A compend of materia medica and therapeutics : for the use of students / by John C. Riley.

MATERIA MEDICA

AND

THERAPEUTICS.

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FOR

THE USE OF STUDENTS.

By JOHN C. RILEY, A.M., M.D.,

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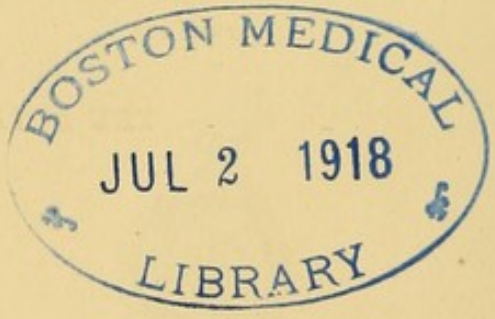

TO

JOSHUA RILEY, M.D.,

FORMERLY PROFESSOR OF MATERIA MEDICA AND THERAPEUTICS IN THE NATIONAL MEDICAL COLLEGE, WASHINGTON, D. C.,

THIS VOLUME

IS RESPECTFULLY AND AFFECTIONATELY

DEDICATED

BY HIS SON

THE AUTHOR.

PREFACE.

THIS work is simply a compend of the Materia Medica, and is not designed to be a full exposition of the subject. It is, in fact, a comprehensive syllabus, embracing outline descriptions of the articles and subjects named, which the student may complete in the lecture-room, or by reference to the United States Dispensatory, or to the more extended text-books on the subject. It may serve as a guide to the beginner, pointing out the leading facts and principles he is to study, while it may refresh the memory of the more advanced student, or the practitioner of medicine. The classification adopted is that usually pursued in the lecture-room, and the description of the medicines and the formula for the officinal preparations are principally compiled from the United States Dispensatory and Pareira's Materia Medica.

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INTRODUCTION.

MATERIA MEDICA is that department of medicine which treats of the remedies employed for the alleviation and cure of disease. In its most comprehensive sense it embraces all agents which are capable of making sanative impressions on the human system, including hygienic remedies, as diet, exercise, and climate; surgical and mechanical remedies; and certain physical agents, as heat, light, and electricity: but, as employed in this work, it has a more restricted sense, and applies only to the consideration of those material substances derived from the animal, vegetable, or mineral kingdom, which are used as pharmacological agents or medicines.

THERAPEUTICS is that division of the science which treats of the various actions and effects of agents upon the diseased system, and their application for the cure, alleviation, or prevention of disease.

Medicines may be defined to be those substances which possess the power of affecting the solids and fluids of the body, thereby producing certain modifications of the vital functions, which render them serviceable in the treatment of disease. They differ from aliments in resisting the digestive powers, and consequently are not adapted to supply growth, to repair waste, and to maintain the various functions at the healthy standard. Poisons differ from medicines only in the degree of their effects, and the uses to which they are applied; for the most powerful poisons become, when administered with proper precautions, very valuable medicines.

A complete knowledge of medicines consists in an acquaintance with their natural history, the sources from which they are obtained, and the mode of collecting, extracting, or preparing them;

their physical properties; their chemical composition and relations, including the tests for their purity, and the mode of detecting their probable adulterations; their physiological action in large and small doses, their effects in overdoses, and their mode of producing death; their therapeutic action and uses; and lastly, the dose, mode of administration, and the officinal preparations containing them.

Before proceeding to the consideration of individual remedies, it is necessary, in order to avoid repetition, to make some general observations in relation to their effects, their *modus operandi*, and the various modes and forms in which they are administered.

EFFECTS OF MEDICINES.

The effects of medicines are divided into two classes: *Primary* or *Physiological*, those which are produced on the system without regard to disease; and *Secondary* or *Therapeutical*, those which exhibit themselves in the alleviation or cure of disease.

The *physiological effects* are subdivided into local and remote —those which the medicine makes upon the part to which it is applied, and those which are developed in distant parts of the system. The local effects may be produced in one of three ways: 1, *mechanically;* 2, *by chemical action*, as when caustics applied to a part corrode or destroy it; or, 3, they may *modify the vital properties* of the part, either by increasing its sensibility or irritability, as when rubefacients or blisters are applied to the surface, or when stimulants are introduced into the stomach; or by diminishing it, as when aconite or narcotics are applied.

The *remote* or *constitutional effects* are those which are developed in distant parts of the system, and, like the local effects, differ in character. Some are stimulating, some are depressing, and others are alterative. It is important to note that there is no necessary similarity in the nature of their action between the local and the remote effects of a medicine. One may be stimulant to the part to which it is applied, and yet depressing to other parts of the system. The remote effects also differ greatly as to the parts of the system which they affect, each particular medicine or class of medicines having a tendency to act upon some

one portion of the system, some one organ, or set of organs, more than upon others; and this tendency is often independent of the part of the body to which the medicine is applied. Thus, some act on the nervous, vascular, or glandular systems, or on these conjointly, and are general in their action; others act especially upon particular organs, as the stomach, bowels, skin, kidneys, etc., and may be said to be local in their action.

The *secondary* or *therapeutical effects* follow the primary, and are not produced by the immediate operation of the agent, but are remote. They are dependent upon certain laws of the system, pathological as well as physiological. The explanation of the effects of medicines, and of the mode in which they are produced, constitutes their *modus operandi.*

MODUS OPERANDI OF MEDICINES.

The manner in which these effects are produced has long been a disputed point among medical writers. There are only two ways in which medicines, locally applied, are capable of producing their effects upon different and remote parts of the system, either through the medium of the nervous system, by *sympathy*, or through the medium of the circulation, by means of *absorption.* Until a comparatively recent period it was thought that the impressions of all medicines were transmitted from the parts receiving them to distant parts by means of nervous communication; but it is now generally conceded, that while some few medicinal agents act in this way, by far the great majority are absorbed into the circulation, and carried to different parts of the system, and produce their remote or constitutional effects in consequence of such absorption.

That they are absorbed and enter the circulation is proved by the fact that they can be detected in the solids and fluids of the body, and in the various secretions, no matter to what part they may be applied. It has also been proved that vascular connection is necessary for the propagation of such effects, and that the circulation of the blood is sufficiently quick to account for the operation of those which act most rapidly. It was for a long time a disputed point as to whether absorption was effected by the lym-

phatics or veins, but it has been rendered evident, by the experiments of physiologists, that though both absorb medicinal substances, this office belongs principally to the veins.

The great majority of medicines are capable of solution in the gastric and intestinal juices, or undergo such chemical changes in the stomach as render them soluble. Those which are completely insoluble in water, and in the gastric and intestinal secretions, cannot gain entrance into the circulation, and are consequently inert, and act as foreign bodies.

The precise mode in which agents, after gaining entrance into the circulation, produce their curative power, has given rise to many ingenious theories, and many different explanations have been attempted at various periods in the history of medicine. Some have attempted to explain their action on mechanical, others on chemical, principles; while the great majority of writers have explained their therapeutic powers on vital or general principles. The limits and the object of this work will not allow us to give even a synopsis of these various theories as to the ultimate action of remedies.

CIRCUMSTANCES MODIFYING THE EFFECTS OF MEDICINES.

The circumstances modifying the action of medicines relate both to the medicines themselves and to the human system.

The medicinal substances derived from the vegetable kingdom vary in active properties according to the climate, the soil, and the mode of cultivation, the season in which they are gathered, and the care employed in their preservation and preparation for use. It is only in this way that we can explain the conflicting testimonies of the observers of different countries with respect to the efficacy of the same remedy in similar diseases. The action of almost all medicines is also greatly modified by the dose and the manner of giving it. For example, ipecacuanha, in minute doses, acts as a tonic and alterative; in moderate doses, as an expectorant; and in large doses, as a prompt emetic. The time of day at which they are administered, and the intervals between the doses, also influence their action. It should be noticed here that certain substances, when taken in small and repeated doses,

are cumulative,—that is, suddenly produce symptoms caused by an overdose of the article.

Of the modifying influences presented by the patient the most important are age, sex, temperament, habit, idiosyncrasy, and state of the system.

Age greatly modifies the condition of the human system, and consequently the effects of medicinal agents. The young require a smaller dose to produce the same effect than the adult; and the aged, though less susceptible to impressions than formerly, are unable to bear full doses of active medicines. Various tables have been published for the graduation of doses to the respective ages, but no scheme can be devised to which there are not many exceptions. The following scheme of Dr. Young, from Paris's Pharmacologia, is simple, and generally correct: "For children under twelve years the doses of most medicines must be diminished in the proportion of the age to the age increased by twelve; thus, at two years to $\frac{1}{7}$, viz., $\frac{2}{2+12}=\frac{1}{7}$. At twenty-one the full dose may be given."

Sex. Females, from their delicate constitution and greater nervous susceptibility, seldom bear the same doses as males. The more active articles accordingly require to be used with greater caution, especially during the periods of pregnancy and menstruation.

Temperament influences the operation of medicinal agents. Stimulants which produce a pleasant degree of excitement in the phlegmatic, cannot be well borne and must be used with caution in the sanguine and nervous temperaments.

Constitutional peculiarity, called *idiosyncrasy*, often exists in individuals, rendering them more than usually susceptible or insusceptible to the action of certain remedies, requiring a modification of dose, and sometimes prohibiting their use altogether. In some cases a minute dose of a mercurial will produce the constitutional effects of the remedy, while in others almost any quantity may be administered without inducing any effect. It is often found that the odor of ipecacuanha will induce a distressing dyspnœa, and copaiba cause a peculiar eruption. Some of these anomalies are very striking, and almost incredible, and show the necessity of the physician inquiring into the peculiarities of the patient before prescribing.

Habits and modes of life also exercise a very marked influence in modifying the action of medicines, in some instances diminishing, in others increasing the susceptibility of the system to their influence. The usual consequence of the long-continued use of vegetable medicines is to diminish the susceptibility to their influence, and it is astonishing what enormous doses of opium and tobacco can be borne by those habituated to their use. Mineral substances appear, as a general rule, to act with increased power by repetition; thus the system becomes more and more susceptible to the operation of mercury and arsenic. As a general rule, persons living in the country, and those accustomed to outdoor exercise, bear much more active treatment than the inhabitants of large and overcrowded cities, and those of sedentary habits.

The *character*, *period*, and *form of disease* also greatly modify the effect of remedies. There are many circumstances connected with the progress of disease that tend to render the administration of a medicine, which acts beneficially at one period of an attack, less so, or even injurious, at another. For example, stimulants, which cannot be given without danger at the commencement of dysentery, while active inflammation of the mucous membrane exists, may be used with benefit when these symptoms have abated, and debility results as a consequence of the disease. The nature of the symptoms also often modifies the action of remedies: thus narcotics may be administered in doses during violent pain and spasm which cannot be borne with impunity in a state of health.

Mercury may be given in large and repeated doses in a febrile condition without producing its constitutional effects.

The influence of the *imagination* upon the effects of medicine deserves the attention of the physician. Hope and confidence exercise a most beneficial influence in disease; while faith in the curative powers of the remedies employed often enables them to produce important medicinal effects.

PARTS TO WHICH MEDICINES ARE APPLIED.

Medicines may be applied to the mucous membrane, to the skin, to the subcutaneous cellular tissue, or they may be injected into the veins.

The mucous membrane of the stomach is the surface most commonly resorted to, and from which, as a general rule, more prompt and decided effects are obtained than from any other part. The stomach, from its great susceptibility, its absorbing power, and by nature of its nervous communications with all parts of the system, possesses a power of transmitting impressions unequaled by any other portion of the mucous membrane, and therefore in describing the effects and doses of medicines, it is always understood that this is the way, unless the contrary be stated.

They are also applied to the mucous membrane of the rectum. When of a liquid form, and thrown up by means of a syringe, they are called *enemata, clysters,* or *injections;* when solids, they are termed *suppositories.* In this way they are employed to remove from the rectum and lower intestines accumulated fæces, to allay irritation of the pelvic viscera, to produce counter-irritation, or to introduce medicinal substances into the system when the stomach is irritable, or when from any cause they cannot be administered by the mouth. The absorbing power of the rectum is much less active than that of the stomach, and, as a general rule, double the quantity of medicine should be administered in this way to produce the same effect.

In the form of solution, medicines may be applied, to obtain their local effect, to various portions of the mucous membrane. When applied to the conjunctiva, they are termed *collyria;* to the mucous membrane of the throat, *gargles;* they are also injected into the urethra, vagina, uterus, etc., and sometimes applied to the nasal membrane.

On the *tracheo-bronchial* membrane they produce a decided influence, both general and local. Inhalation, in a therapeutic sense, is the act of breathing air or vapor impregnated with medicinal substances, and has, from the earliest times, been recognized as a means of medication in diseases of the respiratory organs. Of late years liquids have been introduced into the air-passages in the form of a fine spray, and this method is called the atomization of fluids. Various instruments have been resorted to in the atomization of liquids. The *hand-ball atomizer,* in which a current of air is used as the means of atomizing the

medicated liquid, is the simplest, and is very readily used. Instead of air, steam has been substituted as the forcing power, and several instruments have been constructed on this principle. Siegle's apparatus, as modified by Da Costa, is, perhaps, the most simple and convenient for general use, and one by which inhalation can be practiced without assistance or fatigue.

Next to the mucous membrane, the skin is most frequently resorted to, to obtain the effects of medicines. This presents an extensive surface, and being plentifully supplied with nerves, possesses great sensibility, and is therefore capable of receiving the primary impressions of many medicines. There are three modes by which this method of medication may be effected: 1, *by simple application;* 2, *by friction;* and, 3, *to the surface denuded of cuticle.* The first, called the *enepidermic method,* is when the application is made to the skin in the form of *cataplasms* or *poultices, fomentations, lotions, plasters,* etc. These are resorted to for their topical effects, to soften the condition of the skin, or to relieve pain. The density of the epidermis in almost all cases prevents the absorption of remedies when applied in this way, and to obtain their constitutional effects two methods are resorted to: the one consists in the application of remedies by friction, called the *iatroleptic method;* the other consists in first removing the cuticle from a portion of the skin, and then applying medicines to the denuded surface, called the *endermic method.* These methods are resorted to, to obtain the local effects of medicines, or to impress the system, and in some instances we obtain the constitutional effects of a remedy with more rapidity than by its internal administration.

Medicines are also applied by injection into the subcutaneous cellular tissue, and this is called the *hypodermic method.* This consists of injecting, by means of a minute syringe, substances, in solution, into the cellular tissue beneath the skin, and, when so introduced, they have been found to act with extraordinary rapidity, and with the most satisfactory results. It is particularly adapted to the speedy relief of pain, which it effects, when large doses by the stomach have failed to produce the slightest effect. It has been objected to as likely to produce local inflammation, or even abscess; but this very seldom occurs. To pro-

duce beneficial effects it is not necessary to localize the injection; a good spot for injection is at the insertion of the deltoid muscle, in the arm, or at the back of the neck. I have used it constantly in all portions of the body, and have never seen any ill effects follow.

Medicines have also been introduced into the system by injecting them into the veins. The first attempt appears to have been made about the year 1607, and it has frequently been tried since, with variable success. Recently, aqueous or saline fluids have been injected into the veins, and in some cases with apparent benefit; it is, however, a practice attended with too much danger to warrant its use, except in extraordinary cases.

FORMS IN WHICH MEDICINES ARE ADMINISTERED.

As medicinal substances in their crude state are not usually fit for exhibition, they require a number of preliminary processes to adapt them for this purpose, and to give them such forms as suit the different organs to which they are to be applied. These are called the *Operations of Pharmacy.*

As exactness is essential to these operations, it is necessary to thoroughly understand the WEIGHTS AND MEASURES which are employed. These vary much in different countries, and even in the same country. In the United States the weights used by the apothecary in compounding prescriptions and dispensing medicines are the troy pound and its divisions; those by which he buys and sells, commercially, are the avoirdupois pound and its divisions. The U. S. Pharmacopœia recognizes the troy weights, but employs only the grain and ounce, and, to prevent confusion, designates the latter as troyounce. The measures used are the wine pint and gallon. The following tables, with the signs annexed, will explain those which are used in the United States:

U. S. APOTHECARIES' WEIGHT.

Pound.	Ounces.	Drachms.	Scruples.	Troy Grains.
℔	12	96	288	5760
	℥i	8	24	480
		ʒi	3	60
			℈i	20
				gr.

AVOIRDUPOIS WEIGHT.

Pound.	Ounces.	Drachms.	Troy Grains.
1	16	256	7000
		16	437·5
		1	27·34

APOTHECARIES' OR WINE MEASURE.

Gallon.	Pints.	Fluidounces.	Fluidrachms.	Minims.
Cong. 1	8	128	1024	61440
	O	16	128	7680
		f℥	8	480
			f℥i	ℿ60

Besides these regular and authorized measures, there are others constantly used in the preparation and administration of medicines which have been adopted for convenience. These are far from being uniform, but may be used without danger for ordinary purposes. The following are the estimated capacities of the several vessels in common use:

A teaspoon contains about	a fluidrachm	- - - -	f℥i
A dessertspoon	" 2 fluidrachms	- - -	f℥ij
A tablespoon	" half a fluidounce	- - -	f℥ss
A wineglass	" 2 fluidounces	- - -	f℥ij

It is still more common to estimate small quantities or doses of medicines by drops, as representing, and equivalent to, minims. This is erroneous, as the drops vary in size according to the nature of the fluid to be measured, the size and shape of the lip of the bottle containing it, and the mode in which the operation is performed. For example, a fluidrachm, or 60 minims, will contain 60 drops of water, 120 of laudanum, or 200 of chloroform. An open vessel affords a larger drop than a bottle with stopper half drawn out—a mode commonly practiced.

Medicines are administered either in a *liquid, solid, semi-liquid* or *semi-solid* form. The following are the officinal forms usually employed.

Infusa. U. S. *Infusions* are aqueous solutions made by treating vegetable products with cold or hot water, but never carried

to ebullition. When prepared with hot water, and kept for some hours at a low heat, they should be strained or filtered before being used. They are liable to spoil, as this process dissolves, along with the active ingredient, starch and other inert matter, which renders the infusion acid or liable to become mouldy. When made with cold water, by the process of displacement, these inconveniences are obviated, and the infusion has less tendency to spoil. This is an excellent mode of administering those medicines, which are easily exhausted of their active principles in this way.

Decocta. U. S. *Decoctions* are solutions prepared by boiling the substance in water for a longer or shorter period, according to the solubility of the substance, or its constituents. It is a common form for administering vegetable medicines, as all the principles soluble in water can be obtained, and even many substances not properly soluble in that fluid are diffused through it, and held in suspension. It is, however, not an eligible one in many cases, for, since the discovery of the vegetable alkaloids, it is well known that the activity of vegetable drugs is often diminished or entirely destroyed by heat, especially if their active principle be volatile. Besides, during ebullition important chemical reactions take place, in consequence of which they are either rendered insoluble, or undergo decomposition. All substances which depend for their properties upon starch or gummy matter are best prepared by decoction ; but it is found that water at a common temperature will exhaust most vegetable substances more effectually by the process of displacement than the same fluid at 212° by decoction.

Liquores. U. S. *Solutions* are watery liquids containing non-volatile medicines wholly soluble in that menstruum.

Aquæ. U. S. *Medicated waters* are solutions in water of the essential oils or of gaseous substances. They are generally obtained by distilling water from the fresh vegetable substances; but they may also be conveniently made by agitating water, with the volatile oil previously separated. Most of the aromatic waters are now made by combining the oil and water together by the intervention of the carbonate of magnesia, and filtering the mixture. The magnesia acts by producing such a minute divi-

sion of the oil as will enable the water to act on it more efficiently.

Misturæ. U. S. *Mixtures* are liquid preparations in which insoluble substances, whether solid or liquid, are suspended in watery fluids by the intervention of gum arabic, sugar, yelk of egg, or other viscid matter. In making a mixture, the object to be aimed at is an equal diffusion and thorough admixture of all the ingredients, so that each dose shall be similarly composed. When the mixture contains oleaginous or resinous matter it is called an *emulsion*.

Mucilagines. U. S. *Mucilages* are aqueous solutions of gum, or of substances closely allied to it.

Syrupi. U. S. *Syrups* are prepared by simply dissolving sugar in solutions of substances formed by infusion, decoction, expression, etc., and sometimes by concentrating the syrup after the sugar has been dissolved. They are intended to cover the disagreeable taste of drugs, but more generally to preserve them in a convenient state for making mixtures, without the risk of undergoing decomposition.

Mellita. U. S. *Honeys* are liquid preparations, somewhat analogous to syrups, but in which sugar is replaced by honey. Though formerly much used, they are now seldom prescribed, as the honey contains principles which are apt to disagree with the stomach. The preparations in which honey and vinegar are combined are called *oxymels*.

Aceta. U. S. *Vinegars* are solutions of vegetable substances in distilled vinegar or diluted acetic acid. This menstruum dissolves substances not readily soluble, or altogether insoluble, in water, especially those whose activity depends upon the presence of an alkaloid, which it converts into a soluble acetate.

Tincturæ. U. S. *Tinctures* are solutions of vegetable, animal, and, in some cases, of mineral substances in spirituous fluids. Alcohol, either diluted or undiluted, is usually employed, but sometimes spirit of ammonia and ether are used, and then the solutions are designated as *ammoniated* and *ethereal tinctures*. This form of administering medicines is much used; it presents the active principles of drugs in a small volume, it can be preserved unaltered for a long time, and is generally well adapted

to unite with other substances in extemporaneous prescriptions. They may be prepared by macerating the solid materials in the menstruum for one or two weeks, without the aid of heat, and then filtering the fluid, or by displacement. This process, *displacement* or *percolation*, is of comparatively recent introduction in the making of tinctures; it consists in the gradual transmission of the spirit through the solid materials in a state of moderately fine division, and is to be preferred to maceration for a great proportion of these preparations.

Vina. U. S. *Medicated Wines* are solutions in wine: sherry is usually preferred. As they contain less alcohol than tinctures, they are less stimulating; but they are very liable to undergo decomposition, and on this account are inferior to tinctures, and are not now much used.

Spiritus. U. S. *Spirits* are alcoholic solutions of volatile principles, and are prepared either by distillation or by simply dissolving the principles in alcohol or diluted alcohol.

Pulveres. U. S. *Powders.* Most dry substances can be reduced to the powdered state, which renders them convenient for manipulation. This process may be performed in a variety of ways: by contusion in an iron or brass mortar, by grinding in a mill, by trituration, by levigation, or by elutriation. The lighter powders may be administered in water, the heavier require a more consistent vehicle, as syrup, honey, etc.

Pilulæ. U. S. *Pills* are small, globular masses, of a size that can be conveniently swallowed, and are an excellent form for administering two or more medicines in combination, especially those which are not bulky, and are of a disagreeable taste and smell, or insoluble in water. They have as a base a powder, extract, etc., and may be rendered of the proper consistence by the addition of a little spirit, gum, honey, etc.; and very soft or liquid substances require the addition of some dry, inert powder, as liquorice root, to reduce them to the proper consistence. The nature of the excipient should be suited to that of the constituents; thus, syrup or honey are to be used for vegetable powders, soap for fatty matters, calcined magnesia for copaiba or turpentine. Mucilage is objectionable when the pills are to be kept for any length of time, as it renders them so hard as to pass through the

bowels almost unaltered. They may be prevented from cohering, when placed together, by being sprinkled with powdered liquorice root, lycopodium, etc., and when desirable, may be coated with sugar, or gold or silver leaf. A *bolus* differs from a pill in being larger and generally less solid.

CONFECTIONES. U. S. *Confections* are soft, solid preparations, in which medicinal substances are incorporated with saccharine matter with a view either to their preservation or more convenient administration. When the fresh vegetable substances are beat into a uniform mass with sugar, they are called *conserves;* when dry powders are mixed with syrup or honey, they are termed *electuaries.*

TROCHISCI. U. S. *Troches* or *Lozenges* are small, dry, solid masses, usually consisting of powders incorporated with sugar and mucilage. They are intended to be held in the mouth, and dissolved slowly in the saliva, and are used to maintain the moisture of the fauces, as well as exert some medicinal effect.

EXTRACTA. U. S. *Extracts* are solid, or soft-solid substances, obtained by the evaporation of the solution, infusion, or decoction, or of the expressed juice of plants. They are generally of a soft consistence, of a dark color, and of an odor and taste analogous to those of the substance from which they are derived; and are classed according to the fluid employed in obtaining them, as watery, alcoholic, acetic, or ethereal extracts. In preparing them the object is to obtain as much of the active principle of the plant with as little inert matter as possible, and this is effected by employing a menstruum which dissolves the one and leaves the other behind.

Extracts made by inspissating the expressed juices of plants have been considered the best. When this is not practicable, the menstruum used depends upon the substance to be acted upon. When the active principles are soluble in water, that fluid is to be used as the vehicle of extraction; when resinous, alcohol; and when oleoresinous, ether will be found the best menstruum. Much caution is requisite in evaporating extracts to the proper consistence, as the various constituents of many plants are liable to undergo decomposition when exposed to the action of heat and atmospheric air. Evaporation in vacuo is

always to be preferred when practicable, as the process can be carried on at a lower temperature, and without the deteriorating influence of the air. When alcoholic solutions are to be concentrated, distillation should always be used. But notwithstanding all precautions, they deteriorate by long keeping, and the best plan is to renew them from time to time.

Extracta Fluida. U. S. *Fluid Extracts* are preparations in which the active ingredients of medicines are concentrated into a small bulk in the liquid form, and possess the advantage over the solid extracts, that the evaporation not being carried so far, the active principles are less liable to be injured by heat. Their liability to undergo decomposition may be counteracted by means of sugar or alcohol, or by a mixture of the two. Properly prepared, they are convenient and elegant preparations.

Oleoresinæ. U. S. *Oleoresins* consist of principles extracted from vegetable substances by means of ether. They differ from fluid extracts in not requiring the presence of sugar or alcohol to prevent decomposition.

Resinæ. U. S. *Resins* are made by exhausting the substance by alcohol, and then precipitating the resinous matter by the addition of water.

Unguenta. U. S. *Ointments* are soft, fatty substances, of such a consistence that they may be readily applied to the skin by inunction. They are generally prepared by mixing medicines in fine powder, or in the form of extract, with lard or simple ointment. When the extract is hard it may be previously triturated with a little water or alcohol, according to its nature. The tendency to rancidity may be counteracted by the addition of a little benzoic acid.

Cerata. U. S. *Cerates* consist of a basis of wax and a fatty matter, with which medicinal substances are incorporated. Their consistency is intermediate between that of ointments and plasters.

Emplastra. U. S. *Plasters* are more consistent than cerates, adhesive at the temperature of the body, and requiring the aid of heat to soften them sufficiently to be spread. Most of them have as their basis a compound of olive oil and litharge, though

some are composed wholly of resinous matters, or these mixed with fatty substances or wax.

CATAPLASMATA. U. S. *Cataplasms* are moist substances intended for external application, and of such a consistence as to accommodate themselves accurately to the surface to which they are applied, and without being so liquid as to spread over the neighboring parts.

LINIMENTA. U. S. *Liniments* or *Embrocations* are preparations of a more or less fluid character, which are employed as external applications, by means of friction. They are used, according to their nature and composition, to soothe pain and remove inflammation, as revulsive agents, or as a means of introducing medicinal substances into the system.

CLASSIFICATION OF MEDICINES.

In treating the articles of the Materia Medica, it is necessary to adopt some classification, both for the sake of convenience and in order to prevent repetition. Different arrangements have been followed by different writers: some founded on the botanical, chemical, or sensible properties; some on their physiological or therapeutical effects; while others again have arranged them in alphabetical order. The physiological classification has fewer defects than any other, and offers more important advantages to the student, and various arrangements have been attempted on this basis. In the following pages the plan adopted by Dr. Wood will be followed, as being about as perfect as our present knowledge of the action of remedies will admit of. Almost all remedies produce different effects, according to the dose and the different modes of application; we shall speak of a remedy under the head of its most important effect, and point out its other properties under the proper head.

Remedies are divided into those which act on the system, and those which act on foreign matter in the body. In this latter class are only placed *anthelmintics* and *antacids*.

The former are divided into general and local; the former acting on the whole system, the latter on particular parts or organs. The following table will explain the classification:

- General Remedies.
  - Stimulants.
    - Permanent.
      - Astringents.
      - Tonics.
    - Diffusible.
      - Arterial.
      - Nervous.
      - Cerebral.
      - Spinal.
  - Sedatives.
    - Arterial.
    - Nervous.
  - Alteratives.
- Local Remedies.
  - Affecting functions.
    - Emetics.
    - Cathartics.
    - Diuretics.
    - Diaphoretics.
    - Expectorants.
    - Emmenagogues.
  - Affecting organization.
    - Rubefacients.
    - Epispastics.
    - Escharotics.
  - Operating mechanically.
    - Demulcents.
    - Emollients.
    - Diluents.

GENERAL REMEDIES.

ASTRINGENTS.

ASTRINGENTS are those substances which when applied to the living body corrugate and condense its fibres, and at the same time indirectly exert a tonic influence. They increase the appetite, promote digestion, and are capable of fulfilling the same indications as tonics, but are distinguished by the sudden contraction and corrugation they produce in the tissues to which they are applied, whereas in tonics such effect is slowly, if at all, produced. They diminish secretion, repress hemorrhage, and give tone to the muscular system by increasing the density of the muscular fibre, and diminishing the caliber of the blood-vessels and exhalants of the part. When applied locally to arrest hemorrhage, they are called STYPTICS, and act either by constringing the blood-vessels, or coagulating the albumen of the blood. Nearly all of them possess this power of coagulating or precipitating albumen. When internally administered, they are absorbed into the circulation, and their effects are the same, though less in degree, as when applied externally. Headland thinks that their operation may be explained in the same way: by reference to their power in causing contraction of muscular fibre, and thus diminishing the caliber of certain tubes and cavities. Some explain their action on physical, others on vital, principles. Stillé very properly remarks that "the difficulty of explaining the modus operandi of medicines is nowhere more manifest than in what relates to this, one of the simplest of the classes into which they are divided."

The therapeutical agency of astringents is mainly limited to the accomplishment of two objects: 1st, the restraining of

excessive evacuations from the system, whether in the form of blood, or of the various secreted fluids; and, 2d, to the producing contractions of relaxed animal fibre, and thus imparting tone. Thus they are employed to repress hemorrhage from the lungs, bowels, and uterus, to control the profuse perspirations of phthisis and other diseases, and to check chronic discharges from the mucous membranes. Their use is contraindicated in cases of febrile or inflammatory excitement where general plethora exists, where excessive secretion is dependent upon active irritation, or where there is much derangement of the digestive organs.

Astringency in a substance may be recognized by the peculiar sensation of roughness and hardness, causing puckering of the tongue, lips, and gums when taken into the mouth. This is of importance, since, in the mineral astringents, we have no chemical test by which this quality may be detected. Medicine, however, is dependent on the vegetable kingdom for most astringent remedies. These owe their peculiar properties to a proximate principle called *Tannic Acid*, differing only in the proportion in which it is found, and in the character of the other ingredients with which it is associated.

ACIDUM TANNICUM. U.S. *Tannic Acid.*

Tannin is the proximate principle of all the vegetable astringents, but as it exists in a larger quantity in galls, it is generally obtained by exhausting the powdered galls by means of ether, and evaporating the solution.

Properties. It is an amorphous yellowish-white, spongy solid, inodorous, with an extremely astringent taste, without bitterness, very soluble in water, less so in alcohol and ether, and insoluble in the fixed and volatile oils. When heated it swells up, is decomposed, and leaves a bulky charcoal. With solutions of gelatin it produces an insoluble, white precipitate, and with the sesquisalts of iron a bluish or greenish-black precipitate, which is the basis of writing ink and black dyes. It unites with the vegetable organic alkalies, and with most metallic oxides, forming salts which are nearly insoluble in water. Tannin, as obtained from different plants, is found to exhibit some difference of prop-

erties, and chemists have recognized two varieties: one existing in oak bark, galls, etc., characterized by producing a bluish-black precipitate with the sesquisalts of iron; and the other found in Peruvian bark, kino, etc., distinguished by giving a greenish-black precipitate with the same reagent. It is probable, however, that they are identical, but the latter is modified in its reactions by the presence of other matters.

Medical Properties and Uses. Tannic acid is a pure and powerful astringent, applicable to all cases in which this class of remedies are useful, and possesses an advantage over the astringent extracts in the comparative smallness of the dose, which renders it less apt to offend an irritable stomach. It is a useful remedy in most forms of hemorrhage, in colliquative sweats, in bronchitis attended with a profuse and debilitating expectoration, and in the advanced stages of hooping-cough. Locally it may be used in solution as a gargle in sore-throat, as a wash in hemorrhoids, and as an injection in gonorrhœa and leucorrhœa. Moistened with glycerin it is one of the most efficacious applications to sore nipples, and may be applied in the same way to other parts requiring an astringent impression. Dose, 2 to 5 grains, in powder, pill, or solution.

Unguentum Acidi Tannici. U. S. *Ointment of Tannic Acid* is prepared by rubbing thirty grains of tannic acid, first with a little water, and then with a troyounce of lard. It is an excellent astringent application to hemorrhoids and prolapsus ani, and has also been found useful in obstinate skin diseases, and to ulcers with copious discharge.

ACIDUM GALLICUM. U. S. *Gallic Acid.*

This acid exists in most vegetable substances which contain tannic acid, and is probably the result of changes which the latter undergoes. It is best prepared by exposing powdered galls, moistened with water, to the action of the atmosphere, when a portion of the tannic acid is gradually converted into gallic acid by the absorption of oxygen and the escape of an equivalent quantity of carbonic acid.

Properties. When pure it is in delicate, small, silky crystals,

colorless, but, as generally found, of a slight brownish color, inodorous, of an acid and astringent taste. Sparingly soluble in cold water, but freely so in boiling water, alcohol, and ether. It reddens litmus, and produces a deep bluish-black color with the persalts of iron, but differs from tannin in not forming precipitates with gelatin or the vegetable alkalies.

Medical Properties and Uses. Gallic acid does not precipitate albumen, and possesses little activity as an astringent when externally applied, but is very efficacious as an internal remedy, and may be employed to fulfill the same indications as tannic acid. The facility with which it is absorbed and enters the circulation renders it a most valuable remedy in all cases of hemorrhage dependent upon the hemorrhagic tendency, and in all diseases in which excessive secretion becomes a prominent and distressing symptom, as pyrosis, serous diarrhœa, chronic bronchitis, profuse night-sweats, etc. Dose, 5 to 15 grains, three or four times a day.

QUERCUS ALBA. U. S. *White-Oak Bark.*
QUERCUS TINCTORIA. U. S. *Black-Oak Bark.*

Oak Bark is derived from several species of *Quercus*, an extensive genus of large forest trees natives of North America, but only the *Q. Alba* and *Q. Tinctoria* are officinal. The *Q. Alba* is a large tree found in great quantities in the Middle States and more temperate portions of the United States, and is much esteemed for its wood, which is extensively used in ship-building. The bark, when deprived of its epidermis, presents a coarse, fibrous texture, is tough, of a light-brown color, has but little odor, and an astringent, bitter taste. The *Q. Tinctoria* is one of the largest of our native oaks, its bark has a more bitter taste, and may be distinguished by staining the saliva yellow when it is chewed. It contains a coloring principle which is much employed as a dye, and it is largely exported under the name of *Quercitron*. Water and alcohol extract the virtues of these barks, which depend upon tannin, and the proportion of this varies with the size and age of the tree, and the season in which the bark is collected. It is most abundant in the young bark, which should be gathered in the spring.

Medical Properties and Uses. Oak bark is astringent, but seldom or never used internally. In the form of decoction it may be used as a gargle in relaxed conditions of the uvula, as a wash in prolapsus ani and hemorrhoids, and as an injection in leucorrhœa. It is often resorted to with advantage as a bath in diseases of children, where a tonic impression is desired, and the condition of the stomach contraindicates the internal use of remedies. Externally, it is useful as an application to flabby and ill-conditioned ulcers; and a poultice of the ground bark is sometimes of service in gangrene and mortification.

Decoctum Quercus Albæ. U.S. *Decoction of White-Oak Bark* is prepared by boiling a troyounce of bark in a pint of water.

Quercus Suber, though not officinal, is valuable as furnishing the cork of commerce. This tree is a native of the northern portions of Africa and the southern parts of Europe; and cork is that part which is commonly termed the cellular envelope, or medulla externa, which is removed when the tree has attained a certain age, dried, and cut into the proper shape.

GALLA. U. S. *Galls, Nutgall.*

Galls are morbid excrescences upon the young branches of *Quercus Infectoria*, a small tree or shrub of Asia Minor, seldom exceeding six feet in height. The gall originates from the puncture of a hymenopterous insect, the *Cynips Quercusfolii*, which deposits its egg in the wound thus made. This irritates the part, and gives rise to an influx of the juices of the plant, and a morbid growth is formed. Within this the insect is hatched, and undergoes its various changes; the larva, feeding upon the vegetable matter around it, forms a cavity in the centre of the gall, and, changing into a fly, escapes by eating its way out.

Properties. Galls are round, from the size of a pea to that of a hazel-nut, tuberculated on the surface, the tubercles and the intervening spaces being smooth. There are two varieties in commerce,—the black-blue or green galls, and white galls. The former are considered the best, and are gathered before the insect has escaped; they are heavy, compact, and brittle, breaking with a resinous fracture, and showing a small cavity in the cen-

tre, indicating the presence of the undeveloped insect. The white are inferior, have a loose texture, and break with a powdery appearance, and have a large cavity communicating externally, showing that the insect has escaped. The powder is of a light yellowish-gray color. They yield their astringent property to water, alcohol, and ether. Besides tannin, they contain a trace of gallic acid, extractive, mucilage, and saline matter. The proportion of tannin varies in different specimens, in some being as high as 65 per cent.

Medical Properties and Uses. As they contain such a large proportion of tannic acid, they are among the most powerful astringents we possess; but they are very seldom administered internally, except as an antidote to poisoning by tartar emetic and the vegetable alkaloids. Their efficacy in this latter case depends upon the tannic acid forming insoluble and inert compounds with the alkaloids. Externally, they may be employed as topical astringents wherever these remedies are indicated. Dose of the powder, 10 to 20 grains.

Tinctura Gallæ. U. S. *Tincture of Galls*, prepared by percolation (four troyounces of nutgalls to two pints of diluted alcohol), is a powerful astringent, often added to gargles, but is more used as a test than as a medicine.

Unguentum Gallæ. U. S. *Ointment of Galls*, prepared by mixing a troyounce of finely-powdered galls with seven troyounces of lard, is an excellent astringent ointment, and is much used in piles and prolapsus ani.

CATECHU. U. S. *Catechu.*

The term *catechu*, signifying the juice of a tree, was formerly applied to astringent extracts obtained from various plants. It is properly applied to an extract of the wood of *Acacia Catechu*, a small tree of the East Indies. To obtain it, the inner or heart wood is cut into small chips, and boiled in water until all the soluble matter is dissolved. The decoction is then poured off, and evaporated till it becomes somewhat consistent, when it is poured into moulds, or placed on mats, and dried in the shade. There are many varieties obtained from different sources, though

not recognized as officinal; the most important are the *Areca Catechu*, prepared from *areca* or *betel nut*, the seed of *Areca Catechu*, a species of palm growing in India; and *Gambir*, an inspissated juice from the leaves and young shoots of *Uncaria Gambir*, a climbing shrub of the Indian Archipelago. The latter was probably the variety first introduced under the name of *Terra Japonica*, and is a strong astringent, though seldom used medicinally in this country.

Properties. The genuine catechu is in masses of different shapes and sizes, varying from small angular pieces to lumps which weigh one or two pounds. The color varies from a pale-reddish to a dark liver-color—in some specimens it is almost black; hence the extract has been distinguished as the pale and dark varieties, but there is very little difference between them. It is very easily broken into small angular fragments, with a smooth, glossy surface, bearing some resemblance to kino; it is inodorous, and has a bitter, astringent taste, followed by a sensation of sweetness. It is soluble in water and alcohol. It contains from 30 to 55 per cent. of tannin, which gives a greenish-black precipitate with the persalts of iron, and a peculiar extractive, called *Catechuin*, or *Catechuic Acid.*

Medical Properties and Uses. Catechu is a powerful astringent, possessing also mild tonic properties, which render it particularly serviceable in diseases of children, where it is desired to restrain immoderate discharges. In diarrhœa, dependent upon a relaxed or atonic state of the mucous membrane of the intestinal canal, it may be advantageously combined with carminatives and chalk mixture. It is used in affections of the mouth and throat, especially where there is debility or relaxation of the parts. In the form of lozenge, allowed to dissolve slowly in the mouth, it diminishes or prevents the hoarseness consequent upon long-continued exercise of the vocal organs. It is sometimes added with benefit to astringent injections in gonorrhœa and leucorrhœa. Dose of the powder, 10 to 30 grains.

Infusum Catechu Compositum. U. S. *Compound Infusion of Catechu* is prepared by macerating half a troyounce of catechu with sixty grains of cinnamon in a pint of boiling water. Dose, f℥i to f℥iij.

TINCTURA CATECHU. U. S. *Tinctura Catechu* (three troyounces of catechu, two troyounces of cinnamon, in two parts of diluted alcohol) is an excellent astringent tincture, and may be used in all cases in which catechu is applicable. Dose, 30 minims to 3 fluidrachms.

KINO. U. S. *Kino.*

The inspissated juice of *Pterocarpus Marsupium*, and of other plants. The term KINO was originally applied to an astringent gum resin introduced and described by Dr. Fothergill, in 1757, but afterward various vegetable extracts resembling it in external appearance and in astringency received the same name. At present there are several varieties, but much confusion and uncertainty still exist as to their botanical and commercial history. There are four principal varieties in commerce—the *African*, *Jamaica*, *Botany Bay*, and *East Indian*. The *African*, the original variety introduced into Europe, but now seldom met with, is derived from *Pterocarpus Erinaceous*, a native of Senegal. The *Jamaica* is the extract of the wood of *Cocoloba Uvifera*, or *sea-side grape*, a small tree of South America and the West Indies, and is obtained by evaporating a decoction of the wood and bark. The *Botany Bay* is the concrete juice of *Eucalyptus Resinifera*, the brown gum-tree of New Holland, and is rarely met with in commerce. The *East Indian* is the variety frequently met with, and most highly esteemed, and is derived from *Pterocarpus Marsupium*, a large tree of the East Indies. It is the juice, extracted by incisions in the trunk, and allowed to harden in the sun. There is no essential difference between these varieties, either in appearance or in medicinal properties.

Properties. They are generally in irregular masses of different sizes, and varying in color from brownish-red to almost black. The ordinary kino of the shops is in small and shining, brittle, angular fragments, of a dark or reddish-brown color, and affording a powder which is lighter colored than the masses. It is inodorous, has a bitterish, highly astringent, and ultimately sweetish taste. It is not softened by heat, and imparts its virtues to water and alcohol. It contains, besides tannin, a peculiar extractive, and red gum.

Medical Properties and Uses. Kino is highly astringent, and may be administered in the same manner, and for the same purposes, as catechu. It is principally employed in chronic diarrhœas, and may be given either alone or combined with other astringents. Dose, 10 to 30 grains.

Tinctura Kino. U. S. *Tincture of Kino.* (Three hundred and sixty grains to half a pint of menstruum, consisting of two measures of alcohol with one of water.) Dose, f℥i to f℥ij, used as an addition to cretaceous and other astringent mixtures.

KRAMERIA. U. S. *Rhatany.*

The root of *Krameria Triandra*, a shrub of Peru. The *Krameria ixina*, growing in the West Indies and Brazil, affords a root resembling the officinal in appearance and properties.

Properties. The root consists of woody cylindrical pieces, more or less branched, varying in diameter from an inch to that of a quill. The cortical portion is of a dark reddish-brown color, fibrous, and easily separated; the central or woody part is tough, fibrous, and of a reddish-yellow color. The root is inodorous, has an astringent, bitter, slightly sweetish after-taste. As the virtues reside mainly in the cortical portion, the small pieces, from the greater proportion of bark, are most efficacious. It yields a powder of a reddish color, and imparts its virtues to water and alcohol. It contains tannin, like that of kino and catechu, minute quantities of gum, starch, and saccharine matter, and a peculiar acid, termed *krameric acid.*

Medical Properties and Uses. Rhatany is a powerful astringent and a gentle tonic. It is useful in checking profuse morbid discharges, and imparting tone to the system, and is preferable to either kino or catechu. It is an excellent local application to spongy gums, and forms an ingredient in tooth-powders: the tincture is also used in astringent mouth-washes. Dose of the powder, 10 to 30 grains.

Infusum Krameriæ. U. S. *Infusion of Rhatany* is made by displacement (a troyounce to a pint).

Extractum Krameriæ. U. S. *Extract of Rhatany* is prepared by evaporating a strong decoction of the root. This ex-

tract should have a reddish-brown color, a smooth, shining fracture, a very astringent taste, and be almost entirely soluble in water. Dose, 10 to 20 grains.

TINCTURA KRAMERIÆ. U. S. *Tincture of Rhatany* is prepared by percolation (six troyounces to two pints of diluted alcohol). It is an elegant preparation, and is much used as an addition to astringent mixtures.

HÆMATOXYLON. U. S. *Logwood.*

The inner wood of *Hæmatoxylon Campechianum*, a medium-sized tree, native of tropical America. It is imported in logs, deprived of the sap wood, chiefly for the use of dyers.

Properties. As found in the shops it is cut into chips, or rasped into coarse powder. The wood is hard, close grained, and tough; has a slight, pleasant odor, and a sweet, somewhat astringent, taste; it imparts its virtues to water and alcohol; it contains tannin, and a peculiar principle, called *hæmatoxylon* or *hematin*, on which its coloring properties depend.

Medical Properties and Uses. Logwood is a mild astringent, with slight tonic properties, well adapted to the weakened conditions of the bowels following cholera infantum. It may be given in decoction or extract.

DECOCTUM HÆMATOXYLI. U. S. *Decoction of Logwood* (made by boiling a troyounce of rasped logwood in a pint of water) may be given in doses of two or three fluidrachms to a child about two years old.

EXTRACTUM HÆMATOXYLON. U. S. *Extract of Logwood* is prepared by evaporating to dryness a strong decoction. It is of a deep ruby color, an astringent, sweetish taste, and has all the properties of the wood. Dose, 10 to 30 grains.

GERANIUM. U. S. *Cranesbill.*

The RHIZOMA of *Geranium maculatum, Cranesbill*, an indigenous perennial plant growing in woods. The root should be collected in autumn.

Properties. The root, as found in the shops, is in rough,

wrinkled pieces, of various sizes, of a dark-brown color externally, and pale flesh color within, without odor, and with an astringent taste, without bitterness. It contains tannic and gallic acids, with some mucilage.

Medical Properties and Uses. It is one of our best indigenous astringents, very similar to kino and rhatany in its action on the system, and may be employed for all the purposes to which these medicines are applicable. It has also proved successful as a remedy in aphthous affections of the mouth, and in ulcerations of the fauces and tonsils. Dose of the powder, 10 to 20 grains, but it is generally given in decoction.

RUBUS. U. S. *Blackberry Root.*

The ROOT of *Rubus Canadensis* and *Rubus Villosus*, indigenous plants of genus Rubus, an extensive genus of perennial shrubby plants, with erect or procumbent prickly stems, bearing white or reddish flowers, succeeded by an edible fruit, well known under the names of blackberry, dewberry, etc.

Properties. The root is horizontal, irregularly tuberous, of a reddish-brown color. The virtues, which mainly depend upon tannin, reside in the cortical portion; the smaller root should therefore be selected for use.

Medical Properties and Uses. Blackberry root is tonic and strongly astringent, and has long been highly esteemed as a remedy in the diarrhœas of children. Dose of the powder, 10 to 20 grains; it is, however, generally given in infusion, decoction, or syrup. The fruit is considered beneficial in bowel complaints, and is much used in domestic practice in the form of cordial or syrup.

SYRUPUS RUBI. U. S. *Syrup of Blackberry Root* is prepared by adding sugar to a concentrated tincture of the root, obtained by percolation. It is a useful preparation in the chronic diarrhœa of children. Dose, f℥i to f℥vij.

ROSA GALLICA. U. S. *Red Rose.*

The petals of *Rosa Gallica*, a native of Europe, but extensively cultivated in this country. The parts used are the petals of the

buds, which should be gathered before the flowers have blown, and deprived of their white claws.

Properties and Uses. When dried rapidly by a stove heat they have a purplish velvety appearance, an agreeable odor, and a bitter astringent taste. Their color is destroyed by the action of light and air, and they should therefore be kept in close boxes. They are mildly astringent, but are chiefly employed in medicine on account of their color and odor; the officinal preparations forming agreeable vehicles for the administration of more active, astringent, and tonic remedies.

INFUSUM ROSÆ COMPOSITUM. U. S. *Compound Infusion of Rose* (prepared by macerating half a troyounce of rose leaves in two pints and a half of water, and adding three fluidrachms of diluted sulphuric acid and a troyounce and a half of sugar) is astringent and refrigerant. It forms a useful solvent for the sulphates of quinia and magnesia, the taste of which it serves to cover.

CONFECTIO ROSÆ. U. S. *Confection of Roses* is prepared by rubbing rose petals with rose-water, adding sugar and honey, and beating the whole together until thoroughly mixed. It is used almost exclusively to impart consistency to a pilular mass.

The petals of ROSA CENTIFOLIA, *the Hundred-leaved Rose*, are employed for the distillation of rose-water, which is extensively used, on account of its agreeable odor, in collyria and other lotions.

UVA URSI. U. S. *Uva Ursi.*

Bearberry Leaves. The LEAVES of *Arctostaphylos Uva Ursi*, a small, trailing, evergreen shrub, growing in the northern regions of Europe and America. The leaves should be gathered in autumn, and those which are young and green should be selected.

Properties. The dried leaves are dark-green, convex, smooth and shining above, concave and reticulated beneath, with a bitterish, astringent taste, and a faint, haylike odor. They afford a light-brown, greenish powder, and yield their virtues to water and diluted alcohol. Uva ursi contains about 36 per cent. of tannin, with bitter extractive, and resinous matter. It is often adulterated with the leaves of *Vaccinium vitis idæa* (red whortle-

berry), and of *Buxus sempervirens* (common box); the former are distinguished by their under surface being dotted instead of reticulated, the latter by their entire want of astringency.

Medical Properties and Uses. Uva ursi is tonic and astringent, with a tendency to act especially on the urinary organs. It may be employed for all the purposes for which the vegetable astringents are prescribed, but is principally used in chronic affections of the bladder, attended with increased secretion of mucus, and unaccompanied by inflammatory symptoms. The dose of the powder is from 20 to 60 grains, but the decoction or fluid extract is preferred.

DECOCTUM UVÆ URSI. U. S. *Decoction of Uva Ursi* (prepared by boiling a troyounce of uva ursi in a pint of water for fifteen minutes) may be given in doses of f℥i–f℥ij.

EXTRACTUM UVÆ URSI FLUIDUM. U. S. *Fluid Extract of Uva Ursi*, a concentrated tincture. Dose, 30 to 60 minims.

CHIMAPHILA. U. S. *Pipsissewa.*

The LEAVES of *Chimaphila Umbellata, Winter-Green* or *Ground-Holly*, a small, herbaceous, evergreen plant, found in all parts of the United States.

Properties. The LEAVES, which only are used, are somewhat wedge-shaped, narrowed toward the base, serrated at their edges, and of a shining sap-green color on the upper surface, paler beneath. When fresh they have a fragrant odor when bruised, but when dried have scarcely any smell; their taste is bitter, astringent, and somewhat sweetish. Water and alcohol extract their virtues, which depend upon tannin and bitter extractive. They probably contain some acrid principle, as the fresh leaves, when bruised and applied to the skin, cause redness and even vesication.

Medical Properties and Uses. Pipsissewa is a tonic astringent, and has a decided action on the renal organs, increasing the urinary secretion, possessing properties similar to uva ursi. It may be employed in dropsy, rheumatism, and chronic affections of the kidneys and urinary organs. It has been used in scrofulous diseases, but does not exercise more curative influence

than many other of the vegetable tonics. It is generally given in decoction.

DECOCTUM CHIMAPHILÆ. U. S. *Decoction of Pipsissewa* is made in the same way as that of uva ursi. One pint may be given in the course of twenty-four hours.

GRANATI FRUCTUS CORTEX. U. S. *Pomegranate Rind.*

GRANATI RADICIS CORTEX. U. S. *Bark of Pomegranate Root.*

The RIND OF THE FRUIT and the BARK OF THE ROOT of *Punica Granatum, Pomegranate-Tree,* a small, shrubby tree, growing in tropical countries. The fruit is about the size of an orange, covered with a thick, reddish-yellow rind, and divided internally into cells, which contain an acidulous pulp and numerous seeds.

Properties. The RIND OF THE FRUIT is found in irregular, convex, brittle fragments of a brownish color, without odor, and with a bitter, astringent taste. The BARK OF THE ROOT is in small pieces, of an ash-gray color internally, yellow within, brittle, but not fibrous, and of an astringent but not bitter taste. Both contain tannin, some gallic acid, resin, mannite, and other unimportant substances. The fresh bark has also been found to contain a peculiar acrid principle termed punicine.

Medical Properties and Uses. This medicine is astringent, but is seldom used for this purpose. The bark of the root is often employed on account of its powerful anthelmintic properties. By many it is considered almost a specific against tænia or tape-worm, and may be given in the form of decoction (made by boiling two ounces of the bark in two pints of water), in doses of from one to three fluidounces, repeated every hour until four doses have been taken.

TORMENTILLA. *U. S. Secondary. Tormentil.* The root of *Potentilla Tormentilla,* a small perennial plant common throughout Europe, where it is known as *Septfoil.* The ROOT, when dried, is in irregular, cylindrical, knotty pieces, of a blackish color externally, reddish within, with a faint odor, and an astringent taste. It contains tannin, and is a simple astringent, but seldom used

in this country. It may be given in substance, infusion, or extract. Dose, 30 to 60 grains.

DIOSPYROS. *U. S. Secondary. Persimmon.* The unripe fruit of *Diospyros Virginiana*, a large, indigenous tree. The FRUIT is a globular berry, dark-yellow when perfectly ripe, and containing numerous seeds imbedded in a soft, yellow pulp. It has been used in diarrhœa, chronic dysentery, and uterine hemorrhage. The bark is bitter and astringent, and is sometimes used in infusion as a gargle where astringents are indicated.

ALUMEN. U. S. *Alum.*

ALUM is a double salt, consisting of tersulphate of alumina and sulphate of potassa. ($Al_2O_3,3SO_3+KO,SO_3+24HO$.)

ALUMINA is an earth, the sesquioxide of ALUMINUM, a silver-white, sonorous, very light metal, sp. gr. 2·56, and scarcely tarnished by exposure to the air.

Alum is sometimes found native effloresced on the soil in the neighborhood of volcanoes, but is generally manufactured from alum ores (*aluminous slate* or *aluminous schist*) by roasting, and exposing them to the air, and then lixiviating the product. It may also be procured by the direct combination of its constituents.

Properties. Alum is a transparent, colorless salt, crystallizing in regular octohedrons, but is usually found in irregular masses with an obscurely crystalline surface. It is inodorous, has a sweetish, acidulous, very astringent taste, is soluble in fifteen parts of cold, and in three-fourths its weight of boiling, water, but is insoluble in alcohol. It effloresces slightly on exposure; when heated it fuses in its water of crystallization; and if the heat be continued, it loses its water and becomes a white, opaque, porous mass, known as *dried alum.* Exposed to a red heat it is decomposed.

Besides the potassa alum, there are others, in which the potassa is replaced by some other base, as soda or ammonia. These have the same crystalline form as the potassa alum, and possess similar properties. Ammonia alum—ALUMINÆ ET AMMONIÆ SULPHAS, U. S.—is officinal, and is now much used in this country.

Medical Properties and Uses. Alum is a powerful astringent,

whether employed internally or externally, and as such is used with benefit in the treatment of many diseases. Its local effects depend upon its chemical action on the albuminous and gelatinous constituents of the living tissues. When administered internally, it is absorbed, and appears to produce more or less general astriction of the tissues and fibres, and a diminution of secretion. In large doses it acts as an emetic and purgative. As an astringent it is employed in chronic diarrhœa and dysentery, in passive hemorrhages, in colliquative sweats, and in atonic mucous discharges, as gleet and leucorrhœa. In doses of twenty grains or more, repeated every few hours, it has been recommended as one of our most efficacious remedies in colica pictonum. It seems to convert the poisonous salt of lead in the system into the innocuous sulphate, and at the same time to stimulate to contraction the muscular fibre of the paralyzed portion of the intestine. As an emetic it proves very serviceable in croup; it acts more promptly and certainly than any other emetic, and produces less prostration of the system. For this purpose a teaspoonful, mixed with honey or molasses, may be given, and repeated every ten minutes till free vomiting is produced. In hooping-cough, administered in small and gradually increasing doses, it often affords marked and rapid relief; it is best adapted to the second, or nervous period of the disease, when all inflammatory symptoms have subsided. It may be given, mixed with syrup, in doses of from one-half to two grains, according to the age. Locally, it may be used in solution as a gargle in affections of the mouth, throat, and fauces; as an injection in gonorrhœa, gleet, and leucorrhœa; as a collyrium in chronic ophthalmia; and as an application to indolent and other ill-conditioned ulcers.

Administration. The dose of alum as an astringent is from 10 to 20 grains, given in solution in some aromatic water, or made into an electuary with syrup or molasses. An elegant mode of administering it in solution is in the form of *alum-whey*, made by boiling two drachms of alum with a pint of milk, and then straining to separate the curd. A wineglassful of this contains about fifteen grains of alum. For local use the solutions must vary in strength according to the parts to which they are ap-

plied: as a collyrium, from four to six grains for every ounce of rose-water.

ALUMEN EXSICCATUM. U. S. *Dried or Burnt Alum* is prepared by exposing alum to a heat sufficient to free it from its water of crystallization without decomposing it. It is in the form of an opaque, white powder, with a more astringent taste than the crystallized alum. It is used as an escharotic for destroying exuberant and spongy granulations. Its virtues probably depend upon its attraction for the moisture of the parts and its power of coagulating albumen, while its astringency counteracts the relaxation, which favors this sort of growth, and thus promotes the healing process.

ALUMINÆ SULPHAS. U. S. *Sulphate of Alumina* is prepared by decomposing ammonia alum with carbonate of soda, and neutralizing the precipitate (which is alumina in the form of hydrate) with sulphuric acid, $Al_2O_3,3SO_3+18HO$. As thus obtained it is a white, opaque powder, or in thin, flexible plates of a pearly aspect, with a sour, astringent taste. It is soluble in twice its weight of cold water, but not in alcohol. It is only used externally as an astringent and antiseptic application to foul ulcers, etc. A solution of one pound in two pints of water is used to preserve bodies for dissection.

PLUMBUM. U. S. *Lead.*

LEAD, in its metallic state, is inert, but it is the basis of several important preparations which possess active medicinal properties. It is sometimes, though rarely, found native, but is abundantly diffused in the form of galena, a native sulphuret, and in saline combination. The lead of commerce is generally obtained from galena, and is extracted by melting the ore with charcoal. It is a soft, flexible, very malleable and ductile metal, of a bluish-gray color, presenting a bright surface when newly melted or cut: sp. gr. 11·4, melting point 612°. It is quickly oxidized at a high temperature, and attracts carbonic acid from the atmosphere. Lead in solution may be recognized by producing a brown or black precipitate with sulphuretted hydrogen, a yellow one with iodide of potassium, and a white one with muriatic acid and the soluble chlorides.

The preparations of LEAD act as astringents, checking secretion, and causing constipation, and at the same time exert a sedative influence on the system. They are generally used internally for checking hemorrhage and inordinate discharges, and externally for subduing inflammation. In large quantities they act as irritant poisons, giving rise to the usual symptoms of gastro-enteritis. When introduced into the system in a gradual manner with the food or drink, inhaled in the form of vapor, or taken in small and frequently-repeated doses, they act injuriously upon the nervous system and deteriorate the blood, producing a peculiar train of symptoms constituting lead-poisoning. Sometimes these are manifested by a peculiar colic, called *lead colic* or *colica pictonum;* at others it produces local palsy, particularly of the muscles about the wrist; and sometimes affects the sensory nerves, causing sharp, shooting pains in the limbs. In lead colic there is generally a paralysis of the muscular fibre of a portion of the intestine, and the pain is caused by an irritation of the nerves of the part. The absorption of lead into the system is indicated by a narrow, blue line at the edge of the gum, and the colic is characterized by sharp, abdominal pains, especially in the region of the navel, obstinate constipation, nausea, and vomiting. The treatment consists in the administration of the alkaline or earthy sulphates, of which alum is the best, which decompose the salt of lead. The iodide of potassium may also be used to eliminate the poison from the system. The therapeutical uses of the salts of lead will be noticed under the head of the different preparations.

PLUMBI OXIDUM. U. S. *Oxide of Lead.*

LITHARGE. *Semi-vitrified Oxide of Lead* is easily procured when melted lead is exposed to a continuous current of heated air, and is generally obtained as a secondary product in the process for separating silver from argentiferous lead ores. Composition PbO.

Properties and Uses. It is a scaly powder, of a reddish-yellow color, inodorous and tasteless, insoluble in water, but soluble in dilute nitric acid. It is not used internally, but chiefly in pharmacy in the preparation of lead plaster.

Emplastrum Plumbi. U. S. *Lead Plaster, Litharge Plaster,* or *Diachylon,* as it is commonly called, is prepared by boiling litharge, olive oil, and water together, until the two former acquire a proper consistence for a plaster. Olive oil is a compound of oleic and margaric acids with oxide of glyceryl; when subjected to heat with litharge and water, decomposition ensues, the acids combine with the oxide of lead, and the oxide of glyceryl is set free, and takes an equivalent of water to form glycerin. Thus lead plaster is a union of the oily acids with the oxide of lead (*an oleo-margarate of lead*), with perhaps some free glycerin mechanically incorporated with it. It is met with in cylindrical rolls, of a grayish or yellowish-white color, brittle when cold, but softening and ultimately fusing by heat. It is employed in surgery on account of its adhesiveness and the mildness of its local action. In pharmacy it is extensively used as a basis for most officinal plasters.

Emplastrum Saponis U. S. *Soap Plaster* is prepared by mixing one part of soap, rubbed with water until brought to a semi-liquid state, with nine parts of melted lead plaster, and boiling to the proper consistence. It is sometimes applied as a discutient to tumors.

PLUMBI CARBONAS. U. S. *Carbonate of Lead.*

White Lead may be procured by passing a stream of carbonic acid through a solution of subacetate of lead. It is generally manufactured on a large scale for commercial purposes by exposing thin plates of lead to the vapor of vinegar, and at the same time to air loaded with carbonic acid gas, derived from the fermentation of tan, or refuse stable materials, in which the pots containing the lead and vinegar are packed.

Properties and Uses. Carbonate of lead is a soft, heavy, white powder (sometimes in friable lumps), inodorous, and nearly insipid. It is insoluble in water. It is employed externally as a dusting powder in excoriations of children, and as a sedative and astringent dressing to ulcers and inflamed surfaces.

Unguentum Plumbi Carbonatis. U. S. *Ointment of Carbonate of Lead* is made by incorporating eighty grains of finely-

powdered carbonate of lead with a troyounce of simple ointment. It is an excellent application to burns and scalds.

PLUMBI ACETAS. U. S. *Acetate of Lead.*

This salt, known as *Saccharum Saturni* or *Sugar of Lead*, is the most important of the preparations of lead, and has been known and used since the time of Basil Valentine, in the fifteenth century. It may be made by simply dissolving litharge in diluted acetic acid, or by exposing thin sheets of lead to the vapor of vinegar. Composition $PbO,C_4H_3O_3+3HO$.

Properties. It occurs in glossy, needle-shaped crystals, which have the form of quadrilateral prisms, terminated by dihedral summits, with an acetous odor, and an astringent, sweetish taste. On exposure to the air it effloresces slightly, loses part of its acetic acid, and attracts carbonic acid, thereby becoming insoluble. It is soluble in twice its weight of cold water, and less of boiling water, and in eight parts of alcohol.

Medical Properties and Uses. In small doses it acts as an astringent and sedative. Under its use the pulse becomes smaller, the temperature of the body is diminished, and the exhalations from the skin and the urine are lessened in quantity. It differs from most other astringents in producing at the same time a remarkable sedative effect upon the nervous system where it is applied. This combination of sedative and astringent virtues renders it capable of fulfilling a variety of indications in disease. It proves useful in checking morbid discharges, and in diminishing the natural secretions, when excessive. In hemorrhages, whether from the lungs, stomach, kidneys, or other parts, and in diarrhœa, combined with opium, it proves eminently serviceable. As an external application, it may be employed in most forms of superficial inflammation, and is also beneficial in cutaneous eruptions attended with surrounding inflammation, or accompanied by itching or heat. As an injection in gonorrhœa, gleet, and leucorrhœa, it is much used. Dose, ½ to 4 grains, usually given in the form of pill. As an application to mucous surfaces, from 1 to 2 grains may be dissolved in an ounce of water; to the sound skin, from ʒi to ʒij to a pint.

Liquor Plumbi Subacetatis. U. S. *Solution of Subacetate of Lead. Goulard's Extract* is prepared by boiling together acetate of lead in solution with litharge, and filtering the solution. By the addition of litharge to acetate of lead an additional equivalent of the oxide enters into the composition of the salt, forming diacetate of lead, which remains in solution. $2PbO,C_4H_3O_3$ in water.

Properties and Uses. Solution of subacetate of lead is a clear, colorless liquid, sp. gr. 1·267, with an alkaline reaction, and sweet, metallic, astringent taste. It agrees with the acetate in most of its properties, except that it precipitates solutions of gum, most vegetable coloring matters, and organic principles not precipitated by the acetate. It has a great affinity for carbonic acid, and occasions a precipitate of carbonate of lead merely on exposure to the air. It is astringent and sedative, but is employed only as an external application to sprains, bruises, etc.

Liquor Plumbi Subacetatis Dilutus. U. S. *Dilute Solution of Subacetate of Lead. Lead Water* is prepared by mixing f℥iij of the solution to a pint of distilled water.

Ceratum Plumbi Subacetatis. U. S. *Cerate of Subacetate of Lead. Goulard's Cerate*, as it is commonly called, is prepared by mixing f℥ijss of solution of subacetate of lead with four troyounces of white wax, and eight troyounces of olive oil, previously melted together, and adding to the mixture thirty grains of camphor. It speedily becomes rancid, and should, as far as possible, be prepared fresh for use. It is used chiefly in excoriations, burns, scalds, and in cutaneous eruptions.

PLUMBI IODIDUM. U. S. *Iodide of Lead.*

This salt is prepared by double decomposition between nitrate or acetate of lead, and iodide of potassium in solution, filtering, and drying the precipitate.

Properties and Uses. When pure, it is in the form of a bright, heavy, yellow, tasteless, and inodorous powder. It is very sparingly soluble in water, requiring 1235 parts of cold, and 194 of boiling water. Composition PbI. It is supposed to possess the resolvent properties of iodine, combined with those peculiar to

lead. It has been used internally in scrofulous diseases, but is chiefly employed externally, in the form of ointment, to reduce indolent tumors, and in the cure of obstinate ulcers. Dose, ½ to 3 grains. The ointment may be made by adding from twenty to sixty grains to an ounce of lard or simple ointment.

PLUMBI NITRAS. U. S. *Nitrate of Lead.*

Nitrate of Lead is obtained by dissolving litharge, with the aid of heat, in diluted nitric acid, and crystallizing the solution by evaporating and cooling. PbO,NO_5.

Properties and Uses. It is an anhydrous, white salt, forming beautiful octahedral crystals, permanent in the air, with a sweet astringent taste. Soluble in water and alcohol. It produces the same effects as the other soluble salts of lead, but is never used as an internal remedy. Externally, it is sometimes employed as an astringent lotion, but is chiefly valuable as a disinfectant. *Ledoyen's Disinfecting Fluid* is a solution of this salt in water, in the proportion of ℥i to f℥i. Should the salt be used internally, the dose would be from ¼ to ½ a grain.

Plumbi Tannas. *Tannate of Lead* is obtained by adding tannic acid to a solution of acetate of lead, filtering, and drying the precipitate. It is used in the form of ointment, both as curative and preventive in the treatment of bed-sores, and has also been recommended as an application to indolent ulcers.

TONICS.

Tonics are medicines whose continued administration gives tone and vigor to the body, without producing sudden excitement or subsequent depression. They act slowly and permanently, and in this respect differ from stimulants. To fully understand this difference it is necessary to discriminate between strength and action; the former is the power, the latter the mechanism by which the power operates. Tonics increase the

former, and give strength; while stimulants excite the latter, and in consequence of overaction, produce exhaustion as a secondary result. Nutrients which contribute to the strength and support of the body may also be considered tonic, but the term in its medicinal sense is applied only to certain substances whose immediate and primary operation is to improve the appetite, promote the powers of digestion, and augment the strength. Under their use the pulse becomes fuller and stronger, the muscles more firm and solid, the blood is increased in quantity, and assumes a richer appearance, the energy of the brain and nervous system is increased, and all the functions of the body performed with more energy than before.

Tonics act in various ways: some, as the vegetable bitters, increase the energy of the stomach and digestive organs, when enfeebled, thus promoting the appetite, and enabling more food to be taken, and to be more readily assimilated; others, as the salts of iron, etc., act specifically upon the blood by means of absorption, enriching it in hematin, and thus invigorate the muscular tissue; others act upon the nervous system, as strychnia, but more properly belong to the class of stimulants.

They are employed in simple debility, unattended with inflammation, in atonic dyspepsia, in anæmia, in convalescence from acute disease, and in chronic disorders generally. They are contraindicated in general plethora, in active inflammation or hemorrhage, and in organic diseases of the heart.

Tonics are of animal, vegetable, and mineral origin. The only animal substance used is the following:

OLEUM MORRHUÆ. U. S. *Cod-Liver Oil.*

This is a fixed oil, obtained from the livers of the GADUS MORRHUA or *common cod*, and of other species of *Gadus* inhabiting the Northern Atlantic. It is generally procured by boiling the livers in water, or exposing them to a steam heat, when the liquid oil separates and floats on the surface; sometimes the livers are allowed to putrefy, and the oil obtained by expression.

Properties. There are three varieties of the oil in commerce, the *pale-yellow*, the *brownish-yellow*, and the *dark-brown*, dif-

fering in no essential character, but simply from the mode of preparation, the degree of heat employed, and the state of the livers; the pale being procured from fresh livers, the dark-brown from those in a state of putrefaction, and the brownish-yellow from those in an intermediate state. The best oil is transparent, of a pale or golden-yellow color, with the odor of boiled codfish, and a greasy, bland taste, leaving a very disagreeable impression on the palate. Between this and the dark oil there is every shade of difference in color, taste, and odor. It is frequently adulterated with other fixed oils. The most characteristic test of its genuineness is that of sulphuric acid, a drop of which, added to the oil on a porcelain plate, gives rise to a fine violet color, spreading from the point of contact with the acid, which soon passes into a yellowish or brownish-red. By heating it with ammonia, it should afford the peculiar odor of propylamin, the odorous principle of herring-pickle. But the most reliable tests are the sensible properties of odor and taste which are peculiar to this oil.

It contains oleic and margaric acids, with glycerin, butyric, and acetic acids, various biliary principles, some salts of soda and potassa, a peculiar substance named *gaduin*, and a trace of iodine, bromine, and phosphorus.

Medicinal Action and Uses. The immediate effect of cod-liver oil is to produce an increased appetite, and the proper assimilation of food, and thus to improve the quantity and quality of the blood. The blood thus improved, the different organs become better nourished, and more capable of performing their proper functions. One of the most marked effects is the increased weight it causes during the period it is being taken. Its modus operandi has been the subject of much speculation. Some attribute its medicinal virtues to the presence of the iodine, bromine, or phosphorus; others to the biliary matters it contains; some say that it does good by stimulating the lymphatic and absorbent system; but most writers now agree that it acts as a nutrient, affording fat of a better kind, more liquid, and more easily absorbed and assimilated to the adipose tissues of the body.

In phthisis there is no remedy, or combination of remedies, of such efficacy as cod-liver oil. It is of most service when the

disease is only incipient; and if given in the first stage, often arrests its progress. Given in the more advanced stages, it usually improves the condition of the patient, renders him more comfortable, and postpones the final issue. In a majority of cases it agrees well with the stomach and bowels, increases the appetite, and, if continued, promotes the function of nutrition. Under its use the patient becomes fatter and stronger, the frequency of the pulse is diminished, the night-sweats checked, the cough relieved, and, in fine, the general symptoms are greatly ameliorated. It may also be used with great benefit in various affections connected with the scrofulous diathesis, as glandular enlargements, tabes mesenterica, rachitis, diseases of the joints, etc. In chronic rheumatism, in chronic skin diseases, and in almost any disease attended with emaciation and defective nutrition, it may be employed with a hope of benefit.

The dose is a tablespoonful for adults; a teaspoonful for children. It is best taken after meals, and may be administered alone or with some vehicle calculated to conceal its taste and to obviate nausea. It may be floated on some aromatic water, or bitter infusion, on milk or wine, or cold tea, to suit various tastes. It may be used with advantage as a vehicle for the iodide of iron in scrofulous cases.

VEGETABLE TONICS

Are subdivided into *Pure Bitters, Bitters with Peculiar Properties, Stimulating Tonics, and Aromatics.*

PURE OR SIMPLE BITTERS.

These possess tonic properties solely, without any influence over the circulation, except when long employed. They are characterized by bitterness, and produce their impression upon the stomach, increasing the appetite and invigorating digestion. They influence other organs by thus imparting tone to the digestive organs. They are all similar in their effects, are used for the same purposes, and may be substituted one for another.

QUASSIA. U. S. *Quassia.*

The WOOD of *Simaruba excelsa*, formerly *Quassia excelsa*, a large and magnificent forest tree, native of Jamaica and other West Indian islands, called *Bitter Ash*. It was originally obtained from *Quassia amara*, a tall tree, native of Surinam, and cultivated in the West Indies and Brazil. It is imported in logs or billets of various sizes, covered externally with a smooth, brittle bark.

Properties. As found in the shops, the quassia wood is cut into small pieces, or rasped, of a whitish color, becoming yellow on exposure, without odor, with an intensely bitter taste, surpassed by that of few other substances. It contains a bitter crystallizable principle called *Quassin*, upon which its virtues depend. It imparts its sensible properties and medicinal virtues to water and alcohol.

Medical Properties and Uses. It is one of the purest of the simple bitters, acting as a tonic without any stimulant or astringent effects, and is admirably adapted to dyspepsia, and to that debilitated condition of the digestive organs which sometimes succeeds acute disease. It is said to be largely used in England by brewers to impart bitterness to their malt liquors. It may be administered in infusion, tincture, or extract.

INFUSUM QUASSIÆ. U. S. *Infusion of Quassia* is prepared by macerating ℥ij of quassia wood, rasped, in a pint of water. Dose, f℥ij, three or four times a day. In the form of enema this is one of the best remedies for ascaris vermicularis, the seat-worm, causing the death and expulsion of the worm, and relieving the itching about the anus.

TINCTURA QUASSIÆ. U. S. *Tincture of Quassia* (two troyounces to two pints of diluted alcohol) is a pure and intense bitter, and may be employed as an addition to tonic infusions or mixtures in the dose of 1 or 2 fluidrachms.

EXTRACTUM QUASSIÆ. U. S. *Extract of Quassia* is prepared by boiling down a strong infusion to the proper consistence. It is dark-brown or black, and excessively bitter. It is well adapted for combination with chalybeates and laxatives, and

may be given in doses of from 3 to 5 grains, in the form of a pill.

SIMARUBA. *U. S. Secondary.* The BARK of the root of *Simaruba officinalis*, a tree of considerable size, native of Jamaica and other West Indian islands, commonly called *Mountain damson.* The bark is in long pieces, of various sizes, much rolled or quilled, fibrous and tough, of a grayish color externally, and of a yellow internally. It is inodorous, but excessively bitter, and readily imparts its virtues to water and alcohol. It contains *quassin*, and possesses properties analogous to quassia, and may be employed for the same purposes. Dose, 10 to 30 grains, best administered in infusion.

GENTIANA. U. S. *Gentian.*

The DRIED ROOT of *Gentiana Lutea* or *Yellow Gentian*, a native of the mountainous districts of Middle Europe. It is a beautiful plant, with a thick, long, branching, perennial root, an erect, hollow stem, from three to four feet high, bearing large and beautiful whorled yellow flowers. The roots are collected and dried by the peasants, and imported in bales.

Properties. As found in commerce, it is in cylindrical, more or less branched, pieces, of various sizes, marked with annular wrinkles and longitudinal furrows, externally of a yellowish-brown color, internally of a spongy texture, and of a deep yellow. It has a feeble but peculiar odor, and a bitter taste, without astringency. It affords a yellowish powder, and yields its virtues to water and alcohol. It is sometimes adulterated with the roots of other species of gentian, but as they possess much the same properties, it is of little consequence. It contains a peculiar crystallizable principle, *gentianin*, a volatile, odorous principle, yellow coloring matter, with other unimportant substances.

Medical Properties and Uses. Gentian is a pure bitter tonic, without astringency, and the most generally employed of the simple bitters. It is used with great benefit in the forms of dyspepsia attended with torpid digestion and secretion of acid, but unattended with any irritability or inflammation of the

stomach. It is also a useful tonic in debility, and in chronic diseases accompanied by debility. Dose, 10 to 30 grains, best given in infusion, tincture, or extract. The gentian root has been proposed for the manufacture of tents, for treating partial occlusion of the os uteri.

INFUSUM GENTIANÆ COMPOSITUM. U. S. *Compound Infusion of Gentian* (powdered gentian, half a troyounce; bitter orange peel and coriander, each sixty grains; in f℥xiv of water with f℥ij of alcohol) may be given in doses of from f℥i to f℥ij, repeated three times a day.

TINCTURA GENTIANÆ COMPOSITA. U. S. *Compound Tincture of Gentian* is prepared by adding two troyounces of gentian, one troyounce of bitter orange peel, and half a troyounce of bruised cardamom seeds to two pints of diluted alcohol. It is an elegant bitter, much used to improve the tone of the stomach in dyspepsia, and in persons worn out by habitual drunkenness and debauch. Dose, f℥i–f℥ij.

EXTRACTUM GENTIANÆ. U. S. *Extract of Gentian*, prepared by evaporating a strong cold infusion to the proper consistence, is of a dark-brown color, inodorous, and has a very bitter taste. Dose, from 10 to 30 grains. It is generally used as an excipient to other tonic medicines.

EXTRACTUM GENTIANÆ FLUIDUM. U. S. *Fluid Extract of Gentian* is a concentrated tincture, possessing all the sensible and medicinal properties of the root. Dose, 10 to 30 or 40 drops.

CALUMBA. U. S. *Columbo.*

The ROOT of *Cocculus palmatus*, a climbing plant, with a fleshy, perennial root, native of Mozambique, on the southeastern coast of Africa. The roots are dug up during the dry season, the offsets separated, cut into slices, strung on cords, and dried in the shade.

Properties. Columbo as found in the shops is in flat, circular pieces, from the eighth of an inch to an inch in thickness. The cortical portion is externally of a brown, wrinkled appearance, internally of a greenish-yellow color. The internal or medullary part is light, spongy, of a yellowish-green color, and more or less

shrunken aspect, frequently marked with concentric and radiating lines. When good it breaks with a starchy fracture, is bright and solid, and affords a powder of a greenish-yellow tinge, with a somewhat aromatic but exceedingly bitter taste. It is very liable to decay, and is much worm-eaten. Water and alcohol extract its medicinal virtues. Columbo contains a bitter, crystallizable principle, called *calumbin*, an alkaloid, which corresponds in composition and chemical relations with *berberina*, united with an acid, *calumbic acid*, and a large proportion of starch. This latter constitutes about one-third of its weight.

It is often adulterated with some species of bryony and with the Frasera, or American columbo; the former may be detected by not striking a blue color with iodine, and the latter by giving no precipitate with the infusion of galls, and a black one with the sesquichloride of iron.

Effects and Uses. It is an excellent mild tonic and stomachic. As it is free from any astringency or unpleasant taste, and generally agrees well with the stomach, it is adapted as a remedy in simple dyspepsia, and in convalescence, especially where the alimentary canal is enfeebled. It also proves useful in sympathetic vomitings, particularly in that of pregnancy. Dose of the powder, 10 to 30 grains; it is best given in infusion, or the tincture may be added to tonic mixtures.

INFUSUM CALUMBÆ. U. S. *Infusion of Columbo* (half a troy-ounce to a pint of water). The cold infusion is preferred, and it should be freshly prepared, as it rapidly decomposes in consequence of the large proportion of starch it contains.

TINCTURA CALUMBÆ. U. S. *Tincture of Columbo* (four troy-ounces to two pints of diluted alcohol). Dose, f℥i to f℥ij.

FRASERA. *U. S. Secondary. American Columbo.* The ROOT of the *Frasera Walteri*, or *Frasera Carolinensis*, an indigenous plant, growing abundantly in the southern and western portions of the United States. The root is cut into slices like that of columbo and dried. It is distinguished from the genuine by the greater uniformity of its internal structure, the absence of concentric and radiating lines, and by affording a dark precipitate with the salts of iron, showing that it contains tannin. When fresh it acts as an emetic and cathartic, in this respect resembling most of

our indigenous tonics. When carefully dried it is a mild tonic, much used in the form of infusion in domestic practice.

COPTIS. U. S. *Goldthread.*

The ROOT of *Coptis trifolia*, a beautiful little evergreen, growing in swamps and boggy woods in the northern parts of the United States. It has small, creeping, perennial rhizomata, of a bright-yellow color, running in every direction; these should be gathered in the autumn.

Properties. These roots, as dried and found in the market, are in loosely matted masses, frequently mixed with the leaves and stems of the plant, without odor, and of a purely bitter taste, without astringency. It imparts its virtues to water and alcohol.

Effects and Uses. Goldthread is a pure bitter tonic, somewhat resembling quassia in its effects, but more acceptable to the stomach, and is adapted to all cases in which this class of remedies is indicated. It is much used in localities where it abounds as a local application in aphthous and other ulcerations of the mouth, and as a gargle in throat affections. It may be given in substance or infusion. Dose, from 10 to 30 grains.

SABBATIA. U. S. *American Centaury.*

The HERB of *Sabbatia angularis*, a small plant growing in meadow-grounds in most parts of the United States. The whole plant has a very bitter taste, with a slight aromatic flavor, and yields its virtues to water and alcohol.

It possesses the tonic properties of the simple bitters, and is much employed as a domestic remedy in the milder grades of intermittent and remittent fever, in the form of cold infusion made with an ounce of the root to a pint of boiling water.

Various other plants possess analogous properties, and may be used for the same purposes, and in the same manner.

XANTHORRHIZA. *Yellow-root.* The root of *Xanthorrhiza apiifolia.*

CHIRETTA. The herb and root of *Agathotes Chirayta.*

BITTERS WITH PECULIAR PROPERTIES.

These, besides their tonic properties, possess peculiar virtues due to some proximate vegetable principle which somewhat modifies their action. They have all more or less curative power in certain diseases, as ague and other periodic disorders, especially those caused by marsh miasm; and hence are sometimes called *antiperiodics*.

CINCHONA. U. S. *Peruvian Bark.*

The BARK of different species of *Cinchona*, an extensive genus, growing at various elevations on the Andes, from 11° N. latitude to 20° S. latitude. The whole species are either tall shrubs or considerable forest trees, commonly evergreen, and of great beauty both in foliage and in flower. Much confusion has existed among botanists in arranging the different species, partly owing to the foliage and characters, varying according to the elevation, climate, soil, and various other circumstances in the growth of individual plants.

The bark is collected during the dry season by natives, who pursue this occupation as their trade. The bark of both stem and branches is peeled off, and dried with great care, so as to preserve its bright color, and prevent deterioration. The larger and thicker barks form flat pieces, while the smaller curl into quills, varying in size according to the age and size of the branch from which taken. It is then made into bundles, and conveyed to the coast, where it is packed into chests, or in seroons, and exported.

History. Cinchona was so named in compliment to the Countess of Cinchon, the wife of the then viceroy of Peru, who was cured of ague by it, and brought some of it to Europe in 1640. For some time after its introduction into Spain the Jesuits were supplied by their brethren in Peru, and kept the secret of its origin to themselves, but did much to extend its fame throughout Europe, whence it was called *Jesuit's powder*, *Pulvis Patrum*, etc. Not long afterward the secret was discovered by an Englishman named Talbot, who, after curing many persons of rank, sold it, about the year 1679, to the government, which divulged its

true source. Since that time its estimation has continued with little and only temporary diminution, until at present it is one of the most extensively used articles of the Materia Medica.

Classification. The varieties of the Peruvian bark are exceedingly numerous, and different plans have been devised to distinguish them; some founded on their botanical characters; some on their chemical composition, and others on their physical characters. The best arrangement for practical purposes, and the one adopted by the various pharmacopœias, is that founded on their difference of color. Those brought from the Pacific coast of South America, constituting the officinal barks, are accordingly divided into the *Pale bark*, the *Yellow bark*, and the *Red bark*.

Cinchona Pallida. U. S. *Pale bark* is generally found in the market in the form of quilled or cylindrical pieces, from six to fifteen inches in length, and from two lines to an inch in diameter. The quills are simple or double. Externally rough, marked by transverse cracks and fissures, and covered with a grayish-brown epidermis, sometimes diversified with small, whitish, and ash-colored lichens. The inner surface is smooth and uniform, of a pale, cinnamon-brown color, varying somewhat in the different varieties. It has a slightly fibrous fracture, and yields a powder of a grayish-fawn color, which has an agreeable aromatic odor, and an acidulous, slightly astringent, and bitter taste. There are several varieties of the pale bark, obtained from different sources, and differing more or less in properties. The most esteemed are the *Loxa bark*, so called from the province from which it comes; and the *Lima* or *Huanuco bark*, which is obtained from around Huanuco, and is exported from Lima. The Loxa bark, the finest specimens of which are called *Crown bark*, is derived from the *C. Condaminea*, a small tree growing on the declivities of the mountains in the neighborhood of Loxa. The Lima is derived from the *C. Micrantha*, a large forest tree inhabiting the high, cool, and wooded mountains of Peru. The pale barks are characterized by containing a much larger proportion of cinchona than of quinia, and their infusion does not yield a precipitate with the sulphate of soda.

Cinchona Flava. U. S. *Yellow bark* is known commercially as *Calisaya bark*, from the name of the province in Boli-

via where it is collected. It is derived from the *C. Calisaya*, a lofty tree, with a trunk often two feet or more in diameter, inhabiting cold, elevated situations in the Andes in Bolivia, and the southernmost part of Peru. It is met with in quills or flat pieces, according as it is derived from the smaller branches or from the larger stems or trunk. The quilled (*Calisaya arrolada* of the natives) is single, and clothed with the epidermis, and is in pieces from three inches to two feet in length, from a quarter of an inch to two or three inches in diameter, and of equally variable thickness. It is distinguished from the pale bark by being generally larger and thicker, by the brownish color of the epidermis, and by its more fibrous texture. The flat (*Calisaya plancha*) is in pieces of various sizes, either quite flat or slightly curved, and generally destitute of epidermis. It is thicker than the quilled, more fibrous in its texture, and of a more uniform fracture. Both sorts present a uniform, smooth surface, with longitudinal fibres closely compressed. It breaks with a close, fibrous, and splintery fracture, and yields an orange-yellow powder, which has a faint aromatic odor, and a very bitter taste, with little astringency. It is characterized by containing a large proportion of quinia, with very little cinchonia; its infusion affords a precipitate with the sulphate of soda.

Cinchona Rubra. U. S. *Red bark* is derived from the *C. succirubra* and other undetermined species of cinchona. It is collected on the western slopes of Chimborazo, and is imported from Guayaquil and Lima in chests. It comes in quilled and flat pieces, which are derived from different parts of the same tree. The quills are of various lengths and sizes, sometimes rolled, or partially so, as if they had been taken from half the circumference of the branch; while the flat pieces are occasionally very large and thick, as if derived from the trunk of the tree. Both sorts are covered with a rough, reddish-brown epidermis, wrinkled longitudinally, and in the thicker pieces marked with furrows. The inner surface of the small quills is uniform and delicately fibrous, but becomes more fibrous and uneven in the larger; and in the flat is very irregular and splintery. It affords a powder of a faint, brownish-red color, and has a feeble, aromatic, somewhat earthy odor, and a bitter, astringent, slightly aromatic taste.

It is chemically distinguished by containing considerable quantities of both quinia and cinchonia

Under the name of *Carthagena* or *non-officinal* barks are classed all the cinchona barks brought from the Northern Atlantic ports of South America. At one time these were considered very inferior, but the deficient supply, and consequent high price of the officinal varieties, has made a demand for these barks. Most of them are characterized by having a soft, whitish, or yellowish-white, micaceous epidermis, which may be easily scraped by the nail. In their general properties they bear some resemblance to the Calisaya, and are called according to the vicinity in which they are collected, or the particular port from which shipped. The principal varieties are the *Hard Carthagena bark*, sometimes called *Santa Martha bark*, which occurs in quilled and flat pieces; the *Fibrous Carthagena* or *Bogota bark*, which comes in single or double quills, or half rolled pieces; and the *Hard Pitaya bark*, usually found in small, irregular pieces. These all contain the alkaloids in greater or less proportions, but yield more cinchonidia and quinidia than the Calisaya.

Besides the foregoing, there are other varieties of bark met with in commerce, which are called the *false cinchona barks*, but which differ from the genuine materially both in chemical composition and medicinal virtues. They are distinguished from the true Peruvian bark by the absence of its peculiar alkaloids.

Chemical Composition. The cinchona barks contain the alkaloids quinia and cinchonia, quinidia and cinchonidia, united with kinic and kinovic acids, a variety of tannin, cinchonic red, a peculiar yellow coloring matter, fatty matter, starch, gum, ligneous fibre, and a trace of volatile oil. The proportion of these ingredients differs remarkably in the various kinds of bark. Gum, which abounds in the pale, is deficient in the yellow and red. The *volatile oil* is the odorous principle; it is obtained by distillation with water, and is of a thick consistence, with an acrid, bitterish taste, and the peculiar odor of bark. The *cinchonic red* is most abundant in the red bark, and is an inodorous, insipid, reddish-brown substance, nearly insoluble in water, but readily so in alcohol. Acids promote its solution in water. The *tannic acid* (*cincho-tannic acid*) is of a reddish-brown color, soluble in

water and alcohol, and possesses all the properties of the gallo-tannic acid, from which it differs in yielding a green color with the salts of the peroxide of iron, and in the facility with which it absorbs the oxygen of the air, forming cinchonic red. The *yellow coloring matter* has little taste, is soluble in water, alcohol, and ether. The most important ingredients are the alkaloids, and the acids, kinic and kinovic, with which they are associated. *Kinic acid*, sometimes called *cinchonic* or *quinic acid*, exists in all the barks in combination with the alkaloids and with lime. It is in the form of a thick, syrupy liquid, but may with difficulty be crystallized from its aqueous solution in hard, transparent prisms, with rhombic bases. It has an acid taste, is soluble in water and alcohol, and resembles acetic acid in its general properties. *Kinovic acid* (*kinovic bitter*) also exists in a greater or less proportion in all the barks in combination with lime. It is a white, amorphous, very bitter substance, almost insoluble in water, but readily dissolved by alcohol and ether.

QUINIA. *Quinine* ($C_{40}H_{24}N_2O_4$) was discovered in 1820 by Pelletier and Caventou, and is found in greatest abundance in the yellow or Calisaya bark. It may be obtained by boiling the powdered bark in water, acidulated with muriatic or sulphuric acid, and precipitating with an excess of lime. The impure quinia is separated from the lime by digestion in alcohol, which dissolves the former, and precipitates it on evaporation. It may be purified by dissolving in dilute sulphuric acid, filtering the solution through animal charcoal, precipitating with ammonia, and collecting and drying the precipitate. It is usually in the form of a whitish, porous mass, but may with care be crystallized from its alcoholic solution in silky needles. It is soluble in 400 parts of cold, and 250 of boiling water, is very soluble in alcohol and ether, and is dissolved by the fixed and volatile oils. It is inodorous, very bitter, and fusible at about 300° F. It possesses alkaline properties, and forms salts with acids, which are readily crystallizable, very bitter, and have a pearly aspect.

Quinia and its salts may be distinguished from the other vegetable alkaloids by the beautiful emerald-green color which results when the solution is treated first with chlorine, and then with ammonia.

Cinchonia. *Cinchonine* ($C_{40}H_{24}N_2O_2$) was obtained in 1810, and is found in greatest abundance in the pale bark, from which it may be procured by a process similar to that for obtaining quinia. It is also obtained by precipitating the mother-water left after obtaining the sulphate of quinia, washing and drying the precipitate. When pure it is a white, inodorous substance, crystallizing with facility in four-sided oblique prisms from its alcoholic solution; its taste is bitter, though less so than that of quinia. It is also less soluble in water, alcohol, and ether. It is distinguished from quinia by being almost insoluble in ether, and by giving a white precipitate when ammonia is added to its solution in chlorine water. It unites with acids, forming crystallizable salts.

Quinidia. *Quinidine* is an alkaloid isomeric with quinia, and like that substance has a bitter taste, though less intense in degree. It differs from quinia in being much less soluble in ether, and in turning polarized light to the right; while quinia turns it to the left. It readily crystallizes from its alcoholic and ethereal solutions in colorless, hard prisms, with a vitreous lustre, and forms salts, which are more soluble in water than those of quinia.

Cinchonidia. *Cinchonidine* is isomeric with cinchonia, from which it differs in being more soluble in ether, and in producing deviation to the left in its influence on polarized light; cinchonia producing deviation to the right.

Commercial Quinidia, in which the two alkaloids quinidia and cinchonidia exist conjointly, occurs in hard, shining, colorless crystals, which yield on pulverization a snow-white powder. It has a bitter taste, and forms salts, which are crystallizable and soluble in water. When treated first with chlorine and then with ammonia, it does not, like quinia, yield a green color, nor like cinchonia, a white one, but remains unaffected.

The medicinal value of the different varieties of the cinchona barks is determined by the quantity of the alkaloids, especially of quinia, they contain. It is almost impossible to do this with accuracy, as the quantity is by no means uniform in different specimens of the same variety; the best bark, however, is that which throws down the most copious precipitate with the infusion of galls. The quantity varies from 5 per cent. in the finest

large quilled Calisaya, 4 per cent. in the finest red bark, and from 2 to 3 per cent. in the fibrous Carthagena bark, down to a mere trace in the inferior barks.

Physiological Effects. The cinchona barks are astringent and eminently tonic, and when administered in certain states of disease, antiperiodic. The alkaloids are devoid of astringency, but possess the other properties of the bark in a concentrated degree, and since their discovery have been in a great measure substituted for it. In small doses it improves the appetite, and promotes the digestive powers, without producing any well-marked, sensible effects on the system, with the exception perhaps of slight arterial excitement. In larger or long-continued doses, it causes headache, deafness, ringing in the ears, and other symptoms, which indicate that its physiological effects are produced upon the nervous system, and are not due to its tonic action. Its modus operandi as an antiperiodic is enveloped in considerable doubt and obscurity, and many theories have been proposed to account for it. Some attribute to it a sedative, others a stimulant, action upon the efferent nerves of the sympathetic system; while others contend that it changes the constitution of the blood, acting upon it in the same manner as any other poisonous agent. It appears by some peculiar power to break up a train of morbid actions going on in the system during the intervals of periodic disorders, which interrupts the progress of the disease, and prevents its return.

Therapeutical Application. As a tonic its employment is indicated in all cases of debility in which a permanent corroborant effect is desired; provided there is no tendency to inflammation or active hemorrhage, and the stomach and bowels are not in an irritable condition. It is peculiarly serviceable in those forms of debility with great laxity of the solids, which depend on, or are attended with, profuse discharge of the secretions. In convalescence from acute diseases the preparations of cinchona are among our most efficient tonics, but must be used with caution, as any over-excitement is apt to cause a recurrence of the febrile or inflammatory symptoms.

But it is as an antiperiodic that bark displays its most extraordinary powers. In all febrile diseases of an intermittent or

remittent type it proves uniformly successful. It is best given in full doses, or in divided doses during the intermission; but, if necessary, may also be given during the hot stage of fever, with safety, and often with advantage. Any irritability of the stomach, venous congestions, or constipation of the bowels, should be previously removed by appropriate treatment. In the intermittents of the Southern States it is very common to rely on one large dose given a short time previous to the access of the paroxysm, but the same object may be attained by resorting to more moderate doses, frequently repeated, without running the risk of its oppressing or irritating the stomach, or of its dangerous influence upon the brain and nervous system. There has also been a difference of opinion as to whether quinine should be administered in a complicated intermittent, during the continuance of any inflammation. As a general rule in these cases, whenever the intermission is complete, it may be given without hesitation, and it should be conjoined with remedies calculated to reduce the inflammation. If complications of any important viscera, particularly of the brain, exist, it must be used, if at all, with great caution, and its effects carefully watched. It also possesses great powers as a prophylactic against malarious diseases, and may be employed with safety and advantage by healthy persons exposed to malarial influences.

In neuralgia and rheumatism, in fact in any disease assuming a periodical type or character, particularly if there be reason to suspect a malarious origin or influence, it may be resorted to, and will often prove efficacious, even when circumstances would warrant some other form of treatment.

Its topical effects depend on the tannic acid which it contains; and as many vegetable substances contain this in a much larger proportion, and exceed it in astringency, it is but little used. It is sometimes, however, used as an astringent and antiseptic application to unhealthy ulcers, and, in the form of infusion or decoction, as a gargle in putrid sore-throat. Powdered bark is useful as a dentifrice in spongy conditions of the gums.

Administration. The dose of the powder as a tonic is from 10 to 30 grains; as an antiperiodic, a drachm, to be repeated more or less frequently, according to circumstances. It is now

seldom administered in the form of powder, on account of its disagreeable taste, and its tendency to cause nausea and vomiting. The sulphate of quinia has almost entirely superseded it as an antiperiodic; but some of the various preparations of the bark itself is preferred by many when its peculiar influence as a tonic is desired. The following are the officinal preparations:

Infusum Cinchonæ Flavæ. U. S. *Infusion of Yellow Bark.* Infusum Cinchonæ Rubræ. U. S. *Infusion of Red Bark.* These are prepared by displacement with a troyounce of bark, and a pint of water acidulated with one drachm of aromatic sulphuric acid. They are elegant and efficient preparations, and may be advantageously employed in all cases which require tonic treatment without the full powers of the bark. Dose, f℥i to f℥ij.

Decoctum Cinchonæ Flavæ. U. S. *Decoction of Yellow Bark.* Decoctum Cinchonæ Rubræ. U. S. *Decoction of Red Bark.* These decoctions are prepared by boiling a troyounce of the bruised bark in a pint of water for fifteen minutes, straining, and adding water sufficient to make a pint. The virtues of the cinchona are impaired by long boiling, and hence these preparations are not much used.

Tinctura Cinchonæ. U. S. *Tincture of Peruvian Bark* prepared by displacement (six troyounces of yellow bark and two pints of diluted alcohol) is seldom used except as an adjunct to the infusion or decoction of bark.

Tinctura Cinchonæ Composita. U. S. *Compound Tincture of Peruvian Bark*, commonly known as *Huxham's tincture of bark*, is made by maceration and percolation (four troyounces red cinchona, three troyounces bitter orange-peel, three hundred and sixty grains serpentaria, and one hundred and twenty grains of saffron and red saunders, each, in two and a half pints of diluted alcohol). It is an excellent stomachic cordial, and may be given in doses of from f℥i to f℥iv.

Extractum Cinchonæ. U. S. *Extract of Peruvian Bark* is prepared from the yellow or Calisaya bark by first extracting the virtues of the bark by alcohol, and afterward by water; evaporating the tincture and infusion thus obtained, separately, to the consistence of honey, then mixing and evaporating. Dose, 10 to 30 grains.

Extractum Cinchonæ Fluidum. U. S. *Fluid Extract of Peruvian Bark* is a highly concentrated infusion of yellow bark preserved by sugar. It is prepared by percolating sixteen troyounces of bark with four pints of diluted alcohol, evaporating by means of a water-bath to two pints, adding twenty troyounces of sugar, evaporating again to two pints, and straining while hot. The dose, equivalent to a drachm of the bark, is f℥ij.

Besides these there are many unofficinal preparations of bark, made with different menstrua, flavored and sweetened to suit various tastes. Of these the *Elixir Calisayæ* is an elegant aromatic tonic, and is much used, either alone or as an adjuvant of other medicines.

Quiniæ Sulphas. U. S. *Sulphate of Quinia* is the most commonly employed of all the preparations obtained from the cinchona barks. Its mode of preparation has been explained under the head of quinia. It was formerly obtained exclusively from the yellow bark, but the monopoly in this bark, and its high price, has compelled the manufacturer to procure it from the inferior but cheaper Carthagena barks. It occurs in snow-white, feathery crystals, much interlaced, or grouped in starlike tufts, odorless, and of an intensely bitter taste. It is very slightly soluble in cold, more so in boiling, water; soluble in sixty parts of alcohol; at 212° F. it loses its water, and at 240° melts like wax, and at a more elevated temperature is dissipated. The officinal salt is a disulphate, consisting of two equivalents of base to one of acid; with an additional equivalent of sulphuric acid it forms a neutral sulphate, which is much more soluble.

Owing to its high price it is often adulterated with sulphate of lime and other earthy and alkaline salts, gum, starch, fatty matter, sugar, salicine, and various other substances. Mineral substances remain behind when the salt is exposed to a red heat; gum and starch are left behind by alcohol, and fatty matters by water acidulated with sulphuric acid. Sugar may be recognized by its sweet taste when the quinia is precipitated from solution by carbonate of potassa, and salicine by the red color it gives with sulphuric acid.

Sulphate of quinia produces all the effects of the bark on the system, and is preferred on account of its smallness of bulk, its

certainty and uniformity of dose, and its freedom from offensive qualities, except bitterness. Twelve grains are generally considered equivalent to an ounce of good bark. The dose varies according to the condition of the patient, and the object to be accomplished. As a tonic simply, one grain repeated two or three times a day; as an antiperiodic, from ten to twenty grains may be given either at once or in divided doses, according to the condition of the stomach, or the length of the paroxysm. The quantity required is very different in different individuals; some are very easily affected by small doses, as shown by the ringing in the ears; while in others much larger doses are required to produce the same effect. It may be administered in the form of pill, or in solution with an acid, or simply suspended in water by the intervention of syrup or mucilage. When from any cause it is impossible to administer it by the stomach, it may be given with good effect by enema, in two or three ounces of any bland fluid; or it may be employed endermically, by sprinkling it, diluted with gum arabic, upon a surface previously denuded of the cuticle. Advantage sometimes results from combining it with other medicines. Opium adds to its antiperiodic powers; while aromatics and gastric stimulants may be added in cases attended with torpor of the stomach.

Quiniæ Valerianas. U. S. *Valerianate of Quinine* is made by dissolving freshly precipitated quinia in diluted valerianic acid, heated to near the boiling point, and crystallizing by cooling. It is a colorless or white salt, crystallizing in rhomboidal plates, and has the peculiar repulsive odor of valerian, with the bitter taste of the quinia. It combines the tonic properties of the quinia with the antispasmodic effects of the valerian, and is useful in nervous diseases attended with debility. Dose, 1 to 5 grains.

Besides the sulphate and valerianate, other unofficinal salts of quinia have been employed, but they possess no advantage over the sulphate. The *phosphate*, *citrate*, *lactate*, *acetate*, and *muriate* may be obtained by saturating a solution of the acids respectively with quinia, and evaporating the solution. The *tannate* is procured by precipitating an infusion of bark, or a solution of the sulphate, by a solution of tannic acid, washing and

drying the precipitate. It has little taste, and has been of late highly recommended as a remedy in the nocturnal sweats of phthisis and other exhausting diseases. The *Arsenite*, procured by dissolving quinia in boiling alcohol with arsenious acid, possesses the power of the quinia to prevent the coming paroxysm, and the permanent tonic influence of the arsenic to prevent a renewal of the attack. It also proves useful in chronic cutaneous diseases attended with debility. Dose, $\frac{1}{3}$ of a grain. The *chlorate*, from the powerful oxidizing and general stimulating agency of chloric acid, and the influence of quinia as a nervine, has been recommended in low forms of disease.

Quinoidia. *Quinoidine*, more commonly known as *amorphous quinia* or *precipitated extract of bark*, is obtained by precipitating the mother-liquor, left after the crystallization of sulphate of quinia in the preparation of that salt, by carbonate of soda, and extracting with alcohol. It is a reddish-brown mass, of a resinous appearance. Pasteur found it to consist of two alkaloids, derived from quinia and cinchonia in the process for extracting them from the bark, and with which they are respectively isomeric, and named in view of their origin *quinicia* and *cinchonicia*. It has strong febrifuge powers, and in doses double that of the sulphate of quinia is efficient in the cure of intermittents.

Cinchoniæ Sulphas. U. S. *Sulphate of Cinchonia* may be obtained by adding solution of soda to the mother-water left after crystallizing the sulphate of quinia, collecting and washing the precipitate with successive small portions of alcohol, to remove other alkaloids which may be present. The residue is then dissolved in diluted sulphuric acid, boiled with animal charcoal, and filtered while hot, when the sulphate is deposited on cooling. It crystallizes in white, shining, short, oblique prisms with dihedral summits. It melts at 212°, loses its water of crystallization at a somewhat higher temperature, and it is entirely dissipated at a red heat. It has a very bitter taste; it is soluble in fifty-four parts of cold, and much less boiling, water; is readily soluble in alcohol, but very sparingly in ether. Its action on the system is similar to that of the sulphate of quinia, and it may be given in the same doses, and in the same manner.

CORNUS FLORIDA. U. S. *Dogwood.*

The BARK of *Cornus Florida*, a small tree growing in every part of the United States, and bearing a profusion of large, white flowers in May and June. The bark of the stem and branches is used, that of the root contains a greater amount of the active principles, and is preferred.

Properties. It is in pieces of various size, more or less rolled, sometimes invested with a fawn-colored epidermis, sometimes deprived of it; of a reddish-gray color, slight odor, astringent and aromatic taste, very brittle, and affording, when pulverized, a grayish-red powder. It yields its virtues to water and alcohol, and contains tannin, bitter extractive, and a peculiar principle termed *cornine.*

Medical Properties and Uses. It is a mild tonic and feeble astringent, possessing properties analogous to those of Peruvian bark, for which it has been occasionally substituted in the treatment of intermittents. Dose of the powder, from 20 to 60 grains, often repeated.

DECOCTUM CORNÛS FLORIDÆ. U. S. *Decoction of Dogwood,* prepared by boiling a troyounce of dogwood bark in a pint of water. Dose, f℥ij.

The bark of *Cornus sericea, swamp dogwood,* and *C. circinata, round-leaved dogwood,* possesses the same properties, and may be substituted for the officinal.

SALIX. *U. S. Secondary. Willow.* The bark of *Salix alba,* the European or white willow. The natural order *Salicaceæ* embraces a very large genus, growing in the temperate regions of both hemispheres, and used for their therapeutic virtues at a very early period. The bark of the *S. alba* only is used in medicine. When dried it is usually in rolled pieces, is fibrous, somewhat flexible, and difficult to pulverize; it has a slight aromatic odor, and a bitter, astringent, but peculiar taste, which it yields to water.

It contains tannin, and a crystalline principle, called *salicine.* This may be obtained by treating a boiling concentrated decoction of the bark with oxide of lead, to remove the gum, tannin, and extractive matter; purifying by digestion with animal charcoal,

evaporating, and crystallizing. When pure, it crystallizes in white, silky needles; is inodorous, very bitter, neutral to vegetable colors, soluble in water and alcohol, but not in ether. It produces a blood-red color with sulphuric acid, by which test it is distinguished from quinia.

The willow bark is tonic and astringent. At one time salicine was supposed to possess properties analogous to quinia, but it is not much used. Dose, 10 to 15 grains, repeated so that from 20 to 40 grains may be taken in the interval between the paroxysms of an intermittent.

PRUNUS VIRGINIANA. U. S. *Wild-Cherry Bark.*

Bark of *Cerasus serotina*, a large, indigenous tree, abounding in the Middle Atlantic States, and in those bordering on the Ohio. The part used in medicine is the INNER BARK of the root, trunk, and branches; the former of which is the most active, and always to be preferred.

Properties. As found in the shops it is in pieces of various length and size, of a reddish-cinnamon color, brittle, with a reddish-gray fracture, and easily pulverized, affording a fawn-colored powder. When fresh it has an odor resembling that of peach leaves, a bitter and aromatic taste, which it loses by long keeping and exposure to the air. It imparts its virtues to water, but boiling water impairs its medicinal virtues, in consequence of the chemical changes effected by heat, and the volatilization of its active principles. It contains, besides the bitter principle, *amygdalin* and *emulsin;* on macerating the bark in water, hydrocyanic acid is generated. This does not pre-exist in the bark, but is supposed to be formed by the reaction of water upon amygdalin and emulsin.

Medical Properties and Uses. The wild cherry in moderate doses is tonic to the digestive organs, and at the same time sedative to the nervous and circulatory systems. This combined action renders it peculiarly applicable to the treatment of cases of debility with impaired digestive function, and morbid irritability of the nervous system, in cases of hectic fever from pulmonary disease, and in convalescence from fevers and other acute diseases.

In phthisis the amount of hydrocyanic developed often tends to abate the cough and morbid irritability present; while its tonic properties invigorate the stomach, and give tone to the whole digestive system. It has been used as a febrifuge in intermittents; and although not adapted to arrest the paroxysm, it may be employed successfully as a prophylactic, and during convalescence, where the disease has been arrested by quinine. Dose of the powder, from 30 to 60 grains; but it is seldom used in this form.

INFUSUM PRUNI VIRGINIANÆ. U. S. *Infusion of Wild-Cherry Bark* (half a troyounce to a pint of cold water) has the agreeable bitterness and peculiar flavor of the bark, and may be given in doses of f℥ij, repeated as often as may be necessary.

SYRUPUS PRUNI VIRGINIANÆ. U. S. *Syrup of Wild-Cherry Bark*, prepared by adding sugar to a strong infusion, has all the effects of the bark unimpaired by heat. It is an agreeable preparation, and may be used as a vehicle for other sedative medicines, or as an addition to cough mixtures. Dose, f℥ss.

EXTRACTUM PRUNI VIRGINIANÆ FLUIDUM. U. S. *Fluid Extract of Wild-Cherry Bark* contains the virtues of the bark in a concentrated, liquid form. To prepare it, all the soluble principles of the bark, except the emulsin, are extracted by alcohol, which is then distilled off, and water added to hold the amygdalin in solution. An emulsion of sweet almonds is then added, which furnishes all the conditions requisite to the generation of the hydrocyanic acid. One fluidounce represents the virtues of half an ounce of the bark. Dose, f℥i–f℥ij.

STIMULATING TONICS.

These are distinguished by possessing a certain degree of stimulant as well as tonic power, which they owe to the union of a bitter principle with a volatile oil. In virtue of these constituents they have a double action: in moderate doses improving the appetite and digestive functions; in larger doses, especially in warm infusion, promoting the secretions, particularly

those from the skin and kidneys; and in still larger doses acting as emeto cathartics.

EUPATORIUM. U. S. *Thoroughwort.*

The HERB of *Eupatorium perfoliatum*, an indigenous plant, commonly known as *Boneset, Indian Sage* or *Vegetable Antimony.* It is a small shrubby plant, with many erect, hairy, herbaceous stems, simple at the base, branched above, with opposite, oblong, tapering, serrated leaves, and numerous white flowers, which bloom in August, and continue to blossom till October.

Properties. The whole plant is used, and is generally found in the shops in packages put up by the Shakers. It is intensely bitter, with a peculiar flavor, without astringency or acrimony, and yields all its sensible and medicinal properties to water and alcohol. It contains a bitter proximate principle, with a large amount of resinous matter, gum, etc.

Medical Properties and Uses. This plant has a diversity of properties, and will fulfill a variety of indications according to the dose and mode of exhibition, being a stimulating tonic, diaphoretic, or emetic. In cold infusion it is well adapted to those cases of dyspepsia and want of tone in the system requiring the use of bitter tonics. In warm decoction, in small doses, it is an excellent stimulating diaphoretic in catarrh and influenza, inducing a healthy and free perspiration, and replacing the chilly or febrile sensations with a uniform and healthy glow. In large doses it acts as an emetic.

INFUSUM EUPATORII. U. S. *Infusion of Thoroughwort* is prepared by macerating a troyounce of the dried herb in a pint of boiling water. Dose, as a tonic, f℥i–f℥ij, taken cold, three or four times a day; as a diaphoretic or emetic, the warm infusion should be drank freely.

ANTHEMIS. U. S. *Chamomile.*

The FLOWERS of *Anthemis nobilis*, a small, trailing, herbaceous plant, native of Europe, but largely cultivated in this country for medicinal purposes. It has a round, slender, stem, from six to twelve inches long, with bipinnate leaves, and small, acute,

thread-like leaflets, divided into three segments. The flowers are solitary, with a bright-yellow, convex disk, surrounded by white rays, which become more numerous by cultivation, and gradually take the place of the yellow disk florets. These are collected before fully blown.

Properties. As found in the shops they are almost spherical, of a dull-white color, a peculiar fragrant odor, and a bitter aromatic taste. They yield their virtues to water and alcohol. They contain tannin, a peculiar bitter extractive, and a volatile oil.

Medical Properties and Uses. Chamomile is a mild aromatic and bitter tonic in small doses, but acts as an emetic in larger ones. In cold infusion it is very useful in cases of enfeebled digestion, and especially in general debility, with languid appetite, which so often attends convalescence from acute diseases. The tepid infusion is often given to promote the operation of emetics, or to assist the stomach in relieving itself when oppressed by its contents. It was formerly in much repute in intermittents, but is now never used. Externally, the flowers are sometimes applied in the form of fomentation in inflammations, and as a gentle excitant to ill-conditioned ulcers. Dose of the powder, from 30 to 60 grains; the infusion is generally preferred.

INFUSUM ANTHEMIDIS. U. S. *Infusion of Chamomile* is made with half an ounce of chamomile to a pint of boiling water. Dose, as a tonic, a wineglassful or two before meals; as an emetic it should be administered tepid, and in large draughts.

SERPENTARIA. U. S. *Virginia Snakeroot.*

The ROOT of *Aristolochia Serpentaria, A. reticulata,* and perhaps of other species of *Aristolochia,* herbaceous or shrubby plants growing abundantly in rich, shady woods, throughout the Middle and Southern States. The *A. Serpentaria,* the most common variety, has a perennial root, composed of numerous slender fibres arising from a short, knotty head, sending up a number of simple, or slightly branching, stems, with alternate, oblong, cordate leaves of a pale yellowish-green color, and purple, tubular flowers, proceeding from joints near the root.

Properties. The root, as found in the shops, consists of brittle or yellowish-brown tufts of slender, long, matted fibres, attached to a short knotty head, possessing an agreeable, camphoraceous, aromatic odor, and a pungent bitter taste. It affords a grayish-brown powder, and yields its virtues to water and alcohol. It contains a volatile oil, extractive, resin, and a yellow bitter principle.

Medical Properties and Uses. Serpentaria is a stimulating tonic, combining the virtues of the simple bitters and the aromatic class of stimulants, with diaphoretic or diuretic properties, according to the mode of administration. It is admirably adapted to those conditions of the system attendant on, or following, febrile diseases, where the system requires support, and where it is desirable to promote a tendency to the skin. In the exanthemata, where the eruption is tardy in its appearance, or has been repelled, it is useful in restoring the functions of the organs. Before the discovery and isolation of quinine it was generally employed as a prophylactic and remedy for intermittents, and is still used extensively in domestic practice. Dose of the powdered root, 10 to 30 grains; but the infusion is almost always preferred.

Infusum Serpentariæ. U. S. *Infusion of Serpentaria* is made by percolation (half a troyounce to one pint water). Dose, f℥i to f℥ij.

Tinctura Serpentariæ. U. S. *Tincture of Virginia Snakeroot* (four troyounces to two pints diluted alcohol) is sometimes added to bitter infusions. Dose, f℥i to f℥ij.

Extractum Serpentariæ Fluidum. U. S. *Fluid Extract of Serpentaria* is a concentrated tincture, and contains all the virtues of the root within a small bulk. Dose, 20 to 30 minims.

ANGUSTURA. U. S. *Angustura.*

The bark of *Galipea officinalis*, a small tree growing in the warm regions of South America, principally in the district bordering on the Orinoco, and also of the *G. Cusparia*, a tall forest tree of the same region.

Properties. It occurs in pieces of various length and size, flat

or slightly curved, more rarely quilled, covered externally with a grayish-yellow, soft or spongy epidermis, internally of a yellowish fawn color. It is fibrous, breaking with a compact resinous fracture, and affording a pale-yellow powder; it has a peculiar unpleasant odor, and a warm, bitter, somewhat acrid taste. When macerated in water, it becomes soft and tenacious. It contains a peculiar bitter principle, *cusparin*, gum, lignin, and a trace of volatile oil, and imparts its virtues to water and alcohol. It is often adulterated with the bark of some unknown species of *Strychnos*, which may be readily detected by its physical as well as chemical properties. The false bark is much thicker, harder, and more compact, has a more resinous fracture, is inodorous, and intensely bitter, and when steeped in water does not become soft. A drop of nitric acid upon the inner surface produces a blood-red, and upon the external, an emerald-green color; while in the true bark a dull-red color is produced by the acid upon both surfaces.

Medical Properties and Uses. Angustura is an excellent stimulant tonic, devoid of astringency, and may be used in atonic dyspepsia, and in the advanced stages of diarrhœa and dysentery attended with great debility. It was at one time much used as an antiperiodic, but, in consequence of its liability to adulteration, is now seldom or never used. The dose in substance is from 10 to 30 grains.

INFUSUM ANGUSTURÆ. U. S. *Infusion of Angustura* (half a troyounce to a pint of water). Dose, f℥ij, repeated according to circumstances.

CASCARILLA. U. S. *Cascarilla.*

The BARK of *Croton Eleuteria*, a shrub or small tree growing in the Bahamas and other West India islands.

Properties. It is found in the shops in short broken quills, having a whitish-gray epidermis, or in thin flattened pieces without the epidermis, generally somewhat twisted, of a reddish-brown color, hard and brittle, breaking with a close, compact fracture. It has an aromatic odor, which is much increased by friction, or when the bark is burned, and a warm, spicy, bitter

taste. It contains a bitter, crystallizable principle, *cascarillin*, and a volatile oil, and yields its properties to alcohol and partially to water.

Medical Properties and Uses. It is an aromatic and mild carminative tonic. It is principally used as an agreeable addition to more powerful tonics in dyspepsia and chronic diseases of the bowels. Dose of the powder, 10 to 30 grains, but generally given in infusion.

INFUSUM CASCARILLÆ. U. S. *Infusion of Cascarilla*, a troy-ounce to a pint of boiling water. Dose, f℥ij.

MYRRHA. U. S. *Myrrh.*

The CONCRETE JUICE of *Balsamodendron Myrrha*, a small, shrubby tree, growing in Arabia. The juice exudes spontaneously from the bark of the tree, and is at first of a soft, oily consistence, and of a pale-yellow color, but soon becomes hard and darker colored.

Properties. The best myrrh (*Turkey myrrh*) is in small, irregular-shaped fragments or tears, or in agglutinated masses of various size, of a reddish-yellow color, somewhat translucent, having an agreeable, fragrant odor, and a bitter, aromatic taste. It is brittle and pulverizable, affording a powder of a light-yellowish color. It is inflammable, and is softened by heat, but does not melt. The inferior variety (*East India myrrh*) is much darker colored, more opaque, and less odorous. It contains gum, resin, a volatile oil, and bassorin, and is partially soluble in water, alcohol, and ether. Triturated with water it forms an opaque, yellowish or whitish emulsion, which deposits the larger portion on standing.

Medical Properties and Uses. Myrrh is a stimulating tonic, in small doses promoting the appetite and aiding digestion. It also appears to possess the power of diminishing profuse discharges from mucous membranes, particularly from the pulmonary and genito-urinary system. It is accordingly used as an expectorant in debilitated conditions of the system, and where there is a total absence of febrile and inflammatory excitement. It may be used in chronic catarrh, humoral asthma, phthisis, and other

pulmonary affections in which there is excessive secretion, but a deficiency of power to expectorate. In amenorrhœa it is often combined with iron and aloes, and appears to impart to these medicines an activity which they do not possess when given singly. It is also used with advantage as a local stimulant to spongy gums, ulcerated throat, and foul ulcers. Dose, 10 to 30 grains, given in powder, pill, or suspended in water.

TINCTURA MYRRHÆ. U. S. *Tincture of Myrrh* (three troy-ounces to two pints alcohol) is seldom used internally. As a local application it is employed as a stimulant to foul and indolent ulcers, and diluted with water or some astringent infusion, as a mouth-wash in sponginess of the gums, and as a gargle in ulcerated sore-throat.

The following substances possess the properties of the stimulating tonics, with a diaphoretic tendency, and may be used for the same purposes and in the same manner as the preceding.

LIRIODENDRON. *U. S. Secondary. Tulip-tree Bark.* The BARK of *Liriodendron tulipifera*, one of the most beautiful of our American forest trees.

MAGNOLIA. *U. S. Secondary.* The BARK of *Magnolia glauca* and of other species of *Magnolia*, indigenous trees, conspicuous for the beauty of their foliage and the delightful odor of their flowers.

ACHILLEA. *U. S. Secondary. Yarrow* or *Milfoil.* The HERB and FLOWERS of *Achillea millefolium*, a perennial plant growing throughout the United States.

ANGELICA. *U. S. Secondary.* The ROOT of *Angelica Archangelica*, a European plant cultivated in this country.

CONTRAYERVA. The ROOT of *Dorstenia Contrayerva*, a plant growing in Mexico, South America, and the West Indies.

MARRUBIUM. U. S. *Horehound.* The HERB of *Marrubium vulgare*, a perennial herbaceous plant, growing wild in Europe, and fully naturalized in this country.

AROMATICS.

These, in addition to their bitter property, contain an aromatic principle, generally a volatile oil, which gives them a fragrant odor, and a pleasant spicy taste. They are used principally as stimulants to the gastro-intestinal canal, and many of them are in common use as corrigents of food which might disagree with the stomach. When administered in dyspeptic cases to promote digestion, they act as *stomachics* and *cordials*. When given to dispel flatus and relieve colicky pains, they are termed *carminatives*. They are extensively used as adjuvants to other medicines to disguise their taste and odor, and to render them more acceptable to the stomach.

The volatile oils may be separated by distillation with water, and possess, in a high degree, the sensible and medical properties of the plant from which they are procured. They may be administered alone upon a lump of sugar, or made into an emulsion with water, sugar, or gum. The aromatic waters, so much used as vehicles for other medicines, are prepared by impregnating the water with the volatile oils by trituration with carbonate of magnesia, thus bringing them to a state of minute division, and presenting a larger surface to the action of the solvent.

AURANTII CORTEX. U. S. *Orange Peel.*

The dried OUTER RIND of the fruit of *Citrus vulgaris*, the Seville or bitter orange, and of *Citrus Aurantium*, the sweet orange, small evergreen trees, natives of Eastern Asia, but growing abundantly in all tropical climates. It is usually in elliptical concavo-convex pieces, or thin parings, retaining more or less of the pithy, white substance which unites the rind with the pulp.

Properties and Uses. It has a grateful aromatic odor, and a warm, bitter taste, which depends on the volatile oil contained in the minute vesicles. The rind of the Seville orange is much more bitter, and is most generally used. Both yield their virtues to water and alcohol. The bitter orange is a mild aromatic and bitter tonic; the sweet is simply aromatic. They are employed

in medicine principally for their agreeable flavor as an addition to infusions and decoctions.

Confectio Aurantii Corticis. U. S. *Confection of Orange Peel* (prepared by beating together one part of peel, grated from the fruit, and three parts of sugar, until they are thoroughly mixed) is used as a grateful vehicle for other medicines.

Syrupus Aurantii Corticis. U. S. *Syrup of Orange Peel* is prepared by first obtaining a concentrated tincture by percolation and evaporation, and adding sugar and water to form a syrup, taking care to incorporate the tincture with the water by means of carbonate of magnesia. It is employed for its agreeable flavor.

Aqua Aurantii Florum. U. S. *Orange-Flower Water.* The fresh flowers (Aurantii Flores, U. S.) impart to water distilled from them their peculiar fragrance and a bitterish aromatic taste. It is used on account of its agreeable odor as a vehicle, and is sometimes useful as a gentle antispasmodic in hysteria and nervous affections. The *oil of neroli*, distilled from the flowers, is much used in perfumery and in the composition of liqueurs.

CINNAMOMUM. U. S. *Cinnamon.*

The bark of *Cinnamomum Zeylanicum*, a native of Ceylon and Java, and of *Cinnamomum aromaticum*, a tree of China. There are two varieties of cinnamon in commerce, the Ceylon and the Chinese. The *Ceylon* is obtained by the cultivation of the plant. It occurs in long pieces, composed of quills, the larger inclosing the smaller; the finest is procured from the stalks or twigs, which shoot up after the tree has been cut down, and is in splintery rolls, very thin,—not much thicker than writing-paper,—of a light brownish-yellow color, smooth, and with a splintery fracture. It has an aromatic and fragrant odor, and a warm, sweetish, and feebly astringent taste. The inferior sorts are in coarser quills, of a darker brown color, and with a less agreeable odor and taste.

The *Chinese* or *cassia cinnamon* is the variety generally kept in the shops, and is in much larger rolls, from the eighth of an inch to an inch in diameter, of a redder and darker color, thicker, rougher, and breaking with a shorter, resinous fracture, with a

less fragrant and delicate odor, a more pungent and astringent, but less pleasant, taste. Cinnamon yields its virtues wholly to alcohol, and less readily to water; and contains a volatile oil, and a small proportion of tannin.

Medical Properties. It is an aromatic stimulant tonic, with slight astringency, and is much employed as a carminative, and as an addition to other medicines. Dose of the powder, 10 to 20 grains.

Oleum Cinnamomi. U. S. *Oil of Cinnamon* is obtained from the bark of either variety, and is of a light-yellow color, becoming deeper by age, and ultimately red. It has all the cordial properties of cinnamon, without its astringency, and is much employed to correct or conceal the taste of other medicines. Dose, 1 or 2 drops.

Aqua Cinnamomi. U. S. *Cinnamon Water* is made by rubbing up f℥ss of the oil, with sixty grains of carbonate of magnesia, then with two pints of distilled water, gradually added, and afterward filtering. It is much used as a vehicle for other less pleasant medicines.

Tinctura Cinnamomi. U. S. *Tincture of Cinnamon* is prepared by percolating three troyounces of powdered cinnamon with a mixture of two parts of alcohol and one of water until two pints are obtained. Dose, f℥i to f℥iij.

Spiritus Cinnamomi. U. S. *Spirit of Cinnamon*, made by dissolving one part of the oil in fifteen parts of alcohol, is an agreeable aromatic cordial in doses of from 10 to 20 drops.

Pulvis Aromaticus. U. S. *Aromatic Powder* is prepared by thoroughly mixing two parts each of finely powdered cinnamon and ginger, with one part each of nutmeg and cardamom, and is an excellent aromatic addition to other medicines when given in the form of powder. A mixture of aromatic powders in the form of cataplasm, known as *spice plaster*, is an excellent mild rubefacient, and is much employed as an application to the abdomen in infantile colic, and in the nausea and vomiting which attend infantile diseases.

Confectio Aromatica. U. S. *Aromatic Confection*, made by rubbing together equal parts of aromatic powder and honey, affords a convenient means of administering the spices contained in it.

CANELLA. U. S. *Canella.*

The INNER BARK of *Canella alba*, a tall tree, native of Jamaica and other West India islands. The bark of the branches, which is preferred, is removed by an iron instrument, deprived of its epidermis, and dried in the shade.

Properties and Uses. As found in the shops, it is either in quilled pieces, which are of a light-buff color, pale internally, or in flat fragments, which are thicker and rather darker. It has a faint aromatic odor, and an acrid spicy taste; is brittle, and affords a yellowish-white powder. It contains a volatile oil, resin, and bitter extractive, and imparts its virtues to alcohol and partly to water.

It possesses the ordinary properties of the aromatics, and is seldom used, except in combination. Dose, 10 to 40 grains. It enters into the composition of the well-known *Hiera picra, Pulvis aloes et canellæ.*

WINTERA. *Winter's Bark.* The BARK of *Drimys Winteri*, a very large tree, native of the southern parts of South America, is often confounded with the true canella, but differs from it in containing tannin. It may be used for the same purposes as cinnamon or canella. Dose, 30 to 60 grains.

MYRISTICA. U. S. *Nutmeg.*

The KERNEL of the fruit of *Myristica fragrans*, a native of the Moluccas and other neighboring islands. The tree is about twenty-five to thirty feet high, having some resemblance to a pear-tree. The fruit is round or oval, about the size of a peach, with a fleshy pericarp, which, when ripe, divides in the middle, disclosing a thin, brown shell, within which is the kernel, surrounded by a thin arillus, which is the mace of commerce.

Properties. Nutmegs are round or oval, externally of a grayish-brown color, and marked by irregular furrows, internally of a lighter color, and traversed by reddish veins. They have a fragrant odor, and a warm aromatic taste, which they impart to alcohol, and only partially to water. They contain a volatile oil, obtained by distillation, and a fixed oil, procured by subjecting

them to heat and pressure. The latter, known as *oil of mace*, is a soft, unctuous, yellowish or orange-yellow solid.

MACIS. U. S. *Mace*, the arillus of the fruit, is in the shape of a flat, irregularly slit, smooth, soft, and flexible membrane, of an orange-yellow color, with an odor and taste like that of nutmegs. It also yields a volatile oil by distillation, and a fixed oil by pressure.

Properties and Uses. Both nutmegs and mace are almost wholly employed as a condiment for preparations of milk and farinaceous substances. Nutmegs possess slight narcotic properties, which render them useful as a substitute for opium, especially in the diarrhœa of children, when an aromatic is needed, and where opiates are contraindicated. Dose, 5 to 20 grains; it may be reduced to powder by grating.

OLEUM MYRISTICÆ. U. S. *Volatile Oil of Nutmeg* is colorless, or of a pale-straw color, limpid, lighter than water, and soluble in alcohol, ether, and boiling water. It may be used for the same purposes as nutmeg in the dose of 2 or 3 drops, but is not often employed.

SPIRITUS MYRISTICÆ. U. S. *Spirit of Nutmeg*, made by distilling two troyounces of nutmeg in eight pints of diluted alcohol and a pint of water to eight pints, is used as a flavoring addition to other medicines.

CARYOPHYLLUS. U. S. *Cloves.*

The UNEXPANDED FLOWERS of *Caryophyllus aromaticus*, a handsome tree, native of the Moluccas, and growing freely in all parts of the East and West Indies. The clove is the undeveloped flower-bud, consisting of the tubular calyx, resembling a nail, with the unexpanded corolla, forming a small, round ball between its four teeth.

Properties and Uses. When good they are dark, heavy, and perfect, of a peculiar, agreeably aromatic odor, and a hot, acrid taste. They contain tannin, gum, extractive, and about 18 per cent. of volatile oil. They are the most stimulating of the aromatics used as adjuncts to other substances, but are principally employed for culinary purposes.

INFUSUM CARYOPHYLLI. U. S. *Infusion of Cloves*, made by

macerating one hundred and twenty grains in a pint of boiling water, is a warm and grateful stomachic, and is sometimes used to relieve nausea, flatulence, and other dyspeptic symptoms. Dose, f℥i–f℥ij.

Oleum Caryophylli. U. S. *Oil of Cloves*, obtained by distillation with water, is pale, reddish-brown, becoming darker by age, and heavier than water. As usually obtained, it consists of two oils, one heavier, the other lighter, than water, a mixture of the two forming the oil of commerce. Dose, 2 to 6 drops.

PIMENTA. U. S. *Pimento.*

The dried, unripe berries of *Eugenia Pimenta*, a tall and handsome evergreen tree, native of the West Indies, and growing abundantly in the Island of Jamaica, whence it is sometimes called *Jamaica Pepper.*

Properties and Uses. When dried the berries are round, rough, wrinkled, and umbilicated, rather larger than those of black pepper, of a brownish color, an aromatic, agreeable odor, resembling a mixture of cinnamon, cloves, and nutmeg (hence familiarly called *allspice*), and a warm, aromatic, pungent taste, like that of cloves. It is stimulant and carminative, but little used in medicine. Dose, from 10 to 40 grains.

Oleum Pimentæ. U. S. *Oil of Pimento* possesses the properties of the berries, and is given for the same purposes as the other aromatic oils. Dose, 3 to 6 drops.

PIPER. U. S. *Black Pepper.*

The dried, unripe berries of *Piper nigrum*, a perennial, climbing vine, native of various parts of the East Indies, but cultivated in tropical countries. The berries are gathered before they are quite ripe, and dried in the sun, and are known as *Black Pepper;* if permitted to ripen, and deprived of their outer coat by being soaked in water, they form the *White Pepper* of commerce.

Properties and Uses. The dried berries are about the size of a pea, nearly black, and shriveled, of a peculiar aromatic odor, and a hot, spicy, pungent taste. They impart their properties

to alcohol and ether, but only partially to water. They contain an acrid resin, a volatile oil, and a peculiar neutral crystalline principle, called *piperine*. This, when pure, is in white or yellowish-white, transparent, rhombic crystals, inodorous and tasteless, insoluble in cold water, slightly so in boiling water, and soluble in alcohol and ether.

Pepper is principally employed as a condiment, but has also been used in medicine as a warm carminative stimulant. Externally, ground pepper is irritant, and is occasionally added to sinapisms to increase their activity. Piperine has been recommended as an antiperiodic, but its powers are very feeble; it is an excellent adjuvant to quinia in persons of phlegmatic temperament, in whom there is sluggish circulation and feeble digestion.

Oleoresina Piperis. U. S. *Oleoresin of Black Pepper*, known as *oil of black pepper*, is a fluid extract made by evaporating the ethereal tincture. It contains the volatile oil and the resin, and represents the virtues of the fruit. Dose, 1 or 2 minims, given in emulsion or pill.

Piper Longum. The unripe fruit of *Piper longum*, a native of the East Indies and other tropical countries. They are cylindrical, an inch or more in length, of a dark-gray color, and possess the sensible and medicinal properties of the black pepper.

CUBEBA. U. S. *Cubebs.*

The dried, unripe berries of *Piper Cubeba*, a climbing perennial plant, native of Java and other parts of the East Indies.

Properties. In their appearance they resemble the common black pepper, with the exception of being lighter colored, and having a small portion of the peduncle attached to them, whence the name, *Piper Caudatum*. Within the cortical part, which is hard, there is a single, loose, round seed, with a black coat, whitish and oleaginous within. They have a strong, peculiar, aromatic odor, and a warm, pungent, camphoraceous, slightly bitter taste, leaving a sensation of coolness on the tongue. The powder is of a dark color, and has an oily appearance; they yield their virtues to alcohol, and only partially to water. They

contain a resin, a volatile oil, and *cubebin*, a substance which bears a close resemblance to piperine.

Medical Properties and Uses. Cubebs possess the stimulant and carminative properties of the other peppers; but they also exercise a specific influence on the urinary organs, indicated by their power in arresting urethral discharges. In gonorrhœa they prove eminently useful if administered in the earlier stages of the disease, and should be given in as large doses as the stomach can bear. They must be used with caution, as their improper use is apt to create irritation in the urinary passages, and to produce swelled testicles. In chronic bronchitis, and other pulmonary affections, they exercise a beneficial effect in checking the profuse secretion, and giving a gentle stimulus to the system. Dose of the powder in gonorrhœa, from 1 to 3 drachms, repeated three or four times a day; for other affections the dose may be reduced to 10 grains. The powder should be always prepared fresh for use, as it rapidly deteriorates, owing to the volatility of its oil.

Oleum Cubebæ. U. S. *Oil of Cubebs*, obtained by distillation, is transparent, and, when pure, light colored, and has the peculiar odor and taste of the berries. It is a good form of giving the medicine. Dose, 10 to 12 drops.

Oleoresina Cubebæ. U. S. *Oleoresin of Cubebs* is the ethereal fluid extract. Dose, 5 to 30 minims.

Tinctura Cubebæ. U. S. (four troyounces to two pints diluted alcohol). Dose, f℥ss to f℥ij, or more in gonorrhœa.

CARDAMOMUM. U. S. *Cardamom.*

The fruit of *Elettaria Cardamomum*, a perennial plant growing abundantly in the mountainous parts of the Malabar coast. The seed-pods are ovate-oblong, from three to ten lines long, obscurely triangular, rounded at the ends, longitudinally wrinkled, and of a buff color. These contain numerous small, angular, rough, reddish-brown seeds. There are three varieties recognized in commerce, called, according to their length, *shorts*, *short-longs*, and *longs*.

Properties and Uses. Cardamom seeds have an agreeable aromatic odor, and a warm, slightly pungent taste; they contain a

volatile and a fixed oil, coloring matter, etc. They are principally employed in medicine as a flavoring ingredient in various mixtures, and as a corrective of tonic and purgative medicines. Dose of powder, 5 to 20 grains.

Tinctura Cardamomi. U. S. *Tincture of Cardamom* (four troyounces to two pints of diluted alcohol).

Tinctura Cardamomi Composita. U. S. *Compound Tincture of Cardamom* (three hundred and sixty grains cardamom, one hundred and twenty grains of caraway, three hundred cinnamon, sixty grains cochineal, percolated with diluted alcohol until two pints and six ounces are obtained, and adding two ounces of clarified honey). Both of these tinctures are agreeable aromatic preparations, and are perhaps more used than any of the aromatic tinctures. Dose, f℥i–f℥ij.

ZINGIBER. U. S. *Ginger.*

The rhizoma of *Zingiber officinale*, native of the East Indies, but cultivated in all tropical countries. It is an annual plant, with a tuberous, knotty, creeping root or rhizoma, and a round, erect stem two or three feet high, inclosed in an imbricated, membranous sheathing. The fresh root is in various sized pieces, knotty, irregularly branched or lobed, of a light ash color externally, yellowish-white and fleshy internally. In the young state these roots are preserved in sugar, forming a well-known sweetmeat; when old they are taken up, scalded in hot water, and dried, in which state they constitute the ginger of commerce, or *Black Ginger;* if they are deprived of the epidermis by scraping, previous to being dried, they form the *White* or *Jamaica Ginger.*

Properties. Black ginger is of a dirty-gray color, and rugose externally, yellowish-brown and stringy within. White ginger is whitish or pale-yellow externally, pale-buff within, with a somewhat starchy texture. They have a peculiar, rich, aromatic odor, and a hot, pungent, and biting taste. The powder is of a light yellowish-brown color, and loses its properties on long exposure. Its virtues are extracted by water and alcohol, and depend upon a pale-yellow, volatile oil, a soft, acrid, resinous

matter; besides which, it contains gum, starch, and the usual vegetable constituents.

Medical Properties and Uses. Ginger is a powerful aromatic stimulant, increasing the tone of the digestive organs, and consequently is much employed as a condiment. In medicine it is principally employed to give warmth and tone to other medicines in atonic conditions of the stomach, and where there is flatulence and pain. Dose of the powder, 5 to 20 grains.

INFUSUM ZINGIBERIS. U. S. *Infusion of Ginger* is made by infusing half a troyounce of ginger in a pint of boiling water, and may be given in doses of f℥ij.

TINCTURA ZINGIBERIS. U. S. *Tincture of Ginger* (eight troyounces to two pints alcohol) is much employed as a carminative in flatulent colic, and is an excellent remedy in the hot summer season, when there is strong tendency to diarrhœa. It may also be beneficially added to tonic and purgative infusions or mixtures in debilitated states of the alimentary canal. Dose, f℥i.

EXTRACTUM ZINGIBERIS FLUIDUM. U. S. *Fluid Extract of Ginger* is a highly concentrated alcoholic solution of the active principles of ginger. Dose, 10 or 20 minims.

OLEORESINA ZINGIBERIS. U. S. *Oleoresin of Ginger.* Dose, 1 minim.

SYRUPUS ZINGIBERIS. U. S. *Syrup of Ginger* is prepared by mixing one part of tincture of ginger with seven parts of syrup. It is a convenient addition to mixtures, and is much used to impart flavor to drinks, particularly to carbonic acid water.

ASARUM. *U. S. Secondary. Wild Ginger, Canada Snakeroot.* The ROOT of *Asarum Canadense,* an indigenous plant. As found in the shops, the root is in long, more or less contorted, pieces, of the thickness of a pipe-stem or larger, brownish and wrinkled externally, whitish internally, hard and brittle, with a slightly bitter and aromatic taste. It imparts its virtues to diluted alcohol, and slightly to water. Its action is similar to that of serpentaria, and in the form of syrup it is an excellent remedy in obstinate colds and affections of the respiratory organs.

CALAMUS. *U. S. Secondary. Sweet Flag.* The RHIZOMA of *Acorus Calamus,* an indigenous plant, growing abundantly in swamps and along the borders of streams. The root should be dug up

late in the autumn and dried. As found in the shops, they are of various sizes; externally wrinkled, and of a yellowish-brown color; internally whitish, and of a spongy texture. It has a strong and fragrant odor, and a warm, bitterish, and pungent taste. Its active principles are taken up by boiling water. It possesses the ordinary properties of the aromatics, and is generally given in infusion, made in the proportion of an ounce of the root to a pint of boiling water.

FŒNICULUM. U. S. *Fennel.*

The FRUIT of *Fœniculum vulgare*, an umbelliferous plant, native of Europe, and cultivated in this country.

Properties and Uses. Fennel seeds are of a dark-brown color, with an agreeable aromatic odor, and a warm, sweetish, somewhat acrid, taste, which properties they owe to a volatile oil. Fennel is a warm aromatic stimulant, and may be employed for the same purposes as the aromatics.

OLEUM FŒNICULI. U. S. *Oil of Fennel* is colorless, or yellowish, with the odor and taste of the seeds. Dose, 5 to 15 drops.

AQUA FŒNICULI. U. S. *Fennel Water* is an agreeable vehicle for other medicines, and is useful when a mild aromatic is needed.

CARUM. U. S. *Caraway.*

The FRUIT of *Carum Carui*, a small biennial plant, native of Europe, but introduced into this country.

Properties and Uses. Caraway seeds are of a brownish color, with an aromatic odor, and a warm, spicy, somewhat bitter taste. It is an agreeable aromatic stimulant, and is much employed as a seasoning and flavoring agent.

OLEUM CARI. U. S. *Oil of Caraway* is much used to impart flavor to medicines, and to correct their nauseating and griping effects. Dose, 1 to 10 drops.

ANISUM. U. S. *Anise.*

The FRUIT of *Pimpinella Anisum*, a small, annual plant, native of Egypt and the Levant, but extensively cultivated in various parts of Europe.

Properties and Uses. The seeds, commonly called *aniseed*, are oval, about a line in length, striated, downy, of a yellowish-brown color; they have a peculiar, sweet, aromatic odor, and a warm, sweetish taste. Anise is an excellent carminative and stomachic, and as such is employed in flatulent colic, and in the diarrhœa of infants and children.

OLEUM ANISI. U. S. *Oil of Anise* is transparent, and nearly colorless, having a slight greenish-yellow tinge. Dose, 2 to 5 drops.

CORIANDRUM. U. S. *Coriander.*

The FRUIT of *Coriandrum sativum*, an annual plant, native of Europe.

Properties and Uses. The seeds are round, about the size of white pepper, finely ribbed, of a brownish-yellow color, with an agreeable aromatic odor, and a warm, peculiar taste, which depends upon a volatile oil. They possess the ordinary virtues of the aromatics, and are chiefly used as an adjunct to other medicines to cover their taste and render them more acceptable to the stomach.

The following substances belong to the natural order *Labiatæ* or *Lamiaceæ*. This order embraces numerous genera and species of herbaceous plants, having quadrangular stems, and opposite branches and leaves, studded with vesicles containing a highly aromatic essential oil. They are all destitute of any poisonous properties, and most of them are fragrant, and agreeable to the taste. They are much used as stimulants, cordials, carminatives, etc., and also as kitchen herbs for flavoring sauces.

LAVANDULA. U. S. *Lavender.*

The FLOWERS of *Lavandula vera*, a small, shrubby plant, native of Southern Europe, but extensively cultivated in this country. The flowers, which are in spikes, of a purple color, are gathered when in full bloom, and dried in the shade; they have a strong, fragrant odor, and an aromatic, warm, bitterish taste, which they impart to water and alcohol.

OLEUM LAVANDULÆ. U. S. *Oil of Lavender*, obtained by distillation from the flowers, is very fluid, of a lemon-yellow color, with the odor and taste of the flowers. Dose, 1 to 5 drops.

SPIRITUS LAVANDULÆ. U. S. *Spirit of Lavender*, made by distilling alcohol from the fresh flowers, or by dissolving the oil in alcohol, is used chiefly as a perfume, and as an ingredient of other mixtures.

SPIRITUS LAVANDULÆ COMPOSITUS. U. S. *Compound Spirit of Lavender* is prepared by percolating two troyounces of cinnamon, half a troyounce of cloves, a troyounce of nutmeg, and three hundred and sixty grains of red saunders, mixed together, with a mixture of six pints of alcohol and two pints of water, in which f℥i of oil of lavender and f℥ij of oil of rosemary have been dissolved, and adding diluted alcohol until the filtered liquid measures eight pints. This preparation is an excellent compound of spices, and is much used as an adjuvant and corrigent of other medicines, and as a remedy in flatulent colic and gastric uneasiness. Dose, f℥i.

ROSMARINUS. U. S. *Rosemary.*

The FLOWERING TOPS of *Rosmarinus officinalis*, a small evergreen shrub, native of Southern Europe, and cultivated in this country. The dried tops have a fragrant odor, and a pungent, bitter taste.

OLEUM ROSMARINI. U. S. *Oil of Rosemary* is limpid, colorless or amber-colored, with the odor and taste of the herb in an intense degree. It is frequently added to stimulating liniments, and much diluted (*aqua rosmarini*), is useful in preventing the hair falling off after fevers and debilitating diseases.

MENTHA PIPERITA. U. S. *Peppermint.*

The HERB of *Mentha piperita*, a European plant, naturalized, and growing wild in this country. The herb, both in the recent and dried state, has a peculiar, agreeable odor, and a pungent, somewhat bitter taste, followed by a marked sensation of coolness,

which properties it yields to alcohol and partly to water. It is, perhaps, the most used of all the aromatics to expel flatus, obviate nausea, relieve pain in the bowels, and to disguise the unpleasant taste of other medicines.

Oleum Menthæ Piperitæ. U. S. *Oil of Peppermint*, obtained by the usual process of distillation, is limpid and colorless, acquiring a greenish tint from age, with the odor and taste of the plant in an intense degree. Dose, 1 to 3 drops.

Spiritus Menthæ Piperitæ. U. S. *Spirit of Peppermint* is prepared by dissolving f℥i of the oil in f℥xv of alcohol, with one hundred and twenty grains of the powdered herb. The latter is added to impart color to the spirit. It affords a convenient method of administering the oil. Dose, 20 to 30 drops.

Aqua Menthæ Piperitæ. U. S. *Peppermint Water* is one of the most grateful and most commonly employed medicated waters, as a vehicle of medicines given in the form of mixture.

Mentha Viridis. U. S. The herb of *Mentha viridis, common garden mint*, also a European plant, extensively cultivated in this country. Its virtues and applications are the same as those of peppermint, but not so powerful. The officinal preparations, the *oil*, *water*, and *spirit*, are prepared in the same way as those of the preceding, and are often substituted for it.

Monarda. U. S. *Horsemint.* The herb of *Monarda punctata*, an indigenous herbaceous plant, is used for the same purposes as the other aromatic herbs. The oil, Oleum Monardæ, U. S., is powerfully rubefacient, quickly producing pain, redness, and vesication.

Cataria. U. S. *Catnep* or *Catmint.* The leaves of *Nepeta cataria*, a perennial, herbaceous plant, growing abundantly throughout the United States. The whole plant has a strong, peculiar odor, and a bitter, somewhat aromatic taste. It possesses the usual properties of the mints, and is much employed in domestic practice as a carminative and antispasmodic, in the form of infusion, especially in the colic of infants.

SALVIA. U. S. *Sage.*

The LEAVES of *Salvia officinalis, common garden sage*, a perennial, shrubby plant, indigenous to the South of Europe, but cultivated abundantly in this country. The leaves have a strong, fragrant odor, and a warm, bitterish, aromatic, somewhat astringent taste, which they owe to the presence of a volatile oil, which may be obtained by distillation. Sage is a stimulant tonic and astringent, principally employed as a condiment, but it is also used in medicine in the form of infusion.

INFUSUM SALVIÆ. U. S. *Infusion of Sage* (half a troyounce to a pint of boiling water) is much used, with honey and alum, as a mouth-wash in aphthous sore-throat, and as a gargle in inflammation of the throat and relaxation of the uvula. It is also sometimes employed as a drink in febrile diseases, or to allay nausea.

GAULTHERIA. U. S. *Partridge-berry.*

The LEAVES of *Gaultheria procumbens*, a small, indigenous, shrubby, evergreen plant, known as winter-green, deer-berry, etc.

It has a peculiar aromatic taste and odor, which depend upon a volatile oil.

OLEUM GAULTHERIA. U. S. *Oil of Gaultheria* is the heaviest of all the essential oils. It is colorless when freshly distilled, but becomes yellowish or brownish by age, has a peculiar pungent taste, and an agreeable, characteristic odor. It is chiefly used to cover the taste of other medicines.

HEDEOMA. U. S. *Pennyroyal.*

The HERB of *Hedeoma pulegioides*, an indigenous annual plant abounding in all parts of the United States, and possessing the sensible and medicinal properties of the aromatic herbs.

OLEUM HEDEOMÆ. U. S. *Oil of Pennyroyal* has a light-yellow color, with the odor and taste of the herb. It is used as a remedy in flatulent colic, and to flavor purgative and other medicines which tend to gripe or excite nausea. Emmenagogue vir-

tues are attributed to it, and it is much employed in domestic practice in amenorrhœa. Dose, from 2 to 10 drops.

MELISSA. *U. S. Secondary. Balm.* The HERB of *Melissa officinalis*, a European plant extensively cultivated in this country, and much used, in the form of infusion, as a domestic remedy in febrile complaints, and to promote the operation of diaphoretic medicines.

ORIGANUM. The HERB of *Origanum vulgare*, or *common marjoram*, a plant growing wild throughout the United States, possesses the properties of the other members of its class. The oil is a powerful irritant, and may be resorted to in cases in which a stimulant and rubefacient action upon the skin is required.

THYMUS. *Thyme.* The FLOWERING TOPS of *Thymus vulgaris*, a very common plant, indigenous to Southern Europe, and extensively cultivated as a kitchen herb, in our gardens. It has the aromatic properties of the other labiatæ, but is never used in medicine. The oil, OLEUM THYMI, U. S., is used as a local application, and is substituted for the oil of origanum, in connection with spirit and camphor as a mild irritant in chronic rheumatism, bruises, sprains, etc.

MINERAL TONICS.

These are more local in their general action than the vegetable tonics; they either operate more directly on the stomach, without their action being so quickly extended to the whole system, or they act by being received into the blood. Hence they produce less general excitement, and it is only from their continued administration that their tonic effect is obtained. They differ also in power and their adaptation to peculiar states of the system. They include those pertaining to the metals and the mineral acids.

FERRUM. U. S. *Iron.*

IRON is the most abundant and universally diffused of all the metals. It rarely occurs native, but is found in almost all parts

of the world as an oxide or sulphuret, and in saline combination Its physical properties are too well known to require descriptio here. In its metallic state it is probably inert, but when administered in a finely divided state it readily oxidizes in the stomach, and thereby acquires medicinal activity. Its preparations, called *chalybeates*, are capable of being absorbed, and are among the most important tonics, well adapted to improve the condition of the blood when impoverished from any cause. Under their use the appetite is increased, the digestion improved, the pulse increased in frequency and fullness, and the general health improved. That iron is absorbed, is shown by its detection in the various secretions, and it is now an established fact that it acts entirely through and upon the blood, which it improves by increasing the quality and quantity of the blood corpuscles. Iron is an essential constituent of the red coloring matter of the blood, *called hæmatosin*, and the existence of the proper amount of this substance is of vital importance. When it is diminished in quantity, the number of these red globules is lessened in the same proportion, and there follows as a consequence anæmia: a condition characterized by a paleness of the tissues, an inactivity of the muscular fibre, and impairment of all the animal functions, accompanied by general languor and debility of the whole frame. In these cases, iron, in some form or other, is the appropriate remedy, restoring to the blood this wanting *hæmatosin ;* and it often cures other diseases in which anæmia is a prominent symptom, as amenorrhœa, menorrhagia, and other menstrual derangements ; chronic affections of the nervous system, as chorea, epilepsy, etc.; and various diseases of the digestive organs, neuralgia, etc. It has also been used with benefit in diseases of an intermittent or remittent type, in chronic enlargements of the liver and spleen, in cancer, etc. The employment of the ferruginous preparations is contraindicated in plethoric conditions, and where there is a tendency to inflammation or active hemorrhage, and in the sanguine temperament generally. The following are the preparations most generally resorted to in practice:

FERRUM REDACTUM. U. S. *Reduced Iron.*

Ferri Pulvis. *Powder of Iron*, sometimes called *Quevenne's Iron*, is obtained by passing a stream of hydrogen gas over the calcined sesquioxide of iron heated to redness. In this process the hydrogen unites with the oxygen of the oxide, forming water, and leaves the iron in its metallic state.

Properties and Uses. It is a light, inodorous, and tasteless impalpable powder, of a steel-gray color, readily oxidized on expo sure to the air. It possesses all the properties of the ferruginous preparations without any astringency, which renders it a valuable chalybeate for children and persons of delicate stomachs. It sometimes gives rise to disagreeable eructations. Dose, 2 to 5 grains. It may be given in the form of pill or powder, or bonbons made with chocolate.

Ferri Ramenta. *Iron filings*, obtained by filing pure and soft iron, were formerly much employed, but are now entirely superseded by the powdered iron, which has the advantage of greater purity, and more ready solubility in the juices of the stomach.

FERRI OXIDUM HYDRATUM. U. S. *Hydrated Sesquioxide of Iron.*

This is obtained by adding ammonia to the officinal solution of tersulphate of iron, when the sesquioxide is thrown down combined with water. Fe_2O_3+2HO.

Properties and Uses. It is a soft, reddish-brown magma, and, owing to its proneness to decomposition, it should be kept under water, or prepared as wanted for use. It is used principally as an antidote for poisoning by arsenious acid, which it converts into the insoluble and inert arseniate of iron. It should be given in doses of a tablespoonful every five or ten minutes The quantity required to neutralize the poisonous property of arsenic is at least twelve parts to one of the poison.

FERRI SUBCARBONAS. U. S. *Subcarbonate of Iron.*

Precipitated Carbonate of Iron is obtained by precipitating a solution of sulphate of iron by carbonate of soda, washing and drying the precipitate on bibulous paper without heat. The precipitate when first formed is a carbonate of the protoxide of iron, and is of a whitish or bluish-white color, but by washing and drying becomes almost entirely converted into a sesquioxide by absorbing oxygen and by the loss of carbonic acid. The officinal subcarbonate is then the anhydrous sesquioxide of iron mixed probably with a very small amount of the carbonate of the protoxide.

Properties and Uses. It is a reddish-brown powder, of a disagreeable taste, insoluble in water, but soluble in muriatic acid with slight effervescence. It possesses all the properties of the chalybeate salts, and from its mildness may be given in large quantities without any unpleasant consequences. It is principally used in the treatment of neuralgic affections, particularly tic douloureux. Dose, 5 to 30 grains.

Pilulæ Ferri Carbonatis. U. S. *Pills of Carbonate of Iron. Vallet's mass* is made by incorporating freshly precipitated carbonate of the protoxide of iron with sugar and honey, to protect it from oxidation, and preserve it in the form of protocarbonate. It is in the form of a soft, pilular mass, of a dark-greenish color, and a strong ferruginous taste. It is one of the most valuable of the chalybeates on account of the facility with which it is absorbed. Dose, 5 to 10 grains.

Mistura Ferri Compositæ. U. S. *Compound Mixture of Iron*, commonly known as *Griffith's antihectic mixture*, is made by triturating together twenty-five grains of carbonate of potassa, and sixty grains, each, of myrrh and sugar, with f℥vijss of rose-water, and f℥ss of spirit of lavender, and adding twenty grains of sulphate of iron. In this process the carbonate of the protoxide of iron is formed by the reaction between the sulphate of iron and the alkaline carbonate, while the excess of the carbonate forms with the myrrh a saponaceous compound, which holds the iron in suspension. The solution is of a greenish color, which it loses on

exposure, owing to the decomposition of the protocarbonate. It is an excellent chalybeate, and well adapted to the debility of phthisis, and in anæmia accompanying derangement of the menstrual functions. Dose, a tablespoonful or more.

Pilulæ Ferri Compositæ. U. S. *Compound Pills of Iron* are prepared by thoroughly mixing one hundred and twenty grains of myrrh, and sixty grains, each, of carbonate of soda and sulphate of iron, with sugar to form a pilular mass, and dividing into eighty pills. They are closely analogous in composition and properties to the preceding preparation.

FERRI SULPHAS. U. S. *Sulphate of Iron.*

This salt, known in commerce as *Copperas* or *Green Vitriol*, is prepared by dissolving iron wire in diluted sulphuric acid. The oxygen of the water converts the metal of the sulphate into the protoxide, with which the sulphuric acid unites, while hydrogen gas is evolved. Composition, FeO,SO_3+7HO.

Properties. When pure, sulphate of iron is in light, bluish-green rhomboidal prisms, having an astringent styptic taste. It is soluble in about two parts of cold, and in three-fourths of its weight of boiling, water, but is insoluble in alcohol; it effloresces slightly in dry air, and on exposure to moisture, absorbs oxygen, and becomes covered with a brownish-yellow persalt.

Medical Properties and Uses. In small doses it acts as a tonic and astringent; in large doses as a local irritant to the stomach and bowels, causing nausea, vomiting, and purging; and in excessive doses it is an irritant poison. It is employed in passive hemorrhages, in chronic diarrhœa and dysentery, and in atonic mucous discharges. In amenorrhœa with deficient action, it may be advantageously combined with aloes, and the fetid and stimulant gums. When the long-continued use of the ferruginous compounds is required, it is not so well adapted as some of the other preparations, on account of its local action on the alimentary canal. As a topical remedy it may be used to check bleeding from small vessels, and in solution as an astringent lotion or injection to ulcers, and in chronic discharges from mucous membranes. It is one of the cheapest and best of dis-

infectants, especially when mixed with lime. Dose, 1 or 2 grains in pill. Solution is an objectionable form, as the sulphate is decomposed by the absorption of oxygen.

Ferri Sulphas Exsiccata. U. S. *Dried Sulphate of Iron* is prepared by driving off six equivalents of the water of crystallization, by exposing the sulphate to a heat not exceeding 300°. FeO,SO_3+HO. It is used for making pills; the crystallized sulphate not being adapted for this purpose. Three grains equivalent to five of the crystallized salt.

LIQUOR FERRI TERSULPHATIS. U. S. *Solution of Tersulphate of Iron.*

This preparation is made by converting the sulphate of the protoxide into the tersulphate of the sesquioxide. This is effected by gradually adding twelve troyounces of the sulphate to a heated mixture of two troyounces and sixty grains of sulphuric acid, and a troyounce and three hundred and sixty grains of nitric acid, diluted with a pint and a half of water. In this process the nitric acid is decomposed, nitric oxide escaping, and the oxygen uniting with the protoxide of iron to convert it into the sesquioxide, while the additional sulphuric acid is added for the complete saturation of the resulting sesquioxide. Composition, $Fe_2O_3.3SO_3$, in solution, in water.

Properties and Uses. It is a dark-red, inodorous liquid, of an acid and astringent taste, miscible in all proportions with water and alcohol. It is chiefly used for the extemporaneous preparation of the hydrated sesquioxide of iron,—the antidote for arsenical poisoning.

Liquor Ferri Subsulphatis. U. S. *Solution of Subsulphate of Iron. Solution of Persulphate of Iron,* also known as *Monsel's solution,* is prepared in the same way as the preceding, only adding one-half the quantity of sulphuric acid. The protoxide of iron is sesquioxidized at the expense of the nitric acid, but the sulphuric acid is in quantity insufficient to fully neutralize the sesquioxide; a subsalt therefore results, with the composition $2Fe_2O_3,5SO_3$.

Properties and Uses. This solution is an inodorous, syrupy

liquid, of a ruby-red color, and of an extremely astringent taste, without acridity. By evaporation at a moderate heat it yields the subsulphate of the sesquioxide, in the form of a light, reddish-brown powder, deliquescent, and readily soluble in water and alcohol. The solution is a powerful astringent, without any irritant properties. It has been used internally, in doses of from 5 to 10 drops, with great benefit in hemorrhages from the stomach and bowels. As an external styptic it is perhaps more effectual than any we possess, and is well adapted to arrest hemorrhage from incised wounds, and from hemorrhoids, where it is desirable to avoid irritation.

FERRI ET AMMONIÆ SULPHAS. U. S. *Sulphate of Iron and Ammonia. Ammonio-ferric Alum* is obtained by heating a solution of the tersulphate of iron with sulphate of ammonia until the latter salt is dissolved, when the two salts unite to form the double salt. $Fe_2O_3,3SO_3+NH_4O,SO_3+24HO$.

Properties and Uses. It is in octahedral crystals, of a pale-violet color, and sour astringent taste, efflorescent on exposure, and soluble in water. It is astringent and tonic, and has been used in cases requiring a combined tonic and astringent treatment. Dose, 3 to 5 grains.

FERRI CHLORIDUM. U. S. *Chloride of Iron.*

This salt is procured by heating metallic iron, in the form of wire, with muriatic acid, and afterward treating it with muriatic and nitric acids, till red fumes are no longer evolved. By the action of muriatic acid upon the iron a protochloride results, which is converted into a sesquichloride by the action of the nitric acid. The nitric acid is decomposed, yielding two eqs. of oxygen to two eqs. of the hydrochloric acid, thus forming water, and setting free two eqs. of chlorine, which unite with the iron, converting the protochloride into a sesquichloride. Fe_2Cl_3 with a variable proportion of water.

Properties and Uses. It is in orange-yellow crystalline masses, very deliquescent, inodorous, and of a strong styptic and ferruginous taste; wholly soluble in water, alcohol, and ether. Internally, it is used almost exclusively in the form of tincture;

externally, it is used in watery solution as a styptic for arresting hemorrhage from small vessels, and as an astringent wash.

Tinctura Ferri Chloridi. U. S. *Tincture of Chloride of Iron. Tincture of Muriate of Iron*, as it is commonly called, is prepared by heating three troyounces of iron wire with eleven troyounces of muriatic acid till effervescence ceases, and the acid is saturated; the solution is then filtered, and heated to the boiling point, with six and a half troyounces of muriatic acid, and treated with nitric acid, gradually added, till effervescence ceases; water is then added to make the liquid measure a pint, and afterward three pints of alcohol. The reactions which take place are the same as in the preceding preparation; the alcohol reacts gradually with the acid, producing a small amount of muriatic ether, which gives a peculiar flavor to the tincture, and probably modifies its influence on the system.

Properties and Uses. It is of a reddish-brown color, with an ethereal odor, and a very acid styptic taste. It is one of the most powerful and certain preparations of iron. Besides the tonic properties which it possesses in common with the other compounds, it is an energetic astringent and styptic, and in large doses acts as an irritant. It appears also to possess diuretic properties, which render it highly useful in diseases of the urino-genital organs, as gleet, chronic gonorrhœa, vesical catarrh, and in chronic hemorrhages from the kidneys and bladder. It is also employed with great success in the treatment of erysipelas, purpura hemorrhagica, and other diseases in which the blood is poisoned, and the symptoms are of a malignant type. Dose in ordinary cases, 10 to 20 drops three times a day; in erysipelas, etc. it may be repeated much oftener.

FERRI IODIDUM. *Iodide of Iron.*

This compound is prepared by gradually adding iron filings to a solution of iodine in distilled water, and gently heating, filtering, and evaporating the mixture. It is a deliquescent, crystalline substance, of a greenish-black color, and styptic chalybeate taste. Owing to the strong affinity of iron for oxygen, and the liability of the iodide to be decomposed on exposure to the air,

it is only employed in combination with saccharine matter, which protects it from change.

Syrupus Ferri Iodidi. U. S. *Syrup of Iodide of Iron* is prepared by adding sufficient syrup to the filtered solution of the iodide (made by digesting two troyounces of iodine and three hundred grains of iron wire in three fluidounces of water) to make the whole measure twenty fluidounces. FeI.

Properties and Uses. It is of a clear, pale-green color, and, if pure, deposits no sediment by keeping, and does not tinge solution of starch blue; mixed with sulphuric acid, it becomes brown, and the mixture emits violet vapors when heated. It combines the alterative effects of iodine with the tonic powers of iron, and is applicable to the treatment of scrofulous diseases in anemic patients. Dose, 20 to 40 minims.

Pilulæ Ferri Iodidi. U. S. *Pills of Iodide of Iron* are prepared by mixing the recently prepared iodide of iron with sugar and reduced iron, to protect it from the oxidizing influence of the air, and adding marshmallow and gum, to give consistency to the mass. Each pill contains about one grain of iodide of iron and one-half of a grain of reduced iron.

FERRI ET POTASSE TARTRAS. *Tartrate of Iron and Potassa.*

Tartarated Iron is obtained by gradually adding the recently prepared hydrated sesquioxide of iron to a solution of the bitartrate of potassa, heated to 140°; filtering, evaporating to a syrupy consistence, and spreading upon plates of glass or porcelain to dry. In this process the excess of acid in the bitartrate combines with the sesquioxide of iron, forming a neutral double salt. $Fe_2O_3,C_4H_2O_5+KO,C_4H_2O_5+HO$.

Properties and Uses. As thus obtained, it is in transparent, ruby-red scales, without odor, and with a sweetish, slightly ferruginous taste, wholly soluble in water. From its mild taste and ready solubility it is one of the best forms of giving the metal to children and persons of delicate stomachs. Dose, 10 to 30 grains.

FERRI ET AMMONIÆ TARTRAS. U. S. *Tartrate of Iron and Ammonia.*

Ammonio-tartrate of Iron. To prepare this salt the tartrate of ammonia is first prepared by saturating a solution of tartaric acid with carbonate of ammonia, and this is then converted into a bitartrate by the addition of tartaric acid. The recently prepared hydrated oxide of iron added to this solution gives the double salt. $Fe_2O_3,C_4O_2O_5+NH_4O,C_4H_2O_5$.

Properties and Uses. It is in garnet-red scales, with a sweetish taste, very soluble in water, but insoluble in alcohol and ether. It is a mild chalybeate, without astringency, and may be given in doses of from 10 to 30 grains.

FERRI PHOSPHAS. U. S. *Phosphate of Iron.*

This salt is formed by double decomposition between solutions of sulphate of iron and phosphate of soda. $2FeO,HO,PO_5$.

Properties and Uses. It is in the form of a powder, of a pale-blue color, insoluble in water, but soluble in the diluted acids. It possesses the general properties of the ferruginous preparations. Dose, 5 to 10 grains.

FERRI PYROPHOSPHAS. U. S. *Pyrophosphate of Iron* is made by precipitating a solution of the tersulphate of iron with the pyrophosphate of soda, and dissolving the gelatinous precipitate in a solution of the citrate of ammonia (formed by the direct union of its elements), and evaporating the solution till of suitable consistence to be spread on plates of glass to dry. It is in thin and brittle scales, of an apple-green color, and an acidulous, somewhat saline taste, freely soluble in water. It contains about 48 per cent. of anhydrous pyrophosphate of iron. It is a very good chalybeate, without any disagreeable taste, and from its ready solubility may be administered in any form that may be desirable. It is well adapted to those delicate conditions of the system in which iron is so often indicated. Dose, 2 to 5 grains.

The phosphates of iron are sometimes administered with other phosphates in the form of syrup, and several preparations of this kind have been introduced by different pharmaceutists, and are

used extensively in the treatment of various diseases requiring tonic treatment. The *syrup of the phosphates of iron, quinia, and strychnia*, prepared according to Prof. Aitken's formula, contains in each drachm two grains of phosphate of iron, one grain of phosphate of quinia, and one-thirty-second of a grain of phosphate of strychnia; it is an admirable general tonic, well adapted for certain chlorotic and anemic states.

LIQUOR FERRI NITRATIS. U. S. *Solution of Nitrate of Iron.*

This is a solution of the pernitrate of iron, $Fe_2O_3,3NO_5$, in water. It is prepared by dissolving iron wire in nitric acid, and diluting with water. The liquid has a pale-amber color, with a sp. gr. 1·060, and a strong astringent taste.

Medical Uses. It is astringent and tonic, and is a safe and efficient remedy in diarrhœa, dysentery, and in exhausting hemorrhage from the lungs, uterus, or kidneys. The dose is 7 or 8 drops, gradually increased to 15, sufficiently diluted with water.

FERRI CITRAS. U. S. *Citrate of Iron.*

This salt is prepared by saturating a solution of citric acid with the recently prepared hydrated oxide of iron, evaporating to the consistence of syrup, and spreading on glass to dry. $Fe_2O_3,C_{12}H_5O_{11}$.

Properties and Uses. It is in thin, transparent scales, of a garnet-red color, slightly soluble in cold water, and of a mild ferruginous taste. It is a pleasant chalybeate, best given in solution. Dose, 5 to 10 grains.

Liquor Ferri Citratis. U. S. *Solution of Citrate of Iron* is a concentrated solution (each fluidounce contains half a troy-ounce of citrate of iron). It has a deep reddish-brown color, and slight, not unpleasant, ferruginous taste, and may be given for the same purposes as the other preparations. Dose, 10 minims, equivalent to 5 grains of the salt.

Ferri et Ammoniæ Citras. U. S. *Citrate of Iron and Ammonia. Ammonio-citrate of Iron* is prepared by neutralizing the acid citrate in solution with water of ammonia and evaporating the solution. It is a double salt (consisting of one

equivalent of each of its ingredients), and dissolves much more readily in cold water than the citrate. It is applicable to the strumous affections of children, and to invalids of delicate stomachs. Dose, 5 grains.

FERRI ET QUINIÆ CITRAS. U. S. *Citrate of Iron and Quinine* is obtained by adding quinia (prepared by precipitation from the sulphate by ammonia) to a solution of the acid citrate of iron, evaporating, and drying the mixed salt in the usual way; five grains contain about one grain of quinia. It is in scales of a greenish golden-yellow color, of a bitter and chalybeate taste, deliquescent, and soluble in water. This salt combines the virtues of the two bases, and may be given in all cases in which they are indicated; it is admirably adapted for children and delicate females, being easily borne when the stronger salts of iron are inadmissible Dose, 5 to 10 grains.

FERRI ET STRYCHNIÆ CITRAS. *Citrate of Iron and Strychnia* is best obtained by dissolving nine hundred and eighty grains of citrate of iron in nine ounces of water, and mixing the solution with ten grains of citric acid and ten grains of strychnia in one ounce of water, evaporating and drying in the usual manner. The salt thus prepared contains 1 per cent. of strychnia, and possesses the combined properties of iron and strychnia. It has been successfully used in cases of paralysis, chorea, and amenorrhœa; five grains contain one-twentieth of a grain of strychnia.

FERRI FERROCYANIDUM. U. S. *Ferrocyanide of Iron.*

This salt, known as *Prussian Blue*, is obtained by double decomposition between solutions of ferrocyanide of potassium and tersulphate of iron.

Properties and Uses. It is of a rich blue color, inodorous and tasteless, insoluble in water and alcohol. Owing to the cyanogen which it contains, this salt is thought to possess sedative properties, in addition to its chalybeate powers, and has been recommended in intermittent and remittent fever, and in neuralgic affections. Dose, 3 to 5 grains gradually increased.

FERRI LACTAS. U. S. *Lactate of Iron.*

This preparation is obtained by digesting iron filings in lactic acid, filtering, and evaporating the solution.

Properties and Uses. It is in greenish-white crystalline crusts or grains, of a mild, sweetish, ferruginous taste, soluble in forty-eight parts of cold, and twelve of boiling water, but insoluble in alcohol. It is a mild and efficient chalybeate, and is said to have also the property of greatly increasing the appetite. Dose, 10 to 20 grains daily, in divided doses.

Besides the preceding officinal preparations of iron, various other combinations have, from time to time, been introduced and recommended in the practice of medicine. The following are among the most important:

FERRI ACETAS. *Acetate of Iron*, prepared by digesting the hydrated sesquioxide in acetic acid, is an agreeable, mild chalybeate, and is much used in Europe in the form of solution.

FERRI ARSENIAS. *Arseniate of Iron* is prepared by mixing a solution of arseniate and acetate of soda with one of sulphate of iron, when the salt is deposited. $3FeO,AsO_5$. It is an amorphous, greenish-white powder, without smell or taste. It is supposed to possess the combined properties of iron and arsenic, and is used chiefly in skin diseases accompanied by anæmia. Dose, $\frac{1}{20}$ to $\frac{1}{10}$ of a grain, in pill.

FERRI BROMIDUM. *Bromide of Iron* is obtained by heating bromine and iron filings together in water. It is a very deliquescent salt, of a brick-red color, and of a very disagreeable, styptic taste, and, like the iodide, is best given in combination with syrup. It acts as a tonic and resolvent, and may be used for the same purposes as the iodide. Dose of the syrup, 20 minims three times a day.

FERRI OXALAS. *Oxalate of Iron* is obtained by mixing solutions of sulphate of iron and oxalic acid. It is of a beautiful yellow color, odorless, and almost tasteless, insoluble in water. It produces all the effects of the ferruginous preparations; its entire want of astringency renders it an excellent form to introduce iron into the system. Dose, 2 or 3 grains three times a day.

FERRI VALERIANAS. U. S. *Valerianate of Iron* is prepared by double decomposition between sulphate of iron and valerianate of soda. It is a reddish-brown powder with an intense odor of valerian, and with but little taste. It is recommended in hysterical affections with chlorosis. Dose, 1 grain repeated several times a day.

CUPRUM. *Copper.*

COPPER in its pure metallic state is inert, but in combination forms important medicines. Its preparations in small doses are tonic and antispasmodic; in larger or full medicinal doses, emetic; and in still larger quantities, poisonous, giving rise to gastro-intestinal irritation and disorder of the nervous system. Their long-continued use, even in small doses, produces slow or chronic poisoning, indicated by chronic derangements of the digestive organs, various affections of the nervous system, slow fever, and wasting of the body. The best antidote for poisoning by the cupreous compounds is albumen, as white of eggs, milk, or wheaten flour. The ferrocyanide of potassium, given freely, also neutralizes the poison by forming the insoluble ferrocyanide of copper.

CUPRI SULPHAS. U. S. *Sulphate of Copper.*

This salt, commonly known as *Blue Vitriol* or *Blue Stone*, may be obtained by evaporating the waters which flow through copper mines, and which hold it in solution; or by roasting the native sulphuret (copper pyrites) in a reverberatory furnace, lixiviating, and evaporating the solution; or by dissolving copper wire in diluted sulphuric acid. For medicinal purposes it is dissolved, filtered, and crystallized. CuO,SO_3+5HO.

Properties. It is in semi-transparent, rhomboidal crystals, of a rich, deep-blue color, effervescing on exposure to the air, without odor, and of a harsh, styptic, metallic taste. It is soluble in four parts of cold and two parts of boiling water, and insoluble in alcohol.

Medical Properties and Uses. In small and repeated doses (one-fourth to one grain) it acts as a general tonic and astringent; in larger doses (three to ten grains) it proves a prompt and

powerful emetic, acting without producing much nausea or depression of the system; and in large doses it is a powerful, irritant poison. In chronic diarrhœa and dysentery, combined with opium, it proves highly serviceable, and often succeeds in checking the discharges when the ordinary vegetable astringents fail. In chorea, epilepsy, and other spasmodic diseases, in small and gradually increasing doses, it has been found useful, and it has also been given in intermittent diseases. As an emetic it is used whenever speedy vomiting is desired, as in cases of narcotic poisoning, etc. Externally, it is applied in substance as an escharotic, to destroy unhealthy or excessive granulations, and as a styptic to bleeding surfaces; in solution, as a wash to weak, irritable, and indolent ulcers; and as an injection in chronic mucous discharges from the vagina or urethra. The solutions for external use vary in strength in different cases, from two to ten grains to the ounce of water.

CUPRUM AMMONIATUM. U. S. *Ammoniated Copper.*

Ammonio-Sulphate of Copper is prepared by rubbing together in a glass mortar half a troyounce of sulphate of copper and three hundred and sixty grains of carbonate of ammonia until effervescence ceases, and drying with a gentle heat. When the two salts are rubbed together a reaction takes place between them, with the extrication of the water of crystallization of the sulphate of copper, and the carbonic acid of the ammonia, and the formation of the compound salt. CuO,SO_3+2NH_3,HO.

Properties. As usually met with, this preparation is in powder or prismatic crystals, of a fine, azure-blue color, with an ammoniacal odor, and a styptic, metallic taste. It is soluble in water; and on exposure to the air parts with its ammonia, leaving behind a green powder, composed of sulphate of ammonia and carbonate of copper.

Medical Properties and Uses. It is tonic and astringent, producing effects similar to those of the sulphate, and appears also to exercise an antispasmodic influence over the nervous system. It is principally used in the treatment of epilepsy, chorea, and other spasmodic affections, and is often productive of benefit when these

diseases occur in debilitated constitutions, and are not associated with organic disease. Dose, $\frac{1}{4}$ of a grain, gradually increased to 5 grains.

CUPRI SUBACETAS. U. S. *Subacetate of Copper.*

This preparation, known in commerce as *Verdigris*, is manufactured on a large scale by exposing copper plates to the action of the fermenting refuse of the wine-press, or to pyroligneous acid.

Properties and Uses. It occurs in powder, or amorphous masses of a beautiful bluish-green color, with a disagreeable acetous odor, and a styptic, metallic taste. It is a powerful irritant poison, never given internally. It is sometimes applied externally as a caustic to indolent ulcers, to venereal warts, and to fungous growths.

Cupri Nitras. *Nitrate of Copper* is obtained by dissolving copper, its oxide or carbonate, in nitric acid. Composition, $CuO\,NO_5+3HO$. It crystallizes in deep-blue prisms, which are deliquescent, and soluble in alcohol. It is a powerful caustic and escharotic, and has been used successfully in substance or concentrated solution in inflammation and ulceration of the throat and tongue, in syphilis, etc.

ARGENTUM. U. S. *Silver.*

Metallic Silver is wholly inert, but is of great value as the basis of several officinal preparations. It is sometimes found native, or alloyed with other metals, or combined with sulphur, iodine, or chlorine.

ARGENTI NITRAS. U. S. *Nitrate of Silver.*

This salt is obtained by dissolving silver in nitric acid, evaporating the solution, and crystallizing. During the solution part of the acid is decomposed into nitric oxide (which is given off), and oxygen, which oxidizes the silver; the oxide formed then combines with the remainder of the acid and generates the nitrate of silver. AgO,NO_5.

Properties. It crystallizes in colorless, transparent, right rhombic prisms, with a strong metallic and bitter taste. It is soluble in its own weight of water, and in four parts of boiling alcohol; it does not deliquesce, but on exposure to air and light blackens, owing to the action of organic matters contained in the atmosphere. It fuses at 426°, and on concreting constitutes the ARGENTI NITRAS FUSA, U. S., described under the head of caustics; at 600° it is decomposed.

Medical Properties and Uses. This salt, in small and frequently repeated doses, acts as a tonic, antispasmodic, and sedative; in large doses it is a corrosive poison. It is said that its long-continued use, in small doses, occasionally communicates a peculiar blue appearance to the skin. As a tonic it is useful in chronic affections of the stomach, particularly where there is morbid sensibility of the gastric and intestinal nerves. In these cases it seems to lessen the sensibility of the nerves, and to render them insusceptible of irritation. In chronic diarrhœa, when astringents have failed, it often proves effectual, and, in addition to checking the discharges, appears to alter the general assimilative functions. It has also been employed, and with benefit, in the diarrhœa of phthisis, and in acute and chronic dysentery. In the treatment of epilepsy and chorea, it perhaps holds the highest rank among the mineral tonics, but to be of benefit it should be continued for a long time. Dose, $\frac{1}{6}$ of a grain to 2 grains. In cases of poisoning the proper antidote is common salt, which acts by converting the poison into the very insoluble chloride of silver.

ARGENTI OXIDUM. U. S. *Oxide of Silver.*

This oxide is obtained by decomposing the nitrate of silver by potassa or lime, and drying the precipitate. AgO.

Properties and Uses. It is an olive-brown powder, very slightly soluble in water, but soluble in acids. Exposed to heat it gives off oxygen, and is converted into metallic silver. Its medicinal properties are similar to, but milder than, those of the nitrate, and it may be used for the same purposes. Dose, $\frac{1}{2}$ to 2 grains.

ARGENTI CYANIDUM. U. S. *Cyanide of Silver.*

This compound is prepared by distilling into a solution of the nitrate of silver, a solution of ferrocyanide of potassium in diluted sulphuric acid. In this process the silver of the nitrate is converted into the cyanide by hydrocyanic acid, extricated from the ferrocyanide of potassium by the action of sulphuric acid. It consists of one equivalent of cyanogen and one of silver.

Properties and Uses. It is a tasteless white powder, insoluble in water, and is only used in medicine in the extemporaneous preparation of diluted hydrocyanic acid.

ARGENTI CHLORIDUM. *Chloride of Silver*, prepared by adding a solution of common salt to a solution of nitrate of silver, has been recommended as an alterative in epilepsy, in scrofulous and syphilitic diseases, in doses of from $\frac{1}{2}$ of a grain to 1 grain.

ZINCUM. U. S. *Zinc.*

ZINC occurs only in the mineral kingdom, and is found in the form of oxide, of sulphuret, or in saline combination. In its metallic state it is inert, but in combination forms preparations which possess medicinal properties similar to, but less energetic than, those of copper.

ZINCI SULPHAS. U. S. *Sulphate of Zinc.*

This salt, known in its impure state as *White Vitriol*, is obtained by dissolving zinc in diluted sulphuric acid. In this process, water is decomposed, the hydrogen escapes, while the oxygen unites with the zinc to form oxide of zinc, which combines with the sulphuric acid and forms the sulphate. ZnO,SO_3+7HO.

Properties. When pure it is in small, transparent, colorless, rhombic prisms, resembling crystals of sulphate of magnesia, without odor, and of a disagreeable styptic metallic taste. It effloresces slightly on exposure, and is very soluble in water, but insoluble in alcohol. It is incompatible with the alkalies and their carbonates, earths, acetate of lead, nitrate of silver, and astringent vegetable infusions.

Medical Properties and Uses. In small and repeated doses it is tonic and astringent, and when persevered in for a long time it appears to act also as an antispasmodic. In larger doses it proves a prompt and powerful emetic, producing but little nausea and subsequent depression. In excessive doses it is an irritant poison. As a tonic and antispasmodic it proves highly serviceable in chorea, epilepsy, hooping-cough, and other spasmodic diseases. As an astringent it may be beneficially employed in chronic diarrhœa and dysentery, and in excessive secretion from the bronchial tubes. As an emetic it is much used in narcotic poisoning, and is applicable to any case in which we wish a single but complete evacuation of the contents of the stomach. Externally, it is employed in solution as a collyrium in chronic ophthalmia; as a lotion in some chronic skin diseases; as a wash in old ulcers attended with profuse discharge or with loose flabby granulations; and as an injection in the advanced stages of gonorrhœa, gleet, and leucorrhœa. Dose as a tonic, 1 grain, gradually increased; as an emetic, from 10 to 30 grains. For external use, the solutions are of various strengths; generally from one to twenty grains to the ounce of water.

ZINCI ACETAS. U. S. *Acetate of Zinc.*

This salt is prepared by double decomposition between solutions of acetate of lead and sulphate of zinc, or by dissolving the carbonate or oxide in acetic acid. $ZnO,C_4H_3O_3,+2HO$.

Properties and Uses. It is in thin, transparent, colorless, crystalline plates, with an astringent metallic taste. It effloresces in dry air, is very soluble in water, and moderately so in alcohol. In its medicinal effects it resembles the sulphate, but is seldom employed as an internal remedy. Externally, it is used as a collyrium in ophthalmia, and as an injection in gonorrhœa. The strength of the solution is one or two grains to the ounce.

ZINCI OXIDUM. U. S. *Oxide of Zinc.*

This is prepared by exposing the carbonate to a low red heat, until the water and carbonic acid are wholly expelled. It may

also be obtained by the combustion of the metal, and when thus prepared was formerly called *flowers of zinc, nihil album,* etc. Composition, ZnO.

Properties. It is a white, inodorous, and tasteless powder, insoluble both in water and alcohol. It dissolves readily in acids without effervescence, and in alkalies. The commercial oxide is sometimes adulterated with starch, chalk, and the carbonate of zinc, which may be easily detected. The impure oxide, known as *tutty,* is formed during the smelting of lead ores containing zinc; it has a bluish cast, from the presence of metallic zinc.

Medical Properties and Uses. The oxide of zinc possesses feeble tonic and antispasmodic properties, and has been used in epilepsy, chorea, and other spasmodic diseases. It is also recommended as a remedy in the night-sweats of phthisis and other exhausting diseases. Externally, it is a mild absorbent and desiccant, and is used as a dusting powder to excoriated surfaces, or in the form of ointment to chronic diseases of the skin attended with profuse secretion.

Unguentum Zinci Oxidi. U. S. *Ointment of Oxide of Zinc* is prepared by mixing eighty grains of the pure oxide with a troyounce of simple ointment.

ZINCI CARBONAS PRÆCIPITATA. U. S. *Precipitated Carbonate of Zinc.*

This preparation is obtained by the reaction between solutions of carbonate of soda and sulphate of zinc; sulphate of soda is formed in solution, and carbonate of zinc is precipitated, washed, and dried by a gentle heat. $8ZnO,3CO_2+6HO$. The *prepared calamine,* obtained by burning and reducing to an impalpable powder, the native carbonate of zinc, was formerly used, but its use is now almost entirely abandoned.

Properties and Uses. The precipitated carbonate is in the form of a very soft, loose, white powder, resembling magnesia. In its medicinal properties it closely resembles the oxide, and is used externally as a dusting powder, either alone or mixed with starch, or in the form of ointment.

Ceratum Zinci Carbonatis. U. S. *Cerate of Carbonate of*

Zinc is prepared by mixing one part of carbonate to five parts of ointment of lard. This is a mild astringent application to excoriations, and superficial ulcerations produced by chafing of the skin, irritating secretions, burns, or other causes.

ZINCI VALERIANAS. U. S. *Valerianate of Zinc.*

This salt is prepared by double decomposition between sulphate of zinc and valerianate of soda. Composition, ZnO,C_{10},H_9,O_3.

Properties and Uses. It is in white, pearly scales, with the odor of valerian, and an astringent metallic taste; it is soluble in one hundred and sixty parts of water, and sixty of alcohol. It is a nervine tonic, combining the antispasmodic virtues of zinc and valerian. It is found of superior efficacy in epilepsy to all the other salts of zinc, and also affords relief in neuralgia, where the disease is purely nervous, or accompanies uterine derangement. Dose, $\frac{1}{2}$ of a grain, gradually increased to 3 grains; it is best given in the form of pill, or suspended in a little mucilage.

ZINCI IODIDUM. *Iodide of Zinc* is prepared by digesting two parts of iodine and one part of zinc in four parts of water. Composition, ZnI. It is a white, very deliquescent salt, soluble in water. It has been used internally, in doses of 1 grain thrice daily, in spasmodic diseases when complicated with scrofula; and externally, in the form of an ointment (℥i to ℥i of lard), in enlarged lymphatic glands and scrofulous affections.

ZINCI PHOSPHAS. *Phosphate of Zinc* is obtained by reaction between solutions of sulphate of zinc and an alkaline phosphate. Composition, ZnO,PO_5. It is a white salt, insoluble in water, but soluble in an excess of phosphoric acid. It has been recommended in epilepsy attended with disorder of the uterine functions, and in the night-sweats of phthisis. Dose, from 1 to 3 grains, in pill, or dissolved in water acidulated with phosphoric acid.

ZINCI LACTAS. *Lactate of Zinc*, prepared by dissolving metallic zinc in dilute lactic acid and evaporating to crystallization, has been recommended as a remedy in epilepsy, as being more easily taken, and less liable to disagree with the stomach. Dose, 2 grains three times a day, gradually increased till 10 grains are taken daily.

CADMIUM. U. S. *Cadmium.*

Cadmium is a rare metal found associated with the zinc ores. It has a tin-white color, a high metallic lustre, is very malleable, and oxidizes slowly in the air. Its preparations possess medicinal properties analogous to those of zinc; in overdoses they act as irritant poisons.

CADMII SULPHAS. U. S. *Sulphate of Cadmium.*

This salt is obtained by dissolving the carbonate of cadmium in diluted sulphuric acid, concentrating the solution, and crystallizing. The carbonate is procured by first forming a nitrate (by dissolving the metal in diluted nitric acid), and then decomposing this with carbonate of soda. Composition, CdO,SO_3+4HO.

Properties and Uses. Sulphate of cadmium crystallizes in transparent and colorless oblique rhombic prisms, with an astringent, slightly acidulous taste. It effloresces on exposure, and is very soluble in water. It resembles sulphate of zinc in its actions, but is much more powerful. It is chiefly used as a collyrium in nervous and inflammatory diseases of the eye, and as an injection in otorrhœa. Strength of solution, one grain to f℥i of rose-water.

Cadmii Iodidi. *Iodide of Cadmium* may be prepared by mixing iodine and filings of cadmium in a moist state. It is in large, white, transparent, six-sided crystals, soluble in water and alcohol. This preparation has been recommended as an efficient substitute for the iodide of lead, in the form of ointment, in enlarged scrofulous glands, and in certain cutaneous diseases, and is preferred by many, as it does not produce yellow discoloration.

BISMUTHUM. U. S. *Bismuth.*

This is a brittle, brilliant, crystalline metal, of a pinkish-white color, usually found native, associated with arsenic and copper, and occasionally in combination with oxygen and sulphur. It is extensively used in the arts in the composition of type metal, etc.; it is not used in medicine, except in the preparation of the sub-

carbonate and subnitrate. It generally contains arsenic, and it is very important that this should be left behind in the preparation of these officinal preparations.

BISMUTHI SUBNITRAS. U. S. *Subnitrate of Bismuth.*

This salt, known as *White Bismuth*, is prepared by dissolving the metallic bismuth in dilute nitric acid to form a solution of the ternitrate of the oxide of bismuth As this is apt to contain arsenic, it is decomposed by adding carbonate of soda, thus precipitating the insoluble carbonate of bismuth, and leaving in solution nitrate of soda, with any combinations of arsenic. The precipitate is then washed, and dissolved in nitric acid, and diluted with water till precipitation commences. Composition, BiO_3,NO_5. It is a heavy, white powder, with a faint acid odor and taste, nearly insoluble in water.

Medical Properties and Uses. Subnitrate of bismuth is a sedative and astringent tonic, principally used in painful affections of the stomach, unaccompanied by any organic disease, and in diarrhœa. In dyspepsia connected with irritability of the stomach, and characterized by pain after eating, it often proves serviceable when administered a short time before meals. In the diarrhœa of children, from irritability of the mucous membrane, and in the diarrhœa of phthisis, it proves very efficacious. It may often be given with advantage with other medicines which allay pain, or neutralize acid, or restrain undue secretion. Dose, 5 to 20 grains.

BISMUTHI SUBCARBONAS. U. S. *Subcarbonate of Bismuth.*

This is prepared by dissolving the freshly precipitated nitrate of bismuth in nitric acid by the aid of heat, diluting with water till the solution begins to be milky, and then gradually adding it to a solution of carbonate of soda, when an interchange of principles takes place, nitrate of soda remaining in solution, and carbonate of bismuth being precipitated ; this is then carefully washed, to remove the soda, and dried. Composition, BiO_3,CO_2.

Properties and Uses. It is a white or yellowish-white, inodorous, and tasteless powder, insoluble in water, but soluble with effervescence in dilute acids. It has been recommended as a substitute for the subnitrate, and is applicable to the same diseases. It is more soluble in the gastric juice, is somewhat antacid, and is said not to constipate. Dose, 10 to 40 grains.

Bismuthi et Ammoniæ Citras. *Citrate of Bismuth and Ammonia.* To prepare this, the citrate is first made by double decomposition between the freshly precipitated subnitrate of bismuth and citrate of potassa. The precipitated citrate thus formed is then rubbed with sufficient water to make a paste, and water of ammonia is gradually added until it is dissolved. The solution is filtered, and spread on glass to dry. Composition, BiO_3, $NH_4O,C_{12}H_5O_{11}+5HO$. It is in fine, glossy, translucent, colorless scales, of a slight, acidulous, somewhat metallic taste, very soluble in water. It possesses the advantage of being soluble, and hence acts with greater certainty and efficiency than the insoluble and bulky preparations. Dose, 2 grains.

Liquor Bismuthi is a solution of the above salt in water, protected from spontaneous decomposition by a small quantity of ammonia and alcohol. There is, however, no occasion for a permanent solution, as it may at any time be dissolved when wanted for use.

Bismuthi Tannas. *Tannate of Bismuth* may be obtained by triturating tannic acid with the oxide of bismuth, precipitated from a solution of the nitrate by caustic soda. It occurs in the form of a yellowish, insoluble, nearly tasteless powder. It combines the astringency of tannin with the sedative quality of bismuth, and is highly useful in the treatment of diarrhœa, both acute and chronic. Dose, 5 to 20 grains, in pill, or suspended in mucilage.

Bismuthi Valerianas. *Valerianate of Bismuth* is formed by mixing a neutral solution of the subnitrate with valerianate of soda, washing the precipitate with water, and drying with a gentle heat. It is a white powder, soluble in water, and has been used in neuralgia, and in painful affections of the stomach. Dose, $\frac{1}{2}$ to 2 grains repeated several times a day.

MANGANESII OXIDUM NIGRUM. U. S. *Black Oxide of Manganese.*

This is the *native impure deutoxide* of manganese. This metal is very generally diffused throughout the mineral kingdom, and may be obtained from the native black oxide (pyrolusite) by intense ignition with charcoal; it is a hard, brittle, grayish-white metal, resembling iron in some of its chemical properties. The salts of manganese are tonic and alterative, closely resembling those of iron in their medicinal properties, and applicable to the same class of diseases. Only the oxide and sulphate are officinal, though several other of its combinations have been proposed as medicines: the *Phosphate*, *Tartrate*, *Carbonate*, and *Iodide*. The oxide is used in the arts for various purposes, in the laboratory in the processes for obtaining oxygen and chlorine; as a medicine it is seldom resorted to, but has been used as a tonic in doses of from 3 to 20 grains three times a day, given in the form of pill.

MANGANESII SULPHAS. U. S. *Sulphate of Manganese.*

This salt is prepared by heating the native black oxide with concentrated sulphuric acid; oxygen is evolved, and a sulphate of the protoxide is formed. MnO,SO_3.

Properties and Uses. It is in transparent, rhombic prisms, of a pale-rose or pink color, with an astringent or bitterish taste, very soluble in water, but insoluble in alcohol. In small doses (5 to 20 grains), it has been used as an adjuvant to iron in anæmia, and other cases requiring mineral tonics; in larger doses (1 to 2 drachms), it acts as a purgative, resembling the sulphate of soda in its operation.

CERII OXALAS. *Oxalate of Cerium.*

The metal *Cerium* is found in the form of oxide, associated with other metals, in *cerite*, a very rare mineral. The oxalate of cerium is prepared by double decomposition between oxalic acid and the protosulphate of cerium, procured from the mineral cerite

by the action of sulphuric acid, and freed from the other metals by a complex process. Composition, $2CeO,C_4O_6+6HO$.

Properties and Uses. The oxalate is a white, granular powder, inodorous and tasteless, insoluble in water, alcohol, and ether, but readily dissolved by sulphuric acid. It acts as a sedative tonic, and may be used with evident advantage in cases of dyspepsia with gastrodynia and pyrosis. It is also much used, and with decided success, as a remedy for obstinate vomiting in pregnancy. Dose, 1 or 2 grains three times a day in pills.

The *Nitrate of Cerium* (CeO,NO_5) possesses similar therapeutic powers, and has been recommended in the same cases.

NICCOLI SULPHAS. *Sulphate of Nickel.*

This salt is obtained by dissolving the carbonate or oxide of nickel in dilute sulphuric acid, concentrating and crystallizing. NiO,SO_3+7HO. It occurs in emerald-green, prismatic crystals, of a sweetish, astringent taste, very soluble in water, but insoluble in alcohol. It acts as a gentle tonic, and has been successfully used in cases of severe and obstinate periodic headache. Dose, $\frac{1}{2}$ to 1 grain three times a day, in pill or simple solution.

MINERAL ACIDS.

The mineral acids, in their concentrated form, are caustic and escharotic, and when swallowed, act as corrosive poisons. They unite with the water, and coagulate the albumen of the tissues with which they come into contact, decomposing and destroying them. Properly diluted and in moderate doses they act as tonics, increasing the appetite and promoting the digestion. They are absorbed, and in their passage through and out of the system act as astringents to the glands generally, by corrugating and diminishing the calibre of their minute ducts, and thus decrease the amount of the secretions. In poisoning by the mineral acids the antidotes are the alkaline earths, soap, and mucilaginous drinks.

ACIDUM SULPHURICUM. U. S. *Sulphuric Acid.*

This acid, formerly called *Oil of Vitriol*, is obtained by burning a mixture of sulphur and nitrate of potassa over a stratum of water in a leaden chamber. Sulphur when burned forms sulphurous acid, which, coming into contact in the form of vapor with nitrous acid from the burning nitre, becomes more highly oxidized into sulphuric acid, which unites with one equivalent of water. HO,SO_3.

Properties. It is a dense, oily-looking liquid, sp. gr. 1·845, colorless when pure, without odor, with an intensely acid and corrosive taste, evolving heat on the addition of water. It acts powerfully on organic bodies, whether vegetable or animal, by abstracting from them the elements of water, developing charcoal, and turning them black. Its presence may be detected, whether free or in combination, by the white precipitate it affords with all the soluble salts of baryta, which is insoluble in water, in acids, and alkalies.

Medical Uses. Externally, it is sometimes used as a caustic; internally, in small doses, properly diluted, it is a powerful tonic, refrigerant, and antiseptic. It is only prescribed in one of the following officinal diluted forms:

ACIDUM SULPHURICUM DILUTUM. U. S. *Diluted Sulphuric Acid* is prepared by gradually adding two troyounces of acid to sufficient water to make a pint. Sp. gr. 1·082.

It is used as a refrigerant in fevers, as an astringent to check hemorrhage and passive mucous discharges, and as a general tonic, to improve digestion. It is beneficially employed in diarrhœa dependent on a relaxed state of the mucous membrane, and is one of our most efficient remedies for the colliquative sweats of phthisis. In convalescence from protracted fevers, combined with vegetable tonics, it proves of great service. It is also resorted to, both as a prophylactic and as a remedial agent, in colica pictonum. Dose, 10 to 30 drops, freely diluted, and repeated three times a day or oftener.

ACIDUM SULPHURICUM AROMATICUM. U. S. *Aromatic Sulphuric Acid*, commonly called *Elixir of Vitriol*, is prepared by

adding six troyounces of acid, gradually, to a pint of alcohol, and mixing with a pint of tincture, obtained by percolating a troyounce of ginger, and a troyounce and a half of cinnamon, with alcohol. It is a reddish-brown liquid, with an agreeable aromatic odor and taste. It possesses the same properties as the diluted acid, and is generally preferred as a tonic. It contains more acid than the diluted acid, but the dose in drops is about the same, the alcoholic liquid giving smaller drops than the aqueous.

ACIDUM NITRICUM. U. S. *Nitric Acid.*

This acid, called *Aqua Fortis*, exists in nature in combination, and is sometimes free in spring-water. It is artificially obtained by distilling a mixture of equal parts by weight of nitrate of potassa and sulphuric acid. The sulphuric acid combines with the potassa, and the nitric acid, being set free, is distilled over. The strongest acid containing one equivalent of water, HO,NO_5, has a sp. gr. 1·5, but owing to the presence of water in the ingredients used in its preparation, is usually of a lower specific gravity. The officinal acid contains four equivalents of water, $NO_5,4HO$, and has a sp. gr. 1·42. It contains about 75 per cent. of nitric acid, of the sp. gr. 1·5.

Properties. The officinal acid is a strongly acid and corrosive liquid, colorless when pure, but usually of a yellowish tinge, due to the presence of nitrous acid, developed by the action of light; it has a powerful affinity for water. It acts powerfully on animal matter, causing its decomposition. When uncombined, it may be recognized by its dissolving copper, with the production of red fumes, and by its forming nitre when saturated with potassa.

Medical Properties and Uses. In its concentrated state it is a powerful caustic and escharotic, and is used to destroy warts, and as an application to hemorrhoids; properly diluted, it may be applied as a wash to sloughing and ill-conditioned ulcers. Internally, diluted, it acts as a refrigerant and tonic.

Acidum Nitricum Dilutum. U. S. *Diluted Nitric Acid* is prepared by adding three troyounces of acid to water sufficient to make a pint. It is less used as a tonic than the sulphuric acid, but is often resorted to as an alterative after long courses

of mercury. It is highly recommended in secondary or constitutional syphilis, particularly in obstinate syphilitic eruptions. In chronic hepatitis, when the use of mercury is contraindicated, the symptoms will frequently be ameliorated by the use of this acid. Dose, 20 to 40 drops, diluted with water at the time of taking it.

Nitrous Acid. The nitrous acid of the shops is nitric acid containing more or less hyponitric acid, NO_4, and is usually such as passes over at the commencement of the process for obtaining the nitric acid. It is chiefly used by the pharmaceutist in preparing *Hope's camphor mixture*, which contains thirty minims of acid, and twenty minims of laudanum, in f℥iv of camphor-water. This is much used in diarrhœa and dysentery, in doses of f℥ss every two hours.

ACIDUM MURIATICUM. U. S. *Muriatic Acid.*

Hydrochloric Acid (also called *Marine Acid, Spirit of Salt*) is an aqueous solution of muriatic acid gas, HCl, of the sp. gr. 1·160. It is obtained by the action of sulphuric acid on chloride of sodium (common salt). The water of the sulphuric acid is decomposed, its oxygen combining with the sodium to form soda, which unites with the acid to form sulphate of soda, while the hydrogen of the water and the chlorine combine to form the gaseous hydrochloric acid, which distills over, and is absorbed by the water in the receiver.

Properties. When pure it is a colorless and sour liquid, but as found in commerce has a yellowish or brownish tint, with an acid odor. On exposure it emits white, pungent fumes.

Medical Properties and Uses. The strong acid is caustic and escharotic, and may be employed for the same purposes as the nitric acid, though inferior to it.

Acidum Muriaticum Dilutum. U. S. *Diluted Muriatic Acid,* prepared by adding four troyounces of acid to water sufficient to make a pint, is an excellent alterative and tonic. It has been employed with benefit in some forms of dyspepsia, and proves highly serviceable in typhus and typhoid fevers. It is an excellent adjunct to gargles in ulcerated sore-throat and scarlatina maligna.

Dose, 10 to 30 drops freely diluted. As a tonic it may be combined with the bitter tonic infusions.

ACIDUM NITROMURIATICUM. U. S. *Nitromuriatic Acid.*

This acid, the *Aqua Regia* of the earlier chemists, is prepared by mixing together three parts of nitric acid and five parts of muriatic acid. It is a compound of chlorine and nitric oxide, mixed with free chlorine.

Properties. It has a golden-yellow color, with the odor of chlorine; it possesses the property of dissolving gold and platinum, which are insoluble in either of its components separately; owing to its proneness to lose its free chlorine, it should be made in small quantities at a time as required for use.

Medical Properties and Uses. The strong acid is caustic and escharotic. Internally, diluted, it acts as a tonic and alterative.

ACIDUM NITROMURIATICUM DILUTUM. U. S. *Diluted Nitromuriatic Acid* is prepared by mixing one and a half troyounces of nitric acid with two and a half troyounces of muriatic acid, and adding water to make a pint. This preparation is much used in calculous diseases, and in chronic diseases of the liver, and has also been highly recommended in syphilitic affections, especially where mercury is contraindicated by a scrofulous or broken-down constitution. Largely diluted, it is used as a bath or stimulating wash. Dose, 5 to 15 minims properly diluted.

STIMULANTS.

The term Stimulant is applied to all agents which increase the vital activity of the system. Food and fresh air are the essential stimuli of the living organism, and heat, light, and electricity act as universal stimulants to the system. But in a medical sense we apply the term to those substances whose primary influence is to increase the vital actions, and they may be sub-

divided into Arterial, Nervous, Cerebral, or Spinal Stimulants, according to their tendency to affect either of these systems.

ARTERIAL STIMULANTS.

This class of medicines, also termed Diffusible Stimulants, are those which act especially on the circulatory system, with comparative little direct influence on the nervous system. Their general effects are simple and obvious. When swallowed, they produce a sensation of warmth in the stomach, which soon diffuses itself over the whole body. They are absorbed, and while in the blood increase the action of the heart and arteries, invigorate the muscular system, and impart general energy to the brain and nervous system. They differ from tonics in acting rapidly and forcibly, and without adding anything to the blood, producing merely increased action, without power. Their effects pass off promptly, while those of tonics are permanent. In their passage out of the system through the secretory organs they act as topical agents, and increase the secretions; hence we find among them some of the most powerful expectorants, sudorifics, and diuretics.

They are to be resorted to in cases of debility with great depression of the vital powers, and where there is a tendency to prostration and collapse. They must be used with caution, in consequence of the danger of inordinate reaction. They are also used in hemorrhages, in debility occurring during the progress of acute disease, and sometimes to establish reaction at the onset of disease. Their use, as a general rule, is contraindicated during the existence of active local inflammation, and in organic disease of the heart, and in all cases must be used with caution.

The number of agents producing a stimulant effect on the circulation is very large, but most of them possess other prominent properties, which rank them in other classes. Those only are mentioned here which are chiefly used in disease for their primary stimulant properties, and not for their secondary or remote effects.

AMMONIÆ CARBONAS. U. S. *Carbonate of Ammonia.*

This salt, sometimes called *Sesquicarbonate of Ammonia*, is usually prepared by subliming a mixture of muriate of ammonia and chalk (carbonate of lime) from an iron retort into a large earthen or leaden receiver.

Properties. It occurs in commerce in white, hard, translucent lumps, of a fibrous, crystalline texture, with a pungent, ammoniacal odor, and a caustic, alkaline taste, producing a protracted irritation in the throat. Composition, $2NH_4O,3CO_2$. On exposure it loses a portion of its ammonia, and becomes a white, pulverulent mass, which is the bicarbonate of ammonia. It volatilizes when heated, is soluble in water, sparingly so in alcohol, and effervesces with the dilute acids.

Medical Properties and Uses. Carbonate of ammonia is antacid, stimulant, and expectorant; in large doses emetic, and in still larger doses irritant, causing great disturbance of the nervous system. As a stimulant, it is resorted to in the advanced stages of typhus and typhoid fevers, in which it possesses the power of increasing the action of the heart, without unduly exciting the brain. As a stimulating expectorant, it often proves serviceable in the advanced stages of pneumonia, when the inflammatory symptoms have subsided and it becomes of importance to promote expectoration; also in chronic bronchitis and catarrhal affections occurring in debilitated constitutions, and in the advanced stages of croup. In skin diseases, and especially in the exanthemata when the eruption has suddenly disappeared, it proves a valuable remedy by removing the depression of the nervous system. As an antacid, it is less eligible than the other alkaline carbonates. Dose, 5 to 10 grains, in pill or solution, preferable in the latter. Its acrimony may be blunted by the use of sugar and mucilage.

Spiritus Ammoniæ Aromaticus. U. S. *Aromatic Spirit of Ammonia.* (A solution of one troyounce of carbonate of ammonia, with three fluidounces of water of ammonia, in a pint and a half of alcohol, diluted with water sufficient to make a pint, and flavored with ℥ijss of oil of lemons, forty minims of oil of nutmeg, and fifteen minims of oil of lavender.) An excellent stimulant, antispasmodic, and carminative. Dose, f℥ss to f℥i.

Spiritus Ammoniæ. U. S. *Spirit of Ammonia.* (A solution of ammoniacal gas in alcohol.) This preparation is now but little used, the aromatic spirit, which is more pleasant, being preferred. As it dissolves gum-resins, it is a convenient addition to liniments intended to produce a rubefacient effect.

OLEUM TEREBINTHINÆ. U. S. *Oil of Turpentine.*

The volatile oil, obtained by distillation from the turpentine of *Pinus palustris* and of other species of *Pinus.* It is chiefly procured from North Carolina, and may be purified by redistilling it with water, which deprives it of the resin, which the commercial oil usually contains. Composition, $C_{20}H_{16}$.

Properties. The oil, commonly called *Spirit of Turpentine,* is a colorless, limpid liquid, sp. gr. 0·86, with a powerful, penetrating odor, and a burning, pungent taste. It is very volatile and inflammable; is very slightly soluble in water, soluble in alcohol and ether; is miscible in all proportions with the fixed oils, and dissolves resins and fats. On exposure it absorbs oxygen, and becomes thicker and yellowish, owing to the formation of resin.

Medical Properties and Uses. In small doses, repeated, it is stimulant and diuretic; in large doses, cathartic; and applied to the skin, rubefacient. It is absorbed, imparting a violet odor to the urine, and, if long continued, produces painful irritation of the urinary passages, sometimes amounting to violent strangury. As a stimulant, it is of the highest value in typhoid fever, and in the advanced stages of continued and inflammatory fevers. In cases where the vital energies are depressed, and especially those in which the tongue has become perfectly dry, with a surface destitute of its ordinary papillary appearance; when coma or stupor are present, or when delirium, with subsultus tendinum, exists, it often arouses the vital powers, and exercises a most beneficial influence. In typhoid fever, in addition to its stimulant properties, it seems to have an alterative influence upon the ulcerated surface of the bowels characteristic of that disease. In intestinal hemorrhages, especially those of a passive character, in hemorrhages from the lungs, uterus, and kidneys, and in cases of dys-

entery, when the tongue is smooth and dry, it often proves highly useful. In small and repeated doses it also exercises a powerful influence in diseases of the genito-urinary organs, when chronic and unattended by inflammatory symptoms, as gleet, leucorrhœa, and gonorrhœa; and Pereira says that it seems to act by setting up a new kind of irritation, which supersedes the previously existing disease. In cerebral affections, particularly apoplexy, in the form of enema, it proves valuable as a revulsive and derivative. In large doses, as a cathartic, it is an excellent anthelmintic. It appears to destroy or debilitate the worm, which, losing its hold upon the bowels, is easily discharged. Dose, 10 to 20 drops. As an anthelmintic, from 2 to 4 drachms, followed by castor oil in a few hours.

Linimentum Terebinthinæ. U. S. Known as *Kentish's ointment* (prepared by adding half a pint of oil of turpentine to twelve troyounces of melted resin cerate) is highly recommended as a remedy in burns and scalds.

CAPSICUM. U. S. *Cayenne Pepper.*

This is commonly called *Red Pepper*, and is the fruit of *Capsicum annuum*, and of other species of *Capsicum*, tropical plants, but extensively cultivated in this country.

Properties. The fruit is a light, shining berry, of a bright-red or orange color, of a faint, peculiar odor, with a hot, acrid taste. This, when dried and ground, forms the Cayenne pepper of commerce, and when fresh, is of a bright-red color, which it loses by age or exposure. Water and alcohol extract its virtues, which depend upon an acrid, volatile principle, *capsicin*.

Medical Properties and Uses. Capsicum is much employed as a condiment added to various articles of food, either to improve their flavor, or to promote their assimilation. As a medicine it is chiefly valuable as a local stimulant to the mouth, throat, and stomach. Internally, it is given in various diseases, attended with diminished susceptibility of the stomach, and proves a valuable adjunct to other remedies, whose operation it promotes. As a gargle it is useful in relaxed conditions of the throat, and particularly in that form of tonsillitis which arises in some cases of

scarlet fever. Externally applied, it is a powerful rubefacient, well adapted to low forms of disease where a stimulant impression is desired. Dose of the powder, 5 to 10 grains given in pill.

Infusum Capsici. U. S. *Infusion of Capsicum* (half a troy-ounce to a pint of boiling water) is used chiefly as a gargle.

Tinctura Capsici. U. S. *Tincture of Capsicum.* (A troy-ounce to two pints of diluted alcohol.) This preparation is a useful stimulant in the low stages of typhus and scarlet fevers, and is often used to prevent the nausea which oil of turpentine is apt to occasion. Dose, f℥ss to f℥i.

Oleoresina Capsici. U. S. An ethereal extract, possessing in a high degree all the properties of capsicum. It may be used when a powerful stimulating stomachic is needed. Dose, ½ to 1 drop.

ALCOHOL. U. S.

When the juices of certain saccharine vegetable substances are exposed to the action of air and moisture, they undergo what is called vinous fermentation. In this process the sugar disappears, and becomes converted into alcohol, which remains in the liquid, and carbonic acid, which escapes. Thus the grape yields wine; the apple, cider, etc. These liquors contain alcohol, along with coloring matter and other principles. On subjecting them to distillation, we obtain what are called ardent spirits, as brandy, whisky, gin, rum, etc., which contain alcohol in a diluted state, with additional ingredients, which give to each its peculiar characteristics. By subjecting these again to distillation we obtain alcohol, which is officinal in different forms.

Alcohol. U. S. *Rectified Spirit. Spirit of Wine.* Spirit of the specific gravity 0·835.

Alcohol Fortius. U. S. *Stronger Alcohol.* Spirit of sp. gr. 0·817 (prepared by agitating officinal alcohol with heated carbonate of potassa).

Alcohol Dilutum. U. S. *Diluted Alcohol.* (Alcohol mixed with an equal measure of water.) Sp. gr. 0·491.

Alcohol is a transparent, colorless liquid, with a pungent, rather agreeable odor, and acrid, burning taste. It is highly inflammable, and burns with a pale-blue flame, free from smoke,

and boils at 173°. It unites in all proportions with water, dissolves many vegetable substances, most fixed oils and resins. Its formula is $C_4H_6O_2$, or, viewing it as a hydrated oxide of ethyl, C_4H_5O+HO.

Spiritus Vini Gallici. U. S. *Brandy.* Spirit obtained by distillation from fermented grape-juice, containing from 48 to 56 per cent. of alcohol.

Spiritus Frumenti. U. S. *Whisky.* Spirit obtained from fermented grain by distillation, of the same strength.

Besides these officinal liquors, we have Arrack from fermented rice, Rum from molasses or sugar, and others, manufactured from a variety of substances, and of varying degrees of purity, which are used when we wish to obtain the medicinal effects of alcohol.

Physiological Effects. Alcohol is a powerful diffusive stimulant, exciting the nervous and vascular systems, producing general exhilaration of spirits, and occasioning a rapid flow of ideas. These effects vary according to the strength of the liquor, the quantity taken, and the constitution of the patient. These are succeeded by a state of depression, varying in intensity to the previous amount of excitement. In large doses it produces the well-known effects of intoxication; and in excessive doses it acts as a powerful narcotic poison, causing death, preceded by slow pulse, contracted pupils, and coma. Externally, it acts as a refrigerant and irritant. It also possesses the power of preventing the putrefaction of animal matter.

Medical Properties and Uses. In moderate doses, properly diluted, alcoholic liquors are employed as stimulants to support the vital powers when exhausted, as in the advanced stages of fevers, particularly those of a typhoid character, and in conditions of collapse. Externally, alcohol may be employed as a refrigerant and stimulant for many forms of external inflammation, as erysipelas and erythema, for various skin diseases, and to prevent excoriation in parts exposed to prolonged pressure. In cases of poisoning by alcohol the stomach should be evacuated by an emetic, and should insensibility remain, the cold affusion will be found useful. The coma of ordinary intoxication is best treated by the internal use of ammonia, or of the solution of the acetate of ammonia.

VINUM. U. S. Wine is the fermented juice of the grape, the fruit of the *Vitis vinifera*, of which several thousand varieties exist. Wines vary in quality and character according to the plants from which they are produced, and the locality in which they grow. The most important constituent is alcohol, associated with coloring matter, volatile oil, extractive, and various acids and salts. The proportion of alcohol varies from 7 or 8 per cent. in claret to 22 in the best madeira. Though only VINUM XERICUM, *Sherry Wine*, and VINUM PORTENSE, *Port Wine*, are officinal, others, as claret, champagne, etc., are used as remedies in several forms of disease.

Wine is a diffusible stimulant, and is preferable to ardent spirits in acute inflammations, and fevers when typhoid symptoms develop themselves. It may be given pure, or in the form of *wine-whey*, made by adding wine to boiling milk, straining to separate the curd, and sweetening with sugar. In pharmacy it is used as a menstruum to extract the virtues of several plants.

MALT LIQUORS may be advantageously employed where we desire to give permanent support with as little stimulation as possible, as in diseases tending to emaciation, chronic abscesses, etc.

ALCOHOL AMYLICUM. U. S. *Amylic Alcohol. Fusel Oil* is a peculiar alcohol obtained by continuing the distillation from fermented grain or potatoes after the ordinary spirit has ceased to come over. It is an oily, colorless liquid, of a strong, offensive odor, and acrid, burning taste. It is employed in pharmacy in the preparation of valerianic acid.

PHOSPHORUS. U. S.

Phosphorus is a non-metallic element, discovered in 1669, and found in the animal, vegetable, and mineral kingdoms, in the form of phosphoric acid, usually united with lime. It is obtained by treating with sulphuric acid the calcined bones of animals, and sublimating the mass with charcoal, when the phosphorus may be collected in a receiver containing water.

Properties. It is a semi-transparent solid, resembling bleached wax, without taste, having a garlicky smell. At 32° it is brittle,

but at ordinary temperatures it is flexible, and may be easily cut. It fuses at 110°, is inflammable, and on exposure to the air at ordinary temperatures undergoes slow combustion, emitting vapors, which are luminous in the dark. It is insoluble in water, but soluble in alcohol, ether, and fixed and volatile oils.

Medical Properties and Uses. In small doses phosphorus is stimulant and aphrodisiac; in large doses, an irritant poison. It has been used in cases attended with great prostration of the vital powers, as in the latter stages of fever, dropsies, and other diseases, occurring in debilitated subjects. It also acts on the genital organs, and has been given with reputed success in impotence. Dose, $\frac{1}{16}$ to $\frac{1}{8}$ of a grain. The best form for internal use is the ethereal tincture (four parts of phosphorus in two hundred of ether), or phosphorated oil (ten grains of phosphorus in an ounce of oil). The dose of either of these formulas is from 5 to 10 drops.

Acidum Phosphoricum Glaciale. U. S. *Glacial Phosphoric Acid.* Pure anhydrous phosphoric acid is only obtained when phosphorus is burned in oxygen gas. It is susceptible of three modifications, each characterized by peculiar properties, distinguished by its relation to water acting the part of a base. It is called metaphosphoric acid, bibasic or tribasic acid, according as it is united with one, two, or three equivalents of water. The glacial acid (HO,PO_5) is obtained by heating phosphate of ammonia to drive off ammonia and all but one equivalent of water.

Properties. It occurs in transparent, colorless, glasslike masses, slowly deliquescent in the air, soluble in water and alcohol, inodorous, and sour to the taste. It is only used in medicine in preparing the medicinal acid.

Acidum Phosphoricum Dilutum. U. S. *Dilute Phosphoric Acid.* This is a solution of tribasic phosphoric acid ($3HO,PO_5$) in water. It may be prepared by boiling the glacial acid in water, with the addition of a little nitric acid, by which it becomes converted into tribasic acid, or by the direct action of dilute nitric acid upon the phosphorus.

Properties. The dilute acid is a colorless, inodorous, sour liquid, possessing strong acid properties. In small doses it

is a tonic and refrigerant; and in larger doses it acts as a powerful stimulant to the nervous and vascular systems. It has been employed as a stimulant in purely chronic and asthenic cases, and occasionally with a view of correcting alkalescence in the urine. Dose, 10 to 40 drops, diluted.

NERVOUS STIMULANTS.

Nervous Stimulants or *Nervines* are those agents which stimulate the nervous system, without acting especially on the brain, and without being followed by depression or insensibility.

They are usually termed *Antispasmodics*, from their power of controlling irregular and inordinate muscular contraction, but this term is improper. It views them as correcting a single morbid condition of the system, and is not at all descriptive of the medicinal effects of these agents. Spasm may arise from a variety of causes, and whatever removes the cause of nervous irritation will prove antispasmodic. Thus purgatives, by removing an irritating cause from the intestinal canal, anodynes, by allaying irritation and pain, and tonics, by strengthening the whole system, act as antispasmodics. But there are certain medicinal agents which appear to exert a specific control over spasmodic action, independent of any influence upon its exciting cause, and these seem to act by their stimulating effect upon the nervous system. Headland says, "The spasms which these medicines relieve are due to a fault in the nervous polarity, commencing generally in the brain or nerve-centres, and are more or less subdued by general stimulation of the nervous functions."

All the agents belonging to this class are remarkable for their peculiar odor and their volatility. They are absorbed unaltered, and their odor can readily be detected in the secretions. When taken internally they produce a feeling of heat and warmth in the stomach, which is speedily diffused throughout the system. The circulation is increased, and they induce a tendency to sleep, not from any direct narcotic effect, but by relieving the system from pain, and quieting the nervous irritability, which so often prevents sleep. They act very rapidly, and their effects are only tempo-

rary, thus requiring a repetition and increased doses of the medicine.

They may be used to give tone in diseases which depend upon a morbid sensibility and impaired energy of the whole nervous system, and to allay that irregular and violent contraction of the muscular fibre which is called spasm. They ought not to be used where there is plethora or inflammatory action.

CASTOREUM. U. S. *Castor.*

A peculiar concrete substance, obtained from (membranous follicles which exist between the anus and external genitals of) *Castor Fiber*, the *Beaver*, an animal inhabiting the northern portions of Europe, Asia, and America. The drug is distinguished, according to its source, into the Canadian or American, and the Russian castor. The latter is considered the most valuable, but our market is supplied chiefly by the former.

Properties. It consists of pear-shaped bags, much wrinkled and flattened, about two inches in length, of a dark-brown color externally, paler within, breaking with a resinous fracture, and feeling unctuous to the touch. It has a bitter taste, and a strong, fetid odor. It is insoluble in water and cold alcohol, but ether extracts its virtues, which depend upon a peculiar proximate principle termed *castorin*. Besides this, it contains volatile oil, resin, and other unimportant substances.

Medical Properties and Uses. Castor is a mild nervous stimulant, with but little effect upon the circulation, and may be used in low forms of fever, attended with nervous symptoms, and in spasmodic affections dependent upon uterine derangement. It is but little used. Dose, 10 to 30 grains, given in bolus or emulsion.

Tinctura Castorei. U. S. *Tincture of Castor.* (Two troy-ounces to two pints of alcohol.) Dose, 30 to 60 drops.

MOSCHUS. U. S. *Musk.*

Musk is a peculiar concrete substance, obtained from the preputial follicles of the *Moschus moschiferus*, an animal resem-

bling the deer in its general characters, and inhabiting the mountainous regions of Central Asia.

Properties. The sac or bag which contains the musk is from two to three inches in length, bare on the side to which it is attached, and covered with stiff hairs on the convex side. The musk is granular, of a dark-brown color, soft and unctuous to the touch, of a bitter and aromatic taste, and of a well-known and remarkable odor. There are two varieties in commerce, the *Russian*, and the *Chinese*, which is the most valuable when genuine. The bags are frequently found to have been opened, and the musk adulterated with dried blood and other impurities, which may generally be detected by the feeble odor and gritty feel. It is insoluble in water, but yields its properties partially to alcohol and wholly to ether.

Medical Properties and Uses. Musk is a powerful stimulant and antispasmodic, and may be used with decided advantage in the subsultus tendinum of fevers and other diseases assuming the typhoid type. Dose, 5 to 20 grains, given in pill or emulsion.

ASSAFŒTIDA. U. S. *Assafetida.*

The concrete juice of the *Narthex Assafœtida*, a tall perennial plant, native of Persia, and the adjacent countries. The gum is obtained by slicing off the top of the living root, which is fleshy, a foot or more in length, and about three inches in diameter at the top, and then scraping off the juice with a knife as fast as it concretes. This process is repeated until the root is completely exhausted, and the juice is then allowed to harden in the sun.

Properties. It is in lumps of different sizes and consistence, sometimes soft and adhesive, at others quite hard and brittle, of a brownish-yellow color, interspersed with tears of a white, red, or violet hue. Occasionally it is met with in distinct roundish or oval tears, varying from the size of a pea to that of a walnut. When cut it presents a waxy lustre, acquiring on exposure a rose tint. It has a powerful alliaceous and disagreeable odor, with a bitter and acrid taste; softens at a moderate heat, and is inflammable. It is a gum-resin, containing about 65 per cent. of resin, with gum, bassorin, and a trace of volatile oil. It is insoluble

in water, but forms with it a milky emulsion (the gum being soluble suspends the resin in mixture); it is soluble in alcohol.

Medical Properties and Uses. Assafetida is a powerful stimulating antispasmodic, the most active of all the fetid gum-resins, well adapted for the spasmodic nervous diseases of females, as hysteria, and some forms of chorea and epilepsy. In flatulence and flatulent colic, occurring in old or hysterical persons, in the convulsions of children, especially when dependent on flatulence, and in the chronic stage of hooping-cough, it is very efficacious. Dose, 5 to 10 grains.

TINCTURA ASSAFŒTIDÆ. U. S. *Tincture of Assafetida.* (Four troyounces in two pints of alcohol.) This tincture becomes milky on the addition of water, owing to the precipitation of the resin, but possesses all the properties of the medicine. Dose, 20 drops to f℥.

MISTURA ASSAFŒTIDÆ. U. S. *Lac Assafœtida. Milk of Assafetida,* prepared by rubbing ℥ij of assafetida with half a pint of water until they are thoroughly mixed, is often employed as an enema.

EMPLASTRUM ASSAFŒTIDÆ. U. S. This plaster, made by incorporating assafetida and galbanum with lead plaster and wax, may be advantageously applied over the stomach or chest, where we wish the effects of the medicine.

AMMONIACUM. U. S. *Ammoniac.*

The concrete juice of *Dorema ammoniacum,* an umbelliferous plant, native of Persia. The whole plant abounds in a milky juice, which exudes upon the slightest puncture, and this, when hardened, constitutes the gum ammoniacum.

Properties. The purest ammoniac is met with in various sized roundish tears, of a reddish-yellow color externally, white and shining internally, hard and brittle. The inferior varieties occur in masses of a darker color and less uniform structure, appearing when broken as if composed of numerous tears imbedded in a brownish substance. The odor is peculiar, faintly nauseous, more powerful when heated; the taste is bitter and disagreeable. It softens by heat, and is inflammable; is soluble in alcohol and ether, and forms a milky emulsion with water. It is a gum-resin,

containing 80 per cent. of resin, 18 of gum, with a trace of volatile oil.

Medical Properties and Uses. Ammoniac resembles assafetida in its action; but is much less powerful, and is seldom used as a stimulant. It is often resorted to, on account of its expectorant properties, in asthenic pulmonary diseases, aiding in expelling the secretions, when they have become dry, and the patient has not the strength to expectorate. It is often employed as an external stimulant, in the form of plaster, to scrofulous tumors, chronic enlargements of the joints, and indolent glandular swellings. Dose, 10 to 20 grains.

MISTURA AMMONIACI. U. S. Prepared by rubbing two drachms of ammoniac with half a pint of water.

EMPLASTRUM AMMONIACI. U. S. This plaster is prepared by dissolving five troyounces of ammoniac in half a pint of dilute acetic acid and evaporating until it acquires the proper consistence.

GALBANUM. U. S.

The concrete juice of an unknown Eastern plant, and imported from India and the Levant.

Properties. Galbanum is met with in tears and in lump; the tears are irregular, about the size of a pea, usually agglutinated together, of a pale greenish-yellow color, having a strong, peculiar odor, and an acrid, bitter taste; the lump variety is of a darker color, with a less powerful odor and taste. It consists of resin and gum, with a small proportion of volatile oil. It is soluble in, and forms an emulsion with, water.

Medical Properties and Uses. It is stimulant, antispasmodic, and expectorant, like the fetid gum-resins generally, and may be employed in the same cases as assafetida, with which it is sometimes given in combination. Dose, 10 to 20 grains. Externally it is discutient and stimulant.

EMPLASTRUM GALBANI COMPOSITUM. U. S. (Prepared by melting together eight parts galbanum, one part turpentine, three parts Burgundy pitch, and thirty-six parts lead plaster.) This plaster is an excellent local application to indolent tumors and scrofulous enlargements of the glands and joints.

Pilulæ Galbani Compositæ. U. S. *Compound Pills of Galbanum.* (Three parts of galbanum and myrrh, each, and one part assafetida, with syrup to form a pilular mass.) Dose, 10 to 20 grains.

OLEUM SUCCINI. U. S. *Oil of Amber.*

The volatile oil obtained by the destructive distillation of amber.

Succinum or *Amber* is a fossil resin of vegetable origin, washed up by the sea in different parts of the world, but found chiefly on the shores of the Baltic. It is a hard, brittle, and translucent substance, in irregular-shaped pieces, of various shades of yellow or brown, insipid, and inodorous, except when heated. It yields on destructive distillation an acid, *succinic*, a volatile oil, and resin. The crude oil is thick, and dark colored.

Oleum Succini Rectificatum. U. S. *Rectified Oil of Amber.* The crude oil, by repeated distillation, is rendered pure and colorless. It is usually found of a light yellowish-brown color, with a strong, peculiar odor, and a hot, acrid taste, which properties it imparts to water.

Medical Properties and Uses. This oil was at one time much esteemed as a stimulant in nervous and spasmodic diseases, but is now rarely prescribed. Dose, 5 to 15 drops. Externally, it is rubefacient, and may be employed as an addition to stimulating liniments.

Succinic Acid is a volatile, crystallizable acid, soluble in water, insoluble in cold alcohol It was formerly employed as a stimulant and antispasmodic, in doses of 5 to 15 grains.

OLEUM CAJUPUTI. U. S. *Oil of Cajeput.*

The volatile oil distilled from the leaves of *Melaleuca Cajuputi*, a small tree, native of the Moluccas, and neighboring islands.

Properties. When pure it is a transparent, limpid liquid, of a fine green color, a strong, penetrating odor, resembling that of camphor and cardamom, and an aromatic, camphoraceous taste, succeeded by a sensation of coldness.

Medical Properties and Uses. Cajeput oil is a powerful dif-

fusible stimulant and antispasmodic, useful in spasmodic affections of the stomach, in hysteria, and in palsy of the tongue, where a stimulating action is desired. In the East it is much used in nervous diseases, and to raise the energy of the vital powers in low fevers and in cholera; externally, it acts as a rubefacient stimulant. Dose, from 1 to 5 drops, given in pill or in emulsion.

VALERIANA. U. S. *Valerian.*

The root of *Valeriana officinalis*, or *wild valerian*, a tall, perennial plant, found in many parts of Europe, and introduced into the gardens of this country. The root should be gathered in the spring, before the stems begin to grow, or in the autumn, when the leaves decay.

Properties. The root consists of numerous slender, cylindrical fibres, from two to six inches in length, attached to a rough, tuberculated head, often with a part of the stem attached. When dried it is of a yellowish-brown color externally, whitish internally, of a powerful, penetrating odor, and a bitter, acrid, somewhat nauseous taste. It imparts its active properties to both water and alcohol. It contains a volatile oil, resin, and a fatty acid, *valerianic acid.*

Oleum Valerianæ. U. S. *Oil of Valerian* is obtained by distillation with water, and is of a yellowish or pale-greenish color, with the odor and taste of valerian.

Acidum Valerianicum. U. S. *Valerianic acid* is obtained by the action of sulphuric acid on valerianate of soda. This salt is prepared by neutralizing with caustic soda the artificial valerianic acid, which is formed when fusel oil is distilled with a mixture of sulphuric acid and bichromate of potassa. The acid, when pure, is a colorless or yellowish oleaginous liquid, with a strong, repulsive odor, and a pungent, sour, acrid, and disagreeable taste. In this state it is not used as a medicine, but only to form salts with bases.

Medical Properties and Uses. Valerian is one of the most valuable and efficacious of the nervous stimulants, and is generally resorted to in the treatment of functional disorders of the nervous system. Dose of the powder, from 30 to 90 grains; of the oil, from 2 to 6 drops.

INFUSUM VALERIANÆ. U. S. (Half a troyounce of valerian in a pint of water.) Dose, f℥ss to f℥ij.

TINCTURA VALERIANÆ. U. S. *Tincture of Valerian.* (Four troyounces of valerian in two pints of diluted alcohol.) Dose, f℥i to f℥iv.

TINCTURA VALERIANÆ AMMONIATA. U. S. *Ammoniated Tincture of Valerian.* This preparation is made by macerating four troyounces of valerian in two pints of aromatic spirits of ammonia, and is much employed as an antispasmodic in hysteria and other nervous affections.

EXTRACTUM VALERIANÆ ALCOHOLICUM. U. S. This extract, prepared by evaporating the concentrated tincture, contains the active properties of the root, and is useful for combining in pills. Dose, 5 to 10 grains.

EXTRACTUM VALERIANÆ FLUIDUM. U. S. A concentrated tincture fully representing the virtues of the root. Dose, f℥i.

AMMONIÆ VALERIANAS. U. S. *Valerianate of Ammonia* is prepared by saturating valerianic acid with gaseous ammonia, and is in snow-white, pearly, quadrangular crystals, having the disagreeable odor of valerianic acid, and a sharp, sweetish taste. It is deliquescent in moist air, but effloresces in a dry atmosphere, and is soluble in water and alcohol. It is decomposed by potassa, and by the mineral acids. It is much used as a diffusible stimulant and antispasmodic in neuralgia, hysteria, and other nervous disorders. Dose, from 2 to 8 grains, dissolved in water or in elixir. The *Elixir of Valerianate of Ammonia* may be readily prepared by neutralizing the valerianic acid with carbonate of ammonia, and adding red Curaçoa cordial diluted with orange-flower water. It may be given in doses of f℥i to f℥ij.

ARNICA. U. S.

The flowers of *Arnica montana, Leopard's-bane.* A small, perennial, herbaceous plant, native of the northern portions of Europe and Asia, flowering in June and July.

Properties. The flowers are either single or compound, of a golden-yellow color, with a strong, peculiar, aromatic odor, and an herbaceous, acrid, somewhat bitter taste. They yield their

virtues to water and alcohol. They contain a bitter acrid principle, termed *cytisin*, a resin, and a volatile alkaloid, *arnicina*.

Medical Properties and Uses. Arnica is a powerful nervous stimulant, and in large doses, emetic and cathartic. In Germany it is much used as a nervine, but in this country is seldom given internally. Externally, it is much used for the relief of bruises, sprains, and local rheumatism. Dose of the powder, 5 to 20 grains, best given in infusion, made by adding half an ounce of arnica to a pint of water.

TINCTURA ARNICÆ. U. S. *Tincture of Arnica.* (Six troyounces of arnica to two pints of diluted alcohol.) Only used externally.

EXTRACTUM ARNICÆ ALCOHOLICUM. U. S. Dose, 5 to 10 grains, principally employed in the preparation of the plaster.

EMPLASTRUM ARNICÆ. U. S. Prepared by mixing a troyounce and a half of extract of arnica with three troyounces of melted resin-plaster. This is an excellent stimulant application in chronic rheumatism and chronic local inflammations.

The following are substances of minor importance which are occasionally used as antispasmodics, and require a brief notice:

DRACONTIUM. *U. S. Secondary. Skunk Cabbage.* The root of *Dracontium fœtidum*, also called *Symplocarpus fœtidus*, an indigenous plant. The root, which should be gathered in autumn, is a large tuber, with numerous fleshy fibres, with an acrid, rank, and nauseous odor, and a very acrid taste. In small doses it is stimulant and antispasmodic; in large doses, narcotic. Dose, 10 to 20 grains.

SCUTELLARIA. *U. S. Secondary.* The herb of *Scutellaria lateriflora*, or *Skullcap*, an indigenous, perennial plant, growing in all parts of the United States. This plant has enjoyed considerable repute as a tonic, nervine, and antispasmodic. It may be given in infusion or fluid extract. The oleoresin, obtained by precipitating the tincture, is sometimes used in doses of from 2 to 6 grains.

CYPRIPEDIUM. *U. S. Secondary.* The root of *Cypripedium pubescens*, or *yellow ladies' slipper*, also known as *nerve root*, and *American valerian*, a small plant, inhabiting the woods in different parts of the United States. The dried root consists of a knotty head, with numerous, contorted fibres, of a yellowish-

brown color, an aromatic odor, and a peculiar bitter taste. It appears to act as a gentle nervous stimulant, resembling valerian, though less powerful in its effects. Dose, 15 grains, given in powder, infusion, or tincture.

CAFFEA. U. S. *Coffee* is the seed of the *Caffea Arabica*, a small tree, native of Southern Arabia and Abyssinia, but extensively cultivated in most tropical countries. It contains a volatile, crystalline, highly nitrogenized substance, called *caffeine*. The berry, when dried and burnt, is tonic and stimulant, and when taken in large quantities produces restlessness, and other nervous symptoms. From its antisoporific properties it may be used to counteract the effect of opium and other narcotics, and to relieve intoxication. Caffeine has been recommended as an antiperiodic.

TEA. The dried leaves of *Thea Chinensis*, an evergreen shrub of China and Japan. There are several varieties in commerce, differing in color, flavor, and in strength; but all contain tannin, a volatile oil, and a volatile, crystallizable, nitrogenized substance, *thein*, considered to be identical with caffeine. Tea is astringent and moderately stimulant, and a strong infusion will often relieve nervous headache.

CEREBRAL STIMULANTS.

NARCOTICS are medicines which produce a primary stimulating effect on the nervous and vascular systems, which is rapidly followed by depression of the vital powers, and sleep, or, if a large quantity be taken, by coma. Different names have been given to the medicines belonging to this class. Thus, they are called SEDATIVES, from their repressing action; ANODYNES, from their influence in relieving pain; HYPNOTICS or SOPORIFICS, from their effects in inducing sleep; and ANÆSTHETICS, from producing insensibility in general. In their action three stages are noticed: 1st, that of excitement; 2d, that of narcotism or sleep; and, 3d, that of depression. When administered in medicinal doses, the first effect is to excite the nervous and vascular systems,—quickening the pulse and increasing the energy of the brain. This is soon followed by a greater depression of the vital

powers than is commensurate with the degree of previous excitement, soon terminating in sleep. If a larger quantity be taken, the stage of excitement is so short, and the narcotic effect so immediate, that many regard them as producing a direct sedative effect upon the system. In larger doses they prove poisonous, inducing a state of the system to which the term *Narcotism* has been applied. This is characterized by a perverted and prostrated condition of the brain and nervous system, followed by stupor or insensibility, and, toward the close, complete coma. Death ensues from the cessation of respiration consequent upon the want of cerebral influence.

These medicines differ more or less from one another, in the degree of their narcotic power, in their relative effect upon the different organs, their manner of affecting them, and in their several local tendencies. They produce their effects when applied to any part of the system capable of absorbing them, and when one fails to act, or their use must be long continued, another of analogous properties will often be found effectual. They are remarkable for the tolerance to their impression induced by long-continued use or by disease. This is remarkably the case with opium; but it does not follow that when the system has become accustomed to one narcotic it is so to all others. On the contrary, a moderate dose of some other narcotic will produce its usual effects. In certain diseased conditions large quantities may be given with benefit, which in ordinary conditions of the system would prove fatal. They must be used with great caution in children, as the impression to their effects is proportionally much greater in them than in adults.

This class of remedies is employed to relieve pain, allay irritation, and procure sleep; to arrest inordinate secretion; to control inflammatory action or irritation; or to make a powerful impression upon the nervous system. As a general rule, they are contraindicated where great plethora exists, or where inflammation or active determination to the brain is present. Their application to particular diseases will be referred to when speaking of the individual remedies belonging to the class.

OPIUM. U. S.

Opium is the concrete juice of the unripe capsules of *Papaver somniferum*, or *Poppy*, a native of Persia, but now growing wild or extensively cultivated in Europe and this country. The poppy is an annual plant, with an erect, smooth, glaucous stem, from two to five feet in height, with large, ovate, alternate leaves, bearing large white, silver-gray, or violet-colored flowers. There are two varieties,—*the white* and *the black*, distinguished by the color of their seeds; the former is usually described as the opium-plant. The capsule is smooth and globular, two or three inches in diameter, somewhat flattened at the top and bottom, and crowned by a starlike stigma, and when ripe, of a yellowish or brownish-yellow color. It contains numerous minute white seeds, which, when perfectly ripe, escape through small openings beneath the stigma. The capsules are sometimes used, in the form of syrup, as an anodyne for children, and applied externally in decoction, as an anodyne fomentation. The seeds are destitute of narcotic properties, but furnish, by expression, a bland oil, which is used in the East for culinary and pharmaceutical purposes.

The opium is obtained by making longitudinal incisions into the half-ripe capsules, taking care not to penetrate into the interior cavity, when a thick, milky juice exudes, which concretes on the edges of the cuts. This is scraped off, beat up to the proper consistence, and dried in the sun.

Properties. Opium comes in opaque masses of various size, generally enveloped in the poppy leaf, of a compact texture and tenacious, of a reddish-brown or deep fawn color, with a strong narcotic odor, and a bitter, slightly acrid taste. On exposure to the air it becomes hard, breaks with a resinous fracture, and is easily pulverized, yielding a powder of a yellowish-brown color. It yields its virtues to water, alcohol, and the dilute acids, but not to ether. It becomes soft on the application of heat, and burns at a higher temperature.

Commercial History. There are several varieties known in commerce, designated according to the countries in which they are produced. 1. *Turkey opium*, including Smyrna and Con-

stantinople. The *Smyrna*, called also *Levant opium*, is imported from Smyrna, and is the most esteemed for its cleanness and good quality. It occurs in irregular, rounded masses, of various size, covered with the capsules of a species of Rumex, with minute portions of the poppy capsule mingled with the mass, and when cut into, showing minute, shining tears. It contains more morphia than any other variety, averaging about 10 per cent. The *Constantinople opium* is in flattened cakes, covered with the leaves of the poppy, otherwise scarcely distinguishable from the former variety, except that it is destitute of the minute, shining tears. 2. *East Indian*, distinguished as *Bengal*, *Patna*, and *Malwah* opium, seldom reaches this country. 3. *Egyptian opium* is in flat, roundish cakes, and is distinguished from the Smyrna variety by being destitute of Rumex capsules, and in being brittle, instead of tenacious, being equally hard in the centre as at the surface, and of a redder color. It is an inferior variety, yielding only 6 or 7 per cent. of morphia.

Adulterations. Opium is often adulterated with the extract of poppy, various gums, aloes, sand, ashes, and other foreign substances, sometimes amounting to one-fourth of its weight. Besides, much is brought into the market from which the morphia has been fraudulently extracted. Most of the impurities may be detected by a careful inspection, but the only reliable test of purity is to ascertain the proportion of morphia which it contains. Good opium should yield 10 or 12 per cent. of impure morphia, precipitated from the infusion by ammonia with alcohol.

Chemical Constituents. Much attention has been paid to the analysis of opium, and it was the investigation of this substance that led chemists to the discovery of the alkaloids. The most important constituents are *morphia*, *narcotina*, *codeia*, *narceia*, and *meconic acid;* but numerous other principles have been found in it, though many think that some of them may be the result of the processes to which opium is submitted for their extraction.

Morphia. U. S. *Morphia* exists in opium combined with meconic acid, and is the principle upon which its narcotic effect essentially depends. It may be obtained by adding ammonia to an infusion of opium, and purifying the impure morphia by the agency of alcohol. Morphia is in colorless, shining crystals, in-

odorous and bitter, almost insoluble in water and ether, but soluble in alcohol, and in solutions of the caustic fixed alkalies. At a moderate heat it fuses, and at a red heat is dissipated. It assumes a fine blue color with the sesquichloride of iron. It is rarely administered, its salts being preferred, on account of their solubility.

Narcotina, the bitter principle of opium, exists in a free state, and is left behind when the drug is macerated with water. It is a white, inodorous, insipid substance, crystallizing in silky, flexible needles, insoluble in water, slightly soluble in alcohol, and very soluble in ether. It combines with acids and forms salts. From morphia it is distinguished by being insipid, soluble in ether, and by not giving a blue color with iron. It is entirely devoid of narcotic properties, but is supposed to be tonic and antiperiodic.

Codeia exists, like morphia, in combination with meconic acid, and is extracted with it in the preparation of the muriate. If ammonia be added to the mixed solutions of the muriates, morphia is precipitated, and the codeia, remaining in solution, may be obtained by evaporation. It is a white crystalline solid, soluble in water, alcohol, and ether, but insoluble in alkaline solutions. It is distinguished from morphia by not becoming blue on the addition of the salts of iron. It possesses narcotic and sedative properties, but is inferior to morphia.

Narceia is a white, inodorous, crystalline solid, with a bitter taste, obtained from the mother-liquor left after crystallizing out the salts of morphia. It is distinguished from other substances by the dilute mineral acids giving with it a fine light-blue color, and also by its forming a bluish color with iodine. It is without known influence on the system.

Paramorphia or *Thebaina* is a white, crystalline, fusible solid, with an acrid, styptic taste, soluble in ether and alcohol, but hardly so in water. It is distinguished from morphia by not forming crystalline salts with acids. Pelletier considers it isomeric with morphia, and Magendie states that it acts like brucia and strychnia.

Meconin is a white, crystalline, odorless solid, with an acrid taste, slightly soluble in water, but readily dissolving in alcohol

and ether. It is distinguished from morphia by its greater solubility in water, and from codeia by its not possessing alkaline properties.

Meconic acid is found in the poppy tribe only, and is in white, transparent, crystalline scales, of a sour taste. It is procured from meconate of lime by the action of hydrochloric acid; and is soluble in water, readily forms salts, and is remarkable for producing a deep-red color with the persalts of iron. It has little or no action on the system.

Opium also contains several other principles, *opiana*, *papaverina*, *porphyroxin*, whose properties have not been fully investigated, besides resin, gummy, fatty, and extractive matters, a trace of volatile oil, and inorganic salts.

Tests. It is very difficult to detect opium, either in its solid or fluid form, except by its peculiar odor. As morphia and meconic acid exist only in the products of the poppy, the presence of opium in any substance may be shown by the detection of these two principles. Meconic acid yields a cherry-red color with the tincture of chloride of iron, and a pale-green precipitate with the sulphate of copper. The chloride of iron forms a deep-blue solution, and nitric acid gives an orange-red color to morphia. This latter property it possesses in common with brucia and strychnia.

Physiological Action. In small doses, opium produces a stimulant effect, increasing the force, fullness, and frequency of the pulse, augmenting the heat of the body, and exhilarating the nervous functions. Its action is directed particularly to the brain, the mind becomes active, and crowded with ideas, and a sensation of pleasurable comfort pervades the system. Unless the dose be repeated, these effects soon subside, and are succeeded by depression of the arterial system, with great mental languor, drowsiness, and sleep. In larger doses, the stage of excitement is shorter, and the depression much greater, and the medicine proves narcotic. On awaking from the sleep produced by opium, there is a sense of fullness and weight in the head, with some nausea, and a furred tongue, loss of appetite, and indisposition to active exertion, with other symptoms of irregular nervous action, which, however, soon yield to the recuperative powers of the system.

While these effects are taking place, the secretions, except that of the skin, are diminished, and constipation usually follows. In some persons nausea and vomiting take place, and occasionally there is a disagreeable itching, or sense of pricking in the skin, sometimes attended with a species of miliary eruption.

In large doses opium causes giddiness and stupor without any previous excitement. The pulse and breathing are much diminished in frequency and force, the pupils become contracted, and insensible to light, with a dark suffusion of the countenance, coma soon supervenes, and death ensues unless the patient be relieved. The quantity necessary to produce these effects varies in different individuals, and is modified by age, sex, physical condition, and, above all, by habit. In many parts of the world, particularly in the East, opium is habitually employed with a view to its exhilarating influence, and enormous quantities are sometimes taken daily for this purpose. This vice of opium eating and smoking renders the mind sluggish and torpid, and brings about a derangement of the physical functions, which hurries the victim to a premature and miserable death.

Toxicology. The effects of opium are exerted chiefly on the brain and nervous system, and death is produced by a suspension of respiration, arising from a want of due influence from the brain. Hence the post-mortem appearances in poisoning do not afford any very satisfactory evidence of its mode of operating. The most marked appearances are turgescence of the vessels of the brain, and watery effusion into the ventricles. Sometimes the lungs are found gorged with blood, and there is almost always more or less lividity of the skin, and generally a fluid state of the blood; the body is also apt to pass rapidly into putrefaction. In poisoning by opium, the primary object is to remove the poison from the stomach; active emetics, such as the sulphate of zinc or copper conjoined with ipecacuanha, may be administered, and should these fail, the stomach-pump may be resorted to. The next object is to keep the patient constantly roused, and to obviate the debility which generally supervenes, by the use of internal stimulants, as brandy, ammonia, and strong coffee. If these means should fail, resort may be had to artificial respiration, by which the functions of the lungs and heart may be sustained

till the brain has overcome the effects of the narcotic. Of late years belladonna has been proposed as an antidote to poisoning by opium, on the theory of an antagonism between the physiological action of the two substances, and many cases are recorded of its successful employment.

Therapeutic Uses. Opium is undoubtedly one of our most important and valuable remedies. Pareira remarks, "for other medicines we have one or more substitutes; but for opium, none. Its good effects are not, as is the case with some valuable medicines, remote and contingent, but they are immediate, direct, and obvious; and its operation is not attended with pain or discomfort." As a general rule, it may be resorted to where the object is to relieve pain, allay nervous irritation, or procure sleep. In fevers it is principally used to procure sleep, where there is great wakefulness and delirium present without vascular excitement, or where this has been subdued by appropriate treatment. It may also be used at a later period, when symptoms of general debility supervene, both as a general stimulant and with a view to relieving particular symptoms. In these cases it must be used with caution, and not persevered in if the pupils become contracted, or if stupor or coma supervene. In inflammatory diseases opium may be judiciously combined with the antiphlogistic treatment, either as auxiliary, or to palliate particular symptoms, to mitigate pain, allay spasm, or to check excessive secretion. As a general rule, it should not be employed in imflammations of the brain or of the pulmonary organs, but in inflammations of the abdominal viscera, it may be freely used. In enteritis and peritonitis it is a remedy of the highest value, and may be employed in almost every form and stage of these diseases. In dysentery it allays the irritation of the intestines, relieves the perpetual desire to go to stool, and at the same time restrains the acrid secretions from the intestinal surface, and equalizes the circulation by determining to the skin. In cystitis, and diseases of the genito-urinary organs, in nephralgia caused by the passage of calculi down the ureters, it proves useful by allaying spasmodic action and diminishing irritation. In pulmonary catarrh, when the first stage has passed by and secretion is fully established, opium may prove beneficial by

diminishing the sensibility of the bronchial mucous membrane; but great caution is requisite in these cases occurring in old or debilitated subjects. In diarrhœa it relieves pain, checks the excessive secretion of fluids into the intestines; and in chronic forms of the disease, allays the morbid irritability of the bowels, and often of itself effects a cure. In internal hemorrhages, particularly those from the lungs and uterus, it is a valuable adjuvant to astringents, as acetate of lead, etc.; and, though it has no influence upon the sanguineous discharge, it proves highly serviceable in allaying the nervous excitement which generally accompanies profuse hemorrhages. In delirium tremens, when the skin is cool and moist, the bowels free, and the pulse soft, without much prostration, opium as a general result produces profound and long-continued sleep; but when the prostration is extreme and the pupils contracted, it is inadmissible. In neuralgia, rheumatism, and gout, it is constantly employed. In fact, there is hardly a disease which does not occasionally present symptoms demanding its use. As a general rule, opium is contraindicated in all affections of the brain attended with congestion, as phrenitis, apoplexy, etc.; in inflammatory diseases in plethoric subjects; in pulmonary affections, where the cough is dry and hard, and the expectoration is difficult or scanty; and during pregnancy. Its use should be avoided in infants and young children, unless imperatively called for.

Administration. The average dose of opium is 1 grain, administered either in pill or powder, or an equivalent dose of one of its numerous preparations. This dose, however, is subject to great variations, depending on the age or habits of the patient, the nature of the disease, and the object for which it is employed. When from any cause it cannot be administered by the mouth, it may be advantageously employed by the rectum, either in the form of enema or suppository, and when used in this way about twice the ordinary quantity should be given. It may also be applied externally, especially upon a part denuded of the cuticle. Morphia may be injected into the subcutaneous cellular tissue, and in this way acts with great energy. The effects are much modified by combination with other medicines: ipecacuanha increases its action on the skin; mercurials obviate its constipating

tendency; the antimonials lessen its peculiar action on the nervous system; while it increases the power of astringents, without the production of narcotism.

Tinctura Opii. U. S. *Tincture of Opium. Laudanum.* (Prepared by macerating two and a half troyounces of powdered opium in a pint of water for three days, then adding a pint of alcohol and macerating for three days longer, and percolating with diluted alcohol, until two pints of tincture are obtained.) Thirteen minims or twenty-five drops are equivalent to one grain of opium. This is the most common and extensively employed preparation, and may be used for all the purposes for which the opium itself is employed.

Tinctura Opii Camphorata. U. S. *Camphorated Tincture of Opium. Paregoric Elixir.* (Prepared by macerating for seven days powdered opium and benzoic acid, each, sixty grains; camphor, forty grains; oil of anise, a fluidrachm; clarified honey, two troyounces; diluted alcohol, two pints.) Each half a fluidounce contains one grain of opium. In this preparation the combination of stimulants modifies their separate actions, and renders it a mild anodyne and antispasmodic. It is much used to allay troublesome cough, where there are no inflammatory symptoms, and to relieve nausea and slight pain in the bowels. Dose, for an adult, f℥i to f℥ij; for an infant, from 5 to 20 drops; for children the dose varies, according to age, from 20 drops to f℥i.

Tinctura Opii Deodorata. U. S. *Deodorized Tincture of Opium* is a watery infusion of opium, free from certain noxious ingredients in the crude drug. It is prepared by first macerating opium in water, and thus obtaining a liquid, watery extract, which is free from all the ingredients insoluble in water. This is then agitated with ether, which dissolves out the noxious odorous matter. The ether is then separated, and the solution mixed with enough alcohol to preserve it. It is of the same strength as laudanum, and may be used in all cases in which opiates are indicated.

Tinctura Opii Acetata. U.S. *Acetated Tincture of Opium* is prepared by rubbing two troyounces of opium with twelve fluidounces of vinegar, and adding half a pint of alcohol. Ten minims or twenty drops equivalent to one grain of opium.

Vinum Opii. U. S. *Wine of Opium*, a substitute for *Sydenham's laudanum*, is prepared by adding two troyounces of opium, with sixty grains of cinnamon and cloves, each, to a pint of sherry wine. Strength same as that of laudanum. It is much used as an external application in chronic inflammation of the conjunctiva.

Acetum Opii. U. S. *Vinegar of Opium. Black Drop.* This preparation contains the morphia in a state of acetate, which is considered to be the most agreeable in its mode of action. It is prepared by macerating five troyounces of powdered opium, a troyounce of nutmeg, one hundred and fifty grains of saffron, in a pint of diluted acetic acid, and then percolating with the same menstruum till two pints are obtained. It is double the strength of laudanum.

Confectio Opii. U. S. *Confection of Opium*, prepared by beating opium with honey and spices. One grain of opium in thirty-five grains of confection.

Extractum Opii. U. S. *Extract of Opium* is made by evaporating the aqueous solution. It is about twice the strength of the opium itself, and is less stimulating and unpleasant.

Pulvis Ipecacuanhæ Compositus. U. S. *Pulvis Ipecacuanhæ et Opii. Dover's Powder.* This valuable preparation is made by rubbing together one part of opium and ipecacuanha, each, with eight parts of sulphate of potassa. The sulphate of potassa serves by its hardness to promote the minute division and thorough intermixture of the active ingredients; ten grains of the powder contain one grain of opium and one of ipecacuanha. Dover's powder is an admirable anodyne diaphoretic, unsurpassed by any other combination in its power of promoting perspiration. The opium itself strongly determines to the skin, while the ipecacuanha has a relaxing influence over the cutaneous vessels, and the compound is more active in this way than either of its ingredients individually. It is contraindicated in irritable states of the stomach.

Pilulæ Opii. U. S. *Pills of Opium* are prepared by beating together sixty grains of opium and twelve grains of soap with water, to form a mass, and dividing into sixty pills. Each pill contains one grain of opium.

Pilulæ Saponis Compositæ. U. S. *Compound Pills of Soap*, made of soap and opium, in the proportion of four grains of soap to one grain of opium.

The salts of morphia are obtained by saturating the alkali with the acid, and evaporating the solution. They are all freely soluble in water, and produce analogous effects, being less apt to cause nausea, headache, and other unpleasant effects, than the opium itself. One-sixth of a grain equivalent to one grain of opium.

Morphiæ Sulphas. U. S. *Sulphate of Morphia* is in delicate, white, and feathery crystals, of a silky lustre, resembling very much in appearance the sulphate of quinia. It is the salt of morphia most generally used, and may be given in pill or solution.

Liquor Morphiæ Sulphatis. U. S. *Solution of Sulphate of Morphia* is a simple solution in the proportion of one grain to an ounce of water. *Magendie's solution*, which is sometimes used, contains sixteen grains to the fluidounce.

Morphiæ Acetas. U. S. *Acetate of Morphia* is in the form of slender, acicular crystals, or of a white powder, wholly soluble in water and alcohol.

Morphiæ Murias. U. S. *Muriate of Morphia* is in snow-white, feathery crystals, soluble in water and alcohol.

We employ these salts in preference to opium, when we wish to obtain the medicinal effects by endermic application, or by injection into the subcutaneous cellular tissue.

Morphiæ Citras. A *Solution of the Citrate of Morphia* is employed in some parts of the United States. It is prepared by dissolving sixteen grains of morphia with eight grains of citric acid and one-quarter of a grain of cochineal in one ounce of water. It is considered two and a half times stronger than laudanum; ten drops equivalent to one grain of opium.

A *Solution of Bimeconate of Morphia* has also been introduced into medicine. It is of the same strength as laudanum, and is said to produce less cerebral disturbance and less constipation than other preparations of opium.

LACTUCARIUM. U. S. *Lactucarium.*

The CONCRETE JUICE of *Lactuca sativa*, the common *Garden Lettuce*, an annual plant, cultivated in all parts of the civilized world. The leaves and stem abound in a milky juice, which is obtained by slicing off the flowering head before the flowers expand, collecting the juice as soon as it concretes, and removing a fresh slice as long as it yields any white juice.

Properties. As met with, it is in small, roundish, rough masses, of a reddish-brown color, a narcotic odor, closely resembling that of opium, and a bitter and acrid taste. It yields its virtues to water and alcohol, and contains a peculiar neutral bitter principle called *lactucin.*

Medical Properties and Uses. In its action on the system lactucarium closely resembles opium, but it produces scarcely any excitement, merely impairing the sensibility of the system and inducing sleep. It is sometimes employed to allay cough in phthisis and other pulmonary affections, and as an anodyne in febrile and inflammatory diseases, where opium, from its stimulant properties, is inadmissible. Combined with camphor it often gives relief in chordee and spermatorrhœa. Dose, 5 to 20 grains.

SYRUPUS LACTUCARII. U. S. *Syrup of Lactucarium* is prepared by adding a concentrated tincture of lactucarium to syrup. It possesses the virtues of the medicine, free from its inert albuminous matter. Dose, f℥i to f℥iij.

HYOSCYAMUS. U. S. *Henbane.*

The LEAVES and SEEDS of *Hyoscyamus niger*, *Henbane*, a biennial plant, with a long, tapering, fleshy root, bearing considerable resemblance to that of the common parsnip. It grows wild throughout Europe, and is naturalized in this country. All parts of the plant possess medicinal virtues, but only the leaves and seeds are officinal.

Properties. The *leaves* should be gathered when the plant begins to bloom, and when fresh have a mucilaginous and acrid taste, with a strong fetid and narcotic odor. When dried they are of a greenish-yellow color, with but little odor or taste.

They impart their virtues to water and alcohol. The *seeds* are small, roundish, of a grayish-yellow color, with an odor like that of the leaves, and a bitter, oily taste. Both leaves and seeds contain *hyoscyamia*, an alkaloid, crystallizing in transparent, colorless needles, inodorous, of an acrid and disagreeable taste, slightly soluble in water, and soluble in alcohol and ether. It possesses properties almost identical with those of atropia, from which it differs in being more soluble in water.

Medical Properties and Uses. Hyoscyamus is anodyne, antispasmodic, and narcotic. In medicinal doses it soothes irritation, allays pain, and relieves spasm. It differs from opium in not checking secretion, causing constipation, or producing headache; besides, it dilates the pupil, while opium contracts it. In overdoses it produces the effects of the narcotic poisons. It may be employed in all cases where the stimulating effects of opium would prove injurious, as in delirium and cerebral affections; in all forms of neuralgia and spasmodic diseases, attended with great excitability of the nervous system; and in irritation of the bronchial tubes, causing cough. It is often combined with cathartics, to correct their irritating effects, without interfering with their activity. Dose, 5 to 20 grains, administered in substance, infusion, tincture, or extract.

Extractum Hyoscyami. U. S. The *Extract of Hyoscyamus* is the inspissated juice, obtained by evaporating the expressed juice of the fresh leaves to a proper consistence. It is of a dark-olive color, a narcotic odor, and a bitter, nauseous taste. Dose, $\frac{1}{2}$ to 3 grains.

Extractum Hyoscyami Alcoholicum. U. S. The *Alcoholic Extract of Hyoscyamus*, obtained by evaporating the concentrated tincture of the dried leaves, is of a more uniform strength than the common extract. Dose, 1 to 2 grains.

Extractum Hyoscyami Fluidum. U. S. *Fluid Extract of Hyoscyamus* is a concentrated alcoholic tincture, and may be given in doses of from 5 to 10 minims.

Tinctura Hyoscyami. U. S. *Tincture of Hyoscyamus* (four troyounces of hyoscyamus leaves to two pints of diluted alcohol) may be substituted for laudanum, when the latter disagrees with the patient, or is objectionable on account of its tendency to produce constipation. Dose, f℥i.

BELLADONNA.

BELLADONNÆ FOLIUM. U. S. *Belladonna Leaves.* BELLADONNÆ RADIX. U. S. *Belladonna Root.* The LEAVES and ROOT of *Atropa Belladonna*, or *Deadly Nightshade*, an herbaceous perennial plant, with a fleshy creeping root, native of Europe, but cultivated in this country. The stem is from three to four feet high, with alternate, ovate, pointed leaves from three to six inches long, of a greenish color on their upper surface, and paler beneath, bearing large, bell-shaped, dull-red flowers. The fruit is a shining black berry, about the size of a small cherry. The whole plant is active, but only the LEAVES and ROOT are used. The leaves should be collected when the plant is in flower, before the ripening seeds have deprived them of their activity; the roots in autumn or early in the spring, and from plants three years old.

Properties. The dried leaves are of a dull-greenish color, have a faint narcotic odor, and a sweetish, subacrid, nauseous taste. The root is long and fibrous, of a reddish-brown color externally, whitish within, with little odor, and a feeble sweetish taste. Both the leaves and root impart their active properties to water and alcohol. They contain a peculiar alkaline principle called *atropia*, in combination with malic acid.

Physiological Action. In very small doses, belladonna produces no sensible effects, except, perhaps, a slight dilatation of the pupil, and diminished sensibility and irritability when these are morbidly increased. In larger doses the most marked effects are a sense of fullness and giddiness about the head, dilatation of the pupil, more or less dimness of vision, with a sense of dryness and constriction of the fauces, frequently accompanied with difficulty of swallowing. These effects soon disappear on discontinuing the medicine. In large doses it acts as an energetic poison, and all these symptoms are present in an aggravated form, and are followed by extravagant delirium and coma. In comparing the action of belladonna with that of other narcotics, the most marked symptoms are dilatation of the pupil, with insensibility of the iris to light, and disturbance of vision.

It produces this effect in whatever way it is introduced into the system. When applied locally to the eye, it dilates the pupil, without causing any constitutional disturbance, and when applied to one eyebrow does not affect the other. The manner in which it produces this is not fully understood. Headland says that there are several possible ways in which it may act: "By a direct paralyzing action on the muscles of the iris; by paralyzing the nerves of the pupil generally, or that part of them only which tends to cause lessening of the aperture; or by stimulating the nerves which supply the radiating fibres of the iris, and so enlarging the aperture."

Medical Uses. Belladonna is used as an anodyne to allay pain and quiet irritation in nervous and spasmodic diseases, and to produce dilatation of the pupil in diseases of the eye, and in ophthalmic surgery. As an antispasmodic it is one of our most reliable remedies in hooping-cough, diminishing in a marked degree the violence and frequency of the paroxysms of cough. In spasmodic asthma and spasmodic coughs it also exercises a beneficial influence. In epilepsy, chorea, and other derangements of the nervous system arising from irritability, it proves useful as a sedative and palliative, and may be advantageously conjoined with the tonic treatment. In neuralgia, particularly of the head and face, it proves successful where all other remedies have failed. In dysmenorrhœa, in incontinence of urine, so common in children, it has also been found very efficacious. It has been used both as a remedy and as a preventive of scarlet fever, and medical opinions are divided as to its value for the latter purpose. Externally it may be applied in rigidity of the os uteri during lingering labors, and in spasmodic strictures of the urethra, or of the sphincters of the bladder and rectum. It is also recommended to be applied in the form of plaster to the breasts, to arrest the secretion of milk. For dilating the pupil the atropia is generally preferred. Dose of the powdered leaves, $\frac{1}{2}$ to 1 grain. It is, however, seldom used in this way, the extract being preferred.

Extractum Belladonnæ. U. S. *Extract of Belladonna* (prepared by evaporating to the proper consistence the expressed juice of the fresh leaves) is of a dark brown color, a slightly

narcotic, not unpleasant odor, and a bitterish taste. It is uncertain, on account of its variable strength, and is best given in small doses, gradually increased till the effects of the medicine are experienced. Dose, $\frac{1}{4}$ to $\frac{1}{2}$ grain.

Extractum Belladonnæ Alcoholicum. U. S. *Alcoholic Extract of Belladonna.* Made by evaporating the concentrated tincture. Dose, same as the simple extract.

Tinctura Belladonnæ. U. S. *Tincture of Belladonna* (four troyounces of the dried leaves with two pints of diluted alcohol). Dose, 15 to 30 drops.

Unguentum Belladonnæ. U. S. *Belladonna Ointment* is prepared by rubbing one drachm of extract, rendered soft with a little water, with a troyounce of lard. It is a convenient form for the external application of belladonna. Its tendency to become hard may be obviated by adding a little glycerin instead of water, as directed in the officinal process.

Emplastrum Belladonnæ. U. S. *Belladonna Plaster* is prepared by mixing one part of alcoholic extract of belladonna with two parts of resin plaster. It is an excellent anodyne and antispasmodic application in neuralgia, rheumatic and other pains.

Atropia. U. S. *Atropia* is procured by exhausting the root by alcohol, by means of percolation, and, after distilling off the alcohol, adding sulphuric acid to convert the atropia into the sulphate. The liquid, still further concentrated, is then mixed with water to separate resinous and fatty matters, and, after filtration, is treated with chloroform and solution of potassa. The latter separates the atropia from the sulphate, and the former dissolves it and sinks to the bottom, and yields the atropia by evaporation. It is in needle-like, prismatic crystals, of a brilliant white color, inodorous, of a bitter and acrid taste, sparingly soluble in water, more readily in alcohol and ether. It forms crystallizable salts with acids. Atropia is an energetic poison, producing effects analogous to belladonna, but much more powerful. Dose, $\frac{1}{30}$ of a grain, rarely given internally, but chiefly externally, to dilate the pupil. It is sometimes used hypodermically, but this method requires great caution. It is principally used in the form of solution, *Liquor Atropiæ*, made

by dissolving four grains in seven drachms of water with one drachm of alcohol. One drop of this solution applied to the eye is sufficient to dilate the pupil.

ATROPIÆ SULPHAS. U. S. *Sulphate of Atropia* is prepared by dissolving atropia in ether, and adding sulphuric acid with a little alcohol, drop by drop, till the atropia is saturated, and evaporating the solution. It is a white, slightly crystalline powder, having the taste of atropia, very soluble in water and alcohol, but insoluble in ether and chloroform. The only advantage it possesses over the alkaloid is its solubility in water.

STRAMONIUM.

STRAMONII FOLIUM. U. S. *Stramonium Leaf.* STRAMONII SEMEN. U. S. *Stramonium Seed.* The LEAVES and SEED of *Datura Stramonium. Thornapple*, commonly called *Jamestown Weed*, is an herbaceous, annual plant, growing wild in all parts of the world. It has a leafy, branching stem, usually about three feet high, with leaves five or six inches in length, of an ovate, triangular form, dark-green on the upper surface, and pale beneath. In July and August it bears large trumpet-shaped flowers, which are succeeded by a capsule, about the size of a hen's egg, covered with long prickles and filled with seeds. All parts of the plant possess medicinal properties, but only the LEAVES and SEEDS are officinal.

Properties. The LEAVES should be gathered when the flowers are full-blown, and when fresh have a fetid, narcotic odor, which they lose on drying. They have a bitter and nauseous taste, and when chewed give the saliva a greenish tinge. The SEEDS, when ripe, are small, kidney-shaped, of a brownish-black color, without odor, but with a faint bitter taste. They are much more energetic in their action on the system than the leaves. Both the leaves and seeds impart their active properties to water and alcohol. They contain a vegetable alkaloid, *daturia*, which is similar in its chemical and physiological properties to atropia. When pure, it is a colorless, crystalline substance, without odor, of a bitterish, tobacco-like taste, alkaline in its reactions,

sparingly soluble in water, except at a boiling temperature, but soluble in alcohol.

Medical Properties and Uses. Stramonium is a narcotic, closely resembling hyoscyamus and belladonna in its effects, and may be used for the same purpose. It is, however, principally used as an inhalation, by smoking or otherwise, as a remedy for the asthmatic paroxysm, and the dyspnœa which occurs in emphysema of the lungs, and in organic diseases of the heart. Externally, it is much used in the form of ointment in hemorrhoids and other painful affections of the rectum, and often affords relief to the intolerable itching and burning so annoying in these affections. Dose of the powdered leaves, 2 grains; of the seeds, 1 grain.

TINCTURA STRAMONII. U. S. *Tincture of Stramonium* (prepared by percolation; four troyounces of seeds with two troyounces of diluted alcohol) may be used for all the purposes for which the medicine is given. Dose, 20 to 40 drops, repeated till it affects the system.

EXTRACTUM STRAMONII. U. S. *Extract of Stramonium*, the inspissated juice. Dose, 1 grain.

EXTRACTUM STRAMONII ALCOHOLICUM. U. S. *Alcoholic Extract of Stramonium.* Prepared by evaporating the alcoholic tincture to the proper consistence. Dose, 1 grain.

UNGUENTUM STRAMONII. U. S. *Ointment of Stramonium* (sixty grains of extract of stramonium, rubbed up with half a fluidrachm of water, and mixed with a troyounce of lard) is used as an anodyne application to hemorrhoids, irritable ulcers, etc.

DULCAMARA. U. S. *Bittersweet.*

The stalks of *Solanum Dulcamara, Woody Nightshade* or *Bittersweet*, a woody creeping or climbing vine, indigenous to Europe, and naturalized extensively in this country. The officinal part is the stems, which should be collected in the autumn, after the leaves have fallen.

Properties. As found in the shops, these twigs are about the size of a goose-quill, from two to three inches in length; when fresh they have a faint nauseous odor, which they lose on dry-

ing, and a bitter taste, followed by sweetness. Water and alcohol extract their virtues, which depend principally upon an alkaline principle, *solania*, which also exists in the stalks of the *S. tuberosum*, or common potato. It is a white, opaque powder, inodorous, very bitter, possessing narcotic and emetic properties, and is in large doses powerfully poisonous.

Medical Properties and Uses. Bittersweet is slightly narcotic, with supposed sudorific and alterative properties. In overdoses it acts as an acro-narcotic poison. It is chiefly employed in chronic cutaneous diseases of an obstinate character, particularly those of a scaly nature, as lepra, psoriasis, and pityriasis, and in chronic rheumatism. It is usually administered in the form of decoction, extract, or fluid extract.

DECOCTUM DULCAMARÆ. U. S. *Decoction of Bittersweet* is prepared by boiling a troyounce of bittersweet in a pint of water, and, after straining, adding sufficient water to make the decoction measure a pint. Dose, f℥i to f℥ij, three or four times a day.

EXTRACTUM DULCAMARÆ. U. S. *Extract of Bittersweet* is prepared by evaporating the alcoholic tincture to the proper consistence. Dose, 10 to 20 grains.

EXTRACTUM DULCAMARÆ FLUIDUM. U. S. *Fluid Extract of Bittersweet* is prepared by adding sugar to the concentrated tincture. Dose, 30 drops to f℥i, three or four times a day, and gradually increased if necessary.

HUMULUS. U. S. *Hops.*

The STROBILES of *Humulus Lupulus*, or *Hop vine*, a perennial climbing plant, native of North America and Europe, and cultivated throughout the world. These are picked when fully ripe, and carefully and gradually dried by artificial heat.

Properties. The fruit or strobiles consist of thin, leaf-like scales, of a greenish-yellow color, with a strong, fragrant, somewhat narcotic odor, and a bitter, aromatic taste. They impart their properties to boiling water and alcohol. They contain a bitter principle and a volatile oil, but the most active portion is a peculiar resinous secretion which covers the surface of the scales, called *lupulin*.

LUPULINA. U. S. *Lupulin* may be obtained separate by thrashing and sifting the strobiles, of which it constitutes about one-sixth by weight. It occurs in small, shining, yellowish grains, with the peculiar flavor of hops, and a bitter taste. It is inflammable, and when moderately heated becomes somewhat adhesive.

Medical Properties and Uses. Hops are tonic, diuretic, and slightly narcotic, and have been recommended in diseases of debility accompanied with wakefulness or other nervous derangement. They form an excellent anodyne when opium or other narcotics cannot be tolerated. A pillow of hops is sometimes resorted to, and is useful in allaying restlessness and producing sleep in nervous disorders. They are also applied as fomentations in painful swellings and tumors. Their principal consumption, however, is in the manufacture of malt liquors, to which they communicate their bitter flavor and tonic properties. The effects of hops may be obtained most conveniently by the use of *lupulin*. The dose in substance is from 6 to 12 grains, given in the form of pill.

INFUSUM HUMULI. U. S. *Infusion of Hops* is prepared by macerating half a troyounce of hops in a pint of boiling water. Dose, f℥i to f℥ij.

TINCTURA HUMULI. U. S. *Tincture of Hops* is prepared by percolation, with five troyounces of hops to two pints of diluted alcohol. Dose, f℥i to f℥iij.

TINCTURA LUPULINÆ. U. S. *Tincture of Lupulin* is prepared by percolation, with four troyounces of lupulin to two pints of alcohol. It is preferable to the tincture of hops. Dose, f℥i to f℥ij.

EXTRACTUM LUPULINÆ FLUIDUM. U. S. *Fluid Extract of Lupulin* is a concentrated tincture, containing the virtues of an ounce of lupulin in a fluidounce. Dose, 10 to 15 minims.

OLEORESINA LUPULINÆ U. S. *Oleoresin of Lupulin* is the volatile oil and resin, extracted by ether. Dose, 2 to 5 grains.

EXTRACTUM CANNABIS. U. S. *Extract of Hemp.*

An alcoholic extract of the dried tops of *Cannabis sativa*, variety *Indica*, an annual plant, native of Persia and the northern parts of India. It is cultivated in many parts of Europe and this country on account of the strong fibres of its bark, so extensively employed in the manufacture of rope. It is from the India variety only that the medicine is obtained; the heat of the country apparently favoring the development of its active properties, which reside in a resinous substance exuding from glands upon the surface of the stalks and leaves.

Properties. The extract, which is prepared by evaporating a tincture of the dried tops, is of a dark olive-green color, soft and adhesive when warmed, of a fragrant, narcotic odor, and a bitter, acrid taste. It is soluble in alcohol and ether, but not in water. Its active principle is the resin *cannabin;* it also contains a small portion of volatile oil.

Medical Properties and Uses. Extract of hemp is a powerful narcotic, causing exhilaration and intoxication, followed by delirium and stupor, with but little effect upon the circulation. It differs from opium in not decreasing the secretions, nor causing headache or subsequent constipation, and may be occasionally substituted for it; but it is much less certain in its effects. In the East, both the herb and the resin are employed, under the name of *hashish*, for their intoxicating effects, which resemble somewhat those produced by alcohol and opium. Dose, $\frac{1}{2}$ grain to 2 grains.

EXTRACTUM CANNABIS PURIFICATUM. U. S. *Purified Extract of Hemp* is prepared by evaporating the tincture of the commercial extract. It has the advantage of being more uniform than the crude extract.

TINCTURA CANNABIS. U. S. *Tincture of Hemp* is prepared by dissolving three hundred and sixty grains of the purified extract in one pint of alcohol; forty drops are equivalent to one grain of the extract.

CONIUM. U. S. *Hemlock.*

The LEAVES of *Conium maculatum*, an umbelliferous plant, native of Europe, but cultivated in this country for medicinal

purposes. It is a large plant, with a tall, smooth, spotted stem, with smooth, tripinnate, bright-green leaves, flowering from June to August, and emitting a fetid odor, generally compared to that of the urine of a cat. The leaves should be gathered when the plant is in flower, and should be quickly dried, and kept in close vessels, excluded from the light.

Properties. The dried leaves have a fine green color, a strong, heavy, narcotic odor, and a bitter nauseous taste, which is retained in the powder. All parts of the plant contain a volatile oil, and a volatile liquid alkaloid, *conia* or *conine*, united with *conic acid.* CONIA may be obtained by distilling the fresh leaves or the alcoholic extract with water and caustic potash, when it readily passes over and floats on the surface of the water. It is in the form of a yellowish oily liquid, lighter than water, with a strong, penetrating odor and an acrid taste. Sparingly soluble in water, freely so in alcohol, ether, and the oils. It is a highly energetic poison in very small doses.

Medical Properties and Uses. Conium is narcotic, and somewhat sedative to the circulation. It acts principally on the spinal cord, depressing the reflex action, and producing effects directly opposite to those of strychnia. As an anodyne and antispasmodic it has been used in asthma and hooping-cough, and may be substituted for opium to relieve the irritative cough of chronic catarrh and phthisis. In these cases it is soemtimes used with benefit by inhalation. To relieve pain it is used in connection with other narcotics in neuralgic and rheumatic affections. In moderate and repeated doses it is said to increase the secretions and to cause the absorption and disappearance of glandular enlargements, and at one time enjoyed great reputation in the treatment of cancerous tumors and scrofulous and syphilitic swellings; but beyond relieving pain and quieting nervous irritation it does not appear to possess any peculiar powers in these diseases. The alkaloid conia acts very rapidly, prostrating the nervous power, and, according to Christison, producing paralysis of the voluntary muscles, and causing death by arresting respiration. Dose of the powdered leaves, from 3 to 5 grains, but the extract is generally preferred.

EXTRACTUM CONII. U. S. *Extract of Conium* should be made

by evaporating the expressed juice of the fresh leaves, without the aid of heat. When pure, it has an olive-green color, with a strong narcotic fetid odor, and a bitterish saline taste. Dose, 2 grains, repeated till it affects the system.

Extractum Conii Alcoholicum. U. S. *Alcoholic Extract of Conium*, when made from recently and carefully dried leaves, is a good preparation. Dose, same as simple extract.

Extractum Conii Fluidum. U. S. *Fluid Extract of Conium* is a concentrated tincture, prepared with diluted alcohol to which acetic acid has been added. The acid not only increases the solvent powers of the menstruum, but contributes to protect the alkaloid against decomposition during the concentration. Dose, 4 or 5 minims, increased if necessary.

Tinctura Conii. U. S. *Tincture of Conium.* (Four troy-ounces to two pints of diluted alcohol.) Dose, 30 minims to f℥i. The best preparation of this medicine is the Succus Conii of the British Pharmacopœia, prepared by adding one part by measure of alcohol to three parts of inspissated juice.

CAMPHORA. U. S. *Camphor.*

Camphor is a peculiar concrete substance obtained from *Camphora officinarum*, *Camphor Laurel*, a handsome evergreen of considerable size, native of China, Japan, and other parts of Eastern Asia. To procure the camphor, which is diffused through all parts of the plant, the small branches, the wood, and roots are cut into small pieces, and placed with a little water in large iron vessels, to the top of which are attached earthen receivers furnished with a lining of straw. A moderate heat is then applied, and the camphor, volatilized by the steam, is condensed upon the straw. This constitutes the crude camphor, which is imported chiefly from Canton. There are two varieties in the market, the *Chinese* or *Formosa* and the *Japan* or *Dutch* camphor, named from the place of its origin. For medicinal purposes it is refined by mixing with it a little lime, and subliming it in thin glass or iron vessels. When thus purified, it is met with in the form of large circular cakes, one or two inches thick, concave on one side, convex on the other, and perforated in the centre.

Properties. Camphor is a white, translucent substance, solid at ordinary temperatures, somewhat unctuous to the touch, fragile, breaking with a shining crystalline fracture, yet so tough as to be pulverized with great difficulty, unless with the aid of a little alcohol. It has a powerful, penetrating, diffusible odor, and a bitter, pungent, cooling taste. It is lighter than water, and so volatile that it evaporates at ordinary temperatures if exposed to the atmosphere, and if kept in bottles the vapor condenses in large and beautiful crystals. It melts at 288°, and forms a transparent liquid, which boils if the heat be increased to 400°. It is insoluble in water, requiring 1000 parts for its solution, to which, however, it imparts a decided camphoraceous odor and taste; it is soluble in alcohol, ether, chloroform, and the fixed and volatile oils. It is highly inflammable, burning with a brilliant flame and much smoke. In its chemical composition it is closely analogous to the essential oils, and is thought to be an oxide of *camphene*, a proximate principle, of the nature of a volatile oil, found in oil of turpentine, and which enters into the constituents of many vegetable organic substances.

Borneo camphor, a variety highly esteemed by the Chinese, is found in the wood of *Dryobalanops Camphora*, a large forest tree of Borneo and the adjacent islands. It exists, in concrete masses of considerable size, in the trunk of the tree, from which it is obtained by splitting it. It is white, opaque, of a foliaceous crystalline texture, analogous in odor and taste to the officinal camphor. The genuine is sometimes adulterated with artificial camphor, a product of the action of hydrochloric acid upon common oil of turpentine.

Medical Properties and Uses. In moderate doses, frequently repeated, camphor first acts as a gentle stimulant, increasing somewhat the heat and strength of the body, and producing a determination to the skin. After this, or if a full dose be taken, it quiets irritation, allays pain, and induces sleep. In larger doses it acts as an acro-narcotic poison. Its moderately stimulating powers, its diaphoretic tendency, and its tranquilizing influence over the nervous system render it particularly useful in fevers assuming the typhoid type, and in the advanced stages of acute inflammations when the vital powers are greatly exhausted.

In these cases, when delirium, extreme restlessness, and great depression of the nervous energy are the prominent symptoms, it may advantageously be conjoined with stimulants and tonics. In diseases of the brain, attended with great wakefulness and irritability, it is one of the best remedies we possess. In disorders of the genito-urinary organs it exercises a most beneficial influence, and is extensively employed as an anodyne in a great number of spasmodic and nervous diseases. In many of these cases it is often combined with opium, and tends to prevent the headache and other disagreeable symptoms which that remedy is apt to occasion. In the exanthemata it is said to be effectual in restoring the eruption, when from any cause it has receded. Externally, dissolved in alcohol or oil, it forms a valuable anodyne embrocation in sprains, chronic rheumatism, indolent enlargements of the glands, and in various inflammatory complaints. The medium dose of camphor is from 5 to 10 grains, but it may be diminished or increased to meet various indications. It may be given in pill, or diffused in water by trituration with various substances; the emulsion, made with gum arabic and sugar, is the preferable mode of administering it.

Aqua Camphoræ. U. S. *Camphor Water* is prepared by rubbing one hundred and twenty grains of camphor first with a little alcohol, then with carbonate of magnesia, and gradually adding two pints of water, and filtering. This preparation contains a little more than three grains of camphor in each fluidounce. It is chiefly employed in low fevers and as a vehicle for the administration of other medicines.

Spiritus Camphoræ. U. S. *Spirit of Camphor*, more commonly called *Tincture of Camphor*, is prepared by dissolving four troyounces of camphor in two pints of alcohol. It is chiefly used as an anodyne application, but may be given internally in doses of from five drops to a fluidrachm. The camphor is precipitated on the addition of water, but may be suspended by the intervention of sugar.

Linimentum Camphoræ. U. S. *Liniment of Camphor* is prepared by dissolving one part of camphor in four parts of olive oil, and is an excellent anodyne embrocation in sprains, bruises, and local pains.

Linimentum Saponis. U. S. *Soap Liniment*, or, as it is more commonly called, *Camphorated Tincture of Soap*, is prepared by digesting four troyounces of Castile soap in two pints of alcohol, with four fluidounces of water, until it is dissolved, and then adding two troyounces of camphor and half a fluidounce of oil of rosemary. This is used for the same purposes as the preceding.

Cocculus. *Cocculus Indicus.* The dried fruit of *Anamirta Cocculus*, a strong climbing plant, native of the Malabar coast and of India. As found in the shops, it is round or kidney-shaped, about the size of a pea, with a thin, dry, blackish-brown, wrinkled integument, inclosing a whitish, oily, very bitter kernel. The seed owes its activity to a non-nitrogenous crystalline principle termed *picrotoxin*, and an alkaloid, *menispermia*. The Cocculus is an acrid cerebro-spinal narcotic, rarely employed internally, but sometimes used externally, in the form of ointment, to destroy pediculi, and in obstinate cutaneous diseases. Dishonest brewers use it for adulterating malt liquors to increase their intoxicating effects.

ANÆSTHETICS.

Anæsthetics are agents which prevent pain and diminish sensibility; but the term may more properly be applied to those, the vapors of which induce more or less complete insensibility, and thus allow the performance of surgical and other operations without pain or consciousness on the part of the patient. The properties common to all articles of this class are volatility, the presence of carbon, and solubility in the serum of the blood. The primary action of all is more or less stimulating. The principal substances used to produce anæsthesia are ether and chloroform; but of late many others have been introduced for this purpose.

ÆTHER. U. S. *Ether.*

Sulphuric ether is prepared by the reaction between sulphuric acid and alcohol. Alcohol is the hydrated oxide of ethyle, and ether is the oxide of ethyle without water. On the addition of sulphuric acid, which has a great affinity for water, the alcohol parts with this element, and an impure ether is obtained. This is purified by redistillation with a solution of potassa, to remove sulphurous acid, and agitated with water to remove alcohol.

Æther Fortior. U. S. *Stronger Ether* is prepared by first agitating the ether with water, in order that the latter, by its superior affinity for alcohol, may take it from the former, and afterwards with the chloride of calcium and lime, to separate from the ether any water that may be united with it. It is then distilled to further strengthen the ether. Composition, C_4H_5O.

Properties. Ether is a clear, colorless, very volatile and inflammable liquid, of a pungent odor, and a warm, acrid taste, followed by a sensation of coldness. When pure it has the sp. gr. 0·713, boils at 96°, and forms a vapor which has a density 2·586. It is soluble in water and alcohol, and dissolves oils, many resins, and some vegetable alkaloids. It evaporates rapidly, producing a sensation of coldness.

Medical Properties and Uses. Internally administered, ether is a diffusible stimulant, possessing antispasmodic and anodyne properties, and proves very useful in painful and spasmodic affections unaccompanied by inflammation, as hysteria, asthma, and spasmodic diseases of the bowels. Dose, 30 to 60 minims, frequently repeated when the full effect of the remedy is desired. Externally, it is used to produce cold by its speedy evaporation, and in this way sometimes relieves severe headache, and has been employed to reduce hernia; but if evaporation is prevented, it proves a rubefacient, and even a vesicant. Its vapor is powerfully anæsthetic. Its application for this purpose in surgery was first made by Dr. Morton in 1846, since which time it has been extensively used to relieve pain during surgical operations and to prevent the shock which the system would otherwise suffer in

consequence of pain. The introduction of anæsthesia is one of the most important discoveries of our age, and a great blessing to humanity, by removing all the horrors of operative surgery. It is, however, attended with some risk, and cannot be resorted to with impunity in all constitutions and in all cases. The precautions necessary and the contraindications to its use will be mentioned when treating of chloroform.

Spiritus Ætheris Compositus. U. S. *Compound Spirit of Ether. Hoffmann's Anodyne Liquor* is an alcoholic solution of ether, impregnated with heavy oil of wine. It is a colorless, volatile liquid, having a slightly sweetish taste and the peculiar odor of ethereal oil. It possesses the same medicinal properties as the ether, but is more used as a tranquilizing and anodyne remedy in nervous irritation and in certain disturbed states of the system. It is also an excellent adjunct to laudanum, to prevent the nausea which the latter so often produces. Dose, 30 drops to 1 or 2 fluidrachms, given in sweetened water.

Oleum Ætheream. U. S. *Ethereal Oil. Heavy Oil of Wine.* This is one of the results of the distillation of alcohol with a large excess of sulphuric acid. The officinal oil is the proper oil diluted with an equal volume of stronger ether. It is a yellowish liquid, of an oleaginous consistency, with a penetrating, aromatic odor and a sharp, bitter taste. It has antispasmodic and anodyne properties, but is only used in medicine as an ingredient of the compound spirit of ether.

CHLOROFORMUM. U. S. *Chloroform.*

Chloroform is generated by the reaction between alcohol and chlorinated lime. In this process the hypochloride of lime contained in the chlorinated lime reacts upon the alcohol, displaces a portion of its hydrogen to form water, and replaces it with chlorine to form chloroform.

Chloroformum Purificatum. U. S. *Purified Chloroform* is prepared by agitating the impure or commercial chloroform with one-sixth its weight of pure sulphuric acid, then removing any acid and water that may be present by means of alcohol and

carbonate of potassa previously heated to redness, and distilling the mixture to dryness.

Properties. Chloroform is a dense, limpid, colorless liquid, sp. gr. 1·48, readily evaporating, possessing an agreeable, fruit-like odor, and a sweet, saccharine taste. It boils at 140°; it is not inflammable, but its vapor burns with smoke and a yellowish flame. It is very slightly soluble in water, but mixes in all proportions with alcohol and ether; it possesses extensive solvent powers, being capable of dissolving most resins and fats, the organic alkalies, and many other substances. Composition, C_2,HCl_3. *A terchloride of formyle.*

Medical Properties and Uses. Taken internally, chloroform acts as a sedative narcotic, operating through the nervous system, and may be used as an anodyne and antispasmodic in asthma, spasmodic cough, and various diseases attended with nervous irritability. It often relieves the vomiting, cramps, and other symptoms of cholera morbus, and has been used with good effects in lead colic. Externally, it is anodyne and counter-irritant, and often affords speedy and permanent relief in neuralgia and other severe local affections, when applied over the seat of pain. Inhaled in the form of vapor it is anæsthetic. When first inhaled it gives rise to exceeding pleasant sensations and a rapid flow of ideas, which soon become confused and incoherent; this is soon followed by an absolute relaxation of the voluntary movements and a total insensibility to external impressions. In administering chloroform, care must be taken that atmospheric air be inhaled at the same time: this is necessary not only to moderate the action of the remedy, but that the vital function of respiration may not be interfered with. Another point of importance in its administration is the state of the stomach at the time of inhalation. If it is given when the stomach is full, there will be much greater congestion of all the important organs, in addition to the sickness that follows, which is sometimes most troublesome. It must be used with great caution when there exists any serious disease of the lungs or heart, and should never be given when the pulse is very weak and intermitting, or in poisoned conditions of the blood. The occurrence during its administration of sudden pallor or lividity, with flickering of the

pulse and feeble respiration, indicates danger. If these symptoms are urgent, the tongue should be pulled forward so as to admit air into the larynx, cold water dashed on the face and chest, and, if these measures fail, resort should be had at once to artificial respiration. In addition to its use to produce insensibility during surgical operations, it has also been extensively employed to relieve pain during parturition, and its value in these cases has been a matter of much difference of opinion. The object here is to keep the patient in a state unconscious of pain, yet not so deeply anæsthetized as to interrupt the uterine action. While there may be doubt as to the propriety of its use in natural labor, it may certainly be employed with advantage in various obstetrical operations; as forceps, turning, craniotomy, and extraction of retained placenta, unless the patient is too much enfeebled by hemorrhage. It is also resorted to with success to relieve pain in various spasmodic and painful diseases; as hooping-cough, asthma, hysteria, nephritic colic, puerperal convulsions, tetanus, and sometimes in the convulsions of children. The dose for internal administration is 1 to 10 minims, rubbed up with syrup or mucilage; for inhalation, a fluidrachm or more, repeated in a few minutes till the desired effect is produced.

Spiritus Chloroformi. U. S. *Spirit of Chloroform*, formerly called *Chloric Ether*, is prepared by dissolving one troyounce of chloroform in six fluidounces of stronger alcohol. It is more convenient for internal administration, more readily mixing with water. Dose, 30 minims to a fluidrachm.

Mistura Chloroformi. U. S. *Mixture of Chloroform* is prepared by mixing half a troyounce of chloroform and sixty grains of camphor in six fluidounces of water, by the intervention of the yelk of egg. It forms an agreeable and easy mode of administering these medicines jointly. Dose, 1 or 2 tablespoonfuls.

Linimentum Chloroformi. U. S. *Liniment of Chloroform*, made by mixing three parts of chloroform and four parts of olive oil, is an excellent local application in painful affections.

Chlorodyne is a popular anodyne and narcotic preparation extensively used in England in doses of from 5 to 10 drops. It consists of muriate of morphia, chloroform, and prussic acid

dissolved in alcohol, with syrup, extract of liquorice, and oil of peppermint.

Many other substances have been introduced and recommended as anæsthetics. Among the most important are the following :

Rhigolene. A petroleum naphtha, obtained by the distillation of petroleum. It is a hydrocarbon, wholly destitute of oxygen, the lightest of all known liquids, very volatile, and highly inflammable; sp. gr. 0·625, boils at 70°. It is the most convenient, rapid, and easily controlled freezing liquid that can be used, and is an excellent agent to produce local anæsthesia for the opening of felons and other abscesses, and the removal of small tumors. For large operations it is obviously less convenient than general anæsthesia, and will never supersede it.

Amylene was discovered by Balard, in 1844, and was introduced as an anæsthetic agent by Dr. Snow, in 1856. It is a hydrocarbon, having the formula $C_{10}.H_{10}$, and is prepared by distilling amylic alcohol with a concentrated solution of chloride of zinc. It is a colorless liquid, having a peculiar disagreeable odor, soluble in alcohol and ether in all proportions, but very sparingly so in water.

Aldehyde is obtained by the distillation of sulphuric acid, water, alcohol, and peroxide of manganese, and rectified with chloride of calcium. It is a colorless, very inflammable, ethereal liquid, having a pungent taste and odor. It boils at 193° F. It is a powerful anæsthetic, but is objectionable on account of its very unpleasant odor, and is consequently better suited when local anæsthesia is to be induced.

Bichloride of Methylene is developed by the action of nascent hydrogen upon chloroform. Composition, $CH_2.Cl_2$. It is a colorless fluid, having an odor like that of chloroform; sp. gr. 1·34, boils at 88°, and mixes with ether and chloroform in all proportions. By recent observers it is considered superior to chloroform, its effects being more rapid and attended with less danger to life. Administered internally by the stomach, in doses of from 10 to 20 minims, it is a good anodyne.

Protoxide of Nitrogen. *Nitrous Oxide* (NO) is a safe, pleas

ant, and efficient anæsthetic, well adapted for employment in the extraction of teeth; but its effects are too transient to render it available for surgical operations.

SPINAL STIMULANTS.

Cerebro-Spinants, by some called *Spastics*, are medicines which act exclusively upon the spinal cord and nerves issuing from it, exciting muscular contraction. Under this head are placed only those vegetable substances which contain strychnia and brucia, and ergot, which is used to excite uterine contractions.

NUX VOMICA. U. S. *Nux Vomica.*

The seed of *Strychnos nux vomica*, or *poison-nut tree*, a tree of moderate size, growing in various parts of the East Indies. This tree yields a round fruit, about the size of an orange, covered with a smooth, hard, yellow rind, and filled with a soft, jelly-like pulp, in which are imbedded from three to five seeds. These seeds are the officinal portion, and are round, less than an inch in diameter, nearly flat, or convex on one side and concave on the other, with a depression in the centre. They have two coats: the outer one, or testa, is simple, fibrous, of a grayish-yellow color, and covered with short, silky hairs; within this is the inner coat, which is thin, and envelops the kernel or nucleus of the seed. This is hard, tough, almost horny, and of a yellowish-white color.

The powder is of a yellowish-gray color, with an odor analogous to that of liquorice, and an intensely bitter taste. The seeds impart their virtues to water, but more readily to alcohol. They contain the alkaloids *strychnia* and *brucia*, in combination with a peculiar acid, termed *igasuric* or *strychnic acid*, with other less important ingredients.

Strychnia. U. S. This vegetable alkaloid was discovered in 1818 by Pelletier and Caventou in the seed of nux vomica, the St. Ignatius bean, and in other varieties of the genus Strychnos.

It may be obtained by boiling the seeds, first rasped or softened by steam, in water acidulated with muriatic acid, and decomposing the resulting muriate of strychnia and brucia by lime. The strychnia is then separated from brucia by boiling alcohol, which deposits it on cooling, leaving the brucia in solution. It is a white, crystalline substance, permanent in the air, inodorous, with an intense bitter taste, almost insoluble in water, sparingly so in cold alcohol and ether, but readily soluble in boiling alcohol. It is alkaline in its relation to vegetable colors, and forms crystallizable salts with acids. It is liable to be adulterated with lime or magnesia. When perfectly pure, it is entirely soluble in boiling alcohol, and is decomposed and dissipated when exposed to a calcining heat with the access of air. Brucia may be detected by the blood-red color it gives with nitric acid.

Brucia is a crystalline substance, of a white color, without odor, with a very bitter taste, but less than that of strychnia. Its effects on the system are the same as those of strychnia, though less active, being considered about one-twelfth its strength.

Physiological Action. In small doses, nux vomica, or its alkaloid, strychnia, acts as a tonic, improving the appetite and tone of the digestive organs, sometimes producing a slight laxative or diaphoretic effect. In larger doses, so as to bring the system decidedly under its influence, it stimulates the functions of the spinal cord and its system of nerves without affecting the brain, except that portion which is immediately associated with the spinal system. Its operation is manifested by pain in the head, a feeling of weight and weakness in the limbs, a slight trembling or stiffness of the muscles or joints, anxiety of mind, greatly increased nervous sensibility, and loss of appetite. In still larger or poisonous doses, the above symptoms are increased in intensity, and are rapidly followed by tetanic and general convulsions, which affect both the limbs and trunk. Death takes place from a suspension of respiration, resulting from spasm of the muscles concerned in the act. Where it does not prove rapidly fatal, intense thirst, vomiting, diarrhœa, and severe colic are present.

Therapeutical Uses. The prominent indications for the use of nux vomica and its preparations are torpid or paralytic conditions of the motor or sensitive nerves, or of muscular fibre. In paraly-

sis it has been used with variable success, on account of its injudicious employment in all forms of this disease. Where the lesion is of recent occurrence, or where it has been of so serious a nature as to admit of no ultimate repair, the remedy will be ineffectual; but where the injury to the nervous centre has healed up, and the effusion been absorbed, and where the limb continues paralyzed, merely because the motor nerves have lost the power to transmit the necessary impulse, as if from habit, it will prove successful. Upon the same principle it proves useful in habitual constipation, depending upon deficient tone of the muscular coat of the large bowels and imperfect propelling power of the upper part of the rectum. In incontinence of urine, prolapsus of the rectum, in spermatorrhœa, and in all cases dependent upon impaired power in the muscular system it may be used with benefit. In amenorrhœa, depending upon diminished action in the uterine vessels, it is beneficial by stimulating these, while at the same time it improves the general tone and vigor of the system. Where there is a tendency to costiveness it is best to combine it with purgatives. As a tonic it proves useful in those cases of dyspepsia which depend on, or are connected with, an atonic condition of the muscular coat of the stomach. In intermittent fever it frequently effects cures where the ordinary antiperiodic treatment has failed. Dose of the powdered seeds, from 1 to 5 grains (the extract is usually preferred). The effect of strychnia is similar in every respect; and it is generally preferred on account of the certainty and uniformity of its action. Dose, $\frac{1}{12}$ to $\frac{1}{32}$ of a grain, gradually increased if necessary. Whenever in medicinal doses it causes muscular stiffness or convulsive twitchings, it should be discontinued for a few days, and then resumed if the circumstances of the case require it. In cases of poisoning, the stomach should be evacuated as speedily as possible. No chemical antidotes are known. Iodine, chlorine, or bromine have been recommended, on the supposition that they form with strychnia compounds which are not deleterious; but as absorption takes place so rapidly after its administration, but little reliance can be placed on them. As conia and nicotia produce directly opposite physiological effects, they may be tried. To relieve the spasms,

opium, camphor, and other narcotics may be given, and of late chloroform has been used with good effects.

Extractum Nucis Vomicæ Alcoholicum. U. S. *Alcoholic Extract of Nux Vomica* is prepared by evaporating a strong tincture. It is an active preparation, but, owing to the variable proportion of strychnia in the nux vomica, not always of uniform strength. Dose, $\frac{1}{4}$ grain to 2 grains.

Tinctura Nucis Vomicæ. U. S. *Tincture of Nux Vomica* is prepared by percolation (eight troyounces of powdered nux vomica to two pints of alcohol). Dose, 20 minims, increased if necessary.

Strychniæ Sulphas. U. S. *Sulphate of Strychnia* may be readily obtained by neutralizing the alkaloid with dilute sulphuric acid. It occurs in colorless, prismatic crystals, which effloresce on exposure; the salt is inodorous and extremely bitter. It is freely soluble in water, which gives it an advantage over the alkaloid for external use and for subcutaneous injection. The dose is the same as that of the alkaloid itself. The *nitrate, muriate,* and *acetate of strychnia* have also been occasionally used on account of their solubility. They are prepared by neutralizing the acid with strychnia, and evaporating.

IGNATIA. U. S. *Ignatia.*

Bean of St. Ignatius. This is the seed of *Strychnos Ignatia* (by some called *Ignatia amara*), a tree of the Philippine Islands. The seed is about the size of a small olive, flat on one side and irregularly convex on the other. Externally, it is rough, and of a pale-brown color; internally, hard, horny, and semi-transparent. The seeds contain about three times as much strychnia as the nux vomica, and are principally used for obtaining the alkaloid.

Extractum Ignatiæ Alcoholicum. U. S. *Alcoholic Extract of Ignatia* is prepared in the same way as the extract of nux vomica, and possesses the same medicinal properties. Dose, $\frac{1}{2}$ grain to 2 grains, repeated until its effects begin to be experienced.

Several other species of Strychnos have attracted attention for

their poisonous properties. Of these the most celebrated are the *S. Tieute*, a large, climbing shrub of Java, from which is obtained an extract, known in the East as *Upas Tieute;* and the *S. toxifera*, a native of South America, and supposed to be an ingredient of the *Woorari poison* of Guiana.

TOXICODENDRON. *U. S. Secondary.* The leaves of *Rhus Toxicodendron, Poison oak*, a climbing vine, growing abundantly in all parts of the United States. They possess properties similar to those of nux vomica, and have been used for the same purposes. Dose of the powdered leaves, from ½ to 1 grain.

ERGOTA. U. S. *Ergot.*

The diseased seeds of *Secale cereale, common rye.* The disease called spur, caused by the growth of a fungus on the grain, is common to various grains, but the rye seems peculiarly subject to it.

Properties. Ergot or spurred rye is a cylindrical body, from the third of an inch to an inch or more in length, marked with longitudinal furrows, and slightly curved like the spur of a cock. Externally, it is of a dingy-purple color; internally, of a pale grayish-red or yellowish. When perfectly dry it is brittle and easily pulverized. It has a peculiar, musty odor, and a bitter, acrid taste. It loses much of its efficacy if exposed to the air, and deteriorates by age. Its medicinal virtues are extracted by water and alcohol. It contains a fixed oil and a peculiar substance, *ergotin.* The oil is obtained by evaporating the ethereal tincture, formed by the process of displacement, by a gentle heat. It is of a reddish-brown color, with an oily and slightly acrid taste, is lighter than water, and is soluble in alcohol and in alkaline solutions. At one time it was thought to be the active ingredient, but is now supposed to be a mixture of several proximate principles. The *ergotin* is prepared by digesting the ergot in ether, to remove the oil, and then in boiling alcohol, evaporating the alcoholic solution, and treating the extract thus obtained with water, when the ergotin remains undissolved. It is a brownish-red substance, with an acrid, bitter taste, and an unpleasant odor, soluble in alcohol, but insoluble in ether and water. Re-

cently a volatile alkaloid has been detected in ergot, united with an acid termed *ergotic acid.* This is called *secalia,* and has been ascertained to be identical with *propylamin,* the odorous principle of herring-pickle; it may be obtained by distilling the watery extract of ergot with potassa.

Physiological Effects. On the adult male ergot does not produce any very marked effects, unless it be taken in large or long-continued doses, when it gives rise to a train of symptoms called *ergotism.* Two distinct varieties of this have been noticed: the one, a nervous disease, characterized by weight and pain in the head, giddiness, delirium, and stupor, followed by violent spasmodic convulsions; the other, a depraved state of the constitution, accompanied by great depression of the vital powers and coldness of the extremities, followed by gangrene. This last effect is probably due to its causing obstruction in the vessels by diminishing their calibre. In medicinal doses in the female, independent of its action on the cerebro-spinal system, it acts as a stimulant to the nerves of the uterus and excites uterine contractions. The pains and contractions produced by ergot may be distinguished from those of natural labor by their steady continuance, commencing usually within a period varying from five minutes to half an hour after the medicine has been administered, and becoming stronger and more frequent, without any distinct interval between them, until the child is expelled. In most cases, if judiciously administered, it produces no ill effects, either temporary or permanent, on the mother; but much difference of opinion prevails as to its effects upon the fœtus, most writers agreeing as to its injurious effects.

Therapeutic Uses. Ergot is principally used on account of its power of producing contraction of the uterus, and is resorted to when the pains are feeble in protracted and lingering labors, or when the life of the patient is endangered by alarming symptoms. In these cases care must be had that the os uteri is soft and dilatable, and that no obstacle exists to a natural labor, either from deformity of the pelvis or from mal-presentation. It may also be given with advantage to cause the expulsion of the placenta, when its retention depends on feebleness or absence of uterine contractions, or when there is much hemorrhage after de-

livery. In women who are known to have been subject to alarming hemorrhage in their preceding labors, it may be given just before delivery, to secure a good and permanent contraction of the uterus. Sometimes it is used to provoke abortion when, from any proper cause, this becomes necessary. It may also be employed in hemorrhages unconnected with pregnancy, and has been found particularly efficacious in menorrhagia. It is also used with success in leucorrhœa and gleet. It is usually given in substance, tincture, or fluid extract. Dose of the powder, 15 to 20 grains, repeated every twenty minutes till its effects are experienced.

Extractum Ergotæ Fluidum. U. S. *Fluid Extract of Ergot*, prepared by evaporating the tincture (made with acetic acid and diluted alcohol), possesses all the virtues of the medicine in a concentrated state. It is a clear, reddish-brown liquid, having the taste of ergot, but without its fishy odor, owing to the fixation of the alkaloid *propylamin*, upon which that odor depends. One fluidounce represents a troyounce of ergot. Dose, 10 to 20 minims.

Vinum Ergotæ. U. S. *Wine of Ergot* is prepared by exhausting two troyounces of powdered ergot with one pint of sherry wine. Dose, from 1 to 3 fluidrachms, repeated if necessary.

SEDATIVES.

Sedatives are medicines which directly and primarily depress the vital powers without inducing any previous excitement. From their action being the reverse of stimulant, they are sometimes called Contrastimulants. Some writers confound them with narcotics. Both impair and repress action, but narcotics are excitant in their primary action, and only secondarily act as sedatives; besides, sedatives exert little or no effect upon the mind. Their effects must also be distinguished from the exhaustion resulting from overstimulation, in which case the stimulus, having exhausted the nervous power, leaves the system in a state of

collapse. They may be divided into those which are more especially directed to the arterial, and those which act upon the nervous system. The two systems, however, are so closely connected by sympathy, that any great disturbance in the one seldom exists without inducing disorder in the other.

ARTERIAL SEDATIVES.

These are those medicines which lessen the force and frequency of the circulation, independent of any depletion, and only indirectly affect the nervous system. Though sedative in their general influence, they act as stimulants to particular functions or organs, and in large quantities act as local irritants. Their influence on the system is shown by the diminished force, frequency, and fullness of the pulse, and, as a consequence, the diminished temperature of the body. On account of this latter effect, they are sometimes called REFRIGERANTS. They may be used in all acute inflammations attended with fever and not complicated with a typhoid tendency, and in all fevers in which the grade of action is above the healthy standard. Even where the vital forces are impaired they may be cautiously used to diminish preternatural heat and febrile excitement; but in these cases the vegetable acids and such as have the least depressing tendency should be selected. The most important remedies belonging to this class are the antimonial preparations.

ANTIMONIUM. *Antimony.*

METALLIC ANTIMONY, *Stibium*, exists in nature as an oxide, and in the form of tersulphuret; from the latter all the metal of commerce is extracted. It is a brittle, highly crystalline metal, of a bluish-white color, and bright, metallic lustre; sp. gr. 6·7. It burns when submitted to a high temperature, giving off dense vapors of the oxide. The absolutely pure metal has no medicinal property, but its compounds are among the most valuable articles of the Materia Medica. They are active in proportion to their solubility in the gastric juice, and, according to most observers, become converted into soluble double chlorides. The preparations were introduced into medicine by Basil Valentine,

a German monk, from whose unfortunate administration of it to his brother monks it is supposed to have derived its name.

ANTIMONII ET POTASSÆ TARTRAS. U. S. *Tartrate of Antimony and Potassa.*

TARTAR EMETIC. *Tartarized Antimony.* This salt is obtained by boiling a mixture of bitartrate of potassa and teroxide of antimony in water, thereby saturating the excess of tartaric acid in the bitartrate with the oxide of antimony. It is a double salt, consisting of tartaric acid united with potassa and teroxide of antimony. $KO,SbO_3\ (C_8H_4O_{10})+2HO$.

Properties. When pure, it is in colorless, transparent, rhombic, octahedral crystals, which effloresce and become opaque on exposure to the air. As found in the shops, it is a white powder, inodorous, with a nauseous styptic taste; it is soluble in fifteen parts of water, insoluble in alcohol, but dissolves in proof spirit or wine. It is incompatible with acids, alkalies, and alkaline carbonates; it is also precipitated in an insoluble form by astringent solutions.

Physiological Effects. In small and repeated doses, it lessens the action of the heart and blood-vessels, and at the same time promotes the secretions of the mucous membranes and of the skin. In larger doses, it acts as a nauseant and emetic. In excessive quantities, it acts as an irritant poison. It is absorbed into the system and exercises a peculiar action on the stomach and alimentary canal, as is shown by the fact that it produces nausea and vomiting when applied to the denuded skin or injected into the rectum. Headland says: "It is by the production of nausea that antimony becomes so valuable an agent in the control of sthenic inflammations and high fever." The force of the heart being diminished, the fever is allayed, and the active congestion which was maintained by the violent action of the heart is subdued. At the same time absorption is favored by the removal of the pressure from the capillary circulation. It produces the same effects as blood-letting, but in a different way, —it diminishes the pressure on the vessels by weakening the force of the heart, whereas blood-letting weakens the force of the heart by diminishing the pressure on the vessels.

Therapeutical Uses. Tartar emetic is capable of fulfilling numerous indications in disease, according to the dose and the peculiar circumstances under which it is administered. In minute doses, it has been found useful as an alterative in certain diseases of the skin. In small doses, either alone or combined with saline remedies, it proves useful in febrile and inflammatory diseases, by subduing the increased vascular excitement and determining freely to the skin. In pneumonia, acute bronchitis, and in all inflammations, except those of the stomach and alimentary canal, it controls the inordinate action of the heart and arterial system, and is most beneficially conjoined with calomel and opium. As a powerful antiphlogistic in the treatment of acute inflammations, it was recommended in large doses by Rasori, and this plan was adopted by Laennec and by others, and though its efficacy in these cases is undoubted, it is not now given in such large doses. It seems most beneficial when given in frequent small doses, not exceeding the fraction of a grain. By cautiously increasing the dose, a degree of tolerance of the remedy may be established in the system, so that large doses may be given without producing any great sensible effects. Tartar emetic also proves useful in pulmonary and bronchial disease as an expectorant, and with this view is often conjoined with squill and similar remedies. As an emetic, it is useful where we wish to make a powerful impression on the system and put a stop to the progress of disease; it is sometimes administered for this purpose in the early stages of fever, particularly when accompanied by bilious disorders, and in some inflammatory diseases, as tonsillitis, orchitis, etc. Where the object is simply to evacuate the stomach, as in cases of narcotic poisoning, mustard or sulphate of zinc, which acts without producing nausea, should be preferred. Before the introduction of chloroform it was much used as a nauseant, to reduce the force of the circulation and diminish muscular power, to facilitate the reduction of dislocations and of hernia. Externally, it is often employed as a counter-irritant It possesses the power of inflaming the true skin and of producing a pustular eruption. In cases of poisoning, vomiting should be promoted by the free use of diluents. The best antidote is any astringent infusion or decoction containing tannin, which decomposes it and forms an insoluble tannate with the teroxide of antimony.

Administration. Dose, as an alterative, from $\frac{1}{32}$ to $\frac{1}{16}$ of a grain; as a diaphoretic or expectorant, $\frac{1}{12}$ to $\frac{1}{6}$ of a grain; as a nauseant, from $\frac{1}{6}$ to $\frac{1}{2}$ of a grain, repeated every few hours according to circumstances; as an emetic, 1 grain, repeated every fifteen minutes till it vomits. In all cases it should be used with caution in children, as it sometimes, even in small doses, acts with unexpected violence.

Vinum Antimonii. U. S. *Wine of Antimony* is prepared by dissolving tartar emetic (previously dissolved in a little water) in sherry wine, in the proportion of two grains to each fluidounce. It is a very convenient form of administering the medicine to children, or where it is desired to give it in minute doses. Dose, as an expectorant or diaphoretic, 10 to 30 drops; as an emetic for children, 30 drops to a fluidrachm, repeated till it operates.

Unguentum Antimonii. U. S. *Tartar Emetic Ointment* is prepared by thoroughly mixing one hundred and twenty grains of tartar emetic with a troyounce of lard. The proportion of tartar emetic, however, may be varied to suit the indications. It is most generally resorted to when we wish to obtain the peculiar pustular effects of the remedy.

Emplastrum Antimonii. U. S. *Plaster of Antimony* is prepared by adding one part of tartar emetic to four parts of melted Burgundy pitch. It affords a convenient method of obtaining the local effects of tartar emetic.

ANTIMONII OXIDUM. U. S. *Oxide of Antimony.*

This oxide is prepared by first obtaining a solution of the terchloride of antimony, by digesting the tersulphuret in muriatic acid, and afterwards adding a little nitric acid to complete the decomposition of the sulphuret. Water is then added to precipitate the impure oxide, formerly called oxychloride or powder of Algaroth. This is then washed and treated with water of ammonia, which decomposes any chloride and converts the whole into the teroxide. SbO_3.

Properties. When pure, it is a heavy, grayish-white powder, inodorous, tasteless, insoluble in water, but readily dissolved by weak acids. It fuses at a red heat, forming a yellowish liquid,

which concretes on cooling into a crystalline mass of a pearl color.

Medical Properties and Uses. The oxide has the general therapeutic properties of the antimonials, and is the active ingredient of all the medicinal preparations, but is principally used in the preparation of tartar emetic. Dose, 1 to 3 grains.

Pulvis Antimonialis. *Antimonial Powder* is an imitation of *James's powder* (*Pulvis Jamesii*), prepared by mixing thoroughly one part of teroxide of antimony with two parts of precipitated phosphate of lime. The original *James's powder* was prepared by exposing one part of tersulphuret of antimony and two parts of horn-shavings in a crucible to a red heat: the sulphur being expelled in the form of sulphurous acid, and the animal matter of the horn being reduced to charcoal and dissipated, leaves only the oxide of antimony mixed with phosphate of lime. This is a white, inodorous, tasteless, gritty powder, formerly much resorted to as an alterative and diaphoretic, but now seldom used, on account of the uncertainty of its effects. Dose, 3 to 8 grains, every three or four hours.

ANTIMONII SULPHURETUM. U. S. *Sulphuret of Antimony.*

This is the native black tersulphuret of antimony, called in commerce *common* or *crude antimony.* For medicinal purposes it is purified by fusion, and procured in the form of powder by pulverization and levigation. It is an insoluble powder, of a dull-black color, without odor or taste. It is not used as a medicine in this country, except in the preparation of the following compounds.

Antimonii Sulphuratum. U. S. *Precipitated Sulphuret of Antimony.* This is prepared by boiling the black sulphuret with solution of potassa and adding diluted sulphuric acid to the strained solution as long as it produces a precipitate, washing this and drying it. It is a reddish-brown powder, with a slight styptic taste, insoluble in water. Composition, SbO_3+5SbS_3+16HO.

Medical Properties and Uses. It possesses the alterative and

diaphoretic properties of the antimonial preparations, but is very uncertain in its operation. It is principally employed as an alterative in chronic cutaneous diseases and in secondary syphilis, and sometimes in the treatment of chronic rheumatism—generally in combination with calomel and guaiacum, as in Plummer's pill. Dose, 1 to 3 grains.

ANTIMONII OXYSULPHURETUM. U. S. *Oxysulphuret of Antimony, Kermes Mineral.* This is prepared by boiling the tersulphuret with an alkaline carbonate (usually the carbonate of soda) and drying the precipitate without heat. Composition, $2SbS_3+SbO_3$. It is a purplish-brown, tasteless powder, soft and velvety to the touch, insipid and inodorous. It is a more active preparation than the precipitated sulphuret, but may be used for the same purposes. Dose, $\frac{1}{2}$ to 3 grains.

ANTIMONII SULPHURETUM AUREUM. *Golden Sulphuret of Antimony* is obtained by adding an acid to the solution from which kermes mineral has been precipitated. It is a mixture of the tersulphuret and oxide, with a small portion of free sulphur; it is a dark, orange-colored powder, nearly tasteless and inodorous, insoluble in water and alcohol. It possesses properties similar to the officinal sulphurets, but is much weaker, and must be given in a larger dose.

PILULÆ ANTIMONII COMPOSITÆ. U. S. *Compound Pills of Antimony. Plummer's Pills,* formerly known as *Compound Calomel Pills,* consist of equal parts of calomel and sulphurated antimony and two parts of guaiac, made into a mass with molasses. Six grains of the mass contain one grain of calomel. This combination is well adapted to the treatment of chronic rheumatism, and of scaly and other eruptive diseases, especially when of syphilitic origin.

POTASSÆ NITRAS. U. S. *Nitrate of Potassa.*

This salt, commonly known as *Nitre* or *Saltpetre,* is both a natural and artificial product. It is found native, effloresced on the surface of the soil, in the fissures of calcareous rocks, and in caverns and caves where large quantities of animal remains exist. The rationale of its production is simple: the oxygen of

the atmosphere combines with the nitrogen of ammonia, generated by the decomposition of animal substances, producing nitric acid, which combines with the alkali of the soil, forming the salt. It may be artificially produced by mixing animal and vegetable refuse with ashes and calcareous earth. At the end of a certain time a gradual reaction is produced by the action of air and moisture, which results in the production of nitric acid, which, combining with the potassa existing in the vegetable remains, forms nitre. The crude salt is obtained by lixiviation, and purified by dissolving in boiling water and crystallizing. Composition, KO,NO_5.

Properties. Nitre, when pure, is a solid, colorless, semi-transparent salt, generally in six-sided prismatic crystals, inodorous, with a cooling saline, slightly bitter taste. It is insoluble in alcohol, soluble in four parts of cold water, generating great cold, and in half its weight of boiling water. It contains no water of crystallization, but exposed to a great heat it fuses, and on cooling concretes into a white opaque mass, called *sal prunelle.* When thrown on burning coals it burns with bright scintillations.

Medical Properties and Uses. In moderate doses, repeated, it lessens the force and frequency of the pulse, diminishes preternatural heat, and stimulates the functions of the skin and kidneys. This combined action renders it very useful in febrile and inflammatory diseases, and in active hemorrhages. In combination with calomel and tartar emetic (nitrous powders) it is much employed to promote the secretions of the liver and skin, and to lessen febrile excitement. Large doses have been recommended in acute rheumatism, on the supposition that it acts by restoring the saline constituents of the blood, and lessens the excess of fibrin. In overdoses it acts as an irritant to the gastro-intestinal canal, producing pain, nausea, vomiting, and purging, with excessive nervous prostration, and sometimes death. The treatment consists in the removal of the poison from the stomach, and in the administration of mucilaginous drinks and opiates to allay irritation and pain. In consequence of its irritant properties, it is contraindicated in inflammatory affections of the stomach, kidneys, or bladder. Dose, 5 to 20 grains.

ACIDUM CITRICUM. U. S. *Citric Acid.*

This acid exists largely in the juice of the lemon, lime, and orange, and in smaller quantities in that of the grape and other fruits. It is obtained by saturating boiling lemon or lime juice with carbonate of lime, and decomposing the citrate of lime thus formed with dilute sulphuric acid, which forms an insoluble sulphate of lime, and leaves citric acid in solution, from which it may readily be crystallized.

Properties. Citric acid crystallizes in large, transparent, colorless, rhombic prisms, inodorous, with an agreeable, purely acid taste. It is very soluble in water, and in weak alcohol. It is permanent in dry, but deliquesces in moist air; it fuses in its water of crystallization. It forms soluble salts, most of which are extensively used in medicine on account of their solubility.

Medical Properties and Uses. Largely diluted, citric acid forms a useful and grateful refrigerant drink in fevers and inflammatory affections. In some irritable conditions of the stomach it affords great relief, and has been used with advantage in scurvy; but fresh lemon juice should be preferred when it can be obtained.

Syrupus Acidi Citrici. U. S. *Syrup of Citric Acid* is prepared by dissolving one hundred and twenty grains of citric acid in two pints of syrup, and flavoring with four minims of oil of lemons. It is much employed as an agreeable and refrigerant addition to drinks, especially carbonic acid water.

Ammoniæ Citras. *Citrate of Ammonia,* obtained by saturating twenty grains of carbonate of ammonia with twenty-six grains of citric acid in solution, is an excellent febrifuge and refrigerant, frequently remaining on the stomach when other medicines are rejected.

ACIDUM ACETICUM. U. S. *Acetic Acid.*

The acetic acid of commerce is obtained by the purification of the crude pyroligneous acid, procured by the destructive distillation of wood, and contains 36 per cent. of anhydrous acetic acid; sp. gr. 1·047. It is a colorless, volatile liquid, having a sharp

taste and pungent odor; it unites with water in all proportions. It is chiefly used for pharmaceutical purposes. The *Glacial* or *Monohydrated Acetic Acid* is obtained by decomposing acetate of soda with sulphuric acid; sp. gr. 1·063. It consists of the pure acid united with one equivalent of water. $C_4H_3O_3,HO$. It is a colorless liquid, with a pungent odor and corrosive taste, and is converted, when cooled to nearly 32°, into colorless, prismatic crystals. The glacial acid is only employed externally, and acts as a rubefacient, vesicant, or caustic, according to the length of time it is applied. Acetic acid is officinal in three forms.

Acidum Aceticum Dilutum. U. S. *Dilute Acetic Acid* is prepared by mixing one part of acetic acid with seven parts of distilled water; sp. gr. 1·006. Properly diluted, it forms an excellent refrigerant drink, but is not as much used for this purpose as the other vegetable acids. It is sometimes used as an addition to gargles, and, largely diluted with water, is valuable for sponging the surface, for the purpose of lessening morbid animal heat.

Acetum. U. S. *Vinegar* is impure dilute acetic acid, the product of acetous fermentation, by which alcohol is converted into acetic acid through the agency of some ferment, and if this is not added, it is generated by the air itself. The conversion of alcohol into acetic acid consists in—first, the removal of two equivalents of hydrogen, and afterward the addition of two equivalents of oxygen. Vinegar may be obtained from all liquors which have undergone the vinous fermentation; in France it is usually made from inferior wines; in England from malt liquors; and in this country from cider. And though these all differ somewhat in strength and purity, they agree in medicinal action, and may be used for the same purposes as the dilute acid.

Acetum Destillatum. U. S. *Distilled Vinegar* is prepared by simply distilling common vinegar, to purify it from the coloring and other foreign matters it usually contains. It is used for the same purposes as the above preparations.

ACIDUM TARTARICUM. U. S. *Tartaric Acid.*

This acid is found in the juice of grapes and all acid fruits, and is extracted from tartar, a peculiar substance which is deposited on the inside of wine casks during the fermentation of wine. This impure bitartrate of potassa is dissolved in water, and saturated with carbonate of lime, thus precipitating a tartrate of lime; this is washed and decomposed by dilute sulphuric acid, which precipitates sulphate of lime and leaves tartaric acid in solution, from which it may be crystallized.

Properties and Uses. This acid sometimes crystallizes in irregular prisms, but it is usually found in the shops in the form of a fine, white powder; it is inodorous, and has a purely acid taste; it is soluble in water and alcohol. Composition, 2HO, $C_8H_4O_{10}$. It is refrigerant, but inferior to citric acid in many respects, being more apt to disorder the digestive organs, to produce colic, and to purge. In large doses, it acts as an irritant poison. Dose, 10 to 20 grains, dissolved in water and sweetened.

NERVOUS SEDATIVES.

These are medicines which depress nervous force, without any direct influence on the brain, and thus diminish the force of the circulation. Most writers class them with narcotics, but as they differ essentially from these in their mode of action, they are best treated of by themselves. All of them, in overdoses, are most energetic poisons. Their use is indicated where there is excessive action of the heart and nervous irritation, more especially in diseases which combine these two indications. Their effects on the system and their therapeutic application will be considered in connection with the several articles classed under this head.

DIGITALIS. U. S. *Foxglove.*

The LEAVES of *Digitalis purpurea* or *Foxglove*, a beautiful biennial plant, growing wild in the temperate regions of Europe, and cultivated in this country as an ornamental plant and for

medicinal purposes. It has a fibrous root, from which arises, in the second year, a single, erect, leafy stem, from two to five feet high. The leaves are large, alternate, egg-shaped, and serrated, of a dark-green color above, pale and downy beneath; it bears large, purple, bell-shaped flowers. The leaves should be gathered in the second year, about the time of inflorescence, and should be carefully dried in the dark, and always kept protected from the light.

Properties. When good, the dried leaves should have a dull-green color, a feeble but somewhat narcotic odor, and a bitter, unpleasant taste. The powder is of a fine deep-green color, and yields its virtues to water and alcohol. It is incompatible with the salts of lead and iron, and all solutions containing tannic acid. The virtues of digitalis reside in a peculiar bitter principle, *digitaline.* To isolate this, the alcoholic extract of the leaves is treated with water acidulated with acetic acid, by which process most of the extractive and resinous matters are left undissolved, while the digitaline is taken up by the acid. The solution, after partial decolorization, is neutralized by ammonia, and the digitaline precipitated by tannic acid. This precipitate is decomposed by rubbing it with oxide of lead, which unites with the tannic acid, and the resulting digitaline may be obtained by dissolving in alcohol, filtering through animal charcoal, and evaporating at a gentle heat. It may be further purified by washing with ether to remove impurities. As thus obtained, it is a white, or yellowish-white, inodorous substance, somewhat crystalline, of an intensely bitter taste, scarcely soluble in water, but very soluble in alcohol. It possesses the advantage over the leaves of uniformity of strength and facility of administration. One part of it is equivalent to fifty parts of good digitalis.

Physiological Action. Digitalis acts on the system in a different manner, according to the dose, mode of administration, and the circumstances under which it is given. In small quantities, often repeated, it affects the organic functions, without disordering those of the cerebo-spinal system; the most frequent results being a reduction of the force and frequency of the pulse, and an increased flow of urine. It seems to depress the action of the

heart and circulation by a directly debilitating power, and without producing the usual symptoms of nausea. When given in too large or long-continued doses, it causes a disordered state of the digestive and circulatory organs and of the cerebro-spinal system, manifested by slow and irregular pulse, coldness of the extremities, a tendency to syncope, and confusion of the vision. In still larger quantities it acts as a narcotico-acrid poison; and the above symptoms are present in an aggravated degree, accompanied with nausea and vomiting, stupor and delirium, and if not relieved are followed by hiccough, convulsions, and death. Great caution is necessary in its use as a medicine, for when given in small and long-continued doses it is apt to accumulate in the system, and suddenly to evince its poisonous and even fatal effects.

Therapeutical Uses. From its sedative action it is a remedy of great value in diseases of the heart, and may be employed in all cases attended with overexcitement of the circulation. It is particularly useful in hypertrophy of the heart,—whether complicated with other diseases or not,—in increased action arising from functional derangement, and in aneurism of the aorta. In dilatation, where the tissue of the organ is enfeebled by defective nutrition, and in organic diseases attended with great debility, it would seem to be contraindicated. In inflammations it was at one time recommended, but experience has shown that, although it exercises a depressing influence on the circulation, it is not sufficiently powerful as an antiphlogistic to be relied upon to the exclusion of more active measures. At one time it acquired a great reputation in the treatment of phthisis; and although it is now seldom used, it may sometimes act beneficially in this disease by depressing the excited movements of the heart. Its diuretic power renders it highly useful in dropsical diseases. It is especially useful in dropsies which result from an obstruction to the cardiac circulation. By subduing the action of the heart, it relieves the congestion of the vascular system, which is the cause of the effusion of serum, and by its diuretic action relieves the loaded vessels, and causes a quantity of fluid to be eliminated from the system through the kidneys. It should always be avoided in those cases where the heart's action is habitually weak and there is a natural tendency to syncope. In the dropsy

following scarlet fever, the coagulability of the urine rapidly disappears under the use of digitalis; in this case it is best combined with tonics. It has been recommended as specific in delirium tremens, in full doses, repeated every few hours till symptoms of narcotism are induced, but the practice is rather hazardous. Where an overdose has been taken, the stomach should be promptly evacuated, and the condition of the system combated by the administration of diffusible stimulants, as brandy and ammonia.

Administration. In the employment of digitalis as a medicine, its effects should be carefully watched, and whenever its use is continued for any length of time the patient should not be allowed to use any active exertion; and when nausea or intermission of pulse occurs, its use should be discontinued for a time. It may be administered in substance, in doses of from $\frac{1}{2}$ a grain to 1 grain, repeated two or three times a day, or oftener if occasion requires, and gradually increased till some effect is produced. The tincture and infusion are often resorted to, and are good and efficient preparations. Digitaline is sometimes resorted to, but its use requires great caution; the dose to begin with should not exceed the $\frac{1}{50}$ part of a grain, and should not be carried beyond the $\frac{1}{12}$.

INFUSUM DIGITALIS. U. S. *Infusion of Digitalis.* (Prepared by macerating sixty grains of digitalis in half a pint of boiling water, and adding a fluidounce of tincture of cinnamon.)

TINCTURA DIGITALIS. U. S. *Tincture of Digitalis* (four troyounces to two pints of diluted alcohol) is a convenient mode of administering the medicine, especially in mixtures. Eight minims, or sixteen drops, contain one grain of digitalis.

EXTRACTUM DIGITALIS ALCOHOLICUM. U. S. *Alcoholic Extract of Digitalis* contains all the virtues, and may be used for the purposes, of the powdered leaves.

TABACUM. U. S. *Tobacco.*

LEAF TOBACCO, the dried leaves of *Nicotiana Tabacum*, an herbaceous annual plant, native of tropical America, but cultivated in most parts of the world.

Properties. The dried leaves, as met with in commerce, are of

various shades of color, with a peculiar, penetrating, narcotic odor, and a bitter, nauseous taste. The darker the hue, the stronger is the tobacco and its action on the system. Water and alcohol extract its virtues. All parts of the plant contain a volatile alkaline principle termed *nicotia*, which is separated by a complicated process, the most important step of which, however, is the distillation of tobacco juice with potassa. It is a colorless liquid, with the odor of tobacco, and an acrid, burning taste; it combines with acids, forming crystallizable salts. It also contains a volatile oil, *nicotianin*, which is probably the odorous principle. An empyreumatic oil, produced by burning from the decomposition of some of its constituents, and found in pipes which have been long used, is also an active poison.

Medical Properties and Uses. In moderate doses, tobacco produces the usual effects of nervous sedatives, combined with those of an emetic and diuretic in a minor degree. When locally applied, it acts as a stimulant; thus, when used in the form of snuff, it causes violent sneezing, and when chewed greatly increases the flow of saliva. In larger quantities, and even in small doses in those unaccustomed to its use, it induces nausea, vomiting, giddiness, with great prostration of the circulatory powers; in overdoses it acts as a powerful narcotico-acrid poison, with these symptoms increased in intensity, followed by convulsions, paralysis, and coma. These symptoms occur in whatever way it has been taken, whether by the mouth, or in the form of enema, or even where the leaves have been applied to an abraded surface. The smoking and chewing of tobacco, in those unaccustomed to its use, gives rise to the same symptoms; but for those habituated to its impression, its moderate use quiets restlessness, and produces a state of general languor and repose.

On account of the great depression it produces, it is not a remedy adapted for internal administration; but in the form of enema may be used to produce muscular relaxation, to facilitate the reduction of strangulated hernia, and to relieve obstructions in the bowels from any cause. It has been used in severe colic and in tetanus, but at the present day is rarely resorted to in practice. It has been recommended as a physiological antidote to poisoning by strychnine

Infusum Tabaci. U. S. *Infusion of Tobacco* (sixty grains to a pint of boiling water) is used only in the form of enema in strangulated hernia, obstinate colic, etc.

Oleum Tabaci. U. S. *Oil of Tobacco* is obtained by the destructive distillation of tobacco, and is an empyreumatic oil, identical with that of old tobacco-pipes. It is a violent poison, and is sometimes employed in the form of ointment as an application to indolent tumors and obstinate cutaneous eruptions, but must be used with great caution, for fear of producing the constitutional effects.

Unguentum Tabaci. U. S. *Tobacco Ointment* is prepared by mixing a soft watery extract, made by concentrating the infusion, with lard.

Vinum Tabaci. U. S. *Wine of Tobacco* is prepared by macerating a troyounce of tobacco in a pint of sherry wine. Dose, as a diuretic, 10 to 30 minims, but seldom used.

ACONITUM. U. S. *Aconite.*

Aconiti Folium. U. S. *Aconite Leaf.* Aconiti Radix. U. S. *Aconite Root.*

The leaves and root of *Aconitum Napellus, Monkshood* or *Wolfsbane*, a perennial herb, native of the mountainous regions of middle Europe, and cultivated in this country. It has a tapering spindle-shaped root, about the size of the finger, from four to five inches long, with numerous fleshy fibres arising from it. The leaves are alternate, petiolate, divided almost to the base, from two to four inches in diameter, deep green on their upper surface, paler beneath, and more or less smooth and shining on both sides. Both leaves and root are used, but the root is preferred, as containing more of the active principle, and as being more uniform in strength.

Properties. The root is of a dark color externally, white within, has a faint earthy odor, and a bitter, acrid taste, leaving, when chewed, a peculiar tingling and benumbing impression on the lips, tongue, and fauces. The leaves have a faint narcotic odor, with a taste similar to that of the root. Both owe their virtues to an alkaloid, *aconitia*, which is officinal.

ACONITIA. U. S. *Aconitia* is obtained by first adding dilute sulphuric acid to an alcoholic extract of the root, obtained by percolation, and then precipitating the alkaloid from the sulphate by means of ammonia, and purifying it by repeated agitation with ether. When pure it is a white, amorphous powder, inodorous, of a bitter, acrid taste, producing in the mouth a sensation of numbness. It is very soluble in alcohol and ether, and partially so in water.

Medical Properties and Uses. Aconite, in medicinal doses, acts as a powerful sedative to the nervous system, reducing also the force of the circulation. Dr. Fleming says it occasions warmth in the stomach, nausea, numbness and tingling on lips and cheeks, extending more or less over the whole body, diminution in the force and frequency of the pulse and number of respirations, with great muscular weakness, and indisposition to either mental or bodily exertion. It has no direct narcotic effect, but predisposes to sleep by deadening the sensibility to pain. When given in overdoses, or if the medicinal doses be long continued, these symptoms are increased in intensity, the senses become impaired, the pupils are dilated, slight convulsions ensue, and death takes place by syncope.

This remedy is almost too powerful for internal use, but has been used with marked benefit in all forms of painful disease, but especially in neuralgia and acute rheumatism. In the latter disease it sometimes has a wonderful effect in reducing the pulse and alleviating the pains. In tic douloureux, sciatica, and other neuralgic affections, when all internal remedies have failed, the tincture, or an ointment containing the alkaloid, applied over the seat of pain, is a most effectual and certain palliative. In diseases of the heart—particularly in those in which the indication is to diminish the force of the circulation—its use is sometimes attended with benefit; and in simple hypertrophy or functional disorder, Dr. Fleming prefers the use of aconite to that of digitalis, considering that the effects are more uniform, and, at the same time, less dangerous.

Administration. The alkaloid is too powerful a poison for internal use. The dose of the powdered leaves is from 1 to 2 grains, but it is seldom used in this form,—the tincture is generally preferred.

Tinctura Aconiti Folii. U. S. *Tincture of Aconite Leaf* is prepared by percolation. (Four troyounces of recently dried leaves to two pints of diluted alcohol.) Dose, 20 drops.

Tinctura Aconiti Radicis. U. S. *Tincture of Aconite Root.* (Twelve troyounces of powdered root to two pints of alcohol.) This tincture is much stronger than that of the leaves, and care must be had to avoid mistaking one for the other. The dose is from 5 to 10 drops to begin with, and this may be increased, if necessary, until its peculiar effects are experienced. *Fleming's tincture* contains the virtues of eight ounces of the root in twelve fluidounces, and is a much stronger preparation. Dose, 3 to 5 drops.

Extractum Aconiti Alcoholicum. U. S. *Alcoholic Extract of Aconite* is prepared by exhausting the dried leaves by alcohol and evaporating to the proper consistence. Dose, from half a grain to a grain, to be gradually increased, if necessary.

VERATRUM ALBUM. U. S. *White Hellebore.*

The root or rhizome of *Veratrum album*, an herbaceous plant, with a fleshy, fusiform root, beset with long, cylindrical fibres, native of the mountainous regions of central Europe. All parts of the plant are active, but only the root is used.

Properties. The root is in cylindrical, somewhat contorted pieces, with the radicles attached, and of a blackish-brown color When fresh it has a strong, disagreeable odor, which is nearly lost by drying, and an acrid, bitter taste.

Medical Properties and Uses. In moderate doses it acts as a sedative to the circulation, and a stimulant to the secretions. It is also a violent emetic and cathartic, in large doses acting as a powerful acro-narcotic poison. It is very uncertain in its operation, and is now seldom or never used, as its virtues depend upon the veratria which it contains, and which can be used with much more certainty.

Veratria. U. S. *Veratria* or *Sabadilla* is an alkaloid found in the root of the *Veratrum album*, also in the seeds of the *Veratrum Sabadilla*, a plant growing in Mexico, and in other plants. It is generally procured from the seeds of the *V. Sabadilla* (*Ceva-*

dilla). It is obtained by boiling an alcoholic extract of the seeds in water acidulated with sulphuric acid, which forms a sulphate of veratria in solution, from which the alkaloid may be precipitated by magnesia. It may afterward be purified by boiling with water, sulphuric acid, and animal charcoal, filtering and precipitating with ammonia. As thus obtained, it is a white or grayish-white powder, without odor, of an intensely acrid taste, producing a feeling of numbness and tingling when applied to the tongue. It is very sparingly soluble in water, but dissolves in alcohol and ether. It forms uncrystallizable salts with acids. It is a powerful sedative to the nervous system, and appears to act chiefly upon the spinal cord; but from the violence of its action is rarely administered internally. The symptoms are those of active irritation in the alimentary canal, vomiting and purging, followed by tetanic convulsions and death in a few hours. When applied externally, it produces a sense of warmth and tingling in the part, and, if the application be continued, the same general symptoms as when taken internally. It may be used as an external application, in the form of ointment, in neuralgia and in scrofulous diseases of the joints. The dose, when it is desired to give it internally, is from the $\frac{1}{12}$ to the $\frac{1}{6}$ of a grain, in the form of pill, and repeated every three hours until the effects of the medicine are experienced.

UNGUENTUM VERATRIÆ. U. S. *Ointment of Veratria* may be prepared by rubbing twenty grains of veratria with a troyounce of lard. It should be employed with great caution.

VERATRUM VIRIDE. U. S. *American Hellebore.*

The RHIZOME of *Veratrum viride*, commonly known as *Indian poke* or *swamp hellebore*, a stout, tall, leafy, perennial plant, growing abundantly in swamps and damp meadows throughout the United States. The part used in medicine is the body of the root or rhizome, which is stout, thick, and fleshy, giving out a great number of snow-white radicles. It should be collected in the autumn, as it then contains a larger amount of its active principle, and when fresh, has an unpleasant fetid odor, which disappears on drying. The taste is bitter and unpleasant, followed

by an acrid, pungent sensation, spreading throughout the mouth and fauces, and persisting for a long time. It yields its virtues to water and alcohol. It contains the alkaloid *veratria* in small proportion, but its peculiar effects on the system are due to a resin, which Dr. Wood says is a complex body, and contains another alkaloid distinct from veratria.

Physiological Effects. Veratrum viride exercises a powerful sedative influence over all the vital functions, reducing the force and frequency of the pulse, and diminishing the number of the respirations, while at the same time it stimulates the secretions, especially those of the skin and kidneys. In large or frequently repeated doses, it causes a sense of faintness or vertigo, with nausea, vomiting, and general prostration, which may result fatally. It is rapidly absorbed, its effects on the pulse being very remarkable, causing it to fall in a few hours; and it is also rapidly eliminated, its effects passing away in a short time. It accomplishes the same effects as blood-letting, but in a safer and more satisfactory manner. The mechanical effects of blood-letting are often but temporary, since the amount and force of the blood may soon become as great as before, and a repetition of the bleeding would be extremely hazardous. By the influence of veratrum the heart's action is simply held in check, the force of the circulation being reduced to its natural standard; and its sedative effects are freed from the danger of too great a reaction, so that a quicker and more perfect convalescence is insured to the patient.

Therapeutic Uses. This is comparatively a new remedy, and during the past ten years there is scarcely a disease for which it has not been proposed. Its remarkable sedative action renders it particularly useful, when cautiously and timely administered, in inflammations of a sthenic character, and in febrile affections where it is desirable to reduce the pulse and respiration. In pneumonia, and diseases of the lungs, it proves of benefit by diminishing the impulse and amount of blood forced into the lungs, thus favoring a quick resolution of the disease. It is also of value in controlling the heart's action, and relieving pain in acute rheumatism. Its depressing effects are readily controlled by combining it with opium; and any ill effects may be counteracted by alcohol and ammonia. It may be given in substance, tincture, or extract. Dose, 1 or 2 grains.

TINCTURA VERATRI VIRIDIS. U. S. *Tincture of American Hellebore* (sixteen troyounces to two pints of alcohol) may be given in doses of from 6 to 8 drops, to be gradually increased if necessary.

EXTRACTUM VERATRI VIRIDIS FLUIDUM. U. S. *Fluid Extract of American Hellebore* is a strong preparation. Dose, 4 to 5 drops.

ACIDUM HYDROCYANICUM DILUTUM. U. S. *Dilute Hydrocyanic Acid.*

Prussic acid, Cyanohydric acid, is found in many vegetables, as the bitter almond, the kernels and leaves of the peach, and is produced in others by the mutual reaction of some of their constituents. The anhydrous acid, consisting of one equivalent of cyanogen and one of hydrogen (H,NC_2), is never used. The medicinal acid consists of the pure acid dissolved in water, and constituting 2 per cent. of the solution. It is obtained by distilling a mixture of sulphuric acid and water with ferrocyanide of potassium. It may be prepared extemporaneously by decomposing cyanide of silver by dilute muriatic acid.

Properties. It is a colorless, volatile liquid, with a peculiar penetrating odor, and a bitter taste, leaving a warm sensation on the tongue and palate. Exposed to air and light, it undergoes decomposition; hence it should be kept in well-stoppered bottles in a dark place.

Medical Properties and Uses. Hydrocyanic acid is one of the most active poisons known, but properly and judiciously administered it is a safe and valuable medicine. In medicinal doses it is a powerful and direct sedative, reducing the force and frequency of the pulse, lowering the sensibility of the nervous system, allaying vascular excitement, relieving spasm, and inducing a general tranquillity of the system. It has been used with benefit in spasmodic and painful affections of the stomach, unaccompanied by active inflammation, as gastrodynia, pyrosis, etc. It has also been found very serviceable in allaying irritative and spasmodic coughs in various pulmonary affections, as in simple hooping cough, in pure, spasmodic asthma, in the advanced stages of

phthisis, and in the spasmodic cough of nervous and hysterical females. It may be given as an anodyne in neuralgia and other painful affections. Externally, in the form of lotion, it sometimes proves serviceable in allaying the violent itching which attends many forms of skin diseases. In poisonous doses, it proves rapidly fatal. When death does not take place immediately, the usual symptoms are convulsions, difficult and spasmodic breathing, and insensibility. The antidotes and remedies most to be relied upon, are chlorine, ammonia, cold affusion, and artificial respiration. Dose of the medicinal acid, from 1 to 4 drops, dissolved in water, or mixed with gum or syrup. *Scheele's acid* is about twice as strong as the officinal acid, containing 4 per cent. of the anhydrous acid.

Oleum Amygdalæ Amaræ. U. S. *Oil of Bitter Almond* is obtained by distilling with water the kernels of the fruit of *Amygdalus communis*, variety *amara*, after the fixed oil has been expressed from them. It does not pre-exist in the almond, but results from the reaction of water upon the *amygdalin* contained in it, through the intervention of another constituent, *emulsine*. It is a volatile, oleaginous product, of a yellowish color, with an acrid, burning taste, and the odor of the kernels. It is heavier than water, soluble in alcohol and ether, and slightly soluble in water. Its effects upon the system are closely analogous to those of hydrocyanic acid. Dose, from $\frac{1}{4}$ of a drop to 1 drop, cautiously increased till some effect upon the system is observed.

Aqua Amygdalæ Amaræ. U. S. *Bitter Almond Water* is prepared by dissolving sixteen minims of oil of bitter almonds in two pints of water by the intervention of carbonate of magnesia. This preparation has the effects of hydrocyanic acid on the system, and may be used as a vehicle of other medicines in various spasmodic affections. The dose should not exceed $\frac{1}{2}$ a fluid-ounce.

Cherry-laurel Water (Aqua Lauro-cerasi, Br.), obtained by distillation from the leaves of *Lauro-cerasus*, the common European *cherry-laurel*, is a dangerous remedy on account of its uncertain strength.

Potassii Cyanidum. U. S. *Cyanide of Potassium* is obtained by igniting together ferrocyanide of potassium and carbonate of

potash. It occurs in white, opaque, amorphous masses, with a sharp, somewhat alkaline and bitter almond taste. It is deliquescent in moist air, readily soluble in water, and sparingly so in alcohol. It acts precisely like hydrocyanic acid as a medicine and as a poison. Dose, $\frac{1}{8}$ of a grain, dissolved in water; it is not much used, however, as a remedy.

GELSEMIUM. *U. S. Secondary.* The root of *Gelsemium sempervirens*, known as *Yellow or Carolina Jasmine* and *Woodbine*, a beautiful, smooth, climbing vine, growing in rich, moist soils throughout the Southern States. The root is seldom seen in the shops, but may sometimes be found sliced in pieces about an inch in length, very light and fibrous, of a dirty-yellowish color, a feeble narcotic odor, and a bitter, unpleasant taste. Its virtues depend upon a peculiar alkaloid, *gelseminia*, which is a light, drab-colored powder, with a pleasant odor, and an agreeable aromatic taste. Gelsemium has recently been introduced as a remedy, and appears to act as an arterial and nervous sedative, without producing either nausea, vomiting, or purging. Its physiological effects are dimness of vision, double-sightedness, inability to open the eyelids, general muscular debility, and complete prostration of the whole system. It may be used for the same purposes as the other remedies of this class, and is generally administered in the form of a saturated tincture.

CALABAR BEAN. The *Ordeal Bean of Calabar*, so called because it is used by the natives of Western Africa to test the guilt or innocence of an accused person, is the seed of *Physostigma venenosum*, a large perennial climbing plant of Old Calabar, on the western coast of Africa. The seed is kidney-shaped, about the size of a large horse-bean, with a firm, hard, bitter, grayish-brown integument, inclosing a white and easily pulverizable kernel, without bitterness or acrimony. The kernel is the active portion, and yields its virtues to rectified spirit, but not to water or acetic acid. It has been found to contain a peculiar principle, which has been termed *physostigmin*. The Calabar bean is an energetic poison. Administered internally it appears to exert a sedative influence on the spinal cord, producing paralysis of the lower extremities, and death by asphyxia; or, if given in large doses, death by

paralysis of the heart. Its physiological action indicates that it may prove useful in all hyperæsthetic conditions of the spinal cord. In tetanus and in poisoning by strychnia, the excited condition of the cord may be allayed. Its most interesting effect, and the one for which it is principally used in medicine, is its power of contracting the pupil and the ciliary muscle, when immediately applied to the eye. In this way it counteracts mydriasis, from whatever cause produced, whether dependent on the overaction of belladonna, or as a symptom of amaurosis, and proves useful in restoring the power of accommodation. Dose of the kernel, 2 or 3 grains. Its effect on the pupil is most conveniently obtained by introducing a drop of the watery solution of the alcoholic extract into the eye. Paper impregnated with its active principle, by repeated immersings in a concentrated tincture, is also used: a small piece of this being introduced under the lower lid.

ALTERATIVES.

This term is applied to those medicines which produce changes in the system or functions, restoring them to their normal or healthy state, without either elevating or depressing vital action, and independent of any eliminating properties. Though the surest and most potent of all our remedies in the treatment of disease, their modus operandi is involved in greater doubt and obscurity than any other class, and their action is almost imperceptible, and known only by the result of their use in various diseased conditions. They are peculiarly applicable to chronic diseases, and those of a passive character, and when administered with a view to their alterative effect, should be given in small doses, and persevered in for a long period.

HYDRARGYRUM. U. S. *Mercury.*

Mercury or *Quicksilver* has been known from remote antiquity. It is found in various parts of the world, in its metallic state, as native or virgin mercury, and in combination with

chlorine (*native calomel*) and sulphur (*native cinnabar*). For commercial purposes it is generally procured from the latter, which is its most abundant ore, by distillation with lime in iron retorts.

Mercury, when pure, is fluid at ordinary temperatures, and easily divisible into spherical globules; it has a silver-white color, with much brilliancy; is inodorous and tasteless; sp. gr. 13·5. It freezes at 39° or 40° below zero, and boils at 662°, volatilizing without any residue. Occasionally it contains other metals, as tin, lead, zinc, etc., which give it a dull appearance, and lessen its fluidity and mobility. It may be purified from these by digestion in dilute muriatic acid, which unites with the contaminating metals, but does not act on the mercury.

In its liquid metallic state it is inert. It was formerly used to remove mechanical obstructions in the intestines by its weight; and quantities have been taken without producing any deleterious effects. The injurious effects of the mercurial vapors, when inhaled or otherwise applied to the body, have long been known, and are frequently observed in those employed in quicksilver-mines, and in those whose trade exposes them to its vapors. The most common symptoms are derangement of the nervous system, manifested by shaking palsy, loss of memory, and other cerebral disorders, which oftentimes terminate fatally. In combination, or in a state of minute division, it exerts a powerful influence on the system.

Effects of the Preparations. In small and repeated doses the mercurials promote gently the secretions, particularly those of the mucous system, without producing any apparent disturbance of the system. In larger doses they act manifestly upon the secretions, particularly that of the liver, causing copious bilious evacuations from the bowels. When the small doses are long continued, they produce what are termed the constitutional effects of mercury, manifested by its action on the salivary glands, called *salivation*, or *ptyalism*. The first symptoms of this are a slight swelling or tenderness of the gums, with a metallic taste, as of copper, in the mouth, attended with an increased flow of saliva. If these symptoms are not checked, or if more mercury is administered, the soreness increases, the tongue, gums, and cheeks

swell, the throat sometimes ulcerates, the breath acquires a peculiar fetid odor, and a very copious flow of saliva is induced. This local irritation is oftentimes accompanied by a slow fever, with rapid emaciation and great prostration of the whole system. In some peculiar constitutions these effects may be produced by almost the minutest dose of any preparation; while there are others which appear to be totally insensible to the operation of the medicine. Sometimes, instead of producing these ordinary effects, they cause much disturbance of the vital organs, and give rise to a peculiar condition of the system, known as *erythismus mercuriale*. This is characterized by great depression of the vital powers, with a pale and contracted countenance, a sense of anxiety about the precordia, great nervous agitation, with irregular action of the heart. This affection does not depend on the quantity of mercury taken, or on the presence of salivation. The use of the mercurials is also occasionally attended with an eruption, called *eczema*, or *erythema mercuriale*, which is ushered in by heat and itching, gradually spreading over the whole body, in the progress of which the hair and nails sometimes fall off. Each individual preparation of mercury is characterized by some peculiarity in its operation, which will be noticed in its appropriate place.

Mode of Action. Of the modus operandi of mercury we know very little, except that it is absorbed and passes into the circulation, and that it possesses a peculiar alterative power over the vital functions, which enables it, in many cases, to cure or alleviate disease. Various theories have been advanced, at different times, to account for its beneficial action. The most reasonable explanation of its action, and the one now generally adopted, is that it affects the character of the blood itself: its solid constituents, the fibrin, albumen, and red globules, are diminished in amount; it contains more water, and is more prone to decomposition. The medicine seems, then, to exercise its therapeutic influence by depreciating and deteriorating the character of the circulating fluid, and, like all agents which impoverish the blood, it increases the action of the absorbents and counteracts effusion.

Circumstances modifying their Effects. From peculiar idiosyncrasy, some persons are unable to take even the smallest dose

of mercury without its exciting ptyalism and producing serious, and even fatal, consequences; while, on the other hand, some are quite insusceptible to its influence. Age, sex, temperament, and general health greatly modify its action. Children are salivated with difficulty; indeed, they bear larger proportionate doses than adults, owing, probably, to the intestines at this early age being lined with mucus, which prevents the absorption of the mercury. Aged persons are also extremely difficult to bring under its influence. As a general rule, females are more readily affected than males; and nervous and irritable habits are more susceptible, and bear badly the operation of this metal.

Contraindications. Mercury cannot be used with advantage, nor even with safety, in all states of the system. It is injurious in all forms of tuberculous disease, as scrofula, phthisis, etc., and in persons of a strongly marked scrofulous diathesis. Its use should also be avoided in cases where the blood is greatly depraved, as in granular disease of the kidneys, and in all anemic states, from whatever cause arising, or where there is a disposition to passive hemorrhage or gangrene. In these cases, where circumstances demand its use, it should be conjoined with tonics and nutritious diet.

Therapeutic Application. Mercurials are given in disease to meet various indications,—to stimulate the secretions, to promote absorption, and to change the condition of the blood, constituting its alterative effect. As has already been mentioned, its influence is chiefly exerted on the function of the liver, and it is very often resorted to with this view; but, as Dr. Wood says, "there are so many affections which either have their roots in disorder of this function, or are greatly aggravated by it, that the curative effects of the remedy are greatly diversified." Besides, when the liver itself is not in fault, the increase of its function may operate beneficially, by depleting the portal circulation, and thereby relieving congestion and irritation of all the abdominal viscera, which are embraced in this circulation. In many febrile diseases most of the secretions are deficient, indicated by dry skin, scanty urine, and constipation, and, no matter what may be the special disease, a gentle mercurial influence seems to be indicated, and often proves serviceable. In malarial fevers, either intermittent

or remittent, there is almost always a congested condition of the abdominal viscera and a deficiency of the secretions, which require the exhibition of mercurials before the antiperiodic treatment can be successfully resorted to. In typhoid fever its use requires great caution. It may sometimes be used to promote secretion from the intestinal glands, by its direct local action on the intestines, and to promote resolution of the inflamed patches, but should be used early in the disease.

As an antiphlogistic in inflammatory diseases, both acute and chronic, it is very much employed. It is peculiarly adapted to those forms of inflammation which result in the formation of coagulable lymph or serum, and exerts its beneficial influence by restraining the morbid action of the blood-vessels and aiding in the reparation of parts, by removing the substances foreign to them. In acute inflammations, when active symptoms continue after depletion has been carried as far as admissible, it exercises a wonderful influence in arresting the progress of inflammatory action. But in low asthenic inflammations, and in those of a scrofulous and erythematous type, it is, as a general rule, positively injurious.

As a deobstruent it acts in the removal of glandular swellings, morbid deposits, and other organic alterations of structure, and proves useful even when all signs of inflammation have disappeared, and often when there is no proof that inflammation has ever existed. In enlargement of the liver, a mild and continuous course of mercury proves more effectual than any other plan of treatment. In apoplexy, mercury can be of no use except as a safe and efficient cathartic; but it may be used with great advantage in cases of paralysis. In these cases it is not unusual to find the first signs of improvement concurring precisely with the first symptoms of mercurialism.

In dropsy the mercurials have been much used to promote the absorption of the effused fluids, and prove very useful where the effusion is dependent upon chronic inflammation or some derangement of the hepatic functions; but where it is dependent upon an impoverished condition of the blood, or is the result of disease of the kidneys, it should be avoided. Also in dropsy occurring as a symptom of organic disease it will only do harm, by exhausting the strength of the patient.

Mercury has been used for a long period in the treatment of syphilis in all its forms; and at one time this disease was thought incurable without its use. It is now, however, satisfactorily established that many cases may be cured without it, and that in some forms of the disease it is not only useless, but positively injurious. When judiciously employed, in those cases in which it is admissible, so as to produce moderate ptyalism, it has been found to cure the disease more rapidly, and to afford greater security against constitutional symptoms, than any other form of treatment. In addition to the circumstances already mentioned as contraindicating the use of the mercurials, it should not be given in syphilis when there is much inflammation in the neighborhood of the primary sore. In secondary or constitutional syphilis it has been found highly serviceable by promoting the absorption of the lowly organized albuminous material which is effused into the tissues, and by its alterative properties.

Treatment of the Effects of Mercury. When the patient is under the mercurial influence, he should immediately discontinue the medicine, avoid exposure to cold, take light but nutritious diet, and keep the bowels moderately open. For the sore-mouth, astringent washes, iodine in solution, or creasote may be used; but there is nothing more effectual for moderating the excessive flow of saliva, and for correcting the offensive odor, than chlorate of potassa combined with some astringent infusion or decoction; and, if the symptoms are aggravated, it may be also given internally. To relieve restlessness and pain, opium, and, if debility is present, tonics, may be administered. For the nervous disorders resulting from the inhalation of the vapor, and in all other forms of chronic poisoning, an attempt should be made to eliminate the poison from the system by means of iodide of potassium, by saline laxatives, and by diaphoretics. The exhaustion must be combated by stimulants, tonics, and a nutritious diet. For the affection of the skin (*eczema mercuriale*) demulcent lotions and emollient baths prove most beneficial.

Modes of Administration. The preparations of this metal are generally administered by the stomach. The preparation to be employed, and the dose, must be regulated by the severity or character of the disease to be treated. In acute diseases, where

its antiphlogistic powers are required, calomel in small doses is preferred, and its tendency to irritate the bowels or to produce purging may be obviated by combining with it a small quantity of opium. In mild or chronic cases the less active preparations may be used. It may also be used by inunction: this is the most ancient mode of administering mercury, and was almost exclusively resorted to in the treatment of syphilis. It may be resorted to when the medicine cannot be given by the mouth, and may also be advantageously combined with its internal use, when it is desired to bring the system speedily under the mercurial influence. Fumigation is also sometimes resorted to, and is highly recommended by many writers of the present day, as one of the best methods of bringing the system under its influence in cases of constitutional syphilis. Where it is desirable to employ this means, the patient may be placed in a box, with an opening in the top for the head, and the preparation to be used (cinnabar or the black oxide) thrown on a hot iron or burning coals in the bottom of the box. The vapors thus produced surround the whole body, and thus, by direct application, produce its effects.

All the officinal preparations—excepting perhaps the sulphuret, which is inert—are capable of producing the peculiar effects of the metal as described. They vary, however, in the degree, rapidity, and certainty of their action. Some writers, among them Mialhe, contend that they all operate by conversion into the bichloride; while others say that it is only by conversion into an oxide that mercury can produce its peculiar effects upon the system. The difference in their effects, and their special applications, will be mentioned under the head of the different preparations.

PILULÆ HYDRARGYRI. U. S.

Blue Pill, formerly called Mass. Hydrargyri, or *Blue Mass*, is prepared by rubbing one part of mercury with one and a half parts of confection of roses, until globules cease to be visible, and then beating the mixture with one half part of powdered liquorice root into a pilular mass. Three grains of the mass contain one grain of mercury. Care must be taken to use confection of roses free from sulphuric acid, as this would form some sulphate

of mercury. It is now generally prepared by steam-power, which is an advantage, as the efficacy of the preparation depends upon the extent to which the extinction of the mercury is carried.

Properties and Uses. This is a mass of a dark-blue or olive color, of a convenient consistence for making into pills. The precise condition of the metal in this preparation is somewhat uncertain. It is probable that a small proportion is converted into an oxide during the process of trituration ; but by far the greater portion is in a state of minute mechanical division. When introduced into the stomach it undergoes certain chemical changes, and produces all the characteristic effects of the preparations of mercury. It is one of the mildest and most useful of the mercurials, producing all their effects with certainty and with little irritation upon the system. In full doses, from 5 to 15 grains, it acts as a laxative; from 1 to 2 grains, repeated, as an alterative. It is usually given in the form of pill ; but, when desirable, it may be administered in the form of powder, or suspended in mucilage.

HYDRARGYRI CUM CRETA. U. S. *Mercury with Chalk.*

This is prepared by rubbing together three parts of mercury and five parts of prepared chalk till the metal is extinguished. In this, as in the other, the mercury is in a state of minute mechanical division, as the globules can be seen by the aid of a magnifying glass, and the chalk may be dissolved out by acetic acid. Eight grains contain three grains of mercury.

Properties and Uses. It is a heavy, grayish powder, tasteless and insoluble. It resembles blue mass in its general operation, but is much milder. In doses of from 20 to 30 grains it acts as a gentle laxative, but is principally used as an alterative. The antacid properties of the chalk render it well adapted to the cases of children requiring a gentle mercurial action. Dose, 1 to 3 grains. The late Dublin Pharmacopœia directed a similar preparation, made with magnesia instead of chalk, which may be used when a laxative effect is desired.

UNGUENTUM HYDRARGYRI. U. S. *Mercurial Ointment.*

Blue Ointment is prepared by rubbing two parts of mercury with one part each of lard and suet, until globules cease to be visible. The extinction of the metal may be promoted by the admixture of some old ointment, and the trituration should be continued until a portion of it rubbed upon paper exhibits no metallic mercury.

Properties and Uses. It is an unctuous, fatty substance, of a bluish-gray color, becoming darker by age; and contains half its weight of mercury. Rubbed on the surface of the skin, or applied to a blistered surface, it is absorbed, and produces all the constitutional effects of the metal. It is resorted to when circumstances prevent the internal use of the remedy, and may also be employed as a resolvent in tumors and chronic glandular swellings, upon which it may be made to operate directly by being applied in the course of the absorbents passing through the glands. It is also used to destroy parasites on the skin, and has been successfully employed to prevent the maturation of the smallpox pustules, and the consequent pitting. When the object is to excite the constitutional effects, it should be applied night and morning by means of friction to the inner surface of the thighs, legs, and arms, where the cuticle is thinnest.

EMPLASTRUM HYDRARGYRI. U. S. *Plaster of Mercury.*

Mercurial Plaster is prepared by first melting together two troyounces, each, of olive oil and resin, and when cool rubbing the mixture with six troyounces of mercury till globules disappear, and then adding twelve troyounces of melted lead plaster. It is sometimes used to produce the local effects of mercury in glandular enlargements and swellings, especially when dependent upon a syphilitic taint. It is sometimes applied over the region of the liver in hepatic enlargements.

Emplastrum Ammoniaci cum Hydrargyro. U. S. *Plaster of Ammoniac with Mercury* is prepared by incorporating mercury, olive oil, and ammoniac together, with a minute proportion of sublimed sulphur. It is more stimulating than the above, and is used for the same purposes.

HYDRARGYRI OXIDUM RUBRUM. U. S. *Red Oxide of Mercury.*

The *Deutoxide*, commonly called Red Precipitate, is obtained by dissolving mercury in diluted nitric acid, evaporating the solution to dryness, and exposing the resulting mass to heat until red vapors cease to rise. In this process the mercury is oxidized at the expense of a portion of the nitric acid, the remainder of which unites with the oxide to form a nitrate of the deutoxide of mercury; this on exposure to heat is decomposed, giving out red nitrous fumes, and leaving behind the deutoxide of the metal. HgO_2.

Properties and Uses. It is of a bright-red color, of a shining, scaly appearance, with an acrid metallic taste, insoluble in water, alcohol, and ether; it is entirely decomposed by a red heat. It is never employed internally, on account of its irritant and poisonous properties, but is extensively used externally as a stimulant and caustic to indolent ulcerations, either in the form of powder or ointment.

Unguentum Hydrargyri Oxidi Rubri. U. S. *Ointment of Red Oxide of Mercury* is prepared by adding one part of oxide to eight parts of simple ointment previously softened by a gentle heat. Owing to the conversion of the red oxide into the black when kept, it should be prepared only when wanted. This ointment is a valuable stimulant application to ulcers when we wish to increase the quantity and quality of the discharge.

Yellow Wash. *Aqua Phagedænica. Phagedenic Lotion* is made by adding corrosive sublimate to lime-water, in the proportion of two grains to a fluidounce. By mutual decomposition, the red oxide of mercury is precipitated and chloride of calcium remains in solution. It was formerly much employed as a wash in ulcers and cutaneous eruptions.

Hydrargyri Oxidum Nigrum. *Black Oxide of Mercury*, known by the common names of *black*, *gray*, or *ash-colored* oxide, is obtained by decomposing calomel by means of an alkali. It is a dark-colored powder, without odor or taste, and insoluble in water. It is never used internally, but is used as a fumigating agent. In the form of *black wash* (*lotio nigra*), it is much used as

a mild and unirritating application to chancres and syphilitic sores of all kinds. This is prepared by adding one drachm of calomel to a pint of lime-water.

HYDRARGYRI CHLORIDUM MITE. U. S. *Mild Chloride of Mercury.*

CALOMELAS. *Calomel* is sometimes, though rarely, found native, as horn-quicksilver; but all the drug of commerce is artificially prepared. It is a protochloride (HgCl), and is made by subliming a mixture of protosulphate of mercury and chloride of sodium, when calomel is sublimed over and sulphate of soda remains behind. The protosulphate is obtained by first boiling metallic mercury in sulphuric acid until a dry mass is left,—constituting a bisulphate of the deutoxide ($2SO_3,HgO_2$),—and then triturating this with metallic mercury until globules are no longer visible,—thus forming the protosulphate, $2(SO_3,HgO)$. As thus obtained, calomel is liable to contain a little corrosive sublimate, from which it may be purified by washing it with boiling water until ammonia produces no precipitate with the washings. A variety known as Jewell's or Howard's calomel is more perfectly brought into a state of minute division by subliming it in contact with steam in a large receiver, whereby it is condensed into an impalpable powder and freed from corrosive sublimate at the same time.

Properties. Calomel, when made by sublimation, is a fibrous substance, crystallizing in four-sided prisms; but as usually found in the shops it is a tasteless, inodorous powder, of a dull-white color, becoming dark on exposure to light. It is insoluble in water, alcohol, and ether. It becomes black on the addition of the alkalies and alkaline earths, in consequence of the formation of the protoxide. When pure, it is entirely volatilized by heat, by which means any fixed impurities, as the salts of lime, baryta, etc., may be detected. It is incompatible with the alkalies and their carbonates, acids, salts of iron and lead, the chlorides and hydrosulphurets.

Medical Uses. Calomel is one of the mildest of the preparations of mercury, and the one most generally used. It is em-

ployed as an alterative in chronic skin diseases, in glandular affections, and in disordered affections of the digestive organs, more particularly those connected with hepatic derangement. In the treatment of febrile and inflammatory affections it is usually combined with small doses of opium, to prevent its acting on the bowels. It is very commonly employed as a purgative, but generally in combination with other drastic cathartics, particularly in bilious fevers and all disorders attended with congestion of the portal system, and where we wish to relieve other organs on the principle of counter-irritation. It is also frequently added to other medicines to promote their peculiar effects: thus, it increases the diuretic action of squill, and the diaphoretic tendency of the antimonials. In large doses, from 20 to 40 grains, it has been supposed to act as a sedative, and has often been administered with this view in yellow fever, in malignant bilious fevers, in cholera and dysentery. Externally it forms a useful desiccative dressing to soft chancres, and in the form of ointment is one of our most useful applications in several forms of chronic skin diseases. Dose as an alterative, $\frac{1}{2}$ to 1 grain, or even less; to produce ptyalism, 2 to 5 grains, three times a day; as a purgative, 5 to 10 grains.

HYDRARGYRI CHLORIDUM CORROSIVUM. U. S.

Corrosive Chloride of Mercury.

Corrosive Sublimate is obtained by exposing a mixture of the bisulphate of mercury (obtained by boiling sulphuric acid with mercury to dryness) and chloride of sodium to a subliming heat, when decomposition takes place; the chlorine of the salt unites with the mercury and sublimes as bichloride, while the sodium, oxygen, and sulphuric acid unite to form sulphate of soda, which remains behind. Composition, Hg,Cl_2.

Properties. As thus obtained, it is in the form of colorless crystals, or in white, semi-transparent crystalline masses, sp. gr. 5·2, permanent in the air, with a very acrid, styptic, metallic taste. It dissolves in sixteen parts of water, and is soluble in alcohol and ether. With albumen it forms a white precipitate, which is soluble in water; with caustic potash a yellow, and with ammonia a white, precipitate. It is incompatible with the

alkalies and their carbonates, all sulphurets, all vegetable astringent infusions, albumen, and all albuminous solutions.

Medical Properties and Uses. In small or therapeutic doses, $\frac{1}{16}$ to $\frac{1}{8}$ of a grain, it acts as an alterative. It produces all the beneficial effects of the mercurials in augmenting the secretions, producing the absorption of morbid growths, altering the state of the skin in many cutaneous diseases, and changing the character of morbid actions generally, with less tendency to salivate and less obvious disturbance of the vital functions than any other preparation of the metal. In large doses, or in long-continued small doses, it causes griping and purging, accompanied by all the constitutional effects before described. In large quantities it acts as a powerful corrosive poison, by virtue of its affinity for the albumen and the other constituents of the tissues, causing violent irritation and inflammation of the stomach and alimentary canal; and sometimes it occasions inflammation of the lungs and irritation of the urinary organs. It should not be administered to those predisposed to pulmonary disease or suffering from irritation of the kidneys or urinary organs.

Corrosive sublimate is much employed as an alterative in chronic cutaneous diseases, chronic rheumatism, and in various other chronic diseases requiring the use of the mercurials. It is much employed as a remedy in secondary or constitutional syphilis. Those who recommend its use contend that it removes the venereal symptoms in a very short space of time, without causing any of the unpleasant effects attending a long-continued course of medicine. In these cases it may be advantageously combined with a vegetable diaphoretic or tonic. Externally, it acts as a stimulant and escharotic, and may be employed dissolved in water as a wash in lepra, psoriasis, and other scaly eruptions. In cases of poisoning with corrosive sublimate, albumen, as white of eggs, is the best antidote; in its absence, wheaten flour, milk, or iron filings may be used. Dose, $\frac{1}{16}$ to $\frac{1}{8}$ of a grain, given in the form of pill or in solution.

HYDRARGYRI IODIDUM VIRIDE. U.S. *Green Iodide of Mercury.*

This salt, called the *Protiodide* or *Iodide of Mercury*, is obtained by triturating together mercury and iodine with a little alcohol. This is a case of simple combination, the alcohol facilitating the union by dissolving the iodine. Composition, HgI.

Properties. It is a heavy, yellowish-green powder, becoming dark on exposure to light, without odor or taste, insoluble in water and alcohol, and entirely volatilized at a high temperature.

Medical Properties and Uses. This preparation is alterative and resolvent, possessing the properties of both the mercury and the iodine. It is used in syphilis, occurring in strumous habits, and in various obstinate skin diseases. In long-continued doses it occasionally produces salivation, and in large quantities proves an irritant poison. Dose, $\frac{1}{2}$ to 1 grain, gradually increased.

HYDRARGYRI IODIDUM RUBRUM. U. S. *Red Iodide of Mercury.*

This preparation, the *Biniodide of Mercury* (HgI_2), is obtained by double decomposition between corrosive sublimate and iodide of potassium. It is a scarlet-red powder, inodorous, with a slight metallic taste, insoluble in water, sparingly soluble in alcohol, and very soluble in ether.

Medical Properties and Uses. It is alterative and deobstruent, possessing properties similar to the green iodide, but more irritant in its action. It should be given with great caution, and should be discontinued, if it cause much irritation. It resembles corrosive sublimate in its poisonous effects. By many it is considered the best form of mercury which can be used in secondary and constitutional syphilis. The dose is $\frac{1}{16}$ of a grain, gradually increased. The best mode of administering it is in a solution of iodide of potassium. It is sometimes used in the form of ointment, as a topical application to chronic cutaneous diseases and glandular enlargements of strumous origin.

HYDRARGYRUM AMMONIATUM. U. S. *Ammoniated Mercury.*

White Precipitate, sometimes called *Ammonio-Chloride of Mercury*, is obtained by precipitating a solution of corrosive sublimate by ammonia. This precipitate is a peculiar compound, composed of amidogen or amide, the radical of ammonia, with bichloride of mercury, designated by the formula $HgCl_2+2HgNH_2$. The reactions which take place are very complex: a portion of the ammonia (NH_3) parts with one equivalent of its hydrogen, becoming amidogen (NH_2), which unites with a portion of the mercury of the bichloride, forming a biamide of mercury ($2Hg, NH_2$), while the hydrogen of the ammonia and the chlorine of the bichloride, thus liberated, unite to form hydrochloric acid. This biamide of mercury, thus formed, unites with the remaining bichloride to form a chloro-amide of mercury.

Properties and Uses. Ammoniated mercury is a bulky, milk-white, amorphous powder, sometimes in irregular masses, with a styptic metallic taste, insoluble in water and alcohol. It is a powerful preparation, but used only as an external application in the form of ointment.

Unguentum Hydrargyri Ammoniati. U. S. *Ointment of Ammoniated Mercury* is prepared by mixing one part of white precipitate with twelve of simple ointment. It is used in chronic cutaneous diseases and to destroy pediculi.

UNGUENTUM HYDRARGYRI NITRATIS. U. S. *Ointment of Nitrate of Mercury.*

Citrine Ointment is made by dissolving one and a half troy-ounces of mercury in three and a half troyounces of nitric acid, adding the solution to a mixture of twelve troyounces of neat's-foot oil and four and a half troyounces of lard, heated together, and stirring until effervescence ceases and the ointment thickens. The precise chemical changes which take place in this process are not satisfactorily understood; but it is supposed to be a mixture of the nitrate of the peroxide of mercury

with the fatty acids and elaidin, which is produced by the action of the nitrous acid on the oleic acid of the oil.

Properties and Uses. When recently prepared, it is of a golden-yellow color; but when kept for some time, it acquires a dirty-greenish color, and becomes hard, so as to be unfit for use. It is much employed as an alterative and stimulant application to indolent ulcers, in chronic cutaneous diseases, as herpes, porrigo, impetigo, certain forms of eczema, and to the eyelids when affected with chronic ophthalmia. It may be diluted with lard when necessary.

HYDRARGYRI SULPHAS FLAVA. U. S. *Yellow Sulphate of Mercury.*

Turpeth Mineral is obtained by boiling mercury in sulphuric acid until a dry, white mass remains, and then throwing this into boiling water, when the bisulphate of the deutoxide of mercury is decomposed, and an insoluble salt is precipitated, which is the yellow sulphate. $3HgO_2,SO_3$.

Properties and Uses. It is a lemon-yellow powder, with an acrid taste. It is an alterative, emetic, and irritant poison, too violent for internal use. It is sometimes used as an errhine, diluted with snuff or powdered liquorice root.

HYDRARGYRI SULPHURETUM RUBRUM. U. S. *Red Sulphuret of Mercury.*

The *Bisulphuret of Mercury*, commonly called Cinnabar, is found native, being the ore from which mercury is extracted, and is also prepared artificially by heating together mercury and sulphur. HgS_2.

Properties and Uses. It is in the form of heavy, brilliant, crystalline masses, of a dark-red color and fibrous texture, without odor or taste, and insoluble in water and alcohol. It furnishes a brilliant, rich-red powder, commonly called *vermilion.* It is entirely volatilized by heat. It is never used internally, but is the preparation generally employed for mercurial fumigation.

HYDRARGYRI SULPHURETUM NIGRUM. U. S. *Black Sulphuret of Mercury.*

Ethiops Mineral is prepared by rubbing equal parts of mercury and sulphur together till all the globules disappear and a powder is formed. It is a heavy, inodorous, tasteless, black powder, insoluble, and entirely dissipated by heat. It possesses the alterative properties of the mercurial preparations, and was at one time used in glandular affections and in cutaneous diseases, but at present is very little used as medicine.

HYDRARGYRI CYANIDUM. U. S. *Cyanide of Mercury.*

This salt is prepared by the reaction between the red oxide of mercury and hydrocyanic acid generated by the action of sulphuric acid on ferrocyanide of potassium. Composition, $HgCy_2$.

Properties and Uses. It is in heavy, white or colorless, prismatic crystals, inodorous, with a strong styptic taste, wholly soluble in water, and very little if at all so in alcohol; it is entirely decomposed by heat. It is a potent poison, producing effects similar to those of corrosive sublimate, excepting that it does not produce the epigastric pain which that salt occasions, and on this account has been employed in the treatment of syphilis. Dose, $\frac{1}{16}$ of a grain, gradually increased.

IODINIUM. U. S. *Iodine.*

Iodine is a non-metallic element, discovered in 1812 by Courtois, a saltpetre manufacturer at Paris. It exists in both kingdoms of nature; it is found in many mineral waters, in certain marine vegetables, in sponge and some molluscous animals, and occasionally in combination with silver, zinc, and lead. For commercial purposes it is obtained from the ashes of the fuci, or common sea-weeds, which are its most abundant natural source. These ashes, commonly called kelp, are lixiviated with water, to which they yield about half their weight of salts. The mother-liquor is poured off from these salts, which are deposited by evaporation and crystallization; it is then treated with sulphuric acid,

and, as soon as effervescence has ceased, is distilled with deutoxide of manganese, when the iodine passes over and is condensed in proper receivers. In this process the iodide of sodium is decomposed and the iodine evolved; while the sulphuric acid, deutoxide of manganese, and sodium unite to form sulphate of protoxide of manganese and sulphate of soda.

Properties. Iodine is a soft, friable, opaque, crystalline solid, of a bluish-black color and metallic lustre, usually met with in micaceous scales. It has a strong, peculiar odor, somewhat like that of chlorine, and a hot, acrid taste. It is very volatile, and volatilizes rapidly on the application of heat, giving a rich violet vapor, from which it derives its name. Applied to the skin, it produces a yellow color, which soon disappears. It is soluble in alcohol and ether, but requires seven thousand times its weight of water to dissolve it. In its free state it may be distinguished from most other substances by its characteristic vapor, and by the deep-blue color it gives with starch. This color is destroyed by heat, and hence in testing for iodine the substance must be cold and the iodine be free. Where it is present in combination with bases, some deoxidizing substance must be added: nitric acid is generally used. Iodine is sometimes adulterated with mineral coal, plumbago, and black oxide of manganese, which may be readily detected by their fixed nature, while the pure iodine is entirely volatilized by heat. Its entire solubility in ether is another mode of detecting impurities.

Physiological Action. Its effects vary according to the dose, degree of concentration, and state of combination. In small and repeated doses it is absorbed and acts as an alterative, exciting the vital actions, especially of the glandular and absorbent system It also acts as a tonic, improving the appetite and promoting digestion. When these small doses are continued for a long time, it palliates and even aids in the removal of disease, without any perceptible effect upon the functions of the body, thus acting as an alterative in the true sense of the word. If given in large or too long-continued doses, it has the effect of impoverishing the blood, and produces a peculiar disordered state of the system, which has been named *iodism.* This is characterized by fever and restlessness, accompanied with nausea, headache, loss of appetite, and

great depression, followed by an emaciation of the whole frame. These soon disappear upon the discontinuance of the medicine. In overdoses it acts as an irritant poison. When the vapor is inhaled, it excites cough and irritation of the air-passages. Externally applied, either in the form of tincture or ointment, it produces intense local action, causing itching, redness, and desquamation.

Its modus operandi as a curative agent is not well understood: by some its therapeutic action is ascribed to its tonic effects in establishing a healthy tone of the system; by some, to a liquefaction of the blood; by others, to a direct stimulation of the absorbent system; while some contend that it is one of the constituents, favorable, if not essential, to perfect health.

Therapeutical Application. Iodine was introduced as a medicine in 1819, by Dr. Coindet, Sr., of Geneva, for the cure of goitre or bronchocele; and it has since been employed in the treatment of many chronic diseases, but especially those of the absorbent and glandular systems. In glandular enlargements and morbid growths unattended by acute inflammation, it displays extraordinary powers over the function of nutrition. In bronchocele, when the hypertrophy is the result of chronic irritation or subacute inflammation, its steady employment proves beneficial; but when the normal tissue has been displaced by diseased growth, no benefit can be expected. In all cases of simple enlargement of the various glandular organs it exerts a salutary influence. In scrofula, in all its various forms, it possesses greater virtues than any other article of the Materia Medica; it is particularly beneficial in tumors, abscesses, ulcers, ophthalmia, and affections of the bones and joints occurring in scrofulous subjects. At one time it was much lauded as a remedy, both internally and in the form of inhalation, in phthisis; but at the present day most writers agree that but little benefit is derived from its employment in this disease, and that it seems to have no effect in promoting the absorption of tuberculous matter. The inhalation of the vapor sometimes proves useful in chronic bronchitis. In dropsy it also proves beneficial, by removing the lesions which so often lead to and tend to keep up the effusion, as in hydrocephalus, and in ascites depending upon enlargement of the liver. Topically it is

employed in the form of tincture or ointment to obtain its alterative influence, or simply as a local stimulant, in many forms of chronic cutaneous diseases, to enlarged glands and chronic swellings. In erysipelas, the tincture painted over the inflamed parts often alleviates the symptoms. As an injection in hydrocele, into cysts, cavities, or abscesses, it provokes adhesive but not suppurative inflammation.

In poisoning by iodine, the stomach must be evacuated by emetics, and afterward amylaceous and demulcent drinks freely administered. The dose is $\frac{1}{2}$ grain, gradually increased; but it is now never given in substance; the most eligible form of giving it is in solution with the iodide of potassium.

Tinctura Iodini. U. S. *Tincture of Iodine* is prepared by dissolving one troyounce of iodine in a pint of alcohol; sixteen minims, equivalent to thirty-five drops, contain one grain of iodine. It is of a deep-brown color, and undergoes a gradual change when kept, owing to the reaction between the iodine and the alcohol. The dose is from 10 to 20 drops, but it is now seldom employed internally, as water precipitates the iodine and renders it apt to irritate the stomach. It is almost exclusively employed externally when it is desired to obtain the local effects of the remedy. When used for injection into serous cavities, it should be diluted with an equal bulk or twice its bulk of water.

Unguentum Iodini. U. S. *Ointment of Iodine* is made by incorporating twenty grains of iodine and four of iodide of potassium, rubbed together with six drops of water, with a troyounce of lard. The use of the iodide is simply to facilitate the incorporation. It is employed as a local application to glandular tumors, etc.

POTASSII IODIDUM. U. S. *Iodide of Potassa.*

This salt, sometimes incorrectly called *Hydriodate of Potassa*, may be prepared by different processes. The pharmacopœia directs that an aqueous solution of potassa be treated with iodine in excess, and the solution evaporated, by which means we obtain a mixture of iodide of potassium and iodate of potassa. By mixing this with charcoal and exposing the mixture to a dull-

red heat, the oxygen is driven off, and the iodate converted into the iodide, which may be dissolved out of the mass and obtained pure by crystallization. Composition, KI.

Properties. Iodide of potassium is in white or colorless opaque cubic crystals, inodorous, with a pungent, saline taste, soluble in two-thirds its weight of water, somewhat less so in alcohol. Exposed to a red heat, it decrepitates and fuses without undergoing decomposition. It is incompatible with acids and the salts of most earths and metals.

Medical Properties and Uses. The physiological and therapeutical effects of this salt are closely analogous to those of iodine, only less energetic and less irritant. It is absorbed and rapidly eliminated from the system, and may be readily detected unaltered in the secretions. It is the preparation most commonly used when the effects of iodine on the system are desired. In secondary syphilitic affections it is extensively employed, and with great benefit; it is particularly adapted for those cases in which mercury has been administered in large quantities during the primary stage, and for scrofulous subjects. It is of most service in that form of the disease characterized by vague pains in the limbs, with or without periosteal tumors or nodes, and in the tubercular form of syphilitic eruptions. It is also employed with much benefit in chronic rheumatism, in rheumatic gout, and in chronic diseases accompanied with induration and enlargement of various organs. In that form of rheumatism affecting the fibrous tissue after the acute symptoms have subsided, and where the periosteum is affected, it gives speedy relief, oftentimes removing the pain and swelling in a few days. In paralysis, where the paralytic condition depends upon pressure upon the brain, or upon a nervous trunk, by an effusion or thickening, it sometimes proves useful by producing absorption of the cause. In poisoning from lead or mercury, particularly the former, it is said to prove useful by forming a soluble salt of the metal lodged in the tissues, which is readily eliminated from the system. It is sometimes used externally in the form of lotion, ointment, or bath, and in this way is capable of producing the effects of iodine on the system. The dose is from 5 to 20 grains in solution three times a day. Occasionally it produces nausea, and an affection

like catarrh, and sometimes ptyalism. In this case the dose must be diminished until these symptoms disappear, when the ordinary dose may be resumed.

Tinctura Iodini Composita. U. S. *Compound Tincture of Iodine* is prepared by dissolving half a troyounce of iodine and a troyounce of iodide of potassium in a pint of alcohol. This tincture may be diluted with water without decomposition, and is preferable to the simple tincture for internal administration. Dose, 15 to 30 drops, to be gradually increased if necessary.

Unguentum Iodini Compositum. U. S. *Compound Ointment of Iodine* is made by incorporating thirty grains of iodide of potassium and fifteen grains of iodine, previously rubbed together with a little water, with a troyounce of lard. It is used for the same purposes as the simple ointment, from which it differs chiefly in being stronger with iodine.

Liquor Iodini Compositus. U. S. *Compound Solution of Iodine* is a concentrated solution of iodine with iodide of potassium, and is prepared by dissolving three hundred and sixty grains of iodine and a troyounce and a half of iodide of potassium in a pint of water. The dose is 6 drops, containing about a quarter of a grain of iodine, and it is a very convenient form for the internal exhibition of the remedy. It may also be used for inhalation, by means of the atomizer.

ACIDUM HYDRIODICUM DILUTUM. U. S. *Diluted Hydriodic Acid.*

This acid is prepared by passing sulphuretted hydrogen gas through water in which iodine has been suspended. In this process one equivalent of the hydrogen unites with one of iodine to form hydriodic acid, while the sulphur with which it was united is isolated, and may be separated by filtration.

Properties and Uses. It is a colorless liquid, having a sour taste, and an odor somewhat resembling that of hydrochloric acid. It darkens on exposure to the air, in consequence of the separation of the iodine. Each fluidrachm contains ten grains of iodine. It is capable of producing all the medicinal effects of iodine upon the system, and is said to be absorbed and enter the

circulation with great facility, while it is less unpleasant to the taste, and less apt to offend the stomach. Dose, ʒss three times a day, diluted with water.

Ammonii Iodidum. *Iodide of Ammonium* is obtained by the action of iodine on a solution of the hydrosulphuret of ammonia, and evaporating to crystallization. It is a crystalline, white powder, deliquescent, soluble in water, with a taste like that of iodide of potassium, but a little more pungent. It is a tonic alterative, and has been recommended as a substitute for the iodide of potassium as a remedy in skin diseases and syphilitic affections. Dose, 1 to 3 grains, or more.

Sodii Iodidum. *Iodide of Sodium* is prepared by double decomposition between carbonate of soda and freshly prepared solution of iodide of iron, and evaporating at a gentle heat to crystallization. It is a white, crystalline, very deliquescent salt, soluble in water. It possesses properties similar to the iodide of potassium, but has a much less disagreeable taste, and is better adapted to weak and delicate stomachs, and has sometimes succeeded in constitutional syphilis where the potassium salt has failed. Dose, 5 to 20 grains.

Amyli Iodidum. *Iodide of Starch* is prepared by rubbing twenty-four grains of iodine, previously moistened with a few drops of spirit, with an ounce of starch until the powder assumes a uniform blue color, and drying it at a moderate heat so as not to drive off the iodine. It was introduced into notice as the best means of administering iodine in large quantities without the occurrence of gastric irritation and the other unpleasant symptoms which sometimes attend its use. The dose is a teaspoonful, gradually increased.

ARSENICUM. U. S. *Arsenic.*

Arsenic is sometimes found native, but most commonly in combination with other metals, as cobalt and iron, or with sulphur, as orpiment or realgar.

Properties. When pure, it is a brittle, crystalline metal, of a brilliant steel-gray color, becoming dull or blackish on exposure, with a granular texture; sp. gr. 5·8. When heated, it sublimes

without fusion, giving rise to white vapors having a garlicky smell. It is inert in its metallic state, but when swallowed it is oxidized and becomes capable of producing poisonous effects. It forms two compounds with oxygen, *arsenious* and *arsenic acid;* the first is the only one used in medicine.

ACIDUM ARSENIOSUM. U. S. *Arsenious Acid.*

This preparation, known in the shops as *Arsenic, White Arsenic, Oxide of Arsenic*, is obtained chiefly from Bohemia and Saxony, where it is procured on a large scale as a collateral product in the smelting of cobalt ores (arseniurets of cobalt), and purified by a second sublimation. Composition, AsO_3.

Properties. It occurs in commerce in glassy, transparent masses, with a vitreous fracture, and of a milk-white color. As found in the shops, it is generally in the form of a fine white powder, inodorous and tasteless. It is slightly soluble in water, but more readily soluble in alcohol and the fixed oils. It is entirely volatilized by heat without undergoing any change; but if carbonaceous matter be present, it is reduced and the metal sublimed and its peculiar alliaceous odor made manifest. Any fixed adulteration may be detected by subjecting it to heat sufficient to volatilize the arsenic, when the impurities will be left behind.

Physiological Action. Arsenic is absorbed into the system, and has been detected in the tissues and secretions of the body. In small doses ($\frac{1}{30}$ to $\frac{1}{15}$ of a grain), it is an alterative, and, if persevered in, tonic, increasing the appetite and improving the quantity and quality of the secretions. In large doses ($\frac{1}{12}$ to $\frac{1}{8}$ of a grain), it is a powerful antiperiodic. In larger doses, it acts as an irritant poison. When given in slight excess, or even in long-continued small doses, it oftentimes produces serious, and even fatal, results. The first symptoms of its cumulative effect are œdema of the face and redness of the conjunctiva, which soon subside if the medicine be discontinued. If, however, its use be persevered in, it occasions a great depression of the digestive and nervous systems, characterized by a quick, small pulse, hurried respiration, and swelling of the face and extremities. We can give no explanation of its action: it possesses an action peculiar to itself, acting on the system without any visible effect, except

in the alleviation of the disease for which it may be administered. Headland refers its action in periodic and cutaneous diseases to its power of decomposing the poisons in the system upon which they depend, and causing them to be eliminated. All the compounds of arsenic exert an antiseptic influence on dead animal tissues, preventing decomposition; and Liebig supposes that they may be able to arrest contagious and other disorders in the system in the same way that they control putrefaction out of the body. Externally, it acts as a powerful caustic, quickly and entirely destroying the vitality of the part acted upon.

Poisonous Effects. The symptoms produced by excessive or poisonous doses are extremely diversified. Sometimes they indicate inflammation of the gastro-intestinal membrane; at others there is very little irritation of the alimentary canal, the poison affecting chiefly the nervous system, producing great depression. Mr. Hunt says that arsenic proves fatal in one of three ways, according to the form and dose in which it is administered, and its solution in the stomach, each characterized by distinct symptoms. In very large doses, it sometimes though rarely proves fatal in a few hours, from failure (paralysis) of the heart's action, the symptoms being excessive prostration of strength, with frequent fainting. Where death occurs in two or three days, it is from excessive inflammation of one or more of the abdominal viscera, accompanied by intense pain, violent and incessant vomiting of a brown, turbid matter mixed with mucus and sometimes streaked with blood, followed by purging, with tenesmus and severe cramp or spasm of the muscles of the extremities. In cases where the doses have been small and repeated for a long time, it produces great disturbance of the nervous system, with local palsy as if from lead-poisoning, and epilepsy. Sometimes exfoliation of the hair and cuticle, and ptyalism occur.

The post-mortem appearances are generally confined to the stomach and intestines, and are well marked in proportion to the size of the dose and the length of time the individual has survived after taking the poison. They are generally those of active inflammation, sometimes accompanied with ulceration, softening, effusion of lymph, and even gangrene in the intestinal canal. The blood is said to be sometimes fluid and dark.

Treatment of Poisoning. The first object is to expel the poison from the stomach, by administering emetics and promoting vomiting by the use of diluents. The next object is to decompose the poison and render it inert, by freely administering hydrated sesquioxide of iron in the form of pulp or magma. This acts by producing (by a transfer of oxygen from the oxide to the acid) an insoluble, and consequently inert, arseniate of the protoxide of iron. Magnesia and charcoal have also been recommended as antidotes. The gastro-enteric inflammation and the nervous prostration must be combated by the usual means.

Tests. As arsenic is so frequently employed for criminal purposes, it is of importance to detect its presence. The most simple and characteristic test for it in its solid state, either pure or combined with inorganic substances, is its reduction to the metallic state and its subsequent oxidation. In solution it may be detected in one of four ways: by what are called liquid tests; by subliming the metal from the precipitate produced by one of these by heating it with potash or soda flux; by Marsh's method, which is the most delicate, and which consists in disengaging it in the form of arseniuretted hydrogen gas, and decomposing the gas by combustion, so as to obtain the metallic arsenic; or by Reinsch's test, which consists in boiling the suspected solution with muriatic acid and then immersing in it a slip of copper foil, when the latter acquires a steel-gray coating of metallic arsenic, which may be further tested by the reduction test. The most characteristic liquid tests are *hydrosulphuric acid*, which gives a golden-yellow precipitate of sulphuret of arsenic; *ammoniacal nitrate of silver*, which produces the rich-yellow arsenite of silver; and *ammoniacal sulphate of copper*, which affords the green arsenite of copper.

Therapeutic Uses. In intermittent and periodic diseases, arsenic has long been highly esteemed. In the treatment of these it ranks next to quinine, and often succeeds in curing obstinate cases which have resisted the quinine treatment. Headland says it appears to act by antagonizing a morbid action, which is either the cause or the result of the blood disease. It is also useful in other intermittent disorders besides ague, as neuralgia, especially that form which attacks the brow. In cutaneous

diseases, particularly those of a scaly character, it displays its alterative powers in a most marked degree. In that class of skin diseases in which the eruption is the chief or the only symptom of the existence in the blood of certain poisons or peculiar morbid conditions, arsenic proves most efficacious. Mr. Hunt considers it a specific for all skin diseases that are not syphilitic in their origin. In the treatment of chorea it appears to exercise a powerful influence, and is highly recommended by Dr. Pareira. It has also been used in other nervous affections, in epilepsy, in chronic rheumatism, and in various other affections which call for an alterative treatment. It is contraindicated in all acute diseases, and where the stomach or intestinal canal is irritated, in inflammatory pulmonary affections, and should be used with great caution in infancy and childhood.

Administration. The dose of arsenious acid is from $\frac{1}{20}$ to $\frac{1}{10}$ of a grain, three times a day, given in the form of pill with crumb of bread. It is best given directly after meals, and any tendency to nausea or vomiting may be corrected by combining it with opium. During its employment the patient should be carefully watched, and if the eyelids or conjunctiva become inflamed, or if cough or other symptoms of bronchial irritation arise, it should be suspended for a short period, and then resumed. In consequence of the great difficulty of accurately dividing so small a quantity into pills, the following preparation is generally preferred.

LIQUOR POTASSÆ ARSENITIS. U. S. *Solution of Arsenite of Potassa.*

Fowler's Solution, sometimes called "*tasteless ague-drops*," is prepared by boiling sixty-four grains each of arsenious acid and bicarbonate of potassa in twelve ounces of water, adding half an ounce of compound spirits of lavender, and then water sufficient to make a pint.

Properties and Uses. It is a transparent liquid, having the color, odor, and taste of the lavender. Composition, KO,AsO_3, in water. Each fluidrachm contains one-half grain of arsenious acid. Its action is similar to that of arsenious acid, and it is the preparation usually resorted to when the medicine is given inter-

nally. Dose, 5 to 10 drops, two or three times a day. It is incompatible in prescription with acids, lime-water, alum, and most of the sulphates, and the preparations of bark.

Liquor Sodæ Arsenitis. *Pearson's Solution* is a solution of arsenite of soda (four grains to ℥ of water), and possesses properties similar to the above. It is much used in Europe for the same purposes.

Liquor Ammoniæ Arsenitis. *Biette's Arsenical Solution* is a solution of arsenite of ammonia (one grain to ℥i of water). Dose, 20 to 60 minims.

ARSENICI IODIDUM. U. S. *Iodide of Arsenic.*

This compound is made by the direct combination of its constituents (sixty grains of arsenic and three hundred of iodine) with the aid of a gentle heat. Composition, AsI.

Properties and Uses. It is an orange-red, crystalline solid, entirely soluble in water, and wholly volatilized by heat. In small doses ($\frac{1}{20}$ of a grain, gradually increased to $\frac{1}{3}$) it is a powerful alterative, highly recommended by some as a constitutional remedy in obstinate skin diseases. Its use requires great caution, and it is but little used except in the preparation of Donovan's solution.

LIQUOR HYDRARGYRI ET ARSENICI IODIDI. U. S.
Solution of Iodide of Mercury and Arsenic.

This solution, commonly known as *Donovan's solution*, is prepared by dissolving thirty-five grains of iodide of arsenic and red iodide of mercury, each, in half a pint of water.

Properties and Uses. It is of a pale-yellow color, with a slightly styptic taste. Occasionally the color is orange-yellow, owing to the presence of free iodine. It is supposed to combine the medicinal virtues of its three constituents, and has been found decidedly useful in various skin diseases, particularly those of syphilitic origin. Dose, 5 to 20 drops, three times a day, properly diluted with water. It is incompatible with laudanum and the salts of morphia. Sometimes it disorders the stomach and causes headache and other unpleasant symptoms, in which case it must be stopped for a time, and afterward resumed, but in a smaller dose.

BROMINIUM. U. S. *Bromine.*

Bromine is a non-metallic element, discovered in 1826, analogous in many respects to iodine and chlorine. It exists in sea-water and numerous mineral springs, in certain marine animals and vegetables, and occasionally in combination with metals. It is obtained for use from the bittern of salt springs (the mother-liquor left after the crystallization of the common salt), in which it exists as bromides of sodium and magnesium, by distilling it with sulphuric acid and deutoxide of manganese.

Properties and Uses. Bromine is a very volatile, dark-red liquid, sp. gr. 2·966, with a stifling odor like that of chlorine, and a very acrid taste. At 4° below zero it becomes a hard, brittle, crystalline solid, and at 117° boils, forming a reddish vapor, resembling that of nitrous acid. It is soluble in thirty-four parts of water, to which it communicates an orange color; more soluble in alcohol and ether. It acts like iodine in stimulating the lymphatic system and promoting absorption, and has been employed in the same affections. Internally it is used in solution (one part bromine to forty parts water), in doses of 6 drops several times a day. Externally, in its pure state, it is caustic and irritant. Recently it has been used as an antiseptic in purifying the atmosphere of hospitals where contagious diseases exist, and also, properly diluted, as a local application in hospital gangrene and other diseases.

POTASSII BROMIDUM. U. S. *Bromide of Potassium.*

This salt is obtained by decomposing a solution of bromide of iron (formed by heating together iron filings and bromine) by carbonate of soda, when the carbonate of iron is precipitated, and the bromide left in solution, from which it may be crystallized.

Properties. It is a permanent white salt, crystallizing in cubes or prisms, with a pungent, saline taste, very soluble in water, but sparingly soluble in alcohol. When heated it decrepitates, and at a red heat fuses without decomposition. It is incompatible with acids and the salts of most metals and earths.

Therapeutic Action and Uses. The bromide of potassium

possesses alterative and resolvent properties similar to, but milder than, the iodide of potassium. In large doses it acts as a sedative on the nervous system, diminishing in a remarkable degree the sexual function. All sorts of theories have been proposed to account for the action of this medicine; most writers now agree that it acts as a soothing sedative to the nervous centres, lessening their reflex excitability when morbidly increased, and producing a quiet, refreshing sleep. Where the want of sleep arises from mental rather than from physical pain, or from trifling causes, exciting a morbidly sensitive nervous system, it is a remedy of great power, and almost always induces sleep. Against abnormal irritability of the genital system it acts with undoubted efficacy; and, as a remedy for spasm and increased reflex action of the nervous centres, it proves most useful in such diseases as hooping-cough, infantile convulsions, chorea, etc. In full and frequent doses, and sufficiently long continued, it is of great value in epilepsy, uncomplicated with any organic derangement. It may also be used to relieve the various symptoms attending uterine or ovarian diseases, such as insomnia, hysteria, etc., and other forms of mental and nervous derangement, as delirium tremens, mania, etc. Dose, from 5 to 30 grains, dissolved in water.

Ammonii Bromidum. *Bromide of Ammonium* is prepared by dissolving bromine in water of ammonia. NH_4Br. It is a white, crystallizable salt, soluble in water. It possesses properties similar to the bromide of potassium, as an absorbent in glandular and other enlargements. It also appears to exercise a beneficial effect over certain functional nervous diseases, as hooping-cough, epilepsy, etc., and has a marked control over the mucous membranes of the entire body. In the treatment of hooping-cough, especially, it is highly recommended, and appears to diminish the frequency and severity of the spasm, and to deaden the sensibility of the fauces and palate. Dose, 2 to 5 grains.

CHLORINUM. *Chlorine.*

Chlorine is an elementary gaseous fluid, of a greenish-yellow color and characteristic pungent odor and taste. It is found in

combination in both kingdoms of nature, and is obtained by the action of diluted muriatic acid on the black oxide of manganese. When inhaled, it acts as a powerful irritant of the bronchial mucous membrane, causing a sense of suffocation, cough, and spasm of the glottis. Properly diluted with atmospheric air, chlorine inhalations have been found useful in acute and chronic bronchitis, and in aphonia following an ordinary cold, without organic lesion.

It is of great value as a fumigating and disinfecting agent, possessing the property of destroying or neutralizing fetid exhalations and correcting offensive odors. Its disinfecting property is supposed to depend on its affinity for hydrogen, which it abstracts from the water or aqueous vapor, setting free nascent oxygen, which acts as the effective agent by oxidizing the organic matter; or it may act merely by abstracting hydrogen from the miasmata. It is also used as an antidote to poisoning by hydrocyanic acid and sulphuretted hydrogen, decomposing them, by abstracting their hydrogen.

The chlorine compounds resemble, in their general action, those of bromine and iodine, and have the power, when taken in sufficient quantity, of diminishing the fibrin of the blood. They are useful in diseases attended with a depraved condition of the blood and a low state of the vital powers. The gastric juice abounds in alkaline chlorides, especially the chloride of sodium; and the bad consequences which follow the omission of this substance from the food show that it has a beneficial action on the blood and is essential to health.

Aqua Chlorini. U. S. *Chlorine Water. Solution of Chlorine* is an aqueous solution containing twice its volume of gas, and is prepared by simply passing chlorine gas through water.

Properties and Uses. It is a pale, yellowish-green liquid, with an astringent taste, and the peculiar odor of the gas. It is decomposed by light, with the production of muriatic acid and the evolution of oxygen, and hence must be kept in a dark place. The concentrated solution is an irritant poison; properly diluted, it acts as a stimulant and antiseptic, and has been used in diseases of a malignant character, as scarlatina, typhus fever, erysipelas, etc. Externally it is used as a gargle in malignant sore-

throat, as a wash in ill-conditioned ulcers, and as a local bath in diseases of the liver. It furnishes a good means of liberating the gas for inhalation. Dose, f℥i to f℥ij, largely diluted.

CALX CHLORINATA. U. S. *Chlorinated Lime.*

This substance, known as *chloride of lime*, or *bleaching powder*, is made by saturating hydrated or slacked lime with chlorine gas, and is a mixture of hypochlorite of lime and chloride of calcium. $CaO,ClO+CaCl$.

Properties and Uses. It is a loose, grayish-white powder, with the odor of chlorine, and a strong, bitter, astringent taste, readily soluble in water. On exposure to the air it deliquesces, and absorbs both moisture and carbonic acid, and gives out chlorine and hypochlorous acid gas. It is stimulant and antiseptic, but for internal use the solution of chlorinated soda is preferred. Locally its action is that of an irritant and caustic, and in solution it has been used as an application to ill-conditioned ulcers, cutaneous eruptions, and as a wash for the mouth in ulcerations of the gums. In consequence of the facility with which it parts with its chlorine, it is much used as an antiseptic and disinfectant, and is particularly useful in hospitals, jails, sick-chambers, and all other places the air of which requires purification.

LIQUOR SODÆ CHLORINATÆ. U. S. *Solution of Chlorinated Soda.*

Labarraque's Disinfecting Liquid is made by decomposing a solution of carbonate of soda by one of chlorinated lime, when carbonate of lime is precipitated and chlorinated soda remains in solution. In the original process of Labarraque the chlorine gas is passed into a solution of carbonate of soda.

Properties and Uses. It is a transparent or greenish-yellow solution, with a faint odor of chlorine, a sharp, saline taste, and an alkaline reaction. It is stimulant and antiseptic, and has been employed beneficially in malignant or putrid diseases, and in the advanced stages of all fevers and exanthematous diseases, when they assume the typhoid type. As a local remedy it is

useful in all affections attended with fetor, in scarlatina and aphthous ulcerations of the mouth, and as an addition to gargles in ulcerated sore-throat. One of its principal uses is to purify the air in sick-rooms, in which case it acts by decomposing sulphuretted hydrogen. The dose is f℥ss, diluted with water. For gargles, from f℥ss to f℥i may be used, in half a pint of water.

CALCII CHLORIDUM. U. S. *Chloride of Lime.*

Chloride of Lime is prepared by dissolving chalk or marble in muriatic acid and evaporating to dryness, after which it may be fused. The anhydrous is a white, translucent solid, of a crystalline texture, with an acrid, bitter, saline taste, very soluble in water and alcohol. On account of its great affinity for water, it is used for drying gases, and for depriving various liquid substances of water. Medicinally it is used only in solution, which is officinal.

Liquor Calcii Chloridi. U. S. *Solution of Chloride of Calcium* is a solution of one part of chloride in two and a half parts of water.

Medical Properties and Uses. In small doses it increases the action of the secretory organs, and if long continued appears to act upon the lymphatic system, causing the reduction and absorption of glandular and other tumors. It has also proved serviceable in scrofula and chronic cutaneous diseases. Dose, 30 drops to f℥i, given in milk or sweetened water, and repeated three times a day.

BARII CHLORIDUM. U. S. *Chloride of Barium.*

This salt is prepared by dissolving carbonate of baryta in dilute muriatic acid, with a gentle heat, evaporating and crystallizing. It is a white, permanent salt, crystallizing in flat, four-sided tables, with a bitter, acrid taste, freely soluble in water. It is chiefly used in medicine in the form of the officinal solution.

Liquor Barii Chloridii. U. S. *Solution of Chloride of Barium* is made by dissolving one part of chloride in three parts of water, and filtering the solution if necessary.

Medical Uses. In small doses (5 drops two or three times a day) it is tonic, alterative, and resolvent, and has been proposed as a remedy for scrofula, and in scrofulous diseases of the joints. In overdoses it is a powerful irritant poison, causing violent vomiting, purging, and other dangerous symptoms. The best antidote is the sulphate of magnesia, which acts by converting the poison into the insoluble and inert sulphate of baryta.

The *Iodide of Barium*, prepared by dissolving carbonate of baryta in hydriodic acid, has been proposed as a remedy in scrofulous disease, in the dose of $\frac{1}{10}$ of a grain, twice daily. Externally, it may be used in the form of ointment, containing twenty or thirty grains to the ounce of simple ointment.

AMMONIÆ MURIAS. U. S. *Muriate of Ammonia.*

This salt, sometimes called *hydrochlorate of ammonia, sal ammoniac*, or *chloride of ammonium*, is obtained by subliming a mixture of sulphate of ammonia and chloride of soda, when muriate of ammonia is sublimed, and sulphate of soda remains behind. NH_4Cl. The sulphate is procured chiefly from the impure ammonia contained in gas liquor, in bone spirit, and in other secondary empyreumatic products, by treating them with sulphuric acid.

Properties. It is generally found in white, translucent cakes, convex on one side and concave on the other; it has no odor, but has a pungent, saline taste. For medicinal use it is reduced by dissolving, evaporating, and granulating at a moderate heat. It is very soluble in water, producing great cold during the solution.

Medical Uses. This salt is extensively employed by German practitioners as an alterative and resolvent. It is by some supposed to resemble mercury in its action on the system, and is recommended in cases where that medicine is inadmissible. It is much used as a stimulating alterative in catarrhs, in mucous fevers, as soon as the acute inflammatory symptoms have subsided, in chronic rheumatism, and in passive dropsies. It has also been used in eruptive fevers, especially in measles when the eruption is imperfect. Externally, it is used in solution as a refrigerant lotion in contusions, as an ingredient in discutient

lotions, and as a wash in some skin diseases attended with a troublesome itching. Dose, 5 to 30 grains, given in sweetened water or mucilage.

POTASSÆ CHLORAS. U. S. *Chlorate of Potassa.*

This salt may be obtained by the reaction between solutions of chloride of potassium and hypochlorite of lime by the aid of heat. It may also be procured by saturating with chlorine a mixture of equal parts of carbonate of potassa and hydrate of lime in solution, when the carbonic acid unites with the lime, leaving the chloride of potassium and chlorate of potassa in solution. The chlorate crystallizes when the solution cools, leaving the chloride of potassium in solution. Composition, KO,ClO_5.

Properties. It is a white, anhydrous salt, crystallizing in rhomboidal plates, inodorous, and of a cooling, saline taste. It is soluble in sixteen parts of cold water, and in two and a half of boiling water. It is permanent in the air; but exposed to a red heat it gives out oxygen, and is converted into chloride of potassium.

Medical Uses. Chlorate of potassa was introduced into medicine on the supposition that it might prove useful in affording oxygen to the system in certain putrid and malignant diseases, and of late years has been used in the treatment of a great variety of diseases. In scarlet fever, in the advanced stages of typhus, and in all diseases in which there is a depraved condition of the blood, it proves useful. In scarlet fever particularly, ℥i dissolved in a pint of water, as a daily drink, appears to exercise a favorable influence over the general character of the disease. In diphtheria, in conjunction with the tincture of chloride of iron, it often proves successful. In all forms of sore-mouth, and in mercurial salivation in particular, it is a remedy of undoubted efficacy, both as a wash and an internal remedy. Dose, 5 to 30 grains. When used as a wash, from ℥i to ℥ss may be dissolved in a pint of water.

SODÆ SULPHIS. U. S. *Sulphite of Soda.*

This salt may be obtained by passing a stream of sulphurous acid gas into a solution of carbonate of soda and evaporating out of contact with the air. The sulphurous acid unites with the soda, setting free carbonic acid. Composition, NaO,SO_2+3HO.

Properties. It is in the form of white, prismatic crystals, soluble in four parts of cold and in less than one of boiling water. It has a bitterish, sulphurous taste, and a feeble alkaline reaction.

Medical Uses. The sulphites have recently been introduced into medicine in consequence of their powers in destroying those microscopic fungi which sometimes infect the system and are the cause of troublesome, if not serious, disease. Their efficacy is no doubt due to the ease with which they part with their sulphurous acid, which is known to be very destructive to the lower forms of organic life, and capable of arresting fermentation. The sulphite of soda has been used with benefit in cases of dyspepsia with vomiting of a yeasty fluid containing sarcina ventriculi. In pyæmia, and all cases of fever which depend upon purulent absorption, such as hospital fever, etc., it proves useful. In zymotic or catalytic diseases, depending upon the presence of an organic poison circulating in the system and acting as a ferment, it seems to possess the property of neutralizing this action and arresting the process of fermentation. In miasmatic fevers, after the administration of quinine, it may be given to prevent their return, and it has been recommended as a prophylactic in malarious districts. In scarlet fever it is a remedy of much power in controlling the symptoms of the developed disease by destroying and eliminating the poison, and also as a prophylactic. As a remedy in secondary syphilis, and as a wash in syphilitic ulcerations of the tongue and throat, it has been used with success. In all suppurations, sloughings, and ulcerations the solution is useful in soothing pain, removing fetid odors, and exciting healthy action. Dose, 30 to 60 grains, three times a day.

SODÆ HYPOSULPHIS. *Hyposulphite of Soda*, though not officinal, may be substituted for the sulphite. It is obtained by boiling a solution of the sulphite with sulphur, by which another equivalent of this element is taken up, so as to form the hyposul-

phite; the solution is then evaporated to crystallization. $NaO\ S_2O_2+5HO$. It is in the form of large, colorless, rhombic prisms, of a mild, saline, sulphurous taste, soluble in water, but insoluble in alcohol. It possesses the same properties and may be used for the same purposes as the sulphite, and in the same doses.

The *Sulphite of Magnesia* and the *Sulphite of Lime* are sometimes used, and produce analogous effects.

POTASSÆ PERMANGANAS. U. S. *Permanganate of Potassa.*

This salt may be made by mixing equal parts of finely-powdered deutoxide of manganese and chlorate of potassa with rather more than an equal weight of caustic potassa dissolved in water, evaporating to dryness, and exposing to a temperature just short of redness. In this process chlorate of potassa yields oxygen to the binoxide of manganese, converting it into permanganic acid, which unites with the potassa to form the salt. KO,Mn_2O_7.

Properties. It is in the form of slender, prismatic crystals, of a dark-purple color, inodorous, and with a sweetish, astringent taste. It is soluble in water; and a very minute portion of the salt gives the solution a beautiful lilac color.

Medical Properties and Uses. This salt was introduced to the notice of the profession in 1857, as a disinfectant. In consequence of the facility with which it parts with oxygen, it is one of the most powerful oxidizing agents known, and hence has gained a great reputation in the treatment of fetid and gangrenous ulcers, and wounds of all kinds. It is also used in fetid discharges from the mucous membranes, in ozæna, otorrhœa, and similar affections. In this country it has been largely employed in hospital gangrene, and as a gargle in diphtheria. More recently it has been suggested as an internal remedy, in doses of from $\frac{1}{2}$ to 1 grain, repeated two or three times a day, in cases of poisoned blood, as pyæmia, scarlatina, diphtheria, etc., and is supposed to act by yielding nascent oxygen to the blood. As an application to mucous surfaces, from two to four grains may be dissolved in an ounce of water; as an external wash, half an ounce may be used to a pint of water.

LOCAL REMEDIES.

LOCAL REMEDIES AFFECTING FUNCTIONS.

These are remedies which affect the functions of the organs and indirectly impress the entire system. They are also called Evacuants, or Eccritics, as they stimulate particular organs and tend in a direct manner to increase secretion or evacuation. Headland calls them Eliminatives, and defines them as "medicines which act by passing out of the blood through the glands, which they excite to the performance of their functions."

EMETICS.

Emetics are agents which excite vomiting, independently of the stimulus of quantity or of any nauseous odor, but by some peculiar or specific operation. They may be divided into direct, or irritant, emetics, which produce vomiting by an immediate impression on the stomach, exciting a reflex nervous action; and indirect, or specific, emetics, which enter the circulation and affect the organs concerned through the medium of the nervous system.

The act of vomiting is a very complex operation, and different opinions have been held as to the parts concerned in effecting it. Those most commonly received are that the stomach, the diaphragm, and the abdominal muscles act conjointly with the nervous arrangement controlling them. The mechanism of vomiting may be thus explained: the stomach contracts, closing the pyloric orifice and relaxing the cardiac orifice, so that it tends to expel its contents in the wrong direction. A large set of distant muscles are thrown into sudden action by means of nervous

communication, a quick, deep breath fills the lungs with air, and the glottis being spasmodically closed prevents expiration, so that the diaphragm cannot be pushed upward. Then the abdominal muscles contract, and, being unable to act on the diaphragm, press on the stomach, emptying it forcibly of its contents. These muscular movements are the mere mechanical agency by which vomiting is produced: it is dependent upon the nervous system. That the influence of the nervous system is indispensably necessary for producing vomiting is evident from the fact that in cases where the energy of the brain is suspended, as in profound intoxication, or coma from narcotic poisoning, it is impossible to produce emesis till this is restored. Again, when the brain is only partially influenced, as by incipient intoxication, by the motions of swinging, or by slight blows on the head, vomiting is excited by the slightest causes. Besides, if the par vagum on both sides be divided, the stomach will not act.

A short time after an emetic is taken, an uneasy sensation, termed nausea, is experienced, which gradually increases till vomiting ensues. At first, while the nausea is present, the pulse becomes small and feeble, the face and lips grow cold, and a distressing sensation of faintness and coldness of the whole system is experienced. As soon as vomiting ensues, these phenomena are altered; the face becomes flushed, the pulse quicker and stronger, and the temperature of the body increases. As soon as the vomiting ceases, the system is left in a state of languor, accompanied with moisture on the surface and a disposition to sleep. The intensity and duration of these stages have no relation with each other, but vary with the article used.

Emetics differ in their action, some acting with great rapidity, others more slowly; some producing great nausea, followed by depression, others scarcely any: hence the remedy should be selected according to the indication to be fulfilled. Their habitual use is highly injurious, rendering the stomach so irritable that ordinary diet cannot be retained.

From this brief analysis it is evident that emetics are remedies of great importance. In their primary action they impress the stomach; during the act of vomiting they agitate and convulse the whole system; while by their remote operation they affect

almost every organ and tissue in the body. They may be employed to remove from the stomach crude indigestible matters or poisonous substances; to affect the liver and other abdominal viscera by mechanical pressure; to excite nausea, and thus depress the vascular and nervous systems; to promote absorption, and to produce muscular relaxation. When the object is simply to evacuate the stomach, we should choose those which act promptly and quickly, without any nauseating tendency; but, on the other hand, when we wish to influence other organs through their secondary effects, those of an opposite tendency may be resorted to. One of the most important uses of emetics is to aid expectoration, when the air-passages are gorged with mucus, and the breathing and pulmonary circulation are much oppressed. In these cases they often afford speedy and complete relief. They are contraindicated when general plethora exists, or there is a tendency to cerebral disease; in diseases of the heart and large vessels; in inflammation of the stomach or neighboring viscera; in great debility; in hernia; and in the advanced stages of pregnancy. Age, also, greatly modifies the effects of emetics. In children the mechanical act is easily performed, and is unattended with danger; while in advanced age it often produces great and even dangerous prostration. Emetics are generally administered by the stomach; though sometimes they can be made to operate through the skin. Injection into the veins is only justifiable in the most extreme circumstances, as when a patient is choking from food in the œsophagus. When administered internally, their operation may be promoted by the free use of diluents, or by titillation of the fauces. Emetics are frequently combined, either to increase their efficiency by securing the effects of different agents, or to modify the effects of one remedy by the other. Thus, the powerful action of antimony is modified by the prompt and certain effects of ipecacuanha, while its depressing effects are moderated by squill. Emetics are divided into those of mineral and those of vegetable origin.

The mineral substances chiefly employed as emetics are tartar emetic, and the sulphates of zinc and copper, which have been fully described as possessing other properties. The tartar

emetic is slow in operating, producing much nausea, and makes a strong impression on the general system, occasioning great relaxation and prostration. It is chiefly used as an emetic for its secondary effects. The sulphates of zinc and copper excite speedy vomiting, without occasioning much nausea or depression, and are adapted to those cases where the object is simply to evacuate the stomach without producing any constitutional effect, as in narcotic poisoning. Many other mineral substances possess emetic properties, but are never used for this purpose expressly.

IPECACUANHA. U. S. *Ipecacuanha.*

The ROOT of *Cephaëlis Ipecacuanha*, a small, shrubby plant, with perennial root, native of Brazil.

Properties. The roots are of a grayish or light-brown color, variously contorted, about the thickness of a quill, with numerous annular rugæ separated by nearly parallel grooves, giving the whole a knotted appearance. Hence the term annulated applied to the genuine root. The cortical portion, constituting about one-fifth of the root, is horny and brittle, breaking with a resinous fracture, and is the active part: the woody fibre is inert. The powder is of a light-yellowish color, has a peculiar, nauseous odor, and a slightly bitter, somewhat acrid taste, and yields its virtues to water and alcohol. There are three varieties of ipecacuanha root, distinguished by the color of the epidermis into *brown*, *red*, and *gray*, but all derived from the same plant, and essentially the same in composition and properties, the varieties of color being owing to difference in the age of the root, the nature of the soil, and the mode of preparing it. Its active principle is *emetia*, besides which it contains a variable proportion of starch, fatty matter, gum, and traces of gallic acid. Emetia is a whitish, inodorous, slightly bitter principle, sparingly soluble in water and ether, soluble in alcohol, and forms crystallizable salts with acids.

Medical Properties and Uses. In large doses, ipecacuanha is a mild, safe, and certain emetic; in smaller doses, diaphoretic and expectorant; in still smaller doses, alterative and tonic. As an

emetic, it may be resorted to whenever it is desirable not merely to evacuate the stomach, but to make an impression on and promote secretion from the mucous tissue without producing any great prostration or relaxation, and is to be preferred when vomiting is requisite in delicate persons and in children. In diseases of the lungs and bronchial tubes it may be used with benefit in such doses as will keep up a slight degree of nausea and promote secretion from the inflamed membrane, while in the advanced stages it proves advantageous by expelling the secretion which is oppressing the lungs and interfering with the function of respiration. In some forms of dyspepsia, where the liver appears torpid and inactive, in small and long-continued doses it may be advantageously combined with the tonic treatment. In dysentery, ipecacuanha in large doses was formerly much used, and has recently been again resorted to with success; and in many other diseases it appears to exert a powerful influence.

Administration. Dose as an emetic, 20 grains or more, repeated every twenty minutes if necessary; as an expectorant or diaphoretic, $\frac{1}{2}$ to 2 grains, repeated; and as an alterative tonic, $\frac{1}{6}$ grain. The dose of emetia is about $\frac{1}{4}$ of a grain; but it must be used with caution, as in overdoses it causes dangerous and even fatal consequences. Some persons, from idiosyncrasy, cannot take it, and in some the mere odor produces distressing symptoms.

Extractum Ipecacuanhæ Fluidum. U. S. *The Fluid Extract of Ipecacuanha* is prepared with acetic acid, alcohol, and water, and may be used with expectorant or diaphoretic mixtures. A fluidounce represents an ounce of the root.

Syrupus Ipecacuanhæ. U. S. *Syrup of Ipecacuanha* is prepared by mixing one ounce of the fluid extract with fifteen ounces of syrup. One ounce contains the virtues of thirty grains of the root. It is chiefly applicable to the cases of children. Dose as an emetic, half a drachm to a drachm; as an expectorant, 5 to 10 drops; for adults, more.

Vinum Ipecacuanhæ. U. S. *Wine of Ipecacuanha* is made by macerating a troyounce of ipecacuanha in a pint of sherry wine. It possesses all the properties of the root, and may be

substituted for it, when it is desirable to give the medicine in the liquid form. Dose as an emetic, ℥ss; as an expectorant or diaphoretic, 10 to 30 drops.

Trochisci Ipecacuanhæ. U. S. Prepared by rubbing ipecacuanha in fine powder, arrow-root, and sugar, with mucilage of tragacanth. Each lozenge contains about one-quarter of a grain of ipecacuanha. They are useful expectorants in catarrhal complaints.

Besides the genuine root, there are two non-officinal ipecacuanhas found in the market,—the *striated* or *black ipecacuanha*, the product of *Psychotria emetica*, a small shrub growing in Peru and other parts of South America, and the *undulated ipecacuanha*, obtained from *Richardsonia scabra*, a native of the Brazils. These roots are distinguished from the genuine by being destitute of rings, and containing a much larger proportion of woody fibre, and less of the active principle emetia.

SANGUINARIA. U. S. *Bloodroot.*

The rhizome of *Sanguinaria Canadensis*, *Bloodroot* or *Puccoon*, a small herbaceous perennial plant, growing abundantly throughout the United States.

Properties. The fresh root is truncated, two or three inches in length and half an inch in diameter, fleshy and succulent, and abounding in a red, viscid juice, from which it has derived the name of bloodroot. When dried, it is in flattened, wrinkled pieces, with radical fibres attached, externally of a reddish-brown color, breaking with a short fracture, and presenting an orange-red color within. It has a peculiar feebly narcotic odor, a bitterish, acrid taste, and yields its color and virtues to water and alcohol. It contains a peculiar principle, *sanguinarina*, a pearly-white substance, of an acrid taste, sparingly soluble in water, soluble in alcohol and ether, and forming soluble salts with acids.

Medical Properties and Uses. Bloodroot is an acrid emetic, and in large doses an acro-narcotic poison. In moderate doses it is a stimulating expectorant, and may be employed in asthenic pulmonary affections. Locally it acts as an irritant, and to fungous surfaces as an escharotic. The powder is sometimes used

as an errhine. Dose as an emetic, 5 to 15 grains; as an expectorant, 1 to 2 grains.

TINCTURA SANGUINARIÆ. U. S. *Tincture of Sanguinaria* is prepared by adding four troyounces of sanguinaria to two pints of diluted alcohol. Dose as an emetic, f℥i to f℥ij. It is much more used as an addition to stimulating cough mixtures, in doses of from 30 to 60 drops.

ACETUM SANGUINARIÆ. U. S. *Vinegar of Bloodroot*, prepared by macerating four troyounces of sanguinaria in two pints of diluted acetic acid, is an efficient preparation, and may be used for the same purposes as the powdered root. Dose, same as the tincture. As a local application it has been used in obstinate skin diseases, and as a gargle in the sore-throat of scarlatina.

LOBELIA. U. S. *Lobelia.*

The HERB of *Lobelia inflata*, commonly known as *Indian tobacco*, or *emetic weed*, an annual herbaceous plant, very common throughout the United States.

Properties. The plant should be gathered in August, when the capsules are full and the leaves are just beginning to fade. All parts of it are active, but the leaves and capsules are to be preferred. These have an unpleasant odor, and an acrid, nauseous taste, at first faint, but soon becoming excessive. It yields its virtues to water and alcohol; but heat destroys its active qualities. The powder is of a greenish color. It contains a volatile oil, a peculiar acid, *lobelic acid*, and a peculiar principle, *lobelina*, analogous to nicotina, upon which its active properties are supposed to depend.

Medical Properties and Uses. In small doses it acts as a nauseating expectorant and sedative diaphoretic; in large doses, as an emetic, producing great prostration, like tobacco; while in larger doses its effects are those of an active acro-narcotic poison. As an emetic it is too violent and dangerous, and is seldom resorted to except in extreme cases. Its principal employment is as an antispasmodic in asthma, hay fever, and other spasmodic diseases of the pulmonary organs. Dose as an emetic, from 5 to 20 grains; as an antispasmodic or expectorant, 1 to 3 grains.

Tinctura Lobeliæ. U. S. *Tincture of Lobelia* (prepared by adding four troyounces of lobelia to two pints of diluted alcohol) possesses the emetic and other properties of the medicine. It is the best form of administering it in asthmatic attacks. The dose as an emetic is about f℥ss; as a nauseating sedative, f℥i, repeated until its effects are experienced.

Acetum Lobeliæ U S. *Vinegar of Lobelia* (prepared by macerating four troyounces of lobelia in two pints of diluted acetic acid) is used for the same purposes and may be given in the same doses as the tincture.

GILLENIA. U. S. *Gillenia.*

The root of *Gillenia trifoliata* and *G. stipulacea*, known as *Indian physic*, indigenous, perennial plants, the former growing east, the latter west, of the Alleghany Mountains.

Properties. The root, as found in the shops, is of a reddish-brown color, much wrinkled, with occasional transverse fissures, and composed of an easily separable, cortical portion and an internal ligneous cord. It has a feeble odor, and a bitter, nauseous taste.

Medical Properties and Uses. Gillenia is a mild and efficient emetic, but less powerful than ipecacuanha in its action, and in small doses thought to be tonic. Dose of the powdered root, 30 grains, repeated at intervals of twenty minutes till it vomits; as a tonic, 2 or 3 grains.

Euphorbia Ipecacuanha. *U. S. Secondary.* The root of *Euphorbia Ipecacuanha*, the *Ipecacuanha spurge*, or *American ipecacuanha*, a plant growing in many parts of the United States. The dried root is light and brittle, of a grayish color externally, white within, inodorous, and of a somewhat sweet, not unpleasant taste. In doses of from 10 to 15 grains the powdered root is emetic, but is apt to operate on the bowels; and in overdoses it proves extremely irritant.

Euphorbia Corollata. *U. S. Secondary.* This plant, called *Large-flowering Spurge*, and sometimes *milk-weed*, is also indigenous. The root possesses properties similar to the above, but is more active.

CATHARTICS.

CATHARTICS, or PURGATIVES, are medicines which increase the number or quantity of the evacuations from the intestines, or which, when given in a certain dose, cause purging.

They produce their effects in various ways: either by acting on the muscular coat of the intestines, increasing their peristaltic action; by increasing the secretion from the mucous membrane, and the exhalation of serous liquid; or by occasioning an increased flow of bile or pancreatic secretion. Some act in one of these ways, and some combine two or more modes of action.

The different agents belonging to this class act on different portions of the alimentary canal, some affecting the upper portion more particularly, some the lower, and others operating on all parts equally. This difference may be partly ascribed to the different degree of solubility of the medicine, but is chiefly owing to the peculiar susceptibilities of different portions of the bowels.

The character of the evacuation varies according to the cathartic used, as regards quantity, consistence, and composition. Those acting on the large intestines produce consistent fecal evacuations; those acting on the whole extent of the canal occasion liquid, but still feculent, stools; those which act by increasing serous exhalation produce thin, watery discharges; while those acting on the liver cause bilious stools.

Cathartics differ greatly in power, and are divided into *Laxatives*, which act mildly, merely producing looseness without causing irritation or affecting the general system; *Purgatives*, which act with greater energy, but not violent in their local action, and devoid of any stimulant action on the system; and *Drastics*, characterized by the property of irritating the mucous membrane, and in overdoses causing serious consequences. The term *Hydragogue* has been applied to those which produce copious watery stools.

They are employed in disease to fulfill various indications. 1. To simply unload the intestinal canal and to remove indigestible matters and unhealthy secretions. 2. To promote the secretion of the liver, and thus relieve congestion of this organ, and of the portal system generally. 3. To keep up a determination of

fluids to the intestines, and thus relieve other parts of the system on the principle of revulsion or counter-irritation. They prove peculiarly useful in this way in diseases of the brain and remote organs. 4. To directly deplete the blood-vessels by increasing the action of the intestinal exhalants. Hence their use in almost all inflammations and congestions, in plethora, and in febrile complaints. 5. To promote absorption by diminishing the quantity of the circulating fluid, thus proving useful in dropsy. 6. To act on contiguous viscera in the pelvis by the stimulating influence which they exert on the pelvic vessels.

The more active cathartics are contraindicated in inflammatory conditions of the intestinal canal, in peritonitis, in pregnancy, in passive dropsies, particularly in old persons, and in general debility.

Their action may be modified by combination. By mixing several drastics together, they become milder and less irritating, without losing any of their purgative power. Their tendency to gripe, and their nauseating effects, are lessened by combining them with aromatics; while the bitter tonics promote their operation.

They operate most favorably when administered on an empty stomach, and their action is diminished during sleep, and increased by exercise: hence, when a prompt and powerful effect is required, they should be given in the morning before breakfast; but when a mild and slow action is necessary, the medicine should be given at bedtime. They may often be advantageously administered in the form of enema, and form a valuable resource either where the patient is unable to swallow or where it is of importance speedily to unload the lower intestines.

Hypercatharsis may be checked by from five to fifteen drops of laudanum, or by an equivalent quantity of some other preparation of opium, given by the mouth, or administered by the rectum.

Several articles of diet are useful as laxatives in cases of habitual constipation, as bran, corn-meal, molasses, and saccharine and acidulous fruits.

VEGETABLE CATHARTICS.

TAMARINDUS. U. S. *Tamarind.*

The preserved fruit of the *Tamarindus Indica*, a large tree, native of the East and West Indies. The pulp of the fruit contains citric, malic, and tartaric acids, with bitartrate of potash.

Medical Properties and Uses. Laxative and refrigerant. Infused in water, forms a grateful beverage in febrile diseases, and sometimes used in connection with other mild cathartics.

MANNA. U. S. *Manna.*

The CONCRETE JUICE of *Fraxinus Ornus* and of *Fraxinus rotundifolia, Manna ash*, small trees, growing in the south of Italy, and in Sicily. The manna is obtained by incisions, and differs according to the season in which collected. There are three varieties in commerce.

1. *Flake manna*, the purest, collected during the hot and dry season, is in pieces of irregular size and shape, of a white or yellowish-white color, porous and friable, with a slight peculiar odor, somewhat like that of honey, and a sweet taste, followed by acridity.

2. *Common manna*, or *manna in sorts*, collected later in the season, is in smaller pieces, softer, more viscid, and darker than the flake manna.

3. *Fat manna*, an inferior variety, is in soft, viscid fragments, of a yellowish-brown color, and full of impurities.

Manna is soluble in water and alcohol. It contains *mannite*, a white, inodorous, crystalline principle, bearing considerable resemblance to sugar, from which it differs in not undergoing the vinous fermentation.

Medical Properties and Uses. It is a gentle laxative, well adapted for children and delicate persons. It is generally used in conjunction with senna to cover its nauseous taste. Dose for an adult, 1 or 2 ounces; for children, 1 to 4 drachms, according to the age. Given in solution.

CASSIA FISTULA. U. S. *Purging Cassia.*

The FRUIT of *Cassia Fistula*, a large tree, native of Egypt and India, but extensively diffused through all tropical countries.

Characters. The fruit is a dark-brown, cylindrical, woody pod, a foot or more in length, straight or slightly curved, divided by transverse partitions into cells, each containing an oval, shining seed, imbedded in a soft, black pulp. This pulp is the part used, and has a slight nauseous odor, with a sweet, mucilaginous taste.

Medical Properties and Uses. A mild, agreeable laxative. Dose, ʒi to ℥i.

OLEUM OLIVÆ. U. S. *Olive Oil.*

A fixed oil, obtained by expression from the fruit of *Olea Europæa*, or *olive-tree*, a small tree flourishing in all the countries bordering on the Mediterranean.

Properties. An unctuous liquid, of a pale-yellowish or greenish color, with scarcely any smell, and a bland, sweetish taste, becoming rancid on exposure. Much liable to adulteration with the cheaper fixed oils.

Medical Properties and Uses. It is nutritious, and mildly laxative. Extensively used in pharmacy as a constituent of liniments, cerates, and plasters.

OLEUM RICINI. U. S. *Castor Oil.*

The fixed oil obtained from the seeds of *Ricinus communis*, or *palma Christi*, an annual plant, native of India, but extensively cultivated in all parts of the world. The seeds are oval, about the size of a bean, of a pale-gray color, marked with yellowish-brown spots and stripes. They contain, besides the oil, an acrid resinous principle. The oil is obtained either by expression, by decoction, or through the agency of alcohol, and varies in properties according to the mode of preparation. The expressed, called *cold drawn*, is the best, and generally used in this country.

Properties. Castor oil is a thick, viscid fluid, with a mild, somewhat nauseous taste, colorless when pure, but generally of a light-straw color, becoming thick and rancid on exposure. It is soluble in alcohol and ether. It is often adulterated with more common oils, which may be detected by its solubility in alcohol.

Medical Properties and Uses. A mild and efficient laxative, operating without griping, and well adapted to all cases where the object is to evacuate the bowels without causing any irritation. Also well suited for children. Dose for adults, f℥ss to f℥i; for children, f℥i to f℥ss.

The seeds are acrid-cathartic, and, in large doses, an acro-narcotic poison.

RHEUM. U. S. *Rhubarb.*

The ROOT of *Rheum palmatum* and of other species of *Rheum*, perennial herbaceous plants, natives of the interior of Asia, and cultivated to a limited extent in Europe. Great difficulty has been experienced in ascertaining the true source of Asiatic rhubarb; but most writers attribute it to the *R. palmatum.* The root is dug up in the spring, deprived of its cortical portion, cut into pieces, and hung up and dried in the sun or by the aid of artificial heat. There are three principal varieties in commerce, —the Chinese, Turkey or Russian, and European.

Chinese or *East India rhubarb*, the most common variety, is brought from Canton, and is in cylindrical or roundish pieces, of a dirty brownish-yellow color, a close and compact texture, a ragged fracture, presenting a variegated appearance and perforated with small holes. It has a peculiar, aromatic odor, and a bitter, astringent taste. When chewed, it feels gritty and stains the saliva yellow. It affords a yellowish or reddish-brown powder.

Russia or *Turkey rhubarb*, the best, comes from Tartary, and is exported through St. Petersburg. It is in irregular and somewhat angular pieces, having a cleaner and fresher appearance than the Chinese, less compact and heavy, of a more lively color, and perforated with holes made for the purposes of inspection. The powder is of a bright-yellow color.

European rhubarb, the inferior variety, is in larger pieces, more woody in texture, of a reddish or brownish-yellow color, and distinguished from the preceding varieties by its more disagreeable odor, its astringent and mucilaginous taste, and its want of grittiness.

Rhubarb contains rhabarbaric acid, a peculiar crystalline principle, several resins, a bitter principle, astringent matter, and oxalate of lime. It imparts all its activity to water and alcohol.

Medical Properties and Uses. In small doses, laxative, with astringent tonic properties, its operation being confined wholly to the digestive organs. In larger doses, a slow and mild purgative, increasing the peristaltic motion of the intestines. Admirably adapted to the constipation of dyspepsia and to the diarrhœas of children. Dose, as a stomachic and laxative, from 5 to 10 grains; as a purgative, from 20 to 30 grains.

Infusum Rhei. U. S. *Infusion of Rhubarb.* (℥ij to half a pint of boiling water.) Dose, f℥i to f℥ij.

Tinctura Rhei. U. S. *Tincture of Rhubarb.* (℥iij to a pint of diluted alcohol with ℥ss of cardamom.) Useful where a conjoint stimulant and laxative effect is wanted. Dose, f℥i to f℥ss.

Tinctura Rhei et Sennæ. U. S. *Tincture of Rhubarb and Senna. Warner's Gout Cordial* contains, in addition to rhubarb and senna, other ingredients, to give it color, improve its flavor, and render it more acceptable to the stomach. Useful as a purgative in persons of a gouty habit and accustomed to the use of alcoholic drinks. Dose, f℥ss.

Vinum Rhei. U. S. *Wine of Rhubarb* is prepared by digesting rhubarb and canella in sherry wine. A warm cordial laxative. Dose, f℥i to f℥ss.

Syrupus Rhei. U. S. *Syrup of Rhubarb.* (One and a half parts fluid extract rhubarb to fourteen and a half parts syrup.) Dose, ℥i for children.

Syrupus Rhei Aromaticus. U. S. *Spiced Syrup of Rhubarb* differs from the above in containing, besides the rhubarb, cloves, cinnamon, and nutmeg. It is a warm stomachic laxative and cordial, well adapted for the bowel complaints of infants, so common in the summer season. Dose, ℥i for an infant.

Extractum Rhei Alcoholicum. U. S. *Alcoholic Extract of Rhubarb.* (Prepared by evaporating a strong tincture.) Dose, 5 to 30 grains.

Extractum Rhei Fluidum. U. S. *Fluid Extract of Rhubarb.* (Made with alcohol, and containing sugar.) A fluidrachm contains the virtues of a drachm of the root.

Pilulæ Rhei. U. S. *Pills of Rhubarb.* (Prepared by mixing three parts of rhubarb and one of soap.) Each pill contains three grains of the root.

Pilulæ Rhei Compositæ. U. S. *Compound Pills of Rhubarb* contain rhubarb, aloes, and myrrh, with a little oil of peppermint, and form a warm tonic laxative, useful in costiveness with debility of the stomach. Dose, from 10 to 20 grains of the mass.

Pulvis Rhei Compositus. U. S. *Compound Powder of Rhubarb.* Composed of rhubarb, magnesia, and ginger. A good antacid laxative. Dose, ʒi to ʒij.

SENNA. U. S. *Senna.*

The leaflets of *Cassia acutifolia*, of *Cassia obovata*, and of *Cassia elongata*, small trees or shrubs growing in Arabia, Upper Egypt, and various parts of Africa. There are four varieties in commerce,—the Alexandria, Tripoli, India, and Mecca senna.

Alexandria senna is gathered in the interior of Egypt and shipped from Alexandria, and consists of the leaflets of *C. acutifolia*, sometimes mixed with those of *C. obovata*. They are less than an inch in length, ovate, and pointed at the end, well marked with lateral nerves and veins, very brittle, and of a grayish-green color. They are often adulterated with the leaves of *Cynanchum oleæfolium*, commonly called *argel*, distinguished by their greater length, by the absence of lateral nerves, and their lighter color.

Tripoli senna, brought from Tripoli, consists of leaflets shorter, less acute, generally broken up, and is usually less esteemed than the Alexandrian.

India senna, afforded by the *C. elongata*, and brought from India, is distinguished by the greater length and oblong shape of the leaflets. An elegant variety of India senna, known as

Tinnevelly senna, is exported from Madras, and consists of unbroken leaflets, from one to two inches in length, half an inch in breadth, and of a fine green color.

Mecca senna, lately introduced, consists of the leaflets, pods, stems, and petioles of a single variety of senna, imported from Arabia, and is characterized by the large size of the leaflets.

SENNA has a faint and sickly odor, with a slightly bitter and nauseous taste, and affords a greenish powder. Water and alcohol extract its virtues. It contains a peculiar uncrystallizable principle, called *cathartin*, coloring matter, extractive, etc.

Medical Properties and Uses. It is a sure and safe purgative, acting chiefly on the small intestines, increasing their mucous secretion as well as their peristaltic action, and holding a middle place between the mild laxatives and drastic cathartics. It is seldom used alone, on account of its nauseating and griping tendency, which may be obviated by combining it with aromatics and saline purgatives. It is well adapted to cases requiring a prompt and copious evacuation of the bowels with a moderate stimulus to the abdominal and pelvic viscera. Dose, in powder, from ʒss to ʒij, but seldom prescribed.

INFUSUM SENNÆ. U. S. *Infusion of Senna.* (A troyounce of senna in a pint of boiling water, with 60 grains of coriander.) Generally used in combination with one of the saline cathartics.

CONFECTIO SENNÆ. U. S. *Confection of Senna. Lenitive Electuary*, an excellent laxative, without unpleasant flavor, operating mildly, and well adapted to the costiveness of pregnant women.

EXTRACTUM SENNÆ FLUIDUM. U. S. *Fluid Extract of Senna.* (Prepared by evaporating a tincture of senna and adding sugar.) Dose, fʒi to fʒss.

CASSIA MARILANDICA. U. S. *American Senna.*

The LEAVES of *Cassia Marilandica*, a tall, showy, herbaceous, perennial plant, common to the Southern and Western States.

Properties. The leaves are smooth, of a pale-green color, from one to two inches long, a quarter of an inch broad, having the odor and taste of the foreign senna.

Medical Properties and Uses. Its action is similar to that of senna, but more feeble; and it may be employed instead of it, in somewhat larger doses.

JUGLANS. U. S. *Butternut.*

The INNER BARK of the root of *Juglans cinerea*, an American forest tree, commonly known as *butternut*, *oilnut*, and *white-walnut tree*.

Properties. The dried bark is of a deep-brown color, has a fibrous texture, with a feeble odor, and a peculiar, somewhat acrid taste.

Medical Properties and Uses. A mild cathartic, operating very much like rhubarb; used in decoction or extract.

EXTRACTUM JUGLANDIS. U. S. *Extract of Butternut* (prepared by evaporating a decoction of the root) is of a black color, sweetish odor, and a bitter, astringent taste. In doses of from 10 to 30 grains it acts as a mild cathartic.

ALOE. U. S. *Aloes.*

The INSPISSATED JUICE of the leaves of *Aloe Socotrina*, *Aloe spicata*, *Aloe vulgaris*, and other species, perennial, herbaceous plants, growing in tropical countries. The aloes is obtained from the leaves by exudation, by expression, or by boiling. There are three principal varieties in commerce,—the Socotrine, Cape, and Barbadoes aloes, each derived from a peculiar source and characterized by peculiar properties.

ALOE SOCOTRINA. *Socotrine Aloes*, from *A. Socotrina*, produced in the island of Socotra, is the best variety, when genuine. It is of a reddish-brown color, becoming dark on exposure; it has a smooth, shining fracture with translucent edges, a bitter taste, and a strong, fragrant odor. It yields a beautiful golden-yellow powder.

ALOE CAPENSIS. *Cape Aloes*, also called *Shining Aloes*, from *A. spicata* and other species, imported from the Cape of Good Hope. Characterized by its deep brown-red color, shining resinous appearance, and glossy, resinous fracture. It yields a bright greenish-yellow powder.

Aloes Barbadensis. *Barbadoes Aloes*, from *A. vulgaris*, is imported in large gourds from the West Indies. It is in dark-brown or liver-colored opaque masses, with a dull fracture, a disagreeable odor, and a bitter, nauseous taste. It yields a dull olive-yellow powder.

Under the name of *caballine* or *horse aloes*, a very inferior kind is met with, of an opaque, almost black color, and a fetid, offensive odor, and mixed with impurities.

All these varieties have an intensely bitter and tenacious taste, and yield their virtues to water and alcohol. Aloes contains a neutral crystalline principle, *aloin* (inodorous and intensely bitter, readily soluble in water, but nearly insoluble in alcohol and ether), a resinous matter, and an acid, by some thought to be gallic.

Medical Properties and Uses. In small doses, tonic to the alimentary canal, promoting the secretions, especially of the liver. In large doses, a warm, stimulating purgative, acting particularly on the rectum and lower intestines, operating very slowly, and producing copious feculent stools. An excellent remedy in habitual constipation attended with torpor of the liver and digestive organs; and as a purgative, particularly useful in chlorosis, amenorrhœa, and atonic states of the uterine system. Contraindicated in hemorrhoids and in inflammatory diseases Dose, from 5 to 20 grains, generally administered in combination

Aloe Purificata. U. S. (Socotrine aloes purified by straining and evaporating the alcoholic solution.) Thus prepared, it is in angular, brittle fragments, possessing all the properties of the drug.

Tinctura Aloes. U. S. *Tincture of Aloes.* (A troyounce of aloes and three troyounces of extract of liquorice, in half a pint of alcohol and a pint and a half of water.) Dose, f℥ss to f℥iss.

Tinctura Aloes et Myrrhæ. U. S. *Tincture of Aloes and Myrrh* (three troyounces each of aloes and myrrh, and a troyounce of saffron, in two pints of alcohol), known as *Elixir Proprietatis.* An excellent purgative, tonic, and emmenagogue. Dose, f℥i to f℥ij.

Vinum Aloes. U. S. *Wine of Aloes.* (A troyounce of aloes with sixty grains each of cardamom and ginger in a pint of

sherry wine.) A warm laxative and cathartic in doses of from f℥ss to f℥ij.

PILULÆ ALOES. U. S. *Pills of Aloes.* (Aloes and soap combined in equal parts.) Each pill contains two grains of aloes.

PILULÆ ALOES ET ASSAFŒTIDÆ. U. S. *Pills of Aloes and Assafetida.* (By combining equal parts of aloes, assafetida, and soap.) Well adapted to costiveness with debility of stomach and a tendency to flatulence. Dose, 10 to 20 grains.

PILULÆ ALOES ET MASTICHES. U. S. *Pills of Aloes and Mastic.* (Three parts of aloes to one each of mastic and red rose, in fine powder.) A gentle laxative and stomachic. Dose, 5 to 10 grains.

PILULÆ ALOES ET MYRRHÆ. U. S. *Pills of Aloes and Myrrh. Rufus's Pills.* (Four parts of aloes, two of myrrh, and one of saffron, with syrup.) Dose, 10 to 20 grains.

PULVIS ALOES ET CANELLÆ. U. S. *Hiera Picra.* (Four parts of aloes with one of canella.) A popular remedy for amenorrhœa and constipation, in doses of from 10 to 20 grains.

JALAPA. U. S. *Jalap.*

The ROOT of *Exogonium Purga*, formerly *Ipomæa Jalapa*, a climbing plant of Mexico, growing abundantly in the neighborhood of Jalapa, whence it derives its name.

Properties. The dried tubers are imported either entire or cut into slices. When entire, they are roundish or pear-shaped, varying from the size of a nut to that of an orange, much wrinkled, heavy, compact, hard, and brittle, with a resinous fracture. In this state they are liable to be attacked by worms. The powder is of a pale yellowish-gray color, with a heavy, peculiar odor and a sweetish, somewhat pungent taste, becoming impaired by age. It yields its virtues to water and alcohol. It contains a resinoid substance, *jalapin*, starch, gum, etc.

Medical Properties and Uses. A safe and efficacious purgative, operating with rapidity and certainty, causing little irritation, and producing copious watery stools, leaving but little subsequent constipation. Especially useful in dropsy, and generally given with other medicines which assist or qualify its operation. Dose of the powder, from 10 to 20 grains.

Resina Jalapæ. U. S. *Resin of Jalap* (prepared by precipitation from the concentrated tincture with water) is in dark-brown, brittle fragments, readily reduced to a pale-brown powder, insoluble in water and ether, but readily soluble in alcohol. Dose, 4 to 8 grains.

Extractum Jalapæ. U. S. *Extract of Jalap* (prepared by exhausting powdered jalap in a percolator by means of alcohol and water) is of a dark-brown color, and tenacious when not perfectly dry. Dose, 10 to 20 grains.

Tinctura Jalapæ. U. S. *Tincture of Jalap.* (Six troy-ounces of jalap in two pints of diluted alcohol.) Dose, f℥i to f℥ij.

Pulvis Jalapæ Comp. U. S. *Compound Powder of Jalap.* (Prepared by rubbing together one part of jalap and two parts of bitartrate of potash.) An excellent cathartic in dropsy. Dose, 30 to 60 grains.

PODOPHYLLUM. U. S. *May-Apple.*

The rhizoma of *Podophyllum peltatum, may-apple* or *mandrake*, an indigenous, perennial, herbaceous plant.

Properties. The dried root is in wrinkled, yellowish or reddish-brown pieces, of variable lengths, about two lines in thickness, with a short and irregular fracture, nearly inodorous, with a bitter, subacrid, and nauseous taste. The powder is light yellowish-gray, resembling that of jalap. It contains two resinous principles,—one soluble in ether and alcohol, the other only in alcohol,—both possessing cathartic properties and improperly called *podophyllin.*

Medical Properties and Uses. An active hydragogue cathartic, acting upon the liver and the upper portion of the alimentary canal, causing copious liquid discharges, and resembling jalap in its operation. Dose, 20 grains.

Resina Podophylli. U. S. *Resin of Podophyllum* (prepared by precipitating a concentrated tincture of the root by water) has a light-brown color, and an acrid, bitter taste, with the odor of the root. It is a powerful cathartic, producing some nausea and griping, which may be obviated by combination. Much employed in torpor of the liver, and with other cathartics to give them increased energy.

EXTRACTUM PODOPHYLLI. U. S. *Extract of Podophyllum* (prepared in the same way as the extract of jalap) possesses the purgative properties of the root in doses of from 5 to 15 grains.

SCAMMONIUM. U. S. *Scammony.*

The CONCRETE JUICE of the root of *Convolvulus Scammonia*, a climbing perennial plant of Syria and the adjoining countries, obtained by making an incision in the living root.

Properties. The genuine, called *Virgin Scammony*, occurs in irregular pieces, of a dark-greenish color, sometimes covered with a whitish powder, friable, with a dark and brilliant fracture. Moistened with water, it forms a milky liquid. It has a strong, cheesy odor, with a feeble subacrid taste. It affords a pale ash-gray powder. The inferior varieties, consisting of the juice of the stalks and leaves, with that of the root, mixed with foreign substances, occur in large flat or circular masses, of a lighter color, not so friable, and with a dull fracture. It is a *gum-resin*, containing, when pure, about 80 per cent. of resin, partly soluble in water, and forming with it a milky emulsion.

Factitious Scammony, known as *Montpellier Scammony*, the juice of *Cynanchum Monspeliacum*, mixed with other purgative resins, is sometimes imported into this country. It is blacker than the genuine, has a feeble balsamic odor and a nauseous taste.

Medical Properties and Uses. A drastic hydragogue cathartic, resembling jalap in its action, but more active and more liable to produce nausea. Usually given in combination in cases of torpid bowels where a powerful impression is desired. Dose, 5 to 20 grains, administered in pill or emulsion.

RESINA SCAMMONII. U. S. *Resin of Scammony.* (An alcoholic extract, free from the impurities of the original drug.) Dose, 5 to 12 grains.

COLOCYNTHIS. U. S. *Colocynth.*

The FRUIT (deprived of its rind) of *Citrullus Colocynthis*, or *bitter cucumber*, an annual plant, with trailing stems, a native

of Asia Minor and various parts of Africa. The fruit is collected when ripe, in the autumn, peeled, and dried. The prepared fruit is globose, about the size of a small orange, of a white or pale-brownish color. The pulp, which is the part used, is nearly white, light and porous, and contains numerous seeds arranged in double rows around its circumference. It is inodorous, with an intensely bitter taste, and yields its virtues to water and alcohol. It contains a peculiar bitter principle, *colocynthin* (a reddish-brown, brittle, extremely bitter, soluble substance), resin, and extractive.

Medical Properties and Uses. It is a powerful drastic cathartic, increasing the peristaltic action of the intestines and promoting the intestinal secretions. In large doses it acts as an irritant poison, producing inflammation. From its extreme acridity, seldom given uncombined. Dose, 5 to 10 grains.

EXTRACTUM COLOCYNTHIDIS ALCOHOLICUM. U. S. *Alcoholic Extract of Colocynth* (prepared by evaporating the concentrated tincture) is used in making the

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. U. S. *Compound Extract of Colocynth* (prepared by mixing the extract of colocynth with aloes, scammony, cardamom, and soap) is an energetic and safe cathartic, possessing the action of all the purgative ingredients, without their drastic effects. It is much used in constipation with a torpid state of the bowels, inaction of the liver, or dyspeptic condition of the stomach. and is often combined with mercurials. Dose, 5 to 10 grains.

GAMBOGIA. U. S. *Gamboge.*

The CONCRETE JUICE of an undetermined tree, imported from Siam and Cochin China. Probably the gum-resin of a species of *Garcinia.* It is procured by breaking the leaves or young branches and allowing the juice to harden, or collecting it in the joints of the bamboo.

Properties. It occurs in hollow cylindrical rolls, from one to two inches in diameter, called *pipe gamboge*, or in irregular masses, mixed with woody fibre and other impurities, called *cake* or *lump gamboge.* When pure, it is an opaque, brittle

substance, of a uniform orange color, with a smooth, shining, conchoidal fracture, odorless, with little taste, yielding a bright-yellow powder, soluble in alcohol, and forming with water a bright-yellow emulsion. It contains 75 per cent. of a brittle, orange-colored resin, called gambogic acid, forming salts with the alkalies, and a soluble gum.

Medical Properties and Uses. A powerful drastic hydragogue cathartic, in full doses causing vomiting and purging, which may be modified by combination with milder cathartics. It may be used whenever an energetic purgative effect is desired and there is no irritability of stomach present. Dose, 2 to 4 grains.

PILULÆ CATHARTICÆ COMPOSITÆ. U. S. *Compound Cathartic Pills.* (Prepared by mixing compound extract of colocynth, extract of jalap, calomel, and gamboge, then forming them into a mass with water and dividing into pills.) Three pills, the usual dose, contain 4 grains of colocynth, 3 of extract of jalap, 3 of calomel, and $\frac{2}{3}$ grain of gamboge.

ELATERIUM. U. S. *Elaterium.*

A substance deposited by the juice of the fruit of *Momordica Elaterium*, the *wild* or *squirting cucumber*, a trailing, herbaceous, perennial plant, growing native in the south of Europe, and cultivated in England. The fruit is oval, resembling that of the common cucumber, and when ripe separates from the stalk and scatters its seeds and juice to a considerable distance.

Properties. Pure elaterium, called *Clutterbuck's*, is the substance deposited when the juice is allowed to exude spontaneously or is obtained by incision. This, when carefully dried, is in thin, slightly-curved cakes or fragments, very light and pulverulent, of a yellowish or greenish-gray color, a feeble odor, and an acrid, bitter taste. Commercial elaterium is obtained from the expressed juice of the fruit, and is darker-colored, much curled, hard, and breaks with a resinous fracture. It is a much inferior variety. Good elaterium contains from 20 to 30 per cent. of an active crystalline principle, *elaterin*, inodorous, with a bitter, acrid taste, insoluble in water, but soluble in alcohol and ether.

Medical Properties and Uses. An energetic hydragogue cathartic, in large doses occasioning severe griping, vomiting, and hypercatharsis. Only suited for dropsical and cerebral affections where a powerful revulsive action is desired. Dose, $\frac{1}{8}$ to $\frac{1}{4}$ of a grain; of elaterin, $\frac{1}{16}$ to $\frac{1}{12}$ of a grain.

OLEUM TIGLII. U. S. *Croton Oil.*

The OIL obtained by expression or decoction from the seeds of *Croton Tiglium*, a small tree or shrub growing in different parts of the East Indies. The seeds are oval, about the size of the castor-oil seeds, with a dark-brown testa, containing a thin, pale, internal seed-coat, and a yellowish, oily albumen.

Properties. It is a viscid oil, of a pale-yellow or reddish-brown color, with a faint, peculiar odor, and a hot, acrid taste, soluble in ether and in the fixed and volatile oils, and partly so in alcohol. It is a fixed oil, containing a principle termed *crotonic acid* and resin.

Medical Properties and Uses. An active hydragogue cathartic, operating with great rapidity, without nausea and griping, and producing copious watery evacuations. Adapted to obstinate constipation, to apoplexy, coma, and other cerebral affections requiring a rapid and powerful purgative. In large doses, a powerful irritant poison. Rubbed on the skin, it causes rubefaction and vesication, and is useful in phthisis and chronic diseases of the joints, as a counter-irritant. Dose for an adult, $\frac{1}{2}$ to 2 drops, most conveniently administered in pill with bread-crumbs. For external use it may be diluted with the fixed oils.

HELLEBORUS NIGER. U. S. *Black Hellebore.*

The ROOT of *Helleborus niger*, a low, herbaceous plant, native of the mountainous regions of Southern Europe, where it is cultivated for the beauty of its flowers, which bloom in winter, —hence called *Christmas rose.*

Properties. The rhizome is irregular in shape, half an inch or less thick, with numerous cylindrical dark-brown radicles from four to twelve inches in length. It has a feeble odor and a bit-

terish, acrid, and nauseous taste. Water and alcohol extract its virtues. It contains a volatile oil, and a peculiar principle, called *helleborin*, which is white, crystallizable, bitter to the taste, with a slight tingling effect on the tongue, and neuter in its relations to acids and alkalies.

Medical Properties and Uses. A drastic hydragogue, possessed of emmenagogue properties. In large doses, a powerful acro-narcotic poison. Useful only in torpid, phlegmatic habits and where the pelvic circulation is languid. Dose of powdered root, 10 grains.

EXTRACTUM HELLEBORI ALCOHOLICUM. U. S. *Alcoholic Extract of Hellebore.* (By evaporating the alcoholic tincture without heat.) Dose as a drastic purge, 5 to 10 grains.

TINCTURA HELLEBORI. U. S. *Tincture of Hellebore* (four troy-ounces of hellebore to two pints of alcohol), formerly called *Tinctura Melampodii.* Sometimes used in amenorrhœa. Dose, 30 to 60 minims.

LEPTANDRA. U. S.

The ROOT of *Leptandra Virginica, Culver's physic,* an indigenous, perennial, herbaceous plant.

Properties. The root consists of a branched rhizome, several inches in length, with numerous long and slender radicles. It contains a peculiar crystalline principle, called *leptandrin*, soluble in water, alcohol, and ether.

Medical Properties and Uses. An active cathartic, exciting the liver and promoting the secretion of bile without producing irritation of the bowels. Dose, 20 to 60 grains. A resinous matter obtained by precipitating the tincture with water, and improperly called *leptandrin*, is much used in combination, in doses of from 2 to 4 grains.

MINERAL CATHARTICS.

SULPHUR.

Brimstone, an elementary body, is found native or in combination with metals, and is almost always present in animal and vegetable matter. The officinal forms are the sublimed, the washed, and the precipitated sulphur, differing only in their various degrees of purity.

Sulphur Sublimatum. U. S. *Sublimed Sulphur. Flowers of Sulphur.* Crude sulphur purified by distillation. It usually contains a little sulphuric acid, formed by the oxygen of the air contained in the subliming-chambers, from which it may be freed by washing with hot water.

Sulphur Lotum. U. S. *Washed Sulphur.* Sublimed sulphur thoroughly washed with water. It is in the form of a gritty, crystalline powder, of a fine greenish-yellow color, tasteless, and without odor unless heated, burning with a blue flame and the evolution of sulphurous acid.

Sulphur Præcipitatum. U. S. Lac Sulphuris. *Precipitated Sulphur, Milk of Sulphur,* is prepared by boiling together sublimed sulphur, slaked lime, and water, and then precipitating the sulphur by muriatic acid. It is in a state of minute division, of a white or grayish-yellow color, free from grittiness, without odor, and tasteless. Sulphur is insoluble in water and alcohol, but soluble in the volatile and fixed oils. It is fusible and combustible, volatilizing at 180° and melting at 225°.

Medical Properties and Uses. In small doses it is absorbed, and acts as a gentle stimulant to the secreting vessels, especially to the skin and the bronchial membrane. In larger doses it is laxative, operating slowly, and mainly on the lower bowels, producing soft, consistent, and unirritating passages. Employed as a laxative and diaphoretic in chronic skin diseases and rheumatism. Externally applied in the form of ointment or the sulphur vapor-bath. Dose, 1 to 3 drachms, administered in milk or with syrup or molasses.

Unguentum Sulphuris. U. S. *Sulphur Ointment.* (By mixing one part sulphur and two parts lard.) A certain remedy for scabies.

Sulphuris Iodidum. U. S. *Iodide of Sulphur.* (Prepared by heating together four parts of iodine and one part of sublimed sulphur.) It is of a grayish-black color and radiated crystalline appearance, with an odor like that of iodine. Insoluble in water and alcohol, but soluble in glycerin.

Medical Properties and Uses. Admirably adapted, in the form of ointment, as a local remedy in obstinate cutaneous eruptions unattended with inflammation. Also used internally, in small doses, as a resolvent and alterative.

Unguentum Sulphuris Iodidi. U. S. (30 grains to one troy-ounce of lard.)

MAGNESIA. U. S. *Magnesia.*

Prepared by exposing to a red heat carbonate of magnesia until all the carbonic acid is expelled, which is shown by the powder not effervescing with dilute sulphuric acid: hence improperly called *Magnesia Usta*, or *Calcined Magnesia.*

Properties. A light, white, inodorous powder, of a feeble alkaline taste, insoluble in water, but readily dissolved by acids, without effervescence. There is in the market a heavy magnesia, prepared by precipitation from the sulphate, which is less bulky, softer, and more readily miscible with water. Magnesia is the protoxide of magnesium, a white, very brilliant metal, resembling silver, malleable, fusible at a low temperature, and easily oxidized by the action of air and moisture.

Medical Properties and Uses. Antacid, and, by combining with acid in the stomach, becoming laxative. Useful in all cases requiring a laxative antacid, as cardialgia, sympathetic vomiting, and irritated states of the stomach. Dose as an antacid, 10 to 20 grains; as a laxative, one drachm.

MAGNESIÆ CARBONAS. U. S. *Carbonate of Magnesia.*

This salt is sometimes, though rarely, found native. It is prepared by decomposing sulphate of magnesia by an alkaline carbonate, usually the carbonate of soda.

Properties. A light, fine, perfectly white powder, inodorous and nearly insipid, insoluble in water, and decomposed by all the acids.

Medical Properties and Uses. Antacid and laxative, though inferior to magnesia. Dose, ʒi to ʒij; for a child a year or two old, from 5 to 20 grains,—best given suspended in water or milk.

Liquor Magnesiæ Citratis. U. S. *Solution of Citrate of Magnesia.* An aqueous solution of citrate of magnesia, containing an excess of citric acid, impregnated with carbonic acid and sweetened with syrup. When properly prepared, it is a clear liquid, having an agreeable taste like that of lemonade, and forms a mild, cooling cathartic. Dose, ℥ij to ℥viij.

MAGNESIÆ SULPHAS. U. S. *Sulphate of Magnesia.*

This salt is a constituent of sea-water and of many mineral waters. It was originally procured by evaporating the waters of the saline springs at Epsom, in England: hence the common name of *Epsom salts.* It is also found native in this country, and is manufactured on a large scale by the action of sulphuric acid on *magnesite,* a siliceous hydrate of magnesia, a mineral abounding in Maryland and Pennsylvania.

Properties. It occurs in minute, colorless, transparent rhombic prisms, efflorescing slowly on exposure; is inodorous and of a bitter, nauseous, and saline taste, and is readily soluble in water. Composition, MgO,SO_3+7HO.

Medical Properties and Uses. In moderate doses, a mild and certain purgative, promoting the secretions as well as the peristaltic motion of the alimentary canal, producing copious watery dejections. Its freedom from nausea and griping, and its refrigerant qualities, render it an appropriate purgative in febrile affections. Dose, ℥ss to ℥i, generally given in combination with other medicines, especially senna, the griping effect of which it tends to obviate.

SODÆ SULPHAS. U. S. *Sulphate of Soda.*

This preparation, known as *Glauber's salt,* from the name of the chemist by whom its nature was discovered, is extensively diffused throughout nature. It exists in various mineral waters, in the

ashes of certain marine plants, and is found as an efflorescence upon the surface of certain rocks. It is artificially obtained by the action of sulphuric acid upon common salt in the process for procuring muriatic acid.

Properties. It is a colorless salt, crystallizing with great facility in six-sided, striated prisms, effloresecing on exposure, inodorous, of a cooling, saline, and very disagreeable taste. It is very soluble in water. Composition, NaO,SO_3+10HO.

Medical Properties and Uses. An active saline cathartic, employed in the same cases as the sulphate of magnesia; but its bitter and nauseous taste renders it more repulsive, and it is therefore but little used. Dose, ℥ss to ℥i.

SODÆ PHOSPHAS. U. S. *Phosphate of Soda.*

Prepared by decomposing the phosphate of lime (obtained by digesting bone-ash in dilute sulphuric acid) with carbonate of soda.

Properties. It is in large, colorless, oblique rhombic prisms, effloresecing on exposure, inodorous, with a saline taste, and readily soluble in water. Composition, $2NaO,HO,PO_5+24HO$. When gently heated, it loses its water of crystallization; and at a red heat its basic water is driven off and the salt is converted into *pyrophosphate of soda.* $2NaO,PO_5$.

Medical Properties and Uses. A mild and efficient saline purgative, well adapted to persons of delicate stomachs, on account of the absence of unpleasant taste. Dose, ℥i.

POTASSÆ SULPHAS. U. S. *Sulphate of Potash.*

This salt, called *Vitriolated Tartar*, is usually the secondary product in various chemical processes. Most of the salt of commerce is obtained in the process for making nitric acid, by the action of sulphuric acid on the nitrate of potash.

Properties. In white, very hard, six-sided prisms, without odor, of a bitter, saline taste, permanent in air, and only slightly soluble in water. Composition, KO,SO_3.

Medical Properties and Uses. In doses of from 30 grains to

℥ij, a safe and efficient aperient, but seldom used in this country. In pharmacy, it is used in preparing Dover's powder.

POTASSÆ BITARTRAS. U. S. *Bitartrate of Potash.*

Cream of Tartar, Acid Tartrate of Potash, exists in solution in grape-juice, and in other acidulous vegetable juices. During vinous fermentation it is deposited upon the sides or bottom of the vessel containing the liquor, and in this state is known as *crude Tartar,* or *argol.* This is purified by treating the hot solution with charcoal and crystallizing.

Properties. It is sometimes found in white, crystalline masses, but usually in the form of a white, gritty powder, without odor, with a pleasant, acid taste. It is sparingly soluble in water, and insoluble in alcohol. Composition, $KO,HO,(C_8H_4O_{10})$. One eq. of potash, one eq. of tartaric acid, and one eq. of basic water.

Medical Properties and Uses. A refrigerant laxative and diuretic. Dissolved in water and flavored, it forms a good refrigerant drink in fevers. It allays thirst, diminishes preternatural heat, and reduces vascular action. Dose, ℥ij to ℥ss.

POTASSÆ TARTRAS. U. S. *Tartrate of Potash.*

This preparation, formerly called *Soluble Tartar,* is procured by saturating the excess of acid in the bitartrate of potash with carbonate of potash, the acid being extricated with effervescence, and a neutral tartrate formed.

Properties. It occurs in white, six-sided prisms, with dihedral summits, slightly deliquescent, of a bitter and disagreeable taste. It is soluble in water and decomposed by acids. As found in the shops, it is generally in the form of a white powder. Composition, $2KO,(C_8H_4O_{10})$.

Medical Properties and Uses. A mild, cooling purgative, operating like most of the neutral salts, and used as an adjunct to more active purgatives, as the infusion of senna. Dose, ℥i to ℥i, according to the effect desired.

POTASSÆ ET SODÆ TARTRAS. U. S. *Tartrate of Potassa and Soda.*

Rochelle salt is obtained by adding bitartrate of potash to a solution of carbonate of soda. In this process the excess of acid in the bitartrate saturates the soda and liberates the carbonic acid, forming the double salt, consisting of tartrate of potash combined with tartrate of soda. Composition, $KO,NaO,(C_8H_4O_{10})+8HO$.

Properties. It is in the form of colorless, transparent, prismatic crystals, with a saline and bitter taste, and readily soluble in water.

Medical Properties and Uses. A mild, laxative, and cooling salt, very analogous in its effects to the tartrate of potash. When given in small quantities in solution, it becomes absorbed, and renders the urine alkaline. Dose, ʒi, largely diluted with water.

PULVERES EFFERVESCENTES APERIENTES. U. S. *Aperient Effervescing Powders*, called *Seidlitz Powders*, consist of two powders, one containing two drachms of Rochelle salt and two scruples of bicarbonate of soda, the other thirty grains of tartaric acid. These are dissolved separately, mixed, and taken in the state of effervescence. The tartaric acid unites with the soda of the bicarbonate, of which the carbonic acid escapes, producing the effervescence; and the medicine, as taken, is a mixture of the tartrate of potash and soda, and tartrate of soda. It forms an excellent refrigerant laxative, well adapted to cases in which the stomach is delicate or irritable.

DIURETICS.

DIURETICS are medicines which occasion increased action of the kidneys and promote the secretion of urine.

The quantity of urine secreted in the healthy state varies considerably, being modified by climate, time of day, quantity of fluid taken, and state of health. If the ordinary excretions from the skin or lungs be checked from any cause, the kidneys attempt to make up the deficiency; and if these be increased, the

secretion of urine is diminished. Augmenting the quantity of fluid taken, or removing any of the causes which tend to check the urinary secretion, would indirectly have a diuretic effect. Thus, purgatives and antimony by diminishing febrile action, digitalis by weakening the force of the heart, and mercurials by removing portal obstruction, act as indirect diaretics. Others, again, act on the stomach and primæ viæ, or the skin, and sympathetically affect the kidneys.

Diuretics properly so called operate by being absorbed into the circulation, and, acting as direct stimulants to the kidneys, promote their secretory functions. Or they may be decomposed *in transitu*, and act on these organs by one or more of their constituents.

Therapeutically they are resorted to: 1. To promote the healthy action of the kidneys, and restore the natural amount of urine, when diminished from any cause. 2. To act as depletives and revulsives, and thus prove useful in inflammatory and febrile diseases. 3. To promote absorption of effused fluids by diminishing the quantity of liquid in the circulation: hence useful in dropsies. 4. To soothe and diminish irritation or inflammation of the urino-genital organs, by increasing the amount of fluid secreted, and thus enabling it to hold in solution its solid constituents. 5. To alter and modify the nature of the urinary secretion, and thereby prevent the formation of urinary deposits, and also to promote the elimination of poisonous matters from the system.

Their action may be promoted by drinking plentifully of diluents, and may also be modified by the state of the skin and the condition of the bowels. Hence the surface of the body should be kept cool, and, as a general rule, active cathartics should be avoided, during their administration.

A large number of medicines described under other heads, as diaphoretics, cathartics, sedatives, etc., are employed also as diuretics.

COLCHICUM. U. S.

The CORMUS (bulb) and SEEDS of *Colchicum autumnale, meadow-saffron*, a small, perennial, bulbous plant, growing native in the temperate regions of Europe. The bulb should be gathered in July or August. If gathered at any other season, its strength of course varies: early in the spring it is too young to have fully developed its peculiar properties; and late in the fall it has become exhausted by the nourishment afforded the plant.

Properties. The mature cormus is ovoid, about the size of a walnut, of a firm, amylaceous texture, not composed of laminæ or scales. When dried, it is of a brownish color, compressed on one side, convex on the other, with a deep groove running through it, having no odor, but an acrid, bitter taste. As found in the shops, it is usually in transverse slices, of a grayish-white color and starchy appearance. The seeds, when ripe, are small, hard, and of a dark-brown color. Both the cormus and seeds contain *colchicia*, a peculiar crystalline substance, without odor, but with a bitter taste, and a large quantity of starch. They yield their virtues to alcohol, wine, and water.

Medical Properties and Uses. In small and repeated doses it is sedative to the circulation, and promotes the secretions generally; in large doses it produces nausea, vomiting, and purging; and in excessive doses it acts as a powerful poison. The principal diseases in which it is employed are gout and rheumatism, and in these it proves signally beneficial, giving relief in many cases of the former when all other remedies have failed. Its *modus medendi* is not well understood: some refer its effects to its operation on the nervous system; others, to the union of a cathartic with a sedative effect; while most writers attribute to it the power of exciting the kidneys to a more active elimination of lithic acid and other nitrogenized elements from the blood. It must be used with caution, and the dose be very gradually increased till its beneficial effects are experienced. Dose in substance, 1 to 3 grains, made into pill.

ACETUM COLCHICI. U. S. *Vinegar of Colchicum.* (Two troy-ounces of colchicum root to two pints of diluted acetic acid.) Dose, 30 drops to f℥i.

Vinum Colchici Radicis. U. S. *Wine of Colchicum Root.* (Twelve troyounces of colchicum root to two pints of sherry wine.) Dose, 10 drops to f℥i.

Vinum Colchici Seminis. U. S. *Wine of Colchicum Seeds.* (Four troyounces of colchicum seeds to two pints of sherry wine.) This preparation is the one generally used. The seeds are less liable to injury than the bulb, and the wine is therefore of more uniform strength. Dose, 10 drops to f℥i.

Tinctura Colchici. U. S. *Tincture of Colchicum.* (Four troyounces of seeds to two pints of alcohol). Dose, f℥i to f℥ij. Not much used.

Extractum Colchici Aceticum. U. S. *Acetic Extract of Colchicum.* (By evaporating the acetous infusion of the root.) It is an excellent preparation, containing all the virtues of the root, and is much used when it is desired to exhibit the remedy in the form of pill.

Extractum Colchici Radicis Fluidum. U. S. *Fluid Extract of Colchicum Root.*

Extractum Colchici Seminis Fluidum. U. S. *Fluid Extract of Colchicum Seeds.* Both of these preparations are concentrated tinctures, each fluidounce representing a troyounce. Dose, 5 to 10 drops.

BUCHU. U. S. *Buchu.*

The dried leaves of *Barosma crenata*, and other species of *Barosma*, small shrubs growing at the Cape of Good Hope.

Properties. The leaves are of various shapes, less than an inch in length, from three to five lines broad, notched at the edges, smooth and of a green color on the upper surface, dotted and paler beneath, of a strong aromatic odor, and a warm, bitterish, mint-like taste. Water and alcohol extract their virtues, which depend on a volatile oil and a bitter extractive.

Medical Properties and Uses. Gently stimulant and diuretic, with a peculiar soothing effect on the genito-urinary organs. It is well adapted to catarrh of the bladder, morbid irritation of the renal organs, and incontinence of urine from loss of tone in the parts concerned in its evacuation. Dose of the powder, 20 to 30 grains.

INFUSUM BUCHU. U. S. *Infusion of Buchu.* (A troyounce to a pint of boiling water.) Dose, f℥i to f℥ij.

EXTRACTUM BUCHU FLUIDUM. U. S. *Fluid Extract of Buchu.* (A concentrated tincture of the leaves.) It possesses in a high degree all the properties of the drug, and may be given in doses of from 30 drops to f℥i.

PAREIRA. U. S. *Pareira Brava.*

The ROOT of *Cissampelos Pareira*, a climbing plant, native of the West Indies and Brazil.

Properties. The root is imported in cylindrical pieces, from half an inch to three or four inches in diameter, and of various lengths. It is marked externally with longitudinal and angular wrinkles, and is of a dark-brown color; internally, the wood is porous and of a yellowish color. It is inodorous, has a bitter, nauseous taste, and imparts its virtues readily to water. It contains resin, starch, and a bitter principle called *cissampelina.*

Medical Properties and Uses. It is diuretic and mildly tonic, exercising a mild sedative and astringent effect on the mucous membrane of the urinary organs. It is chiefly useful in affections of the genito-urinary organs, particularly in the advanced stages of acute and in chronic inflammation of the bladder.

INFUSUM PAREIRÆ. U. S. *Infusion of Pareira.* (A troyounce to a pint of boiling water.) Dose, f℥i to f℥ij.

JUNIPERUS. U. S. *Juniper.*

The FRUIT of *Juniperus communis*, an evergreen European bushy shrub, naturalized in the United States.

Properties. The berries are globular, more or less shriveled, about the size of a pea, of a purplish-black color, with an agreeable aromatic odor, and a warm, sweetish, terebinthinate taste. They owe their virtues to a volatile oil, and impart their properties to water and alcohol.

Medical Properties and Uses. They are a powerful stimulant diuretic, contraindicated in inflammatory conditions of the kidneys and urinary organs and in active disease of the pelvic viscera,

and are chiefly employed as adjuvants to more powerful diuretics in dropsical diseases. Given in infusion.

INFUSUM JUNIPERI. U. S. *Infusion of Juniper.* (A troyounce to a pint.)

OLEUM JUNIPERI. U. S. *Oil of Juniper.* (Obtained by distillation with water.) It is a limpid, transparent oil, lighter than water, having the odor and taste of the fruit. Dose, 5 to 15 drops.

SPIRITUS JUNIPERI COMPOSITUS. U. S. *Comp. Spirits of Juniper.* (f℥ss of oil of juniper with ten drops each of oil of caraway and oil of fennel in half a pint of diluted alcohol.) This spirit is a cordial and stimulating diuretic, a useful addition to diuretic infusions.

TARAXACUM. U. S. *Dandelion.*

The ROOT of *Taraxacum Dens-leonis*, a small, herbaceous plant, growing spontaneously in all parts of the world. The whole of the plant abounds in a milky juice, which is most abundant in the autumn, at which season the roots should be gathered.

Properties. The dried root is dark brown, much shrunken, very brittle, without smell, but has a sweetish, mucilaginous, bitterish taste, and yields its active properties to water.

Medical Properties and Uses. Taraxacum is tonic, diuretic, and slightly aperient, acting particularly on the liver, increasing the biliary secretion, and has been substituted for mercury when the latter has been inadmissible. Useful in dropsy connected with derangement of the liver.

INFUSUM TARAXACI. U. S. *Infusion of Taraxacum.* (Two troyounces to a pint of boiling water.) Dose, wineglassful, two or three times a day, or oftener.

EXTRACTUM TARAXACI. U. S. *Extract of Taraxacum.* (The inspissated juice of the root collected in autumn.) The pure extract should be of a brownish color, with a bitter and aromatic taste, and completely soluble in water. Dose, 10 to 20 grains.

EXTRACTUM TARAXACI FLUIDUM. U. S. *Fluid Extract of Taraxacum.* (A concentrated tincture of the root.) Dose, f℥i to f℥ij.

ERIGERON. U. S. *Fleabane.*

The HERB of *Erigeron heterophyllum* and of *Erigeron Philadelphicum*, indigenous herbaceous plants. The whole herb is used, and should be collected while the plant is in flower. It has a feeble aromatic odor and bitterish taste, and imparts its virtues to boiling water.

Medical Properties. Fleabane is mildly diuretic, and useful in dropsical and nephritic affections. Given in decoction (℥i to Oj) as an adjuvant to more active remedies.

SCOPARIUS. U. S. *Broom. Broom-Tops.*

The DRIED TOPS of *Cytisus Scoparius*, a common European shrub, cultivated in gardens in this country. The whole plant has a bitter, nauseous taste, and, when bruised, a strong, peculiar odor. The officinal portions are the tops of the branches, which yield their active properties to water and alcohol. They contain a neutral principle, *scoparin*, and a volatile liquid alkaloid, *spartein*.

Medical Properties and Uses. In small doses, they are diuretic and laxative; in larger doses, cathartic and emetic: they are used principally in dropsies, but are very objectionable in acute inflammatory cases. Dose, 20 to 30 grains, best given in decoction made by boiling ℥ss of the fresh tops in a pint of water.

There are many vegetable substances more or less used as diuretics in combination with more active remedies, which, though less frequently resorted to than the foregoing, require a brief notice. Among the more important are:

APOCYNUM CANNABINUM. *Indian Hemp.* The root of *Apocynum cannabinum*, an indigenous herbaceous plant, possessing emetic, cathartic, and diuretic properties.

PETROSELINUM. The root of *Petroselinum sativum*, the common parsley, a small plant, native of Europe, but cultivated everywhere in gardens for its leaves. A mild diuretic, admirably suited to cases of strangury brought on by blisters. Parsley-seeds contain a peculiar principle, in the form of a yellowish,

oily liquid, called *apiol*, which, in doses of from 5 to 10 drops, possesses emmenagogue properties.

CAROTA. *Carrot-seed*, the fruit of *Daucus carota*, a common indigenous plant, possesses properties analogous to the aromatics, with a peculiar tendency to the kidneys, the secretion of which it promotes. The root, boiled, and beaten into a smooth consistence with water, may be used as a poultice to sloughing and phagedenic ulcers, the fetor of which it corrects, while it also changes the character of the diseased action.

ARMORACIA. *Horse-radish root*, the fresh root of *Cochlearia armoracia*, a perennial plant, native of Western Europe, but cultivated for culinary purposes in the United States, is highly stimulant, promoting the appetite and increasing the secretions, particularly the urine. It may be employed in dropsical affections occurring after fevers and attended with much debility.

DELPHINIUM. U. S. *Larkspur*, the root and seeds of *Delphinium consolida*, a showy annual plant, growing abundantly in Europe and this country, possesses diuretic properties, but is little if at all used.

TEREBINTHINA. U. S. *Turpentine.*

The term turpentine, in its general sense, is applied to the liquid or concrete oleoresinous juice obtained from different trees belonging to the family of pines. Only two are recognized as officinal in the U. S. Ph.

TEREBINTHINA. U. S. *White Turpentine. Common American Turpentine.* The concrete juice of *Pinus palustris*, the *long-leaved* or *yellow pine*, and *Pinus Tæda*, the *old field pine*, and of other species of *Pinus*, large evergreen trees of the Southern States. It is procured by making excavations into the trunk of the tree, a few inches from the ground, into which the juice flows freely during the warm season, gradually thickening on exposure.

Properties. As found in the shops, it is in irregular, yellowish-white masses, of various consistence, of a somewhat aromatic odor, and a warm, pungent, bitterish taste. In its recent state it affords about seventeen per cent. of a volatile oil, the OLEUM

TEREBINTHINÆ, the properties of which have been already explained.

TEREBINTHINA CANADENSIS. U. S. *Canada Turpentine. Canada Balsam Balsam of Fir.* The juice of *Abies balsamea*, a large, beautiful, evergreen tree, native of the colder regions of the United States and Canada. It is procured by breaking the vesicles which form spontaneously upon the trunk and branches of the tree, and collecting the contents.

Properties. When pure, it is a thin, tenacious, transparent, colorless or yellowish liquid, of a strong, agreeable odor, and a bitter, somewhat acrid taste. By exposure it becomes thicker, and ultimately solid.

There are other varieties known in commerce, having essentially the same properties: VENICE TURPENTINE, from *Larix Europæa*, or *larch*, growing abundantly upon the Alps and Jura Mountains; CHIAN TURPENTINE, from *Pistacia Terebinthus*, a native of Southern Europe and Syria; BORDEAUX TURPENTINE, from *Pinus silvestris* and *P. maritima*, growing in France

The turpentines, if solid, soften with heat and become adhesive. At a higher heat they melt, and burn with a bright flame but much smoke. They are only very slightly soluble in water, but wholly so in alcohol, ether, and the fixed oils. On distillation they yield a volatile oil, the residue consisting of resin.

Medical Properties and Uses. Their effects on the system are essentially the same as those of the volatile oil, but less speedy and less marked, exercising a powerful influence upon the mucous membranes, particularly those of the urino-genital organs. At one time they were much used in gleet and other diseases of the urinary organs; but they have been generally superseded by the volatile oil, though they are sometimes preferred when a slow effect, with little general stimulation, is desired. Dose, 20 to 40 grains, given in pill, electuary, or emulsion. Externally applied, they act as rubefacients.

The following substances may be properly considered here, as they are derived, directly or indirectly, from the turpentines.

RESINA. U. S. *Resin*, commonly called *rosin*, the residuum after the distillation of the volatile oil from white turpentine.

Properties. In its pure state it is clear and pellucid, and, as usually found, varies in color from a yellowish brown to a dark brown, according to its purity, brittle, with a shining fracture, and a slight terebinthinate odor and taste. It is insoluble in water, but soluble in alcohol, ether, and the fixed and volatile oils. It melts at 270°, is completely liquid at 306°, and is entirely decomposed at a red heat, with a dense yellow flame and much smoke. It is never used internally, but, on account of its great adhesiveness, is very extensively employed in the preparation of plasters and ointments.

Ceratum Resinæ. U. S. *Resin Cerate. Basilicon Ointment.* (Prepared by melting together ten parts of resin, four of yellow wax, and sixteen of lard.) It is much used as a stimulant application to blistered surfaces, indolent ulcers, burns, scalds, etc.

Ceratum Resinæ Compositum. U. S. *Deshler's Salve.* (Prepared by incorporating together twelve parts, each, of resin, suet, and yellow wax, six parts of turpentine, and seven parts of linseed-oil.) This is more stimulating than the preceding, but is applicable to similar purposes.

Pix Liquida. U. S. *Tar.* The impure turpentine procured, by burning, from the wood of *Pinus palustris* and of other species. The wood is set on fire, and covered with earth, in order to insure slow combustion and to prevent the escape of the volatile portions. The resinous matter is melted, and, mixed with the condensed products arising from the decomposition of the wood, flows out beneath in a semi-liquid form, charcoal being left behind.

Properties. Tar is a liquid or semi-liquid, almost black, with a peculiar empyreumatic odor, and a bitter, resinous, somewhat acid taste. It is soluble in alcohol, ether, and the fixed and volatile oils. It consists of resinous matter, united with acetic acid, oil of turpentine, and various volatile empyreumatic products, colored with charcoal. Submitted to distillation, it yields an aqueous acid liquor (*pyroligneous acid*) and a volatile oily matter (*oil of tar*), leaving, as a residue, *pitch.*

Medical Properties and Uses. It is slightly stimulant and diuretic, resembling the turpentines in its effects, but milder in its operation. It is occasionally employed in catarrhal affections and in diseases of the urinary passages. Its vapor, when inhaled,

acts as a stimulant to the lining membrane of the air-passages, and has been found beneficial in bronchial diseases and in phthisis. Locally applied, it acts as a stimulant, and sometimes induces healthy action in indolent and foul ulcers; it has also proved serviceable in cutaneous diseases, especially those which affect the scalp.

Infusum Picis Liquidæ. U. S. *Tar Water.* (By shaking a mixture of one part tar and four parts water, and filtering the infusion.) The water dissolves a portion of the acetic acid, empyreumatic oil, and resinous matter, and acquires the odor and taste of tar. It may be used as a stimulant diuretic in cystitis, and externally as a wash.

Unguentum Picis Liquidæ. U. S. *Tar Ointment.* This is prepared by mixing equal parts of tar and melted suet together, and is highly useful as a stimulant application in various scaly eruptions, particularly that called tinea capitis, or scald-head.

Creasotum. U. S. *Creasote.* This is an artificial product, and is prepared from the oil obtained by the distillation of tar. The process for procuring it is a very complex one. The oil of tar is first freed from acetic acid by carbonate of potash, and distilled; phosphoric acid is then added, to neutralize the ammonia, and another distillation is resorted to, producing a mixture of creasote and eupion. This is mixed with a solution of caustic potash, which combines with the creasote and allows the eupion, which is lighter, to collect on the surface. This is separated, and the alkaline solution which remains is neutralized by sulphuric acid, setting free creasote, which is decanted and purified by redistillation.

Properties. Creasote, when pure, is a colorless, transparent, oleaginous liquid, sp. gr. 1·057, slightly greasy to the touch, with a persistent, smoky, disagreeable odor, and a caustic, burning taste. It boils at 397°, and is combustible, burning with a sooty flame. It is soluble in alcohol and ether, unites in all proportions with oils, and is a solvent of iodine, phosphorus, and resins.

Medical Properties and Uses. It possesses the power of immediately coagulating albumen, and of preserving animal substances. Internally, in small doses it occasions a sensation of warmth in the stomach, and appears to exercise a peculiar

sedative action on the stomach. It also increases the urine, to which it communicates its odor. In overdoses it acts as a poison, producing depressed action of the heart, convulsions, and coma. It is principally employed to arrest nausea and vomiting when not dependent on inflammation or structural disease of the stomach, and occasionally proves effectual in diarrhœa. In chronic bronchitis accompanied by excessive expectoration, the vapor mixed with that of boiling water is often useful in checking the secretion and correcting the fetor of the sputa. Externally, it is employed as an astringent to arrest hemorrhage from small vessels, and as an application to indolent or flabby ulcers and chronic skin diseases, especially those of the scalp. In poisoning, the stomach should be evacuated, and ammonia and stimulants administered. Dose, 1 to 2 drops, in pill or in mucilage, well diluted.

Aqua Creasoti. U. S. *Creasote Water.* (By mixing ℥i of creasote with a pint of water.)

Unguentum Creasoti. U. S. *Creasote Ointment.* (℥ss creasote to ℥i lard.)

Acidum Carbolicum. *Carbolic Acid.* This acid, also called *phenylic* or *phenic* acid, is one of the products of the distillation of coal tar. It is easily prepared by treating the oils of coal tar, which distil between 350° and 400°, with caustic potash, removing the alkaline solution and adding to it muriatic acid, when the carbolic acid is liberated and rises to the surface as an oily fluid, which may be purified by distillation.

Properties. Carbolic acid, when first obtained, is in colorless, prismatic crystals, which deliquesce and remain fluid at ordinary temperatures. As usually met with, it is a colorless, oily-looking fluid, of a slight tarry and aromatic odor, resembling that of creasote, with an acrid and burning taste. Specific gravity, 1·062. It is fusible at 95°, and passes into vapor at 370°, is only slightly soluble in water, but freely soluble in alcohol, ether, and glycerin.

Medical Properties and Uses. In its action on the system, carbolic acid closely resembles creasote. Internally it possesses the power of allaying some forms of vomiting and gastric irritability, especially when produced by miasma or putrid exhalations.

It has also been used as an inhalation in phthisis to allay irritation and arrest hæmoptysis, and in chronic bronchitis to check the profuse secretion. Externally, in its pure state, it acts as a mild caustic by coagulating the albumen. When diluted, it acts as a mild local stimulant, and may be used as a gargle in the various forms of sore-mouth and ulcerated sore-throat, and as a wash to ill-conditioned and fetid ulcers. It has also proved useful in hemorrhoidal affections and fistulas. It destroys the lower forms of animal life, and hence, in the form of ointment, soon effects a cure in scabies. Its powers as a disinfecting and deodorizing agent are very marked. A small quantity added to decomposing matters rapidly and completely removes all smell. It also possesses remarkable antiseptic powers, preventing the decomposition of organic substances. Internally, it may be given in solution (one part carbolic acid to forty parts water), in doses of from ʒss to ʒi; or 1 drop of the deliquesced acid in the form of pill. As an external application, Waring recommends that ʒij of carbolic acid be mixed in ʒi of liquor potassæ and half a pint of water. Or it may be used in the form of ointment (five to thirty grains of carbolic acid to an ounce of lard).

COPAIBA. U. S.

This is the OLEORESINOUS JUICE of *Copaifera multijuga* and of other species of *Copaifera*, large and elegant trees, growing in Brazil and other parts of South America. On making incisions into the stems of the trees, there exudes a clear, colorless, and thin juice, which soon becomes thicker and of a yellowish color.

Properties. It is a clear, transparent liquid, of an oily consistence, with a strong, peculiar odor, and a hot, acrid, and nauseous taste. It is insoluble in water, but entirely soluble in alcohol, ether, and the fixed and volatile oils, and with the alkalies it forms saponaceous compounds. It forms with magnesia a translucent mass, sufficiently consistent to form pills. It contains a volatile oil, resin, and a minute proportion of acid.

Medical Properties and Uses. Copaiba is gently stimulant to the mucous membranes, resembling in its operation the tere-

binthinates, and in large doses it acts as a cathartic. During its administration the urine acquires a peculiar odor, and its smell may be detected in the breath. Occasionally it produces a cutaneous eruption, resembling urticaria, and when given in large doses it causes nausea and vomiting. Its action seems specially directed to the mucous membrane of the bladder and urethra; and hence it is a remedy of great value in diseases of the genito-urinary system, particularly gonorrhœa. Its modus operandi is obscure; but most writers think it operates by exciting a new action on the irritated mucous surfaces. In chronic diseases of the mucous membranes, as chronic diarrhœa or dysentery, and in chronic bronchitis, it has been used with success. Dose, 20 to 40 drops, three times a day, generally given in emulsion with some aromatic water. It is often given in capsules of gelatine, which cover its taste and readily dissolve in the stomach.

Oleum Copaibæ. U. S. *Oil of Copaiba.* The oil of copaiba is obtained by distillation, and constitutes about one-half of the copaiba. It possesses the properties of the oleoresin, and may be used for the same purposes. Dose, 10 to 15 drops.

Pilulæ Copaibæ. U. S. *Pills of Copaiba.* When copaiba is mixed with one-sixteenth of its weight of magnesia, the latter combines chemically with the resin and acts as an absorbent of the volatile oil, producing a soft, tenacious mass capable of being made into pills. Each pill contains five grains of copaiba.

POTASSÆ CARBONAS. U. S. *Carbonate of Potash.*

The *impure carbonate of potash* of commerce is procured from the ashes of wood by lixiviation, and the subsequent evaporation of the solution obtained. This, subjected to calcination, is rendered purer, and is then called *pearlash.* The officinal salt, known as *salts of tartar,* is obtained by purifying pearlash by dissolving it in water, filtering and evaporating the solution, and granulating by constant stirring.

Properties. It is usually met with in the form of a coarse, white, granular powder, inodorous, and of an unpleasant, acrid, alkaline taste. It attracts moisture from the atmosphere, and

becomes converted into a dense oil-like liquid, formerly called *oleum tartari per deliquium.* Composition, KO,CO_2+2HO.

Potassæ Carbonas Pura. U. S. *Pure Carbonate of Potassa* is prepared by heating the bicarbonate of potash to drive off one equivalent of carbonic acid, and differs from the preceding in containing no impurities.

Medical Properties and Uses. It is an antacid and diuretic. Its diuretic effect is greatly increased by the use of diluents, and by combination with other diuretics. It exercises all the peculiar effects of the alkalies on the system, and in calculous affections is preferred to the carbonate of soda, and, as Dr. Wood says, "seems to be generally used where the object is to alkalize the system." It is an old remedy for hooping-cough, and in doses of one grain, repeated three or four times a day, seems to exercise a controlling influence on this disease. Externally, it is applied in the form of lotion, bath, or ointment, for the relief of the chronic forms of scaly and pustular eruptions. Its most common use is in the preparation of the neutral mixture or effervescing draught. In large quantities it acts as a corrosive poison, for which oils and the vegetable acids are the antidotes. Dose, 10 to 30 grains, given in some aromatic water sweetened with sugar. For external application, from ʒi to ʒiii, dissolved in a pint of water. As an ointment, from ten grains to ʒi to an ounce of lard.

POTASSÆ BICARBONAS. U. S. *Bicarbonate of Potassa.*

This salt is prepared by passing carbonic acid through a solution of the carbonate till it ceases to be absorbed, and crystallizing by evaporation.

Properties. It occurs in colorless, transparent, right rhombic prisms, is inodorous, and has a saline, alkaline taste, without acridity. It is permanent in the air; exposed to a moderate heat, it parts with one equivalent of its carbonic acid, becoming reduced to the carbonate. It is soluble in four times its weight of water, and is insoluble in alcohol. Composition, $KO,2CO_2+HO$.

Medical Properties and Uses. Its effects are similar to those of the carbonate, but not so powerful. It possesses the advantage of being less unpleasant to the taste, and its employment

may be continued for a longer period. The dose is from 20 to 60 grains.

POTASSÆ ACETAS. U. S. *Acetate of Potassa.*

This salt, formerly known as *sal diureticus*, is prepared by saturating dilute acetic acid with bicarbonate of potash, and evaporating cautiously.

Properties. It is a pure, white, deliquescent salt, with a fibrous texture, somewhat unctuous to the touch, with a pungent, saline taste; very soluble in water and alcohol. It is decomposed by heat, pyroacetic spirit being driven off, and carbonate of potash left. Composition, $KO,(C_4H_3O_3)$.

Medical Properties and Uses. In small doses, a mild and efficient diuretic; in larger doses, acting as a saline purgative. It proves eminently useful as a diuretic in dropsical affections, and is highly spoken of by Dr. G. Bird in the treatment of acute rheumatism, the urine being remarkably increased, both in its aqueous and solid constituents. Dose, from 20 to 60 grains.

SODÆ ACETAS. U. S. *Acetate of Soda.*

This salt is manufactured on a large scale in the preparation of acetic acid, but for medicinal use may be procured by saturating acetic acid with carbonate of soda, and evaporating.

Properties. It is a white salt, crystallizing in long, striated prisms, with a sharp, bitterish, not disagreeable taste. Composition, $NaO,(C_4H_3O_3)+6HO$.

Medical Properties and Uses. Same as those of the acetate of potash. Dose, 20 grains to ʒij.

Ammoniæ Phosphas. *Phosphate of Ammonia.* This salt was brought to the notice of the profession by Dr. T. H. Buckler, of Baltimore, as a remedy for gout and rheumatism. It may be prepared by saturating a strong solution of phosphoric acid with ammonia, and evaporating. It is in white, rhombic, effervescent crystals, of a slight ammoniacal odor and a not unpleasant taste. On exposure it loses both ammonia and water, and becomes opaque. It is soluble in water, but insoluble in alcohol. Com-

position, $2(NH_4O)PO_5+HO$. Dose, 10 to 40 grains, three times a day, dissolved in a tablespoonful of water.

AMMONIÆ BENZOAS. *Benzoate of Ammonia.* This salt is prepared by neutralizing benzoic acid with a solution of ammonia, evaporating and crystallizing. It occurs in white or colorless, glistening, laminar crystals, having the odor of benzoic acid, with a bitter, saline, balsamic taste. It is deliquescent in the air, and very soluble in water and alcohol. Composition, $NH_4O,(C_{14}H_5O_3)+HO$. It is diuretic, stimulating the mucous membrane of the urinary passages. Being more soluble than benzoic acid, it is more readily absorbed and converted into hippuric acid, which passes out through the kidneys and is found in the urine. It may be used in chronic inflammation of the bladder, and is serviceable where a tendency to phosphatic deposit exists, and has been recommended in anasarca, with albuminuria following scarlatina. Dose, 10 to 20 grains.

DIAPHORETICS.

DIAPHORETICS are medicines which tend to increase the secretion and exhalation from the skin; when this is profuse, they are called SUDORIFICS.

The skin, by means of its sebaceous and sudoriferous glands, secretes and excretes fatty matters, and the perspiration or sweat. Besides this, it exhales water from its surface, which serves to regulate the temperature of the body. The perspiration is said to be *insensible* when no visible moisture is discernible on the skin, and *sensible* when it is so discernible; but there is no real difference between the two. In the former case it evaporates as fast as formed, while in the latter it remains in the form of minute, colorless drops. The quantity of perspiration exhaled by different portions of the body differs, and is influenced both by internal and external conditions. Thus, it is augmented by increased vascularity of the skin, by a higher temperature of the body, by a quicker circulation, and therefore by exercise and effort generally. It is also increased by certain conditions of the nervous system, which tend to relax the skin and its vessels. On the other hand, it is diminished or almost entirely arrested in

febrile conditions and certain forms of excitement. Of the external circumstances modifying the quantity of the perspiration, the most important are the temperature and hygrometric condition of the atmosphere. Thus, warm or dry air increases, while cool or moist air diminishes it.

The agents which, under certain circumstances, augment the cutaneous exhalation are numerous. External heat, assisted by the copious use of diluents, friction, exercise, and all agents which excite vascular action, promote sweating. The sudden and temporary application of cold, in the form of cold affusion or cold bath, proves sudorific by the reaction which it occasions. Diaphoretics, properly so called, are medicinal agents which act through the circulation and cause sweating. These produce their effects in different and opposite ways: by diminishing the force of the circulation, and thus relaxing the cutaneous vessels; by stimulating the capillary vessels to increased secretion; by augmenting the force of the circulation generally; or by producing an impression upon the stomach which is communicated to the skin.

They are employed therapeutically (as summed up by Pareira): 1. To restore the cutaneous secretion when it has been checked by cold, and thereby to relieve the consequences of its suppression. 2. To promote the subsidence of diseases which naturally terminate in augmented cutaneous secretion, as in simple continued fever, the exanthemata, and intermittents. 3. To produce determination to the surface in various maladies attended by coldness of the skin and congestion of the internal organs. 4. To antagonize other secretions: thus, they are sometimes employed to check excessive secretion of urine, or to relieve diarrhœa. 5. To establish a substitute for some other secretion: thus, when the renal secretion is diminished or suppressed, we endeavor to relieve the system by diaphoretics. We also employ them to eliminate noxious matters from the system; and in this way they prove useful in gout, rheumatism, syphilis, and various other diseases.

During the administration of diaphoretics, it is essential that the surface should be kept warm, and a bad conductor of heat, such as flannel, should be employed; care must also be taken to

avoid the application of cold, either by exposing the surface of the body to cold air, or by the use of cold drinks, while the perspiration continues; and finally, where we wish to check the diaphoresis, it must be done gradually, by drying the surface of the body with warm, dry towels, and by diminishing the covering.

Diaphoretics may be considered under the three heads of *nauseating*, *refrigerant*, and *alterative* diaphoretics.

NAUSEATING DIAPHORETICS.

Most emetics are diaphoretic in small doses. Ipecacuanha and tartar emetic are chiefly used, and, from the nausea they occasion, produce a general relaxation of the cutaneous capillaries, by which the watery parts are permitted to ooze through their coats. The former has been treated of under the head of Emetics, the latter under that of Sedatives. Tartar emetic seems to act also by its direct sedative influence upon the nervous system, and through it upon the circulation and its dependent functions.

REFRIGERANT DIAPHORETICS.

Most of the alkaline salts, when absorbed into the circulation, depress the action of the heart, diminish the general heat, and stimulate the skin and kidneys to increased action. Those which are disposed to act on the cutaneous system, without the aid of diluents, may be properly considered here. The nitrate of potash has already been considered among the refrigerants, but, conjoined with other diaphoretic remedies, it sometimes acts by promoting determination to the skin.

POTASSÆ CITRAS. U. S. *Citrate of Potassa.*

This salt is prepared by saturating citric acid in solution with bicarbonate of potassa, evaporating, and granulating by constant stirring.

Properties. It is in the form of a white, granular powder, inodorous, with a saline taste. It is deliquescent, soluble in water, but insoluble in alcohol, decomposed at a red heat, leav-

ing a residue of carbonate of potassa. Composition, 3KO, ($C_{12}H_5O_{11}$).

Medical Properties and Uses. This salt is useful as a diaphoretic in febrile disorders, but it is generally prepared at the moment of administering it. Dose, 5 to 20 grains, in solution.

Liquor Potassæ Citratis. U. S. *Solution of Citrate of Potassa* is prepared by dissolving half a troyounce of citric acid and three hundred and thirty grains of bicarbonate of potassa in half a pint of water.

Mistura Potassæ Citratis. U. S. This solution, known as *Neutral Mixture*, is prepared by saturating fresh lemon juice with the bicarbonate of potassa. It is an agreeable refrigerant and diaphoretic, used in fevers and inflammations, and when given in a state of effervescence, known as *Effervescing Draught*, it has an excellent effect in allaying nausea.

Liquor Ammoniæ Acetatis. U. S. *Solution of Acetate of Ammonia.* This preparation, called *Spirit of Mindererus*, is an aqueous solution of acetate of ammonia, made by saturating dilute acetic acid with carbonate of ammonia.

Properties. It is transparent and colorless, inodorous, and has a faint, cooling, saline taste. It should be prepared in small quantities at a time, as the acid is decomposed on exposure and carbonate of ammonia generated.

Medical Properties and Uses. It is an excellent diaphoretic, when aided by keeping the surface warm, and by tepid dilution. It also lowers the pulse, and abates febrile heat; hence useful in febrile and inflammatory diseases, the exanthemata particularly. Externally it may be used as a discutient to bruises and inflamed surfaces. Dose, ʒi to ʒiv, repeated every few hours.

Spiritus Ætheris Nitrosi. U. S. *Spirit of Nitrous Ether. Spiritus Nitri Dulcis. Sweet Spirit of Nitre.* This is a solution of nitrous ether (C_4H_5O,NO_3) in rectified spirit. Nitrous ether is generated by the reaction of nitric acid with alcohol, and is prepared by distilling a mixture of these substances, and purifying by redistillation with carbonate of potassa.

Properties. When pure, spirit of nitrous ether is a colorless,

volatile liquid, of a fragrant, ethereal odor, and a sweetish, acidulous taste. It has a slightly acid reaction, sp. gr. 0·837, boils at 145°, and is highly inflammable, burning with a whitish flame. It mixes with water and alcohol in all proportions.

Medical Properties and Uses. As a refrigerant diaphoretic, it is much used in mild febrile affections, catarrhs, and influenza, for the purpose of allaying the heat of skin and moderating the excitement of the circulation. As a mildly stimulating diaphoretic, it may be administered in dropsical affections in combination with other medicines of this class. Dose, 20 to 60 drops.

ALTERATIVE DIAPHORETICS.

These are agents which appear to act specifically on the function of the skin, but also have a tendency to influence, to a greater or less degree, all the secretions. They are more used for their general alterative effect than for their direct diaphoretic properties, and are chiefly employed in the treatment of chronic rheumatism, obstinate cutaneous diseases, and in the various forms of constitutional syphilis.

GUAIACUM. U. S. *Guaiac.*

The WOOD and RESIN obtained from *Guaiacum officinale*, a large and beautiful tree, growing in the West Indies and tropical America. All parts of the tree possess medicinal properties, but the wood and the concrete juice only are officinal.

GUAIACI LIGNUM. U. S. The wood, known as *lignum vitæ*, is much used in the arts, on account of its extreme hardness and density. It is usually imported in logs or billets, but as found in the shops is in the form of raspings or shavings. It has a peculiar aromatic odor, and an acrid, bitterish taste, and contains about 26 per cent. of the resin.

GUAIACI RESINA. U. S. The resin either exudes spontaneously from incisions made into the trunk, or is obtained from the wood by the aid of heat. It occurs in irregular pieces, of various sizes, of a dark-olive or reddish-brown color, with an odor and taste similar to, but stronger than, that of the wood. It is brittle, pre-

sents a smooth, shining fracture, and forms a light-gray powder, which acquires a greenish tint on exposure. It is insoluble in water, but soluble in alcohol. Both wood and resin owe their active properties to a resinoid principle, termed *guaiacin.*

Medical Properties and Uses. Guaiacum is a warm, stimulating diaphoretic and alterative. Its stimulating properties render it inadmissible in acute cases, but in chronic fibrous rheumatism and in gout it may be used with benefit, as tending to restore capillary action. In constitutional syphilis it was at one time regarded as a specific, and is still highly esteemed as an alterative in this disease and in some forms of cutaneous eruption, but is generally used in combination with other remedies. In certain uterine affections it has been used with benefit. Dose, 10 to 30 grains.

TINCTURA GUAIACI. U. S. *Tincture of Guaiacum.* (Six troyounces to two pints of alcohol.) Dose, ʒi, increased if necessary.

TINCTURA GUAIACI AMMONIATA. U. S. *Ammoniated Tincture of Guaiacum.* (Six troyounces to two pints of aromatic spirits of ammonia.) This preparation is more stimulating than the simple tincture, and at the same time somewhat antacid. Dr. Dewees speaks of it highly in amenorrhœa, and states that he has succeeded with it where almost all other emmenagogues have failed. Dose, the same as the simple tincture. Water decomposes both these tinctures, and they should be given with some viscid substance.

MEZEREUM. U. S. *Mezereon.*

The BARK of the *Daphne Mezereum* and *Daphne Gnidium,* hardy shrubs, three or four feet in height, growing wild in England and the north of Europe.

Properties. The bark is usually collected in the spring, and is met with in the form of thin, flat, or quilled pieces, tough and fibrous, of an olive hue on its outer surface, yellowish-white within, of a faint, unpleasant odor, and sweetish, acrid taste. Water and alcohol extract its virtues. It contains *daphnin,*—a peculiar, crystallizable, bitter principle,—an acrid resin, upon which its irritant properties depend, and an acrid, volatile oil.

Medical Properties and Uses. Mezereon is a powerful stimulating diaphoretic, exciting the action of the vascular system; in large doses it produces nausea, vomiting, and purging, and in overdoses acts as an acro-narcotic poison. It has long been esteemed as a remedy in chronic rheumatism, secondary syphilis, and obstinate diseases of the skin. Dose, 10 grains, best given in decoction. Externally, it is irritant and vesicant, and may be used in the form of ointment (prepared by mixing the alcoholic extract with lard) for maintaining the discharge from blistered surfaces.

SASSAFRAS RADICIS CORTEX. U. S. *Bark of Sassafras Root.*

The BARK of the root of *Sassafras officinale*, a tree of medium size, growing in great abundance throughout the United States.

Properties. As found in the shops, it is in pieces of various sizes, of a grayish-red color, light, porous, and very brittle, presenting, when freshly broken, a lighter color than that of the exposed surfaces. It has an agreeable, fragrant odor, and a warm, aromatic taste. Water and alcohol extract its virtues, which depend upon a volatile oil combined with tannin and extractive.

OLEUM SASSAFRAS. U. S. *Oil of Sassafras.* The bark contains about 2 per cent. of oil, which may be obtained by distillation with water. It is of a yellow color, becoming reddish by age, and possesses all the properties of the bark.

Medical Properties and Uses. Sassafras is a stimulating diaphoretic and diuretic, and may be used in the same cases as the preceding articles. It is much used as a domestic remedy, in the form of decoction, in chronic affections of the skin.

SASSAFRAS MEDULLA. U. S. *Sassafras Pith.* This is in white, slender, cylindrical pieces, very light and spongy, with a mucilaginous taste, and the slight flavor of the bark. It abounds in gummy matter, which dissolves in water, forming a thick, transparent mucilage, much used as a soothing application in inflammation of the eyes, and as a drink in inflammatory affections of the urinary organs.

Mucilago Sassafras. U. S. *Mucilage of Sassafras.* (Two drachms to a pint of water.)

SARSAPARILLA. U. S.

The root of *Smilax officinalis* and of other species of *Smilax*, slender, prickly, trailing shrubs, natives of Mexico and the warm regions of South America.

Properties. The dried roots are generally several feet in length, sometimes attached to a rhizome, about the thickness of a common quill, cylindrical, flexible, wrinkled longitudinally, with more or less root-fibres attached to them. They consist of a thick cortical part, covered with an epidermis, which can be easily separated, a thin inner layer of woody fibre, and a central medulla or pith. Their color varies from a red or brown to a grayish tint. It is inodorous when dry, but in decoction acquires a decided and peculiar odor; the taste is mucilaginous, bitter, and slightly nauseous, leaving an acrid sensation in the mouth and fauces.

It is generally met with in bundles formed of folded roots. There are several varieties in commerce, designated according to the place of shipment. *Honduras sarsaparilla*, the variety most used in this country, is of a dirty or grayish-brown color, and has but few rootlets attached. The inner bark presents a mealy, amylaceous appearance when broken. *Jamaica* or *red sarsaparilla* differs from the preceding only in having a lively-red tint and more attached root-fibres, and is most esteemed as containing comparatively little starchy matter. *Brazilian sarsaparilla*, or, as it is sometimes called, *Lisbon sarsaparilla*, resembles the Honduras in color and mealiness, but is almost free from rootlets. *Mexican sarsaparilla* consists of thin, tough, grayish roots, connected by their rhizome with few rootlets, and destitute of starch in the cortex.

All these varieties contain a crystalline principle, termed *smilacin*, which is white, inodorous, and almost tasteless, and upon which the medicinal virtues of the root depend. Besides this, it contains an acrid, bitter resin, starch, lignin, and other unimportant substances. It yields its virtues to boiling water

and alcohol; but much of the sarsaparilla of the shops is nearly or quite inert from age, or from being mixed with roots of allied species which do not possess any medicinal properties.

Medical Properties and Uses. It appears to be a stimulant to the secretions, especially those of the skin and kidneys, while it improves the appetite, strengthens the digestion, and invigorates the whole system. It is thought to prove highly serviceable in syphilis and in affections consequent upon syphilis, and may also be employed in chronic rheumatism, scrofulous diseases, certain cutaneous diseases, and other depraved conditions of health. In these cases it is usually associated with other alterative diaphoretics and tonics.

Decoctum Sarsaparillæ Compositum. U. S. *Compound Decoction of Sarsaparilla.* (Prepared by boiling together six troyounces of sarsaparilla, a troyounce, each, of sassafras, guaiacum wood, and liquorice root, with three drachms of mezereon, in four pints of water.) This preparation is an imitation of the celebrated *Lisbon diet drink*, and may be used as an alterative diaphoretic. Dose, 4 to 6 fluidounces.

Syrupus Sarsaparillæ Compositus. U. S. *Compound Syrup of Sarsaparilla.* This syrup is made by first forming a tincture, with diluted alcohol, of sarsaparilla, guaiacum wood, roses, senna, and liquorice root, then evaporating off most of the alcohol, and incorporating sufficient sugar with the residue to form a syrup, to which are added a few drops of the volatile oils of sassafras, anise, and gaultheria. Dose, ʒss to ʒij; generally used as a vehicle for alterative medicines. Care must be taken not to combine corrosive sublimate with this preparation, as it is said to be completely decomposed.

Extractum Sarsaparillæ Fluidum. U. S. *Fluid Extract of Sarsaparilla.* Prepared by evaporating a strong tincture and adding sugar. Dose fʒi to fʒij.

Extractum Sarsaparillæ Fluidum Compositum. U. S. *Compound Fluid Extract of Sarsaparilla.* This preparation contains all the ingredients of the compound decoction, except the guaiacum wood, and may be considered as representing that preparation in a concentrated state. Dose, fʒi.

ARALIA NUDICAULIS. *U. S. Sec.* The root of *Aralia nudicaulis*, commonly called *False Sarsaparilla*, or *small spikenard*, an indigenous, perennial plant, is thought to have an alterative influence analogous to that of the genuine sarsaparilla, and, in the form of infusion, is sometimes used in rheumatism and cutaneous diseases.

XANTHOXYLUM. *U. S. Sec.* The bark of *Xanthoxylum fraxineum*, *prickly ash*, a common indigenous shrub, is closely allied to mezereon in its physical and therapeutical properties. It is a powerful eliminant, exciting the whole secretory and excretory system, particularly that of the skin, and is extensively used in domestic practice in chronic rheumatism and secondary syphilis. It may be given in infusion, decoction, or fluid extract. *Xanthoxylin*, the oleoresin, prepared by exhausting the bark by alcohol and evaporating, may be given in doses of from 1 to 3 grains.

ASCLEPIAS. *U. S. Sec.* The root of *Asclepias tuberosa*, a small plant growing abundantly throughout the United States, and known in different localities as *butterfly-weed* or *pleurisy-root*. This root is a mild alterative tonic, acting with great certainty upon the skin, and possessing sedative properties which render it efficacious in affections of the serous membranes. It is extensively employed at the South in pulmonary affections, and in rheumatism where it is necessary to determine to the skin without exciting or heating the system. It may be given in infusion or decoction, or the resinoid principle, *asclepione*, to which it owes its remedial properties, may be given in doses of 2 or 3 grains.

LAPPA. *U. S. Sec.* The root of *Lappa minor*, *Burdock*, a native of Europe, and growing abundantly in the United States. This root, possessing diaphoretic without irritant properties, is never employed in practice; but the decoction is a popular diet drink in rheumatism and chronic cutaneous affections.

EXPECTORANTS.

EXPECTORANTS are medicines which increase the secretion from the bronchial tubes and air-passages, and promote its subsequent expulsion.

The mucous membrane lining the air-passages secretes a certain amount of mucus, which is necessary to enable the membrane to perform its function properly. From various causes this membrane becomes disordered, and its secretions become changed in quantity as well as quality. The object aimed at here in the treatment is to effect such a change in the disordered membrane as will restore its normal secretion. Besides, there are other disordered conditions of the respiratory organs; thus, morbid matters may be found in consequence of ulceration, the presence of softened tubercles, or of pus, as in abscess. In all these cases expectoration may require to be assisted. The prominent symptom in each of these morbid conditions is cough, which is a forcible expiration, and an attempt of nature to remove the offending cause from the larynx, trachea, or bronchia. Expectorants are here useful by aiding nature in removing the cause of the cough, and by modifying the pulmonary secretions, promoting them when deficient, and diminishing them when excessive.

They may be applied in various ways. By inhalation, they act directly on the mucous lining of the air-passages, and produce their effects by the changes which they thus occasion in it. By allowing them slowly to dissolve in the mouth and make an impression upon the fauces, which is transmitted to the mucous membrane of the trachea and bronchia. In this way demulcent articles act in allaying irritation and in favoring expectoration. Or they may act by being taken internally, and absorbed. These comprise medicines of very diversified characters. Thus, nauseants promote secretion and exhalation by their depressing influence, and are most appropriate in acute and inflammatory cases. Tonics and stimulants improve the general health, and thus tend to restore the secretion to a healthy condition, and are best adapted to old or chronic cases where there is deficiency

of power to expel the vitiated secretions. And the alkalies, from their property of rendering the fluids of the body more liquid, lessen the viscidity of the mucous secretion, and allow it to be more easily expelled from the air-passages.

Most agents used as expectorants are derived from other divisions of medicinal substances, and none are more uncertain in their effects. We shall mention those here which are most generally used for their expectorant properties.

The relaxing expectorants have been spoken of under the head of Arterial Sedatives and Emetics. The most important of these are tartar emetic and ipecacuanha. These prove useful, in minute doses, by relaxing the mucous membrane of the pulmonary organs, and thus promoting secretion and exhalation. They are usually given in combination, as additions to cough mixtures. Ipecacuanha is more commonly given in the form of syrup.

SCILLA. U. S. *Squill.*

The BULB of *Scilla maritima, Sea-onion,* a perennial plant, shooting from a large bulb with fibrous roots, growing native on the shores of the Mediterranean.

Properties. The bulb is pear-shaped, varying in size, composed of concentric fleshy scales, each of which is covered with a thin membranous coat. Two kinds are met with in commerce, the *white* and the *red,* which differ only in color. As found in the shops, it is usually cut into thin slices, of a dull yellowish-white color, flexible when moist, but brittle and pulverizable when dry, without odor, and of a bitter, acrid, and nauseous taste. It yields its virtues to water, alcohol, and vinegar. It contains an acrid resin, and a bitter principle, termed *scillitin.*

Medical Properties and Uses. Squill, in small doses, is expectorant and diuretic; in large doses, emetic; and in excessive doses, an acro-narcotic poison. As an expectorant, it is said to attenuate the mucus, and to excite a more copious secretion from the mucous follicles, thereby relieving congestion and dyspnœa; but it should never be employed in inflammatory cases. As a diuretic, it proves of the greatest service, in combination with other remedies, in dropsical diseases. As an emetic, its action is

too uncertain for general use, though it is occasionally used to excite nausea and emesis in hooping-cough and croup. Dose, from 1 to 2 grains, gradually increased till it evinces its action upon the lungs or kidneys. As an emetic, from 6 to 12 grains.

ACETUM SCILLÆ. U. S. *Vinegar of Squill.* (Four troyounces of squill to two pints of distilled vinegar.) This preparation possesses all the properties of the medicine, but is injured by keeping, and is chiefly used in the preparation of the syrup.

SYRUPUS SCILLÆ. U. S. *Syrup of Squill* (prepared by dissolving sugar in the vinegar of squill while hot) is much employed as an expectorant. Dose, f℥i to f℥ij; less for children.

SYRUPUS SCILLÆ COMPOSITUS. U. S. *Compound Syrup of Squill* contains squill, seneka, and one grain of tartar emetic in each ounce of syrup, and is intended as a substitute for *Coxe's hive syrup*, from which it differs in containing sugar instead of honey. It is emetic, diaphoretic, or expectorant, according to the dose. Dose for children, 10 drops to f℥i, according to age.

PILULÆ SCILLÆ COMPOSITÆ. U. S. *Compound Pills of Squill.* (These pills contain one part of squill, two parts, each, of ginger, ammonia, and soap, with sugar to form a pilular mass.) It is a stimulant expectorant compound, principally used in chronic bronchial affections. Dose, 5 to 10 grains.

TINCTURA SCILLÆ. U. S. *Tincture of Squill.* (Four troyounces to two pints of diluted alcohol.) Dose, 10 to 40 drops.

SENEGA. U. S. *Seneka.*

The ROOT of *Polygala Senega*, a hardy, perennial plant, native of North America, growing abundantly in the Southern and Western States.

Properties. The dried root varies in size from a quill to that of the little finger, is much contorted, marked with rough eminences, and with a projecting line extending the whole length of the root. The virtues reside in the cortical portion, which is thick, hard, and resinous; the central portion is white and inert. It has a faint odor, and a nauseous and acrid taste. The powder is grayish-yellow. Water and alcohol extract its virtues, which depend upon a peculiar principle, called *senegin*, or *polygalic acid*, a white substance, inodorous, and of a bitter, acrid taste.

Medical Properties and Uses. Senega is a stimulating expectorant, peculiarly adapted to the advanced stages of chronic bronchitis and of pneumonia, especially when occurring in the aged or debilitated, or when the inflammatory symptoms have subsided. In large doses it is emetic and cathartic. Dose of the powder, from 10 to 20 grains.

DECOCTUM SENEGÆ. U. S. *Decoction of Seneka.* (By boiling a troyounce of senega in a pint of water for ten minutes.) Dose, ℥ij.

SYRUPUS SENEGÆ. U. S. *Syrup of Seneka.* (Prepared by extracting the virtues of four troyounces of senega with two pints of diluted alcohol, and adding fifteen troyounces of sugar to make a syrup.) It affords a convenient mode of exhibiting senega in pectoral complaints. Dose, f℥i to f℥ij or more.

EXTRACTUM SENEGÆ ALCOHOLICUM. *Alcoholic Extract of Seneka.* Dose, 1 to 3 grains.

CIMICIFUGA. U. S. *Black Snake-root.*

The ROOT of *Cimicifuga racemosa*, sometimes called *Actea racemosa*, and commonly known as *Black Snake-root* or *Black Cohosh*, a tall, stately plant, growing throughout the United States.

Properties. The root consists of a thick, irregularly bent or contorted body, furnished with many slender radicles, of a dark-brown color externally, whitish internally, with a peculiar disagreeable odor, and a bitter, astringent taste, leaving a slight sense of acrimony. It imparts its virtues to water and alcohol. It contains a peculiar alkaloid principle, *cimicifugin*, a resin, and volatile oil.

Medical Properties and Uses. It is an alterative tonic and expectorant. It is much used in chronic affections of the pulmonary organs, and is especially serviceable in the severe and protracted cough of phthisis. Dr. Wood considers that it is useful in these affections by allaying irritation through its sedative properties. It has also been found useful in chorea, and some other nervous affections, and appears to be a remedy of value in acute and chronic rheumatism. Dose of the powdered root, from 20

to 40 grains; or it may be administered in infusion or tincture. An excellent cough syrup may be prepared by combining cimicifuga, senega, liquorice root, ipecacuanha, and wild cherry.

EXTRACTUM CIMICIFUGÆ FLUIDUM. U. S. *Fluid Extract of Cimicifuga.* Dose, 30 to 60 drops.

ALLIUM. U. S. *Garlic.*

The BULB of *Allium sativum, Garlic.* A perennial, bulbous plant, native of Italy and the south of France, but cultivated in all civilized countries.

Properties. The bulb is spherical, consisting of several small bulbs, called *cloves*, grouped together within a common membranous covering, of a dirty whitish color and withered aspect when dry. These small bulbs are of an oblong shape, somewhat curved, white and fleshy, with a strong, disagreeable, peculiar odor, and an acrid, pungent taste, which depend on a volatile oil.

Medical Properties and Uses. Garlic acts as a general stimulant and expectorant. It is most generally used internally for its expectorant properties in chronic catarrh and other pectoral affections of children, as well as in the nervous and spasmodic coughs to which patients of this class are liable. Externally applied, it is stimulant and rubefacient; and applied in the form of poultice, it acts as a revulsive in febrile diseases, quieting restlessness and producing sleep.

SYRUPUS ALLII. U. S. *Syrup of Garlic.* (Prepared by dissolving garlic in dilute acetic acid and adding sugar to form syrup.) Dose, f℥i.

Onion, the bulb of *Allium Cepa*, possesses similar properties. The juice, made into a syrup with sugar, forms an excellent expectorant in infantile catarrh and croup when inflammatory symptoms are absent.

BENZOINUM. U. S. *Benzoin.*

The CONCRETE JUICE of *Styrax Benzoin*, a large tree, native of Sumatra, Java, and other parts of the East Indies. It is procured by making incisions into the bark of the tree, and allowing the juice which exudes to concrete.

Properties. It occurs either in whitish tears, or masses consisting of aggregate tears, of a reddish-brown color externally, or in large blackish masses of a mottled appearance. It is brittle, has a resinous aspect and fracture, an agreeable, aromatic odor which is increased by rubbing, and a sweet, balsamic taste. It is soluble in alcohol and ether, and is precipitated from the solution by water. It is fusible and inflammable, exhaling pungent fumes when heated. It contains resin, volatile oil, and benzoic acid.

ACIDUM BENZOICUM. U. S. *Benzoic Acid*, also called *Flowers of Benzoin*, is procured from gum benzoin by sublimation, and occurs in white, feathery, acicular crystals, of a satiny appearance, having a faint, aromatic odor, and an acid, penetrating taste. It fuses at 248°, and volatilizes at 293°, producing white, suffocating vapors. It dissolves in twenty-five parts of boiling water, in two hundred parts of cold water, and in twice its weight of alcohol. It forms salts; but its acid powers are very feeble.

Medical Properties and Uses. Benzoic acid was formerly much used as a stimulating expectorant in old cases of bronchitis and in the advanced stages of phthisis, but at present is not much used, except as a constituent of paregoric. For its action in diminishing the tendency of uric acid calculus, see *Ammoniæ Benzoas.* Dose, 10 grains, in pill or emulsion.

TINCTURA BENZOINI COMPOSITA. U. S. *Compound Tincture of Benzoin* is prepared by dissolving three troyounces of benzoin, half a troyounce of aloes, two troyounces of storax, and a troyounce of Tolu in two pints of alcohol. It is sometimes used as a stimulating expectorant in old pectoral diseases, in doses of from 30 drops to f℥ij.

UNGUENTUM BENZOINI. U. S. *Ointment of Benzoin* is prepared by heating together a troyounce of benzoin and sixteen troyounces of lard. The benzoin seems to obviate the liability of the lard to become rancid, and hence this ointment is useful as a vehicle of medicines in this form.

BALSAMUM PERUVIANUM. U. S. *Balsam of Peru.*

The JUICE of *Myrospermum Peruiferum*, a lofty, handsome tree, native of the forests of Peru and the warmer regions of

South America. It is procured by making incisions into the bark of the tree.

Properties. It is a thick, semi-transparent liquid, becoming thicker on exposure, of a dark, reddish-brown color, with an agreeable, aromatic odor, and a pungent, bitter, and acrid taste. It is inflammable, burning with a bright flame, and giving off a dense, white smoke. It is insoluble in cold water, but soluble in alcohol. Its principal constituents are resin, a peculiar oil, and *cinnamic acid.*

Medical Properties and Uses. Balsam of Peru is a mild, stimulating expectorant, at one time much used in chronic bronchitis, in the advanced stages of phthisis, and in old asthmatic cases, but now seldom employed as an internal remedy. Dose, f℥ss, best administered in emulsion with sugar or gum arabic. Externally, in the form of ointment (℥i of balsam to ℥i of simple ointment), it is a mild stimulant application to indolent ulcers and to wounds in parts of inferior vitality, and often proves serviceable to sore or chapped nipples.

BALSAMUM TOLUTANUM. U. S. *Balsam of Tolu.*

The CONCRETE JUICE of *Myrospermum Toluiferum*, a tree growing upon the mountains of Tolu and in other districts of South America and Mexico.

Properties. It is in soft, tenacious masses of a resinous aspect, becoming more solid and brittle on exposure, of a reddish-yellow color, with a peculiar, fragrant odor, and a sweet, aromatic taste. Exposed to heat, it melts, and is inflammable, diffusing an agreeable odor while burning. It is soluble in alcohol, ether, and the volatile and fatty oils. It contains resin, volatile oil, and cinnamic acid.

Medical Properties and Uses. Balsam of Tolu is a stimulating expectorant, much employed, on account of its flavor, as an adjunct to cough syrups; but it is contraindicated in active inflammatory states of the lungs and air-passages.

TINCTURA TOLUTANA. U. S. *Tincture of Tolu* is prepared by dissolving three troyounces of the balsam of Tolu in two pints of alcohol. It is often employed in small quantities to flavor cough syrups and troches.

Syrupus Tolutanus. U. S. *Syrup of Tolu* may be prepared by first precipitating the resin from the tincture of Tolu by means of carbonate of magnesia, and then adding water and sugar to form a syrup. It is a pleasant ingredient of pectoral mixtures. Dose, f℥i to f℥ij.

STYRAX. U. S. *Storax.*

The prepared juice of *Liquidambar orientale*, the *Oriental sweet-gum*, a large tree, native of Asia Minor. It is obtained by expression from the inner bark of the tree.

Properties. There are several varieties of storax, but the one commonly used is a semi-transparent, semi-fluid resin, brown or blackish on the surface exposed to the air, but of a greenish-gray color within, of a fragrant odor and aromatic taste. It is soluble in alcohol and ether, and melts at a moderate heat. It contains resin, a volatile oil, and cinnamic acid.

Medical Properties and Uses. Storax is a stimulant expectorant, closely allied in its properties to benzoin and balsam of Tolu, but is now only used as a constituent of the compound tincture of benzoin.

EMMENAGOGUES.

Emmenagogues are medicines which excite or promote the functional action of the uterus, and tend to restore a healthy condition of the menstrual function.

As the retention or suppression of the catamenia may be occasioned by very different circumstances, no one agent can be expected to prove emmenagogue or to be applicable in every case: indeed, very opposite remedies are available in different instances. In most cases deficient menstruation is only a symptom of some derangement of the general health, and the function is to be restored by remedies which are employed with reference to this morbid condition. Aloes and purgatives, which act on the lower portion of the large intestines, operate by their stimulant action, being conveyed by sympathy to the contiguous uterus, and are adapted to cases where the suppression of the secretion depends upon congestion of the vessels of the uterus. Stimulating diuretics may also act by a kind of sympathy, and thus stimulate its

function. In amenorrhœa, coexisting with anæmia or debility, the preparations of iron are the most efficient remedies, and act by removing the cause, and restoring the deficient constituents in the blood. In hysterical cases the antispasmodics prove indirectly emmenagogue.

The term, however, is usually employed to designate those substances which are supposed to possess a direct action on the uterus and its appendages, so as to promote the menstrual discharge. The tonics, purgatives, and diuretics, which appear to possess special influence over this function, have already been referred to. Ergot, which has been by some classed among emmenagogues, rather promotes uterine contractions than the menstrual function, and is more properly classed among the spinal stimulants. Under this head we shall mention those only which are peculiarly emmenagogue without other properties.

SABINA. U. S. *Savine.*

The TOPS of *Juniperus Sabina*, an evergreen, bushy shrub, with tough, slender branches, closely invested with short, acute, imbricated leaves, growing in the south of Europe, and introduced into this country. It bears considerable resemblance to our common red cedar, the *Juniperus Virginiana*, the leaves of which are sometimes substituted for it.

Properties. The tops, consisting of the young branches with the attached leaves, when dried are yellowish-green, with a strong, disagreeable odor, and a hot, bitter, and acrid taste. Water and alcohol extract their virtues, which depend on a volatile oil.

OLEUM SABINÆ. U. S. *Oil of Savine* is obtained by distillation from the fresh plant, and is a limpid, colorless, or light-yellowish liquid, with the odor and taste of the plant.

Medical Properties and Uses. Savine and its oil are stimulants, and appear to act powerfully upon the uterus, and may be used as emmenagogues in cases in which the circulation is languid and unattended by fever. It is inadmissible in plethoric cases, and in overdoses acts as an irritant poison. Dose in powder, 5 to 15 grains, sometimes given in infusion. Dose of the oil, 1 to 5 drops.

Ceratum Sabinæ. U. S. *Savine Cerate* is prepared by evaporating the ethereal tincture of savine to the consistence of syrup and adding melted resin cerate. It is much used to keep up a discharge from blistered surfaces.

Ruta. *U. S. Secondary. Rue*, the leaves of *Ruta graveolens*, a hardy, evergreen under-shrub, native of the south of Europe, and cultivated in this country. It flowers during the whole summer, and is known by its strong, peculiar, and even fetid odor. It has a warm, bitter, and acrid taste. Water and alcohol extract its virtues, which reside in a volatile oil, separated by distillation with water. It is an active stimulant, and appears to act upon the uterus, in moderate doses proving emmenagogue, and in larger doses causing a degree of irritation in the organ which sometimes produces abortion. In large doses it acts as an acro-narcotic poison. It is little employed by regular practitioners, but is in much repute among empirics and in domestic practice. Dose of the powder, from 15 to 30 grains; is also given in infusion or extract.

Rubia. *U. S. Secondary. Madder* is the root of *Rubia tinctorum*, or *dyers' madder*, a herbaceous, perennial plant, native of the south of Europe, and extensively cultivated. The dried root, as found in commerce, is in long, cylindrical pieces, about the size of a goose-quill, of a reddish-brown color, having a strong, peculiar odor, and a bitter, astringent taste. It imparts its virtues to water and alcohol. It contains coloring matters, a saccharine substance, and some resin. The root is tonic, and has been used with advantage as an emmenagogue in amenorrhœa. It may be given in powder or in decoction. Dose of the powder, ʒss to ʒij.

Gossypii Radix. *U. S. Secondary. Cotton Root.* The root of *Gossypium herbaceum*, and of other species of *Gossypium*, natives of the tropical regions of Asia and America. The herbaceous parts of the plant contain much mucilage, and have been used as a demulcent. The seeds yield, by expression, an oil which is used in the arts. The roots are emmenagogue, and are much employed for this purpose in domestic practice throughout the Southern States. The cotton-wool, a filamentous substance separated from the seeds, forms an excellent

application to burns and scalds, and is recommended as a dressing to blisters when it is wished to heal them rapidly.

APIOL. APIOLIUM. The peculiar principle of the seeds of *Petroselinum sativum*, or *common parsley*, obtained by treating them with alcohol. It is a yellowish, oily-looking fluid, with a peculiar and tenacious odor and an acrid, piquant taste. It is soluble in alcohol, ether, and chloroform. In doses of from 8 to 15 drops, it is said to be the best and safest emmenagogue that can be employed. Waring states that "it is especially adapted for amenorrhœa and dysmenorrhœa, when they arise from a diminution, excess, or perversion of the vitality of the uterus, attended with local or general nervous symptoms." It should be administered when the menstrual discharge would be naturally expected to return, and continued for several days. It has also been supposed to possess antiperiodic properties similiar to those of quinia.

SIALOGOGUES.

This name is applied to medicines which increase the quantity or promote the excretion of the saliva. Those whose internal administration affects these organs through the medium of the circulation, of which mercury is the most important, are never given for this purpose expressly. The term is here applied to those substances which stimulate the excretory ducts by topical application to the secretory vessels. As they are generally chewed for this purpose, they are called MASTICATORIES. They are very seldom employed as remedial agents, as their therapeutical application is very limited.

They are sometimes useful in toothache, and are often beneficial in relieving congestions in remote parts of the head, by the depletion and revulsion they occasion from the neighboring vessels. They may also be employed as direct stimulants in paralytic affections of the tongue and throat, and to restore and maintain the cohesive power of the gums in a spongy state of these parts. By the superabundant discharge of the natural secretion which they cause, they diminish the quantity of the circulating fluid in a degree that entitles them to be called evac-

uants. Those ordinarily employed are mezereon and tobacco, which have been considered, and

PYRETHRUM. *U. S. Secondary. Pellitory.* The root of *Anacyclus Pyrethrum*, a small, perennial, herbaceous plant, a native of the countries bordering on the Mediterranean. The root is cylindrical or fusiform, about the thickness of the little finger, covered with a thick dark-brown bark studded with small, black, shining spots. It breaks with a resinous fracture, and presents a brownish-yellow internal surface. It is inodorous, and at first insipid, but afterward causes a hot, prickling sensation on the tongue and lips. It contains an acrid oleoresin, and a peculiar principle. When chewed, it acts as a local stimulant to the salivary glands, producing a copious secretion of saliva. For this purpose it is used in toothache, neuralgia of the face, and paralysis of the tongue. The dose, as a masticatory, is from 30 grains to a drachm.

ERRHINES.

ERRHINES are medicines which tend to increase the natural secretion from the mucous membrane of the nostrils. When they provoke sneezing, they are called STERNUTATORIES. All substances producing this effect are applied directly to the interior of the nostrils, and act by stimulating the secretory tissue. They may be used to promote secretion, and thus deplete the neighboring vessels; to relieve the organ of suppression of discharge; or to produce a revulsive influence on neighboring parts. They are principally employed for the relief of headache and a tendency to fullness of the head; sometimes they are used to provoke sneezing with a view to the expulsion of foreign bodies from the nasal cavities. Their medicinal employment, however, is very limited, and no substances are used exclusively for this purpose. Almost any acrid substance will stimulate the pituitary membrane and act as an errhine: ammonia, tobacco, turpeth mineral, hellebore, and sanguinaria may be employed for this purpose.

REMEDIES AFFECTING ORGANIZATION.

These are all external remedies, which act by irritating, inflaming, or destroying the part to which they are applied. When they operate so mildly as merely to excite the capillaries without occasioning the effusion of serum, they are called RUBEFACIENTS; but if, by increased strength or continued application, they excite the extreme vessels into such a state of inflammation as to terminate in the effusion of a serous fluid between the cuticle and the skin, they are called EPISPASTICS; if they destroy the texture of the part, they are termed ESCHAROTICS. The distinction between these classes is not very marked: thus, water of ammonia may act as a rubefacient, an epispastic, or an escharotic, according to its degree of strength; and most of the agents in one class may be so applied as to produce the characteristic effects of the others.

EPISPASTICS,

Also called VESICATORIES, or BLISTERS, are substances which, when applied to the skin, irritate it and occasion the effusion of a thin, serous fluid under the cuticle. The part to which they are applied undergoes all the changes of ordinary inflammation, with redness, heat, swelling, and pain, followed by an effusion of serum and consequent separation of the cuticle, forming a blister. On removing the epispastic and discharging the serum, the part, unless again irritated, soon heals, and in a few days is restored to its natural state.

They are employed for various purposes: 1. To establish a degree of irritation or inflammation on the surface, and thus cause a diversion of the circulation from the inflamed or engorged vessels of the neighboring organs, as in diseases of the heart, lungs, brain, and other important viscera. In these cases their stimulant effect should be considered, and their application avoided in the very acute stage of inflammatory diseases, or until the general excitement has been subdued. 2. To substitute a mild and easily managed disease for an internal and intractable

one. 3. To stimulate the absorbents, and thus cause evacuation of effused fluids. 4. To stimulate the whole system, and thus support the action of the heart and give energy to the nervous system, in cases where the vital powers are much depressed. In low fevers, where the capillary circulation is feeble, it is requisite to seize the proper period for the application of a blister, lest the blistered surface should degenerate into troublesome or gangrenous sores. 5. To relieve pain through the medium of sympathy. They are also applied to denude the cuticle, so as to apply medicines by the endermic method. They should be applied as near as possible to the morbid part, and must be used with great caution in children where there is great exhaustion and immediately after exanthematous diseases. Care is also necessary not to apply them where the skin is very tender and delicate, nor over a bony prominence, as the process of healing will be very slow and difficult. When it is desirable to keep up a discharge from a blistered surface for any length of time, the surface may be dressed with savine ointment or the ointment of Spanish flies. If much inflammation should take place, it may be relieved by emollient poultices; and when there is an indisposition to heal, nothing is so effectual as weak lead cerate.

CANTHARIS. U. S. *Cantharides.*

The *Spanish Fly*, or *Cantharis vesicatoria*, is an insect belonging to the beetle tribe, and is found adhering to the leaves of a number of trees and plants in the southern and temperate portions of Europe and Asia. They are collected by shaking them from the branches early in the morning, while they are yet torpid from the cold of the previous night.

Properties. The insect is from six to ten lines in length, and two or three in breadth, of a shining, golden-greenish color, and, when alive, has a fetid, penetrating odor. When dried, they retain this offensive odor, and have an acrid, burning taste. They yield a grayish-brown powder, interspersed with shining green particles. They contain a volatile, odorous oil, fatty matter, and a peculiar principle, termed *cantharidin*, to which their vesicating properties are due. This may be procured by evaporating the

ethereal tincture obtained by percolation, dissolving the residue in boiling alcohol, decolorizing with animal charcoal, and crystallizing. It is in small, crystalline, micaceous plates, inodorous and tasteless, insoluble in water and cold alcohol, but soluble in hot alcohol, ether, and oil. The powder soon undergoes putrefaction if exposed to a damp atmosphere: hence the flies should be kept whole, and powdered as needed for use. They are also liable to be attacked by mites, which destroy the interior soft part of the body, reducing them to powder.

Medical Properties and Uses. In small medicinal doses, cantharides are stimulant diuretic, and appear to exercise a peculiar action over the mucous membrane of the genito-urinary system. They seem to act as a tonic on these organs, and to arrest mucous discharges from them, and have been successfully used in leucorrhœa, chronic gonorrhœa, and all diseases of the bladder attended with want of tone and unaccompanied with inflammatory symptoms. In incontinence of urine in children, in paralysis of the bladder, they may be used with benefit. In large or poisonous doses, they cause violent inflammation of the mucous lining of the whole alimentary canal, and severe irritation and inflammation of the urinary organs, attended with strangury, micturition of blood, and sometimes suppression of urine. In these cases the poison should be removed from the stomach as speedily as possible, and bland and demulcent liquids freely administered. Cantharides are principally used as external agents, sometimes as stimulants, but more frequently as epispastics. Locally applied, they prove useful as a stimulant to promote the growth of the hair in baldness, and in falling off of the hair after debilitating diseases, and are sometimes added to liniments to excite the sensibility of the skin in numbness and paralysis, and also to produce local irritation in neuralgic and rheumatic pains. As vesicants they have no equal, whether for certainty of effect or facility of application. When applied to the skin, they raise a large blister, and cause more effusion than any other local irritant,—even than boiling water and steam.

Ceratum Cantharidis. U. S. *Cerate of Cantharides. Blistering Cerate.* (Prepared by adding twelve troyounces of powdered cantharides to seven troyounces of yellow wax and resin,

each, and ten troyounces of lard, melted together.) This is the ordinary blistering plaster of the shops, and is best applied by spreading it on adhesive plaster, and covering it with thin gauze, to prevent any of the cerate from adhering to the cuticle. The time required for it to produce vesication varies according to the part to which it is applied: from four to twelve hours is the time it usually takes to produce a complete blister. A poultice of bread and milk, or flaxseed meal, may be applied for a few hours, and the surface may then be dressed with simple cerate; or, if it be desirable to maintain the discharge for a short time, resin cerate may be used. In some constitutions it is apt to produce the irritant action of cantharides upon the urinary organs. In these cases demulcent fluids, or a decoction of uva ursi, will soon afford relief.

Various other preparations have been recommended as substitutes for the cerate. These consist of the active principle, cantharidin, dissolved in olive oil, or incorporated with wax, and spread upon cloth or paper, constituting the *blistering cloth* or *paper* of the shops.

Ceratum Extracti Cantharidis. U. S. *Cerate of Extract of Cantharides* is prepared by first obtaining an alcoholic extract of the flies, and mixing it with resin, wax, and lard, melted together. It may be used for the same purposes as the cerate of cantharides, but is more powerful.

Linimentum Cantharidis. U. S. *Liniment of Cantharides* is prepared by dissolving, with the aid of heat, a troyounce of powdered cantharides in half a pint of oil of turpentine. It is a powerful irritant, and may be used as an external stimulant in very urgent cases, but with caution, as it is liable to produce troublesome, if not dangerous, vesication. It may be diluted with olive oil, or added to other liniments.

Tinctura Cantharidis. U. S. *Tincture of Cantharides* (a troyounce of powdered cantharides to two pints of diluted alcohol) possesses all the virtues of the flies, and is the most convenient form for internal administration. It is also used externally as a vesicant, and as an addition to stimulating liniments. Dose, 15 to 30 minims, best administered in some demulcent liquid.

COLLODIUM CUM CANTHARIDE. U. S. *Collodion with Cantharides. Cantharidal Collodion.* The powdered flies are exhausted by ether and alcohol; the alcoholic solution is evaporated, and the two liquids are then mixed; gun-cotton, as prepared in the process for collodion, is then added, and the mixture agitated until it is dissolved. This is a very convenient epispastic, and affords a ready and convenient mode of blistering uneven or irregular surfaces. It may be applied by means of a camel's-hair pencil, and may be repeated without inconvenience, if the part has not received a sufficient coating.

There are several other species of Cantharis found in the United States, which are sometimes substituted for the officinal. The *Cantharis vittata*, or *potato fly*, is the most common. This is smaller than the *C. vesicatoria*, but resembles it in shape, and contains cantharidin. The *C. Nuttalli*, a large and beautiful insect of Missouri, and the *C. albida*, another large species, found near the Rocky Mountains, are said to possess vesicating properties quite equal to those of the Spanish fly.

RUBEFACIENTS.

RUBEFACIENTS are substances which simply irritate or inflame the part to which they are applied, without producing vesication. The principles of their operation are the same as those of epispastics, and they are employed where the object is to make a rapid and powerful but transient impression, as in sudden or extreme cases. Where a permanent effect is desired, blisters are preferred. Capsicum and oil of turpentine, which have been noticed as arterial stimulants, are excellent rubefacients, acting rapidly and efficiently on the skin. The turpentine may be applied in low states of fever, and is much used as an application over the whole abdomen, in puerperal and typhoid fevers. It may be used either as a lotion, or applied on flannel saturated with it and laid closely upon the part.

SINAPIS. U. S. *Mustard.*

The SEEDS of *Sinapis nigra* and *Sinapis alba, Black* and *White Mustard*, small, annual plants, natives of Europe, but cultivated in our gardens.

Properties. Black mustard seeds are small, globular, rugose, of a deep-brown color, inodorous when whole, but exhaling a strong, pungent odor when crushed, with a hot, bitter taste. *White mustard seeds* are larger, of a yellowish color and a less pungent taste. These seeds ground and sifted constitute the flour of mustard, or mustard of the shops. This is a greenish-yellow powder, with an acrid, burning taste, and a strong, penetrating odor, which is much increased by moistening it. It is liable to adulteration with flour and various other farinas, and is sometimes colored with turmeric. The seeds contain a fixed oil, which may be obtained by expression. The black mustard seeds contain a peculiar principle, *myrosyne*, analogous to vegetable albumen, and *myronate of potassa*, a bitter, inodorous substance. On distillation with water it yields a pungent, volatile oil, which does not pre-exist in the seeds, but is developed on the addition of water, by the mutual reaction between the water, the myrosyne, and the myronate of potassa. This is colorless, of a pale-yellow color, with a penetrating odor, and an acrid, burning taste.

Medical Properties and Uses. Mustard, in small doses, is stimulant, and is much used as a condiment to increase the appetite and to improve the tone of the digestive organs. In large doses, from 1 to 3 teaspoonfuls, it acts as a powerful stimulating emetic, and may be employed where the sensibility of the stomach is impaired, as in cases of narcotic poisoning, apoplexy, etc. Externally, it is irritant, and, if left in contact with the skin, causes vesication. It is much employed in the form of poultice, called *sinapism*, made by mixing mustard to the consistence of a poultice with water or vinegar, to produce counter-irritation, or when a speedy and powerful rubefacient impression is desired. The length of time during which the sinapism should be left on may be regulated by the feelings of the patient; but in cases of insensibility it should be removed as soon as the skin is reddened.

AMMONIA.

Ammonia is a peculiar gaseous substance, composed of nitrogen and hydrogen, and easily obtained by the action of lime on muriate of ammonia; the lime unites with the muriatic acid, and sets free the ammonia in the form of gas. This is passed by suitable contrivances into water, which absorbs it.

Aqua Ammoniæ Fortior. U. S. *Stronger Water of Ammonia.* An aqueous solution of ammonia, of the sp. gr. 0·900, and containing 26 per cent. of the gas.

Aqua Ammoniæ. U. S. *Water of Ammonia.* The above reduced by water to sp. gr. 0·960, and containing about 10 per cent. of ammonia.

Properties. Solution of ammonia is a transparent, colorless liquid, of an acrid, alkaline taste, and a strong, pungent, ammoniacal odor. It is very strongly alkaline, and when exposed to the air quickly parts with ammonia, and also absorbs carbonic acid. It unites with oils to form soaps or liniments. It is incompatible with acids, and decomposes most earthy and metallic salts, throwing down their oxides.

Medical Properties and Uses. The solution is rarely given internally, the spiritus ammoniæ being preferred for internal use. The vapor, when inhaled, is powerfully irritant to the mucous membrane of the air-passages, and proves an excellent stimulant in syncope, in hysteria, and in collapse. It is also an antidote to poisoning by hydrocyanic acid and other sedative poisons. Externally applied, it is a valuable and efficacious rubefacient, and if applied of full strength and long continued, produces vesication. It may be employed in the way of friction, and for this purpose is usually united with oils to form liniments.

Linimentum Ammoniæ. U. S. *Volatile Liniment,* prepared by mixing one part of solution of ammonia with three parts of olive oil, is an excellent rubefacient, much employed as a counter-irritant in neuralgia, chronic rheumatism, and other local inflammations without fever. It may be applied by rubbing it gently on the skin, or placing a piece of flannel, saturated with it, over the affected part. Where the parts are very tender, it may be diluted with oil.

PIX BURGUNDICA. U. S. *Burgundy Pitch.*

The PREPARED CONCRETE JUICE of *Abies excelsa*, the *Norway Spruce*, a large tree, native of the mountainous districts of Northern Europe and Asia. The pitch is prepared by removing the juice which concretes upon the bark, and purifying it by melting and straining.

Properties. When pure, it is hard and brittle, opaque, of a brownish-yellow color, and feeble, terebinthinate odor and taste. It is very fusible, and at a moderate temperature becomes soft and adhesive.

Medical Properties and Uses. Burgundy pitch is employed only as a plaster, and as such acts as a gentle rubefacient. Applied to the chest, it often proves highly serviceable in chronic bronchitis and other pulmonary affections, not only as a counter-irritant, but by protecting the chest from feeling the atmospheric changes.

EMPLASTRUM PICIS BURGUNDICÆ. U. S. *Burgundy Pitch Plaster* is prepared by melting together twelve parts of Burgundy pitch and one part of yellow wax, which is used to give consistency to the pitch.

EMPLASTRUM PICIS CUM CANTHARIDE. U. S. *Plaster of Pitch with Spanish Flies. Warming Plaster* is composed of twelve parts of Burgundy pitch and four parts of cerate of cantharides, and is an excellent rubefacient, much employed in various chronic diseases.

PIX CANADENSIS. U. S. *Canada Pitch.*

The PREPARED CONCRETE JUICE of *Abies Canadensis*, the *Hemlock Spruce* of the United States and Canada. The bark of the full-grown trees is boiled in water, and the pitch, which rises to the surface, is skimmed off and purified by melting and straining.

Properties. It is hard, brittle, of a dark yellowish-brown color, a weak, peculiar odor, and no taste. It contains resin and a small proportion of volatile oil.

Medical Properties and Uses. It is a gentle rubefacient, analogous to Burgundy pitch in its medicinal effects.

Emplastrum Picis Canadensis. U. S. *Canada Pitch Plaster* is prepared by melting together twelve parts of Canada pitch and one of yellow wax.

ESCHAROTICS.

These are topical agents, which destroy the tissue of the part to which they are applied: those which act dynamically, by directly destroying the vitality of a part, are *actual cauteries*, as heated iron, moxa, etc.; those which act by virtue of their chemical affinities for one or more constituents of the tissue, and thus decompose it, are *caustics*. They are employed to remove excrescences or morbid growths of various kinds; to open abscesses; to form artificial ulcers or issues; to alter the nature of morbid action in diseased surfaces; and to decompose or destroy parts infected with poison. For these purposes various substances are used, which differ in strength and specific effects; many of them have already been referred to under other heads, as the *Mineral Acids*, *Sulphate of Copper*, *Arsenious Acid*, and *Corrosive Sublimate*. In the selection of a caustic we must be guided by the circumstances of the case, and the effects we intend to produce. The mineral acids, in their concentrated state, act as caustics by virtue of their affinity for the water of the tissues; of these, nitric acid is the most energetic, and is used where an immediate destruction of diseased parts is required. Arsenious acid was at one time much employed, especially in cancer, but is rarely used in the present day, since alarming consequences may result from its absorption. *Dupuytren's powder*, which obtained so much celebrity as a local application in this and other malignant ulcerations, was a composition of four parts of arsenious acid and ninety-six parts of calomel.

POTASSA. U. S. *Caustic Potassa.*

Potassa is procured by evaporating solution of potassa until ebullition ceases, and pouring it into moulds to concrete.

Properties. It is met with in sticks, having a fibrous fracture; when perfectly pure, white and translucent, but as usually found in the shops, of a grayish or bluish tint; very deliquescent, and

readily attracting carbonic acid. Composition, KO,HO. A hydrate of potassa.

Medical Properties and Uses. It is a powerful escharotic, quickly destroying the vitality of the part to which it is applied, and extending its action to a considerable depth below the surface. It is much used for forming issues, and for opening abscesses.

POTASSA CUM CALCE. U. S. *Potassa with Lime*, sometimes called *Vienna Caustic*, is prepared by rubbing together equal parts of potassa and lime. It is a grayish-white powder, and for use may be made into a paste with a little alcohol. The presence of the lime renders it milder and slower in its operation, and it is much more manageable than the pure potassa.

ARGENTI NITRAS FUSA. U. S. *Fused Nitrate of Silver.*

This is obtained by melting the nitrate of silver and pouring it into silver moulds, and is commonly known as *Lunar Caustic.*

Properties. It is in the form of hard, brittle sticks, about the size of a goose-quill, at first translucent, but becoming more or less dark on exposure to light. Its chemical properties are the same as those of the crystallized nitrate, referred to under the head of Tonics.

Medical Properties and Uses. It acts as a stimulant vesicant or escharotic, according as it is used dissolved in water or in the solid state. Applied to the denuded cuticle, or to a mucous membrane, it first produces a white color, owing to its union with the albumen and fibrin of the tissues, which soon becomes grayish, and, if exposed to light, finally black. It is much more frequently employed than any other caustic, on account of its mild and effectual action, for removing warts and other morbid excrescences, to check hemorrhage from small vessels, and to repress exuberant granulations upon sores. It establishes a healthy surface and promotes cicatrization in relaxed and flabby ulcers, and its efficacy in these cases depends not so much on its corrosive action as on its causing increased absorption and altered action. To primary chancres it is one of the best local applications, and applied freely to the whole surface it frequently destroys the character of, and checks, the disease;

indeed, in all sores about the prepuce or glans penis, whether of syphilitic origin or not, its application is for the most part beneficial. Applied to the sound skin, so as to encircle the inflamed part, it tends to arrest the spread of erysipelas and erythema. It has also been proposed as a means of preventing the pitting in small-pox. It is employed with benefit in many forms of ulceration of the mouth and fauces, in excoriations of the nipples, in the chronic stages of many cutaneous diseases, and as an injection in leucorrhœa and gonorrhœa. It is often valuable in ulcerations of the cornea, in purulent and gonorrhœal ophthalmia, and in acute and chronic conjunctivitis. The strength of the solution varies according to the indication to be fulfilled and the part to which it is to be applied, from $\frac{1}{4}$ of a grain to 40 grains, to the f$\overline{3}$ of water.

ZINCI CHLORIDUM. U. S. *Chloride of Zinc.*

This salt is formed by dissolving metallic zinc in diluted muriatic acid. It may be freed from any iron which may have existed in the zinc by adding a small quantity of nitric acid and chalk. The iron is peroxidated by the nitric acid, and separated by the chalk.

Properties. It occurs in grayish-white, translucent masses, without odor, but with a sharp, styptic, metallic taste. It is very deliquescent, and soluble in water, alcohol, and ether. Composition, ZnCl.

Medical Properties and Uses. In small doses it possesses the tonic and antispasmodic properties of the salts of zinc, and has been used in epilepsy, chorea, and other nervous diseases; but its irritant qualities render it unsafe. It is chiefly used externally, as an escharotic in cancerous affections and in intractable ulcers. It not only destroys the diseased structure, but excites a new action in the surrounding parts. From its deliquescent nature, it cannot be used alone, but is usually made into a paste with flour, and allowed to remain on the part for a short time, when it is washed off, and a poultice applied.

LIQUOR HYDRARGYRI NITRATIS. U. S. *Solution of Nitrate of Mercury.*

The *Acid Solution of Nitrate of Mercury* is prepared by dissolving mercury in nitric acid diluted with water with the aid of heat. The mercury is oxidized at the expense of part of the nitric acid, and the oxide of mercury thus formed is dissolved in the remainder. It is a solution of the binitrate of deutoxide of mercury in nitric acid.

Properties. It is a dense, transparent, and colorless liquid, of a strongly acid taste. Sp. gr. 2·165.

Medical Properties and Uses. It is a powerful escharotic and caustic, and has been employed in cancerous and malignant ulcerations. It is too powerful for ordinary purposes.

ACIDUM CHROMICUM. U. S. *Chromic Acid.*

This acid is obtained by the action of sulphuric acid upon bichromate of potash in solution. The acid unites with the potash and sets free the chromic acid, which is deposited in crystals.

Properties. It is in the form of brilliant crimson prisms, of an acid, metallic taste, very deliquescent, and readily soluble in water, forming an orange-yellow solution. Composition, CrO_3. Teroxide of chromium.

Medical Properties and Uses. Chromic acid is a powerful escharotic, oxidizing and decomposing the tissues, and well suited to the destruction of morbid growths. Its action is exceedingly slow and gradual, but deeply penetrating, and gives less pain than other caustics. It may be used in solution, graduated according to the degree of effect desired.

POTASSÆ BICHROMAS. U. S. *Bichromate of Potassa.*

This salt is prepared by acidulating a solution of yellow chromate of potassa with sulphuric acid, and allowing the solution to crystallize by spontaneous evaporation. The neutral chromate of

potassa is obtained by igniting chrome-iron ore with nitrate of potassa and lixiviating the resulting mass with water.

Properties. Bichromate of potassa occurs in orange-red, prismatic crystals, soluble in water, but insoluble in alcohol. Composition, $KO,2CrO_3$.

Medical Properties and Uses. In small doses, alterative; in larger doses, emetic; and in overdoses, a corrosive poison. Externally applied, it is irritant and caustic, and is sometimes applied to syphilitic warts and excrescences.

REMEDIES WHICH ACT MECHANICALLY.

DEMULCENTS.

Demulcents, or Lenitives, are medicines which soften and relax the tissues to which they are applied. They generally consist of gum, or a mixture of gummy with saccharine and farinaceous substances, and form with water a viscid solution. Most of them are nutritious, and may be used as articles of diet in debilitated or irritated conditions of the stomach or alimentary canal, when more exciting articles cannot be taken.

They may be used to sheathe and protect the gastro-enteric surface; to relieve irritation and inflammation of the alimentary canal; to diminish the acridity of the secretions in affections of the urinary passages; as mild expectorants in catarrhal affections, and as agreeable drinks in febrile diseases.

Externally, they are used to soothe inflamed surfaces, to protect parts from the action of irritating discharges, and as poultices to promote suppuration. They are also much used for pharmaceutical purposes to suspend medicines insoluble in water.

ACACIA. U. S. *Gum Arabic.*

The concrete juice of *Acacia vera, A. Arabica,* and other species of *Acacia,* prickly trees or shrubs, natives of Africa and

Arabia. The gum exudes spontaneously from the bark, or from incisions made to facilitate its exudation, and hardens on exposure.

Properties. Gum arabic is in roundish tears, or amorphous pieces, or irregular fragments of various sizes, more or less transparent, or of a yellowish-white color, hard and brittle, breaking with a shining fracture, and readily pulverizable, yielding a pure white powder. It is inodorous, and has a mucilaginous, slightly sweetish taste. It is insoluble in alcohol, ether, and the oils, but dissolves in water, forming a viscid solution, called *mucilage.* It consists essentially of a peculiar principle called *gum,* but for which the name of *arabin* has been adopted.

Several varieties of gum are met with in commerce: the most common are Turkey, Barbary, Senegal, East India, and Cape gum. The Turkey is the purest and the most esteemed. The other varieties are usually in larger-sized pieces, of a darker color, less brittle, and of a much inferior quality. The finer varieties are liable to be adulterated with the inferior, and these again with the cheaper and more common gums; but the picked gum should alone be used in medicine.

Medical Properties and Uses. Gum arabic is nutritive and demulcent. It is employed in solution to sheathe and protect the surface in inflammations of the mucous membranes, in gastric irritation, in acrid poisoning, etc. Allowed to dissolve slowly in the mouth, it often affords relief in cough. Its chief use, however, is as a vehicle for the administration of more active medicines, for suspending insoluble substances in water, and as a basis for pills.

Mucilago Acaciæ. U. S. *Mucilage of Gum Arabic* is prepared by rubbing up powdered gum arabic with water, in the proportion of half an ounce to an ounce. By keeping it becomes sour: it should therefore be prepared only in small quantities. Half a fluidounce is usually sufficient for a six- or eight-ounce mixture.

Syrupus Acaciæ. U. S. *Syrup of Gum Arabic* is prepared by dissolving two troyounces of gum arabic in half a pint of water, and then dissolving fourteen troyounces of sugar with a gentle heat. This syrup is a good demulcent, and a convenient vehicle for the administration of other medicines.

TRAGACANTHA. U. S. *Tragacanth.*

The CONCRETE JUICE of *Astragalus verus*, and of other species of *Astragalus*, an extensive genus of small, herbaceous, perennial plants, natives of Asia. The gum exudes spontaneously from the stems and branches, and is collected when dry.

Properties. Tragacanth is in small, wrinkled, leaf-like pieces, of a whitish or yellowish-white color, semi-transparent, and resembling horn in appearance. It is inodorous, with a slightly viscid taste, very hard and fragile, but is with difficulty reduced to powder, unless thoroughly dried and powdered in a heated mortar. It does not dissolve in water like gum arabic, but absorbs a certain proportion of that liquid, swells up, and forms a soft, tenacious mass, which may be mechanically mixed with water. It is wholly insoluble in alcohol. It consists of two gums, one soluble in water, like *arabin*, the other insoluble, called *tragacanthin*, and a small quantity of insoluble *starch*.

Medical Properties and Uses. It is demulcent, but is not much used internally, on account of its difficult solubility. It is extensively employed in the preparation of troches, for which its great tenacity and imperfect solubility render it very useful.

MUCILAGO TRAGACANTHÆ. U. S. *Mucilage of Tragacanth* is prepared by macerating a troyounce of tragacanth in a pint of boiling water, triturating, and expressing through linen. This mucilage is very thick and viscid, and is chiefly used in making pills or troches, or for the suspension of heavy, insoluble substances in water.

ULMUS FULVA. U. S. *Slippery Elm Bark.*

The INNER BARK of *Ulmus fulva*, the *Slippery Elm*, called also *Red Elm*, a large, indigenous tree, growing most abundantly west of the Alleghany Mountains.

Properties. The part used in medicine is the inner bark, from which the epidermis has been removed. It is met with in long, flat pieces, of a fibrous texture, a peculiar sweetish odor, and a highly mucilaginous taste when chewed. It abounds in muci-

laginous matter, which readily dissolves in water, forming an insipid, mucilaginous fluid.

Medical Properties and Uses. Slippery elm bark is an excellent demulcent and nutritive, and is applicable to all cases in which this class of medicines is employed. Externally, in the form of infusion, it is employed in inflammation of the skin, as in erysipelas, etc. The powder, mixed with water, is frequently employed as a poultice in cases of external inflammation.

MUCILAGO ULMI. U. S. *Mucilage of Slippery Elm Bark* is prepared by macerating a troyounce of bruised slippery elm bark in a pint of boiling water. This is more properly an infusion, and may be used freely as a drink in catarrhal and nephritic diseases.

LINUM. U. S. *Flaxseed.*

The SEEDS of *Linum usitatissimum*, the *Common Flax*, an annual plant, cultivated in all parts of the world.

Properties. The seeds are oval, oblong, about a line in length, pointed, smooth and shining, reddish-brown externally, and whitish within. They are inodorous, and have an oily, mucilaginous taste. Their investing coat abounds in a peculiar gummy matter, or mucilage, which is readily imparted to hot water, and the interior, or nucleus, is rich in a peculiar oil, which is separated by expression.

Medical Properties and Uses. Flaxseed is an excellent demulcent and emollient, and in the form of infusion, known as *flaxseed tea*, is much employed as a drink in inflammatory affections of the mucous membranes of the lungs and urinary passages.

INFUSUM LINI COMPOSITUM. U. S. *Compound Infusion of Flaxseed* is prepared by macerating half a troyounce of flaxseed and two drachms of bruised liquorice root in a pint of boiling water.

LINI FARINA. U. S. *Flaxseed Meal. Linseed Meal.* The ground seeds are of a dark-gray color, highly oleaginous, and when mixed with hot water form a soft, adhesive mass, much used as an emollient poultice to relieve inflammation or to promote suppuration.

OLEUM LINI. U. S. *Flaxseed* or *Linseed Oil* is obtained from

the seeds by expression. It has a yellowish-brown color, a disagreeable odor, and a nauseous, somewhat acrid taste. It possesses the property of drying, or becoming solid on exposure to the air, and hence is much used in painting and the formation of printers' ink. Mixed with lime-water, it is used as an application to recent burns.

GLYCYRRHIZA. U. S. *Liquorice Root.*

The ROOT of *Glycyrrhiza glabra*, a small, perennial plant, growing in the south of Europe, where it is also extensively cultivated as an article of commerce.

Properties. The root is dug up when the plant is about three years old. As met with, it is in long and flexible cylindrical pieces, about the size of the little finger, externally of a brownish color, and yellow within. It is inodorous, and has a sweet, mucilaginous taste, mingled with a slight degree of bitterness. The powder is of a grayish-yellow color. It contains starch and a peculiar saccharine principle, *glycyrrhizin*, scarcely soluble in cold water, but readily so in boiling water, and differing from sugar in not undergoing vinous fermentation, and in not yielding oxalic acid by the action of nitric acid.

Medical Properties and Uses. Liquorice root is an excellent demulcent, chiefly employed in the form of extract or decoction in catarrhal affections. It is also employed as an addition to other medicines in decoction, to give them flavor and render them more acceptable to the stomach. The powder is much used in pharmacy in the preparation of pills, either to give them due consistence, or to prevent them from adhering together.

EXTRACTUM GLYCYRRHIZÆ. U. S. *Liquorice* is prepared by evaporating a decoction of the dried root to the proper consistence. It is then formed into rolls from five to six inches long by an inch in diameter, which are dried in the air, and wrapped in laurel leaves. When good, it is black, dry, and brittle, breaking with a shining fracture, and of a sweet, slightly acrid taste. As the commercial liquorice contains many impurities, it requires to be purified for use. This is done by dissolving in water without boiling, straining, and evaporating, making what is known in

the shops as *refined liquorice.* It is much used as an addition to cough mixtures, and is frequently added to infusions and decoctions to cover the taste or obtund the acrimony of the principal medicine. Allowed to dissolve slowly in the mouth, it often allays cough by sheathing the irritated membrane of the fauces.

Mistura Glycyrrhizæ Composita. U. S. *Compound Mixture of Liquorice. Brown Mixture* is prepared by rubbing half a troyounce, each, of liquorice, sugar, and gum arabic with twelve fluidounces of water, and then adding two fluidounces of paregoric, and half a fluidounce, each, of wine of antimony and spirit of nitrous ether. This is an excellent cough mixture, much employed in the advanced stages of catarrhal affections after expectoration has become established. Dose, a tablespoonful for an adult; a teaspoonful for a child two years old.

Trochisci Glycyrrhizæ et Opii. U. S. *Troches of Liquorice and Opium* are prepared by rubbing together half a troyounce of opium and ten troyounces, each, of liquorice, sugar, and gum arabic, and then adding a fluidrachm of oil of anise, and water sufficient to make a mass; to be divided into lozenges, each weighing six grains. Each lozenge contains about one-tenth of a grain of opium. They are demulcent and anodyne, and useful in allaying cough in cases which admit the employment of opium.

CETRARIA. U. S. *Iceland Moss.*

Cetraria Islandica, a small plant, belonging to the natural order of Lichens, from two to four inches high, native of the dry mountainous districts of the northern parts of both hemispheres.

Properties. As met with in the shops, Iceland moss consists of the dry frond, or leaf, much divided, irregular in shape, and fringed at the edges with rigid hairs, of a grayish, brownish-white or reddish color, inodorous, and with a mucilaginous, somewhat bitter taste. It contains about 80 per cent. of amylaceous matter, 3 per cent. of a peculiar bitter principle, *cetrarin*, with a little gum, uncrystallizable sugar, and extractive. Cetrarin is an acid principle residing in the cortical portion of the thallus, and may be separated by maceration in a weak solution of car-

bonate of soda, which leaves behind the demulcent and nutritive principle. It imparts all its virtues to boiling water.

Medical Properties and Uses. Cetraria is a mild, nutritive demulcent and tonic, well adapted to pulmonary affections. It is very much used, in the form of jelly, as an article of diet in diseases of debility, and in convalescence from acute diseases.

Decoctum Cetrariæ. U. S. *Decoction of Iceland Moss* is prepared by boiling half a troyounce of Iceland moss in a pint of water for fifteen minutes, and straining with compression.

CHONDRUS. U. S. *Irish Moss.*

Irish Moss, or *Carrageen*, consists of the flat, slender frond of *Chondrus crispus*, a marine plant found on the coast of England and Ireland.

Properties. When fresh, it is of a purplish color, but as found in the shops it is of a yellowish-white color, tough, and partially translucent, with a marine odor, and but little taste. It resembles Iceland moss in most of its properties, but is more mucilaginous and less bitter. It swells and softens in cold water, but does not dissolve; boiling water dissolves a large proportion of it, and the decoction forms, when cold, a clear and colorless jelly.

Medical Properties and Uses. Carrageen is an agreeable, nutritive demulcent, useful in intestinal diseases and pectoral affections. It is best given in the form of decoction or jelly.

ALTHÆA. U. S. *Marshmallow.*

The root of *Althæa officinalis*, an herbaceous, perennial European plant, occasionally found in this country. The roots should be collected in autumn from plants at least two years old, and as prepared for the market are destitute of epidermis.

Properties. As met with, it is in cylindrical pieces, three or four inches in length, with a fibrous fracture, of a whitish color, destitute of smell, and of a viscid, mucilaginous taste. It contains a large amount of mucilage, with starch, and a peculiar principle, *asparagin*, which it readily yields to boiling water.

Medical Properties and Uses. Exclusively those of a demulcent, and used in the form of decoction or syrup.

MARANTA. U. S. *Arrow-root.*

The fecula of the root of *Maranta arundinacea*, a perennial plant, native of South America and the West Indies, but extensively cultivated in the Southern States. The root is white, tuberous, and jointed, running horizontally in the ground, sending down many tuberous rootlets, about the thickness of a quill. These tubers are dug up when about a year old, washed, and beaten in a wooden mortar to a pulp. This is then thrown into water, and well stirred, for the purpose of separating the amylaceous matter from the fibrous part. The fibrous portion is then removed, and the milky liquor which remains is strained, and deposits a white mass, which, when washed and dried, constitutes the arrow-root of commerce.

Properties. It is in the form of a white powder, or small, irregular, granular masses, which produce a crackling sound when rubbed between the fingers. It has no odor or taste, is insoluble in water, but forms with boiling water a consistent jelly. Examined under the microscope, it is found to consist of very minute, ovate-oblong or irregularly convex grains, with very fine rings, a circular hilum, which cracks in a stellate manner, and occasionally with small mammillary processes projecting from them. It is sometimes adulterated with common starch or potato starch, which may be detected by the microscope.

Medical Properties and Uses. Arrow-root is a valuable nutritive and demulcent, much used as an article of diet for the sick and convalescent, and as food for infants after weaning or when the mother's milk is insufficient. A tablespoonful may be made into a paste with a little cold water, and a pint of boiling water then gradually added, with brisk agitation. This may be made palatable by flavoring it with sugar, lemon juice, etc. It may be prepared in the same way with milk.

CANNA. U. S. *Canna.* The fecula prepared from the rhizoma of an undetermined species of *canna*, and commonly known as *tous-les-mois.* It is obtained from the tubers in the same manner as the arrow-root, and has the ordinary chemical properties of starch. It may be employed and prepared in the same way as arrow-root.

TAPIOCA. U. S. *Tapioca.*

The fecula of the root of *Janipha Manihot*, a shrub from six to eight feet high, with a large, fleshy, tuberous root, native of Brazil, and extensively cultivated in the West Indies, where it is known as the *cassava plant.* There are two varieties, the *sweet* and the *bitter;* the root of the latter contains an acrid, milky juice, which renders it highly poisonous if eaten in the recent state. The tapioca is obtained from the expressed juice, which deposits it on standing, and it is freed from the poisonous juice by repeated washings, and then dried by exposure to heat.

Properties. Tapioca occurs in irregular-shaped, hard, white, rough grains, inodorous and tasteless, partially soluble in cold water. This solubility is owing to the rupture of the starch-granules by heat.

Medical Properties and Uses. Precisely similar to those of arrow-root. It is prepared by boiling it in water or milk.

SAGO. U. S. *Sago.*

The prepared fecula of the pith of *Sagus Rumphii*, the *Sago Palm*, and of other species of *Sagus*, large trees growing in the East India Islands. The pith is reduced to powder, and the fecula separated from the woody fibre by repeated washings with water over a fine sieve, when the milky liquor which passes through deposits the sago in the form of a fine powder, which is dried and moulded into whatever shape may be desired. Commercial sago is prepared by forming the meal into a paste with water, and rubbing it into grains, and the natives refine it so as to give the grains a fine pearly lustre.

Properties. Pearl Sago, which is the most esteemed, is in globular grains, about the size of a pin's head, hard, of a whitish or pinkish-white color, inodorous, and with but little taste. *Common Sago* is in larger, more irregularly-rounded grains, of a browner color, and frequently mixed with a dirty-looking powder.

In its chemical properties sago resembles starch; is insoluble in cold water, but by long boiling forms a gelatinous solution.

Medical Properties and Uses. Sago is demulcent and nutritious, and is used almost exclusively as an article of diet in febrile diseases and in convalescence from acute disorders.

HORDEUM. U. S. *Barley.*

Pearl Barley. The decorticated seed of *Hordeum distichon, Common Barley*, cultivated in different parts of the world. The seed, after being deprived of its husk, is rounded and polished in a mill.

Properties. It is in small, spherical grains, white, smooth, retaining a trace of the longitudinal furrow of the seed, without odor, and of a mild, sweetish, mucilaginous taste. It contains starch, with some sugar, gluten, and gum.

Medical Properties and Uses. Barley is one of the mildest and least irritating of all the farinaceous substances, and is much used, in the form of decoction, as a demulcent drink in febrile and inflammatory affections, and as a vehicle for other remedies.

Decoctum Hordei. U. S. *Decoction of Barley. Barley Water* is prepared by boiling two troyounces of barley with water for a short time, and, after thowing away the resulting liquid, pouring on it four pints of boiling water, and boiling down to two pints.

Malt consists of the seeds made to germinate by warmth and moisture, and then baked so as to deprive them of vitality.

AMYLUM. U. S. *Starch.*

The fecula of the seed of *Triticum vulgare, Common Wheat.* Starch is a proximate principle abounding in the various grains and tuberous roots, constituting a large portion of the vegetable food consumed by animals. The starch of commerce is prepared by washing coarsely bruised wheat, straining or pouring off the liquid, and allowing it to stand till the fecula, which it holds in solution, has subsided.

Properties. Starch usually occurs in small, white, pulverulent masses, having a crystalline aspect, unalterable in the air, crackling under the fingers when lightly pressed, inodorous and insipid. It is insoluble in alcohol, ether, and in cold water; but

unites with boiling water, forming with it an opaque jelly, which becomes more consistent as it cools. Starch is composed of an external tegumentary portion, termed *amylin*, and an interior mucilaginous portion, called *amidin*. With a cooled decoction of starch iodine forms a rich-blue color, which varies in intensity as the iodine or the starch predominates.

Medical Properties and Uses. Starch is nutritive and demulcent, but in its ordinary form is seldom administered internally, except as an antidote for poisoning by free iodine. Dissolved in hot water, and allowed to cool, it is often employed as an enema in dysentery, diarrhœa, and inflammatory affections of the abdominal viscera and rectum, or as a vehicle for other remedies. Externally, in fine powder, it is applied to excoriated parts.

SACCHARUM. U. S. *Sugar.*

Saccharum Album. The refined sugar of *Saccharum officinarum*, or *Sugar-cane*, an herbaceous plant, extensively cultivated in tropical countries. The physical properties of the different varieties of sugar are too well known to need description.

Medical Properties and Uses. Sugar is highly nutritious, but as an article of diet is rather employed for its agreeable sweetness. As a medicine it is demulcent, and as such is used in coughs and in irritant poisoning. In pharmacy it is used to disguise the taste of medicines, to give them bulk and consistence, and to preserve them from change.

Syrupus. U. S. Syrupus Simplex. *Syrup. Simple Syrup* is prepared by dissolving thirty-six troyounces of sugar in twenty fluidounces of water with the aid of heat, and, after straining, adding sufficient water to make the syrup measure two pints and twelve fluidounces. It is much used to sweeten extemporaneous mixtures, and in various pharmaceutical operations in which sugar in solution is required.

Syrupus Fuscus. U. S. *Molasses. Treacle.* The impure, dark-colored syrup obtained in making sugar from the sugar-cane.

Saccharum Lactis. U. S. *Sugar of Milk*, or *Lactin*, is a crystalline substance obtained from the whey of cow's milk. To prepare it, the milk is first coagulated by the addition of a little

sulphuric acid, and the resulting whey is evaporated to a syrupy consistence, and set aside to crystallize. It is a hard, somewhat gritty, white substance, possessing a slightly sweet taste. It has been proposed as a non-nitrogenous article of diet, but is principally used in pharmacy in preparing powders which are required in a very fine condition.

MEL. U. S. *Honey.* A saccharine fluid deposited by *Apis mellifica*, the common honey-bee. It possesses the medical properties of sugar, but is more laxative. It is often added to astringent gargles, and is sometimes used as an addition to poultices, and as a vehicle. Clarified honey, MEL DESPUMATUM, U. S., is prepared by melting honey in a vapor-bath, and removing the scum.

The following demulcent substances, though not used as medicines, deserve notice, as affording nutritious and easily digested articles of diet.

AVENÆ FARINA. U. S. *Oatmeal.* The meal prepared by grinding the seeds of *Avena sativa*, the *Common Oat*, a plant cultivated throughout the world. It is a nutritious demulcent, with slightly laxative properties, and is much used in the form of gruel. *Oatmeal gruel* may be prepared by boiling one ounce of the meal with three pints of water to a quart, and after it cools pouring off the clear liquor from the sediment.

ICHTHYOCOLLA. U. S. *Isinglass* is a gelatinous substance prepared from the sounds or swimming bladders of the *Acipenser Huso*, and other species of fish. It consists almost entirely of pure gelatin, which is soluble in boiling water, and forms, on cooling, a transparent jelly. Several other varieties of gelatin are found in the market, derived from other sources, and used for the same purposes. In the form of jelly it is a highly nutritious article of diet. It is used in pharmacy in preparing court-plaster, and in the formation of capsules for the administration of offensive medicines.

ORYZA. *Rice.* The seed of *Oryza sativa*, an annual plant, originally from the East Indies, but now extensively cultivated in various parts of the world. It is highly nutritive, and in the form of decoction *rice-water* is an excellent drink in irritation of the bowels with diarrhœa.

EMOLLIENTS.

EMOLLIENTS are bland and unirritating substances, capable of retaining moisture, and of forming a soft, slightly adhesive mass, and serve, when applied to the skin, to soften and relax its tissue. Nearly all the substances used as such have been mentioned under the head of Demulcents. Warm water is the most important of all the non-medicinal substances employed as emollients, and the higher the temperature at which it can be applied without producing pain, the greater will be its emollient power: in fact, the solid substances used merely afford the means of applying heat and moisture. Those most commonly resorted to for the purpose of fomenting the part, either to diminish heat, tension, and pain, and relieve inflammation, or to promote suppuration, are flaxseed meal and slippery elm bark. There are some substances which are not strictly demulcent or emollient, but which operate rather as protectives, and sheathe and defend the surface from the contact of air and from the action of matters which are capable of irritating it. These are generally oily, fatty, and waxy substances, and are seldom used alone; but, as they are the basis of most of the officinal cerates and plasters, we will briefly refer to them under this head.

GLYCERINA. U. S. *Glycerin.*

GLYCERIN is a sweet principle obtained from fats and fixed oils, in which it exists in combination with the fatty acids, and is separated from them when they unite with bases in the process of saponification. It may be obtained by evaporation from the water in which lead-plaster has been made, care being taken to precipitate any lead held in solution, by sulphuretted hydrogen, and to drive off the excess of this gas by heat.

Properties. It is a colorless or amber-colored, syrupy fluid, inodorous, with a sharp, sweet taste, sp. gr. 1·25, soluble in all proportions in water and alcohol, and possessing extensive powers as a solvent.

Medical Properties and Uses. Glycerin is nutritive and emollient. As it abounds in carbon, it has been compared as a nutri-

ent with cod-liver oil, and may be used in cachectic and strumous conditions. Its property of not evaporating and becoming dry at ordinary temperatures, renders it particularly adapted to the treatment of skin diseases, and as an addition to any lotion, poultice, or external application, where the object is to keep the parts moist and soft. In pharmacy it is used as a solvent for many active remedies.

Nitroglycerin, or *Glonoin*, is produced when glycerin is treated with equal parts of strong nitric and sulphuric acids, successively, in small portions, at a temperature kept below freezing. It is a bright-yellow, volatile, explosive, and oleaginous liquid. It has been administered dissolved in alcohol; but its therapeutic effects have not been fully tested.

OLEUM THEOBROMÆ. U. S. *Oil of Theobroma.*

Cacao Butter is the concrete oil of the kernels of the fruit of *Theobroma Cacao*, a large tree growing in tropical America. The fruit is an oblong capsule, six or eight inches in length, with a thick, coriaceous, somewhat ligneous rind, inclosing a whitish pulp, in which numerous seeds about the size of an almond are imbedded. These are ovate, somewhat compressed, and consist of an exterior thin shell, and a brown, oily kernel, and constitute the *cacao* and *chocolate nuts* of commerce. The oil is extracted either by expression, decoction, or the action of a solvent.

Properties and Uses. Cacao butter is whitish or yellowish, solid at ordinary temperatures, but rapidly melting at the heat of the body, with an agreeable odor, and a bland, pleasant taste. It is sometimes used as an ingredient in cosmetic ointments, but is principally employed in pharmacy for preparing suppositories. From the seeds are prepared, by various processes, the well-known *chocolate*, which is used as a substitute for coffee with the invalid. It is also a good article of diet for convalescents.

OLEUM AMYGDALÆ DULCIS. U. S. *Oil of Sweet Almonds.*

This is the fixed oil obtained by expression from the kernels of the fruit of *Amygdalus communis*, a small tree, native of Syria

and Barbary, but growing freely throughout the south of Europe. There are two principal varieties of this species of Amygdalus, the *bitter* and the *sweet*, the former bearing bitter, the latter sweet, almonds. The fixed oil is obtained equally from both; but the bitter, after the fixed oil has been obtained, yields on distillation with water another oil, the oil of bitter almonds, which has been referred to under the head of Sedatives.

Properties and Uses. The oil of sweet almonds is clear and colorless, or of a slight greenish-yellow color, nearly inodorous, and of a bland, sweetish taste. It is used for the same purposes as olive oil, and, suspended in water by means of mucilage, forms a pleasant emulsion much used in coughs.

ADEPS. U. S. *Lard.*

Lard is the prepared fat of *Sus Scrofa*, the *Hog*, freed from saline matter. It is insoluble in water, partially soluble in alcohol, but entirely so in ether and the volatile oils. When melted, it readily unites with wax and resins.

Properties and Uses. Lard is emollient, and is occasionally employed by itself in frictions, or in poultices, to prevent them from becoming hard; but it is chiefly employed in pharmacy as an ingredient of cerates and ointments.

Ceratum Adipis. U. S. Ceratum Simplex. *Simple Cerate* is prepared by melting together two parts of lard and one part of white wax, and stirring the mixture constantly until cool. It is used as an emollient dressing for blisters and wounds, and in all cases where the object is to protect the part from irritation and to preserve its moisture.

Unguentum Adipis. Unguentum Simplex. *Simple Ointment* is made by melting four parts of lard and one of white wax, and stirring constantly while cooling. This is also emollient, but is principally used as a vehicle for more active substances.

Sevum. U. S. *Suet* is the fat of *Ovis Aries*, the *Common Sheep*, purified by melting and straining, and is of a firmer consistence, and requires a higher temperature for its fusion, than any other animal fat. It may be employed for the same pur-

poses as lard, and is used in pharmacy to give a proper consistence to ointments and plasters.

CETACEUM. U. S. *Spermaceti* is a peculiar, concrete substance, obtained from the head of *Physeter macrocephalus*, the *Spermaceti Whale.* When pure, it occurs in white, pearly, crystalline masses, which are formed of an infinite number of small, brilliant scales; it is soft and unctuous to the touch, inodorous and insipid. It is employed in pharmacy as an ingredient in various cerates and ointments.

CERATUM CETACEI. U. S. *Spermaceti Cerate* is prepared by melting together one part of spermaceti, three parts of white wax, and five parts of olive oil. Used for the same purposes as the simple cerate.

CERA FLAVA. U. S. *Yellow Wax*, a peculiar, concrete substance, prepared by *Apis mellifica*, the common honey-bee, and procured immediately from the comb.

CERA ALBA. U. S. *White Wax* is the same, bleached by exposing it to the combined influences of air, light, and moisture. Both are used in pharmacy in the formation of cerates, ointments, and plasters.

REMEDIES THAT ACT ON SUBSTANCES WITHIN THE BODY.

ANTACIDS.

ALKALINES, ANTILITHICS, LITHONTRIPTICS, are medicines which neutralize free acids existing in the stomach, blood, or secretions, either by virtue of their chemical affinities, or by absorbing the acid. They unite with the free acid and form mild and innocuous salts, which are absorbed and carried off by the various secretions. Their action is only temporary, as they do not correct that peculiar state of the digestive organs which favors the formation of acid. When given indiscriminately, or

in too long-continued doses, they impair the function of digestion and deteriorate the blood: hence they must be used with proper caution.

They are resorted to in dyspepsia accompanied with excess of acid in the primæ viæ; as antidotes in cases of poisoning by the acids; as antilithics to neutralize lithic acid when separated in undue quantity by the urine; and as alteratives in gout, rheumatism, scrofula, etc. They are indicated in all diseases characterized by an excess of acid in the system, and should be administered largely diluted.

The preparations of ammonia, magnesia, and the carbonate of potassa have been already referred to as possessing other more prominent properties, but may be used when remedies of this class are indicated.

LIQUOR POTASSÆ. U. S. *Solution of Potassa.*

This is prepared by boiling caustic lime with a solution of bicarbonate of potassa. In this process the lime, by its superior affinity, precipitates the carbonate of lime, while the potassa remains in solution as the hydrate of potassa. As thus prepared, solution of potassa has the specific gravity 1·065, and contains $5\frac{8}{10}$ per cent. of hydrate of potassa. It may also be prepared extemporaneously by dissolving ℥ss of pure caustic potassa in f℥i of distilled water, and pouring off the clear liquid after the sediment subsides.

Properties. It is a colorless, limpid liquid, with an intensely acrid, caustic taste, and an alkaline reaction. It has a strong affinity for carbonic acid, which it continually abstracts from the air, and hence should be kept in closely-stoppered bottles.

Medical Properties. It is antacid, diuretic, and lithontriptic; its use in medicine is chiefly confined to neutralizing free acid in the stomach and in the secretions. In chronic bronchitis and catarrh, and in the advanced stages of pneumonia, where the expectoration is scanty, thick, and viscid, it proves useful in combination with expectorants. In calculous affections, and in some diseases of the bladder, when the urine is acid and there is much irritability of the urinary organs, it may be combined

with diuretics with benefit. As a blood alterant and resolvent it may be given in inflammations of serous membranes attended with fibrinous deposits, also in scrofula, rheumatism, etc. Dose, 5 to 30 drops, freely diluted. It is incompatible with acids, all earths and oxides held in solution by acids, calomel, and corrosive sublimate.

LIQUOR SODÆ. U. S. *Solution of Soda.*

This is prepared by double decomposition between carbonate of soda and hydrate of lime. It has a sp. gr. of 1·071, and contains $5\frac{7}{10}$ per cent. of hydrate of soda.

Properties and Uses. It is a colorless liquid, having an extremely acrid taste and a strong alkaline reaction. It is employed in medicine as an antacid and antilithic; it is well adapted to replace solution of potassa, being somewhat milder in its action. Dose, 5 to 30 drops, largely diluted.

SODÆ CARBONAS. U. S. *Carbonate of Soda.*

Carbonate of Soda is found native, and is also extracted from the ashes of sea-weeds, in which case it is called barilla, or kelp; it is, however, chiefly procured for commercial purposes from common salt, by first converting it into a sulphate of soda, and then decomposing this by carbonate of lime. Composition, NaO,CO_2+10HO.

Properties and Uses. It crystallizes in colorless or white, large, oblique or rhombic prisms, which effloresce on exposure to the air, forming a white, opaque powder. It is inodorous, with a harsh, disagreeable taste and an alkaline reaction. It is very soluble in water, and contains 62 per cent. of water of crystallization, which may be dissipated by heat. It is antacid and deobstruent, and in large doses acts as an irritant poison. It is chiefly used in the arts, and in the preparation of numerous officinal salts. Dose, 10 to 30 grains.

Sodæ Carbonas Exsiccata. U. S. *Dried Carbonate of Soda* is prepared by exposing the carbonate to heat in an iron vessel until it is thoroughly dried. Dose, 5 to 15 grains.

SODÆ BICARBONAS. U. S. *Bicarbonate of Soda.*

This is prepared by adding an additional equivalent of carbonic acid to the carbonate of soda. The process usually resorted to consists in passing gaseous carbonic acid into a box containing effloresced crystals of the carbonate, when the bicarbonate is generated. Composition, $NaO,2CO_2+HO$.

Properties and Uses. As met with in the shops, it is a dry, snow-white powder, of an alkaline taste, permanent in the air, and soluble in thirteen parts of water. It is used in medicine as a mild antacid, and, from its mild taste and less irritating qualities, is more acceptable to the stomach than the carbonate. Dose, 10 to 60 grains.

PULVERES EFFERVESCENTES. U. S. *Effervescing Powders. Soda Powders* consist of two powders, the one containing twenty-five grains of tartaric acid, the other thirty of bicarbonate of soda. The acid and alkaline powders are to be dissolved in separate portions of water and then mixed, when tartrate of soda is formed, while the carbonic acid escapes with effervescence. These powders are refrigerant, and afford an agreeable drink in febrile complaints.

LIQUOR CALCIS. U. S. *Solution of Lime.*

AQUA CALCIS. *Lime-Water* is prepared by slaking four troy-ounces of lime in eight pints of water. Each fluidounce contains about half a grain of lime.

Properties. It is a colorless, limpid liquid, without odor, of a styptic, alkaline taste. Exposed to the air, it absorbs carbonic acid, and hence should be kept either in closely-corked bottles, or in bottles with an excess of lime.

Medical Properties and Uses. Lime-water is antacid, tonic, and astringent, much used for nausea and vomiting dependent upon irritability of the stomach. In diarrhœa dependent upon acidity in the primæ viæ, especially when occurring in infants and young children, it may be given with benefit in combination with milk. It is also sometimes used as a solvent for urinary calculus, but does not appear to possess any particular

virtues over the other alkalies. Dose, f℥ss to f℥ij. Mixed with olive or linseed oil, it is much used as a local application to burns and scalds, etc.

CALCIS CARBONAS. *Carbonate of Lime.*

Carbonate of Lime is officinal in three forms.

Calcis Carbonas Precipitata. U. S. *Precipitated Carbonate of Lime* is prepared by precipitating a solution of chloride of calcium with carbonate of soda and drying the precipitate. It is in the form of a fine white powder, free from grittiness, insoluble in water, but wholly soluble in dilute muriatic acid with effervescence.

Creta Præparata. U. S. *Prepared Chalk* is prepared from crude chalk by levigation and elutriation. Composition, CaO, CO_2. Nearly pure carbonate of lime.

Medical Properties and Uses. These preparations are excellent antacids, absorbents, and astringents. The chalk is generally preferred, and is especially adapted to diarrhœa accompanied with acidity, and may be advantageously combined with the vegetable astringents and opium. Dose, 10 to 40 grains, or more. Externally, it is highly useful in burns, ulcers, and excoriations, absorbing the discharge, and thus preventing the spread of the disease.

Mistura Cretæ. U. S. *Chalk Mixture* is prepared by triturating half a troyounce of prepared chalk, two drachms, each, of gum arabic and sugar, with f℥iv, each, of cinnamon-water and water. It is a convenient form of administering chalk.

Testa Præparata. U. S. *Prepared Oyster-Shell* is prepared by reducing oyster-shell freed from extraneous matter to a fine powder. It differs from prepared chalk in containing animal matters, and is supposed to be more acceptable to the stomach. Dose and mode of administration, same as those of chalk.

Calcis Phosphas Præcipitata. U. S. *Precipitated Phosphate of Lime.* This salt is prepared by macerating calcined bone in dilute muriatic acid, precipitating with ammonia, and drying at a temperature not exceeding 212°. The muriatic acid dissolves

the phosphate of lime of the bones, and lets it fall, on the addition of ammonia, in a state of minute division. Composition, $3CaO,PO_5$.

Properties and Uses. It is a white powder, without taste or smell, insoluble in water, but soluble in acids. It is antacid and alterative, highly spoken of in scrofula and scrofulous affections and in diseases accompanied with defective nutrition. It forms the basis of several of the phosphatic preparations now so popular. Dose, 10 to 30 grains.

LITHIÆ CARBONAS. U. S. *Carbonate of Lithia.*

LITHIA is the oxide of *lithium*, a rare metal, resembling sodium, and ranks in chemical properties with the alkalies. The CARBONATE is found in many mineral waters; it is obtained from the lithia minerals, or by decomposing the sulphate of lithia or chloride of lithium with carbonate of ammonia. Composition, LO,CO_2.

Properties and Uses. It is a white powder, of an alkaline reaction, sparingly soluble in water, but insoluble in alcohol, and fusible at a high temperature. It is characterized by imparting a crimson color to the flame of alcohol. Its medicinal uses are the same as those of the other fixed alkalies. Its value depends on its affinity for uric acid, on its small combining proportion, and on the great solubility of the urate of lithia. These qualities render it a valuable antacid in certain states of the system in which urate of soda is liable to be deposited in the tissues, as in gout, etc. Dose, 3 to 6 grains.

LITHIÆ CITRAS. U. S. *Citrate of Lithia* is prepared by dissolving the carbonate in a solution of citric acid. It is a white, amorphous powder, deliquescent, and soluble in water. Composition, $3LO,(C_{12}H_5O_{11})$. Its medical properties and uses are the same as those of the carbonate, but it possesses the advantage of a less disagreeable taste and of being less disposed to irritate the stomach. Dose, 5 to 10 grains.

CARBO LIGNI. U. S. *Charcoal.*

This is prepared from the lighter kinds of wood by exposure to a red heat without excess of air.

Properties and Uses. It is a black, shining, brittle, porous substance, tasteless, inodorous, and insoluble. It is a good conductor of electricity, but a bad one of heat. It is disinfectant and absorbent, and acts as an antacid by virtue of its absorbing powers, and not from any chemical influence. It may be employed with advantage in dyspepsia with fetid breath and eructations, attended with obstinate constipation. A teaspoonful is the usual dose. Added to poultices it proves highly serviceable in correcting the fetor of the discharge and in arresting the progress of the ulceration in foul and gangrenous ulcers. It is also much used as a dentifrice, and is thought to check caries of the teeth.

CARBO ANIMALIS. U. S. *Animal Charcoal.*

Bone Black, Ivory Black, is obtained by subjecting bones to a red heat in close vessels. It is used as an antidote to vegetable and animal poisons, and in pharmacy for decolorizing vegetable principles.

ANTHELMINTICS.

ANTHELMINTICS, or VERMIFUGES, are agents which destroy or cause the expulsion of intestinal worms. They effect this in different ways: as specifics, destroying the worm while in the intestines, requiring a brisk cathartic to assist and complete their action; by their mechanical action, wounding or irritating the worms, and causing them to leave their hold on the membrane; or by their purgative action, effecting their expulsion. In this latter way most of the cathartics act as anthelmintics. Their action is also rendered more effectual by combining them with other medicines of the same class. As a general rule, they should be taken upon an empty stomach (the best time is in the morning, before breakfast).

SPIGELIA. U. S. *Pinkroot.*

The ROOT of *Spigelia Marilandica, Carolina Pink*, an indigenous, perennial, herbaceous plant, abounding in the Southern States.

Properties. The root consists of numerous, brownish-yellow, slender, crooked fibres, from three to six inches in length, proceeding from a small, dark-brown, knotty head. They have a peculiar odor, and a sweetish, slightly bitter, not unpleasant taste. They afford a grayish powder, and impart their virtues to water and alcohol. They contain a bitter principle, a volatile oil, resin, and other unimportant matters.

Medical Properties and Uses. In medicinal doses, it is anthelmintic, without any sensible effect upon the system. In larger doses, it causes vomiting and purging; and in excessive doses, it operates as an acro-narcotic poison. It is much employed in this country as a safe and efficacious remedy against lumbrici, or round worms. Dose for a child, 10 to 20 grains.

INFUSUM SPIGELIÆ. U. S. *Infusion of Spigelia* is made by adding half a troyounce of the root to a pint of boiling water. It is rendered more efficient by the addition of a little senna.

EXTRACTUM SPIGELIÆ FLUIDUM. U. S. *Fluid Extract of Spigelia* is prepared by adding sugar to the concentrated tincture. It is a dark-brown, translucent, syrupy liquid, with the flavor of the root. Dose, f℥i to f℥ij for an adult; 10 to 30 minims for a child. It is most used in connection with the fluid extract of senna.

EXTRACTUM SPIGELIÆ ET SENNÆ FLUIDUM. U. S. *Fluid Extract of Spigelia and Senna* contains, besides spigelia and senna, sugar and aromatic oils to give it flavor and to prevent griping, and carbonate of potassa to hold the resinous matter in solution. Dose, f℥ss for adults; f℥i for children.

CHENOPODIUM. U. S. *Wormseed.*

The FRUIT of *Chenopodium anthelminticum*, or *Jerusalem oak*, an indigenous, perennial plant, growing in almost all parts of the United States.

Properties and Uses. The whole herb has a strong, peculiar, aromatic odor, but only the seeds, which ripen throughout the autumn, are used. These are small, irregularly-shaped, of a greenish-yellow color, a peculiar bitterish, aromatic, and pungent taste, and possessed in a high degree of the smell of the plant. Their properties depend upon a volatile oil. Wormseed is an efficient anthelmintic, and is much used for the expulsion of the round worms in children. Dose, from 20 to 40 grains, administered in powder mixed with syrup. It is usually given night and morning for a few days, followed by a brisk cathartic.

Oleum Chenopodii. U. S. *Oil of Wormseed*, prepared by distillation, is of a light-yellow color, becoming deeper yellow by age. Sp. gr. 0·908. It is soluble in alcohol and ether. Dose, 4 to 8 drops.

The fruit of *Chenopodium ambrosioides*, also an indigenous plant, is often mixed with the genuine, but is much weaker.

SANTONICA. U. S. *Levant Wormseed.*

Santonici Semen. *European Wormseed.* The unexpanded flowers and peduncles of *Artemisia Contra*, and other species of *Artemisia*, plants growing in Persia, Asia Minor, and other parts of the world.

Properties and Uses. Wormseed consists of the unexpanded flowers with the peduncles attached or separate, and minute leaves or fragments of leaves. It has a deep-greenish color, a very strong aromatic odor, increased by friction, and a very bitter, disagreeable taste. It contains a volatile oil, a resinous matter, and a neutral principle, *santonin*, to which it owes its efficacy. It acts as a mild, stimulating tonic, but is chiefly used as an anthelmintic. Dose, 20 to 30 grains, made into an electuary with honey. The active principle is generally preferred, on account both of its energy and want of taste.

Santoninum. U. S. *Santonin* is prepared by first exhausting santonica by digestion in diluted alcohol in connection with slaked lime, and then precipitating with acetic acid. When pure, it is in brilliant, colorless, rhombic prisms, becoming yellow on exposure to light, inodorous, of a feeble, bitterish taste, sparingly

soluble in water, but freely soluble in chloroform and boiling alcohol. It possesses the vermifuge properties of santonica in a marked degree, with some slight narcotic powers, producing a yellow discoloration of the vision. Dose, 2 to 4 grains, with sugar or in syrup.

FILIX MAS. U. S. *Male Fern.*

The RHIZOMA of *Aspidium Filix mas*, or *Male Fern*, a cryptogamic plant, native of Europe and Asia, and growing abundantly in woods and shady places in this country.

Properties and Uses. The root, as found in the shops, is of various sizes, externally of a brownish color, internally yellowish or reddish-white, without odor, of a sweetish, bitter, and nauseous taste. It contains a volatile oil, a fixed oil, and resin. The powdered root is of a greenish-yellow color. The male fern-root appears to act as a poison to the worms, as they are discharged dead in all cases. It proves a valuable anthelmintic in the treatment of tænia. Dose of the powdered root, ʒi to ʒiii, administered in electuary or emulsion, early in the morning, and followed in a few hours by a brisk cathartic. The ethereal extract, known in Europe as the *oil of fern*, has all the anthelmintic powers of the root, and may be given in the dose of fʒss.

PEPO. U. S. *Pumpkin Seed.*

The SEED of *Cucurbita Pepo*, the *Common Pumpkin*, a very common plant in this country.

Properties and Uses. The seeds are oval, flattish at each extremity, of a light, brownish-white color, and a sweetish and aromatic odor and taste. They consist of a firm, brittle coating, and a white, oily kernel, and contain a fixed oil, upon which their virtues depend. They are highly recommended as efficient for the expulsion of tape-worm. Dose, ʒij, to be taken in the morning fasting, and followed, in an hour or two, by a dose of castor oil. They are best administered by depriving them of their outer coat and beating them into a paste with sugar, or made into an emulsion with water and sugar.

AZEDARACH. *U. S. Secondary. Azedarach.* The bark of the root of *Melia Azedarach, Pride of China, Pride of India,* or *Common Bead-Tree,* a large and beautiful tree, native of the East, but extensively cultivated as an ornamental tree in different parts of the world. The recent root is preferred. It has a bitter, nauseous taste, and yields its virtues to boiling water. Its medical properties are similar to those of spigelia. It is best given in the form of decoction (two troyounces to a pint of boiling water), in tablespoonful doses, every two or three hours till it affects the bowels.

MUCUNA. *U. S. Secondary. Cowhage.* The setæ or hairs of *Mucuna pruriens, Cowhage* or *Cowitch,* a perennial, climbing plant, native of the East and West Indies and intertropical America. The fruit is a pod, about five or six inches long, containing from three to five seeds, and thickly covered with short, stiff, brown hairs, which are officinal. Its action is purely mechanical, the setæ wounding and irritating the worms, obliging them to leave their hold on the lining of the intestines. It is chiefly serviceable in cases of ascarides and lumbrici. The pods are dipped in honey or molasses, and the hairs scraped off with the liquid. Dose, teaspoonful night and morning for several days, followed by a brisk cathartic.

BRAYERA. *U. S. Secondary. Koosso.* The dried flowers of *Brayera anthelmintica,* a small tree of Abyssinia. It is in compressed masses, of a greenish-yellow color, with a fragrant, balsamic odor and a disagreeable taste. It destroys entozoa, but, being devoid of cathartic power, it fails to expel them without the subsequent administration of a purgative. It has been principally administered in cases of *tænia,* or *tape-worm,* and should be taken fasting, in the form of infusion, or in that of electuary, with honey, followed by a mild aperient. Dose for an adult, ℥ss.

ROTTLERA. *U. S. Secondary. Kameela.* The powder or hairs obtained from the capsules of *Rottlera tinctoria,* a small tree growing abundantly throughout Hindostan and in several of the East Indian islands. It is an orange-red, granular powder,

with little taste or smell, insoluble in water, soluble in alcohol and ether. It is highly esteemed as an anthelmintic in India. Dose, ʒi to ʒij, followed by castor oil.

Cadinum Oleum. *Oil of Cade.* A tarry oil, obtained by the dry distillation of the wood of *Juniperus Oxycedrus.* Internally, in doses of a few drops, it has been given as an anthelmintic; externally, it is a useful application in chronic eczema, lepra, and other obstinate skin diseases.

Stanni Pulvis. *Powdered Tin* is prepared by reducing melted tin to a powder while it is cooling. Formerly it was much used against lumbrici, or round worm, and is supposed to act by its mechanical properties, but is now seldom prescribed. Dose, ʒi, mixed with molasses.

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