1}{2}$ -2 fl. dr.
capsici fluidum	2-5 min.	grindeliæ fluidum	$\frac{1}{2}$ -1 fl. dr.
cascaræ sagradæ fluidum	$\frac{1}{2}$ -1 fl. dr.	guaiaci ligni fluidum	$\frac{1}{2}$ -1 fl. dr.
cascarillæ fluidum	$\frac{1}{2}$ -2 fl. dr.	guaranæ fluidum	10-30 min.
chimaphilæ fluidum	1 fl. dr.	hæmatoxyli	5-30 gr.
chiratæ fluidum	$\frac{1}{2}$ -1 fl. dr.	fluidum	$\frac{1}{2}$ -1 fl. dr.
cimicifugæ	$\frac{1}{2}$ -1 gr.	hamamelidis fluidum	$\frac{1}{2}$ -2 fl. dr.
fluidum	20-60 min.	humuli	5-20 gr.
cinchonæ	5-10 gr.	fluidum	$\frac{1}{2}$ -1 fl. dr.
fluidum	30-60 min.	hydrangeæ fluidum	$\frac{1}{2}$ -1 fl. dr.
coçæ fluidum	1-2 fl. dr.	hydrastis	5-10 gr.
colchici radicis	1-2 gr.	fluidum	10-30 min.
fluidum	2-4 min.	hyoscyami	$\frac{1}{2}$ -2 gr.
seminis fluidum	2-5 gtt.	fluidum	5-10 min.
colocynthis	1-5 gr.	ignatiæ	$\frac{1}{4}$ - $\frac{1}{2}$ gr.
compositum	5-20 gr.	fluidum	1-5 min.
conii	1 gr.	ipëcacuanhæ fluidum	20 min.
fluidum	1-5 min.	jaborandi fluidum	$\frac{1}{2}$ -1 fl. dr.
convallariæ fluidum	10-30 min.	jalapæ alcoholicum	5-15 gr.
coto fluidum	5-20 min.	juniperi fluidum	$\frac{1}{2}$ -1 fl. dr.
cubebæ fluidum	5-20 min.	kamalæ fluidum	$\frac{1}{2}$ -1 fl. dr.
cusso fluidum	$\frac{1}{2}$ fl. oz.	krameriæ	5-10 gr.
damianæ fluidum	$\frac{1}{2}$ -2 fl. dr.	fluidum	10-20 gtt.
digitalis	$\frac{1}{4}$ - $\frac{1}{2}$ gr.	lactuæ	5-20 gr.
fluidum	1-2 gtt.	fluidum	$\frac{1}{2}$ -1 fl. dr.
dulcamaræ	5-15 gr.	lactucarii fluidum	10-30 min.
fluidum	1-2 fl. dr.	leptandræ	2-6 gr.
ergotæ	5-20 gr.	fluidum	10-30 min.
fluidum	1-2 fl. dr.	lobeliæ fluidum	1-5 min.

Extractum lupulini fluidum	$\frac{1}{2}$ -2 fl. dr.	Extractum tritici fluidum	1-4 fl. dr.
matico fluidum	30-60 min.	ustilaginis maydis fluidum	20-60 min.
nectandræ fluidum	1-4 fl. dr.	uvæ ursi	30-60 gr.
nucis vomicæ	$\frac{1}{8}$ - $\frac{1}{4}$ gr.	fluidum	2-4 fl. dr.
fluidum	1-5 gtt.	valerianæ fluidum	$\frac{1}{2}$ -1 fl. dr.
opii	$\frac{1}{4}$ - $\frac{1}{2}$ gr.	veratri viridis fluidum	1-3 gtt.
pareiræ fluidum	$\frac{1}{2}$ -2 fl. dr.	viburni opuli fluidum	1-2 fl. dr.
physostigmatis	$\frac{1}{8}$ - $\frac{1}{4}$ gr.	prunifolii fluidum	1-2 fl. dr.
fluidum	1-4 min.	wahoo	1-5 gr.
phytolacæ	10-60 min.	zingiberis fluidum	5-10 gtt.
pilocarpi fluidum	$\frac{1}{2}$ -1 fl. dr.	Fel bovis purificatum	3-10 gr.
podophylli	2-5 gr.	Ferri bromidum	1-5 gr.
fluidum	2-30 gtt.	carbonas saccharatus	3-5 gr.
pruni virginianæ fluidum	30-60 min.	citras	3-5 gr.
pulsatillæ fluidum	2-5 min.	et ammonii citras	3-5 gr.
quassæ	1-3 gr.	tartras	3-5 gr.
fluidum	$\frac{1}{2}$ -1 fl. dr.	et potassii tartras	3-5 gr.
quebracho fluidum	20-60 min.	et quininae citras	5-10 gr.
quercus fluidum	$\frac{1}{2}$ -1 fl. dr.	solubilis	5-10 gr.
rhamni purshianæ fluidum	$\frac{1}{2}$ -1 fl. dr.	et strychninae citras	2-3 gr.
rhei	5-10 gr.	iodidum saccharatum	3-5 gr.
fluidum	10-30 min.	lactas	3-5 gr.
rhois glabræ fluidum	1-2 fl. dr.	oxidum hydratum	$\frac{1}{2}$ -2 oz.
toxicod. fluidum	1-5 min.	cum magnesia	$\frac{1}{2}$ -2 oz.
rutæ fluidum	10-30 min.	phosphas solubilis	3-5 gr.
sabinæ fluidum	5-20 min.	pyrophosphas solubilis	3-5 gr.
sanguinariæ fluidum	1-5 min.	sulphas	2-3 gr.
santonicæ fluidum	10-60 min.	exsiccatus	2-3 gr.
sarsaparillæ compositum		granulatus	2-3 gr.
fluidum	1-2 fl. dr.	valerianas	1-3 gr.
fluidum	1-2 fl. dr.	Ferrum dialysatum	10-30 gtt.
scillæ fluidum	1-5 min.	reductum	1-5 gr.
scoparii fluidum	1-2 fl. dr.	Fowler's solution	1-5 min.
senegæ fluidum	10-15 gtt.	Gamboge	1-4 gr.
sennæ fluidum	2-4 fl. dr.	Glauber's salt	1-4 dr.
serpentariæ fluidum	10-20 gtt.	Glycyrrhizinum ammonia-	
spigeliæ fluidum	1-4 fl. dr.	tum	5-10 gr.
et sennæ fluidum	1-4 fl. dr.	Guaiaci resina	10-20 gr.
stilingiæ fluidum	$\frac{1}{2}$ -2 fl. dr.	Guaiacol	5-30 min.
stramonii seminis	$\frac{1}{4}$ - $\frac{1}{2}$ gr.	Guarana	5-30 gr.
fluidum	1-4 min.	Hoffmann's anodyne	$\frac{1}{2}$ -2 fl. dr.
sumbul fluidum	20-60 min.		
taraxaci	30-60 gr.		
fluidum	$\frac{1}{2}$ -2 fl. dr.		

Hydrargyri chloridum cor- rosivum	$\frac{1}{100}$ — $\frac{1}{2}$ gr.	Liquor pepsini	$\frac{1}{2}$ —2 fl. dr.
mite	$\frac{1}{10}$ —8 gr.	potassæ	10—20 min.
iodidum flavum	$\frac{1}{10}$ — $\frac{1}{2}$ gr.	potassii arsenitis	1—5 min.
rubrum	$\frac{1}{50}$ — $\frac{1}{2}$ gr.	citratiss	$\frac{1}{2}$ —1 fl. oz.
viride	$\frac{1}{10}$ — $\frac{1}{2}$ gr.	sodii arsenatis	1—5 min.
subsulphas flavus	2 gr.	Lithii benzoas	10—30 gr.
Hydrargyrum cum cretæ	1—8 gr.	bromidum	10—30 gr.
Hydrastin	5—10 gr.	carbonas	5—10 gr.
Hydrastininæ hydrochloro- ras	$\frac{1}{12}$ — $\frac{1}{2}$ gr.	citras	5—10 gr.
Hyoscine	$\frac{1}{150}$ — $\frac{1}{60}$ gr.	salicylas	20—30 gr.
Hyoscyamine	$\frac{1}{150}$ — $\frac{1}{40}$ gr.	Lugol's solution	5—10 gtt.
Ichthyl	3—5 gr.	Lupulin	3—5 gr.
Infusum brayeræ	2—8 fl. oz.	Magnesia	10—120 gr.
cinchona	$\frac{1}{2}$ —1 fl. oz.	ponderosa	10—120 gr.
cusso	4—8 fl. oz.	Magnesi carbonas	10—120 gr.
digitalis	1—4 fl. dr.	citras	1—4 dr.
pareira	$\frac{1}{2}$ —2 fl. oz.	sulphas	1—8 dr.
pruni virginianæ	$\frac{1}{2}$ —2 fl. oz.	Mangani dioxidum	3—5 gr.
sennæ compositum	1—3 fl. oz.	sulphas	2—3 gr.
Iodoform	1—3 gr.	Manna	$\frac{1}{2}$ —2 oz.
Iodol	3—5 gr.	Massa copaibæ	10—30 gr.
Ipecacuanha	20—30 gr.	ferri carbonatis	5—15 gr.
Jalap	10—30 gr.	hydrargyri	1—20 gr.
Jambul	20—30 gr.	Menthol	1—3 gr.
Kamala	1—2 dr.	Methyl salicylas	10—20 min.
Kino	10—20 gr.	Methylene blue	2—5 gr.
Krameria	10—20 gr.	Mistura asafœtidæ	$\frac{1}{2}$ —2 fl. oz.
Lactucarium	10—20 gr.	cretæ	1—6 fl. dr.
Laudanum	10—30 gtt.	ferri compositæ	$\frac{1}{2}$ —1 fl. oz.
Leptandrin	1—3 gr.	glycyrrhizæ composita	2—6 fl. dr.
Liquor acidi arsenosi	1—5 min.	rhei et sodæ	$\frac{1}{2}$ —3 fl. oz.
ammonii acetatis	2—4 fl. dr.	Morphina	$\frac{1}{8}$ — $\frac{1}{2}$ gr.
arseni et hydrargyri io- didi	2—10 min.	Morphinæ acetas	$\frac{1}{8}$ — $\frac{1}{2}$ gr.
calcis	$\frac{1}{2}$ —2 fl. oz.	hydrochloras	$\frac{1}{8}$ — $\frac{1}{2}$ gr.
ferri et ammonii acetatis subsulphatis	$\frac{1}{2}$ —1 fl. oz. 2—3 gtt.	sulphas	$\frac{1}{8}$ — $\frac{1}{2}$ gr.
iodi compositus	5—10 gtt.	Moschus	10—20 gr.
magnesi citratis	5—10 fl. oz.	Naphthalinum	$\frac{1}{8}$ —10 gr.
		Naphthol	1—15 gr.
		Nitro-glycerinum	$\frac{1}{150}$ — $\frac{1}{50}$ gr.
		Nux vomica	1—5 gr.
		Oleoresina aspidii	30—60 gr.
		capsici	$\frac{1}{8}$ — $\frac{1}{2}$ gr.

Oleoresina cubebæ	2-10 min.	Pilulæ aloes	1-3 pills.
filicis	30-60 gr.	et asafoetidæ	1-3 pills.
lupulini	10-60 gr.	et ferri	1-3 pills.
piperis	$\frac{1}{2}$ -2 gr.	et mastiches	1-3 pills.
zingiberis	$\frac{1}{2}$ -2 min.	et myrrhæ	2-5 pills.
Oleum cajuputi	3-5 min.	asafoetidæ	1-3 pills.
caryophylli	1-3 gtt.	catharticæ compositæ	1-2 pills.
chenopodii	5-10 min.	vegetabilis	2-3 pills.
cinnamomi	1-3 min.	ferri carbonatis	2-5 pills.
copaibæ	10-20 min.	iodidi	1-4 pills.
cubebæ	5-20 min.	opii	1-2 pills.
erigerontis	10-20 min.	phosphori	1-3 pills.
eucalypti	3-5 min.	rhei	1-3 pills.
gaultheriæ	10-20 min.	compositus	2-4 pills.
juniperi	2-5 min.	Piperazine	5 gr.
morrhuæ	1-8 fl. dr.	Piperinum	1-10 gr.
myristicæ	2-3 min.	Pix liquida	5-10 gr.
phosphoratum	1-5 min.	Plumbi acetas	1-5 gr.
sabinæ	5-10 gtt.	iodidum	$\frac{1}{2}$ -3 gr.
santali	5-10 gtt.	Potassii acetas	$\frac{1}{2}$ -1 dr.
terebinthinæ rectificatum	5-10 min.	bicarbonas	$\frac{1}{2}$ -1 dr.
tiglii	$\frac{1}{2}$ -2 gtt.	bitartas	$\frac{1}{2}$ -1 dr.
Opii deodoratum (13 to		bromidum	$\frac{1}{2}$ -2 dr.
15% of morphine)	1-2 gr.	citras	$\frac{1}{2}$ -1 dr.
pulvis (13 to 15% of		effervescens	$\frac{1}{2}$ -1 dr.
morphine)	1-2 gr.	cyanidum	$\frac{1}{2}$ - $\frac{1}{10}$ gr.
Opium (9% of morphine)	1-3 gr.	et sodii tartas	$\frac{1}{2}$ -2 oz.
		iodidum	3-10 gr.
Pancreatin	10-20 gr.	nitras	10-20 gr.
Papain	5-10 gr.	permanganas	2-3 gr.
Papayotin	5-10 gr.	Pulvis aromaticus	10-20 gr.
Paraldehydum	$\frac{1}{2}$ -2 fl. dr.	cretæ compositus	10-60 gr.
Paregoric	1-8 fl. dr.	effervescens	1-2 powd.
Pelletierine tannate	5 gr.	glycyrrhizæ compositus	1-4 dr.
Pepo	1-2 oz.	ipecacuanhæ et opii	5-10 gr.
Pepsinum	5-10 gr.	jalapæ compositus	20-40 gr.
saccharatum	$\frac{1}{2}$ -1 dr.	morphinæ compositus	5-10 gr.
Phenacetine	5-10 gr.	rhei compositus	20-30 gr.
Phenocoll	5-15 gr.		
Phosphorus	$\frac{1}{100}$ - $\frac{1}{30}$ gr.	Quinidinæ sulphas	1-30 gr.
Physostigmina	$\frac{1}{80}$ - $\frac{1}{15}$ gr.	Quinina	1-30 gr.
Physostigminæ salicylas	$\frac{1}{100}$ - $\frac{1}{50}$ gr.	Quininæ bisulphas	1-30 gr.
sulphas	$\frac{1}{100}$ - $\frac{1}{50}$ gr.	hydrobromas	1-30 gr.
Picrotoxinum	$\frac{1}{100}$ - $\frac{1}{20}$ gr.	hydrochloras	1-30 gr.
Pilocarpinæ hydrochloras	$\frac{1}{20}$ - $\frac{1}{3}$ gr.	sulphas	1-30 gr.

Quininæ valerianas	1-3 gr.	Spiritus juniperi	$\frac{1}{2}$ -1 fl. dr.
Reduced iron	1-5 gr.	compositus	2-4 fl. dr.
Resina copaibæ	5-10 gr.	lavandulæ compositus	$\frac{1}{2}$ -1 fl. dr.
jalapæ	2-5 gr.	menthæ piperitæ	$\frac{1}{2}$ -1 fl. dr.
podophylli	$\frac{1}{20}$ - $\frac{1}{2}$ gr.	phosphori	20-60 min.
scammonii	3-5 gr.	Strotonii bromidum	30-60 gr.
Resorcinum	3-5 gr.	iodidum	5-20 gr.
Rheum	5-20 gr.	lactas	10-30 gr.
Rhubarb	5-20 gr.	Strophanthin	$\frac{1}{100}$ - $\frac{1}{50}$ gr.
Rochelle salt	$\frac{1}{2}$ -2 oz.	Strychninæ sulphas	$\frac{1}{40}$ - $\frac{1}{20}$ gr.
Saccharinum	5-20 gr.	Sulphonal	15-30 gr.
Salicinum	$\frac{1}{2}$ -2 dr.	Sulphur	1-3 dr.
Salipyrin	10-20 gr.	Sweet spirits of nitre	$\frac{1}{2}$ -4 fl. dr.
Salol	5-30 gr.	Syrupus allii	1-4 fl. dr.
Salophen	10-15 gr.	calcii lactophosphatis	1-4 fl. dr.
Santoninum	$\frac{1}{4}$ -5 gr.	calcis	$\frac{1}{2}$ -2 fl. dr.
Scilla	1-3 gr.	ferri bromidi	20-60 min.
Senna	10-60 gr.	iodidi	10-30 gtt.
Sodii arsenas	$\frac{1}{50}$ - $\frac{1}{20}$ gr.	quin. et strych. phos-	
benzoas	10-20 gr.	phat.	$\frac{1}{2}$ -1 fl. dr.
bicarbonas	10-30 gr.	hypophosphitum	1-4 fl. dr.
boras	20-30 gr.	cum ferro	$\frac{1}{2}$ -1 fl. dr.
bromidum	$\frac{1}{2}$ -1 dr.	ipecacuanhæ	$\frac{1}{2}$ -6 fl. dr.
carbonas	10-30 gr.	krameriæ	$\frac{1}{2}$ -1 fl. oz.
chloras	10-30 gr.	lactucarii	1-2 fl. dr.
nitris	2-5 gr.	picis liquidæ	1-4 fl. dr.
phosphas	$\frac{1}{2}$ -4 dr.	pruni virginianæ	1-4 fl. dr.
salicylas	10-20 gr.	rhei	1-4 fl. dr.
sulphas	1-4 dr.	aromaticus	1-4 fl. dr.
Sodium ichthyolate	3-5 gr.	sarsaparillæ compositus	4-8 fl. dr.
Somnal	20-40 min.	scillæ	$\frac{1}{2}$ -1 fl. dr.
Sparteinae sulphas	$\frac{1}{2}$ -3 gr.	compositus	5-60 min.
Spirit of Mindererus	2-4 fl. dr.	senegæ	$\frac{1}{2}$ -1 fl. dr.
Spiritus ætheris composi-		sennæ	1-4 fl. dr.
tus	30-60 min.	Tolutanus	1-4 fl. dr.
nitrosi	$\frac{1}{2}$ -4 fl. dr.	Tamarindus	$\frac{1}{2}$ -1 oz.
ammoniaæ	20-60 min.	Tar	5-10 gr.
aromaticus	20-60 min.	Terebenum	5-10 min.
camphoræ	10-20 min.	Terpini hydras	2-5 gr.
chloroformi	20-60 min.	Terpinol	10-20 min.
cinnamomi	5-10 min.	Tetronal	30-40 gr.
gaultheriæ	10-20 min.	Thallin	1-4 gr.
glonoini	1-2 gtt.	Theine	1-5 gr.
		Thymol	1-3 gr.

Tinctura aconiti	1-3 min.	Tinctura opii	10-30 gtt.
aloes	1-2 fl. dr.	camphorata	1-8 fl. dr.
et myrrhæ	1-2 fl. dr.	deodorati	10-30 gtt.
arnicæ florum	10-30 min.	physostigmatis	10-30 min.
radicis	20-30 min.	phytollacæ	10-60 min.
asafoetidæ	$\frac{1}{2}$ -1 fl. dr.	quassiæ	1-2 fl. dr.
belladonnæ foliorum	5-30 min.	rhei	1-2 fl. dr.
benzoini	30-60 min.	aromatica	$\frac{1}{2}$ -2 fl. dr.
composita	30-60 min.	dulcis	2-3 fl. dr.
bryoniæ	15-30 min.	sanguinariæ	$\frac{1}{2}$ -1 fl. dr.
calumbæ	1-2 fl. dr.	scillæ	1-2 fl. dr.
cannabis indicæ	10-60 min.	serpentariæ	1-2 fl. dr.
cantharidis	1-5 min.	stramonii seminis	10-20 min.
capsici	5-10 min.	strophanthi	3-10 min.
cardamomi	30-60 min.	sumbul	1-4 fl. dr.
composita	1-2 fl. dr.	Tolutana	1-2 fl. dr.
catechu composita	1-3 fl. dr.	valerianæ	2-3 fl. dr.
chirate	1-2 fl. dr.	ammoniata	2-3 fl. dr.
cimicifugæ	$\frac{1}{2}$ -2 fl. dr.	veratri viridis	3-6 gtt.
cinchonæ	1-2 fl. dr.	zingiberis	$\frac{1}{2}$ -3 fl. dr.
compositæ	1-4 fl. dr.	Trional	30-40 gr.
cinnamomi	$\frac{1}{2}$ -1 fl. dr.	Trochisci cubebæ	1-3 tr.
colchici seminis	20-90 min.	morphinæ et ipecacu-	
conii	$\frac{1}{2}$ -1 fl. dr.	anhæ	1-2 gr.
cubebæ	$\frac{1}{2}$ -4 fl. dr.	Tully's powder	5-10 gr.
digitalis	5-20 gtt.	Turpeth mineral	2 gr.
ferri chloridi	10-30 gtt.		
gallæ	1-2 fl. dr.	Urethan	30-40 gr.
gelsemii	10-20 min.		
gentianæ composita	1-4 fl. dr.	Vinum aloes	1-2 fl. dr.
guaiaici	$\frac{1}{2}$ -1 fl. dr.	antimonii	5-240 min.
ammoniata	$\frac{1}{2}$ -1 fl. dr.	colchicis radicis	10-15 gtt.
humuli	$\frac{1}{2}$ -2 fl. oz.	seminis	20-90 min.
hydrastis	1-2 fl. dr.	ergotæ	2-4 fl. dr.
hyoscyami	$\frac{1}{2}$ -1 fl. dr.	ferri amarum	1-2 fl. dr.
iodi	5-10 gtt.	citratæ	1-2 fl. dr.
ipecacuanhæ et opii	5-15 min.	ipecacuanhæ	$\frac{1}{2}$ -6 fl. dr.
kino	$\frac{1}{2}$ -1 fl. dr.	opii	5-10 gtt.
krameriæ	$\frac{1}{2}$ -1 fl. dr.	picis liquidæ	$\frac{1}{2}$ -3 fl. oz.
lactucarii	$\frac{1}{2}$ -1 fl. dr.		
lobeliæ	$\frac{1}{2}$ -1 fl. dr.	Zinci oxidum	$\frac{1}{2}$ -5 gr.
matico	$\frac{1}{2}$ -2 fl. dr.	phosphidum	$\frac{1}{20}$ - $\frac{1}{10}$ gr.
moschi	1-2 fl. dr.	sulphas	1-30 gr.
myrrhæ	10-20 min.	valerianas	1-5 gr.
nucis vomicæ	10-30 gtt.		

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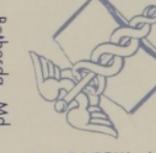


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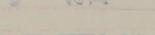


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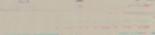


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