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DENTAL MEDICINE.

GORGAS.

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DENTAL MEDICINE

A MANUAL

OF

DENTAL MATERIA MEDICA

AND THERAPEUTICS.

BY

FERDINAND J. S. GORGAS, A. M., M. D., D. D. S.,

EDITOR OF "HARRIS' PRINCIPLES AND PRACTICE OF DENTISTRY," AND "HARRIS' DICTIONARY OF MEDICAL TERMINOLOGY AND DENTAL SURGERY," PROFESSOR OF THE PRINCIPLES OF DENTAL SCIENCE, DENTAL SURGERY, ETC., IN THE UNIVERSITY OF MARYLAND, BALTIMORE.

FOURTH EDITION. REVISED AND ENLARGED.

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PREFACE TO FOURTH EDITION.

In presenting a fourth edition of the "Dental Medicine" to the dental profession, the author desires to express his grateful appreciation for the favor with which every one of the preceding editions has been received, and the kind notices they have elicited.

The history of the Third Edition has been similar to that of the first and second editions, every copy having been disposed of some months before the present edition was ready for publication.

So much has been added to this (fourth) edition, in order to bring the work up to the present status of dental materia medica and therapeutics, that the author cherishes the hope that its value as a text-book and work of reference, has been greatly increased over that of former editions.

Considerable matter has been added to Diagnosis of the Affections of the Mouth, the different Remedial Agents, the various substances classed as dental materia medica, with their medicinal properties, action, dental uses and mode of application; among the number—Arsenious Acid, Carbolic Acid, Aromatic Sulphuric Acid, Tannic Acid, Chloroform, Nitrous Oxide, Chloral, Antipyrene, Antifebrin, Bichloride of Mercury, Peroxide of Hydrogen, Creolin, Chloride of Methyl. Sulphonal, etc., etc.

A new chapter has been added on the use of Antiseptics in Dental Practice, which includes the Sterilization of Dental

and Surgical Instruments. The list of new antiseptics, disinfectants, germicides and hypnotics, etc., referred to in the present edition, includes, Aristol, Bromol, Campho-Phenique, Phenol-Camphor, Chloralamide, Synthetic Carbolic Acid, Biniodide of Mercury, Iodine Tri-Chloride, Chloral-Phenol, Iodophenacetin, Lysol, Bichloride of Methylene, Microcidine, Myrtol, Phenacetine, Pyoktanin, Salol, Sodium Silico-Fluoride, Salipyrene; also the effects of the Vermilion of Vulcanized Rubber on the Mouth, Test Papers for Dentists, List of New Remedies, Rendering the Hands Aseptic, Organic and Inorganic Acids, and Carbon Compounds, Alkalies and Alkaline Earths.

A number of new and valuable formulæ have also been added, and the Index to "Dental Diseases and Remedies" has been correspondingly increased.

FERDINAND J. S. GORGAS.

HAMILTON TERRACE, BALTIMORE.

October 1, 1891.

PREFACE TO THIRD EDITION.

In presenting a third edition of the "Dental Medicine," the author trusts that the new matter it contains, comprising nearly one hundred pages, will add to its value as a text-book, and increase its usefulness to the dental practitioner. The universal favor with which the preceding editions have been received, is gratefully appreciated, and the fact that, like the "Principles and Practice of Dentistry," the second edition of the "Dental Medicine" was exhausted for several months before the present one could be prepared for publication, is an evidence of its favorable reception. What the author deems an improvement, has been made in the arrangement of a portion of the subject matter of the present edition, and considerable additions have been made to a number of subjects, among them being the following: Diagnosis of the Affections of the Mouth, General and Local Anæsthesia, the Action of Arsenious Acid as a Devitalizing Agent, etc., etc.

In the new matter will be found: The Action of Antiseptic Agents, The Proper use of Antiseptics in Dental Practice, The value of Germicides and Disinfectants, The Digestibility of Foods, Incompatibility, etc., etc. To the Dental Materia Medica and Therapeutics have been added such agents as Iodol, Hydronaphthol, Bromides of Ammonium, Calcium, Lithium, Sodium, Benzoates, Lithium and its Preparations, Phosphates and Phosphites, Creolin, Cresylic Acid, Hydrate

of Amylene, Herbst's Obtundent, Lanolin, Kandol, Methyl Chloride, Nux Vomica, Turpentine, Rhubarb, Paraldehyde, Sodium and its Preparations, Sulfanol, Stenocarpine, Salicylates, Serpentaria, Prunus Virginiana, Naphthalene, Guiacol, Cod-liver Oil, Colchicum, Sulphite of Aluminium, Anthemis, Antifebrin, Antipyrene, Aloes, Acetanilide, Sulphurous Acid, Ammonia and its Preparations, Cresylicum, Aromatic Bitters, etc., etc., etc. A number of new formulæ have also been added, and the Index to "Dental Diseases and Remedies" has been correspondingly increased.

FERDINAND J. S. GORGAS.

HAMILTON TERRACE, BALTIMORE.

PREFACE TO THE FIRST EDITION.

THIS work has been prepared by the author in deference to many requests from former pupils, and has been compiled from lectures delivered by him in dental institutions during the past twenty-five years, and notes obtained from the standard works on Materia Medica and Therapeutics, and also from personal experience as a dental practitioner and teacher.

While the author claims the credit of the compilation, he does not claim originality in the sources, derivations, medical properties and action of the various articles of dental materia medica which are given in this work.

His intention has been to present not alone his own ideas as to the particular application of remedies, but also those of well-known and acknowledged authorities, and in such a manner as may be of service to the dental student in acquiring a knowledge of this important branch of his profession; hence nothing has been presented in this work that, in the author's opinion, is not applicable to dental practice, and that will not be of benefit to the dental student.

The dental formulary comprises many valuable combinations, and credit has been given, in every case where it was possible, to the authors of the different preparations.

The necessity for an American work of this kind has long been apparent, and after years of delay and promises the author gratefully dedicates this work to his former pupils in the dental institutions with which he has been and is now connected, in the capacity of a teacher.

HAMILTON TERRACE, BALTIMORE.

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DENTAL MEDICINE.

DEFINITION OF SUBJECTS.

Materia Medica is that branch of medical science which refers to and describes the methods and substances known as "medicinal agents," which are employed in the prevention and treatment of disease.

Therapeutics is that branch of medical science which comprises the doctrine of the management of disease. Generally, however, the term is restricted to a description of the *modus operandi* of medicines, or, in other words, their use, application and effects when applied in the treatment of various morbid conditions. An accurate knowledge of the principles and rules which govern the administration and action of medicinal substances enables the practitioner to restore disordered functions, and to so impress the organism as to maintain harmonious conditions, by means of which the various functions, in a state of health, are intimately connected by relation and sympathy.

Some medicinal agents exert their influence on primary nourishment, converting food, by digestion, into the substance of organic beings, while other remedies, without interfering with digestion, by a modification of the process of assimilation exert a destructive influence upon the tissues. Some medicinal agents affect the nervous system, and others are so irritant in their effects as to cause their speedy expulsion; while others, again, have a particular affinity for certain organs, and are eliminated by them, the effects ceasing as soon as the evacuation is completed. Other medicinal agents prevent septic decomposition and the growth of micro-organisms.

What are known as topical or external remedies act directly upon the parts to which they are applied, and their general effects are produced through the nervous system.

INFLAMMATION:

WITH SPECIAL REFERENCE TO ORAL MUCOUS MEMBRANE.

Definition of Conditions Associated with Disturbances of Nutrition.—Hyperæmia signifies superabundance of blood in the blood vessels, but this term is restricted to such a condition existing in a definite organ or portion of an organ; hence hyperæmia and dilatation of blood vessels are so intimately connected that the one cannot exist without the other.

It is also necessary that the capillaries as well as the arteries and veins should be injected, in order that the color of the region so affected should be increased, as the former constitute a dense network, which traverses the entire organ, while the latter only form single branches, which occupy limited spaces.

The term *Plethora*, as distinguished from hyperæmia, signifies a superabundance of blood in the entire circulatory system. Active hyperæmia in the skin and mucous membranes is characterized by a diffuse bright-red coloration, the parts so affected having a higher temperature than those around them. The diffuse coloration is caused by the bright-red arterial blood which fills the capillaries; and the elevation of the temperature is due to the presence of the blood, which heats the skin or mucous membranes, and the more quickly the blood circulates the warmer the tissue becomes, until at length the highest degree of blood heat is accomplished.

Passive hyperæmia denotes a condition of the tissues characterized by a diffuse venous, not arterial, coloration and a relatively low temperature. In passive hyperæmia the capillaries are also dilated, but the blood current through them is retarded; hence the tissues so affected are of a venous color instead of the bright-red or arterial color of active hyperæmia.

The term *Anæmia* signifies a condition in which there is an abnormal diminution in the amount of blood, and is the opposite to that of Plethora, being characterized by a pale face, lips, gums and mucous membranes. But the normal amount of blood may be present, and yet the characteristic paleness

denote an anæmic condition, for the reason that the number of red blood corpuscles are decreased and replaced by white blood corpuscles, or by blood plasma.

Again, the paleness of an anæmic condition may be due to a deficiency of the red coloring matter of the red blood corpuscles. A permanent contraction of the blood vessels may also cause a paleness of the face, lips, gums and mucous membranes.

The term *Ischæmia* is also employed to denote local poverty of the blood, a deficiency of the coloring matter (hæmoglobine).

The direct cause of hyperæmia, and also of ischæmia, is a change of calibre of the blood vessels, namely, dilatation and contraction. This dilatation and contraction of the blood vessels is due to the elastic and contractile elements of the sheaths and walls of the arteries and veins, and both the dilatation and contraction are regulated by the spinal cord, through the medium of the vaso-motor nerves. It is a common opinion that hyperæmia cannot exist without the influence of the vaso-motor nerves.

IRRITATION indicates the condition of a tissue in which there exists an excess of vital action, on account of the disordered state of the nerves of the affected part or organ. It is commonly manifested by such symptoms as increased circulation, warmth and sensibility, and functional disturbance of a greater or less degree.

What inflammation is to the vascular system, irritation is to the nervous system, and the difference between these two conditions is defined by the explanation that the latter terminates when the former begins. Irritation is generally excited by the action of certain stimuli upon organic tissues, by which the sensibility of such tissues is perverted and the circulation deranged; such pathological conditions when they are not the precursor of inflammation, soon passing off, and the affected tissue regaining its normal state, when the exciting cause ceases to operate. Irritation may be direct and indirect—direct when the irritation manifests itself at the point where

the impression to which it owes its origin is received; indirect when the irritation, through sympathy and reflex action, is transmitted to more or less remote parts or organs. An example of direct irritation may be adduced by friction upon the skin or mucous membrane of the mouth sufficient to cause redness in the first tissue, and increased coloration in the second; or indirect irritation, in the convulsions attending difficult dentition, the irritation being communicated to the brain by the fifth pair of nerves, and from thence to the nerves of the voluntary muscles, the seat of the spasmodic action. Dental caries also affords another example of indirect irritation, in the form of neuralgic pains of the temple, face, ear, eye, and of even more remote parts, such as the uterus.

The effect of irritation upon the vascular system is manifested by dilatation of the blood vessels; but the immediate effect, however, of a slight chemical or mechanical irritant is not at once apparent in the capillaries, but first causes contraction of the smaller arteries, and sometimes of the veins, such contraction being followed by dilatation, the immediate cause of which is yet obscure. It is, however, supposed to be the result of a relaxation or a temporary paralysis of the walls of the vessels, a condition following contraction, and which, as a consequence, causes a decrease of their resistance to the pressure of the blood within them. The irritation either perverts the function of the nerves of the vessels, or of the lining cell substance of the capillary walls; or the disturbance is due to reflex action.

Inflammation denotes an abnormal process or condition characterized by certain changes of texture, which, although uniform in type, differ widely in appearance, and terminate in different results, according to the nature and permanency of the causes upon which such a condition depends, or which have given rise to it.

The *symptoms* of inflammation consist of the phenomena which accompany the textural changes characteristic of this condition, and its *pathology* the textural changes which occur during the continuance of this condition. The essential

features of inflammation are an increased afflux of blood to the affected part, with a greatly increased tendency to cell proliferation and tissue formation.

The *causes* of inflammation determine in a great degree its treatment on account of the influence they exert upon its destructive tendency, and they may be classified as those arising—1st, from mechanical violence; 2d, from irritating and destructive chemical action; 3d, from poisonous infection, and the effect of injurious micro-organisms—the latter being regarded as "immediate determining causes of the more destructive phases of the inflammatory process." When inflammation owes its origin to an evident injury, or the reverse, it is termed *traumatic*, or *idiopathic*, and when no apparent cause can be discovered it is termed *spontaneous*.

The causes of inflammation are divided into *predisposing* and *exciting*.

Among the more important predisposing causes are *impoverished blood*—defective in quality—such as may result from a want of proper food and of fresh air, the effects of such deprivations being manifested in the case of a neglected child where a hard swelling occurs in the cheek, which, after a few days, presents a gangrenous condition, constituting the disease known as *cancrum oris* or *gangrænopsis*. On the other hand, an habitual excess of food and drink is also a predisposing cause of inflammation, the blood, as a consequence, being impaired, and also the tissue which it supplies. *Blood poisoning* is also another predisposing cause, resulting, it may be, from the presence of certain diseases, such as syphilis, diabetes mellitus, eczema, etc. A local hyperæmia, constituting the first stage in the development of inflammation, may result from certain poisons in the blood, which cause it to stagnate in limited areas, through an inability to stimulate the heart and blood vessels. Syphilitic ulceration of the mucous membrane of the mouth is an example of such a predisposing cause. *Weakened vitality of parts* is also a predisposing cause of inflammation, and may result from habitual ill feeding, protracted illness, over-work, long exposure to extreme cold. Parts such

as the mucous membrane of the mouth, which have already been the seat of inflammation, are prone to such a condition subsequently, from slight provocation.

Defective or perverted nervous supply may also be regarded as a predisposing cause of inflammation. Certain forms of skin disease, and inflammatory conditions of the mucous membrane of the mouth, furnish examples; also, of the periosteum of the teeth, resulting in severe periodontitis and alveolar abscess.

The *influence of climate* is also regarded as a predisposing cause, for, in tropical regions, inflammations of certain organs, often terminating in abscesses, are very prevalent. The midsummer and fall months are considered to be more favorable for surgical operations, on account of the comparative absence of inflammatory complications at such times.

Age has also some influence as a predisposing cause of inflammation. In childhood acute hyperæmia is induced by comparatively slight exciting causes, as then the process of nutrition is at its greatest period of activity, and any interruption of its process is followed by derangement of health.

The effects of the irritation of the first dentition may be adduced as an example. Old age induces weakness in the tissues and decrease of power of resistance to the exciting causes of inflammation.

Exciting Causes of Inflammation.—These causes may all be included in the condition known as irritation of the tissues, resulting from irritants of various kinds, the action of which is immediate in producing the inflammatory condition. Exciting causes may be divided into *external*, which are easily recognized, and *internal*, which are more obscure, and are assisted by some predisposition of the organism.

Cold is a frequent cause of inflammation, and its effects are due to sudden changes in the constitution of the blood from an arrest of the function of the tissues, temporary in its nature, which interferes with the emunctory action, whereby effete and irritant materials which should be eliminated are retained, and poison the blood. *Heat* is also a cause of inflammation,

its effects varying from a slight redness, denoting transient hyperæmia, to vesication, either superficial or deep. When death of tissue results from such a cause, suppuration ensues on the separation of the eschar; and when there is a loss of cicatricial power, repair by granulation and suppuration (second intention) is prevented. The inflammation resulting from simple burns and scalds, provided no eschar is formed, and air is excluded, soon subsides.

Mechanical violence excites inflammation, yet, under favorable circumstances, this condition resulting from an incised wound, is soon arrested, owing to its benign form, by the particles of lacerated tissue being carried away by the blood and the subsequent liquid exudation, while those that remain undergo liquefaction and absorption by the lymphatics; hence, when the cut surfaces are brought and retained in proper apposition, speedy union, "by the *first intention*," results. Union by "first intention" is induced by such changes as cell-proliferation, the formation of new capillaries, and the generation of cicatricial tissue. It is only when the vitality of the tissue is destroyed and foreign matters left in the wound, especially a punctured one, caused by a rough or rusty instrument, that there are complications. The tissues themselves, when they lose their vitality, become irritants, even when the dead matter is very minute. A boil furnishes an example, the core of which is composed mainly of yellow, elastic fibres with some leucocytes or pus cells in the meshes. This mass becomes dead, and while the white fibrous element liquefies and mingles with the pus, the yellow fibres remain unchanged and constitute the irritant body, to the presence of which is due the suppurative inflammation. The presence of a clot of blood in a wound may prevent union, and cause pus formation.

Chemical irritants excite inflammation by first causing increased redness, which steadily extends and becomes more intense until a considerable diameter is attained. There is also increased heat and fullness of the part affected, and an eschar forms as the result of the action of the chemical agent upon the epidermis in the case of the skin, or the corium in

the case of mucous membrane, the depth of the action depending upon the nature of the chemical irritant. After one or two days the narrow circle of redness disappears, and, after one or two weeks, the eschar separates, disclosing an area of smooth cicatricial tissue. When the action of such irritants is slight, repair soon follows, without the formation of an eschar; but when their action is severe enough to devitalize the tissue, the sloughs are thrown off without suppuration, if the parts have been protected from the air, or antiseptic applications have been made.

Mineral irritants, such as mercury and arsenic, for example, cause inflammation by a process different from that of chemical irritants. The inflammatory action of mercury and arsenious acid is developed only after the poison has entered the circulation, and a certain amount has been received by the stomach, when active inflammation of the mouth with salivation (mercurial stomatitis) supervenes, if the agent is mercury, or active gastric hyperæmia with vomiting, if the agent is arsenic. There is a *specific* poisonous action brought about by such irritants, on account of the tissues of the mouth and stomach being more sensitive to the influence of these mineral poisons. The cause of this peculiar susceptibility is as yet obscure.

Micro-organisms are capable of exciting inflammation by direct contact with tissues, when the latter are exposed by injury.

Many of these low forms of life are indestructible by the most extreme heat and cold, and also by the strongest chemical agents. And whenever the oxygen is prevented from entering a wound these micro-organisms generate with great rapidity, and are nourished by the fluids and granulating surfaces which surround them. The chemical and vital changes which these animal materials undergo bring about putrefaction through the agency of fermentation, and certain poisonous combinations are thus formed. These micro-organisms, therefore, acting as a poison, decompose the materials generated for repair, and thus prevent the constructive process;

they also act as a putrefactive ferment, producing septic poisons destructive in their action. It has been definitely determined that these organisms, although present in every destructive inflammation, "do not occur in the blood nor in the tissues of the healthy living body of man or of the lower animals." Diminished vitality, whatever may be the cause, favors the invasion and development of micro-organisms in the form of parasites.

Symptoms of Inflammation.—The coexistence of the phenomena, *redness* and *heat*, with *swelling* and *pain*, the ordinary symptoms of inflammation, may, therefore, be considered as sufficient evidence of the presence of the inflammatory condition. The absence, however, of one or more of these phenomena is not incompatible with the existence of inflammation, for the increased redness and heat may disappear before the inflammatory process ceases, and pain be sometimes absent.

The *redness* of an inflamed part is usually the first observable phenomenon, and one of the most characteristic symptoms of inflammation, and one also that is rarely absent. It varies in intensity, according to the degree of the inflammatory process, the nature of the part affected, the condition of the system, and the cause of the inflammation. Of a light tint in the early stage, it becomes deeper as the inflammatory process increases in degree, until every grade, almost, of redness is observable, ending in a deep crimson or even purple. It may appear in points, streaks, in minute ramifications, or be quite uniform over the entire surface affected. Usually it is more intense in one spot, gradually fading as it recedes, until lost in the surrounding healthy tissue; in other cases the redness has an abrupt boundary, and is of equal intensity over its entire area. The brighter hue usually attends ordinary active inflammation; the darker hue that form of inflammation proceeding from some specific cause, or associated with a gangrenous tendency. The redness of inflammation is caused by the increased amount of blood entering the vessels of the part, and remaining there for a longer time than is natural under other conditions.

The *Heat* of an inflamed part is also caused by the unusual quantity of red blood present, and also by an increase of that vital action upon which the evolution of heat depends, namely, superoxidation of the affected tissues, resulting in their decomposition. The increase of temperature is generally more sensible to the sufferer than to the observer, though it may often be detected by the hand, and is very evident by the clinical use of the thermometer; it is also verified by comparison with other unaffected parts.

The *Swelling* of an inflamed tissue is caused in part by the unusual quantity of blood present in the dilated vessels, and also by the matters, both liquid and solid, which exude into the affected tissue through the walls of the dilated vessels, and also to extravasation resulting from rupture of these walls; for as the vessels are distended their walls become thinner, and permit the blood plasma to escape through them in greater quantity than is required for mere nourishment; hence the inflamed tissue becomes infiltrated with this plasma, the consequence of which is an increase of thickness or swelling. The swelling of a part, however, without other symptoms is not an evidence of inflammation, as this phenomenon may occur from other causes. Swelling may also be absent when the other symptoms of inflammation are present, an example of which is afforded in inflammation of mucous membranes, before exudation has occurred in the connective tissue beneath.

The *Pain* of inflammation is due to the local irritation of the nerves of the part, caused by the irritant which has excited the condition; also by the tension which results, together with the injury inflicted upon the nervous filaments. Every tissue is supplied with sensory nerves, and the pain resulting from irritation and injury varies considerably, in accordance with the nature of the part and its supply of nervous filaments. Parts having little sensibility in a normal condition, often become extremely painful when inflamed; the gums afford a well marked example. When the parts are unyielding, as in periodontitis, the pain becomes very severe; and a pulsa-

tile or throbbing pain is caused by the increased force of the smaller vessels conveying the blood to the focus of inflammation, and also the obstruction of the circulation produced by the swelling and increased by the stasis at the focus of the affected area. When the veins of an inflamed part become obstructed by the swelling, bringing about pressure to such a degree as to prevent the blood from passing through them, the quantity being constantly increased by the supply from the arteries, a condition of strangulation results, in which the pain is very severe.

We find an example of this condition of strangulation in pulpitis, or inflammation of the pulps of the teeth. Pain is also generally present, even in the case of soft tissues affected with inflammation, and where every advantage is afforded for their swelling; the oral mucous membrane is an example. There is also pain of an itching character in certain forms of inflammation of mucous membranes; also boring pain in the neighborhood of joints. The pain of alveolar abscesses, when they slowly form, is often of a tensive character, and generally becomes lancinating when they are about to point; and in all such cases is useful in determining the seat of the suppurative process.

Fever of Inflammation, also known as "traumatic," is very generally present when the inflammation is severe, or the injury occasioning it is extensive and complicated. This inflammatory fever generally makes its appearance in from twelve to twenty-four hours after the injury is received, or when the inflammatory process is at its height; and when the parts have previously been healthy, and the inflammation limited, it is moderate in its character and soon terminates spontaneously. The symptoms of inflammatory fever are a feeling of fatigue, restlessness, thirst, hot and dry mouth, coated tongue, urine scanty but deeper in color, frequent pulse, temperature about 100° F.; and the fever usually reaches its climax in about thirty-six hours, when it begins to decline, and by the sixth or seventh day has disappeared. In the case of an abscess, it frequently happens that when suppuration occurs the fever begins to decline. Should the fever continue

longer than the time referred to, the cause may generally be due to deeper suppuration and other complications of the local affection. During the inflammatory process, when putrescent matter has been absorbed by the blood in greater quantity than can be resisted or gotten rid of by the organism, and there is no escape for it by drainage, the symptoms of inflammatory fever become more intense, and a condition of septic poisoning takes place, known as *septicæmia*. When some time has elapsed after the inception of the inflammatory process, and the characteristic fever has almost disappeared, a chill suddenly occurs, followed by profuse perspiration, the condition known as *pyæmia* is present—pus globules in the blood.

Exudation.—The exudation of materials, such as a phosphatic, saline fluid, and white blood corpuscles and fibrin, through the capillary vessels, is due to inflammation, and such exudations are derived from the blood. The symptom of *swelling* is in great part due to exudation. The exudation in what is termed "healthy inflammation," and known as *plastic* or *coagulable lymph*, seen on the surface of a recent wound or in the form of swelling around a centre of inflammation, is a mild and unirritating product, the function of which is to form new tissues for repair, called at first granulations. Inflammatory exudations from free surfaces of mucous membranes contain mucus, and a substance known as *mucin*, in the form of filaments, insoluble in acetic acid. The inflammatory effusion known as *plastic* or *coagulable lymph*, the true indicator of a healthy constructive process, is soon converted from a jelly-like substance, by the germinal power, into a mass of living cells, through which other minute cells, which are to form the capillaries, make their way like a small stream, the primitive living cells flattening out and making walls, apparently, for the forming vessels. These new capillaries penetrate the mass of germinal cells in large numbers, like delicate connecting threads, and furnish the blood supply to the organizing mass, which becomes converted into *new* or *young connective tissue*. This tissue drawing and binding together the opposite sides of the wound, then becomes the *cicatricial tissue*, which originates

from the cement-like material furnished by the inflammatory exudation. The cicatricial tissue becomes invested, in the case of oral mucous membrane, with epithelium, by a similar process of cell growth and development; and this is the process of union by the first intention. The cicatrix or scar is redder than natural, owing to the large number of vessels; but when the supply of blood is no longer needed in such quantity as is at first necessary, the capillaries diminish and disappear, so that the cicatrix grows paler and of smaller bulk. In the case of an abrasion of the skin, the exuding plastic lymph dries upon the denuded surface when not disturbed, and forms a protecting crust, which at length falls off, exposing a reddish surface covered with epidermis. In the case of the oral mucous membrane, a like result is produced under the protection of the mucous secretions peculiar to such a tissue.

Suppuration.—The formation of pus is a result of destructive inflammation, as the presence of such a fluid denotes a loss of substance, which does not occur when a wound heals by *the first intention.* Under favorable circumstances an inflamed surface heals by the process of *the second intention,* as follows: A soft, red surface of coagulable lymph becomes organized into embryonic tissue, which is known as *granulation tissue,* and the yellowish fluid, bland in nature, which is present is pus; these materials or "products of inflammation" being generated for reparative processes. The granulation tissue is composed of embryonic cells and a network of capillary loops, by which the tissue receives its supply of nutritive matter from the blood, so that it may become what is recognized later as the *cicatricial tissue,* or one of a higher organism than the granulation tissue. The granulation tissue is of a variable pinkish color, the tint depending upon the quality of the blood which its vessels contain, and is of a jelly-like consistence, and somewhat smooth and firm. Its surface, when in a normal condition, is studded over with small conical prominences called *granulations,* in which are very minute vessels situated so superficially as to bleed on the slightest touch.

Pus of a yellow color is found between the granulations,

which vary in size, form and color, a moderate bright-red color being indicative of a healthy healing process.

When there is a want of power in the process of forming the cicatricial or repair tissue, the granulations become large and translucent, and the pus which surrounds them is pale and thin. If the affected surface is exposed to friction, or irritation from other causes, the granulations become extremely small and of a deeper red color than is normal, and at length may disappear at points, leaving grayish spots or smooth patches. If the process of cicatrization is prevented in its first stage, the granulations become large and coalesce, protruding and overhanging the edges of the wound, and forming what is commonly known as "proud flesh." During the entire healing process a flow of pus is going on from the affected surface as a normal act, and the first appearance of it is indicative of repair. Its appearance is also coincident with the organization of plastic lymph. When the suppuration is well established, the heat, tension and swelling of the inflamed part become less in degree, and the frequency of the pulse and the temperature of the body diminish. Whenever the granulating surface is formed, union by *the second intention*, or *second adhesion*, as it is termed, will take place, if separated surfaces are brought into apposition.

Origin and Characteristics of Pus.—Pus is a secretion furnished by the blood at the expense of the tissues, an exuberant quantity of plastic material, for which excess there is no demand in the reparative process. The leucocytes which are brought to the surface of a granulating wound are discharged from it in the form of pus, while those that remain behind develop into tissue. This effect, by which the excess of leucocytes is gotten rid of, is accomplished by liquid exudation, the supply of which comes from the newly formed and the old capillaries, and is the same force that carries the nutritive material to the tissues. Healthy pus is of a yellowish-white color, sometimes assuming a pale greenish tint, of cream-like consistence; a slightly saltish taste, but somewhat sweet; a faint animal odor, with an alkaline reaction. The presence of

bile may give to pus a deep orange color, while all of the other shades are due to the coloring matter of the blood, known as hæmatoidine. As long as the air has access to it, there is little tendency to putrefaction; and even when it is removed from the body and exposed to ordinary temperature, change in it occurs very slowly. Pus consists of two portions —a solid portion known as *pus corpuscles*, and which consists almost entirely of young pus cells or leucocytes, and a liquid portion known as *liquor puris*, which is a serous fluid, and constitutes about three-fourths of its bulk.

When pus is subjected to pressure, as sometimes occurs in abscess of the antrum, and about bones, it may become a yellowish, cheesy mass, owing to the compression of the pus cells. The solid portion of pus consists of more than nine-tenths of leucocytes or young pus cells, which, in freshly formed pus, presents under the microscope a granular appearance, and also the peculiar movements of active, young and healthy leucocytes; but pus which has collected in an abscess for several days shows no such movements, thereby indicating that the leucocytes have died. Living and dead pus cells may be found in ordinary pus, mingled together. Pus also contains such micro-organisms as vibrios and bacteria.

Varieties of Pus.—The constitution of pus, which is subject to constant change, depends upon the form of the disease, the locality, and the condition of the patient. When it is of a yellowish-white color, of the consistence of cream, and composed of a great number of pus globules, it is called "healthy," "pure," or "laudable." "*Sanious*," "serous," and "ichorous" pus is almost transparent, of a yellowish, oily, or, reddish color, and very acrid, being the product of unhealthy inflammation, and is common to caries of the bones, irritable ulcers, etc., and frequently mixed with blood, particles of fibrin, and dead tissue. In chronic and cold abscesses the pus corpuscles become pale and watery, showing that they are undergoing solution; the pus from epithelial tumors, indolent ulcers, and phagedenic ulcers, is thin and sanious, and contains more or less dead tissue, which prevents the repair.

The term *abscess* denotes a collection of pus in the substance of the tissues, and the formation of the acute form is as follows: The exciting cause, acting as an irritant, causes an afflux of blood to the centre of the affection, and the distended capillaries pour out liquid exudation, which coagulates at this centre into plastic lymph, expanding the meshes of the neighboring surrounding tissues with a more serous fluid.

Leucocytes are formed from cell proliferation in the plastic lymph, but, on account of their not being in a proper place for their growth and development into tissue, they become changed into pus, which collects in a cavity formed by it, and the result is an abscess. As these phenomena occur in rather quick succession, pain, heat, redness and swelling are present, and also constitutional disturbance in the form of *hectic fever.*

The increase of an abscess in size is attended with a certain amount of redness on the surface over it and to which it is approaching, this increasing redness being preceded by more or less œdema of the tissue beneath, which is owing to the protruding of the serous exudation surrounding the central collection of pus. The centre of the surface redness then presents a more prominent and elevated point, where the outer tissue becomes thinner, purplish, or livid, and soon the yellow pus within is visible through it—a condition to which the term *pointing* is applied. Soon after the "pointing," the integument gives way and the pus exudes through the opening thus made.

This thinning and weakening of the surface is caused by the stretching and obstruction of the blood vessels, which convey the nutritive supply from beneath, by the pressure of the enlarging abscess to such a degree that the surface integument is deprived of its blood and slowly dies by minute particles, the dead material being added to the contents of the abscess.

An abscess unattended with such symptoms as pain, heat, and redness, is termed a *cold abscess,* and its presence depends upon a low degree of vitality.

A *cold abscess* presents the same phenomena of pus forma-

tion as the acute form, but resembles more the growth of a tumor, as all the symptoms may be absent except the swelling. The formation of pus on the surface of a tissue, such as mucous membrane, is not so serious as that in an abscess, as the conversion of the leucocytes into pus requires but little more increased activity than in cell germination. The exudation takes place from the network of capillaries which exist beneath every mucous membrane, and which furnishes nourishment for the constant renewal of the epithelium, and any injury received causes a fluxion of blood to the capillaries, which increases the cell proliferation. The effect is, then, to promote an increased discharge from the surface of the membrane, in the form of pus. Suppuration from mucous membrane usually causes pain, heat, increased redness, and swelling of the inflamed surface, owing to the exudation into the meshes of the connective tissue beneath, and recovery is characterized by diminished fluxion of blood to the affected part, and consequent lessening of cell production; the cells resume their function of producing epithelial tissue, the pus becomes thin and more fluid, and finally ceases when the normal conditions again appear.

Hectic fever is a symptom of destructive inflammation, and is a persistent, low form of continued fever, characterized by remission and exacerbation morning and night. This form of fever is caused by absorption into the blood of some of the products of inflammation, in such quantities and so gradually as not to produce an immediate fatal result, and inducing a regular succession of chill, fever, and perspiration during the space of every twenty-four hours. Its effect is progressive emaciation and a tendency to fatal termination, if the cause is not removed, through combustion of tissue material to supply the fever heat. The regularity of the night sweats, and the pulse retaining its frequency during the apyrexia, even in the morning, when the temperature is normal, are the diagnostic signs of hectic from typhoid and malarial fevers.

The most unfavorable symptoms of hectic fever are the higher fever in the evening, the increase in the frequency of

the pulse, the more exhausting night sweats, with the occurrence of aphthæ in the mouth, and diarrhœa.

CHRONIC INFLAMMATION.—Chronic or asthenic inflammation is a process in which all the cardinal symptoms of inflammation may be present, but in less degree than in the acute form. In chronic inflammation there is present a permanent local hyperæmia, attended with an exudation into the interstices of the inflamed part, or from its surface. The pain in this form is usually slight, or may be intermittent, or even absent, or be no more than an itching sensation; heat is present, but is not a prominent symptom; the redness is of a light hue, sometimes livid, from passive hyperæmia and the stretching of the vessels by the over distention to which they had before been subjected, and the diminished force of the circulation; the swelling is in the form of induration, owing to the exudation having become organized into tissue. This latter accounts for the hardness around an indolent ulcer, and an old sinus. *Inflammatory induration* consists of the new tissue growth in the state of more imperfect organization than the normal cicatricial tissue. In mucous membranes induration is indicative of chronic inflammation, and is caused by exudative infiltration into the substance of the submucous connective tissue, and a considerable change of structure in these membranes often occurs. Although the symptoms of chronic inflammation are present in a limited degree, yet they are more persistent, on account of the object for which the increased nutritive effort was made proving unsuccessful.

ULCERATION is a passive process, and results from the molecular death caused by insufficient blood supply, insufficient nervous influence, impure quality of blood, or the presence of blood poison. Ulceration is very closely associated with inflammation, although the former may be independent of the latter, and consists of a progressive softening and disintegration of successive layers of the affected tissue. Ulceration generally begins in a process of chronic inflammation, and in such a manner that the death of the tissues only occurs when the tissues themselves have undergone cellular

infiltration in consequence of the inflammatory changes. The loss of the integument leaves a red, raw surface, which bleeds easily, and which is covered with a tenacious, slimy matter. Very soon irregular cavities are formed in this surface, separated by red elevations with ragged edges. A thin, serous, bloody discharge exudes, with severe pain of a gnawing character. The ulcer then formed, and which has been defined as "a wound surface having no tendency to heal," spreads more or less rapidly, and the surrounding integument is hot and swollen, and the disintegrated tissue is thrown off as extraneous matter. Ulcers also originate from pustules that fail to heal after the pus escapes, but spread and maintain an acute inflammatory character. An ulcer may be circular, crescentic, irregular, in the form of a shallow or deep ring, or it may be tubular, forming a fistula.

The edges of an ulcer are either low or raised, hard (callous), soft, jagged, vertical, everted, or undermined, etc. Ulcers arising from persistent local irritation, as those of the oral mucous membrane, usually heal as soon as the affected parts are placed under favorable external circumstances. As long as the epithelium is preserved, the superficial inflammatory process in mucous membranes may be called catarrh. When suppuration of mucous membranes proceeds so far as to expose the *substantia propria* or corium, the diseased surface is known as an ulcer.

Effects of Micro-Organisms.—While some of the common parasites cause injurious effects by inciting inflammation in tissues and organs, they only act as foreign bodies, while the *microscopic fungi* and their germs, acting as invisible particles of organized matter, cause the greatest injury. If they are protected from the influence of oxygen, these micro-organisms germinate very rapidly, and derive their sustenance from the fluids of the inflamed tissue and the granulating surface. The form known as *vibrio septica* generate putrefaction in animal matter by bringing about a process of fermentation—dental caries affords an example. The chemico-vital changes accompanying the process of putrefactive fermentation give rise

to *septic poisons*, which, being absorbed in the circulation, result in *septicæmia* and *pyæmia*. Dr. Koch affirms that "bacteria do not occur in the blood nor in the tissues of the healthy living body, either of man or of the lower animals," and the same investigator also says: "When introduced by inoculation into animal tissues, they multiply and excrete soluble substances, which get into the surrounding tissues by diffusion."

The tissues, by the contact of the micrococci, lose their vitality, and the parasite growth multiplies and spreads rapidly in the dead tissues, advancing directly toward the parts in which vitality yet remains.

Terminations of Inflammation.—According to the present knowledge of this subject, inflammation terminates—1st, *By Resolution;* 2d, *By Formation of New Tissue;* 3d, *By Gangrene*, or *Local Death—Necrosis*. When the inflammatory process terminates by *resolution*, all of the symptoms gradually diminish and disappear, and the affected tissues resume their normal condition. Such a result is generally due to the mild character of the injury, and the progress of the inflammation.

When the inflammatory process terminates by the *formation of new tissue*, the new growth is produced by inflammation—either by the union by first intention, or by the development of granulations, which become organized into a cicatrix.

When the inflammatory process terminates in *gangrene*, or *local death*, the effort of the inflammation toward repair has failed, either on account of the functions of the capillaries and the connective tissue becoming impeded to such a degree as to render inoperative the resources of the organisms, or because of certain conditions arising at a later period which have obstructed the reparative effort and caused the parts to lose their vitality.

The termination of the inflammatory process by *gangrene* depends upon the degree and nature of the lesion, and the inability of the capillaries and arteries to maintain the local circulation. The impairment of the vitality of the blood vessels causes stasis and thrombosis to occur, and as soon as

actual death takes place, the dead tissue presents a further obstacle to the local circulation, and also adds to the difficulty of elimination, which favors the spread of the gangrene. The earliest symptoms of gangrene are hard swelling, burning and tensive pain, and livid color. The pain then subsides, vesications appear, the part takes on a marbled, purplish-yellow color, afterward becoming brown or grayish, and finally cold and insensible, exhaling a putrid odor.

TREATMENT OF INFLAMMATION.—It has already been stated that the causes of inflammation determine in a great measure its treatment, and this is especially true of inflammation of the oral mucous membrane. The indications of treatment are as follows:—

Prevention and Removal of Cause.—Prevention may include the removal of a predisposing cause when local, or the lessening of its effects when it is general or constitutional. If malaria is present, quinine is indicated; if syphilis, iodide of potassium, or minute doses of bichloride of mercury.

Irritation, the precursor of inflammation, may often be arrested by the removal of a local cause, such as salivary calculus, for example. The restoration of the secretion of the different organs is also indicated in the treatment of certain forms of inflammation, and also the use of such palliative remedies as will allay the excitement of the nervous system. When the cause is apparent, its removal is, as a general rule, easily accomplished; but when the cause is obscure, the condition of the secretions of the bowels and the diet should receive careful attention. To correct the secretions, purgatives are indispensable; also such other depletory measures as bleeding, abstinence from food, use of emetics or nauseants to lessen the general circulation and reduce the vascular tension. To allay the nervous excitement and irritability, narcotics or opiates are indicated, their direct effect being relief of pain and spasm, and inducement to rest and tranquillity.

The advantage of *rest* and *immobility* cannot be over estimated, for a simple lesion, if subjected to constant mobility, may become one of a much greater character, destructive

inflammation often being provoked by friction and undue motion. An example is furnished in the case of periodontitis, where a cap or partial interdental splint made of modeling composition or gutta percha, or vulcanized rubber, will protect the affected tooth from irritation, and materially assist the remedial measures; also strips of adhesive plaster, collodion, etc., will insure immobility in certain cases where such appliances are indicated, as undue motion retards and prevents the process of healing.

Position is also to be considered as a means for relieving the irritation and pain, so that no provocation may exist for subsequent inflammation. The best position should be selected for the affected part, which will favor the return of venous blood and retard the arterial current; hence, an elevated position will tend to prevent passive hyperæmia. A favorable position will also secure muscular relaxation, and prevent the involuntary spasmodic action, which may result from muscular tension. The administration of an anæsthetic to secure muscular relaxation, in the case of certain injuries, as in fracture or dislocation of the jaw, is often resorted to as a measure against spasmodic contraction, and also to reduce the excessive vascular reaction.

Cold, when outwardly applied as a depressor to the inflamed part, reduces the excitement and irritability. The application of the spray of absolute ether, or of rhigolene, will often prove serviceable in the early stage of periodontitis. Cold, whenever moderately applied, is tonic and invigorating, and besides evaporating applications, ice may be employed; but such local measures to maintain a low temperature must be renewed at short intervals. Cold, when locally applied, causes the capillaries to contract, thus diminishing the afflux of blood to the affected tissue. The persistent application of cold, however, may cause gangrene; but the employment of the ether or rhigolene spray is attended with less danger in this respect than that of ice applications. A granulating surface, on the other hand, develops better in a warm temperature.

Heat and Moisture.—Heat is also, under certain circum-

stances, a valuable antiphlogistic. Dry heat will mitigate pain, and heat with moisture, in the form of a poultice, is very commonly used to relieve the pain and tensive heat of local inflammation by its soothing and relaxing effect. While cold has an astringent, sedative effect, and constringes the capillaries of the inflamed tissue, thus promoting healing by resolution, moist heat is relaxing and promotes exudation, if not suppuration, leading to repair by "the second intention." The use of cold is dispensed with in inflammatory conditions as soon as it is apparent that the termination of the inflammation by resolution is impossible, when resort is had to poultices or warm fomentations, such as flaxseed and slippery-elm bark, to which vaseline, boracic acid, or a weak solution of carbolic acid may be added, to prevent fermentation in the poultice, and putrefaction in the wound. To relieve pain, tincture of opium may be applied to the surface of the poultice, a water dressing, composed of cloth saturated with warm water or a medicated solution, such as boracic acid or biborate of sodium. The local warm bath is also another method of applying heat and moisture, as the granulations of a surface immersed in tepid water develop favorably; and an ulcerated surface which has been subjected to a prolonged warm bath, made antiseptic by carbolic acid, or the application of an eight per cent. solution of chloride of zinc, is greatly benefited. Warmth and moisture are especially indicated for parts having a feeble circulation. Warm, moist applications, such as poultices, promote the tendency to suppuration; hence, care should be observed in applying such applications to the surface of the face, in the case of an alveolar abscess, as pointing and the escape of pus may be induced in a position where permanent disfigurement would be very apparent.

Compression is also of service in the treatment of certain forms of inflammation, especially during the late stages, but it must be uniformly, moderately, and continuously applied. Even in the acute form, compression may prevent the over-distention of the capillaries and limit the exudation; in the chronic form, compression promotes absorption. It is accomplished by

means of bandages, either alone or in conjunction with cotton batting, as the latter prevents irregular constriction and maintains a uniform temperature. A fine compressed sponge, moistened, after it is applied, with tepid water, is a painless and effective means for obtaining compression in the treatment of indolent ulcers. Compression by means of sheet lead or tin, and pads of bibulous paper, will often prevent an alveolar abscess from discharging on the surface of the cheek or neck, when such an event is imminent.

Bloodletting.—General bloodletting is now rarely employed in the treatment of inflammation; but the local abstraction of blood by means of leeches, cups, scarification, incisions, and other means, is of great service in reducing vascular action, and lessening inflammatory symptoms. The efficiency of local depletion in relieving hyperæmia is very evident by the cessation of pain caused by strangulation and tension. Periodontitis and acute gingivitis furnish examples. Leeches should never be applied to a part where it would be difficult to arrest the hemorrhage which may follow their use; their application is also contraindicated in the case of children, who cannot bear the loss of considerable blood with impunity.

Incisions are made for the purpose of relieving tension and pain, evacuating pus, or the escape of dead material, for tension aggravates the inflammation and the retention of pus in an abscess prolongs the pain, and also adds to the destruction of parts by the formation of gangrenous patches. Superficial incisions will relieve the tension of the skin and mucous membrane, and also evacuate the pus of an abscess when it is near the surface.

Deeper incisions are necessary when the pus is at a greater distance from the surface, and there is considerable tension. Incisions are also often judicious as a prevention of suppuration and ulceration; also in cases where the presence of pus is suspected, but there is no apparent fluctuation. In making deep incisions, care is necessary to avoid wounding arteries and nerves; hence the director should precede the use of the knife. In acute abscesses the incisions should be made at an

early stage, and of such a size as will permit of the free evacuation of the pus, and in the most depending position, to insure its easy discharge. Hence, as soon as fluctuation is detected in an acute abscess, the incision for the escape of the pus should be made; while in the case of a chronic or cold abscess, the incision may be delayed, or a puncture with a trocar substituted for it, which may at once be closed.

Drainage is employed for the purpose of giving outlet for any matters liable to collect in a wound or abscess which may act as obstacles to the process of repair. Teeth affected with abscess are often relieved and retained by an opening made into the pulp canal or into the abscess sac, sufficiently free to relieve the tension and drain off the accumulated pus; also in the case of abscess of the antrum, where an opening made through the alveolar cavity of one of the roots of a posterior tooth is kept open by means of a canula, to relieve the tension and permit the pus to escape as it accumulates, and also to afford an easy entrance for the injection of antiseptic and stimulating agents in the treatment of such cases. Drainage can also be made through soft tissues, such as the gum, etc., by strands of floss silk, hemp thread, and horse hair, dipped in a carbolic acid solution before they are inserted into the opening connected with the sac; also by means of caoutchouc tubing.

Counter-Irritants, or "derivatives," are also employed in the treatment of inflammation, for the purpose of inducing an afflux of blood from the locality of the inflammation to another point in close proximity, thus relieving the vessels of the affected part. Such counter-excitement in the case of the oral mucous membrane, is induced by blistering applications, stimulants, escharotics, etc., which excite a new action in a part more or less remote from the focus of inflammation.

Cantharidal collodion, tincture of iodine, either alone or in combination with aconite, or with creasote, or with carbolic acid, nitrate of silver, nitric acid, and the actual cautery, may be named as the most common counter-irritants for application to the oral mucous membrane in the case of deep-seated

inflammation and pulpitis; and are mainly useful in the early stage of the acute form, and in the chronic form.

Mouth Washes and Lotions, such as tincture of myrrh, chlorate of potassa, solutions of carbolic acid, listerine, permanganate of potash, nitrate of silver, sulphate of copper, sulphate of zinc, oxide of zinc, lead water, tincture of opium, etc., are employed with benefit in superficial inflammations and ulcerations of the oral mucous membrane.

When putrefaction is present in the inflamed part, chlorinous washes are serviceable for deodorizing purposes, and also to prevent the entrance of putrid matter into the circulation. The object of cauterizing an inflamed part is to break the continuity of the morbid process.

Anæsthetics, such as chloroform, ether, etc., when employed in the treatment of inflammation, exercise an influence as preventives, and also render lax tissues which become very rigid, and enable reductions to be made, as well as temporarily mitigating the pain; fracture and dislocation of the jaw are examples.

When inflammation has devitalized parts, the treatment varies in respect to the nature of such parts. Dead, soft tissues are to be so treated that the putrid matter is prevented from entering the circulation, by the application of antiseptic agents, which have in a great measure replaced antiphlogistics; hence, antiseptics which possess the power of destroying micro-organisms without the danger of destroying the vitality of the tissues, are considered to be the most active agents of this class. When the hard tissues are devitalized, such as bone, for example, although the living bone becomes separate from the dead portion as effectually as a living soft part from its slough, yet it is necessary to liberate the bony sequestrum from the overlying texture which may confine it; hence the removal of dead bone is necessary as soon as the line of demarcation is formed, the time for which may vary from a period of less than three weeks in the case of small sequestra, to more than two months, where the entire bone is involved. Also in cases where the extremity of a part consisting of soft

and hard tissues, for example, the alveolar process and tissues over it, become gangrenous, it is best, in most instances, to remove the dead tissues by amputation; and such an operation may also become necessary in cases of long-continued exhaustive suppuration. Many forms of inflammation have their special remedies, such as mercurial inflammation of the mouth, when chlorate of potash is indicated; periodontitis, when tincture of iodine and tincture of aconite, or creasote, or carbolic acid, in combination with the iodine, etc., are indicated; gingivitis, where stimulating and antiseptic washes and lotions of tincture of myrrh, biborate of soda, carbolic acid solutions and combinations, etc., are indicated.

General Remarks.—In every case, the first object should be to ascertain and, if possible, remove the cause of a disease. It should be remembered that medicinal substances are always more certain in their action when applied directly to the affected tissue; also, that chemical, physical and vital changes result from the topical action of such substances; and that *age* modifies the effects, and also determines the dose; also, *sex*, owing to the greater susceptibility of the nervous system in females than in males; also the *temperament*, as the sanguine, for example, is more susceptible to the influence of medicinal agents than the phlegmatic; also *habit and mode of life*, as the habitual use of such agents as stimulants lessens their influence, and the *occupation* affects the susceptibility to external influence; also *the condition of the body*, as different diseases exercise considerable influence on the effects of medicinal substances; also *the mind*, as a hopeful mind conduces to the beneficial action of medicines; also *idiosyncrasy*, as some individuals are more susceptible to the action or effects of medicinal substances than others; also the *nature of the tissue or organ* to which application is made, as some are more susceptible to the effect of medicinal agents than others, owing to rapidity of absorption and the degree of decomposition of the substance employed; also *climate*, from the recognized influence of climate in modifying the structure and functions of the animal economy, and increasing or diminishing morbid

conditions, and by such means influencing the effects of medicinal agents.

In most acute diseases there is a tendency to recovery after a certain time has elapsed, in case there is no failure in the functions of any of the essential organs; hence, in all acute diseases, the state of the nervous system should be carefully watched.

When the affection is not of a serious character, such symptoms as are especially troublesome may be relieved; but when the nervous and vascular systems are affected, both locally and generally, then it is necessary that the proper measures for their relief be promptly taken.

Where mucous membrane is the seat of the affection, it is often possible to remove the exciting cause. There are also many inflammatory affections met with, where, from the beginning, there is a diminished action of the heart, and a depressed state of the nervous centres. In the treatment of such cases, the depressed condition of the general system chiefly requires attention, as the progress and termination of the local affection depend upon the cause from which it has originated.

There are also morbid states not necessarily dependent on organic disease. Various acids are produced by the fermentation of substances containing starch or sugar, and there is reason for believing that an increased secretion of acid may take place from the mucous membrane of the stomach and produce symptoms of acidity independently of fermentation, although one of the properties of the gastric fluid is to prevent fermentation. The symptoms of acidity are a sour taste, and the occurrence of acid eructations, often accompanied with heartburn, and sometimes with diarrhœa, and a feeling of sinking at the epigastrium.

In these cases the cause must be sought for, and such treatment instituted as will neutralize the acidity and stimulate the peptic glands to an increased secretion of the digestive fluid; also such as will regulate the bowels. Due attention must also be given to the diet, which should consist of such sub-

stances as will not readily ferment, and all food containing starch should be avoided.

Although topical remedies are more generally employed in the treatment of dental affections, yet there are many diseases of the oral cavity which are due to remote causes, and require constitutional as well as local treatment.

The appearances presented by the mucous membrane of the mouth are valuable, as indicating the state of other parts more remote; and it is frequently the case that, when the constitutional affection is overcome, the local symptoms disappear as a consequence, or become very amenable to local remedies.

IMPORTANT POINTS IN DIAGNOSING AFFECTIONS OF THE MOUTH, WITH A SYNOPSIS OF TREATMENT.

The Irritation of Teething is indicated by a hot, swollen and tender condition of the gums, fretfulness, irritable temper, refusal of nourishment, fever and thirst, and, if not relieved, diarrhœa with offensive motions, sometimes a troublesome cough, convulsions, and other serious results.

An Abnormal Dentition is indicated by a hot, dry mouth, swollen gums, tense, tender and shining, fever, disordered bowels, fretfulness, eruption of skin, diarrhœa, convulsions.

Convulsions of Dentition are indicated by such premonitory symptoms as irritable temper, unusual brightness of eyes, indisposition to eat or sleep, slight involuntary movements of muscles of face or extremities, grinding of teeth. The paroxysm is indicated by rigidity of body, utterance of a cry, face turning red or purple, veins of neck turgid, suspension of respiration, loss of consciousness, irregular and intermittent contractions of muscles, protrusion of tongue, frothing at lips, distortion of face, rolling of eyeballs, contracted and rapid pulse.

Treatment.—For the relief of the premonitory symptoms of dentition, bromide of potassium in doses of gr. iij to v, according to age, every ten minutes. Demulcent and soothing lotions to the gums. An aperient if no diarrhœa is present. For more decided symptoms, scarification or lancing of the gums.

An enema of soap and water to relieve the digestive canal of irritating substances, or the use of the following combination to abate the fever and allay the irritability of stomach and bowels:—

℞. Potass. bromidi pulv. . . . . gr.xv
Potass. nit. pulv. . . . . gr.xij
Zinci oxidi . . . . . gr.ij M.
Divide in chart., No. VI.
SIG.—One powder every four hours, until bedtime.

For the diarrhœa: change the diet, adopt hygienic measures; mild purgatives in small doses. For acid dejections, calcined magnesia; or small doses of sulphate of magnesia and tincture of rhubarb; or of pulv. ipecac., pulv. rhubarb and bicarbonate of soda; or castor oil in doses of ℥ss. For infancy diarrhœas Dr. Thomas claims excellent results from the following mixtures in gastric or gastro-intestinal dyspepsia, characterized by nausea, vomiting, flatulence and diarrhœa with non-slimy, fetid, yellowish or greenish stools. ℞. Lactic acid, ℥j; simple syrup, ℥v; water, ℥iijss. M. Sig.—One drachm every quarter to half hour after meals. (See Dr. James W. White's recipes under opium, chloroform, aromatic sulphuric acid and bromide of potassium.)

For convulsions: the administration of an anæsthetic to abort or control the spasmodic movements; hydrate of chloral, gr. v to x, according to age, dissolved in two or three drachms of water, and injected into the rectum; or the administration of bromide of potassium; use of hot foot bath, to which is added a small quantity of mustard; the warm bath; and when cerebral congestion is threatened, cold applications to the head.

According to Dr. A. Brothers: 1. Dentition is rarely, if ever, a direct cause of death.

2. Precocious or retarded dentition may occur in otherwise healthy children or in entire families.

3. The period of eruption of the first teeth occurs, in healthy, breast-fed children, at six and a half months in the vast majority of cases, and first dentition is usually complete at thirty months.

4. Dentition is distinctly retarded in the first as well as the later teeth in children brought up on a mixed or artificial diet.

5. Congenital diseases—tuberculosis, syphilis, endocarditis—seem to have a retarding influence on dentition.

6. Rachitis has a very pronounced retarding influence on the whole course of dentition.

7. Scrofulosis seems to hasten the eruption of the first teeth, but does not affect the later teeth.

8. In cases of undeveloped brain—idiocy—there is a marked retardation during the entire period of dentition.

9. Chronic diseases have a retarding power over the first teeth, but do not seem to influence the later teeth.

10. Children suffering from marasmus seem to be precocious with the first teeth, but delayed with the later teeth.

11. Cases of epilepsy, developing in early infancy, seem to have their first teeth appear early.

Periodontitis or Inflammation of the Peridental membrane is indicated by a sense of uneasiness and fullness, which is at first relieved by pressure, but after active inflammation is established, pressure on the affected tooth causes intense pain, of a dull, heavy, annoying character. The tooth is also protruded, to a slight degree, from the alveolus, and also somewhat loosened, owing to the thickening of the investing membrane; and the inflammation, which is at first manifested by a red line near the margin of the gum, becomes general over the entire root, sometimes involving the neighboring gum, and even the palate and cheek, and symptoms of febrile disturbance. If not arrested, a suppurative condition, alveolar abscess, ensues. A modification of the symptoms just enumerated, the tooth being tender to pressure, more or less raised in its cavity, and surrounded by a reddened and swollen gum, with a varying amount of pain, and the discharge of pus from around the neck, or from a fistulous opening in the gum, and such symptoms continuing for a long time, indicate the chronic form of an advanced state of periodontitis, which often results from systemic influences.

Treatment.—Remove all irritants; apply counter-irritants, such as equal parts of tinct. iodine and tinct. aconite; or cantharidal collodion; or iodine and creasote, or carbolic acid; or capsicum in form of tincture, or in small bags of the powder to surface of gum over root of affected tooth. Depletion by the lancet, leeches or cups. Hypodermic injection of morphine, or tinct. of opium. Application of spray of rhigolene or absolute ether until gum is blanched. To relieve pain, a solution of equal parts of tinct. aconite, tinct. opium, and chloroform; or lead water and tinct. opium. Constitutional treatment: Saline cathartics; bromide of potassium, gr. xxv, combined with gtt. v of tinct. veratrum, every four hours; or bromide of potassium alone, in doses of gr. xxv or xxx. The tooth protected from irritation during treatment, by a cap over adjoining teeth. The removal of the extremity of the root of a tooth affected with chronic periodontitis, by means of a trepan, has also been suggested.

Alveolar Abscess is first indicated by pain of a constant character, which is afterward aggravated at each pulsation; then swelling about the roots of the affected tooth, which at length becomes defined and prominent, and afterward points and discharges pus, when the active symptoms subside. The development of alveolar abscess is indicated by such constitutional symptoms as foul tongue, offensive breath, hot skin, thirst and headache, and when the suppuration is considerable, symptomatic fever and rigors.

The characteristic pain of an alveolar abscess is deep-seated and throbbing, and, with the swelling, denotes the formation of pus. *A chronic form of alveolar abscess* is indicated by a subsidence of the active symptoms, and a continuance of the discharge of small quantities of pus through a fistulous opening opposite the root of the affected tooth, or about its neck. An elastic fluctuating swelling in any part of the face, or for some distance down the neck, may result from abscessed teeth.

Treatment.—Remove all irritants. Give free vent for the escape of the pus. Destroy sac of abscess by therapeutic

treatment, or by a surgical operation. Therapeutic treatment: First cleanse the root canal by injections of chloride of sodium or peroxide of hydrogen; then apply escharotics to destroy the sac, such as creasote, carbolic acid, salicylic acid, nitrate of silver, iodine, dilute aromatic sulphuric acid, to which, in chronic cases, add tinct. of capsicum; also antiseptics. The surgical method consists in gaining access to the sac, by means of a bistoury or small trephine, through the fistulous opening, where such exists, and detaching and breaking up the sac by means of suitable nerve instruments and the application of escharotic agents. Dr. Brophy, speaking of cases of alveolar abscess where the disease is in the bone, says: "In such cases if the treatment is simply opening into the tooth for drainage with the expectation that nature will effect a cure, we will be disappointed. In such cases an incision should be made down to the diseased bone, packing it with iodoform gauze, or boracic acid gauze. The next day with a bur cut off the affected portion of the roots of the teeth because they are a source of irritation; then with a bud-bur pass over the bone, and remove the dead portions, and again pack the wound with antiseptic gauze. In a day or two make an examination, and if healthy granulations are beginning, insert a wax plug, which is not permeable like the gauze, to prevent the wound from closing, and the consequent trouble from confined pus."

Alveolar Abscess about to point Externally is indicated by the skin, for some distance around the central point, becoming red and distended, with a throbbing sensation, succeeded by a change in the appearance of the skin to a thin and scaly surface, from which the epidermis scales off. The integument becomes glued down to the bone around the spot where the pus will ultimately appear; the latter following a fistulous track between the diseased tooth and the surface of the cheek, the fistula remaining open and discharging as long as the inflammatory action continues.

Treatment.—Make a free incision in the gum opposite and near the apex of the root of the affected tooth. Apply to the

surface of the threatened point of exit of the pus alcohol or spirits of camphor, or paint with collodion, and make gentle pressure by means of a compress of sheet lead or sheet tin, or pads and bandage, to change the direction of the pus.

Abscess of the Antrum is indicated by a discharge of pus into the nose, sometimes producing scarcely any discomfort; at other times the severest local and constitutional suffering; an aching pain in the cheek, which is hot, flushed and somewhat swollen; and as the symptoms increase, greater pain, of a throbbing character, with the rigors and fever peculiar to suppuration; an expansion of the bone of the upper jaw; an elevation of the malar bone, with a very apparent depression beneath it; the molar teeth on the affected side depressed so as to appear elongated, and to prevent the proper closure of the mouth; an increase of pus; the palate losing its concavity and becoming convex; the nostril of the affected side being encroached upon, and, in protracted cases, the floor of the orbit of the eye so pushed up as to force the eye partly from its socket; the sight affected by the stretching of the optic nerve; the walls of the antrum becoming so thin as to afford evidence of fluid-fluctuation on pressure; at length the pus escaping through the cheek, or into the nose, or burrowing along the side of a root of a tooth and discharging into the mouth; the floor of the orbit giving way and the pus discharging along the lower eyelid.

Treatment.—Make an opening into the antrum, either through the alveolar cavity of one of the roots of a superior first or second molar, or through the process about the roots, with a suitable trephine, and thoroughly wash out the cavity with a warm injection of salt ℥j to water Oss, and if there is an offensive odor, syringe with a solution of permanganate of potash; then dress daily with a solution composed of carbolic acid one part, and oil of sweet almonds fifteen parts, applied on cotton secured in the cavity. If no improvement, then syringe the antrum with a solution consisting of carbolic acid ℥j, tinct. iodine ℥j, water ℥viij. Where a more powerful stimlant is required, use an injection of chloride of zinc, gr. x to

the ounce of water. For systemic treatment, administer sulphide of calcium in the form of one-tenth of a grain pill three times a day, after meals, doubling the dose if necessary. (*Dr. Frank Abbott.*)

Alveolar Ulceration is distinguished from alveolar abscess by the presence of an ulcerated surface of peridental membrane instead of pus confined in a fibrous sac, the purulent matter in alveolar ulceration oozing out through the gum or around the neck of the affected tooth: no new tissue is formed, as in the case of abscess, but the normal tissue is disorganized and wasted, and the matter discharged is watery, translucent, and may be in some cases odorless, while that from an abscess is thick, opaque and offensive. Ulceration causes little or no swelling, and the inflammation is phagedenic in character, destroying hard and soft tissues by chemical decomposition. Like alveolar abscess, it may be due to the death of the pulp, and it may begin as abscess, not being a primary disease, but always preceded by some other well established and usually chronic affection. In alveolar ulceration a considerable portion of the peridental membrane is destroyed, and there is a wasting away of the alveolus and cementum in the region of the ulcer, whereas in alveolar abscess the peridental membrane may remain in an inflamed and morbid condition and the alveolar walls firm and penetrated at one point to permit of the escape of the pus. In long-continued alveolar ulceration, as a result of the disease, calcareous deposits, in the form of granules, collect on the root from the ulcerated area to the margin of the gum.

The treatment consists in the thorough removal of the calcic deposit when present, and the scraping of the root of the tooth over the entire ulcerated surface, and the application of antiseptic and astringent remedies.

Maxillary Abscess may be due to caries or the diseases of the teeth, or to pathological changes occurring in the structure of the bone itself.

Treatment.—The treatment of maxillary abscess consists either in puncture or incision, and the extraction of one or

more of the teeth if they are found to be connected with the origin of the disease. If free drainage be established by an early incision, the arrest of the disease is practically secured; it is sometimes necessary to remove a portion of the alveolar process. The presence of dead bone should be determined, and such removed, with other offending matter. Free drainage should be maintained until complete recovery is brought about. The abscess may be opened under cocaine anæsthesia, a soft rubber drainage tube be inserted, and the cavity thoroughly irrigated and disinfected with a 1 to 2,000 bichloride of mercury solution. A safety pin may be placed at the external end of the tube, and a strip of iodoform gauze put between it and the skin; over this the ordinary bichloride gauze dressing may be secured by a roller bandage.

Necrosis of the Alveolar Process is indicated by a dark purple and swollen condition of gum, with offensive purulent discharge from one or more fistulous openings, or from between the gums and the teeth. The gum becomes soft and spongy, very sensitive, bleeds readily, and loses its connection with the necrosed bone beneath.

Treatment.—(See Necrosis of the Jaws.)

Phosphor-Necrosis is indicated by pain in jaw, similar to odontalgia, at first not constant, but soon becoming severe, and extending along side of the head, and to the shoulder, with swelling and great tenderness near the seat of the affection, the integument becoming red and tense, the teeth elongated and extremely painful when closed together, and also becoming loose; the gums and mucous membrane of the cheeks swollen and livid; at length, suppuration ensues, with fever, rigors, etc.; gums become spongy, with escape of pus around necks of necrosed teeth, and the pus fetid, and the swelling very great, especially when the lower jaw is affected; a dense plastic exudation encases the under and external surface of the bone; intense glistening redness of the skin, as the pus approaches the surface; at length, intense fever, with delirium and great suffering; the throwing out of a bony deposit of a peculiar appearance, like pumice-stone.

Treatment.—Removal of patient from exposure to fumes of phosphorus, and the excision of diseased portion of bone.

Fracture of the Alveolar Process is indicated by a swollen, red and painful state of gum and tissues covering maxillary bone, occurring some days after the receipt of the injury, and, if neglected, may result in necrosis of the bone.

Treatment.—Antiphlogistic lotions, to reduce the inflammation, such as—

℞. Plumbi acetatis . . . . . ℥j
Tinct. opii . . . . . ℥ss
Aquæ . . . . . ℥x. M.
SIG.—Apply on lint.

Remove any detached portions of process, and secure loose teeth with waxed sterilized ligatures.

Mercurial Poisoning, or Salivation, when of a mild form, is indicated by a red margin of the gum, which eventually becomes somewhat spongy and tender, with a slight fetor of the breath and a metallic taste.

An increased degree of salivation, or *mercurial stomatitis*, is indicated by a profuse flow of saliva, intense fetor, strong metallic taste, tenderness of the gums, stiffness of the jaws, followed by ulceration and sloughing, if the injudicious use of the mercury is persisted in.

Treatment.—Discontinue use of mercury. Chlorate of potash, internally, gr. x, in water ℥ss: as a gargle, ℥j, to water ℥j; or iodide of potassium in doses of gr. iij, three times a day. To correct fetor of breath, permanganate of potash solution, gr. ij to x, to the ounce of water; or washes of chlorinated soda; astringent washes during convalescence. Loose teeth should not be removed, as they will again become firm.

Lead Poisoning is indicated by a blue line upon the edge of the gums, and such constitutional symptoms as paralysis and colic attend severe cases.

Treatment.—Administration of iodide of potassium in gr. iij

doses, four times a day, after meals, to eliminate the lead; saline cathartics, electricity, strychnine, etc., for the paralysis, and tonics, such as quinine, to promote the strength.

Scurvy is indicated by a general spongy condition of the gums, and, in severe cases, intense fetor, ulceration and sloughing together with constitutional symptoms of an aggravated character. The premonitory symptoms in the mouth are, gums paler than usual, with a slight tumid or everted line on free margins, and slight tenderness on pressure; breath offensive, and a disagreeable taste; tongue flabby and larger, though clean and pale. Later, the gums become darkened in color, inflamed, swollen, spongy, bleed readily, and finally separate from the teeth. The gums of edentulous jaws do not present these symptoms. At length, the gums present great, fungous, lacerable excrescences, which are prone to suppurate and become a brown, fetid mass, with a very offensive odor. The salivary glands become enlarged and swollen; tongue indented by the teeth, which latter become coated with a salivary deposit, and finally drop out. Necrosis and extensive exfoliation of the bones of the jaw may occur. Some varieties of salivary calculus will produce similar local symptoms, especially when the general condition of the system is unfavorable.

Treatment.—Change of diet, substituting fresh meats, soups, nitrogenous food, and recent vegetable acids, as citric, tartaric, and acetic, and these combined with potassium. Nitrate of potassium, either alone or mixed with vinegar, as an anti-scorbutic.

A Simple Form of Stomatitis is indicated by slightly elevated, reddish, glistening patches on the mucous membrane, which may coalesce, so that the whole surface is involved.

Treatment.—Emollient and detergent lotions, such as slippery-elm bark, pith of sassafras, or borax, ℥j, glycerine, ℥j, or, borax, ℥j, honey, ℥iij, or a weak solution of alum, or acetate of lead, gr. iij to the ounce of water. A few doses of bromide of potassium will relieve the nervous excitement. Chlorate of potash lotion, gr. v to the ounce of water, is also efficacious as a local remedy.

Ulcerous Stomatitis, common to childhood, is indicated by ulceration commencing on or near the gums, more frequently in the lower than in the upper jaw, and usually on one side only, and spreading over the entire mouth. The gum first becomes thickened and congested, and of a deep purple color, and bleeds readily; ulceration speedily occurs, and exposes the necks of the teeth, and extends to the mucous membrane of the mouth generally, the ulcerated surface being covered with a dirty-white or yellow exudation, leaving exposed numerous bright red points on a yellowish ground. The edges of the ulcers are sharp and ragged, and the ulcer, at first superficial, becomes gradually deeper. Ulcers of the mouth are often due to syphilis and dyspepsia, and are aggravated by the irritation resulting from the irregular edges of fractured and decayed teeth. When neglected, such ulcers may assume the appearance of epithelioma, especially when induration of the glands beneath the jaw is present.

Treatment.—Remove all apparent causes of irritation. Change diet and residence, if at fault, observe cleanliness, administer tonics, as liquor ferri nitratis with tincture of calumba. Local applications of nitrate of silver, gr. j to iij to the ounce of water, or diluted muriatic acid, alternating with a lotion of equal parts of borax and honey, or chloride of lime, ℥j, honey, ℥j. Chlorate of potash internally, in doses of ℥ij or iij, and also as a lotion, is efficacious; also a strong solution of borax, in obstinate cases, gr. xv to the ounce of water; also a solution of sulphate of copper.

Ulcers of the Mouth due to Syphilis are indicated when such ulceration is obstinate under any but specific treatment, and when accompanied by symptoms peculiar to syphilis.

Treatment.—Constitutional treatment with mercury or iodide of potassium, and such local remedies as are employed in ulcerous stomatitis.

Syphilitic Inflammation of the Mucous Membrane of the Mouth is indicated by a general swelling of the gums, with everted and ulcerated margins, exposing the necks of the teeth, although not affecting, to any great degree, their stability, with

a viscid discharge, mixed with blood, from about their necks; soreness, rendering mastication painful; the affection slowly spreading, until the bone is exposed and a portion exfoliated; greater degree of congestion; formation of mucous patches on sides of cheeks; superficial ulcers inside of cheeks and beneath the tongue; erosions of the soft palate and tonsils: fissures at corner of the mouth, and eruptions on skin and scalp.

Treatment.—(See Ulcers of the Mouth due to Syphilis.)

Gangrenous Stomatitis, common to children during the shedding of the temporary teeth, is indicated by a thick swelling of the face; skin tense and shining; swelling becoming hard and circumscribed, but devoid of tenderness, with a central spot, red and variegated in appearance; the formation of an ulcer, corresponding to the red spot outside, on the inside of the cheek; profuse salivation, the ulcerated part becoming gangrenous, with an opening through the cheek; absence of pain and destruction of parts.

Treatment.—Preventive: Pure air, cleanliness, nourishing diet. Sulphate of quinine, internally, in doses of gr. ij to iij; and as a lotion, sulphate of zinc, ℥j to the ounce of water. When the disease is established, the local use of escharotics, as acetic, sulphuric, nitric, hydrochloric acids, nitrate of silver, acid nitrate of mercury, or chloride of antimony, each applied by means of a camel-hair brush to gangrenous part, and at once followed by the application of dry chloride of lime. The mouth to be washed out with tepid water, by means of a syringe. After the separation of the slough, the dry chloride of lime alone may be used. The muriated tincture of iron is also employed; and after the gangrene is arrested astringent lotions are efficacious.

Scrofula.—In early life the characteristics are most apparent. Tendency to enlargement of lymphatic glands; proclivity to certain forms of skin eruption; to disease of the joints and bones; the efforts necessary for growth and development overtax the defective vital powers; defective quality of the blood and tissues, and especially of the vascular tissue;

injuries such as sprains end in chronic disease of the joint. A scrofulous child may grow finely for several years, and then, without adequate cause, be overtaken by meningitis, or disease of vertebræ : inflammations are prone to take on chronic form.

Treatment.—Pure air of country, cod-liver oil and malt, iron and hypophosphites to increase the quantity of nutritious constituents of the blood.

A Tumor of the Upper Jaw is indicated by a gradually increasing prominence of the cheek, which more or less involves the mouth, obstructing the nostril, causing double vision by displacing the eyeball.

Treatment.—Removal by a surgical operation.

A Malignant Form of Tumor of the Jaws is indicated by a solid prominence, rapid in growth, and having a tendency to invade surrounding structures, and to fungate like a mushroom.

Treatment.—Removal by a surgical operation, and the application of escharotics, as chromic acid, or chloride of zinc, etc., to prevent its reproduction.

A Dentigerous Cyst.—Cysts of the teeth are of two kinds—those connected with the roots of developed or erupted teeth, and those connected with imperfectly developed or unerupted teeth, and both varieties are common to either jaw; the latter, however, are known as "dentigerous cysts." A dentigerous cyst is indicated by the expansion of the bone of the jaw at some particular spot, with disfigurement of the adjacent parts; a sense of weight and tension in the affected part; in some cases, constitutional irritation from pressure; pressure producing a parchment-like crackle or crepitation; absence of a tooth, which has never been erupted nor extracted. Heath remarks that "the clinical history of cysts connected with the teeth is that of painless expansion of the alveolus of either jaw, but more frequently of the upper, with crackling of the bone on pressure, and ultimate absorption of the bony wall. The cyst then presents a bluish appearance through the distended mucous membrane, and if large, gives distinct evidence of fluctuation."

Treatment.—A free incision, and the removal of the unerupted tooth by destroying the front wall of the cyst, and the cavity filled with lint, so as to induce granulation and gradual obliteration. In the case of a cyst of the lower jaw, after the removal of the contents and a portion of the wall, the plates of bone should be pressed together as much as is possible.

An Unerupted Impacted Tooth is indicated by a hard bony tumor on the alveolar ridge, sometimes extending along the surface of the palate bone, or the body of the maxilla, and in form corresponding to a tooth, the absence of which is noted.

Treatment.—Extraction, by first making an incision through the mucous membrane, and then exposing the tooth by the removal of its bony capsule.

Necrosis of the Jaw is indicated by inflammation like that of periodontitis in the early stage, but differing as the disease progresses; gum over affected part thickened, tumid and of a red color; pus oozing from the edge of gum, which soon separates from the alveolus, the margins of which become exposed; loosening and loss of the teeth; the detachment of the dead alveoli from the living bone, and remaining loose in the substance of the thickened gum which becomes dark in color, surrounded by pus; the escape of the pus into the mouth, or pointing below the chin, or beneath the fascia of the neck, as low, at times, as the clavicle.

Treatment.—Remove the dead portions from the living bone. Syringe with peroxide of hydrogen to cleanse the part, and use chlorinated washes, such as chloride of soda, or permanganate of potash, to correct the offensive odor and disagreeable taste. Make daily applications of dilute aromatic sulphuric acid, adding to the acid a few drops of the tincture of capsicum for its stimulating effect; diluted carbolic acid, tincture of iodine and chloride of zinc, sulphate of copper, listerine and ethereal solution of iodoform, aristol, etc., are also used as applications. Support the strength by stimulants, tonics and nourishing diet.

Dislocation of the Lower Jaw, when double, is indicated by inability to close the mouth; the mouth widely open; the chin prominent, with a distinct hollow in front of each ear.

A single dislocation is indicated by the mouth being only partially open, the chin displaced to one side, the distinct hollow below the ear being on the opposite side.

Treatment.—Reduction is made by placing the thumbs, protected by napkins, as far back upon the molars as possible, and then depressing the back part of the jaw, and at the same time raising the chin. The jaws should afterward be secured by a bandage extending under the chin and over top of head.

Fracture of the Lower Jaw is indicated by inability to close the mouth, and to speak articulately; laceration of the gums and hemorrhage; irregularity of the teeth from displacement of the fragments of bone; crepitation. Fracture of the maxilla may, however, show no displacement, or the fracture extending through the angle or ramus, may be diagnosed by grasping the two sides of the jaw and moving them forcibly. Crepitus, increased flow of saliva, mobility of fragments, and irregularity of the teeth, if the fracture is through the body of the bone, are all signs of fracture. A swollen, red and painful condition of the tissues covering the lower jaw, occurring some days after the accident, denote the possibility of fracture, neglect causing a high degree of inflammation, and in some cases even necrosis of the bone.

Treatment.—Reduce by bringing the displaced portions into apposition, being guided by the arch of the teeth, and then securing them by wire, silk, or waxed sterilized ligatures around the teeth, and introducing an interdental splint.

Cleft Palate is indicated by a fissure extending through the soft palate alone, or through both soft and hard palates, and which may be combined with single or double hare-lip, in which case the intermaxillary bones are frequently displaced.

Treatment.—When the cleft is confined to the soft palate, the operation of staphylorraphy may be performed; when, however, the cleft is through both soft and hard palates, the construction of an artificial obturator and palate combined will often prove successful in correcting the voice and preventing much inconvenience in partaking of food and drink.

Hare-lip is indicated by a congenital fissure of the upper

lip, and may be single or double, and may also be complicated with fissure of the hard and soft palates.

Treatment.—Pare the surfaces of the edges of the fissure in such a manner as will allow a flap on one to cover the edge of the other when they are brought in apposition, when they are secured by the aid of pins and the figure-of-eight suture, which, in the case of infants, may be preserved from injury by passing a silver wire through the cheeks, having on each protruding end a button, to prevent the breaking up of the suture during the act of crying. Cocaine is a useful local anæsthetic for such operations.

Facial Paralysis is indicated by distortion of the face, in which the mouth is drawn to one side, being due to paralysis of the facial nerve. The eye may also remain permanently open on the affected side, the saliva escape from the corner of the mouth, and the food collect under the cheek, on account of the paralysis of the buccinator muscle.

Treatment.—Electricity, and systemic treatment with strychnine, phosphorus, iron, quinine, ergot, etc.

A Nasal Polypus is indicated by more or less obstruction of one or both nostrils, with occasional watery discharge; a gray or yellowish mass, like jelly in consistence, can be detected by the finger, if it is passed behind the soft palate, hanging down into the pharynx, and which greatly increases in damp weather; the nose bulged out on one side by the growth within.

Treatment.—Remove either by the snare or by torsion, or by repeated applications of chromic acid. To prevent reproduction apply to the surface chromic acid or chloride of zinc.

Thrush, common to infants and children under eighteen months of age, is indicated by small, white spots, the size of a pin's head, upon the dorsal surface of the tongue, palate, velum, inside of cheek and lips, which increase in size and coalesce, with a tendency to false membrane, the crusts falling off and reappearing; the mucous membrane beneath redder than natural.

Treatment.—Change of diet and residence, if these are at

fault; the administration of saccharate of lime in milk. Local treatment, mel-boracis, or borax solution, or—

℞. Sodii borat . . . . . ℥j
Glycerinæ . . . . . ℥ij
Aquæ . . . . . ℥iv. M.
SIG.—Apply with a camel's-hair brush four or five times a day.

Or—

℞. Zinc sulph . . . . . gr.ij–iv
Aquæ rosæ . . . . . ℥ij. M.

Or a weak solution of nitrate of silver.

Aphthæ or Follicular Ulceration, common to childhood, is indicated by the mucous membrane becoming inflamed, and the formation of small, round, transparent vesicles on the frænum, in the sulcus between the lips and gums, and on lower surface of tongue. On the bursting of the vesicles, small, spreading ulcers, with red and swollen margins, appear, which become coated with a layer of oïdium albicans.

Treatment.—Demulcent applications, such as mucilage of gum acacia, or flaxseed. Mel-boracis applied with a camel's-hair brush. For constitutional symptoms, administer laxatives and the bromides, with warm foot bath.

Epulis is indicated by a growth on the gums, either small and pedunculated, or large and sessile.

If it is firm in texture and slow of growth, the epulis is generally fibrous; but if rapid in growth and dark in color, it is myeloid; if prone to ulcerate and very painful, it may be an epithelioma.

Treatment.—Removal of the growth, and its reproduction prevented by the application of nitrate of silver, or chromic acid, or a fire cautery. Generally, it is necessary to remove the periosteum and a thin scale of the bone beneath, as this growth is connected with the periosteum. Extract all roots of carious teeth, and when the epulis is connected with the alveolar cavity of a tooth and has tendency to the interior of the jaw, it is generally myeloid, and several teeth will have to be sacrificed, so that the alveolus can be thoroughly excavated.

When very extensive, a considerable portion of the alveolus and bone of the jaw must be removed.

Epithelioma is indicated by a ragged ulcer on the lower lip, commencing as a wart, the skin around being hard and infiltrated, with enlargement of the submaxillary lymphatic glands, which become tender, or even ulcerated.

Epithelioma of the gum is in the form of a ragged ulceration, often the result of irritation from diseased teeth; the pain and inconvenience at first slight; a tending of the ulceration to spread toward the tongue and cheek, with induration of the base of the ulcer.

Treatment.—Removal as soon as its nature is manifest. In slight or doubtful cases the application of the strongest nitric acid, the acid nitrate of mercury, or the actual cautery, to bring about a healthy cicatrization. If the disease has involved the alveolus, as is evident by the swelling of the gum and the looseness of the teeth, a free removal of the bone is necessary.

Hypertrophy of the Gums is indicated by an increase of their substance to such a degree as to cause them to overhang and cover the greater portion of the crowns of the teeth; tendency to hemorrhage; gums dark and livid; fetor of breath; increased flow of saliva.

Treatment.—Remove all dead teeth and salivary calculus. Remove the morbid growth by a horizontal incision through the diseased structure to the crowns of the teeth, and freely scarify the gums by passing a lancet between the teeth to the process, and repeat this operation at intervals of four or five days, if necessary. Use detergent and astringent lotions, and occasionally a weak solution of nitrate of silver. Phenate of soda is efficacious as a lotion, also antiseptic. Diet non-irritating, and all excess and intemperance avoided. The teeth should be kept perfectly clean.

Alveolar Pyorrhœa, or Riggs' Disease, is indicated at first by an uneasy sensation; then inflammation of margins of gums; looseness of the gums about the teeth, which form pockets; and necrosis of edges of alveolar process; a tendency to hemorrhage; inflammation extending deeper into gums; small

sulci filled with pus; looseness of the teeth and change of positions; disagreeable taste; peculiar fetor of breath; dark livid color of gums, with thick margins, and often extreme sensitiveness to touch; in some cases the gums are denuded of their epithelium, with a polished appearance, in others, with a pimpled surface; the teeth, at length, held in their cavities by a tough, ligamentous attachment, due to the change occurring in the peridental membrane.

A simple form of this disease may manifest itself at the margin of the gum, indicating its presence by a congested appearance, beneath which may be found a granule of calcified material. While in many cases there is general congestion of the affected gum, and a proneness to hemorrhage, in other cases the gum may present an anæmic appearance—pale and bloodless. This disease may also be associated with syphilis, mercurial salivation and scurvy. The deposit of salivary calculus or other calcified substance is supposed to be secondary to the disease, as a deep-red and denuded gum tissue about the necks of the teeth may be present without any deposit.

Dr. Chas. B. Atkinson describes this affection as follows:—"Perhaps the earliest condition presented to us is a tumefaction of the margin of the gum—from pearly-red and light lilac to purplish blue in tint—sometimes puffing to such an extent as to be easily confounded with an alveolar abscess. The tumefied gum bleeds readily on brushing. A probe passed carefully under the gum will disclose a pocket embracing more or less the circumference of the root, in some places nearly or quite to its apical end. Sometimes the gum will be found receded, perhaps on one side only. A purulent discharge more or less marked, may be demonstrated by pressure of the finger over the root, from its end towards the crown of the tooth. A further demonstration of the pressure of pus may be secured by injection, about the necks of the teeth, of peroxide of hydrogen. A general hypertrophy of the oral tissues may be noticed. Suppuration, perhaps preceding, perhaps following, a solution of the dental ligament, which permits the pocket to be formed, and is the antecedent usually responsible for the

loosening of the teeth. This loosening may, however, be present as a result of inflammation before suppuration has succeeded. The loosening may be attended with recession of the gum or not, and with or without pain. Locally, aside from the gingival congestions already noticed, the teeth may be found elongated, the breath fetid, tartar freely present (although many cases progress to disaster with no appreciable deposit of tartar), pus sometimes oozing from the sockets, putrid taste in the mouth, tenderness of the teeth, already noted, and many times considerable irregularities, the natural result of the loosening of the teeth. Observation may disclose such systemic conditions as stomach dyspepsia, catarrh (as nasal catarrh or other mucous surface debility), constipation, phthisis, adenoid growths, general congestion due to intemperance, kidney disease, rheumatism, cold feet and other extremities, indicating poor circulation and malassimilation. Dr. Rhein has truly said that incurable systemic disorders make only palliation of pyorrhœa disorders."

Treatment.—The first and most important matter is to remove all deposits from the roots of the teeth, and all necrosed bone from the margins of the alveolar processes. This can be accomplished with what are known as Riggs' instruments. An acquired and acute sense of touch is necessary to determine the thoroughness of the cleansing operation. The pockets formed in the gum may then be treated with iodoform and eucalyptus, iodoform and oil of cinnamon, or with injections of chloride of alumina, gr. iij to the ounce of water, also strong tincture of myrrh, aromatic sulphuric acid. Peroxide of hydrogen, and also a solution of iodide of zinc, gr. xii-xiv to the ounce of water, are also recommended by Dr. Harlan, in the form of injections; and for chronic cases the latter in a solution composed of gr. xxiv to the ounce of water, after the parts are cleansed by injections of the peroxide of hydrogen. Another method: After thorough removal of deposits, syringe with aromatic sulphuric acid, diluted with one-half water, and apply night and morning a powder composed of creta preparatæ, ℥j; acidum boricum, ℥j. The use of "Robinson's Reme-

dy" is also recommended, following the use of bichloride of mercury 1 to 500.

Dr. Chas. B. Atkinson recommends first returning loose teeth to place laterally, and securing them with waxed sterilized ligatures. Then, beginning with the upper jaw, such sealing as may be indicated should be performed, after which the pockets should be carefully investigated with proper instruments, all foreign matter removed from them and from about the teeth, having recourse frequently to a $\frac{1}{300}$ or $\frac{1}{1000}$ solution of $HgCl_2$ in H_2O_2. This preparation of peroxide should be first allowed to remain in the pockets and about the teeth for perhaps even three minutes. It may be necessary to reduce the length of elongated teeth, but if direct pressure will answer, this should be resorted to and shortening of the bite avoided. See the patient daily for two weeks. Sometimes no application of medicaments will be indicated—perhaps a little scaling or scraping of overlooked deposit, from time to time. The appearances of the abnormal conditions seem to be best indicated by color, size and texture. A dark blue color of soft and spongy gum should be lanced to relieve the venous congestion, and then injected with aromatic sulphuric acid, full officinal strength. Should suppuration be imminent or present, the pus should be evacuated by incision, or by the injection of peroxide of hydrogen as a first step, followed by a delicate application of "caustic paste" (potassa fusa $\frac{2}{3}$, carbolic acid, cryst. $\frac{1}{3}$). A cherry-red color of slightly puffed gum calls for salicylic acid solution saturated in 95 per cent. alcohol. The constant exhibition of antiseptic and stimulant mouth-washes is necessary, such as combinations of bichloride of mercury, tincture of calendula and distilled water, or hydronaphthol, tincture of calendula and distilled water; or peroxide of hydrogen and tincture of calendula. Systemic remedies are also indicated, such as tonics and cathartics, the latter in the beginning of the treatment; also digestive stimulation.

Dr. E. C. Kirk recommends a ten per cent. solution of aristol, rubbed up with oil of cinnamon, or oil of gaultheria and

introduced into each suppurating pocket, and around the roots of the teeth at the base of each pocket, on wisps of absorbent cotton, saturated with the solution.

Irritation of the Dental Pulp is indicated by an uneasy sensation, which develops into pain of a gnawing or burning character, the affected tooth being sensitive to changes of temperature, painful in mastication, but exhibiting no symptoms of inflammation of the gum or peridental membrane.

Treatment.—The treatment must vary with the condition producing the affection. First remove all irritants. If the cause is systemic, constitutional treatment for the condition present is indicated. Saline cathartics, as the sulphate or carbonate of magnesia; diaphoretics, as spts. mindererus, or Dover's powder; diuretics, as preparations of nitre, often prove efficacious; also bromide of potassium. If the fluids of the mouth are irritative, they must be corrected. If a carious cavity exists, all foreign substances and the softer parts of carious dentine should be removed, and the cavity syringed with a tepid solution of bicarbonate of soda, potash or ammonia. Dilute carbolic acid, or wood creasote, may then be applied, and a non-conducting filling of a solution of gutta percha and chloroform be introduced. (See Dental Formulæ for Odontalgia and Pulpitis.)

Acute Inflammation of the Dental Pulp is indicated by acute pain in the affected tooth, which frequently extends to neighboring teeth and to the side of the face, but is more intense in the tooth itself; pain may subside after a few hours' duration, to return again on the slightest provocation, or on patient assuming a horizontal position; the pain may also assume a throbbing character.

Treatment.—The treatment of this condition of pulp is indicated in that of "irritation of the pulp." For soothing applications, solution of gutta percha and chloroform, tincture of hamamelis applied warm, oil of cloves, dilute creasote, equal parts of chloroform, aconite and tincture of opium, may be employed. (See Dental Formulæ for Pulpitis and Odontalgia.)

Chronic Inflammation of the Dental Pulp is indicated by pain, less severe than in the acute form, and of less duration; coming

on at irregular intervals, and wandering, like neuralgic pains, and incited by changes of temperature, and the application of irritants. (See Irritation of Dental Pulp.)

Fungous Growth of Pulp is indicated by the organ, as a result of continued irritation, assuming the form of a small vascular tumor, or granular mass, attached by means of a pedicle, which, in some cases, completely fills the cavity of decay in the crown of the tooth, and is often extremely sensitive and prone to hemorrhage.

Treatment.—When a tendency to fungous growth is discovered, the free application of carbolic acid or tincture of aconite followed by the use of chromic acid, will obtund the sensibility, when the entire tumor should be excised, and its reproduction prevented by application of nitric acid on a disc of card-board.

Ossification of the Dental Pulp is indicated by pain of a neuralgic character, which commences in an uneasy feeling, and changes to what has been described as a gnawing sensation, similar to that which attends the knitting together of the fractured parts of a bone. It may be continuous, but not constantly severe, and frequently amounts to no more than an uneasy sensation; at other times it may be sharp and darting, affecting the side of the head, and all the branches of the superior maxillary division of the fifth pair of nerves. The affected tooth is free from soreness and discoloration.

Treatment.—Apply anodynes, such as lead water, and those indicated in "acute inflammation of pulp" to relieve the pain. Open the pulp chamber, and completely extirpate the pulp.

Abnormal Sensibility of Dentine is indicated by pain resulting from irritation of dentinal structure, being of shorter duration and less acute in character than that from an inflamed dental pulp; the pain of sensitive dentine soon subsides on the removal of the irritating cause.

Treatment.—Apply obtunding agents, as chloride of zinc, chloroform and aconite equal parts, carvacrol, oil of cloves, oil of cedar, oil of eucalyptus, tannin combined with glycerine or camphor, chloral, camphorized ether, oxide of calcium, car-

bonate of sodium, menthol, thymol, sesquichloride of chromium, sulphate of morphine and gum camphor equal parts, ethylate of sodium, carbonate of potash and glycerine, carbolized potash, campho-phenique, etc. Ottolengui's method: Apply the rubber-dam, dry cavity with bibulous paper, then insert a pledget of cotton saturated with absolute alcohol, then apply intermittingly a series of blasts of hot air to produce evaporation, until parts become whitened or thoroughly dry, then throw on a continuous spray of ether. A jet of nitrous oxide gas directed into the cavity of the tooth by a piece of tubing; also the vapor of alcohol, produced by heating the alcohol in a metal apparatus, and conducting the vapor into the cavity through a fine metal tube, have also been employed for the relief of the pain arising from hyper-sensitive dentine. The application of cocaine and alcohol by electrolysis has also given satisfactory results. (See Therapeutics of Electricity.)

Abrasion of the Teeth is indicated by a loss of structure, due to friction, to such an extent at times as to destroy the entire crowns.

Treatment.— Gold caps or partial crowns, either in the form of ferrules or contour fillings, or fillings of other metals, will often arrest the process of abrasion, and render much worn teeth useful organs. Also the insertion of artificial posterior teeth will often prevent natural front teeth from being abraded from unnatural use.

Hypertrophy of the Alveolar Processes is indicated by an osseous deposit, either at the apex of the alveolar cavity, in which case the affected tooth is protruded from its cavity, or by a deposit of osseous matter on the wall of the alveolar cavity, in which case the tooth is forced to one side.

Treatment.—When the osseous deposit is in the bottom of the alveolar cavity, the length of the tooth may be reduced from time to time until a certain degree is reached, when the loss of the tooth is inevitable. When the deposit is upon the side of the cavity, the effect is irregularity or malposition, for which there is often no remedy but the removal of the deviating tooth.

Hypercementosis or Dental Exostosis is indicated by an uneasy sensation in the affected tooth, followed by a gnawing pain, which in some cases, assumes a severe neuralgic character, especially when the deposit of cementum on the root is of considerable size, in which case there is a prominence apparent on the side of the alveolar ridge.

Treatment.—During the early stages of this affection, the administration of large doses of iodide of potassium, and the application of counter-irritants, such as a saturated tincture of iodine or cantharidal collodion, have been suggested, to arrest the deposit and cause absorption. When the deposit is large and productive of pain and inconvenience, the removal of the affected tooth is inevitable.

Organic Defects of Structure, indicated by defects in the enamel, in the form of opaque spots, grooves or pits, congenital in origin, and due to altered functions from impaired nutrition.

Treatment.—Preventive by mitigating severity of diseases producing the condition, by the administration of proper remedies. For the pitting variety, properly inserted fillings.

Odontomes are indicated by irregular masses of dental tissues, which result from morbid conditions of the formative pulp, such as nodules of enamel and dentine, hypertrophy of cementum, etc., some being congenital, others induced.

Treatment.—Extraction, when they are a source of irritation, or an injury to the normal teeth, or are unsightly.

Syphilitic Teeth are indicated by notches, generally crescentic, in the cutting edges of the incisors, and peg-like shaped cuspids; also, a dark color and soft consistence are characteristic of such teeth.

Treatment.—The most skillful treatment by properly introduced fillings and constant attention, are necessary for their preservation.

Erosion of the Teeth is indicated by the gradual destruction of the enamel of the labial surfaces of the incisors, canines, and sometimes of the bicuspids, generally in the form of a continuous horizontal groove, smooth and regular; in some cases it may extend over nearly the whole of the labial surface,

the color of the enamel being rarely changed. Erosion is the smooth removal of the surface of the enamel, a smooth surface remaining; corrosion is the destruction of the enamel in the form of pits and irregularities due to an acid condition of the fluids of the mouth, lactic acid being a prominent factor in promoting fermentative action.

Treatment.—In advanced stages, arrest its progress by fillings of durable material.

Absorption of Process and Recession of Gum is indicated by a slight increase of redness, some congestion and a shrinkage of the margins of the gums, and may be accompanied with a slight purulent discharge about the neck of the affected tooth. The symptoms resemble those of chronic inflammation of the gums. The progress of the affection is generally slow, and is often first observed about the necks of the canine teeth. Teeth so affected become more susceptible to impressions of heat, cold, acids, etc., and eventually loose.

Treatment.—To arrest the progress of this affection, first remove all irritants, and cleanse thoroughly, polishing the exposed surfaces. Correct the nature of the fluids of the mouth, if at fault, by constitutional treatment, the use of alkaline lotions, such as lime water, and detergent dentifrices. Such agents as a weak solution of chloride of zinc, to produce healthy granulation, carbolic acid, nitrate of silver, and judicious pressure, may be employed with advantage. A moderately stiff brush and floss silk are useful adjuncts to the treatment.

Necrosed Teeth.—The term "necrosed" is applied to a tooth when the vitality of its pulp and lining membrane is destroyed, the peridental membrane, however, maintaining a degree of vitality which prevents the tooth from becoming an irritant, so as to insure its loss as an effete organ.

Treatment.—When a necrosed tooth is not productive of injury to the adjacent structures, and there is a probability of rendering it a useful organ, the pulp canal should be thoroughly exposed, cleansed, and treated, if necessary, with disinfectants, antiseptics, etc., and then filled, together with the crown cavity, with a suitable material. As necrosed teeth are frequently

considerably discolored, on account of the tubuli of the dentine absorbing coloring matter from the dead pulp, such bleaching agents as chloride of lime, chloride of alumina, oxalic acid, chloride of soda, sulphite of soda combined with boracic acid, cyanide of potassium, tartaric acid in combination with chloride of lime, chloride of zinc, also alum in combination with liq. sodæ chlorinatæ, may be employed to improve their appearance, also use of nitrous oxide in combination with chloride of sodium, also peroxide of hydrogen.

Infantile Paralysis During the Period of Teething.—Infantile paralysis, or poliomyelitis, is an obscure affection peculiar to a certain season, which has given to it at the hands of some the name of "warm weather spinal disease." It comes on suddenly, but seldom after the age of four years. According to Gowers, of all cases under ten years, three-fifths occur in the first two years of life, and he claims that a considerable number of cases are congenital. There is usually a febrile initial stage followed by the sudden onset of paralysis in one leg or arm. In more than half the cases the lower limbs are affected; of the remainder, the majority represent implications of the arms, notably the deltoid muscles, and legs, or, perhaps, arm and leg, and very seldom the upper extremity alone. The cause of infantile paralysis is generally assigned to teething, cold or damp, injuries to the spine, measles, scarlatina, malarial or other fevers, convulsions or concussion. Dr. Rot at the Fourth Prussian Congress, declared that heredity is the only etiological factor that has been proven. "The primary cause of the affection must be sought for in the modifications of that part of the fecundated ovum which enters into the formation of the nervous system." During the period of dentition, children are liable to disorders of the cerebro-spinal system, and as from such causes we find convulsions the cause of the death of numberless infants seemingly robust, so we see the same cause producing paralysis. There is loss of heat and atrophy in the affected limbs, and the latter may be a feature of the disease dependent upon the morbid changes in the nerve-centres. The atrophy extends to the bony system,

the nutrition of which is involved; and it is evident that the atrophic degeneration, if not inherent, is a real sequence of inflammatory process in the spinal cord.

Treatment.—The treatment of infantile paralysis consists in the application of mild galvanic stimulation by the uninterrupted current conveyed through the affected cord out through the nerves of the flabby muscles; the skin may also be stimulated with salt and sulphur baths. In the early stage Dr. Althaus advises the injection of ergotine ¼ gr., for a child a year old, in order to contract the arterioles of the part to deplete the blood supply. He stimulates the muscles as they become affected with injections of strychnine. Conium and chloral may be used to calm nervous excitement. Dr. Sequin recommends counter-irritation over the spine, bromides and arsenic, while others use cupping, leeches, and iodide of potassium. Brown-Séquard recommended belladonna to control the inflammatory process of the spinal cord. If pain or fever are present, ether spray to the spine, ice, gelsemium, aconite, antipyrine internally. Rubbing, muscle-beating and massage, have also been employed as adjuncts.

Chemical Bleaching of Teeth.—Prof. Truman's method consists in liberating chlorine from calcium, hydrochlorite or chloride of lime, in the cavity of decay and pulp canal by a dilute acid. He recommends a fifty per cent. solution of acetic acid, although oxalic, citric, or tartaric acid may be used, or indeed any dilute acid to liberate the chlorine. The upper third of the pulp canal should be filled with gutta-percha, and the cavity in all cases should be washed out with ammonia or borax, to remove the fatty matter, previous to the introduction of the bleaching agent. Labarraque's solution of soda has also been used as a medium from which to liberate the chlorine. Dr. A. W. Harlan uses aluminum chloride in the cavity, from which he liberates the chlorine by means of peroxide of hydrogen. Dr. Edw. C. Kirk's method consists of liberating sulphurous acid, SO_2, from sodium sulphite, Na_2SO_3, by means of boracic acid. The two substances, in the proportion of 100 grains of sodium sulphite and 70 grains of boracic acid,

are desiccated separately, and then intimately ground together in a warm dry mortar. In using this powder, the tooth is carefully dried under the dam, and the powder is packed into the pulp-cavity and cavity until both are full; the reaction which liberates the sulphurous acid is then brought about by moistening the powder in the tooth with a drop of water, and the orifice of the cavity is immediately closed with warm gutta percha.

Herpes Zoster of Mouth and Gums.—An acute circumscribed inflammatory affection, characterized by an eruption of vesicles of herpes on a red, inflamed basis, the vesicles being disposed in groups and follow the group of the adjacent nerve. The eruption is preceded and accompanied by a very severe neuralgia of the fifth nerve. The period of invasion (three days) is accompanied by a well-defined fever and other general symptoms. The period of eruption begins on the third day, and lasts about three weeks to one month, the pain being persistent. It is probably of an infectious origin, and is due to a neuritis of the affected region which leads to trophic changes.

Treatment.—Dr. Harlan recommends a palliative treatment, which consists of placing cotton-wool between the cheek and teeth to prevent friction, and on it an ointment consisting of cocaine and morphine.

Merck's Bulletin gives the following new treatment for herpes zoster:

MIXTURE.

℞. Extract gelsemium,
Sodium sulpho-carbolate, } of each 4 grammes.
Distilled water . . . . . 90 grammes.
M. Sig. One teaspoonful every two hours.

At the same time five drops tincture of belladonna are administered every two hours until a slight dryness of the pharynx is experienced.

LOTION.

℞. Lead acetate,
Powdered alum, } of each 4 grammes.
Distilled water, ... 120 grammes.
M. Sig. Externally.

Compresses moistened with this solution are applied to the

affected parts, and renewed every two hours. It is claimed that the pain disappears within a few hours, and that the disease is considerably shortened by this treatment.

Dental Caries is indicated by a process of gradual softening and disintegration of the tooth tissues by deleterious agents, the progress being hastened, primarily, by certain structural defects in the enamel and dentine, and secondarily, by certain diseases of the mucous membrane, and some derangement of the general health. Incipient dental caries is indicated by an opaque, whitish or gray appearance of the enamel. A pale brown varying to a nearly black color indicates the existence and progress of dental caries in the tooth tissues; the deeper the color the slower the progress of the caries, and the paler the color the more rapid the progress. The softening and decalcifying of the bones, and the proneness of the teeth to caries during pregnancy, is ascribed to faulty nutrition and the lack of the supply of the proper elements to the system, and the waste going on during this period. But the principal exciting cause of caries of the teeth during pregnancy is the lactic acid fermentation present, its action being greatly augmented by the changed condition of the fluids of the mouth, such acids existing in the secretions of the mouth as hydrochloric, acetic, oxalic and uric.

Treatment.—Incipient caries should be removed with great care, and the exposed surface of tooth structure prepared to resist further attacks by giving to it as high a polish as is possible, and the patient warned in regard to its future cleanliness. Deep-seated caries should be removed, and its further progress arrested by thoroughly sterilizing or disinfecting the cavity by antiseptics and disinfectants, and the careful insertion of fillings of a durable material. During pregnancy all operations on the teeth should be painless, and long, wearying sittings be avoided. Caries of the teeth of pregnant women can be arrested by plastic fillings until such time as the patient can the better endure more permanent operations. The preventive measures consist in the thorough and frequent use of the tooth-brush and its adjunct, floss silk, at least three times a day, assisted by a proper dentifrice and antacid mouth-wash.

CHARACTERISTIC INDICATIONS OF THE TONGUE.

A White Coated Tongue indicates febrile disturbance.

A Brown Moist Tongue indicates digestive disorder and an overloaded stomach.

A Brown Dry Tongue indicates depressed vital power.

A Red Moist Tongue indicates feebleness, especially from exhaustive discharges.

A Red Dry Tongue indicates inflammatory fever or pyrexia.

A Red Glazed Tongue indicates debility and inability to digest food and stimulants.

A Tremulous, Moist and Flabby Tongue indicates feebleness and nervousness.

A Glazed Bluish Tongue, with loss of epithelium in patches, and in severe cases, cracks and scars, indicates tertiary syphilis.

DIGESTIBILITY OF FOODS.

Giving the time required for the digestion in the stomach of various alimentary substances, derived from actual experiments.

Article.	Mode of Prep.	Hrs.	Min.
Aponeurosis (gristle)	Boiled,	3	00
Apples, sour, mellow	Raw	2	00
Apples, sour, hard	Raw	2	50
Apples, sweet, mellow	Raw	1	30
Bass, striped	Broiled	3	00
Beans, pod	Boiled	2	30
Beans and green corn	Boiled	3	45
Beef	Fried	4	00
Beefsteak	Broiled	3	00
Beef, fresh, lean, dry	Roasted	3	30
Beef, fresh, lean, rare	Roasted	3	00
Beef, with mustard, &c.	Boiled	3	10
Beef, with salt only	Boiled	3	36
Beets	Boiled	3	45
Brains, animal	Boiled	1	45
Bread, corn	Baked	3	15
Bread, wheat, fresh	Baked	3	30
Cabbage	Raw	2	30
Cabbage with vinegar	Raw	2	00

Article.	Mode of Prep.	Hrs.	Min.
Cabbage	Boiled	4	30
Carrot, orange	Boiled	3	13
Cartilage	Boiled	4	15
Catfish	Fried	3	30
Cheese, old and strong	Raw	3	30
Chicken, full-grown	Fricaseed	2	45
Codfish, cured, dry	Boiled	2	00
Custard	Baked	2	45
Duck, tame	Roasted	4	00
Duck, wild	Roasted	4	30
Eggs, fresh	Raw	2	00
Eggs, fresh	Whipped	1	30
Eggs, fresh	Roasted	2	15
Eggs, fresh	Soft Boiled,	3	00
Eggs, fresh	Hard boiled	3	30
Eggs, fresh	Fried	3	30
Fowls, domestic	Roasted	4	00
Fowls, domestic	Boiled	4	00
Gelatine	Boiled	2	30
Goose, wild	Roasted	2	30
Hashed meat and vegetables	Warmed	2	30
Heart, animal	Fried	4	00
Lamb, fresh	Broiled	2	30
Liver, beeves', fresh	Broiled	2	00
Marrow, spinal, animal	Boiled	2	40
Milk	Boiled	2	00
Milk	Raw	2	15
Mutton, fresh	Broiled	3	00
Mutton, fresh	Boiled	3	00
Mutton, fresh	Roasted	3	15
Oysters, fresh	Raw	2	55
Oysters, fresh	Roasted	3	15
Oysters, fresh	Stewed	3	30
Parsnips	Boiled	2	30
Pig, Sucking,	Roasted	2	30
Pig's feet, soused	Boiled	1	00
Porksteak	Broiled	3	15
Pork, fat and lean	Roasted	5	15
Pork, recently salted	Stewed	3	00
Pork, recently salted	Broiled	3	15
Pork, recently salted	Fried	4	15
Pork, recently salted	Boiled	4	30
Potatoes, Irish	Roasted	2	30
Potatoes, Irish	Baked	2	30
Potatoes, Irish	Boiled	3	30

Article.	Mode of Prep.	Hrs.	Min.
Salmon, salted	Boiled	4	00
Sausage, fresh	Broiled	3	20
Soup, barley	Boiled	1	30
Soup, bean	Boiled	3	00
Soup, chicken	Boiled	3	00
Soup, mutton	Boiled	3	30
Soup, oyster	Boiled	3	50
Soup, beef, vegetables and bread	Boiled	4	00
Soup, marrow bones	Boiled	4	15
Tripe, soused	Boiled	1	00
Trout, Salmon, fresh	Boiled	1	30
Trout, Salmon, fresh	Fried	1	30
Turkey, wild	Roasted	2	18
Turkey, domesticated	Roasted	2	30
Turkey, domesticated	Boiled	2	25
Turnips	Boiled	3	30
Veal, fresh	Boiled	4	00
Veal, fresh	Fried	4	30
Venison steaks	Broiled	1	35

ABBREVIATIONS.

In medical prescriptions, letters, parts of words, or certain symbols, are employed as abbreviations, to designate the substance, quantity, etc., as follows:—

Abbreviation.	Latin word.	English word.
āā,	Ana (G.),	Of each.
Ad Saturand.,	Ad saturandum,	Until saturated.
Ad lib.,	Ad libitum,	At pleasure.
Aq.,	Aqua,	Water.
Aq. tepid.,	Aqua tepida,	Warm water.
Aq. ferv.,	Aqua fervens,	Hot water.
Aq. dest.,	Aqua destillata,	Distilled water.
C. or Cong.,	Congius,	A gallon.
Chart.,	Chartula,	A small paper.
Coch.,	Cochlear,	A spoonful.
Coch. mag.,	Cochlear magnum,	A tablespoonful.
Coch. parv.,	Cochlear parvum,	A teaspoonful.
Colent.,	Colentur,	Let them be strained.
Collyr.,	Collyrium,	An eye-water.
Comp.,	Compositus,	Compound.
Contus.,	Contusus,	Bruised or broken.
Cort.,	Cortex,	Bark.
Ext.,	Extractum,	An extract.
F. or Ft.,	Fiat vel fiant,	Let there be made.

ABBREVIATION.	LATIN WORD.	ENGLISH WORD.
Fol.,	Folium vel folia,	A leaf or leaves.
Garg.,	Gargarysma,	A gargle.
Gr.,	Granum vel grana,	A grain or grains.
Gtt.,	Gutta vel guttæ,	A drop or drops.
Haust.,	Haustus,	A draught.
Infus.,	Infusum,	An infusion.
M.,	Misce,	Mix.
Mass.,	Massa,	A mass.
Mist.,	Mistura,	A mixture.
O.,	Octarius,	A pint.
Pil.,	Pilula vel pilulæ,	A pill or pills.
Pulv.,	Pulvis vel pulveres,	A powder or powders.
q. s.,	Quantum sufficit,	A sufficient quantity.
℞.,	Recipe,	Take.
Rad.,	Radix,	A root.
S.,	Signa,	Write or give directions.
Spts.,	Spiritus,	Spirits.
ss.,	Semis,	The half.
Syr.,	Syrupus,	Syrup.
Tinct.,	Tinctura,	A tincture.
℔.,	Libra,	A pound.
℥,	Uncia,	An ounce.
ʒ,	Drachma,	A drachm.
℈,	Scrupulus,	A scruple.
f℥,	Fluiduncia,	A fluid ounce.
fʒ,	Fluidrachma,	A fluid drachm.
♏,	Minim,	A drop.

Although the symbol (♏) is adopted in the United States Pharmacopœia to designate a drop, it should be remembered that the size of a drop varies according to the greater or less fluidity and gravity of the liquid, and the shape of the mouth of the bottle from which it is dropped. It is best to use a small vial with a thin edge of mouth, when great precision is necessary, and to dilute the active medicine and administer it in the form of a mixture; for in some preparations, one hundred and fifty drops would measure but a fluidrachm, while in others the same number of drops would be somewhat more than three fluidrachms.

A *tablespoonful* of any liquid is regarded as equal to *half an ounce* by measure; and a *teaspoonful* equal to a *fluidrachm;*

and such measures are sufficiently accurate where no great precision is requisite.

A gallon contains eight pints.

A pint contains sixteen fluidounces.

A fluid ounce contains eight fluidrachms.

A fluidrachm contains sixty minims (♏).

A wine glass (approximate measurement) contains two fluidounces.

A teacup (approximate measurement) contains four fluidounces.

A tablespoon of powder (approximate measurement) contains two drachms.

A teaspoon of powder (approximate measurement) contains one-half drachm.

One drop of water (small drop, approximate measurement) contains one minim.

One drop of essential oils (approximate measurement) contains one-half minim.

A graduated measure glass is the most accurate measure, as spoons, glasses, etc., vary greatly in size.

FINENESS OF POWDER.

The fineness of powder is denoted either by descriptive words (as in the case of brittle and easily pulverizable substances), or in terms expressing the number of meshes to a linear inch in the sieve. The following degrees of fineness will prove serviceable in the preparation of dentifrices, polishing powders, etc.:—

A *very fine* powder . . . { Should pass through a sieve having 80 or more meshes to linear inch. } = No. 80 Powder.

A *fine* powder . . . . . { Should pass through a sieve having 60 meshes to the linear inch. } = No. 60 Powder.

A *moderately fine* powder { Should pass through a sieve having 50 meshes to the linear inch. } = No. 50 Powder.

A *moderately coarse* powder { Should pass through a sieve having 40 meshes to the linear inch. } = No. 40 Powder.

A *coarse* powder . . . . { Should pass through a sieve having 20 meshes to the linear inch. } = No. 20 Powder.

WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHT.

20 grains (gr.)	make 1 scruple	. . . . .	sc. or ℈
3 scruples	make 1 drachm	. . . . .	dr. or ʒ
8 drachms	make 1 ounce	. . . . .	oz. or ℥
12 ounces	make 1 pound	. . . . .	lb. or ℔

SCALE OF COMPARISON.

℔		oz.		dr.		sc.		gr.
1	=	12	=	96	=	288	=	5760
		1	=	8	=	24	=	480
				1	=	3	=	60
						1	=	20

TROY WEIGHT.

24 grains (gr.)	make 1 pennyweight	. . . . .	dwt.
20 pennyweights	make 1 ounce	. . . . .	oz.
12 ounces	make 1 pound	. . . . .	℔.
3½ grains	make 1 carat (diamond weight)	. . . . .	k.

SCALE OF COMPARISON.

℔.		oz.		dwt.		gr.
1	=	12	=	240	=	5760
		1	=	20	=	480
				1	=	24
				1 k.	=	3½

AVOIRDUPOIS WEIGHT.

16 drachms (dr.)	make 1 ounce	. . . . .	oz.
16 ounces	make 1 pound	. . . . .	lb.
25 pounds	make 1 quarter	. . . . .	qr.
4 quarters	make 1 hundred weight	. . . . .	cwt.
20 hundredweight	make 1 ton	. . . . .	T.
100 pounds	make 1 central	. . . . .	C.

SCALE OF COMPARISON.

T.		cwt.		qr.		lb.		oz.		dr.
1	=	20	=	80	=	2000	=	32000	=	512000
		1	=	4	=	100	=	4000	=	25600
				1	=	25	=	400	=	6400
						1	=	16	=	256
								1	=	16

THE METRIC OR FRENCH DECIMAL SYSTEM OF WEIGHTS AND MEASURES.

The metric system is based upon the METER, which is the standard unit of *length* of that system, and equal to 39.370432 inches, or about 10 per cent. longer than the yard.

The metric unit of *fluid measure* is the LITER—the cube of

$\frac{1}{10}$ meter, or 1000 cubic-centimeters—equal to about 34 fluid ounces.

The metric unit of *weight* is the GRAM, which represents the weight of one cubic-centimeter of water as its maximum density. It is equal to 15(.43234874) troy grains.

One CUBIC-CENTIMETER is equal to 16,231 minims.

IN WRITING PRESCRIPTIONS IT IS SUFFICIENTLY ACCURATE AND SAFE TO CONSIDER 1 GRAM AS EXACTLY EQUAL TO 15 TROY GRAINS, AND TO CONSIDER 1 CUBIC-CENTIMETER AS EQUAL TO 15 MINIMS.

We accordingly have—

1 gram equal $\frac{15}{1}$ troy grains.
1 troy grain equal to $\frac{1}{15}$ gram.
1 cubic-centimeter equal to $\frac{1}{4}$ fluidrachm.
1 fluidrachm equal to $\frac{4}{1}$ cubic-centimeter.

Hence—

1. TO CONVERT TROY GRAINS INTO GRAMS, OR MINIMS INTO CUBIC-CENTIMETERS—

a. *Divide by 10, and from the quotient subtract one-third; or,* b. *Divide by 15;* and

2. TO CONVERT APOTHECARIES' DRACHMS INTO GRAMS, OR FLUIDRACHMS INTO CUBIC-CENTIMETERS, *multiply by 4.*

In writing prescriptions, the "gram" (abbreviated "Gm.") and "cubic-centimeter" (abbreviated "C.C.," which may be called "fluigram," and written "f Gm") only, should be used.

The centigram, which is a very convenient unit to refer to in medicine and pharmacy, is used in books and in speaking, but not in writing prescriptions.

All other terms, and units, and prefixes, used in the metric system, may be wholly ignored by the physician and the pharmacist.*

*The prefixes are simply numerals, as follows :—

myria, which means	10,000.	*deci*, which means	0.1.
kilo, " "	1,000.	*centi*, " "	0.01.
hecto, " "	100.	*milli*, " "	0.001.
deka, " "	10.		

and are quite unnecessary in the writing of prescriptions (if not in all cases), English numerals being more convenient, and at least equally explicit.

EXAMPLE OF A METRIC PRESCRIPTION.

℞.	Hydrarg. chloridi. corros	0	25 Gm.
	Potassi iodidi	10	00 Gm.
	Aquæ	100	00 C.C.
	Tinct. cinch. comp.	100	00 C.C.
	Mix.		

The use of a decimal line prevents possible errors.

To write a prescription for fifteen doses of any medicine, write it first for *one* dose in *grains* and *minims*, and then substitute the same number of "grams" and "cube-cents," thus :—

℞.	Opii	gr. j
	Camphoræ	gr. ij
	Make one pill.	

and to get fifteen such doses in metric terms, write—

℞.	Opii	1 Gm.
	Camphoræ	2 Gm.
	Make fifteen pills.	

The gram and the cubic-centimeter (*fluigram*), when referring to liquids, may be considered as equal quantities, except the liquids be very heavy (as in the case of chloroform), or very light (as in the case of ether).

Measures may be discarded and weights exclusively employed, if preferred. All quantities in a prescription would then be expressed in GRAMS.*

The average "DROP" (water) may be considered equal to 0.05 *C.C.*, or 0.05 *Gm.* An average TEASPOON holds 5 *C.C.*

*As any liquid medicine must necessarily be administered to the patient in *measured*, and not in *weighed*, doses, it will, of course, be more convenient to the physician to continue to make use of fluid measures in writing prescriptions, especially as he is already accustomed to this, and would not then have to bear in mind the specific gravity of *any* liquid ingredient in the prescription. To the pharmacist it makes but little difference, as he will have both weights and measures, and can use one or the other, as may be directed. If the physician discards measures, he must, of necessity, so adjust the proportion in his formula as to produce a mixture of which, after all, the dose must be a "teaspoonful," or some other convenient measure, and this is as unnecessary as it is difficult.—*Oscar Oldberg, Phar. D., in Blakiston's Phys. Visiting List.*

and an average TABLESPOON 20 *C.C.* Decimal numbers should be used as far as practicable without sacrifice of accuracy as to strength and dose of the preparation. It is safe to prescribe 30 *Gm.* for one troy ounce, and 250 *C.C.* for eight fluidounces.

The above contains ALL THAT IS NECESSARY TO KNOW OR LEARN of the metric system, IN ORDER TO WRITE METRIC PRESCRIPTIONS, without a metric posological table, or with one.

To become familiar with the system, the rules given above for the conversion of apothecaries' weights and measures into the corresponding metric quantities, may be profitably used, the results to be verified by comparison with the following—

TABLE OF EQUIVALENTS.

APOTHECARIES' WEIGHTS (AND MEASURES).	METRIC WEIGHTS (AND MEASURES).
Troy grains (or minims).	*Grams (or cubic-centimeters).*
$\frac{1}{64}$	0.001 ($\frac{1}{1000}$)
$\frac{1}{32}$	0.002 ($\frac{2}{1000}$)
$\frac{1}{16}$	0.004 ($\frac{4}{1000}$)
$\frac{1}{8}$	0.008 ($\frac{3}{1000}$)
$\frac{1}{4}$	0.016 ($\frac{1}{60}$)
$\frac{1}{2}$	0.033 ($\frac{1}{30}$)
1	0.066 ($\frac{1}{15}$)
2	0.133 ($\frac{2}{15}$)
5	0.333 ($\frac{1}{3}$)
10	0.666 ($\frac{2}{3}$)
15	1.000 (1)
20	1.333 ($1\frac{1}{3}$)
30	2.000 (2)
Drachms (or fluidrachms).	*Grams (or cubic-centimeters.)*
1	4
2	8
4	16
6	24
Troy ounces (or fluidounces).	
1	32
2	64
4	128
6	192
8	256
12	384
16	512

The adoption of the metric system of weights and measures

is a matter of time only. Its advantages over other systems are well recognized.

RULES FOR REGULATING DOSES.

The *doses* given in this work are applicable to adult age unless the contrary is specified; and for the convenience of students, the rules of Gaubins and Young for determining the proper dose of medicines for children are furnished below.

Take the dose for an adult as unity, and for other ages as follows:—

The dose for a person of middle age being 1, or 1 drachm,—

That for a person	from	14 to 21	years	will be	⅔, or 2 scruples.
"	"	7 to 14	"	"	½, or ½ a drachm.
"	"	4 to 7	"	"	⅓, or 1 scruple.
"	a child of	4	"	"	¼, or 15 grains.
"	"	3	"	"	⅙, or 10 grains.
"	"	2	"	"	⅛, or 8 grains.
"	"	1	year	"	$\frac{1}{12}$, or 5 grains.

The following simple rule by Dr. Young will be found to be convenient: "For children under twelve years, the doses of most medicines must be diminished in the proportion of the age to the age increased by 12; thus, at two years to ⅐; viz.: $\frac{2}{2+12}=\frac{1}{7}$. At twenty-one the full dose may be given." Hence

For one year, $\frac{1}{1+12}=\frac{1}{13}$

For two years, $\frac{2}{2+12}=\frac{1}{7}$

For three years, $\frac{3}{3+12}=\frac{1}{5}$

For four years, $\frac{4}{4+12}=\frac{1}{4}$

For six years, $\frac{6}{6+12}=\frac{1}{3}$

At twelve years the dose is one-half that of the adult. *The U. S. Dispensatory* states that "To the above rules some exceptions are offered, in particular medicines, which require to be given to children in much larger proportional doses than those

above stated. Such are castor oil and calomel, a certain quantity of which will, in general, not produce a greater effect in a child two or three years old than double the quantity in an adult." "Females usually require smaller doses than males, and persons of sanguine temperament than the phlegmatic." The influence of constitutional peculiarities, such as are known as idiosyncrasies, often exist and render patients more than usually susceptible, or the opposite, to the action of medicines, the doses of which must be regulated accordingly. It should also be remembered that the susceptibility to the action of medicines is diminished by frequent and continued use. In advancing age, the dose is gradually lessened.

Opiates affect children to a greater degree than adults, but children bear larger doses of calomel than adults. Females are more rapidly affected by purgatives than males, and the condition of the uterine system is very important.

Medicinal substances act differently on the same person in summer and in winter, and in different climates. Narcotics act more energetically in hot than in cold climates, and, as a consequence, smaller doses are required in hot climates; the opposite is the case with regard to calomel. Owing to a peculiarity of stomach, or rather disposition of body, unconnected with temperament, comparatively mild remedies operate very violently on some individuals.

When administering remedies, the intervals between the doses should be so regulated that the second dose may be taken before the effect produced by the first is entirely effaced. Some medicinal substances, such as mercurial salts, arsenic, etc., are prone to accumulate in the system; and dangerous symptoms may arise if the doses rapidly succeed one another.

The action of some remedies, such as digitalis, elaterium, etc., may continue long after the discontinuance of the agent, and a too powerful effect occur, even by a repetition in diminished doses. Some remedies, such as castor oil, aloes, etc., acquire activity by continued use, hence the dose requires to be diminished.

TOPICAL REMEDIES.

Medicinal substances are applied to the mucous membrane of the mouth and to the dental structures almost exclusively for local effects. In dental practice antiseptic remedies are extensively employed to arrest fermentative and putrefactive processes, as every kind of fermentation depends upon the growth and increase of a living organism. Various diseases of the dental structures have a close relationship with low organisms in the morbid processes which result during their progress, and which are maintained and developed by the presence of living matter. The remedies recognized as belonging to the group of antiseptics, when brought into contact with the disease germs, which are constituted of these organized forms of life, have the power of destroying their vitality and of arresting the fermentative or putrefactive process which they either develop or promote. The effect of escharotics when applied to a part of which the structure and vitality are to be destroyed, is to produce an eschar and incite inflammation and suppuration of the adjacent tissues, by which the slough is separated from the living parts.

Medicinal substances are applied to the mucous membrane of the mouth in the form of gargles or mouth washes, lotions and injections, and generally for a local effect.

Medicinal substances are applied to the skin for both a local and general effect, either by friction, by the endermic, or by the hypodermic methods. In the *endermic method*, the cuticle is usually removed by the action of a blister, and the medicinal agent is applied to the denuded surface in the form of a powder or ointment, and is a useful method when the irritability of the stomach or difficult deglutition prevents medicines from being taken through the mouth.

The *hypodermic method* consists in injecting medicines by means of a graduated syringe with a sharp-pointed nozzle, and constructed for the purpose, into a subcutaneous cellular tissue, thus producing both a local and general effect, and an impression is made much more rapidly than when the medicine

is taken into the stomach. It is necessary that the remedy should be applied beneath the skin, and that it should not be injected into any large vessel; hence for hypodermic injections a locality should be selected free from nerves and large vessels. The medicinal agents used for hypodermic injections are now prepared in the form of tablets which are perfectly soluble, and of considerable strength in small bulk. They are dissolved in pure water at the time the injection is to be made and great accuracy is thus obtained. Anodynes thus used are more rapid in their effect, and the general rule as regards the quantity is, that in first injections the dose should be, for males, two-thirds of the ordinary dose by the stomach and for females, about one-half. It is very necessary that a vein or large vessel should not be punctured when introducing the point of the syringe. The insertion of the deltoid muscle in the arm is generally selected as the place of injection, and the needle-point of the syringe should not be inserted too deep nor at the same point in subsequent injections. Hypodermic injections may also be made in the back, front or thigh—just in front of trochanters, and in the calf of the leg.

Medicinal substances of the classes of rubefacients and epispastics are employed as *counter-irritants*, their effect being to establish external or artificial irritation for the relief or cure of internal inflammation existing in a part or in the body. The extent and character of the counter-irritation thus established should be, in a great measure, regulated by the character of the disease which it is intended to relieve; a rubefacient being indicated in irritation of mucous membrane, a seton or issue when the disease is of a suppurative character, and a vesicant in inflammation of serous membranes.

Setons and Issues are employed to produce permanent counter-irritant effects. A seton consists of a skein of silk or a piece of tape or other substance passed through the integument by means of a seton-needle, and allowed to remain, so that a discharge is maintained. A simple seton in the case of an incision into an alveolar abscess, is composed of a single or double strand of floss silk introduced into a wound

made by the lancet, or into the orifice of a fistulous opening, after the pus of the abscess has been evacuated, to maintain a free exit for the pus which may be secreted after the first operation; fine silver wire is also employed for the same purpose. An issue is generally some irritating substance such as caustic potassa, or a small pea, or piece of orris root introduced to maintain a discharge.

Bloodletting is performed for the purpose of lessening vascular excitement, reducing inflammatory action, relieving congestive pain and spasm, promoting absorption, relaxing the muscles and arresting hemorrhage. It is divided into *general* and *local*, general bloodletting consisting of venesection or phlebotomy, the median cephalic or basilic veins of the arm, and occasionally the external jugular and other veins, being the ones selected from which to draw the blood. But it should be resorted to with caution, as it is a powerful and exhausting agent.

Local Bloodletting is chiefly employed for the relief of local inflammations and congestions, and is accomplished by means of leeches, cups, and scarifications.

The leech—*hirudo*—is commonly employed as an agent for local bloodletting, and is preferable to "cupping" in many local and chronic forms of inflammation; also in infantile affections which require such an operation, when the American leech is used, and it makes a smaller incision than the European leech, and draws less blood. A leech is supposed to draw, on an average, about a drachm and a half to two drachms of blood before it is removed, and the quantity which subsequently flows will generally equal that drawn by the leech.

Leeches are often applied to the gum over the root of a tooth affected with acute periodontitis, to relieve the inflammation and congestion. To make the leech bite readily, the surface to which it is to be applied may be smeared with cream or sweet milk, or a puncture may be made in it, so as to draw blood, and, to isolate the part of the surface on which it is desired to apply the leech, a small hole may be made in a piece of bibulous paper, which will adhere to a dry surface of the

gum, and afford an opening for the mouth of the leech to approach the surface.

To remove a leech, if it does not drop off of its own accord, which they will generally do in from fifteen to twenty minutes, it may be sprinkled with a little cold water or diluted vinegar, or powdered sugar. To promote bleeding from leech bites, fomentations or warm dry cloths, or a cupping glass, may be used. To check the hemorrhage from leech bites, which is sometimes excessive, firm pressure may be made with the finger, or exposure to cold air, or the application of such styptics as alum or matico.

Cupping is employed when it is desired to draw blood rapidly, or to ascertain the exact quantity of blood drawn, or when it is desirable to make an impression on the system. Cupping is performed by means of cupping glasses and a scarificator. The glasses are applied after being partially exhausted of air, when the removal of the atmospheric pressure produces a determination of blood to the capillaries of the part, and it is afterwards easily drawn by scarification.

Scarifications consist of small incisions made in inflamed and congested parts, to relieve the engorged condition of the capillary vessels, and are sometimes employed to relieve acute inflammation of the gums and mucous membrane of the mouth.

ELECTRICITY AS A THERAPEUTIC MEANS IN THE TREATMENT OF DISEASE.

Electricity is a powerful agent in many forms of nervous disease, especially in the treatment of paralysis and neuralgia.

Three forms of electricity are employed, viz.: The *induced current*, the *galvanic current*, both of which are dynamical, and the *static current*, which is frictional.

Galvanic electricity—galvanism, and induced electricity—faradism, are the two forms generally employed, frictional electricity being but seldom applied. What is known as electo-magnetism is a form of induced current, generated by the rotary instrument, and is not reliable. Faradism, so called from its discoverer, is generated by an instrument which is

capable of applying slow or rapid shocks, and giving what is denominated a fine, strong, induced current. It consists of coils of wire; a small hammer of soft iron, attached to a spring; a pole, containing a platinum-pointed screw; the hammer breaking the current in the coil of wire, and by rapid vibration producing shocks.

"The galvanic current is generated by a series of cells, sufficient in number to cause a current of tension, which is the resistance offered to the passage of a current.

"One cell supplies a current, the poles of other cells being alternately joined, and there are finally but two terminal poles." As the current from the first cell passes through the remaining cells, its power is increased and the effect is governed by the number of cells belonging to the circuit. There is also what is denominated a current of "quantity," which is generated by a large metallic surface in the battery cell, the tension current being generated by a number of small metal plates. The "tension current" serves the best purpose for medical use, while the "quantity current" furnishes heat, and is, therefore, adapted to purposes of electro-surgery. The modified Bunsen galvanic cell is the best for medical purposes, although what is known as the Siemens and Halske cell is extensively used; "it consists of an outer cell of glass, with elements of zinc and copper, a diaphragm of porous earthenware, and a diaphragm of papier mache, between the solutions." The Holtz electric instrument furnishes the best static current.

The Ruhmkorff coil is also employed, in the use of which but one wire is brought in contact with the patient, the other conductor being formed by the air, and a spark, similar to the ordinary spark from the friction machine, being produced.

When electricity is applied to the body, sponges of different sizes, or polished metallic surfaces, known as "electrodes," the metallic being the best, are employed, the effect upon the skin being similar to what is caused by puncturing with many small needles. The theory of *electro-therapeutics* is dependent upon the following effects;—

"If a portion of a motor nerve is included between the poles of a galvanic battery, it is said to be *polarized*, and in a state of electrotonus. At the positive pole, the irritability of the nerve is diminished, while at the negative it is excited and more susceptible to stimulation. The condition at the positive pole is called *anelectrotonus*, and that at the negative *catelectrotonus*. The positive pole is known as the *anode;* the negative, the *cathode*, and these give the name to the states described. A nerve is said to be *tetanized* when the muscle supplied is thrown into a state of permanent tetanic contraction by a rapidly intermitting current. The passage of a number of these shocks for some time will diminish the irritability of the nerve to such an extent that, finally there will be no further response. An ascending current causes a greater irritability in a nerve than a descending one; a descending one depresses excitability. The stimulus is felt at the negative pole when the current commences, and when it is broken it is felt at the positive pole. A shock is felt at the *opening* of the weak currents; with moderately strong ones it is felt both at the opening and the closure. With very strong currents, it is impossible to tell the points of sensation, as the power of the nerve is impaired." The action upon involuntary muscles is less than upon the voluntary, and, as regards the latter, it is the same, or nearly so, as long as the integrity of their immediate nerve supply is concerned.

Degenerations and atrophies of muscles interfere to a considerable extent with their susceptibility to electric currents; hence, it is better, in diseased conditions, to pass the current through the nerve trunk which supplies them. The faradic current has but a local effect, the deeper muscles and nerves escaping.

When a metallic or sponge electrode is applied to the moistened skin, a pricking sensation follows, attended with redness and tingling, and this impression on the cutaneous nerves and muscles is known as *electro-muscular sensibility*. The galvanic current occasions a sensation of warmth, like that produced by a local stimulant, such as a mustard plaster,

and when the faradic current is applied to the dry skin, or when the electrodes are but lightly applied, there is produced a sensation of pain, and the pain is the greater when caused by rapidly succeeding shocks than by slow ones.

The galvanic current causes deeper impressions than the faradic, and also electrolytic changes different from the faradic, producing absorption and changing the structure of the different tissues, and beneficial results have resulted from its application in diseases of the brain. The physical effects of the galvanic current upon the sympathetic nerve are dilatation followed by contraction of the pupil, diminished frequency of the pulse, and a lowering of the tension of the carotid arteries. When electricity is used for the purpose of diagnosis, the existence of local tenderness, exalted sensibility, anæsthesia, paralysis, diseases of the brain, spinal cord, etc., may be ascertained. It has also been used to determine the question of doubtful death, whether certain affections are recent or of long standing, and to detect malingering. As various nervous diseases are associated with the loss of such functions of muscles as contraction and sensation, or the reverse, electricity determines the extent of such changes.

When applying the electric current, the anatomy of the part affected should be well understood; for example, for neuralgia of the fifth pair of nerves one pole should be applied as near as possible to the point of exit of the nerve from the cranium, and the other pole to the remote parts of distribution.

Galvanism and faradism are employed for the relief of pain and spasm, to improve the nutritive processes, and to restore deficient muscular power, to stimulate sensation in nerves, to stimulate secretion, to influence circulation, to cause absorption of fluids, to bring about the absorption of morbid growths and deposits, to induce sleep, and in surgery, in the form of the galvanic cautery. The galvanic current is considered to be the most useful for the mediate, and the faradic current for the immediate application, the former proving serviceable in all forms of neuralgia, and especially in facial

neuralgia, and the latter in headaches, especially those of a rheumatic nature.

Galvanism is also employed with advantage in sciatica, spinal irritation and hysteria, also tumors, such as aneurisms and goître, these morbid products being dispersed by connecting the two poles of a galvanic battery with needles, which are thrust into the morbid growth and generate a process known as *electrolysis*. In such operations bubbles of hydrogen gas are disengaged at the negative pole, which separate mechanically the adjacent tissues, breaking them up in such a manner that the disintegrated particles may be taken up by the circulation. Oxygen is disengaged at the positive pole, which forms an acid with certain elements of the tissue, and the albumen is coagulated, forming a clot if this occurs in a cavity filled with blood.

For obtunding sensitive dentine and controlling peridental inflammation by electrolysis, Dr. F. McGraw suggests the following method: "To a 12 per cent. solution of cocaine add an equal amount of absolute alcohol. In connection with this use the galvanic current, varying the power as the needs of each case may indicate." The method of application is as follows: "After applying the rubber-dam, wet a pledget of cotton in the solution; place it in the cavity of the tooth; press the point of the positive pole on to the cotton, and the negative pole, with sponge attachment, to the cheek, turning on the current. An application of three minutes, with an interval of like duration, and then another three-minute application, is sufficient in the majority of cases, although it is occasionally necessary to make the third application. Then dry the cavity thoroughly and begin excavating." In case of peridental inflammation use a stronger current, which tetanizes the vessels and causes a diminished flow of blood to the parts and thus lessens congestion. The same current longer continued will cause electrolytic decomposition. "The medicinal agents he uses for peridental inflammation and for blind abscesses are a saturated solution of the chloride of sodium, seven ounces, tincture of ergot, one ounce. The treatment of

blind abscesses requires a stronger battery power in order to obtain the full effect of the electrolysis. Dr. Weeks has used this method successfully in the painless removal of pulps."

Galvano-Cautery.—For surgical operations, as a substitute for the knife or écraseur, a platinum wire is placed between the poles of a powerful battery, the wire being adjusted in a handle, which in a few minutes becomes red hot, and is especially serviceable for operations in deep cavities where it would be impossible to use the knife, the application of such a galvanic cautery being unattended by pain or hemorrhage. The Galvano-Cautery consists of a platinum wire loop heated by passing a current of electricity through it, the heat being maintained as long as the current passes. Such an appliance will cut through the tissue to which it is applied without causing much hemorrhage.

Electric portable lamps are also employed for illuminating the mouth and examining the teeth, and carious cavities in them.

Strong currents of electricity should not be applied to the head, nor its use be persevered in for more than fifteen minutes at a time.

Electro-magnetism has been employed for relieving pain during the extraction of teeth, one pole of an ordinary battery being attached to the forceps and the other to a handle which is grasped by the patient. The susceptibility to the current is first ascertained by the patient holding both the forceps and the handle in his hands, and a feeble shock applied, which is gradually increased until the sensation is felt at or just beyond the elbows, when the current is somewhat reduced in power. After the gum has been lanced, the connection is made as before described, by the patient holding the handle and the operator the forceps in contact with the tooth to be removed, the handles of the instrument being isolated, when the operation is at once completed. Great diversity of opinion, however, exists as to the efficiency of this method, which has its advocates and opponents.

INCOMPATIBILITY.*

"*Incompatibility* gives rise to many dangers which may in a great measure be avoided by the use of the utmost simplicity in prescribing. 'The tendency of the present age is toward mono- rather than poly-pharmacy, and prescriptions with the orthodox *adjuvans* and *corrigens* are less frequently seen than formerly.' (Piffard.)

"This subject can only be glanced at here. The following simple rules may help the burdened memory of the practitioner:—

"Never use more than one remedy at a time, if one will serve the purpose.

"Never use strong mineral acids in combination with other agents, unless you know exactly what reaction will ensue. They decompose salts of the weaker acids and form ethers with alcohol.

"Select the simplest solvent, diluent or excipient, you know of, remembering that the solvent power of alcohol and water, for their particular substances, decreases in proportion to the quantity of the other added.

"Never combine *Free Acids* with hydrates or carbonates.

"Generally do not combine two or more soluble salts.

"The following more or less insoluble salts will be formed whenever the materials of which they are composed are brought together in solutions: the Hydrates, Carbonates, Phosphates, Borates, Arseniates and Tannates of most earthy and heavy metals and alkaloids, and the metallic Sulphides; the Sulphates of Calcium, of Lead and of the subsalts of Mercury: the Chlorides, Iodides and Bromides of Bismuth, Silver, Lead and subsalts of Mercury; the Iodides of Quinine, Morphine and most alkaloids.

"*Alkalies* precipitate the alkaloids and the soluble non-alkaline metallic salts, and (as also metallic Hydrates and Carbonates) neutralize free acids.

"*Silver Nitrate, Lead Acetate, Corrosive Sublimate, Potassium*

* S. O. L. Potter, M.D.

Iodide should nearly always be prescribed alone. The first with Creasote forms an explosive compound. *Aconite* should never be given in any vehicle except water.

"*Silver Nitrate*, and *Lead Acetate* and *Subacetate*, although incompatible with almost everything, may be combined with Opium: the latter forming with Opium a compound which, although insoluble, is therapeutically active as a lotion.

"*Corrosive Sublimate* is incompatible with almost everything, and should be given in *Simple Syrup;* even the Compound Syrup of Sarsaparilla is said to decompose it.

"*Tannic Acid*, and substances containing it, are incompatible with albumen and gelatin. *Tannic Acid*, *Iodine* and the *soluble Iodides* are incompatible with the alkaloids and substances containing them, and with most soluble metallic salts. *Vegetable Infusions* are generally incompatible with metallic salts.

"*Glucosides*, such as Santonin and Colocynthin, should not be prescribed with free acids or Emulsin.

"*Dangerous Compounds*, because poisonous, are: Potassic Iodide with Potassic Chlorate; Hydrocyanic acid or Potassium Cyanide with metallic Hydrates, Carbonates, Sub-nitrates or Sub-chlorides, as Bismuth, Carbonate or Nitrate or Calomel.

"*Explosions* would result from the combination of powerful oxidizers with readily oxidizable substances, as Potassium Chlorate or Permanganate with Tannin, Sugar, Sulphur, Sulphides, Vegetable powders, Glycerine, Alcohol, Tinctures or Ether."

TABLE OF THE DOSES OF MEDICINES.

Arranged in Alphabetical Order, and Expressed in terms of both the Apothecaries' and the Decimal Metric System of Weights and Measures.

Revised and Corrected according to the New Pharmacopœial Standard.

BY OSCAR OLDBERG, PH. D.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Abstract. aconiti	3 to 10 centigrams	½ to 1½ grains.
Abstract. aspidospermæ	0.30 to 1.20 grams	5 to 20 grains.
Abstract. belladonnæ	3 to 10 centigrams	½ to 1½ grains.
Abstract. cannab. ind.	6 to 20 centigrams	1 to 3 grains.
Abstract. conii	6 to 20 centigrams	1 to 3 grains.
Abstract. coto.	6 to 20 centigrams	1 to 3 grains.
Abstract. digitalis	6 to 20 centigrams	1 to 3 grains.
Abstract. gelsemii	6 to 20 centigrams	1 to 3 grains.
Abstract. hyoscyami	12 to 40 centigrams	2 to 6 grains.
Abstract. ignatiæ	6 to 20 centigrams	1 to 3 grains.
Abstract. ipecac	0.20 to 2 grams	3 to 30 grains.
Abstract. jalapæ	0.40 to 2 grams	6 to 30 grains.
Abstract. nuc. vom.	6 to 20 centigrams	1 to 3 grains.
Abstract. phytolaccæ	0.30 to 1 gram	5 to 15 grains.
Abstract. pilocarpi	0.40 to 2 grams	6 to 30 grains.
Abstract. podophylli	25 to 60 centigrams	4 to 10 grains.
Abstract. sanguin. alterat.	6 to 20 centigrams,	1 to 3 grains.
Abstract. sanguin. emet.	0.60 to 1.20 Gm.	10 to 15 grains.
Abstract. senegæ.	25 to 60 centigrams	4 to 10 grains.
Abstract. valerianæ	0.60 to 1.20 Gm.	10 to 15 grains.
Abstract. veratr. vir.	6 to 20 centigrams,	1 to 3 grains.
Acet. lobeliæ	1 to 4 C. c.	15 to 60 minims.
Acet. opii.	0.30 to 1 C. c.	5 to 16 minims.
Acet. sanguinar	1 to 2 C. c.	15 to 30 minims.
Acet. scillæ	0.60 to 2 C. c.	10 to 30 minims.
Acid. acet. dil.	4 to 6 C. c.	60 to 90 minims.
Acid. arsenios	1 to 5 milligrams	$\frac{1}{64}$ to $\frac{1}{12}$ grain.
Acid. benzoic	0.30 to 1 Gm.	5 to 15 grains.
Acid. carbolic	2 to 6 centigrams	¼ to 1 grain.
Acid. citrici	0.60 to 2 Gm.	10 to 30 grains.
Acid. gallic	0.20 to 1 Gm.	3 to 15 grains.
Acid. gall. in albuminuria	0.60 to 4 Gm.	10 to 60 grains.
Acid. hydrobrom. dil.	1 to 2.50 C. c.	15 to 40 minims.
Acid. hydrochlor. dil.	0.60 to 2 C. c.	10 to 30 minims.
Acid. hydrocyan. dil.	0.10 to 0.30 C. c.	2 to 6 minims.
Acid. lactic	1 to 4 C. c.	15 to 60 minims.
Acid. nitr. dil.	0.60 to 2 C. c.	10 to 30 minims.
Acid. nitro-hydrochlor. dil.	0.30 to 1.30 C. c.	5 to 20 minims.
Acid. phosphoric dil.	0.30 to 2 C. c.	15 to 30 minims.
Acid. salicyl	0.30 to 1 Gm.	5 to 15 grains.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Acid. sulphuric dil.	0.36 to 2 C. c.	5 to 30 minims.
Acid. sulphuric arom.	0.30 to 2 C. c.	5 to 30 minims.
Acid. sulphuros	2 to 4 C. c.	30 to 60 minims.
Acid. tannic	10 to 60 centigrams	2 to 10 grains.
Aconitina (white crystals)	0.15 to 0.30 milligr.	$\frac{1}{400}$ to $\frac{1}{200}$ grain.
Aconitina (Duquesnel's)	0.30 to 0.50 milligr.	$\frac{1}{200}$ to $\frac{1}{120}$ grain.
Æther	2 to 4 C. c.	½ to 1 fl. drachm.
Aloe	10 to 30 centigrams	2 to 5 grains.
Alonium	6 to 20 centigrams	1 to 3 grains.
Alumen	0.50 to 1 Gm.	10 to 15 grains.
Ammonii benzoas	0.50 to 1.30 Gm.	10 to 20 grains.
Ammonii bromid.	0.30 to 2 Gm.	5 to 30 grains.
Ammonii carb.	20 to 60 centigrams	3 to 10 grains.
Ammonii chlorid.	1 to 2 Gm.	15 to 30 grains.
Ammonii iodid.	0.20 to 1 Gm.	3 to 15 grains.
Ammonii phosph.	0.30 to 1.30 Gm.	5 to 20 grains.
Ammonii valer.	0.10 to 0.50 Gm.	2 to 8 grains.
Ammonii valer. elixir	2 to 4 C. c.	30 to 60 minims.
Amyl nitris	0.10 to 0.40 C. c.	2 to 5 minims.
Amylum iodatum	0.20 to 2 Gm.	3 to 30 grains.
Ant. et pot. tartr.; diaph.	4 to 10 milligrams	$\frac{1}{16}$ to $\frac{1}{6}$ grain.
Ant. et pot. tartr.; emetic.	6 to 10 centigrams	1 to 2 grains.
Apomorph. hydrochlor.	3 to 6 milligrams	$\frac{1}{30}$ to $\frac{1}{10}$ grain.
Aqua ammoniæ	0.30 to 2 C. c.	6 to 30 minims.
Aqua amygd. amar.	10 to 15 C. c.	2 to 4 fl. drachms.
Aqua camphoræ	15 to 60 C. c.	½ to 2 fl. oz.
Aqua chlori.	4 to 15 C. c.	1 to 4 fl. drachms.
Aqua creasoti	4 to 15 C. c.	1 to 4 fl. drachms.
Aqua laurocerasi	0.30 to C. c.	6 to 30 minims.
Argenti nitras.	1 to 2 centigrams	⅙ to ⅓ grain.
Argenti oxid.	3 to 10 centigrams	½ to 2 grains.
Asafœtida	0.30 to 1.30 Gm.	5 to 20 grains.
Atropinæ sulph.	0.50 to 2 milligrams	$\frac{1}{128}$ to $\frac{1}{32}$ grain.
Auri et sodii chlorid.	2 to 4 milligrams	$\frac{1}{32}$ to $\frac{1}{16}$ grain.
Bebeerinæ sulph.	20 to 60 centigrams	3 to 10 grains.
Berberina and its salts	0.20 to 1 Gm.	3 to 15 grains.
Bismuthi et ammon. citr.	0.10 to 1 Gm.	1 to 15 grains.
Bismuthi subcarb.	0.40 to 2 Gm.	6 to 30 grains.
Bismuthi subnitr.	0.40 to 2 Gm.	6 to 30 grains.
Caffeinæ citras	6 to 30 centigrams	1 to 5 grains.
Calcii carb.	1 to 4 Gm.	15 to 60 grains.
Calcii hypophosphis	0.20 to 1 Gm.	3 to 15 grains.
Calcii phosphas	1 to 2 Gm.	15 to 30 grains.
Calumba	0.60 to 2 Gm.	10 to 30 grains.
Camphora	20 to 60 centigrams	3 to 10 grains.
Camph. monobrom	10 to 30 centigrams	2 to 5 grains.
Capsicum	6 to 60 centigrams	1 to 10 grains.
Cerii oxalas	6 to 30 centigrams	1 to 5 grains.
Chinoidinum	0.20 to 2 Gm.	3 to 30 grains.
Chloral.	0.20 to 1 Gm.	3 to 15 grains.
Chloroformum	0.05 to 0.30 C. c.	1 to 5 minims.
Cinchona	1 to 4 Gm.	15 to 60 grains.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Cinchonidina, and its salts	0.06 to 2 Gm.	1 to 30 grains.
Cinchonina, and its salts	0.06 to 2 Gm.	1 to 30 grains.
Cinnamomum	0.40 to 2 Gm.	6 to 30 grains.
Codeina	3 to 10 centigrams	½ to 2 grains.
Confectio sennæ	4 to 10 grams	60 to 120 grains.
Convallamarin	1 to 2 milligrams	$\frac{1}{60}$ to $\frac{1}{30}$ grain.
Copaiba	1 to 4 C. c.	15 to 16 minims.
Creasotum	0.05 to 0.20 C. c.	1 to 3 minims.
Creta præpar.	1 to 5 Gm.	15 to 75 grains.
Croton chloral	5 to 60 centigrams	1 to 10 grains.
Cubeba	1 to 4 Gm.	15 to 60 grains.
Cupri sulphas	3 to 60 centigrams	½ to 10 grains.
Decoct. hæmatoxylon	32 to 64 C. c.	1 to 2 fl. ounces.
Digitalinum	1 to 2 milligrams	$\frac{1}{64}$ to $\frac{1}{32}$ grain.
Digitalis	3 to 10 centigrams	½ to 2 grains.
Duboisina, and its salts	0.50 to 1 milligram	$\frac{1}{128}$ to $\frac{1}{60}$ grain.
Elaterinum; U.S.P., 1880	1 to 4 milligrams	$\frac{1}{60}$ to $\frac{1}{16}$ grain.
Elaterium; U.S.P., 1870	4 to 30 milligrams	$\frac{1}{16}$ to ½ grain.
Ergotinum	10 to 50 centigrams	2 to 6 grains.
Eserina and its salts	1 to 3 milligrams	$\frac{1}{64}$ to $\frac{1}{20}$ grain.
Eserina muriat	1 to 6 milligrams	$\frac{1}{60}$ to $\frac{1}{10}$ grain.
Eucalyptus	4 to 16 Gm.	1 to 4 drachms.
Eupatorium	1 to 4 Gm.	20 to 60 grains.
Extr. aconiti rad., U.S.P., 1880	5 to 15 milligrams	$\frac{1}{12}$ to ¼ grain.
Extr. aromat. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. bellad. fol. (Eng.)	1 to 4 centigrams	⅙ to ⅔ grain.
Extr. bellad. alcohol	1 to 3 centigrams	⅙ to ½ grain.
Extr. bellad. fol. fl.	0.20 to 0.40 C. c.	3 to 6 minims.
Extr. bellad. rad.	8 to 15 milligrams	⅛ to ¼ grain.
Extr. bellad. rad. fl.	0.10 to 0.20 C. c.	1 to 3 minims.
Extr. berber. aquifol. fl.	1 to 2 C. c.	15 to 30 minims.
Extr. buchu fl.	2 to 10 C. c.	½ to 2½ fl. drachms.
Extr. calami fl.	1 to 4 C. c.	15 to 60 minims.
Extr. calumbæ	0 to 60 centigrams	3 to 10 grains.
Extr. calumbæ fl.	1 to 4 C. c.	15 to 60 minims.
Extr. cannab. Amer. fl.	0.20 to 1 C. c.	3 to 15 minims.
Extr. cannab. ind.	1 to 3 centigrams	⅙ to ½ grain.
Extr. cannab. ind. fl.	0.20 to 0.40 C. c.	3 to 6 minims.
Extr. cantharidis fl.	0.06 to 0.20 C. c.	1 to 3 minims.
Extr. capsici fl.	0.06 to 0.20 C. c.	1 to 3 minims.
Extr. cardam. comp. fl.	1 to 3 C. c.	15 to 45 minims.
Extr. carnis	1 to 4 Gm.	15 to 60 grains.
Extr. cascarillæ fl.	3 to 10 C. c.	¾ to 2½ fl. drachms.
Extr. catechu liquid	0.50 to 2 C. c.	8 to 30 minims.
Extr. chimaph. fl.	3 to 5 C. c.	¾ to 1¼ fl. drachms.
Extr. chiratæ fl.	2 to 5 C. c.	¼ to 1¼ fl. drachms.
Extr. cimicifugæ fl.	0.50 to 2 C. c.	8 to 30 minims.
Extr. cinchonæ	1 to 2 Gm.	15 to 30 grains.
Extr. cinchonæ fl.	2 to 4 C. c.	30 to 60 minims.
Extr. cinchonæ arom. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. cinchonæ comp. fl.	2 to 5 C. c.	½ to 1¼ fl. drachms.
Extr. colch. rad.	2 to 10 centigrams	⅓ to 1½ grains.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Extr. colch. rad. fl.	0.10 to 0.30 C. c.	2 to 5 minims.
Extr. colch. sem. fl.	0.10 to 0.60 C. c.	1½ to 10 minims.
Extr. colocynth comp.	10 to 30 centigrams	1½ to 5 grains.
Extr. conii fol. alc.; U.S.P, 70	5 to 10 centigrams	1 to 1½ grains.
Extr. con. [fr.] alc. U.S.P., 80	2 to 6 centigrams	⅓ to 1 grain.
Extr. conii fol. fl.	0.20 to 1 C. c.	3 to 15 minims.
Extr. con. [fr.] fl.; U.S.P., 80	0.10 to 0.30 C. c.	1½ to 5 minims.
Extr. convallariæ rad. fl.	1 to 2 C. c.	15 to 30 minims.
Extr. coptidis fl.	2 to 4 C. c.	30 to 60 minims.
Extr. corn. flor. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. cubebæ fl.	1 to 2 C. c.	15 to 30 minims.
Extr. digitalis	1 to 3 centigrams	⅙ to ½ grain.
Extr. digitalis fl.	0.10 to 0.40 C. c.	1 to 6 minims.
Extr. ergotæ	10 to 50 centigrams	1½ to 8 grains.
Extr. ergotæ fl.	1 to 4 C. c.	15 to 60 minims.
Extr. erythroxyli fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. eucalypti	0.06 to 1 Gm.	1 to 20 grains.
Extr. eucalypti fl.	1 to 4 C. c.	15 to 60 minims.
Extr. eupatorii fl.	2 to 4 C. c.	30 to 60 minims.
Extr. gelsemii fl.	0.10 to 0.50 C. c.	1 to 8 minims.
Extr. gent.	6 to 30 centigrams	1 to 5 grains.
Extr. gent. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. geranii fl.	1 to 2 C. c.	15 to 30 minims.
Extr. gossypii fl.	1 to 3 C. c.	15 to 45 minims.
Extr. granati rad. cort. fl.	3 to 8 C. c.	¾ to 2 fl. drachms.
Extr. grind. rob. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. guaranæ fl.	1 to 2 C. c.	15 to 30 minims.
Extr. hæmotoxyli	0.50 to 2 Gm.	8 to 30 grains.
Extr. helleb. nigris	3 to 20 centigrams	½ to 3 grains.
Extr. humuli fl.	2 to 4 C. c.	30 to 60 minims.
Extr. hydrastis fl.	0.50 to 2 C. c.	8 to 30 minims.
Extr. hyoscyami (Engl.)	5 to 25 centigrams	1 to 4 grains.
Extr. hyoscyami alc.	5 to 10 centigrams	1 to 2 grains.
Extr. hyoscyami fol. fl.	0.20 to 1 C. c.	3 to 15 minims.
Extr. hyoscyami sem. fl.	0.10 to 0.50 C. c.	2 to 8 minims.
Extr. ignatiæ	2 to 8 centigrams	⅓ to 1¼ grains.
Extr. ignatiæ fl.	0.05 to 0.30 C. c.	1 to 6 minims.
Extr. ipecac fl.	0.20 to 4 C. c.	3 to 60 minims.
Extr. jaborandi fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. jalapæ; U.S.P., 1870	30 to 60 centigrams	5 to 10 grains.
Extr. jalapæ alc.	20 to 40 centigrams	3 to 6 grains.
Extr. jalapæ fl.	1 to 4 C. c.	15 to 60 minims.
Extr. junip. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. kamali fl.	2 to 4 C. c.	30 to 60 minims.
Extr. kino, liquid	1 to 2 C. c.	15 to 30 minims.
Extr. krameriæ	0.30 to 1 Gm	5 to 15 grains.
Extr. krameriæ fl.	2 to 4 C. c.	30 to 60 minims.
Extr. lactucarii fl.	0.50 to 2 C. c.	8 to 30 minims.
Extr. lupulini fl.	0.30 to 1 C. c.	5 to 15 minims.
Extr. malti	5 to 10 Gm.	1 to 2½ drachms.
Extr. marrubii fl.	4 to 8 C. c.	1 to 2 fl. drachms.
Extr. matico fl.	2 to 4 C. c.	30 to 60 minims.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Extr. nuc. vom. alcohol	1 to 3 centigrams	¼ to ½ grain.
Extr. opii	1 to 3 centigrams	⅙ to ½ grain.
Extr. papaveris	3 to 12 centigrams	½ to 2 grains.
Extr. papaveris fl.	1 to 3 C. c.	15 to 45 minims.
Extr. pareiræ fl.	2 to 4 C. c.	30 to 60 minims.
Extr. physostigmæ	4 to 10 milligrams	$\frac{1}{16}$ to ⅙ grain.
Extr. piper nigr. fl.	1 to 3 C. c.	15 to 45 minims.
Extr. podophylii	3 to 10 centigrams	½ to 1½ grains.
Extr. prun. virg. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. pulsatillæ fl.	0.10 to 0.30 C. c.	2 to 5 minims.
Extr. quassiæ	6 to 30 centigrams	1 to 5 grains.
Extr. quassiæ fl.	2 to 4 C. c.	30 to 60 minims.
Extr. quercus fl.	2 to 4 C. c.	30 to 60 minims.
Extr. rhei	0.30 to 1 Gm.	5 to 15 grains.
Extr. rhei fl.	1 to 3 C. c.	15 to 45 minims.
Extr. ricini fol. fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. rubi fl.	1 to 4 C. c.	15 to 60 minims.
Extr. rutæ fl.	1 to 2 C. c.	15 to 30 minims.
Extr. sabbatiæ fl.	2 to 4 C. c.	30 to 60 minims.
Extr. sabinæ fl.	0.30 to 1 C. c.	5 to 15 minims.
Extr. sarsap. fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. sassafras fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. scoparii fl.	2 to 4 C. c.	½ to 1 fl. drachm.
Extr. scutellariæ fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. senegæ fl.	0.50 to 1 C. c.	8 to 15 minims.
Extr. sennæ fl.	4 to 15 C. c.	1 to 4 fl. drachms.
Extr. serpent. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. spigeliæ fl.	1 to 4 C. c.	15 to 60 minims.
Extr. spigeliæ et sennæ fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. stillingiæ fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. stillingiæ comp. fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. stramonii (Engl.)	3 to 6 centigrams	½ to 1 grain.
Extr. stramonii fol. alc.	2 to 4 centigrams	⅓ to ⅔ grain.
Extr. stramonii sem.	1 to 3 centigrams	⅙ to ½ grain.
Extr. sumbul fl.	1 to 4 C. c.	15 to 60 minims.
Extr. taraxaci	0.30 to 1 Gm.	5 to 15 grains.
Extr. taraxaci fl.	2 to 8 C. c.	½ to 2 fl. drachms.
Extr. ustilag. maid. fl.	1 to 4 C. c.	15 to 60 minims.
Extr. uvæ ursi fl.	2 to 4 C. c.	30 to 60 minims.
Extr. valer.	0.30 to 1 Gm.	5 to 15 grains.
Extr. valer. fl.	2 to 4 C. c.	30 to 60 minims.
Extr. veratr. vir. fl.	0.6 to 0.30 C. c.	1 to 5 minims.
Extr. viburni opuli fl.	4 to 8 C. c.	1 to 2 fl. drachms.
Extr. viburni [prunifol.] fl.	4 to 8 C. c.	1 to 2 fl. drachms.
Extr. zingiberis fl.	0.50 to 2 C. c.	8 to 30 minims.
Fel bovis purif.	20 to 40 centigrams	3 to 6 grains.
Ferri arsen.	6 to 12 milligrams	$\frac{1}{10}$ to $\frac{1}{8}$ grain.
Ferri carb. sacch.	0.25 to 1 Gm.	4 to 15 grains.
Ferri chlorid.	5 to 20 centigrams	1 to 3 grains.
Ferri citr.	30 to 60 centigrams	5 to 10 grains.
Ferri et ammon. citr.	30 to 60 centigrams	5 to 10 grains.
Ferri et ammon. sulph.	30 to 60 centigrams	5 to 10 grains.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Ferri et ammon. tartr.	0.30 to 1 Gm.	5 to 15 grains.
Ferri et cinchonid. citr.	30 to 60 centigrams	5 to 10 grains.
Ferri et pot. tartr.	1 to 4 Gm.	15 to 60 grains.
Ferri et quin. citr.	30 to 60 centigrams	5 to 10 grains.
Ferri et strychn. citr.	5 to 30 centigrams	1 to 5 grains.
Ferri ferrocyanid	20 to 30 centigrams	3 to 5 grains.
Ferri hypophosphis	30 to 60 centigrams	5 to 10 grains.
Ferri lactas	5 to 20 centigrams	1 to 3 grains.
Ferri oxalas	5 to 20 centigrams	1 to 3 grains.
Ferri oxid. hydrat.	15 to 60 Gm.	½ to 2 ounces.
Ferri phosphas	5 to 30 centigrams	1 to 5 grains.
Ferri pyrophosphas	5 to 30 centigrams	1 to 5 grains.
Ferri subcarb.	0.30 to 2 Gm.	5 to 30 grains.
Ferri sulphas	5 to 20 centigrams	1 to 3 grains.
Ferri sulphas exsiccat.	3 to 10 centigrams	½ to 1½ grains.
Ferri valer.	5 to 20 centigrams	1 to 3 grains.
Ferrum dialys	0.60 to 4 C. c.	10 to 60 minims.
Ferrum reduct.	6 to 30 centigrams	1 to 5 grains.
Gentiana	0.60 to 2 Gm.	10 to 30 grains.
Hydrarg. chlorid. corros.	1 to 6 milligrams	$\frac{1}{64}$ to $\frac{1}{10}$ grain.
Hydrarg. chlorid. mite.	1 to 50 centigrams	1/6 to 8 grains.
Hydrarg. cyanid.	3 to 6 milligrams	$\frac{1}{20}$ to $\frac{1}{10}$ grain.
Hydrarg. iodid. rubr.	4 to 30 milligrams	$\frac{1}{15}$ to ½ grain.
Hydrarg. iodid. vir.	1 to 6 centigrams	1/6 to 1 grain.
Hydrarg. subsulphas flav.	15 to 60 milligrams	¼ to 1 grain.
Hydrarg. c. creta	15 to 50 centigrams	3 to 8 grains.
Infusum brayeræ	60 to 250 C. c.	2 to 8 fl. ounces.
Infusum catechu comp.	30 to 60 C. c.	1 to 2 fl. ounces.
Infusum columbæ	15 to 60 C. c.	½ to 2 fl. ounces.
Infusum digitalis	8 to 15 C. c.	2 to 4 fl. drachms.
Infusum eupatoris	30 to 60 C. c.	1 to 2 fl. ounces.
Infusum gentiana comp.	4 to 30 C. c.	1 to 8 fl. drachms.
Infusum pruni virginianæ.	15 to 60 C. c.	⅓ to 2 fl. ounces.
Infusum quassiæ	8 to 60 C. c.	¼ to 2 fl. ounces.
Infusum sennæ comp.	30 to 60 C. c.	1 to 2 fl. ounces.
Ingluvin	0.30 to 1 Gm.	5 to 20 grains.
Iodoformum	5 to 20 centigrams	1 to 3 grains.
Iodum	1 to 3 centigrams	1/6 to ½ grain.
Ipecacuanha, expect.	1 to 6 centigrams	1/6 to 1 grain.
Ipecacuanha, emet.	1 to 2 Gm.	15 to 30 grains.
Jalapa	1 to 2 Gm.	15 to 30 grains.
Kamala.	4 to 8 Gm.	1 to 2 drachms.
Kino	0.50 to 2 Gm.	8 to 30 grains.
Lactucarium	0.50 to 1 Gm.	8 to 15 grains.
Liq. ammon. acet.	8 to 30 C. c.	2 to 8 fl. drachms.
Liq. arsen. et hydr. iod.	0.10 to 0.50 C. c.	2 to 7 minims.
Liq. ferri nitrat.	0.50 to 1 C. c.	8 to 15 minims.
Liq. iodi. comp.	0.30 to 1 C. c.	5 to 20 minims.
Liq. magnes. citratis	60 to 250 C. c.	2 to 8 fl. ounces.
Liq. pepsina	8 to 15 C. c.	2 to 4 fl. drachms.
Liq. potassæ.	0.30 to 1 C. c.	5 to 20 minims.
Liq. potassii arsenit.	0.15 to 0.50 C. c.	3 to 7 minims.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Liq. potassii citrat.	8 to 15 C. c.	2 to 4 fl. drachms.
Liq. sodæ.	0.30 to 1 C. c.	5 to 15 minims.
Liq. sodii arseniatis.	0.15 to 0.50 C. c.	3 to 7 minims.
Lithii benzoas	10 to 30 centigrams	2 to 5 grains.
Lithii bromid.	6 to 30 centigrams	1 to 3 grains.
Lithii carb.	10 to 40 centigrams	2 to 6 grains.
Lithii citr.	10 to 30 centigrams	2 to 5 grains.
Lithii salicylas	10 to 50 centigrams	2 to 8 grains.
Lupulinum	30 to 60 centigrams	5 to 10 grains.
Magnesia	1 to 4 Gm.	15 to 60 grains.
Magnesii carb.	1 to 4 Gm.	15 to 60 grains.
Magnesii citr. gran.	8 to 30 Gm.	2 to 8 drachms.
Magnesii sulphas	8 to 30 Gm.	2 to 8 drachms.
Magnesii sulphis	0.50 to 2 Gm.	8 to 30 grains.
Mangani sulphas	10 to 60 centigrams	2 to 10 grains.
Manna	30 to 60 Gm.	1 to 2 ounces.
Massa copaibæ.	0.30 to 2 Gm.	5 to 30 grains.
Massa ferri carb.	0.30 to 1 Gm.	5 to 15 grains.
Massa hydrarg.	0.06 to 1 Gm.	1 to 15 grains.
Mist. ammoniaci.	15 to 30 C. c.	4 to 8 fl. drachms.
Mist. asafœtidæ	15 to 30 C. c.	4 to 8 fl. drachms.
Mist. camphora (Hopis)	4 to 32 C. c.	1 to 8 fl. drachms.
Mist. chloroformi.	15 to 30 C. c.	4 to 8 fl. drachms.
Mist. cretæ	30 to 60 C. c.	1 to 2 fl. ounces.
Mist. ferri comp.	15 to 60 C. c.	½ to 2 fl. ounces.
Mist. ferri et ammon. acet.	15 to 30 C. c.	½ to 1 fl. ounce.
Mist. glycrrh. comp.	4 to 15 C. c.	1 to 4 fl. drachms.
Mist. magnes. et asafœt.	4 to 15 C. c.	1 to 4 fl. drachms.
Mist. potassii citr.	15 to 60 C. c.	½ to 2 fl. ounces.
Mist. rhei et sodæ	15 to 30 C. c.	½ to 1 fl. ounce.
Morphina and its salts	4 to 30 milligrams	$\frac{1}{16}$ to ½ grain.
Moschus	0.10 to 1 Gm.	2 to 15 grains.
Mucil. acaciæ	4 to 32 C. c.	1 to 8 fl. drachms.
Narceina	1 to 10 centigrams	⅙ to 2 grains.
Nitroglycerinum	1 to 4 milligrams	$\frac{1}{64}$ to $\frac{1}{16}$ grain.
Nux vomica	5 to 30 centigrams	1 to 5 grains.
Oleoresina aspidii	1 to 4 C. c.	15 to 60 minims.
Oleoresina capsici	0.06 to 0.30 C. c.	1 to 3 minims.
Oleoresina cubebæ	0.30 to 2 C. c.	5 to 30 minims.
Oleoresina lupulini	0.30 to 1 C. c.	5 to 20 minims.
Oleoresina piperis	0.06 to 0.20 C. c.	1 to 3 minims.
Oleoresina zingiberis	0.06 to 0.20 C. c.	1 to 3 minims.
Oleum copaibæ	0.50 to 1 C. c.	8 to 15 minims.
Oleum cubebæ.	0.30 to 1 C. c.	5 to 15 minims.
Oleum eucalypti	0.60 to 2 C. c.	10 to 30 minims.
Oleum morrhua	4 to 16 C. c.	1 to 4 fl. drachms.
Oleum phosphoratum	0.05 to 0.20 C. c.	1 to 3 minims.
Oleum ricini	4 to 32 C. c.	1 to 8 fl. drachms.
Oleum sabinæ	0.06 to 0.20 C. c.	1 to 3 minims.
Oleum terebinth.	0.30 to 2 C. c.	5 to 30 minims.
Oleum tiglii	0.30 to 0.10 C. c.	⅓ to 2 minims.
Opium (14% morphine)	1 to 10 centigrams	⅙ to 1½ grains.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Pancreatine	0.30 to 1 Gm.	5 to 20 grains.
Pepsinum purum	1 to 15 Gm.	15 grains to ½ ounce.
Pepsinum saccharatum	0.60 to 1 Gm.	10 to 20 grains.
Phosphorus	0.50 to 3 milligrams	$\frac{1}{128}$ to $\frac{1}{20}$ grain.
Pilocarpina (and salts)	1 to 30 milligrams	$\frac{1}{64}$ to ½ grain.
Pil. aloes	1 to 3 pills	1 to 3 pills.
Pil. aloes et asafœt.	2 to 5 pills	2 to 5 pills.
Pil. aloes et ferri	1 to 3 pills	1 to 3 pills.
Pil. aloes et mast	1 to 3 pills	1 to 3 pills.
Pil. aloes et myrrhæ	2 to 5 pills	2 to 5 pills.
Pil. antimon. comp.	1 to 3 pills	1 to 3 pills.
Pil. asafœtidæ	1 to 6 pills	1 to 6 pills.
Pil. cathart. comp.	1 to 4 pills	1 to 4 pills.
Pil. ferri. comp.	2 to 5 pills	2 to 5 pills.
Pil. ferri iodidi	1 to 4 pills	1 to 4 pills.
Pil. galbani comp.	1 to 5 pills	1 to 5 pills.
Pil. opii	1 to 2 pills	1 to 2 pills.
Pil. phosphori	1 to 4 pills	1 to 4 pills.
Pil. rhei	2 to 5 pills	2 to 5 pills.
Pil. rhei comp.	2 to 5 pills	2 to 5 pills.
Plumbi acetas	3 to 20 centigrams	½ to 3 grains.
Plumbi iodidum	3 to 20 centigrams	½ to 3 grains.
Potassii acetas	1 to 4 Gm.	15 to 60 grains.
Potassii bicarb.	0.50 to 4 Gm.	8 to 60 grains.
Potassii bitartr.	1 to 8 Gm.	15 to 120 grains.
Potassii bromid.	0.50 to 4 Gm.	8 to 60 grains.
Potassii carb.	0.50 to 2 Gm.	8 to 30 grains.
Potassii chloras	0.50 to 2 Gm.	8 to 30 grains.
Potassii citras	1 to 4 Gm.	15 to 60 grains.
Potassii cyanid.	4 to 8 milligrams	$\frac{1}{16}$ to ⅛ grain.
Potassii et sodii tartr.	15 to 30 Gm.	½ to 1 ounce.
Potassii hypophosphis	0.30 to 1 Gm.	5 to 15 grains.
Potassii iodid.	0.10 to 1 Gm.	2 to 15 grains.
Potassii nitras	0.50 to 1 Gm.	8 to 15 grains.
Potassii sulphas	4 to 15 Gm.	1 to 4 drachms.
Potassii sulphidum	5 to 60 centigrams	1 to 10 grains.
Potassii sulphis	1 to 2 Gm.	15 to 30 grains.
Potassii tartras	5 to 30 Gm.	1 to 8 drachms.
Prunus Virginianum	2 to 4 Gm.	½ to 1 drachm.
Pulv. aromat.	0.50 to 2 Gm.	8 to 30 grains.
Pulv. cretæ comp.	0.50 to 2 Gm.	8 to 30 grains.
Pulv. effervescent aperient (seidlitz powder)	}	Chart. No. 1.
Pulv. glycyrrh. comp.	2 to 4 Gm.	30 to 60 grains.
Pulv. ipecac. et opii	0.30 to 1 Gm.	5 to 15 grains.
Pulv. jalapæ comp.	2 to 4 Gm.	30 to 60 grains.
Pulv. rhei comp.	2 to 4 Gm.	30 to 60 grains.
Quassia	0.60 to 4 Gm.	10 to 60 grains.
Quinidina (and salts)	0.05 to 2 Gm.	1 to 30 grains.
Quinina (and salts)	0.05 to 2 Gm.	1 to 30 grains.
Resina jalapæ	10 to 30 centigrams	2 to 5 grains.
Resina podophylli	8 to 30 centigrams	⅛ to ½ grain.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Resina scammonii	10 to 60 centigrams	2 to 10 grains.
Rheum	0.10 to 2 Gm.	2 to 30 grains.
Salicinum	0.50 to 2 Gm.	8 to 30 grains.
Santonica	0.50 to 4 Gm.	8 to 60 grains.
Santoninum	6 to 30 centigrams	1 to 5 grains.
Sapo	0.30 to 2 Gm.	5 to 30 grains.
Scammonium	0.20 to 1 Gm.	3 to 15 grains.
Senna	0.50 to 4 Gm.	8 to 60 grains.
Sodii acetas	1 to 4 Gm.	15 to 60 grains.
Sodii arsenias	1 to 6 milligrams	$\frac{1}{64}$ to $\frac{1}{10}$ grains.
Sodii benzoas	0.30 to 1 Gm.	5 to 15 grains.
Sodii bicarb.	0.50 to 2 Gm.	8 to 30 grains.
Sodii bisulphis	0.50 to 2 Gm.	8 to 30 grains.
Sodii boras	0.50 to 2 Gm.	8 to 30 grains.
Sodii bromid.	0.50 to 2 Gm.	8 to 30 grains.
Sodii carb.	0.50 to 2 Gm.	8 to 30 grains.
Sodii carb. exsicc.	0.30 to 1 Gm.	5 to 15 grains.
Sodii chloras	0.30 to 2 Gm.	5 to 30 grains.
Sodii hypophosphis	0.50 to 1 Gm.	8 to 15 grains.
Sodii hyposulphis	0.50 to 2 Gm.	8 to 30 grains.
Sodii iodidum	0.30 to 1 Gm.	5 to 15 grains.
Sodii phosphas	0.10 to 1 Gm.	2 to 15 grains.
Sodii salicylas	0.30 to 2 Gm.	5 to 30 grains.
Sodii santoninas	15 to 60 centigrams	2 to 10 grains.
Sodii sulphas	4 to 30 Gm.	1 to 8 drachms.
Sodii sulphis	0.50 to 2 Gm.	8 to 30 grains.
Spir. æther. comp.	2 to 4 C. c.	30 to 60 minims.
Spir. æther. nitrosi	2 to 8 C. c.	½ to 2 fl. drachms.
Spir. ammoniæ	0.50 to 2 C. c.	8 to 30 minims.
Spir. ammoniæ arom.	1 to 4 C. c.	15 to 60 minims.
Spir. camphoræ	0.50 to 2 C. c.	8 to 30 minims.
Spir. chloroformi	1 to 4 C. c.	15 to 60 minims.
Spir. frumentis	4 to 16 C. c.	1 to 4 fl. drachms.
Spir. vini gallici.	4 to 16 C. c.	1 to 4 fl. drachms.
Spir. juniper.	4 to 16 C. c.	1 to 4 fl. drachms.
Spir. lavend. comp.	2 to 4 C. c.	30 to 60 minims.
Spir. menth. pip.	2 to 4 C. c.	30 to 60 minims.
Strychnina (and salts)	1 to 5 milligrams	$\frac{1}{64}$ to $\frac{1}{12}$ grain.
Succus conii.	2 to 16 C. c.	½ to 4 fl. drachms.
Succus limonis	4 to 8 C. c.	1 to 2 fl. drachms.
Sulphur	2 to 15 C. c.	½ to 4 drachms.
Syrupus calcii lactophos.	5 to 10 C. c.	1 to 2 fl. drachms.
Syrupus calcis	1 to 2 C. c.	15 to 30 minims.
Syrupus ferri bromidi	1 to 4 C. c.	15 to 60 minims.
Syrupus ferri iodidi	1 to 4 C. c.	15 to 60 minims.
Syr. fer. manganese iodidi	0.60 to 4 C. c.	10 to 60 minims.
Syrupus ferri oxidi	5 C. c.	1 fl. drachm.
Syrupus ferri hypophosph.	5 C. c.	1 fl. drachm.
Syr. fer. quin. et str. phos.	5 C. c.	1 fl. drachm.
Syrupus hypophosphit.	5 C. c.	1 fl. drachm.
Syrupus hypophos. c. fer.	5 C. c.	1 fl. drachm.
Syrupus ipecac.	2 to 15 C. c.	½ to 4 fl. drachms.

DOSE TABLE CONTINUED.

Remedies.	Dose in metric weights or measures.	Doses in apothecaries' weights or measures.
Syrupus lactucarii	5 to 10 C. c.	1 to 3 fl. drachms.
Syrupus pruni virginiani	4 to 16 C. c.	1 to 4 fl. drachms.
Syrupus rhei	4 to 15 C. c.	1 to 4 fl. drachms.
Syrupus rhei arom.	4 to 15 C. c.	1 to 4 fl. drachms.
Syrupus rosæ	4 to 8 C. c.	1 to 2 fl. drachms.
Syrupus rubi	4 to 8 C. c.	1 to 2 fl. drachms.
Syrupus sarsap. comp.	4 to 15 C. c.	1 to 4 fl. drachms.
Syrupus scillæ	2 to 4 C. c.	½ to 1 fl. drachm.
Syrupus scillæ comp.	1 to 4 C. c.	15 to 60 minims.
Syrupus senegæ	4 to 8 C. c.	1 to 2 fl. drachms.
Syrupus sennæ	5 to 15 C. c.	1 to 4 fl. drachms.
Syrupus tolutan	4 to 32 C. c.	1 to 8 fl. drachms.
Tinct. aconiti fol.	0.50 to 1 C. c.	8 to 16 minims.
Tinct. aconiti rad.	0.06 to 0.30 C. c.	1 to 5 minims.
Tinct. acon. rad. Fleming's	0.04 to 0.15 C. c.	⅔ to 2½ minims.
Tinct. aloes (1880)	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. aloes et myrrhæ	4 to 8 C. c.	1 to 2 fl. drachms.
Tinct. arnicæ flor.	0.50 to 2 C. c.	8 to 30 minims.
Tinct. arnicæ rad.	1 to 2 C. c.	15 to 30 minims.
Tinct. asafœtidæ	2 to 4 C. c.	30 to 60 minims.
Tinct. belladonnæ	0.20 to 1 C. c.	3 to 15 minims.
Tinct. calumbæ	3 to 15 C. c.	1 to 4 fl. drachms.
Tinct. cannabis ind.	0.30 to 2 C. c.	5 to 30 minims.
Tinct. cantharid.	0.06 to 0.60 C. c.	1 to 10 minims.
Tinct. capsici.	0.30 to 2 C. c.	5 to 30 minims.
Tinct. catechu	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. cimicifugæ	2 to 4 C. c.	30 to 60 minims.
Tinct. cinchonæ	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. cinchonæ comp.	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. colchici sem.	0.30 to 1 C. c.	5 to 15 minims.
Tinct. conii	0.30 to 2 C. c.	5 to 30 minims.
Tinct. cubebæ	4 to 8 C. c.	1 to 2 fl. drachms.
Tinct. digitalis	0.30 to 1 C. c.	6 to 15 minims.
Tinct. eucalypti	3 to 8 C. c.	½ to 2 fl. drachms.
Tinct. ferri chloridi	1 to 2 C. c.	15 to 30 minims.
Tinct. ferri chloridi æther	1 to 2 C. c.	15 to 30 minims.
Tinct. gentian comp.	3 to 8 C. c.	½ to 3 fl. drachms.
Tinct. gelsemii	0.50 to 1 C. c.	8 to 15 minims.
Tinct. guaiaci	2 to 4 C. c.	30 to 60 minims.
Tinct. guaiaci ammon.	2 to 4 C. c.	30 to 60 minims.
Tinct. humuli	4 to 10 C. c.	1 to 2½ fl. drachms.
Tinct. hydrastis	2 to 6 C. c.	30 to 90 minims.
Tinct. hyoscyami fol.	1 to 4 C. c.	15 to 60 minims.
Tinct. hyoscyami sem.	1 to 2 C. c.	15 to 30 minims.
Tinct. iodi	0.30 to 1 C. c.	5 to 15 minims.
Tinct. ipecac. et opii.	0.30 to 1 C. c.	5 to 15 minims.
Tinct. jalapæ.	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. kino	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. krameriæ	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. lavend. comp.	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. lobeliæ	1 to 3 C. c.	15 to 45 minims.
Tinct. lupulini	2 to 8 C. c.	½ to 2 fl. drachms.

DOSE TABLE CONTINUED,

Remedies.	Dose in metric weights or measures.	Dose in apothecaries' weights or measures.
Tinct. matico	2 to 8 C. c.	½ to 2 fl. drachms.
Tinc. nuc. vomicæ	0.06 to 0.60 C. c.	1 to 10 minims.
Tinc. opii deodorat	0.30 to 2 C. c.	5 to 30 minims.
Tinct. opii camph.	0.50 to 5 C. c.	8 to 75 minims.
Tinct. physostigmatis	0.30 to 1 C. c.	5 to 15 minims.
Tinct. pyrethri	0.50 to 2 C. c.	8 to 30 minims.
Tinct. quassiæ	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. rhei.	4 to 30 C. c.	1 to 8 fl. drachms.
Tinct. sanguinariæ	1 to 4 C. c.	15 to 60 minims.
Tinct. scillæ	0.50 to 4 C. c.	8 to 60 minims.
Tinct. serpentariæ	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. stramon. fol.	0.50 to 1 C. c.	8 to 15 minims.
Tinct. stramon. sem.	0.30 to 1 C. c.	6 to 15 minims.
Tinct. sumbul	0.50 to 2 C. c.	8 to 30 minims.
Tinct. tolutan.	4 to 8 C. c.	1 to 2 fl. drachms.
Tinct. valer.	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. valer. amon.	2 to 8 C. c.	½ to 2 fl. drachms.
Tinct. veratr. vir.	0.20 to 0.60 C. c.	3 to 10 minims.
Tinct. zingiberis	1 to 4 C. c.	15 to 60 minims.
Tritur. elaterini	8 to 30 milligrams	⅛ to ½ grain.
Uva ursi	2 to 4 Gm.	½ to 1 drachm.
Veratrini	1 to 6 milligrams	$\frac{1}{64}$ to $\frac{1}{10}$ grain.
Vin. aloes	4 to 8 C. c.	1 to 2 fl. drachms.
Vin. antim { expect. et. alt	0.06 to 0.50 C. c.	1 to 8 minims.
Vin. antim { emet	2 to 5 C. c.	30 to 75 minims.
Vin. colch. rad.	0.30 to 2 C. c.	5 to 30 minims.
Vin. colch. sem.	0.30 to 2 C. c.	5 to 30 minims.
Vin. ergotæ	4 to 12 C. c.	1 to 3 fl. drachms.
Vin. ferri amar.	5 C. c.	1 fl. drachm.
Vin. ferri citrat.	5 C. c.	1 fl. drachm.
Vin. xericum.	4 to 32 C. c.	1 to 8 fl. drachms.
Vin. ipecac. { expect.	0.30 to 1 C. c.	5 to 15 minims.
Vin. ipecac. { emet.	10 to 25 C. c.	3 to 6 fl. drachms.
Vin. opii	0.30 to 1 C. c.	5 to 15 minims.
Vin. portense	4 to 32 C. c.	1 to 8 fl. drachms.
Vin. rhei	4 to 8 C. c.	1 to 2 fl. drachms.
Zinci acet.	5 to 12 centigrams	1 to 2 grains.
Zinci oxid.	6 to 60 centigrams	1 to 10 grains.
Zinci sulphas emet	1 to 2 Gm.	15 to 30 grains.
Zinci valerianas	30 to 120 milligrams.	½ to 2 grains.

THE BEST TWENTY-FIVE DRUGS.—It is claimed that the medical art could be carried on with the following drugs, twenty-five in number, and which represent the soul of the Pharmacopœia: 1, opium; 2, mercury; 3, iodides; 4, quinine; 5, chloroform; 6, ether; 7, sulphate of magnesia; 8, salicylic acid; 9, aloes; 10, alcohol; 11, bromides; 12, iron; 13,

chloral; 14, castor-oil; 15, digitalis; 16, arsenic; 17, colchicum; 18, ipecac; 19, aconite; 20, strychnia; 21, cocaine; 22, ergot; 23, bicarbonate of potash; 24, mineral acids; 25, nitrites.

POISONS.

SYMPTOMS AND ANTIDOTES.

Cases of poisoning require the prompt administration of remedies, and hence a knowledge of the usual antidotes is requisite, in order that they may be employed with effect.

For the majority of such cases, the chief reliance must be upon emetics, so that free vomiting may be induced by such articles of this class which are most speedy in their effect. Sulphate of zinc is preferable to many, and, if vomiting is present, it may be aided by diluents or a vegetable emetic. When the poisonous substance has remained for any length of time in the stomach, the use of emetics will not prove sufficient, but resort must be had to the stomach-tube and syringe. Milk, lime water, soap, or solutions of sugar or honey will protect the stomach and intestines, while oil and other fatty matters may prove injurious. Carbonate of magnesia with tincture of opium, suspended in water, freely administered, will prove very serviceable after the vomiting has ceased, and the patient is suffering from retching and pain.

When the nature of the poison is unknown, a general antidote, consisting of equal parts of calcined magnesia, pulverized charcoal, and hydrated peroxide of iron, which are to be diffused in water, may be freely administered, and will, in the majority of cases, prove efficient, as one or another of them is an antidote to most of the mineral poisons.

The albumen of eggs and tannic acid are also considered to be valuable antidotes. The albumen neutralizes corrosive sublimate and like salts, and the tannic acid precipitates all of the vegetable alkaloids as tannates,

ACIDS (*Mineral*).

Symptoms.—Corrosion of parts with which the acid comes in contact, with an immediate burning pain in the mouth,

throat, œsophagus and stomach; vomiting of liquid impregnated with mucus and blood. Death occurs from inflammation, or from asphyxia.

Antidotes.—Chalk; magnesia; solution of carbonate of soda; emollient drinks; fixed oil and fatty matter; plaster off wall, in emergency.

ACONITE.

Symptoms.—Numbness and tingling of the mouth and throat, followed by vomiting and purging; giddiness; feeble pulse; dilated pupil; oppressive breathing; paralysis. Death occurs from syncope or apnœa.

Antidotes—Emetics; stimulants, external and internal, such as sulphate of zinc, tannic acid, animal charcoal, atropine, belladonna.

ALKALIES (*See Potash*).

ANTIMONY (*Tartar Emetic, Butter of Antimony*).

Symptoms.—A burning pain in stomach and bowels; vomiting; purging; cold perspiration; great thirst; cramps; great debility, and death.

Antidotes.—Vegetable acids, such as tannic acid, catechu, nutgalls, white oak bark, kino, cinchona.

ARSENIC.

Symptoms.—Faintness and nausea, with burning pain in the epigastrium; vomiting; purging, or diarrhœa; thirst; constriction in the throat; feeble action of the heart, with a quick and weak pulse; painful and hurried respiration; cold and clammy skin. Death occurs from collapse, and sometimes with convulsions.

Antidotes.—Freshly precipitated hydrated sesquioxide of iron (made by adding magnesia to any iron solution); animal charcoal; ammonia; lime water; stomach-pump; artificial respiration; cold affusion; emetics; milk; raw eggs.

ARGENTI NITRAS (*Nitrate of Silver*).

Symptoms.—Corrosion of parts; sometimes nausea and vomiting and convulsions; paralysis.

Antidotes.—Solution of common salt in demulcent drinks; albumen.

ATROPINE.

Symptoms.—Insatiable thirst, with dryness of mouth and throat; nausea; giddiness; palpitation of heart; intensely dilated pupil, coma and death.

Antidotes.—Emetics; sulphate of copper (gr. x); cold to head; ammonia, externally and internally; opium; animal charcoal; calabar bean; stimulants; subcutaneous injection of morphia; mustard flour in water: cold to head.

BELLADONNA.

Symptoms.—Same as those of atropine.

Antidotes.—Same as for atropine.

CANNABIS INDICA (*Indian Hemp*).

Symptoms.—Temporary insanity, as shown by a singular gait, a constant rubbing of hands, and other strange actions, a peculiar and cunning appearance of the eyes, great hunger.

Antidotes.—Hot brandy and water· vegetable acids, such as lemon-juice, vinegar, etc; blisters to nape of neck; indulgence in sleep.

CANTHARIDES.

Symptoms.—A burning pain in stomach; vomiting and purging; blood-stained urine; pain in loins, strangury; priapism; convulsions; death.

Antidotes.—Emetics; emollient or mucilaginous drinks; opiates by mouth and rectum; venesection, if necessary.

CARBOLIC ACID.

Symptoms.—When taken internally, it causes pain in the stomach; a whitened and shriveled appearance of the mucous membrane of the lips, mouth and throat; sometimes vomiting; contracted pupils; stertorous breathing; coma, and death within a period of from five to ten minutes to eight or ten hours, according to the quantity of the acid swallowed.

Antidotes.—Olive oil; castor oil; lime water; saccharate of lime; precipitated carbonate of lime; albuminous and mucilaginous substances; any soluble sulphate such as magnesia.

CHLORINE WATER.

Symptoms.—Irritation of air passages; burning pain in the throat and stomach; vomiting of bloody mucus.

Antidotes.—Albumen; white of egg; milk; flour.

CHLORAL.

Symptoms.—Excitement; delirium; flushed face; cramps in limbs; eyes closed; profound unconsciousness; stertorous breathing; increasing feebleness; lividity of countenance; loss of pulse; pallor; coldness of extremities; muscular relaxation; death from cardiac syncope.

Antidotes.—Nitrite of amyl, when the poison has been taken in large quantity; strychnia, when the action of the poison is slow and culminative. According to some authorities, picrotine, $\frac{1}{20}$ gr., sufficient for 30 grs. of chloral; coffee.

CHLOROFORM.

Symptoms.—Drowsiness; insensibility; stertorous, rapid breathing; weak pulse; dilatation of pupils; relaxation of muscles; coldness of surface; increasing feebleness of pulse; heart ceasing its action.

Antidotes.—Fresh air; artificial respiration (inclining head down, tongue pulled forward), cold water dashed over face and chest; galvanism to pneumogastric and through diaphragm (one pole may be applied to nape of neck and the other to the pit of the stomach); brandy and ammonia enemata; hypodermic injection of 15 ♏ of tincture of digitalis, and $\frac{1}{60}$ gr. of atropine, or hypodermic injection of 1 drachm of ether; inhalation of nitrite of amyl; tracheotomy.

CONIUM (*Hemlock*).

Symptoms.—Thirst; dryness of throat; delirium; convulsions; coma and death, resulting from paralysis of the respiratory muscles.

Antidotes.—Emetics, followed by demulcent drinks, internal and external stimulants, as brandy; ammonia; coffee, if coma is present; tannic acid; animal charcoal.

CORROSIVE SUBLIMATE.

Symptoms.—Heat and pain of a burning nature in mouth, and throat, and stomach; nausea; vomiting of bloody mucus; diarrhœa; dysentery; cramps; convulsions; coma and death.

Antidotes.—Albumen; milk; white of egg (white of 1 egg

to every 4 grs. of corrosive sublimate taken); flour; perchloride of tin; iron and zinc (iron filings 2 parts and zinc 1 part); emetics, stomach-pump.

CREASOTE (*See Carbolic Acid*).

CROTON OIL.

Symptoms.—Irritation of mucous membrane; burning pain along course of alimentary tract; excessive purging; inflammation of stomach and intestines.

Antidotes.—Emetic of sulphate of copper, 10 grs., followed by mucilaginous fluids containing opium, to allay the pain; olive oil; opium.

SULPHATE OF COPPER.

Symptoms.—Metallic taste; eructations; violent emesis and purging; cramps in limbs; griping pains; headache; giddiness; convulsions; coma and death, with symptoms of a disordered condition of the nervous system.

Antidotes.—Albumen or white of egg; yellow prussiate of potash or soap.

DIGITALIS.

Symptoms.—Nausea; vomiting; purging; feeble or slow and irregular pulse; dilated pupils; excessive debility; stupor; convulsions; coma and death.

Antidotes.—Recumbent posture after the use of such emetics as sulphate of zinc; stimulate internally and externally; tannic acid; animal charcoal; tincture of aconite.

HYDROCYANIC ACID.

Symptoms.—Dilated pupils; spasmodic breathing; convulsions; insensibility; fixed eyes; spasmodic closure of jaws; very feeble pulse and speedy death.

Antidotes.—Fresh air and artificial respiration, with cold affusion upon head and neck; freshly precipitated oxide of iron, with an alkaline carbonate, such as carbonate of ammonia; chlorine; ammonia by inhalation and injection in vein of leg.

HYOSCYAMUS.

Symptoms.—A feeling of giddiness, followed by delirium; dilated pupils; fullness about the head; drowsiness; cold perspiration; paralysis; exhaustion; death.

Antidotes.—Stomach pump; emetics; stimulants, external and internal; lemon juice; strong coffee.

IODINE.

Symptoms.—In extreme cases, violent vomiting and purging; fever and excessive thirst; palpitation of heart; cramps; small and frequent pulse; occasional dry cough; and when death ensues, it is probably due to gastro-enteritis. In excessive doses, it acts as an irritant poison, giving rise to such symptoms as restlessness; burning sensation; palpitation; violent priapism; frequent pulse; excessive thirst; extreme diarrhœa; trembling; extreme emaciation, and sometimes syncope.

Antidotes.—Emetics and demulcent drinks; starch or flour diffused in water; albumen; milk; opium and external heat.

LEAD SALTS.

Symptoms.—A dry and constricted throat; pain in stomach and bowels; colic; paralysis of extensor muscles; apoplectic symptoms.

Antidotes.—Any soluble sulphate, either magnesia or soda; Epsom salts, followed by emetics, and afterwards opium and milk; iodide of potassium.

MORPHINE (*See Opium*).

MERCURY.

When in the form of the bichloride (corrosive sublimate), or nitrate of mercury, see corrosive sublimate.

NUX VOMICA.

Symptoms.—Spasmodic twitching of muscles; violent movement of limbs; tetanic spasms; dyspnœa; death.

Antidotes.—Thirty grains of chloral and 60 grains of bromide of potassium. Nitrite of amyl.

OPIUM.

Symptoms.—Increasing drowsiness; giddiness; stupor; insensibility; stertorous breathing; feeble pulse; contracted pupil; coma; convulsions; death.

Antidotes.—Emetic of 10 grs. of sulphate of copper; stomach pump; stimulants, external and internal; brandy and coffee; artificial respiration; cold affusion; ammonia to nostrils; en-

forced exertion; galvanic shocks; belladonna; tannic acid; animal charcoal; atropine hypodermically.

OXALIC ACID.

Symptoms.—Burning pain in throat, œsophagus and stomach; vomiting of a dark green or black fluid, composed of altered mucus and blood.

Antidotes.—Chalk; magnesia; plaster from wall in emergency; lime, not potash or soda; emetics; stomach pump.

PHOSPHORUS.

Symptoms.—Burning pain along alimentary tract; corrosion of tissues; vomiting of mucus and blood; diarrhœa.

Antidotes.—Sulphate of copper; emetics and purgatives.

POTASH AND SODA SALTS.-

Symptoms.—Sharp, burning pain of the mouth, throat, œsophagus and stomach; corrosion; vomiting of blood and mucus.

Antidotes.—Dilute acetic acid; citric acid; lemon juice; fixed oils; demulcents; vinegar.

SILVER (*Nitrate of Silver.*)

Symptoms.—Corrosion of tissues; nausea; vomiting; convulsions; paralysis.

Antidotes.—Chloride of sodium (common salt); albumen; white of egg.

STRAMONIUM (*See Belladonna*).

STRYCHNINE.

Symptoms.—Spasmodic action of muscles (twitching); jerking of limbs; tetanic spasms; dyspnœa; death.

Antidotes.—Chloroform; belladonna; tincture of aconite; morphine; 8 grs. morphine antidote to 1 gr. strychnia; extract of conium; also same as nux vomica.

TOBACCO.

Symptoms.—Nausea; vomiting; violent retching.

Antidotes.—Emetic; stimulants, both external and internal; strychnia; external heat.

ZINC SALTS.

Symptoms.—A burning sensation in stomach; nausea;

vomiting; anxious countenance; difficult breathing; small, quick pulse; cold perspiration; syncope; convulsions; death.

Antidotes.—Carbonate of soda; emetics; warm demulcent drinks.

THE PULSE.

The word "pulse" is derived from the Latin word *pulso*, "I strike," and denotes the striking or lifting of the finger by the distending vessel, as with each contraction of the heart blood is forced into the vessels.

The word pulse has also been applied to the appearance of a lifting up of the coverings over a distending vessel, so that this word "pulse" is applied not only to that which is felt, but to that which is seen.

There are two kinds of pulse, the arterial and the venous. The arterial is appreciated mainly by palpitation, the venous by inspection. It is the "arterial pulse" that it is necessary to study.

The "radial pulse" is the one usually selected, although the "temporal pulse" is also noted in the administration of anæsthetic agents. The pulse in other vessels must also sometimes be observed, as in the brachial, the facial in front of the masseter muscle, the posterior tibial, the dorsalis pedis, the carotid and femoral arteries.

The "radial pulse," the one usually selected, and which, in most cases, answers all the requirements, is of moderate size, superficial, and can be readily compressed against the radius.

When the pulse is to be observed, the patient should be either sitting or lying down. The observer should place his index, middle, or ring finger lightly upon the pulse, and should then appreciate the state of the coats of the artery, and should next note the frequency, the rhythm, the tension, volume and force of the pulse; and, lastly, any peculiarities, if present. Moreover, the pulse of one side of the body should always be compared with the other.

It should also be remembered that forcible extension or flexion of the forearm will sometimes arrest the radial pulse.

In noting the pulse of children and infants, it is well to count the pulse, if possible, while they are asleep.

This can be conveniently done in the temporal artery.

In noting the pulse at the wrist, asleep or awake, there are often involuntary movements of the arm and twitching of the muscles, which render it difficult to keep the finger of the observer on the pulse. This difficulty may be overcome in a great degree by grasping the entire hand of the child, and then extending the index finger upon the pulse. It is also advisable not to take the pulse of the patient until some little time has elapsed after the appearance of the observer. In health, changes in the frequency and rhythm of the pulse are often met with.

The following is a table of the variations in the frequency of the pulse in health:—

Infant asleep, at birth	140
Infancy	120
Child under 5 years of age	100
Youth	90
Male adults	72-80
Female adults	80–85
Old age	70

It is only in rare cases that great frequency of the pulse in health is met with. Sex has some influence. Up to the 7th year of age the frequency is about the same in both sexes, but later the female is from 6 to 14 beats—average 9—greater than in the male.

Posture also affects the pulse. It is most frequent in the standing, and least in the recumbent position.

The pulse of a man is twice as much affected by change of position as that of a woman.

When the pulse is much increased in frequency, change in position has but little effect, and for the higher numbers entirely disappears. When the head is lower than the body, the pulse falls. The general law as to the degree of frequency of the pulse, as affected by position, is as follows:—

The frequency is directly proportionate to the amount of muscular effort required to support the body in different posi-

tions. The pulse falls in sleep, as much as ten beats. Sleeplessness increases its frequency. On awakening from sleep, there is usually a decided increase in frequency. Food increases the rate of the pulse. Mental excitement and activity of the emotions increases the frequency; mental depression is often accompanied by a decrease. Cold lowers and heat raises the rate of the pulse. Among other causes producing an increase in the frequency of the pulse in health, are spirituous and warm drinks, tobacco, diminished atmospheric pressure. Among other causes producing diminished frequency of the pulse, besides those before mentioned, are fatigue, long-continued rest, debility without disease, and increased atmospheric pressure.

Occasionally the pulse is irregular in health, but when it is so, it is usually congenital. Intermittency is not infrequent in health, and it is then either congenital or may be due to terror, anxiety, grief, mental or physical fatigue, and old age. The intermittency may be only temporary, or it may become permanent; and if it becomes very frequent, may be pathological.

A pulse of 90 or more may be regarded as a pulse of abnormal frequency in an adult. There are exceptions to this, but they are rare. If the pulse is quicker than the temperature will explain, it indicates cardiac weakness.

A pulse that day by day progressively increases, the temperature remaining the same, shows increased cardiac weakness. In all febrile diseases, a pulse, in adults, over 120 is serious, and indicates cardiac weakness. A pulse of 130 or 140 indicates great danger; and with a pulse at 160, the patient almost always dies.

Under the age of fifteen, any disease of the lungs is almost invariably accompanied by great frequency of the pulse, so that a pulse of 120 to 140 would not be considered as so serious in significance as if it occurred in an older person.

A pulse of 120 in a strong, robust patient affected with pneumonia, indicates some form of heart disease. When pneu-

monia occurs in the cachectic or debilitated, the pulse is usually very frequent, often 120 to 160, and such cases usually die. In pericarditis and myocarditis, there is great frequency of the pulse, especially on any movement of the patient—130 to 160—and the change may be very sudden. In acute articular rheumatism, unaccompanied by any heart disease, a pulse of 120 or more indicates great danger. In pleuritic effusions, the pulse may be very frequent, especially when there is displacement of the heart.

RESPIRATION AT VARIOUS STAGES.

At one year of age, per minute	35
" two years of age, " "	25
" puberty, " "	20
" adult age, " "	18

THERMOMETERS.

There are three different thermometers in use—Fahrenheit's, Centigrade and Reaumur's—each differing from the other with reference to the number of degrees between the freezing and boiling points of water. In Fahrenheit's, zero is placed at 32 degrees below the freezing point, while in the others zero marks the freezing point.

The boiling point in Fahrenheit's is placed at 212 degrees; in Centigrade at 100, and in Reaumur's at 80.

The degrees between the freezing and boiling points in the instruments are, therefore, respectively 180, 100 and 80.

The following diagram will explain the variance:—

Fahrenheit	0.	32	77	122	167	212
Centigrade	17.77	0	25	50	75	100
Reaumur	14.22	0	20	40	60	80

When a thermometer, in the process of vulcanizing, gives trouble by the column of mercury becoming divided, the divided portion remaining in the top of the tube, the best method is to unscrew the thermometer and turn it upside down, and make the mercury in the bulb unite with the mercury in the tube, so that it may coalesce perfectly. This is a better method than striking the thermometer sharply in the hollow

of the left hand, and thereby risking the breaking of the thin glass tube.

The Clinical Thermometer is employed as a valuable means of diagnosis and prognosis. It is valued because the vital processes can only be normally and perfectly performed at the temperature of 98½°, and just in proportion as it varies from this, either above or below, they are changed or entirely arrested. This standard of temperature, 98½°, of the healthy body, is subject to slight variations during the day. Although observations show that the normal heat, which is the most essential condition of life, may be considerably altered by a number of circumstances, yet the variations in health are generally temporary and within narrow limits, whereas those which arise from disease are persistent during the continuance of the abnormal condition. Both increase and decrease of temperature have to be considered, for while an increase of four to six degrees may be maintained for a month, and not endanger life, a decrease of but one degree, if maintained for a considerable time, will result in death. The increase in temperature of the body is usually proportionate to the frequency of the pulse, one degree corresponding to an increase of ten beats per minute. Thus—

With a temperature of		98°,	we have a pulsation of		60.
"	"	99°	"	"	70.
"	"	100°	"	"	80.
"	"	101°	"	"	90.
"	"	102°	"	"	100.
"	"	103°	"	"	110.
"	"	104°	"	"	120.

TABLE OF ELEMENTARY SUBSTANCES.

Elements.	Symbol.	Atomic Weight.	Equivalent.	Elements.	Symbol.	Atomic Weight.	Equivalent.
Aluminum . .	Al	27	13.5	Molybdenum .	Mo	95.5	42.75
Antimony . . .	Sb	120	120	Nickel	Ni	58	29
Arsenic	As	75	75	Niobium . . .	Nb	94	94
Barium	Ba	137	68.4	Nitrogen[3] . . .	N	14.03	14
Berylium (Glucinum). . .	Be	9	9	Osmium . . .	Os	198.5	99.25
				Oxygen[4] . . .	O	16	8
Bismuth . . .	Bi	28	28	Palladium . .	Pd	105.7	52.85
Boron.	B	11	11	Phosphorus . .	P	31	31
Bromine . . .	Br	79.95	79.95	Platinum . . .	Pt	194.4	97.2
Cadmium . . .	Cd	111.8	55.9	Potassium . .	K	39.11	39.11
Cæsium. . . .	Cs	132.6	132.6	Rhodium . . .	Rh	104.1	52.05
Calcium. . . .	Ca	40	20	Rubidium . .	Rb	85.3	85.3
Carbon[1]. . . .	C	12	6	Ruthenium . .	Ru	104.2	52.1
Cerium	Ce	140.2	70.5	Scandium . .	Sc	44	22
Chlorine[2] . . .	Cl	35.45	35.45	Selenium . . .	Se	78.8	39.4
Chromium. . .	Cr	52.1	26.2	Silicon	Si	28.4	14
Cobalt	Co	58.9	29.45	Silver	Ag	107.92	107.92
Copper	Cu	63.4	31.6	Sodium. . . .	Na	23.05	23.05
Didymium . .	Di	144.6	72.3	Strontium. . .	Sr	87.4	43.7
Erbium	E	165.9	82.95	Sulphur[5] . . .	S	32.06	16
Fluorine . . .	Fl	19	19	Tantalum. . .	Ta	182	182
Gallium. . . .	G	68.8	34.4	Tellurium . .	Te	128	64
Gold	Au	197.3	197.3	Thallium . . .	Tl	203.7	203.7
Hydrogen. . .	H	1.007	1.007	Thorium . . .	Th	233	116.5
Indium	In	113.4	56.7	Tin	Sn	117.7	58.85
Iodine	I	126.85	126 85	Titanium . . .	Ti	48	24
Iridium	Ir	192.7	96.35	Tungsten . . .	Tr	183.6	91.8
Iron	Fe	56	27.95	Uranium . . .	U	238.5	119.25
Lanthanum . .	La	138.5	138.5	Vanadium . .	V	51.3	51.3
Lead	Pb	206.95	103.25	Ytterbium . .	Yb	172.7	172.7
Lithium. . . .	Li	7.02	7.02	Yttrium . . .	Y	89.8	89.8
Magnesium . .	Mg	24.3	12	Zinc	Zn	65.3	32.45
Manganese . .	Mn	55	27	Zirconium . .	Zr	90	45
Mercury . . .	Hg	200	99.85				

[1] Carbon: 11.9736. [2] Chlorine: 35.370. [3] Nitrogen: 14.021. [4] Oxygen: 15.9633. [5] Sulphur: 31.984.

TABLE OF THE SOLUBILITY OF CHEMICALS IN WATER AND ALCOHOL.

Abbreviations; s. = soluble; ins. = insoluble; sp. = sparingly; v. = very; alm. = almost; dec. = decomposed.

CHEMICALS.	WATER.		ALCOHOL.	
	At 15° C. (50° F.)	Boiling.	At 15° C. (50° F.)	Boiling.
One part is soluble in:	Parts.	Parts.	Parts.	Parts.
Acidum arseniosum	30.80	15	sp.	sp.
Acidum benzoicum	500	15	3	1
Acidum boricum	25	3	15	5
Acidum carbolicum	20	. .	v. s.	v. s.
Acidum chromicum	v. s.	v. s.	dec.	dec.
Acidum citricum	0.75	0.5	1	0.5
Acidum gallicum	100	3	4.5	1
Acidum salicylicum	450	14	2.2	v. s.
Acidum tannicum	6	v. s.	0.6	v. s.
Acidum tartaricum	0.7	0.5	2.5	0.2
Alumen	10.5	ins.	0.3	ins.
Alumen exsiccatum	20	ins.	0.7	ins.
Ammonii carbonas	4	dec.	dec.	dec.
Ammonii nitras	0.5	v. s.	20	3
Ammonii valerianas	v. s.	v. s.	v. s.	v. s.
Antimonii et potassii tartras	17	3	ins.	ins.
Argenti cyanidum	ins.	ins.	ins.	ins.
Argenti iodium	ins.	ins.	ins.	ins.
Argenti nitras	0.8	0.1	26	5
Argenti nitras fusus	0.6	0.5	25	5
Argenti oxidum	v. sp.	v. sp.	ins.	ins.
Atropina	600	35	v. s.	v. s.
Atropinæ sulphas	0.4	v. s.	6.5	v. s.
Bismuth subnitras	ins.	ins.	ins.	ins.
Bromum	33	. .	dec.	dec.
Calcii bromidum	0.7	v. s.	1	v. s.
Calcii carbonas præcipitatus	ins.	ins.	ins.	ins.
Calcii chloridum	1.5	v. s.	8	1.5
Calcii hypophosphis	6.8	6	ins.	ins.
Calcii phosphas præcipitatus	ins.	ins.	ins.	ins.
Calx	750	1300	ins.	ins.
Camphora monobromata	alm. ins.	alm. ins.	v. s.	v. s.
Chloral	v. s.	v. s.	v. s.	v. s.
Cinchonidinæ sulphas	100	4	71	12
Cinchonina	alm. ins.	alm. ins.	110	28
Cinchoninæ sulphas	70	14	6	1.5
Codeina	80	17	v. s.	v. s.
Creta præparata	ins.	ins.	ins.	ins.
Cupri acetas	15	5	135	14
Cupri sulphas	2.6	0.5	ins.	ins.
Ferri chloridum	v. s.	v. s.	v. s.	v. s.
Ferri citras	s.	v. s.	ins.	ins.

TABLE OF THE SOLUBILITY OF CHEMICALS IN WATER AND ALCOHOL.
(CONTINUED.)

CHEMICALS.	WATER.		ALCOHOL.	
	At 15° C. (50° F.)	Boiling.	At 15°C. (50° F.)	Boiling.
One part is soluble in:	Parts.	Parts.	Parts.	Parts.
Ferri lactas	40	12	alm. ins.	alm. ins.
Ferri sulphas	1.8	0.3	ins.	ins.
Ferri valerianas	ins.	dec.	v. s.	v. s.
Hydrargyri chloridum corrosivum	16	2	2	1.2
Hydrargyri chloridum mite	ins.	ins.	ins.	ins.
Hydrargyri cyanidum	12.8	3	15	6
Hydrargyri iodidum rubrum	alm. ins.	alm. ins.	130	15
Hydrargyri iodidum viride	alm. ins.	alm. ins.	ins.	ins.
Hydrargyri oxidum flavum	ins.	ins.	ins.	ins.
Hydrargyri oxidum rubrum	ins.	ins.	ins.	ins.
Hydrargyrum ammoniatum	ins.	ins.	ins.	ins.
Hyoscyaminæ sulphas	v. s.	v. s.	v. s.	v. s.
Iodoform	ins.	ins.	80	15
Iodum	sp.	.....	11	.....
Magnesia	alm. ins.	alm. ins.	ins.	ins.
Magnesii carbonas	alm. ins.	alm. ins.	ins.	ins.
Magnesii sulphas	0.8	0.15	ins.	ins.
Magnesii sulphis	20	19	ins.	ins.
Mangani oxidum nigrum	ins.	ins.	ins.	ins.
Mangani sulphas	0.7	0.8	ins.	ins.
Morphina	v. sp.	500	100	36
Morphinæ acetas	12	1.5	68	14
Morphinæ hydrochloras	24	0.5	63	31
Morphinæ sulphas	24	0.75	702	144
Phosphorus	ins.	ins.	v. sp.	v. sp.
Piperina	alm. ins.	alm. ins.	30	1
Plumbi acetas	1.8	0.5	8	1
Plumbi carbonas	ins.	ins.	ins.	ins.
Plumbi iodidum	2000	200	v. sp.	v. sp.
Plumbi nitras	2	0.8	alm. ins.	alm. ins.
Plumbi oxidum	ins.	ins.	ins.	ins.
Potassa	0.5	v. s.	2	v. s.
Potassii acetas	0.4	v. s.	2.5	v. s.
Potassii bicarbonas	3.2	dec.	alm. ins.	alm. ins.
Potassii bichromas	10	1.5	ins.	ins.
Potassii bitartras	210	15	v. sp.	v. sp.
Potassii bromidum	1.6	1	200	16
Potassii carbonas	1	0.7	ins.	ins.
Potassii chloras	16.5	2	v. sp.	v. sp.
Potassii citras	0.6	v. s.	v. sp.	v. sp.
Potassii cyanidum	2	1	sp.	sp.
Potassii ferrocyanidum	4	2	ins.	ins.
Potassii hypophosphis	0.6	0.3	7.3	3.6
Potassii iodidum	0.8	0.5	18	6
Potassii nitras	4	0.4	alm. ins.	alm. ins.

TABLE OF THE SOLUBILITY OF CHEMICALS IN WATER AND ALCOHOL.
(CONTINUED.)

CHEMICALS.	WATER.		ALCOHOL.	
	At 15° C. (50° F.)	Boiling.	At 15° C. (50° F.)	Boiling.
One part is soluble in:	Parts.	Parts.	Parts.	Parts.
Potassii permanganas	20	3	dec.	dec.
Potassii sulphas	9	4	ins.	ins.
Potassii tartras	0.7	0.5	alm. ins.	alm. ins.
Quinidinæ sulphas	100	7	8	v. s.
Quinina	1600	700	6	2
Quininæ bisulphas	10	v. s.	32	v. s.
Quininæ hydrochloras	34	1	3	v. s.
Quininæ sulphas	740	30	65	3
Quininæ valerianas	100	40	5	1
Saccharum	0.5	0.2	175	28
Saccharum lactis	7	1	ins.	ins.
Salicinum	28	0.7	30	2
Soda	1.7	0.8	v. s.	v. s.
Sodii acetas	3	1	30	2
Sodii bicarbonas	12	dec.	ins.	ins.
Sodii boras	16	0.5	ins.	ins.
Sodii carbonas	1.6	0.25	ins.	ins.
Sodii chloras	1.1	0.5	40	43
Sodii chloridum	2.8	2.5	alm. ins.	alm. ins.
Sodii hypophosphis	1	0.12	30	1
Sodii hyposulphis	1.5	0.5	ins.	ins.
Sodii iodidum	0.6	0.3	1.8	1.4
Sodii nitras	1.3	0.6	sp.	40
Sodii sulphas	2.8	0.4	ins.	ins.
Sodii sulphis	4	0.9	sp.	sp.
Strychnina	6700	25000	110	12
Strychninæ sulphas	10	2	60	2
Sulphur lotum	ins.	ins.	ins	ins.
Sulphur præcipitatum	ins.	ins.	ins.	ins.
Sulphur sublimatum	ins.	ins.	ins.	ins.
Thymol	1200	900	1	v. s.
Veratrina	v. sp.	v. sp.	3	v. s.
Zinci acetas	3	1.5	30	3
Zinci carbonas præcipitatus	ins.	ins.	ins.	ins.
Zinci chloridum	v. s.	v. s.	v. s.	v. s.
Zinci iodidum	v. s.	v. s.	v. s.	v. s.
Zinci oxidum	ins.	ins.	ins.	ins.
Zinci phosphidum	ins.	ins.	ins.	ins.
Zinci sulphas	0.6	0.3	ins.	ins.
Zinci valerianas	100	. . . .	40	. . . .

NATURAL DISTRIBUTION OF REMEDIES.

INORGANIC MATERIA MEDICA.

ALKALIES AND ALKALINE EARTHS.

Ammonium.
Barium.
Calcium.
Cerium.
Lithium.
Manganese.
Potassium.
Sodium.

METALS.

Aluminum.
Antimony.
Arsenic.
Bismuth.
Copper.
Gold.
Iron.
Lead.
Manganese.
Mercury.
Nickel.
Phosphorus.
Silver.
Zinc.

NON-METALS.

Halogens: Bromine. Chlorine. Fluorine. Iodine.

Charcoal.
Oxygen.
Ozone.
Peroxide of Hydrogen.
Sulphur.

ACIDS.

Organic.

Acetic.
Benzoic.
Carbolic.
Citric.
Gallic (pyrogallic).
Hydrocyanic.
Lactic.
Meconic.
Oleic.
Salicylic.
Tannic.
Tartaric.

Inorganic.

Boric.
Chromic.
Hydrochloric.
Hydrobromic.
Nitric (oxalic).
Nitrohydrochloric.
Nitrous.
Phosphoric.
Sulphuric.
Sulphurous.

CARBON COMPOUNDS.

Acetanilid.
Acetic ether.
Alcohol.
Amyl Nitrite.
Antipyrin.
Carbolic Acid.
Chinolin.
Chloral hydrate.
Chloroform.
Croton Chloral.
Ether.
Ethyl bromide.
Ethyl iodide.
Ethylate of sodium.
Ethidene bichloride.
Fuchsin.
Hydrocyanic acid.
Iodoform.
Iodol.
Kairin.
Methylene bichloride
Naphthol, Naphthalin.
Nitroglycerin.
Nitrous ether.
Nitrous oxide.
Paraldehyde.
Petrolatum.
Phenacetin.
Pyrodin.
Resorcin.
Salol.
Thallin.
Trymethylamine.
Ural (Uralium).
Urethran.

ORGANIC MATERIA MEDICA.

Composed of the VEGETABLE KINGDOM, which includes plants used for medicinal purposes, and the ANIMAL KINGDOM, as follows:

Cantharides.	Ichthyol.	Pancreatin.
Castor.	Isinglass.	Pepsin.
Cochineal.	Lanolin.	Soap.
Cod Liver Oil.	Lard.	Spermaceti.
Albumen and Yelk of Egg.	The Leech.	Suet.
Formic acid.	Milk.	Sugar of Milk.
Honey and Wax.	Musk.	

CLASSIFICATION OF MEDICINAL SUBSTANCES.

In order to impress the memory and facilitate investigation, it is necessary that medicinal substances should be classified according to their similarity of action on the animal economy, as follows:

1. NEUROTICS, or those which have a special action on and modify the functions of the nervous system. To this group belong: Hypnotics and Narcotics, Anæsthetics, Antispasmodics, Tonics, Astringents, Stimulants, Sedatives, Spinants.

2. ECCRITICS, or those which have a special action on the secretions. To this group belong: Emetics, Cathartics, Diaphoretics, Diuretics, Blennorrhetics, Emmenagogues.

3. HÆMETICS, or those which modify the blood. To this group belong: Hæmatinics, Alteratives, Antacids.

4. TOPICAL REMEDIES. To this group belong: Irritants, Demulcents, Antiseptics, Disinfectants, Coloring Agents, Anthelmintics.

DEFINITIONS OF THE VARIOUS CLASSES OF REMEDIAL AGENTS.

HYPNOTICS AND NARCOTICS.

Hypnotics and narcotics are medicinal substances which affect the cerebral and spinal functions by impairing or destroying nervous action, having first a stimulant effect, to which their therapeutic efficacy is in a great degree due.

They allay cerebral or spinal irritability, relieve muscular spasm, and also pain, and induce sleep. When administered to relieve pain, they are termed *anodynes;* to induce sleep, they are termed *hypnotics* or *soporifics.*

Narcotics fulfill two indications, namely: Exciting and depressing the nervous energy. For the first, it is necessary to begin with small doses and repeat them frequently; for the second, a full dose must be given and not repeated for a considerable time. On account of the system becoming very soon habituated to the action of narcotics, when it is necessary to resort to their use for any length of time the amount must be constantly increased, in order to maintain the same impression. The difference between the susceptibility to their action when the body is in a morbid or a healthy condition should not be overlooked. Hypnotics diminish the cerebral circulation by modifying vascular activity.

Under narcotics and hypnotics are classed such agents as *opium* and its different preparations, chloral, lactucarium, belladonna, stramonium, hyoscyamus, tobacco, lobelia, conium, aconite, cannabis indica, humulus, camphor, hydrocyanic acid, aconite, alcohol, chloroform, digitalis, ether, paraldehyde, potassium bromide, sulphonal, urethran, zinc bromide, etc., etc.

ANÆSTHETICS.

Anæsthetics are medicinal agents which diminish sensibility and relieve pain. They are generally in the form of vapors or gases, applied by inhalation, and possess the power of temporarily suspending the general sensibility, being commonly employed for the prevention of pain during surgical operations. They are divided into general and local anæsthetics.

General anæsthetics are agents capable of producing complete insensibility throughout the entire system. Included in this class are such agents as ether, chloroform, nitrous oxide gas, bromide of ethyl, bichloride of methylene, tetrachloride of carbon, bichloride of ethidene, bromoform, iodide of ethyl, tetrachloride of carbon, trichlorhydrin, etc., etc.

Local anæsthetics are agents whose action is limited to a

certain part or organ, when topically applied, paralyzing the nerves of the part, and temporarily destroying the sensibility. Included in this class are such agents as absolute ether, rhigolene, aconite, pyrethrum, atropine, cocaine, etc., etc.

ANTISPASMODICS.

Antispasmodics are medicinal agents which allay irregular muscular contraction or spasm, and compose the irregular actions of the nervous system, without any special or decided effect on the brain. They are employed in many varieties of mental disturbance, insanity, wakefulness, hypochondriasis, convulsions from teething, spasms from general debility, in which latter case an aromatic stimulant of the circulation and a permanent tonic prove beneficial. In hysteria, dependent upon idiopathic or primary nervous irritation, the use of antispasmodics is indicated. Included in this class are such agents as asafœtida, musk, camphor, valerian, galbanum, ammoniac, castor, compound spirit of ether (Hoffman's anodyne), etc., etc.

TONICS.

Tonics are medicinal agents which impart strength to the system, producing a gradual and permanent increase of nervous vigor, without preternatural exitement. They stimulate also in a secondary manner, by gradually increasing the force of the circulation, and restoring the digestive and secretory functions to a more healthy state, differing, however, from stimulants, in the more permanent character of their effects.

Certain agents of this class, when administered in large doses, act as antiperiodics in intermittent diseases. Benefit also results in the use of tonics by alternating them. They are divided into *vegetable* and *mineral* tonics, the former possessing a bitter extractive principle, and the latter uniting astringent with tonic properties, and, in the case of preparations of iron, increasing the red coloring matter of the blood. Such agents as gentian, quassia, calumba, wild cherry, serpentaria, cinchona and its alkaloid quinine, salix, pepsin, are examples of vegetable tonics; and the preparations of iron, preparations of copper, preparations of zinc, and such agents

as subnitrate of bismuth, sulphuric, nitric, muriatic and oxalic acids, are examples of the mineral tonics.

ASTRINGENTS.

Astringents are medicinal agents which produce contraction of the tissues, having a corrugating power, either directly exerted on a part, or extended by sympathetic action, and thus removing morbid affections arising from a state of relaxation, such as inflammation of superficial parts, hemorrhage and excessive discharges from mucous membranes. This class of remedies is important in dental practice, owing to their great efficacy as antiphlogistics. Astringents are divided into *vegetable* and *mineral*, the former owing their peculiar property of astringency to the presence of tannic acid, while the latter possess a more decided astringency, and exert a sedative action on the vascular system. In the treatment of affections of the mucous membrane, such as *stomatitis*, the object is to arrest the inflammatory action, which is accomplished by the power of the astringent remedies employed locally to increase the tonicity of the tissue, and to diminish the calibre of the vessels supplying the part with blood, thus diminishing the quantity required for the production of the morbid action. Besides diminishing the current of the blood to the inflamed part, astringents also exert an influence on the pores or ducts through which the discharge is poured out, by diminishing their calibre also. Astringents also exert an influence on morbidly relaxed tissues, when such a condition results as the sequelæ of disease, especially in lymphatic temperaments, where flabbiness of the soft tissues is characteristic.

Care, however, is necessary in the use of astringents, for when long or immoderately used they may act as direct irritants, inducing inflammation followed by ulceration and sloughing. They are contra-indicated for the arrest of evacuations that are designated by nature to relieve a plethoric state of the system, unless such evacuations exist to an alarming extent. This class of remedies can be readily detected by the taste, as they convey a sense of roughness to the palate

which cannot be mistaken, and which is more marked in some substances than in others. Such agents as tannic acid, gallic acid, nutgall, matico, kino, catechu, rhatany, white oak bark, creasote, salicylic acid, are examples of the vegetable astringents; while the preparations of iron and lead, alum, sulphuric and nitric acids are examples of the mineral astringents. (See *Styptics.*)

STIMULANTS.

Stimulants, also known as *excitants* and *hypersthenics*, are medicinal substances capable of exciting a temporary and rapid exaltation of the organic actions, the excitation thus produced being extended or not to the rest of the system. Although the stomach is the organ generally selected in medical practice to be the first impressed by stimulants, on account of the extensive sympathy which exists between it and the rest of the system, in dental practice these agents are topically applied to the mucous membrane of the mouth as counter-irritants and vesicants. The influence of stimulants is most apparent in conditions of morbid depression, whereas in health they soon induce depression. They possess the power of arousing the energies of the nervous system, and hence are beneficial in many nervous disorders, especially those of a spasmodic nature. When applied to the gastro-intestinal canal they promote digestion as *stomachics*, and when administered to dispel flatulence they are known as *carminatives*. When internally administered, it is for the most part advisable to begin with small doses, and increase them as circumstances may require. In some cases, however, it is necessary to give them freely from the first. It is often requisite to change the stimulating substance and also the part of the body to which it is applied; when the stomach fails, the rectum and skin may be acted upon beneficially. Topically applied, stimulants irritate and inflame the parts with which they come in contact, and are then known as *irritants*.

The most powerful and rapid stimulants are known as *diffusible*, while others of a vegetable nature, containing a volatile oil, are termed *aromatic*. Among the class of diffusible

stimulants are such agents as alcohol, preparations of ammonia, arnica, phosphorus, etc., etc. Among the class of aromatic stimulants are capsicum, cinnamon, black pepper, mace, cloves, pimento, oil of turpentine, ginger, cardamom, calamus, gaultheria, peppermint, origanum, etc., etc.

SEDATIVES.

Sedatives are medicinal substances employed to diminish the frequency of the action of the circulation, their therapeutic influence being due, it is thought, to a stimulant character. They reduce vascular excitement, and while relieving irritability and irregularity of the heart's action, their first effect is to restore its tone and force when it is in a morbidly depressed condition. Substances known as *refrigerants*, which possess the power of diminishing febrile heat, allaying thirst, restoring the secretions, and which comprise almost all of the neutral alkaline salts, are also included with sedatives. Among the class known as sedatives are digitalis, American hellebore (veratrum viride), white hellebore (veratrum album), yellow jasmine (gelsemium), tartar emetic, nitrate of potassium, etc., etc. Among the class known as refrigerants are borate of soda, citrate of potassium, acetate of ammonia, spirit nitrous ether, and vegetable acids.

SPINANTS.

Spinants or spastics are medicinal substances employed to excite muscular contraction. Vegetable spinants containing the alkaloids strychnia and brucia, and employed therapeutically in cases of torpid and paralytic conditions of the muscular system, are the most important of this class; also ergot, which is employed to excite muscular contraction of the uterus. Among the class of spinants are such agents as nux vomica, and its alkaloid strychnine, ignatia, cotton-root bark, ergot.

EMETICS.

Emetics are medicinal substances which excite vomiting, their action being independent of any effect arising from the quantity of the agent introduced into the stomach.

While the action of an emetic is local as regards the stomach, it extends to almost every organ of the body, and in order that a substance of this kind shall produce its effect upon the stomach, it must first make an impression upon the cerebro-spinal axis. Within fifteen or twenty minutes after an emetic is administered there is experienced a feeling of distress, relaxation and faintness, with a cool, moist skin and small, feeble and irregular pulse, such symptoms increasing until emesis occurs; during which the face becomes flushed, the pulse full and frequent, with an increase in the temperature of the body. When the action of vomiting is over, the skin again becomes moist, the pulse soft and feeble, and a languid and drowsy feeling is experienced. Whatever may be the apparent necessity for evacuating the stomach, all the circumstances of the case must be considered, and, especially if there be much arterial excitement, with determination to the head, blood-letting should sometimes be premised.

When the full dose of an emetic is requisite, as in cases of poisoning, the object is to evacuate the contents of the stomach as speedily as possible; but in other cases it is better to administer the emetic substance in divided doses, frequently repeated, until the desired effect is produced.

In cases of torpor or congestion, it is sometimes necessary to arouse the system by retching or vomiting, which may be done by administering the emetic with only a small quantity of fluid; but when the object is to empty the stomach and duodenum merely, free draughts of tepid water or weak chamomile tea may be given as soon as nausea occurs. When the excitability of the stomach is greatly diminished by a narcotic, as in cases of poisoning, it is necessary to assist the emetic by the addition of some excitant. Vinegar, mustard or ammonia answer as excitants, when such an effect is caused by opium; but the stomach-tube is the best resource.

There are some few cases where emetics cannot be employed with safety, as in congestion of the brain, a great determination of blood to the head dependent upon constitutional causes, pregnancy, hernia, active hemorrhage from the lungs and

uterus, acute gastritis, etc., etc.; and if emetics are allowable in such diseases or conditions, it is in nauseating doses only. When they are used merely to excite nausea, they are termed *nauseants.*

Emetics, by frequent use, are prone to cause an increased susceptibility of the stomach to their action; hence, persons of delicate habits should use them cautiously.

Therapeutically, emetics are employed to evacuate the stomach in cases of poisoning, undigested food, etc., to expel foreign substances from the throat or œsophagus; to excite nausea, in order to depress the vascular and muscular systems; to relieve spasm; to promote secretion and excretion; and to make decided impressions in the forming stages of certain fevers and delirium tremens.

To relieve excessive vomiting, resulting from the use of emetics, ice broken in small pieces and swallowed; lime water and milk (a teaspoonful of each, mixed cold, and given at intervals of 15 or 20 minutes); a drop of creasote in a wine-glass of water (a tablespoonful given every 15 or 20 minutes); ½ drop of diluted hydrocyanic acid in syrup and water, or in syrup of wild cherry bark (given every 15 minutes); or infusion of camphor (made with boiling water and given cold, a teaspoonful frequently repeated); brandy and water; clove or green tea; an anodyne injection; counter-irritant to the stomach (as a mustard plaster, or hot fomentation of brandy and clove or spice plaster).

Among the class of vegetable emetics are ipecacuanha, sanguinaria, mustard, lobelia, tobacco, squill; and mineral emetics, such as sulphate of zinc, sulphate of copper, tartar emetic, alum, common salt, turpeth mineral.

CATHARTICS.

Cathartics or purgatives are medicinal agents which evacuate the bowels, and are capable of fulfilling three different indications: 1. Simply to evacuate the bowels. 2. To excite an increased discharge from the mucous coat of the intestines, and 3. To stimulate the neighboring viscera and cause them

to secrete a greater quantity of their peculiar fluids. When they produce watery discharges by stimulating the mucous follicles and exhalants, they are termed *hydragogues*. When given in overdoses they are so powerful as to produce violent vomiting and purging, pain in the abdomen, cold extremities and a sinking pulse. Several different cathartics are usually combined in one formula, when it is desired to produce all of the indications above referred to. Some agents of this class produce their effect by absorbing the acid generated in the alimentary canal, thus becoming converted into a purgative salt, as magnesia, for example. Others expend their principal force upon the rectum and large intestines, and for this reason are advantageously employed in affections of the lower bowels, and the uterus and its appendages, such as aloes, for example. Cathartics should always be given on an empty stomach. If administered immediately after a full meal, they arrest the digestive process, are liable to cause nausea, if not vomiting, and do not evacuate the bowels with the same certainty or effect.

When simple costiveness is to be removed, the cathartic may be administered in the evening, and, if not sufficient, the dose can be repeated in the morning and at regular intervals through the day, until the effect is produced.

In administering cathartics, the excitement is to be continued till the requisite action is induced, yet not sufficient to prove an irritant. But in the treatment of many diseases, it is preferable to purge through the day, in order that the sleep may not be disturbed at night. The operation of cathartics may be very much accelerated by the free use of diluent drinks, such as gruel, barley water, etc., etc. By combining these remedies, the action of many of them is modified and controlled; and some of the more powerful may be made to operate mildly and certainly by uniting small quantities of several of them in the same dose.

The addition of an emetic substance, such as ipecacuanha, or tartar emetic, gives activity to the combination, while it modifies the harshness of the powerful cathartics.

The operation of a cathartic may often be promoted by judicious venesection, and if there is spasm of the intestines, opium may be advantageously added to the cathartic.

Cathartics act not only upon the bowels, but upon distant parts, as every portion of the organism is capable of being impressed by them. Cathartics are divided, according to the intensity of their operation, into *laxatives*, *purgatives* and *drastics*, to which may also be added *enemata*. Laxatives gently stimulate the mucous coat of the intestines, and hence they are well adapted for cases in which the sole indication is to unload the bowels of their contents. Purgatives are more powerful in their operation; they excite a copious exhalation from the mucous lining of the intestines, and augment the peristaltic action to a great degree. Drastics are the more powerful and violent cathartics, and produce a greater degree of irritation in the lining membrane of the intestines, and occasionally act upon the nerves of the stomach, so as to cause nausea and sometimes vomiting. Drastics generally belong to the resino-extractive substances, and act violently, on account of being sparingly soluble and adhering to the mucous coat of the intestines.

Enemata are agents of this class which act on the lower part of the intestinal tube by direct application; they irritate the lining membrane of the rectum, and by sympathy of continuity, their influence is extended to the intestinal canal. Hence enemata may be employed with advantage when cathartics cannot be given by the mouth, as when deglutition is impracticable. What are known as *saline cathartics* are employed in the treatment of febrile and inflammatory affections, as they do not produce any excitant action on the general system. There are also *acrid cathartics*, which are not violent enough to cause inflammation. Others are known as *mercurial cathartics*. The class known as *laxatives* comprise such substances as certain articles of diet, as ripe and dried fruits, such as tamarinds, peaches, raisins, figs, prunes, also molasses, honey, cracked wheat, Indian meal and oatmeal, etc., etc. Other laxatives are castor oil, manna, sulphur, purging cassia, etc.,

etc. *Saline cathartics* comprise such substances as magnesia, carbonate and sulphate of magnesia (Epsom salts), solution of citrate of magnesia, sulphate of sodium (Glauber's salt), sulphate of manganese, phosphate of sodium, sulphate of potassium, cream of tartar, soluble tartar, Rochelle salts. *Mild, acrid cathartics* comprise such substances as rhubarb, aloes, senna, leptandra, elder. *Drastic cathartics* comprise such substances as jalap, may apple, scammony, colocynth, gamboge, elaterium, croton oil. *Mercurial cathartics* consist of calomel, blue mass, mercury with chalk. *Enemata* consist of tepid water, flaxseed tea or other demulcent infusion; a combination of a tablespoonful each of common salt, molasses and lard or olive oil, in two-thirds of a pint of warm water, to which castor oil or Epsom salt may be added to augment the cathartic effect, is a formula for the common laxative enema. (See *Purgatives.*)

DIAPHORETICS.

Diaphoretics, known also as *sudorifics*, are medicinal substances capable of producing perspiration, or an increase of the cutaneous discharge, which may be occasioned by the mere drinking of a large quantity of fluid, provided the temperature of the system be kept up. The determination of blood to the cutaneous vessels by a warm temperature or exercise will produce diaphoresis, and the action of nauseating agents, by relaxing the orifices of the cutaneous vessels, and also stimulants, by exciting such vessels to increased secretion, will have the same effect.

The external application of heat, friction, etc., stimulates the cutaneous capillaries and causes an increased secretion.

Diaphoresis may also be excited by medicines which enter the circulation and stimulate the cutaneous vessels by contact, such as the mercurials and sulphur; also by medicines which act on the surface sympathetically, through the medium of the stomach, as cold drinks, etc.

Diaphoresis may also be produced by increasing the general action of the vascular system, by such means as violent exercise, the warm bath, and by the use of alcohol, ammonia,

guaiacum, etc.; it may also be produced by the use of agents capable of relaxing the morbidly constricted mouths of the perspiratory vessels, such as the antimonials, saline diaphoretics, and by the operation of venesection.

Nauseating diaphoretics are employed to produce a powerful relaxing action in inflammatory cases not complicated with gastric irritability, and for such effects the emetics ipecacuanha and the preparations of antimony are administered.

Refrigerant diaphoretics are employed to produce a gentle relaxing effect in allaying febrile excitement and reducing the temperature of the body.

Stimulating diaphoretics are employed in rheumatic and pulmonary affections, after vascular excitement has been reduced, and where the surface is cool, being contra-indicated in a high degree of inflammation. For such effects, the diffusible stimulants, aromatic substances, and such narcotics as opium and camphor are administered. During the administration of diaphoretics, the patient should be confined to bed, and when diaphoresis is excited, it should not be suddenly checked. Venesection is generally resorted to when there is great arterial excitement with undue heat of skin, before the attempt is made to administer diaphoretics.

Belonging to the class of diaphoretics are such agents as Dover's powder, guaiac, spirits of mindererus, nitrate of potassa, sweet spirit of nitre, etc., etc.

DIURETICS.

Diuretics are medicinal substances which act upon the kidneys, and produce an increased flow of urine.

Remedies of this class act immediately and specially upon the kidneys, some reaching these organs by first passing through the blood, without being decomposed, while others, on the contrary, undergo changes in the first passages, the result of such changes exciting diuresis. The principal use of diuretics is to promote the absorption of dropsical effusions. They are also employed to correct nephritic disorders, accompanied with obstructed secretion in calculi of the kidneys,

ureters and bladder, and, as evacuants, to reduce inflammation.

Where there is great arterial excitement, a judicious use of a lancet is recommended, prior to the administration of diuretics, the patient being kept cool, to avoid perspiration.

To insure the full effect of diuretics, diluent drinks should be freely given, and especially such as contain some diuretic substance. Included in the class of diuretics are such agents as squill, nitre, cubebs, juniper, colchicum, erigeron, cream of tartar, copaiba, podophyllum, etc., etc.

BLENNORRHETICS.

Blennorrhetics are medicinal substances which increase the secretion of the mucous membranes, and are employed in morbid conditions of such membranes, in order to restore them to healthy action, in cases where their secretion is deficient, excessive or abnormal in quality. They are termed *expectorants* when used to stimulate the secretion of mucus from the bronchial or laryngeal membranes, as in bronchitis and laryngitis, and during convalescence, in pneumonia. The oleo-resinous agents of this class are employed in chronic diarrhœa, and the diarrhœa of typhoid fever, such as oil of turpentine, for example; also in diseases of the urino-genital mucous membranes, such as gonorrhœa, gleet, leucorrhœa, incontinence of urine, cystitis, etc., etc. Included in the class of blennorrhetics are such agents as senna, cimicifuga, garlic, turpentine, squill, copaiba, cubebs, matico, buchu, myrrh, benzoin, storax, balsam of peru, balsam of tolu, etc., etc.

EMMENAGOGUES.

Emmenagogues are medicinal substances which promote the menstrual discharge, or restore it when entirely suppressed. The particular emmenagogue required depends upon the cause of the amenorrhœa; for example, when anæmia is the cause, the preparations of iron prove most effectual; when from plethora, blood letting and cathartics or evacuants are resorted to Certain medicinal substances excite the pelvic circulation, and stimulate the parts in direct connection with the

uterus, and thereby increase or promote the menstrual discharge.

General debility being the cause of the local affection, an active administration of tonics, in connection with the emmenagogue required, is advisable.

The most prominent of this class of emmenagogues are savine, cantharides, ergot, cotton root, Seneca snake root, guaiacum, etc., etc.

HÆMATINICS.

Hæmatinics are medicinal substances which increase the number of blood corpuscles, or the amount of hæmatin in the blood, and hence, are administered in such diseases as are dependent on a deficiency of these elements.

This class of remedies includes the preparations of iron or chalybeates, which are capable of causing changes in the condition of the blood, and also general and local tonic effects.

ALTERATIVES.

Alteratives are medicinal substances which are capable, when administered in small doses, of removing morbid structures and conditions, without any sensible evacuation; in other words, changing, in some inexplicable and insensible manner, certain morbid actions of the system.

Alterative remedies re-establish the healthy functions of the animal economy in a slow but decided manner, acting on the various secreting organs, sometimes without any sensible increase of the secretions themselves. The effect of minute doses of mercury, iodine and other substances, upon the glandular apparatus, afford examples. Medicinal remedies of almost every class become alteratives by being administered in very small doses, at intervals of a few hours; and they are generally classed with stimulants and tonics, and some of them with narcotics. By their action the secretions and exhalations are increased; the exudation of plastic or coagulable lymph is diminished; the formation of false membranes checked; the textures softened; inflammatory action arrested; and morbid growths and deposits absorbed. Phlegmonous

inflammation is arrested, and visceral and glandular enlargements are dispelled. But if administered too freely, the blood may become so impoverished as to interfere with the functions of nutrition, and a marasmatic or cachectic condition be produced, the textures being softened, or even destroyed. Hence this class of remedies should be carefully administered, and their effects be closely observed. The chief use of alteratives is antiphlogistic or resolvent; for example, the mercurials are generally employed in acute inflammation, and the preparations of iodine and bromine in chronic inflammations.

Included in this class are the preparations of mercury, iodine, iodide of potassium, iodoform, bromine, preparations of arsenic, phosphate and hypophosphite of lime, chlorate of potassium, permanganate of potassium, chlorine water, chlorinated lime, etc., etc.

ANTACIDS.

Antacids are medicinal substances, capable of neutralizing acidity of the blood, the secretions, etc., by combining with the acid and counteracting it.

The alkalies, alkaline earths, and their carbonates are the substances included in this class, and the former are more energetic in their action than the alkaline earths, such as magnesia. The carbonates of these earths have little or no chemical influence upon the tissues.

This class of remedies, in the form of alkaline preparations, are administered internally as antacids in cases where an unusual quantity of acid is generated in the stomach—a common symptom of dyspepsia, which is indicated by acid eructations, violent heartburn and marked effervescence when a carbonated alkali is taken; the acid in the stomach laying hold of the alkaline base, and resulting in a large quantity of carbonic acid being driven off.

Alkalies are also employed to relieve irritability of the stomach and check vomiting; also as *antidotes* in cases of poisoning from acids; also as *antilithics*, to neutralize lithic acid when it is separated in unusual quantity by the urinary

secretion; also as *lithontriptics*, or solvents of calculi, more particularly lithates; also employed in cases of acute rheumatism and gout, to neutralize the excess of acid in the blood; also in diabetes mellitus, and to relieve irritability of the urinary organs, cutaneous irritation, itching of the anus, especially when such conditions are dependent on an excess of acid in the system; and also as antiplastics and resolvents in inflammation, and as diuretics. As a general rule, the administration of antacids should be preceded by an emetic or cathartic, and in some cases both.

When a permanent effect is desired, antacids are usually combined with tonics and aromatics, and occasionally with narcotics; for when given alone the relief afforded is but transient. To prevent an irritant and purgative action on the bowels, and also to facilitate their absorption, antacid preparations are administered in a state of large dilution.

In dental practice antacids are also employed for correcting acidity of the fluids of the mouth, often a result of acid eructations from the stomach. The class of antacids comprise the preparations of potassium, sodium, lithium, ammonium, magnesium and calcium. The antacids employed in dental practice are principally precipitated chalk, lime water, carbonate of soda, etc.

IRRITANTS.

The medicinal substances recognized as irritants are subdivided into *rubefacients, epispastics, suppurants and escharotics.*

RUBEFACIENTS are agents employed to redden the surface by exciting the action of the capillaries, and occasioning an afflux of vascular and nervous power to the part with which they come in contact; hence pain is a usual consequence of their employment.

They are used for the same purposes as blisters, and are often a good substitute for them; for example, in low degrees of inflammation, as local anodynes, as general stimulants; their efficacy as such depending upon their action on the capillary circulation, and also on the pain they occasion. They are especially serviceable in the coma and asphyxia resulting

from poisons and drowning, but in cases of cerebral oppression are inferior to blisters. Rubefacients are used until redness and pain occur, and their persistent application will cause vesication, and even gangrene.

In the class of rubefacients are included mustard, capsicum, oil of turpentine, ammonia, liniment, Burgundy pitch, Canada pitch, ginger, black pepper, garlic and spice plaster.

EPISPASTICS, also called *vesicants* and *blisters*, are medicinal agents capable of producing, when applied to the skin, inflammation followed by an effusion of serum beneath the cuticle As a general rule, blisters should remain on the surface of the skin six or eight hours, in order to insure their full effect. When the skin is very delicate, a shorter application will answer every purpose; and in the case of children it is seldom necessary for them to remain longer than three or four hours. When applied to the scalp, twelve hours are generally required. After removing a blister, the usual dressing is some non-irritating ointment, such as simple cerate. In acute diseases, blistering ought never to precede such means as have a tendency to reduce inflammatory action, and the application should be as near the affected part as possible.

Covering blisters with fine gauze renders them much less irritating, and does not retard their operation.

If a blister is applied long enough to redden the skin, a simple poultice will complete the vesication; and in the case of children this method should always be pursued. When it is necessary to keep the blister open, weak epispastic or savin ointment will prove sufficient. When the circulation is languid in the extremities, they seldom act efficiently, and may cause gangrene by exhausting what vitality remains. When strangury is produced, the blister must be removed after three or four hours, and the part bathed with olive oil, or a poultice applied, and diluent drinks used; an opium suppository or injection will prove serviceable. Epispastics are employed as local stimulants in the treatment of inflammation; to create a healthy inflammatory action, as in various cutaneous eruptions; to relieve pain; to destroy morbid associations by causing a

powerful impression; to stimulate the absorbing or secreting vessels of parts in the neighborhood of the affected part; to stimulate generally; to relieve threatened gangrene and paralysis; to produce local depletion as evacuants, and to prepare a surface for the endermic application of medicines.

The class of epispastics include such agents as cantharides, cantharidal collodion, water of ammonia, etc., etc.

SUPPURANTS are medicinal agents, which, when rubbed on the skin, cause rubefaction, accompanied by a pustular eruption; their beneficial effects being due to the counter-irritation set up. The agents of this class are generally employed in subacute, chronic laryngeal and bronchial affections, diseases of the joints, etc., etc.

Included as suppurants are croton oil, antimonial ointments, etc.

ESCHAROTICS, called also *Cauterants* or *Caustics*, are medicinal agents capable of destroying the structure and vitality of the parts with which they come in contact, producing an eschar or slough, which is followed by inflammation and suppuration of the neighboring tissues to such a degree that the slough separates from the living parts. The mode of action of an escharotic is as follows: After being applied to the skin, so as to chemically disorganize it, or destroy its vitality, a new action is set up in the vessels beneath the slough, so as to cause it to be thrown off. The excavation resulting is then kept open by inserting some irritant, which maintains a copious secretion of pus from the ulcerated surface. Escharotics are divided into *Actual* and *Potential;* the actual being fire itself, while the potential are substances which destroy the living solids, either by excessive stimulation, or by producing a chemical decomposition.

Iron heated to a white heat and the *moxa* (cones or cylinders of inflammable substance) represent the actual cautery; and caustic potash, nitrate of silver, burnt alum, chloride of zinc, chromic, sulphuric and nitric acids, and the nerve or arsenical paste employed in dental practice, represent the potential cautery. A sub-class is composed of what are known as

ISSUES and SETONS: the *blister-issue*, where the skin is removed by a blister, and the discharge promoted by means of stimulating applications, as the cantharidal ointment, for example; also, the *pea-issue*, where an incision made by the lancet is kept open by means of a pea, beet or piece of orris root. The *Seton* is prepared as follows: A seton needle, to which is attached a skein of silk, is passed completely through the part chosen for the operation, after which it is removed, and the ends of the silk left hanging from the wound. It is dressed once or several times a day with some mild ointment; or, if this is not sufficient to keep up the discharge, a more stimulating ointment is used. Escharotics are employed to destroy morbid growths, warts, polypi, condylomata, fungous granulations, etc.; also to relieve violent inflammation by their substitutive action; to stimulate indolent ulcers, sinuses, etc.; to open abscesses of the liver and other internal viscera, the method of "aspiration" being preferred; to remove cancer, lupus and other morbid growths; to decompose the virus of rabid and venomous animals, and of chancres and malignant pustules, and prevent their absorption.

Escharotics include such agents as caustic potassa, fused nitrate of silver, caustic soda, solution of nitrate of mercury, corrosive chloride of mercury, bichromate of potassium, the mineral acids, sulphate of copper, and the substances before referred to.

DEMULCENTS.

Demulcents, also called *Lenitives*, are medicinal substances which soften and relax the tissues. When applied to irritated or inflamed surfaces these agents diminish the heat, tension and pain. They consist principally of gum or mucilage, often combined with saccharine or farinaceous substances, and, diluted with water, form viscid solutions. By modifying the acridity of the secretions, they are capable, to some degree at least, of relieving irritation in remote organs, although their constitutional effects are chiefly nutritive. Demulcents are employed internally to protect the gastro-enteric surface from irritating substances, especially poisons of an acrid nature;

also to relieve irritation and inflammation of the alimentary canal in such affections as diarrhœa, dysentery, enteritis, gastritis, etc.; also in catarrhal affections, for their soothing and lubricating effects from direct contact, and also by reflex action; and they also exert some influence in modifying the acridity of expectorated matters; also in such affections of the urinary passages as cystitis, ardor urinæ, as they tend to diminish the acridity of the secretions: also as drinks, to promote the action of the secreting and exhaling organs, and to allay the thirst in fevers; also as light diet, and to suspend substances insoluble in water.

Demulcents are employed externally in the form known as *Emollients*, to relieve the heat, swelling and pain of inflammation, wounds and burns; to hasten suppuration, as detergents, to cleanse foul ulcers, and to promote suppuration from granulating surfaces. Mixed with water in the form of soft masses, they are commonly termed *cataplasms* or *poultices*, and have the effect of softening the parts to which they are applied as vehicles of heat and moisture. Included in the class of demulcents are such substances as gum arabic, flax seed, tragacanth, slippery-elm bark, sassafras pith, marshmallow, benne, quince seed, liquorice root, Iceland moss, Irish moss, starch, arrow root, tapioca, sago, barley glycerin, pyroxylon, collodion, solution of gutta percha, honey, animal fats, such as lard, in the form of cerate (lard 2 parts, and white wax 1 part), and suet, both containing stearine.

ANTHELMINTICS.

Anthelmintics, or *Vermifuges*, are medicinal substances employed to destroy and expel worms (entozoa) from the alimentary canal. Their action differs according to the nature of the substance used, either to destroy by a direct poisonous influence or by mechanical means. The most powerful of the cathartics (drastic) also act as anthelmintics by the copious secretion and exhalation which they produce from the alimentary canal. When anthelmintics are employed, they must be persevered in for several days, with the occasional intervention of an active cathartic.

Belonging to this class are such agents as wormseed, spigelia, santonica, cowhage, male fern, oil of turpentine, kameela, pumpkin seed, kousso, calomel with gamboge, calomel with pink root, iron preparations, etc., etc.

COLORING AGENTS.

Coloring agents are substances employed to communicate their peculiar color to pharmaceutical preparations. They include saffron, cochineal, red saunders, etc., etc.; and in dental practice they are used for coloring dentifrices, such as rose pink.

In addition to the general classes mentioned, there are certain sub-classes recognized, which have not been specially referred to in the preceding definitions as follows :—

Absorbents,	Detergents,	Hypersthenics,
Anodynes,	Deodorizers,	Hypnotics,
Antemetics,	Diluents,	Laxatives,
Anthridrotics,	Discutients,	Nervines,
Antiperiodics,	Disinfectants,	Nutritives,
Antipyretics,	Emollients,	Purgatives,
Antiseptics,	Errhines,	Refrigerants,
Aromatic Bitters,	Escharotics,	Resolvents,
Carminatives,	Expectorants,	Restoratives,
Caustics,	Evacuants,	Sialogogues,
Cauterants,	Excitants,	Stimulants,
Constringents,	Febrifuges,	Styptics,
Counter-irritants,	Germicides,	Vesicants.
Desiccatives,	Hæmostatics,	

ABSORBENTS.

Absorbents, known also as *Desiccatives*, are medicinal agents capable of checking secretions, and drying up secretions or discharges from ulcers and suppurating wounds. Included in this class are tannic acid, oxide of zinc, charcoal, subnitrate of bismuth, starch, powdered galls, magnesia, powdered myrrh, carbonate of lime, etc., etc.

ANODYNES OR ANALGESICS.

Anodynes, which, with *sedatives*, *hypnotics*, or *soporifics*, are included in the group of narcotics, are medicinal agents capable of alleviating pain by lessening the sensibility of the

nerve-centres or the peripheral extremities. When applied locally they are called *analgesics.* Included in this class are opium, morphia, chloroform, sulphuric ether, aconite, croton, chloral, belladonna, camphor, gelsemium, cannabis indica, stramonium, hyoscyamus, carbolic acid, atropine, creasote, cocaine, eugenol, iodoform, iodol, antipyrin, blood-letting, heat and cold, acupuncture, etc., etc.

ANTEMETICS.

Antemetics are medicinal agents capable of arresting vomiting. Included in this class are creasote, dilute, hydrocyanic acid, lime water, chloral, chloroform, magnesia, dilute nitric acid, dilute phosphoric acid, belladonna, oxalate of cerium, etc.

ANTHRIDROTICS.

Anthridrotics are medicinal agents capable of checking perspiration. Included in this class are oxide of zinc, sulphuric acid, acetic acid, tannic acid, sulphate of iron, hæmatoxylon, etc.

ANTIPERIODICS.

Antiperiodics are medicinal agents capable of relieving periodical diseases, such as intermittent fevers, neuralgia, etc. Included in this class are cinchona, quinia, arsenic (in form of Fowler's solution), chloroform, chloride of soda, salicin, etc.

ANTIPYRETICS.

Antipyretics are medicinal agents having a decided power to depress the temperature of the body during fever, and control hyperpyrexia. Included in this class are antifebrin, antipyrin, quinoline or chinoline, thalline, kairine, camphor, eucalyptol, hydroquinon, pyrodin, resorcin, quinine, salicine, thymol, salol, etc.

ANTISEPTICS.

Antiseptics are medicinal agents capable of arresting fermentative processes, preventing the development of bacteria, thereby preventing or arresting the decomposition of organic substances, and the process of putrefaction. When these agents are brought in contact with disease germs they destroy their vitality. Included in this class are carbolic acid, creasote,

salicylic acid, eucalyptus oil, iodoform, benzoic acid, boracic acid, pepsin, bromine, iodol, hydronapthol, peroxide of hydrogen, bichloride of mercury, essential oils, etc.

Forms of Antiseptics for Use: Dr. Black on this subject says: "In regard to the use of antiseptics in different cases and for different purposes, I should divide them into three forms, each of which has especial advantages.

"These forms are: the solution in water, the oil, and the powder.

"The solution in water is especially useful for cleaning infected surfaces of wounds, washing abscesses, and, indeed, in any case where there is something that can be removed by washing. In the performance of this act the antiseptic is diffused to all parts of the wound or abscess mechanically to the best advantage. It is more likely to reach every part in this form than in any other; and this is an advantage that can hardly be over-estimated; for it is very difficult to reach all parts of an abscess by any mode of procedure now known to us on account of the very tardy diffusion of liquids. And in case the liquid containing the antiseptic in solution does diffuse, its very diffusion and mixture with the surrounding fluids soon dilutes it below its range of antiseptic value. It is therefore necessary that the washing be continuous to obtain the continuous effect of the drug. This is generally impracticable, and for this reason the watery form of antiseptics is very much limited in usefulness. The continuous drip, or the application as often as every fifteen or twenty minutes, gives effective results in some favored localities; but it is very difficult to carry out and occasions much trouble. The continuous bath is still more limited in its range of application. Neither of these can be used in dental practice. With us the watery form of antiseptics should be limited to the cleaning of infected parts. They cannot be trusted to prevent septic action for any length of time, for the reason that they so soon become diluted below their range of antiseptic value by mixing with the secretions, or the juices of the flesh. Since studying the powers of antiseptics and disinfectants more closely, my feeling is that it

will not do for us to expect to do much disinfectant work in connection with the soft tissues except in cases in which some tissue destruction can be borne; and that antiseptics only retard the growth of microbes during their presence in effective proportion; hence the necessity for continuous and oft-repeated application. In using these for the purpose of cleaning, much aid may be had by making use of the solution in peroxide of hydrogen instead of water, so as to obtain the mechanical effect of the ebullition of the oxygen evolved in mixing the antiseptic with the secretions. There is possibly some antiseptic virtue in oxygen itself as well, but I am apt to think that its principal use is the mechanical one. And that is a very important use. Thorough cleaning is excellent antiseptic work, and the peroxide of hydrogen will do this in many positions where nothing else will, and at the same time carry the antiseptic proper to the more remote parts of the wound or abscess."

Sir Joseph Lister is the originator of the antiseptic treatment in surgery. He first employed carbolic acid as an antiseptic for surgical dressings, but abandoned it on account of its slow action as a germicide and its volatility. He then employed bichloride of mercury, which was stable and acted promptly, but caused irritation, and was precipitated by the albumen contained in the serum of the blood. He then employed the sero-sublimate gauze, consisting of gauze saturated with a solution of bichloride of mercury, in the serum of the blood; but this being harsh and non-absorbent he substituted for it a combination of chloride of ammonia and chloride of mercury, known as sal-alembroth, which was not only less irritating, but was soluble in blood serum. Later he presented the double cyanide of zinc and mercury as the best antiseptic, on account of its being non-volatile, un-irritating, insoluble in water, and only soluble in 3,000 parts of blood serum, with an inhibitory power so high that a solution of 1:1200 is sufficient to keep animal fluids permanently free from putrefaction. The Listerian method consists in applying over the line of the wound six or eight layers of the gauze, out of which the bi-

chloride has been washed by wringing it out once or twice in a solution of 1 to 20 carbolic acid. All zymotic diseases are at the present time generally attributed to bacteria or to their ptomaines, and for a number of years the theory that all contagious and epidemic diseases are caused by micro-organisms has been received by the medical profession. Many diseases are now regarded as contagious which were not so considered before the discovery of bacteria. Bacteria are found in great numbers and different varieties in the air, earth, water, and in every part of the body of man and animals, and multiply very rapidly by division and by spores. Some varieties are subject to change, others appear to be permanent. New varieties are supposed to be produced by the same laws by which the different kinds of vegetables, plants and animals are generated. The discoveries in bacteriology have brought about a revolution in the treatment of many diseases, namely, tuberculosis—as the Koch treatment—typhoid and other fevers, carbuncle, erysipelas, diphtheria, pneumonia, influenza, malaria, tetanus, etc., etc. (See *Use of Antiseptics in Dental Practice.*)

AROMATIC BITTERS.

Aromatic bitters differ from simple bitters in the aromatic constituents they contain. They possess tonic properties and invigorate digestion and promote constructive metamorphosis. They are employed in the same cases as simple bitters, but appear to possess some specific properties due to the aromatic constituents. Included in this class are serpentaria, prunus virginiana, canella, anthemis, etc.

CARMINATIVES.

Carminatives are medicinal agents capable of dispelling flatulence, and allaying pain in the stomach and bowels. Included in this class are such agents as cinnamon, cardamom, cloves, coriander, lavender, juniper, ginger, caraway, peppermint, etc.

CAUSTICS.

Caustics are medicinal substances capable of destroying vitalized tissue. (See *Irritants.*)

CAUTERANTS (See *Irritants*).

CONSTRINGENTS (See *Astringents*).

COUNTER-IRRITANTS.

Counter-irritants are medicinal agents which are employed to produce external irritation for the purpose of relieving or curing diseased action in another part, as in periodontitis, for example, when such agents as iodine, cantharidal collodion, creasote and iodine, aconite and iodine, ammonia, etc., etc., are applied to the gum over the root of the affected tooth. (See *Irritants.*)

DESICCATIVES.

Desiccatives are medicinal agents capable of checking secretions, and arresting mucous discharges from ulcers, wounds, etc. (See *Absorbents.*)

DETERGENTS.

Detergents are medicinal agents capable of cleansing ulcers, suppurating wounds, etc., by acting as either stimulants or emollients. Included in this class are such agents as borax, burnt alum, slippery-elm bark, acacia, flax seed, tragacanth, etc.

DEODORIZERS.

Deodorizers are medicinal agents capable of destroying infectious and fetid odors. Included in this class are carbolic acid, salicylic acid, creasote, chloride of lime, charcoal, permanganate of potash, thymol, chloride of zinc, solution of chloride of soda, oil of eucalyptus, iodoform, menthol, hydrochloric acid, nitric acid, sulphuric acid, etc., etc. (See *Antiseptics.*)

DILUENTS.

Diluents are medicinal agents capable of diluting the blood and thus increasing its fluidity; at the same time exercising a solvent action and eliminating a portion of the solid constituents. Included in this class are such agents as water, aerated water, mineral waters, rice water, beef tea, whey, barley water, gruel, etc., etc.

DISCUTIENTS.

Discutients are medicinal agents capable of reducing and depressing morbid growths, swellings, etc. Included

in this class are iodine, mercury, bromide of potassium, iodide of potassium, chlorate of potassium, arsenic, colchicum, etc., etc.

DISINFECTANTS.

Disinfectants are medicinal agents capable of depriving effluvia of their morbific properties by chemically combining with them. Included in this class are such agents as chlorine, carbolic acid, carbolate of lime, chloride of lime, salicylic acid, solution of chlorinated soda, charcoal, creasote, hydrochloric acid, sulphuric acid, nitric acid and chloride of zinc. (See *Antiseptics and Deodorizers*).

EMOLLIENTS.

Emollients, or *Protectives*, are medicinal agents capable of relaxing soft tissues, allaying irritation, protecting sensitive surfaces, relieving pain in ulceration of mucous membrane. Included in this case are glycerine, collodion, solution of gutta percha, acacia, tragacanth, Irish moss, sassafras pith, flax seed, slippery-elm bark, liquorice root, wax, in the form of cerate ointment, poultices of bread and milk, yeast and flax seed, and charcoal and yeast with flax seed, lard, etc., etc.

ERRHINES.

Errhines are medicinal agents capable of inducing a secretion from the nose. Included in this class are ammonia, ipecacuanha, chlorine, acetic acid, orris root, etc., etc.

ESCHAROTICS.

Escharotics are medicinal agents capable of producing an eschar or slough, and are included among Irritants. (See *Irritants.*)

EXPECTORANTS.

Expectorants are medicinal agents capable of promoting the excretion of mucus and other fluids from the air passages and lungs. Included in this class are squill, ipecacuanha, benzoic acid, preparations of ammonia, tartar emetic, balsam of tolu, myrrh, nitrate of potash, seneca, wild cherry bark, lobelia, etc., etc. (See *Blennorrhetics.*)

EVACUANTS.

Evacuants belong to the class of cathartics which promote alvine evacuations. (See *Cathartics.*)

EXCITANTS.

Excitants belong to the class of stimulants which excite the vital powers, causing an increase of the circulation. (See *Stimulants.*)

FEBRIFUGES OR ANTIPYRETICS.

Febrifuges are medicinal agents capable of diminishing the heat and allaying the thirst of fevers, and are generally recognized as *Refrigerants.* Included in this class are nitrate of potassa, chlorate of potassa, the mineral acids, spirits of nitrous ether, antipyrin, chinoline, salicin, etc., etc.

GERMICIDES.

Germicides include all substances which destroy any form of microbe or disease germs, such as bacteria, which are inimical to life. Included in this class are bichloride of mercury, peroxide of hydrogen, iodoform, iodol, iodine, salicylic acid, eucalyptus, carbolic acid, chlorine, chloride of zinc, permanganate of potash, naphthol, etc.; also heat.

HÆMOSTATICS.

Hæmostatics are medicinal agents capable of arresting hemorrhage, and belong to the class of Astringents. (See *Astringents* and *Styptics.*)

HYPERSTHENICS.

Hypersthenics belong to the class of stimulants. (See *Stimulants.*)

HYPNOTICS.

Hypnotics belong to the class of Narcotics, and are capable of causing sleep. (See *Narcotics.*)

LAXATIVES.

Laxatives are mild cathartics. (See *Cathartics.*)

NERVINES.

Nervines belong to the class of Neurotics, and are capable of relieving and curing disorders of the nerves. (See *Neurotics.*)

NUTRITIVES.

Nutritives are medicinal agents capable of quickening assimilation and building up the organic tissues. Included in this class are cod-liver oil, gum arabic, glycerin, beef extracts, milk, manna, etc., etc.

PURGATIVES.

Purgatives are active cathartics, and are divided into several classes, according to the nature of their action, such as: *Laxatives*, which incite intestinal movements without much increase of the intestinal secretions. Included in this class are manna, sulphur, magnesia, castor-oil, etc. *Saline Purgatives*, which produce increased secretion, and at the same time hasten the peristaltic action, the stools being loose and watery. Included in this class are sulphate of magnesia, phosphate of soda, tartrate of potassium and sodium, Seidlitz powder, bitartrate of potassium, etc. *Mercurial Purgatives*, principally calomel and blue mass, which are supposed to produce cholagogue effects and also an influence peculiar to themselves. *Tonic-astringent* and *resin-bearing purgatives*, which have an influence over the liver and the glandular appendages, and promote the tonicity of the muscular layer of the intestines. Included in this class are senna, rhubarb, aloes, jalap, scammony, colocynth, podophyllum, etc. *Hydragogue purgatives*, which are very energetic in their action, increase the glandular secretions and cause an abundant outward diffusion to such a degree as to produce very watery stools; and also excite rapid and severe peristaltic movements. Included in this class are cambogia, croton-oil, elaterium, etc. (See *Cathartics.*)

REFRIGERANTS.

Refrigerants are medicinal agents which are capable of diminishing heat and allaying thirst. They are also called *Febrifuges.* Included in this class are nitrate of potassa,

chlorate of potassa, solution of acetate of ammonia, acetic acid, citric acid, hydrochloric acid, nitric acid, tartaric acid, spirits nitrous ether, etc., etc.

RESOLVENTS.

Resolvents belong to the classes of Alteratives and Emollients, being medicinal agents capable of reducing inflammation and dispersing morbid swellings. See *Alteratives* and *Emollients*.

RESTORATIVES.

Restoratives belong to the class of Stimulants and Tonics. (See *Stimulants* and *Tonics*).

SIALAGOGUES.

Sialagogues are medicinal substances capable of increasing the salivary secretion by a stimulant or irritant effect. By the excitant properties of these agents the lining membrane of the mouth is irritated, the effect extending along the ducts to the salivary glands, so that not only is the quantity of fluid exhaled from the mucous membrane increased, but salivation results. In this way depletion follows their employment, and more or less revulsive effect ensues, which may prove beneficial to distant parts affected by disease. Sialagogues may also prove useful in cases of paralysis of the tongue, etc., by their directly excitant properties; also in local palsy of the tongue. They are occasionally employed as masticatories in odontalgia, and in such affections of the head as may indicate the use of substances which excite irritation in and increased discharge from the lining membrane of the nasal cavities. Included in this class are pyrethrum, horse radish, calamus, ginger, tobacco, calomel, corrosive sublimate, blue mass, iodide of mercury, etc.

STYPTICS.

Styptics, which belong to the class of *Astringents*, are medicinal agents capable of arresting hemorrhage when employed externally. They are divided, according to their action, into *chemical* and *mechanical*, the chemical styptics coagulating the blood exuding from the part, and at the same time stimulating

the tissues to contraction; whilst the mechanical, as lint, felt, spider's web, plaster of Paris, etc., detain the blood in their meshes, or absorb it until it coagulates, and thus arrest the hemorrhage. Among the Astringents which may be classed as Styptics and local astringents are tannic acid, persulphate of iron solution, powdered subsulphate of iron, alum, nitrate of silver, powdered galls, sulphuric acid, matico, gallic acid, perchloride of iron, catechu, oak-bark, rhatany, etc.; and as mechanical styptics, collodion, matico, spider's web.

By contraction of the blood-vessels internally: digitalis and ergot; also for checking excessive discharges: acetate of lead, carbonate of lead, subacetate of lead, lime water, the application of cold as ice, and of heat, as hot water, etc.

VESICANTS.

Vesicants, which belong to the class of *Epispastics*, are medicinal agents capable of producing a serous exudation beneath the cuticle. Included in this class are cantharides, cantharidal collodion, glacial acetic acid, strong solution of ammonia, mustard, etc., etc. (See *Epispastics*.)

FORMS IN WHICH MEDICINAL SUBSTANCES ARE EMPLOYED.

Alkaloids are bases capable of combining with acids to form salts, and which exist as proximate principles in certain vegetables, and possess the properties of an alkali in a greater or less degree. Alkaloids are, therefore, the active principles of medicines.

Baths. *Medicinal Baths* are composed of tepid water, with the addition of saline, emollient, narcotic or stimulant substances, such as salt, mustard, etc., etc.

Cataplasms are poultices or plasters composed of soft, macerated preparations, to be applied externally.

Collyria are preparations applied to the eyes. They are sometimes dry, but generally liquid, consisting of infusions, decoctions or distilled waters, with the addition of various medicinal substances.

Confections, or *Electuaries*, are preparations made into a pulpy mass, with sugar or honey, mucilage or glycerin.

DECOCTIONS are solutions made by boiling certain vegetable ingredients in a fluid, for the purpose of extracting the parts soluble at that temperature.

EMULSIONS are preparations composed of oils, resins, etc., suspended by means of mucilage, yolk of egg, sugar, etc.

ENEMATA, or *Clysters*, are liquid preparations injected into the rectum by means of a syringe, as auxiliaries to or substitutes for cathartics.

EXTRACTS are preparations obtained by the evaporation of a vegetable solution, in the form of juices, infusions or decoctions, to a more or less fluid consistence.

FOMENTATIONS are fluid preparations applied to the surface of the body by means of a sponge, flannel or soft cloth.

FUMIGATIONS are the vapors of medicinal substances employed to purify infected air by absorbing or otherwise counteracting deleterious gases. They are also employed in diseases of the skin, and may be sometimes substituted for a local bath.

GARGLES are washes for the mouth and throat, and are generally astringent and stimulating, sedative, refrigerant, etc. To be of any service, gargles or mouth washes must be frequently applied and persevered in for some time. They are employed in cases of inflammation and ulceration of the mucous membrane of the mouth and fauces.

GLYCERITES are solutions of medicinal substances in glycerine.

INFUSIONS are preparations obtained by pouring a hot or cold fluid upon vegetable substances, for the purpose of extracting their medicinal properties.

INHALANTS are remedies in the form of steam, for inhalation directly to the lungs.

INJECTIONS are medicated fluids thrown into a natural or preternatural cavity of the body by means of a syringe.

LINIMENTS, or Embrocations, are unctuous medicinal preparations to be applied externally by means of friction.

LOTIONS are liquid preparations or washes, to be applied to the body externally.

MIXTURES are fluid preparations containing several medicinal ingredients, to be administered by the mouth.

OINTMENTS, or Cerates, are preparations of the consistence of lard, composed of wax, lard, or resin, with solid or liquid ingredients, for topical application. Cerates are somewhat harder than ointments, especially where wax is substituted for the lard.

OLEATES are medicinal ointments. (See Medicinal Oleates).

PILLS are simple or compound medicinal agents, of a firm consistence, spherical or globular in shape, and generally not exceeding five or six grains in weight.

PLASTERS are preparations of a solid glutinous composition, which, at the ordinary temperature of the body, adheres to the part on which it is placed.

POULTICES are preparations for applying continuous heat and moisture and softening the tissues. Their effects are to cause an afflux of blood to the part, dilate the vessels and soften the tissues by the influence of both heat and moisture, and render the diffusion of the fluids easy. In inflammatory conditions, the stasis of the vessels implicated is relieved, the tension of the parts lessened and resolution brought about. Where the stage of exudation is present, these preparations promote the increase and migration of the white corpuscle, and facilitate the escape of purulent matter. Poultices also relieve the pain of inflamed parts by relaxing the tissues, and thereby removing pressure from the sensory nerve filaments; they relieve pain in parts distant from the points where their applications are made, and have both a local and systemic effect. Poultices are generally composed of such substances as flax-seed-meal, powdered slippery-elm bark and corn meal; also bread and milk are sometimes employed.

The substance dissolved in hot water is spread upon soft muslin of such a size as to allow one free end to fold over the mass and intervene between it and the surface of the skin; or it may be inclosed in a small bag of muslin. Glycerine spread over the surface of a poultice will prevent its drying. Laudanum is often added to mitigate the pain, if necessary; also charcoal in the form of powder. A yeast poultice is made of

brewer's yeast with enough of flaxseed to give it a proper consistence. They should not be allowed to remain too long, as their effect will cause the skin to become white, wrinkled and pulpy, and lead to the formation of small boils or abscesses; also, in case of wounded or ulcerated surfaces their too long use will cause the granulations to become pale and flabby and prevent healing; besides, if the granulations are large, they lower the tone and vigor of the system, depress the circulation, and exhaust the irritability of the vaso-motor nerves, and thus prevent healing. Poultices are employed in boils, carbuncles, irritable ulcers, gangrenous sloughs. The charcoal and yeast poultices are used in foul wounds. Poultices are also applied with benefit in pneumonia, pleuritis, pericarditis, hepatitis, peritonitis, faucial inflammation, etc.

SUPPOSITORIES are solid preparations, of a round, cylindrical, or conical form, to be introduced into the anus; and are composed of sedative, astringent, or purgative medicines, combined with suet, cocoa-butter, honey, or soap.

SYRUPS are liquid conserves, made by dissolving sugar with some plant, or in water, either with or without medicinal impregnation.

TINCTURES are preparations in the form of solutions of the active portions of medicinal substances, in rectified or proof spirits. A tincture is called *simple* when it holds only one substance in solution, and *compound*, when two or more ingredients are submitted to the solvent.

DENTAL MATERIA MEDICA

AND

THERAPEUTICS.

ACACIA—GUM ARABIC.

Source.—A thorny tree or shrub, of Arabia and Africa.

Description.—The concrete juice which exudes spontaneously from the stem of the Acacia vera, in the form of a gum, which hardens, on exposure, in small, irregular or roundish or oval pieces, of various sizes, more or less transparent, hard, brittle and pulverizable. It is generally either white or yellowish white, but sometimes of a deep orange or brownish color; the powder, however, being pure white. It is inodorous, with a feeble, slightly sweetish taste, and when pure dissolves wholly away in the mouth.

In water it forms a viscid solution, known as mucilage.

It is insoluble in alcohol, ether and the oils. When kept dry it undergoes no change.

Chemical Constituents.—It consists of a peculiar proximate principle known as *Gum* or *Arabin*, composed chiefly of a soluble acid substance, *Gummic Acid* ($H_2C_{12}H_{18}O_{10}H_2O$), combined with 3 per cent. of lime, forming a soluble salt, gummate of calcium.

Medicinal Properties and Action.—Demulcent and emollient. It forms an excellent adjunct to other medicinal substances of the same class, and an ingredient in all the officinal lozenges.

Dose.—Of the gum, ℥j *ad libitum.* Of the mucilage (℥iv, water ℥vj) ℥ij to ℥vj daily, or *ad libitum.*

Therapeutic Uses.—Coughs and hoarseness, gastro-intestinal irritation, infantile diarrhœa, epistaxis and superficial hemorrhages; applied in the form of fine powder.

Dental Uses.—As an emollient, in the form of mucilage, to cover and protect inflamed surfaces of mucous membrane.

As a mechanical styptic, in a finely-powdered form, in superficial hemorrhages, such as from leech bites, etc.

Combined with borax, it is a useful application for inflamed mucous membrane.

Prof. Bonafoux of the Academy of Medicine, Paris, recommends a powder composed of equal parts of gum arabic, colophony and carbon, as possessing great hæmostatic powers, and capable of arresting the bleeding of large arteries.

DENTAL FORMULA.

For Inflamed Mucous Surfaces.

℞. Pulveris acaciæ . . . . . ʒij
Sodii boratis . . . . . ʒij
Fiat pulvis
SIG.—Apply to inflamed part.

ACIDUM ACETICUM—ACETIC ACID.

Formula.—$HC_2H_3O_2$.

Derivation.—Purified Pyroligneous Acid. Prepared from wood by destructive distillation; contains 28 per cent. of anhydrous acetic acid. Specific gravity 1.047.

DILUTE ACETIC ACID—*Acidum Aceticum Dilutum*, the only form in which it is employed internally, is prepared by mixing one pint of acetic acid with seven pints of distilled water. Specific gravity 1.006.

Medical Properties and Action.—Refrigerant, diaphoretic, astringent, diuretic, stimulant, tonic. It allays restlessness by allaying thirst, and acts upon the skin and kidneys; also acts as an antiscorbutic. The strong acid applied to the skin causes intense redness and pain, followed by rapid vesication.

Dose.—Of acetic acid, gtt. iij to x. Of dilute acetic acid, ʒj to ij.

Therapeutic Uses.—Fevers, night sweats, diarrhœa, scurvy, hemorrhage of the lungs, stomach and nose. Externally, the strong acetic acid is applied in tinea capitis, psoriasis, cancer, corns and warts; the dilute form is applied externally to gangrene, ulcerated throat, in the form of gargle, ulcers, sprains and bruises. Owing to its volatility and pungency, its

vapor, when applied to the nostrils, acts as an excitant in syncope, headache, etc.

Dental Uses.—Acetic Acid is externally employed in indolent ulcers of the mouth, cancrum oris and scurvy, both locally and internally. It is also applied to fungous growths of gums and dental pulps, the stronger acid being used. In the form of glacial acetic acid—*Acidum Aceticum Glaciale* (concentrated acetic acid), it is applied externally, as a caustic in fungous growths of gum, dental pulp, etc. In cancerous ulcerations of mucous membrane, it relieves pain, and promotes a healthier condition.

DENTAL FORMULÆ.

For Indolent Ulcers of the Mouth, Cancrum Oris, Scurvy.

℞. Acidi acetici . . . . . f℥iij
Aquæ. . . . . f℥v.
Fiat solution
SIG.—Apply with a camel's-hair brush.

For Inflamed Fauces.

℞. Acidi acetici . . . . . f℥ij
Ammonii chloridi . . . . ℥j
Mellis . . . . . f℥iss
Aquæ. . . . . f℥xij
Fiat gargarysma.

ACIDUM ARSENIOSUM—ARSENIOUS ACID.

WHITE OXIDE OF ARSENIC—ARSENIOSUM OXIDUM.

Formula.—As_2O_3.

Arsenic—arsenicum, the metal from which arsenious acid is obtained, is not employed as a medicine in its native state. It is combined with sulphur and certain metals, and is hard, brittle, crystalline, of a steel-gray color. When heated to a dull redness, it volatilizes in the form of a colorless vapor, with an odor like that of garlic—alliaceous. It is generally found in cobalt ore. It is a powerful poison.

Derivation.—Arsenious Acid is obtained by roasting arsenical ores, and purifying by sublimation. It is in the form of a fine white powder, which is often adulterated with chalk, lime, etc.; hence it is better to procure it in the solid form or lump, which is of a milk white color externally, and often perfectly transparent internally. It has no odor, and is therefore liable to be mistaken for more innocent substances, and scarcely any taste, or merely a faint, sweetish impression.

Medical Properties and Action.—Arsenious Acid in large doses is a virulent irritant poison, but in doses of one-sixtieth to one-twelfth of a grain, properly administered, is a tonic, increasing the appetite and improving the secretions, both in quality and quantity. In large doses, in the form of Fowler's Solution—*Liquor Potassii Arsenitis* (prepared by boiling 64 grains of arsenious acid and bicarbonate of potassium, each in half a fluid ounce of distilled water, then adding 12 fluid ounces more of distilled water, half a fluid ounce of compound spirit of lavender, and afterward water enough to make the solution measure a pint)—it is a powerful antiperiodic. In small doses, administered for a considerable time, it modifies the blood, and through it nutrition, so as to remove various morbid conditions. When continuously used, a sensation of heat in the throat, œsophagus and stomach is sometimes experienced, nausea, pain in the stomach and occasional vomiting; also, great languor or depression of spirits, with redness of the eyes, swelling of the eyelids and œdema of the face; hence, at the first evidence of such symptoms, the remedy should be discontinued until they have passed away. When continually increasing doses are administered, the arsenic accumulates, and poisonous symptoms quickly appear; hence, it is recommended to begin a course of arsenic with large doses, and the quantity given regularly reduced. When arsenious acid is administered, the bowels should be well evacuated by a purgative, given previously, and the arsenic taken directly after a meal, but never upon an empty stomach, on account of gastric irritation. Its use should be omitted for a day or two every two or three weeks, and a mild aperient employed, in order to prevent the accumulation of the arsenic in the system. A few drops of laudanum added to the arsenical preparation will prevent nausea and vomiting. All arsenical preparations should be administered with the greatest regularity, at stated times.

During the employment of arsenic, the eyes of the patient should be examined daily, and if the eyelids and conjunctiva become inflamed, the remedy should be discontinued; also,

when the urine, from being pale and copious, becomes scanty, acid and high-colored, the arsenic should be suspended.

Poisonous symptoms have been caused by half a grain of arsenious acid, and fatal effects have followed the administration of two grains, although much larger quantities have been taken with impunity; very large quantities often cause emesis, which removes the substance from the stomach, and thus prevents fatal effects. When the idiosyncrasies of the patient are unknown, it is better to use small doses before beginning with large doses. The quantity of arsenic required to produce a fatal effect varies according to the susceptibilities of the patient and the state of the stomach. Much, however, depends on the idiosyncrasies of the individual, which differ greatly in different persons. When large quantities are taken, the effects are sometimes manifested on the cerebro-spinal system, death following, from narcotism, in a short time.

The amount of arsenious acid which may be safely introduced into the stomach should never be equaled in an application to the pulp of a tooth. One-twentieth of a grain may be a safe dose medicinally, but a much less quantity is sufficint for devitalizing the pulps of teeth.

When arsenious acid is swallowed or applied to a denuded surface, it is rapidly absorbed into the system; hence it is a dangerous agent, and in every case should be carefully used, and its effects closely watched. It possesses a very powerful antiseptic property, arresting the process of putrefaction. The stomach and alimentary canal of persons who have died from its effects have been found in a perfect state of preservation for a long time after interment.

Poisonous doses produce great intestinal inflammation, with ulceration in some cases, and rarely, gangrene. It has also been detected after death, in the blood, in the urine, and also in the liver, spleen, kidneys, muscles and stomach. A certain degree of tolerance in the use of arsenic may be established, where poisonous doses can be taken with impunity. Such a state may be produced by the constant legitimate use of the

agent, or in the case of those who begin the habit of arsenic eating at an early age, and who find this practice of service in increased breathing power, strength, and improved bodily condition. As long as such a habit is continued, no ill effects are apparent, but as soon as the arsenic is discontinued, symptoms resembling those of poisonous doses make their appearance.

Arsenious acid acts locally as an escharotic, but while a true escharotic acts chemically, producing decomposition of the part to which it is applied, a state incompatible with life, arsenic destroys the vitality of the organized structure, and its decomposition is the consequence. This distinction should be remembered in the use of arsenious acid in dental practice.

Arsenic is eliminated by the liver, kidneys, intestinal canal and bronchial tubes; and it is thought that some of the symptoms produced by it have their origin in the local effects of the poison on the channels of excretion.

The symptoms of gastro-intestinal arsenical poisoning—the more common form—are described by Bartholow as follows: Burning sensation at the epigastrium, and extending over the abdomen; violent and uncontrollable vomiting; excessive dryness of the mouth and fauces, intense thirst, intestinal irritation, bloody and offensive stools, retracted abdomen, strangury, suppression of urine, or bloody urine, and in females menorrhagia; rapid and feeble action of the heart, oppressed breathing, great agitation and restlessness, shrunken features, cold breath, involuntary evacuations, collapse; consciousness being retained to the end.

The symptoms of the cerebral form of arsenical poisoning are profound insensibility and coma, similar to extreme opium narcosis. The effects of arsenical poisoning, when not fatal, are felt for a long time in the form of gastro-enteric irritability, an irritable condition of the skin, stiffness of the joints, neuralgic pains, numbness, formication, paralysis, etc.

After death from arsenical poisoning, the gastro-intestinal mucous membrane exhibits deep redness, erosions, ecchymosis

and softening. Death generally occurs in the midst of convulsions, followed by rigid spasm of the whole body.

When arsenic has been injudiciously administered for too long a period, in addition to the irritation of the conjunctiva, swelling of the face, desquamation of the skin, etc., salivation has been observed in some instances, and at times a peculiar silvery whiteness of the tongue.

Dose.—Of arsenious acid, gr. $\frac{1}{60}$ to gr. $\frac{1}{12}$, in pills with bread crumb three times a day. Of liquor potassii arsenitis (Fowler's Solution), ♏ij to ♏x, three times a day; each fluid drachm contains half a grain of arsenious acid.

Arsenic is contraindicated in infancy and childhood; in all sthenic diseases accompanied by strong arterial action; in all irritable conditions of the stomach and alimentary canal; and in all inflammatory and pulmonary affections.

Therapeutic Uses.—In intermittent and periodic diseases, such as malaria, neuralgic and spasmodic diseases, being of great value in neuralgia, especially when of a malarial type, hemicrania, chronic rheumatism, asthma, whooping-cough, chorea, diseases of the skin, vomiting of pregnancy, hay fever, irritative dyspepsia, uterine affections, bites of venomous snakes, etc. Externally it is applied to cancerous growths; hypodermically, in cases of local chorea.

Arsenic is also employed medicinally in the forms of arseniate of iron (*Ferri Arsenias*) and arseniate of soda (*Sodæ Arsenias*).

Dental Uses.—The devitalizing power of arsenious acid being far more powerful than its escharotic power, it has been employed for many years to destroy the vitality of the pulps of teeth, for which purpose it is generally combined with either the acetate or sulphate of morphia and sufficient creasote to form a paste, to prevent, or at least mitigate, the extremely painful action of the arsenic when topically applied to living tissue. It was formerly supposed that creasote was a solvent for the arsenic, but this is now denied. Carbolic acid may be substituted for the creasote.

As the danger of absorption is great, there is considerable

risk in applying arsenious acid to the teeth of young persons, or those very susceptible to the influence of this agent; hence other escharotics, such as repeated applications of carbolic acid, or pepsina porci, with dilute hydrochloric acid, or nitric acid, chromic acid, or chloride of zinc, or the galvanic cautery, or the surgical method of introducing into the body of the pulp a barbed wire, are employed in such cases. The arsenious acid, when employed for the devitalization of dental pulps, has been combined with pulverized charcoal, under the impression that the latter prevents the rapid absorption of the arsenic, and thus limits its action mechanically rather than therapeutically.

The creasote (or carbolic acid), employed in combination with the arsenious acid as a nerve paste, obtunds sensibility, acting as a styptic, antiseptic and escharotic; hence some depend upon this agent alone to modify the action of the arsenic, and dispense with the morphine.

Tannic acid and tincture of aconite are sometimes substituted for the morphine and creasote, or carbolic acid, in the preparation of a nerve paste. Arsenious acid is also employed alone, in the form of a dry powder, to devitalize pulps of teeth; but it is not only more painful, but less prompt in its action than when it is combined with other agents. Previous to the application of the arsenical preparation, chloroform, tincture of aconite, sulphate of atropine, cocaine, etc., may be applied to the exposed portion of the pulp, and the painful effect of the arsenic be thus modified. The spray of rhigolene, or absolute ether, has also been employed for this purpose.

The quantity of arsenious acid to be employed for devitalization will depend upon the structure and class of the tooth, varying from the $\frac{1}{100}, \frac{1}{60}, \frac{1}{40}$ to the $\frac{1}{25}$ of a grain; also the length of time the arsenical preparation should remain in the tooth, as the condition of the pulp and tooth, the age of the patient, the quality of the tooth structure and the susceptibility of the patient, should all be considered. While in most cases pulps are readily devitalized by the application of a moderate quantity of the agent, in other cases it appears to be impossible to

accomplish this object without extra measures are resorted to. In teeth of a soft, frail structure, owing to an excess of organic matter, the arsenic is rapidly absorbed; but if, on the other hand, the tooth is of a dense structure, the retention of the arsenical preparation for a much longer time may not be attended with any injurious effects, such as peridental inflammation. From twelve to twenty-four hours are generally required to enable the arsenious acid to properly devitalize the pulp of a tooth; the difference in time depending upon the quantity of the acid employed, as well as upon other circumstances already enumerated. To produce a speedy effect, the pulp should be freely exposed by the careful application of the excavator, and the devitalizing agent applied directly to the exposed surface of the organ. Accuracy as to the quantity of the arsenious acid to be employed may be arrived at by having a grain divided into forty to sixty parts, by weight, in the form of the dry powder. A pellet of cotton, on the end of an excavator, may then be saturated with creasote or carbolic acid or, what may be more painless, oil of cloves, and the desired quantity of the powder, being taken up on the pellet, can be placed directly in contact with the exposed surface of the pulp, and secured in the carious cavity by means of a second pellet of cotton, saturated with either sandarach or shellac varnish, a solution of gutta percha and chloroform, wax of softened gutta percha. To properly secure the arsenical preparation in the cavity of a tooth, a concave disk of thin platinum may be placed over it, and a temporary filling of soft gutta percha introduced into the carious cavity. Many condemn the use of sandarach or other varnish to seal the arsenic into cavities, preferring a filling, such as softened gutta percha, etc., to confine the arsenic more securely.

Dr. Chas. Truman suggests a mixture of iodoform and arsenious acid as a painless devitalizer under all conditions. It is applied as follows: After placing the rubber dam in position, drying cavity, etc., the amount of the arsenious acid it is proposed to employ is placed upon a glass slide and an equal quantity of iodoform, or an excess is added and a paste made

with a five per cent. solution of carbolic acid, and the whole carried to the pulp on a piece of cotton, the size of a pin's head. This is then covered with a gutta percha cap, or one of platinum, and a temporary filling introduced; the latter may consist of softened gutta percha or zinc filling material. Pressure upon the pulp must be avoided.

Some prefer to wound the pulp, so as to draw blood, before the application of the arsenical preparation is made, and thus insure its speedy action. Care is necessary that the arsenic should be completely secured in the carious cavity, and no portion of it come in contact with the parts outside of the tooth. In the case of proximal cavities, a roll of bibulous paper, saturated with sandarach varnish, may be pressed between the teeth, beyond the cavity, and thus prevent the arsenical preparation from coming in contact with the gum and cheek, or gutta percha may be softened and packed against the margin of the gum in such a quantity as will fill the interspace. Failure to observe such precautions may result in violent inflammation involving the alveoli and causing necrosis of the bone. After the devitalization of the pulp has been accomplished, it is necessary that every particle of the arsenic should be removed from the tooth. The effect of permitting the agent to remain in the tooth for a longer time than is necessary for the devitalization of the pulp only, is peridental inflammation. Where several applications of the arsenical preparation fail to produce the desired devitalization, the resistance thus offered to the influence of the agent may be owing to several causes: a granulated, protective covering, which is formed over the surface of the exposed portion of the pulp, which defends it from the action of the arsenic; or, extraordinary vital power in the pulp, which may be due to the peculiar constitution of the patient, who probably would not be as susceptible to the action of arsenic as the majority of persons are, even if it were administered by the mouth.

Such resistance to the action of the devitalizing agent may be overcome either by the removal of the granulated surface where it exists, or, in cases of non-susceptibility, by punctur-

ing the pulp with a pointed instrument, charged with the arsenical preparation; first taking the precaution to obtund the sensibility of the organ by the application of a benumbing agent. The action of arsenic depends upon both local and systemic conditions. When the capillaries of the pulp are congested as a result of the inflammation, the absorption of the agent is prevented or retarded, and it acts chemically upon the superficial tissue of the exposed portion of the pulp and causes pain, rendering it necessary to relieve the congestion before the nerve tissue can be primarily affected. In case of a lymphatic temperament, characterized by low vital power and excess of fluids in the tissues, the arsenic is readily absorbed and devitalization speedily results; whereas in cases where there is great nerve-power or excessive nervous irritability, the susceptibility of the tissues to its influence is very feeble, and the devitalization of the pulp is difficult and sometimes impossible, unless repeated applications are made.

It is not considered advisable to apply arsenious acid to a dental pulp in an acute stage of inflammation, and the method generally pursued in such cases is to remove the loose matter in the cavity, first applying the rubber dam, and relieve the congestion by slightly puncturing the pulp so as to cause a slight hemorrhage. Then apply an anodyne, such as oil of cassia, oil of cloves, eugenol, terpinol, or other agent of like properties. This should be carefully sealed in the cavity, without pressure being made upon the pulp, for from one to three days, according to the degree of inflammation existing in the parts. At the expiration of such time, the dressing is removed, and if the inflammation has subsided, as is shown by the symptoms presented during the period the dressing has remained in the tooth, an application of arsenious acid may be made. Upon the removal of the arsenic, an application of tannin and glycerin should be made in order to harden the devitalized pulp and render its removal easy in the form of an entire mass; then apply some efficient antiseptic dressing to pulp-canal, first washing out with peroxide of hydrogen. The use of dialyzed iron is also recommended, after the re-

moval of the arsenic, as it is not always certain that the latter agent has been carefully applied. The dialyzed iron is introduced into the cavity on a piece of wood. The cavity should be kept free of moisture from the time of the application of the arsenic up to the time of the application of the dialyzed iron.

When arsenious acid is applied to the surface of an exposed pulp, its first effect is stimulating, followed by paralysis of the sensory nerves, a degree of inflammation being excited which depends upon the quantity of arsenious acid employed. After the stimulating effect passes off the arsenic is gradually absorbed and the pulp slowly dies. Too large a quantity of the arsenic will cause violent inflammatory action, increase the congestion and prevent the pulp from absorbing the agent; and experience has shown that recently exposed pulps are more readily devitalized by arsenious acid than those which have been exposed for a considerable time. It is therefore advisable to employ minute quantities of arsenic as a devitalizing agent, and to avoid pressure on the pulp when applying it, so that the pain occasioned by its action may be limited to the space of one hour on an average. The danger of an excess of arsenic passing through the apical foramen of the root to the peridental membrane must always be guarded against by carefully regulating the quantity of the agent; on the other hand all extraneous matters that will interfere with the action and application of the arsenic to the exposed surface of the pulp must be removed or irritation and pain and not devitalization will result. For the application of arsenious acid to the surface of a fractured tooth, where it is difficult to retain it, the filling may be ligatured in place, after being covered with a thin layer of gutta percha. Dr. E. C. Kirk uses for such a purpose surgeon's rubber plaster, carrying it around the tooth.

Arsenious acid is also employed in dental practice to obtund the undue sensitiveness of dentine, but less frequently now than in past years, as its action is due more to devitalizing energy than to a chemical action, such as a true escharotic produces. As it is capable of being absorbed through a con-

siderable thickness of dentine, the result of which would be the death of the pulp, arsenious acid, if it is employed for obtunding the sensibility of the dentine, should be suffered to remain in the tooth but a very short time—from one to three hours—and every particle of it carefully removed. As there are many agents which prove effective for such a purpose, it is much better to refrain from the use of arsenious acid as an obtunder of hyper-sensitive dentine.

When arsenious acid comes in contact with the soft tissues of the mouth, the result of careless application, its irritating effects become apparent in from twelve to twenty-four hours, beginning with a slight soreness and some congestion. Small ulcers then appear which increase in depth but are not attended with much pain, unless the agent penetrates to the periosteum. The parts involved eventually become quite dark in color, and sloughing occurs to some extent. Dr. Faught suggests the following treatment: "Wherever practicable, the soft tissues should be curetted. Scarify freely, and then touch the wound with muriated tincture of iron; then cauterize it with carbolic acid or iodine, and, if need be, stimulate further in a few days with another application of the same."

DENTAL FORMULÆ.

For Devitalizing Pulps of Teeth.

FLAGG.

℞. Acidi arseniosi . . . gr.j
Morphinæ acetatis. . gr.ij
Acidi carbolici . . . gtt.iij. M.
Fiat massa.
SIGNA.—The property quantity to remain 12 to 24 hours.

PIERCE.

℞. Acidi arseniosi . . . gr.x
Morphinæ sulphatis . gr.xx
Creasoti . . . . . q.s.
To make a thick paste.
SIGNA.—To remain 24 hours for adults; 10 hours for children.

GARRETTSON.

℞. Acidi arseniosi,
Morphinæ acetatis . āā gr.x
Creasoti . . . . . q.s.
To make a thick paste.
SIGNA.—To remain 24 hours for adults; 10 hours for children.
If a very irritable condition is present, sulphate of atropia may be substituted for morphia.

HOLLANDER.

℞. Acidi arseniosi . . . gr.xij
Morphinæ acetatis . gr.ij
Olei caryophylli . . gtt.iv
Creasoti . . . . . q.s.
Ut fiat pasta.

℞. Acidi arseniosi . . . gr.v
Acidi tannici . . . . gr.x
Tincturæ aconiti . . . q.s.
To make a thick paste.
SIGNA.—To remain 24 hours.

J. D. WHITE.

℞. Acidi arseniosi . . . gr.ij
Morphinæ sulphatis . gr.j
Creasoti . . . . . q.s. M.
Fiat massa.
SIGNA.—To remain from 12 to 24 hours.

℞. Acidi arseniosi . . . gr.xx
Morphinæ acetatis . gr.x
Creasoti . . . . . q.s.
To make a thick paste.
SIGNA.—To remain 12 to 24 hours for adults; 8 to 10 hours for children.

℞. Acidi arseniosi . . . gr.x
Morphinæ acetatis . . . gr.xl
Creasoti, vel acidi carbolici q.s.
To make a thick paste.
SIGNA.—To remain 12 to 24 hours.

E. C. KIRK.

℞. Acidi arseniosi . . .
Cocaini hydrochloratis āā gr.xx.
Menthol cryst . . . gr.v.
Glycerini . . . enough to make a stiff paste. M.
SIGNA.—Use the desired quantity, and secure it with a lead cap covered with gutta percha.

For Malignant Ulcerations of a Cancerous Character.

℞. Liquoris hydrargyri nitratis . f℥j.
A powerful caustic.
SIGNA.—Applied by means of a camel-hair brush, and the parts then covered with lint.

℞. Acidi arseniosi . . . 1 part.
Cocaini hydrochloras 4 parts.
Lanolin . . . . . 5 parts. M.
SIGNA.—To remain 24 hours.

For Painless Devitalization.

℞. Acidi arseniosi . . . . gr. $\frac{1}{60}$
Olei caryophilli . . . enough to make a paste. M.
Or a pledget of cotton may be saturated with the oil of cloves and the arsenious acid taken up on this and applied to the pulp.

Devitalizing Fibre.

℞. Absorbent cotton . . . (cross cut fine.)
Arsenious acid . . . . gr.v.
Tannic acid . . . . . gr.ij.
Acetate of morphine . . gr.x.
Oily carbolic acid . . . q.s. for a thin paste.
Reduce the cotton by cutting and cross-cutting to a soft fine fuzz, then incorporate it with the above mixture; dry and separate into small pieces for convenient application.

Devitalizing Pulps of Teeth.

DR. A. W. HARLAN.

First apply to point of exposure vinum opii or any anodyne (not carbolic acid) for a minute or two, then use the following:

℞. Acidi arseniosi . . . . ℥j.
Hydrochlorate of cocaine, ℥ij.
Lanolin . . . . . ad.q.s.
To make a stiff paste.
SIGNA.—Apply a small quantity to the exposure on a little square of gummed paper about $\frac{1}{16}$ of an inch in size; this should be covered with a pellet of cotton saturated with liquid vaseline and the cavity filled with soft gutta percha, or paste of oxyphosphate of zinc. This application should remain 48 hours in the case of an adult; 24 hours in case of patient under 21 and more than 12 years of age; and 8 to 12 hours in case of a patient under 12 years of age.

For Destroying and Removing Pulps.

DR. A. W. HARLAN.

℞. Acidi arseniosi . . . . gr.xc;
Cocaini hydrochlor. . gr.x;
Iodoformi . . . . . gr.v to vij
Either oil of cloves, or
oil of cassia . . . . q.s.
To form a stiff paste.

Apply $\frac{1}{60}$ gr. to the pulp and allow it to remain 48 hours. Seal cavity with gutta percha, when the dressing is removed keep cavity dry, and wash it with dialyzed iron, and apply alcoholic solution of tannin. Seal cavity for eight days when the pulp may be removed painlessly. The root may be filled at once.

Tests for Arsenic.—Arsenic, in the solid state, may be detected by its volatility; heated over a spirit-lamp, it passes off in the form of a white vapor, devoid of smell, and is deposited on a cool surface as an amorphous powder, or in octahedral crystals. When arsenic is thrown on burning charcoal, it is deoxidized, and gives out the garlic odor of metallic arsenic. When heated in a glass tube with charcoal or black flux, it sublimes, and condenses in the form of a brilliant steel gray ring or mirror.

The following reagents will detect it when it is in aqueous solution: Sulphuretted hydrogen, or sulphide of ammonium, produces a lemon or yellow sulphide of arsenic; the addition first of ammonia, and then of nitrate of silver, produces a light-yellow arsenite of silver; the addition of potassa, and then of sulphate of copper, produces a light-green arsenite of copper. The most delicate test, however, is that of nascent hydrogen, known as Marsh's Test, which consists of subjecting the arsenic to the action of nascent hydrogen (evolved by the action of diluted sulphuric acid on pure zinc); it is deoxidized, and unites with the hydrogen to form arseniuretted hydrogen gas, which has the odor of garlic, and burns with a bluish-white flame, depositing a black spot of metallic arsenic on the surface of a cold plate held directly in the jet.

Reinsch's Test consists in boiling the suspected material with hydrochloric acid and clean copper foil, when, if any arsenic is present, the copper foil becomes coated with gray metallic arsenic.

COBALT.—*Cobaltum* (*Formula*, Co)—is a metal chiefly found in combination with arsenic, either in the form of the arsenide

(*tin-white cobalt*), or as gray cobalt ore, with sulphur and arsenic. The late Dr. Robert Arthur preferred cobalt as a devitalizing agent to arsenious acid, being of the opinion that less irritation followed its action, and consequently greater immunity from periosteal inflammation. Others, however, do not regard cobalt as being any safer, but, on the other hand, less prompt in its action as a devitalizing agent.

ACIDUM BENZOICUM—BENZOIC ACID.

Formula.— $HC_7H_5O_2$.

Derivation.—Benzoic Acid is obtained from benzoin (a balsamic resin, which exudes from the incised stem of a tree of Sumatra, Java, Borneo and Siam), either by sublimation or by the action of alkalies ; it is also made from hippuric acid. It is in the form of white, feathery crystals, of a silky lustre, a peculiar, agreeable odor, and warm, acidulous taste. While it is sparingly soluble in cold water, it is more soluble in warm or boiling water, and very soluble in alcohol, solutions of potassa, soda, ammonia, lime and concentrated sulphuric and nitric acids. The fixed oils also dissolve it. From solution it crystallizes in transparent prisms. It is also inflammable.

Medical Properties and Action.—Benzoic acid is stimulant, particularly of mucous surfaces, and its vapor causes great irritation of the air passages. It is also antiseptic and expectorant, and some claim that it is a more powerful antiseptic than carbolic acid. Like salicylic and boracic acids, it prevents fermentation and putrefaction and destroys minute organisms. In the system, it is converted into hippuric acid, by the assumption of the elements of glycocoll, and in this form is excreted in the urine ; a large part is excreted by the kidneys, as benzoic acid.

Therapeutic Uses.—Benzoic acid is employed in chronic cystitis, gout, calculous diseases, jaundice, incontinence of urine in children, etc.

Dose.—gr. x.

Dental Uses.—Benzoic acid may be employed as an antiseptic in suppurating and gangrenous conditions of the pulps

of teeth and mucous membrane; also as a local hæmostatic in combination with powdered alum. It forms one of the ingredients of Dr. Chapin A. Harris' Gum Wash.

The tinctures of benzoin are employed in the treatment of unhealthy and sloughing wounds, flabby granulations, foul ulcers, as they destroy the fetor and stimulate to a more healthy growth. In the antiseptic employment of benzoic acid, it may be used as a substitute for boracic and salicylic acids. The addition of borax will increase its solubility in water.

Benzoate of Ammonium—*Ammonii Benzoas*—will dissolve phosphatic calculi, if its use is long continued.

Benzoated Lard, when employed in the preparation of ointments, prevents chemical change, such as rancidity or acridity. It is prepared by digesting, at a moderate heat, ℥ij of powdered benzoin with a pound of lard.

LISTERINE, the formula of which is thyme, eucalyptus, baptisia, gaultheria, and mentha arvensis, in combination, each fluid drachm also containing two grains of benzo-boracic acid, is largely employed as an antiseptic, deodorizer, and disinfectant, in surgical practice, in the form of a lotion, a gargle, a dressing, or an injection. In dental practice, listerine is reliable in carious teeth, ulcerations of mucous membrane, and wounds of the mouth, in the form of a lotion or dressing; for alveolar abscesses, necrosis and caries of maxillary bones, in the form of injections and lotions; after the extraction of teeth, as a mouth wash; and for offensive breath, as a gargle. It may be employed in its full strength, or in various degrees of dilution with water.

For such diseases as diphtheria, catarrh, dysentery, scarlatina, erysipelas, smallpox, different forms of fevers, etc., the dose is one teaspoonful three or more times a day (as indicated).

For Stomatitis of Dentition.

℞. Listerine . . . . . ℥j
Syr. simplicis . . . . ℥vij. M.

℞. Listerine . . . . . ℥j
Glycerine . . . . . ℥ss
Water . . . qs. ad. ℥ij. M.
SIG.—A teaspoonful every two to four hours after nursing or feeding.

or—

For Sore Mouth of Nursing Women.

℞. Listerine
Glycerine . . . . . āā ℥vj
Rose Water . . . . . ℥ijss. M.
SIG.—Use as a mouth-wash.

ACIDUM BORICUM—BORIC ACID—BORACIC ACID.

Formula.—HBO_2.

Derivation.—Boric Acid, formerly called Boracic Acid, is obtained artificially by decomposing a hot saturated solution of borax with sulphuric acid, which unites with the soda to form sulphate of soda, and liberates the acid. It is in the form of white, shining crystals, of a scaly nature. It is soluble in 26 parts of cold water, in three parts of warm water, and feebly soluble in alcohol.

Medical Properties and Action.—Boric acid is antiseptic and deodorant. It destroys minute organisms, and arrests fermentation and putrefactive decomposition, and is said to be as effective an antiseptic, as carbolic acid, and less irritating than salicylic acid.

Therapeutic Uses.—It is locally employed as a dressing for wounds, ulcers, burns, scalds, skin-grafting, etc., as it is non-irritating, and lessens suppuration, and prevents decomposition. Boric acid is employed in all the forms and combinations in which carbolic and salicylic acids are used by the antiseptic method, in the form of a saturated solution.

Boric Lint is made by steeping lint in a saturated solution of boric acid at the boiling point.

Dose.—Of boric acid, gr. viij to xvj. It does not cause any disturbance of the stomach, and is eliminated in the urine.

Boro-glyceride is composed of boric acid 62 parts, and glycerine 92 parts, each gently heated over a water bath and the boric acid gradually added to the glycerine, and the heat continued until 54 parts, or three molecules of water are driven off. It is amber-colored and very friable, and proves to be a valuable antiseptic.

Boro-glyceride has an acid, pungent taste, and an astringent

effect on mucous membranes, and is free from some of the objections to the use of the boric acid powder. (See Glycerine for Glyceroborates of Sodium and Calcium.)

Boric Ointment is composed of boric acid 1 part; paraffin 2 parts; almond oil 2 parts. When used it should be mixed with a little glycerine.

Mel Sodii Boratis—Honey of Borax—is composed of borax, 60 grains; honey, 1 troy ounce.

Dental Uses.—Boric acid may be employed as an antiseptic in all the forms and combinations in which carbolic and salicylic acids are used, and when it is combined with sulphite of soda the compound forms a valuable preparation for bleaching discolored teeth. (See Sulphite of Soda.)

Boric acid, in ten per cent. solution, may be used with benefit in the form of an injection into suppurating cavities. As a mouth-wash and gargle it is employed in a solution composed of twenty grains to the ounce of water. Combined with glycerine in the form of boro-glyceride, a valuable application is secured for antiseptic dressings and injections. One part of boric acid in 130 of water is used as a germicide.

For Alveolar Pyorrhœa.

℞. Creta preparatæ . . ℥j
Acidum boricum . . ℥j. M.

Sig.—Apply this powder to gums about necks of teeth, after all deposits have been thoroughly removed, and aromatic sulphuric acid injected.

For Aphthous Ulcerations of Mouth, Fissured Tongue, Abrasions by Artificial Dentures, etc.

C. N. Peirce.

℞. Acidum boricum . grs. lxiv
Olei gaultheriæ . . . f℥ss
Glycerini . . . . . f℥iv
Alcoholis . . . . . f℥j
Aquæ enough to make four ounces. M.

For Chapped Lips and Abrasions.

℞. Acidum boricum . . . . 2 parts;
Vaselin . . . . . 30 "
Glycerini . . . . . 3 "
Attar of Roses, for perfume, a few drops, if used as a lip salve.

ACIDUM CARBOLICUM—CARBOLIC ACID.

PHENIC ACID; PHENYLIC ALCOHOL; PHENOL.

Formula.—C_6H_5HO.

Derivation.—Carbolic Acid is obtained from coal tar by frac-

tional distillation and subsequent purification, being extracted from that part of the heavy coal-tar oils which distill over between 150° and 200° Centigrade. Specific gravity 1.065.

When pure, it is in the form of colorless acicular, interlacing crystals, which at 95° F. become an oily liquid, possessing a strong odor and taste, closely resembling creasote, having similar characters and properties, although it is a different substance. Much of what is called creasote is nothing but impure carbolic acid (*Acidum Carbolicum Impurum*), combined with two other substances, similar in constitution, and known as *creasole* and *phosole*.

Chemically considered, carbolic acid is an alcohol rather than an acid, and its crystals readily absorb moisture on exposure to the air, and are thus liquefied.

It crystallizes at 70° F., and becomes liquid at from 90° to 95° F., and fuses at 93° to 106°. It is freely soluble in alcohol, ether, chloroform, glycerine and the essential oils. When carbolic acid is liquefied and discolored by exposure, it is difficult to detect it from creasote, as it possesses the same odor, taste, caustic properties, and a like affinity for albumen. Carbolic acid is soluble in from twenty to twenty-three parts of water, the purest being the most soluble. A small quantity of water will convert it into the liquid state, but will not dissolve it. Water dissolves six per cent. of carbolic acid, and five parts dissolve in one part of alcohol; four in one part of ether; three in one part of chloroform; seven in two parts of glycerine, and four in seven parts of olive oil. It is also soluble in carbon disulphide, benzol and fixed and volatile oils. The best quality of carbolic acid contains two per cent. of water, and should be hard and dry, with no odor of creasote nor of volatile sulphur compounds. Crystallized carbolic acid may be dissolved by a small quantity of cologne water; and to prevent recrystallization and prepare it for use (in the form of injections, for example), the bottle containing it should be warmed by immersion in hot water, until it becomes fluid, and about five per cent. of rectified alcohol, or a few drops of glycerine, be added.

The red color which it assumes on exposure is thought to be caused by the ammonia in the air, and also by the presence of copper in the acid, which is affected by the ammonia of the atmosphere.

Medicinal Properties and Action.—Carbolic acid resembles creasote so closely in many of its characters and medicinal properties, that the therapeutic applications are the same in the case of both of these substances. Many, however, consider carbolic acid to be more efficacious in obstinate discharges than creasote; and also less irritating in its crystalline form when applied to very sensitive organs, such as the pulp of a tooth.

In its pure state it is escharotic; when diluted, it is rubefacient, anæsthetic and antiseptic. Internally administered, it is sedative and carminative, possessing the power of allaying vomiting and gastric irritability.

Its powers as an antiseptic and germicide are not now considered to be equal to those of some other substances, such as bichloride of mercury, iodine, iodoform, etc., although it is yet regarded as a useful and important agent. It is irritant to the skin and other tissues, and capable of being absorbed to a dangerous amount. Eisentein regards carbolic acid as an antipyretic as inferior to salicylic acid, and others regard boric acid as possessing equal antiseptic properties. As a local anæsthetic, carbolic acid exerts a very soothing influence upon painful tissues; hence it is beneficial in odontalgia, and for pulp dressing. On account of its solubility, a variety of solutions of special value can be formed with it, which are especially serviceable as antiseptic applications.

The application of large quantites of carbolic acid to an extensive surface is, however, dangerous, as cases of fatal poisoning have resulted by the absorption of this acid; hence, care is necessary in its use as an external application.

Its nauseous odor and taste and its caustic action render it objectionable, unless greatly diluted, for internal administration. To obviate such objections, it is recommended to use it in the form of sulpho-carbolates.

When applied to the skin or to mucous membrane, it produces a burning sensation, of short duration, and the eschar is at first whitish, afterward becoming brown or black, and surrounded by a zone of inflammatory redness; and, notwithstanding its power to coagulate albumen, is rapidly diffused into the blood. Carbolic acid exists in the blood as a carbolate; and the blood itself does not appear to undergo any change in its corpuscular elements. It is in part consumed in the body, and the products of its combustion are excreted in the urine. Solutions of carbolic acid of adequate strength will check suppuration, and correct the fetor of ulcers, etc.

Therapeutic Uses.—Internally, it is employed for nausea and vomiting due to an irritable state of the stomach, in scarlatina, measles and smallpox, pyrosis, etc.; as a gargle in diphtheria; as an inhalation in chronic nasal catarrh, hay asthma, whooping-cough, phthsis, etc.; as an injection in chronic cystitis, primary syphilis, erysipelas, pleuro-pneumonia and uterine diseases; as a lotion in gangrenous and other ill-conditioned ulcers, carbuncle, poisoned wounds, burns, skin diseases, scrofulous ophthalmia and itching of the skin.

Dose.—Of crystallized carbolic acid, gr. ¼ to gr. j, largely diluted. A better form, however, is *one drop* of the crystallized acid, liquefied by heat, in one ounce of mucilage, three times a day. The dose of glycerite of carbolic acid (*Glyceritum Acidi Carbolici*), made by rubbing together ℥ij of carbolic acid with Oss of glycerine, is ♏iv.

The dose of carbolic acid water (*Aqua Acidi Carbolici*), f℥x; of the glycerite, dissolved in distilled water, enough to make the mixture measure a pint, the dose is f℥ss to f℥j.

Impure carbolic acid is employed for disinfectant purposes.

Ointment of carbolic acid (*Unguentum Acidi Carbolici*)—carbolic acid, ℥j; lard, ℥j.

Sulpho-carbolic acid ($HC_6H_5SO_4$) is considered to be a very efficient antiseptic and disinfectant. The addition of acids, particularly sulphuric, to crude carbolic acid of different strengths increases its antiseptic and disinfectant properties, and considerably increases its solubility. Twenty-five per

cent. of crude carbolic acid, mixed with an equal quantity of concentrated crude sulphuric acid, gives the best results, and renders it a cheap and effective disinfectant and sterilizer.

Sulpho-carbolate of zinc ($Zn(C_6H_5SO_4)_2H_2O$) combines the virtues of zinc salts and carbolic acid, and is used internally, in diarrhœa, and externally, in aqueous solution of from three to six grains to the ounce, as a dressing for wounds and ulcers and an injection in gonorrhœa.

Sulpho-carbolates of sodium, potassium, magnesium, calcium, and quinia are employed as antiseptics in cholera and zymotic diseases generally.

Dental Uses.—Carbolic acid being antiseptic, styptic, escharotic, stimulant and sedative, or narcotic, is a valuable agent in dental therapeutics. It has been employed as an application to carious dentine, to obtund sensibility and arrest putrefactive changes in the devitalized structure, and to coagulate the albuminous elements at the end of the dentinal tubuli.

But it is now generally conceded that there are other agents which are more permanent in their action as antiseptics, and hence carbolic acid, it is claimed, should not be introduced into root-canals permanently, as silico-fluoride of sodium, boro-glycerine, oil of cloves, cassia, cinnamon, myrtol, etc., are far more powerful, with better stimulating, antiseptic and disinfectant properties, and do not possess the coagulating property of carbolic acid, nor clog a delicate canal or destroy the tissues to which they are applied. It relieves odontalgia when applied to the surface of an exposed and painful pulp. It is also invaluable in the treatment of alveolar abscess; and in combination with iodine or other agents it is often employed with beneficial effects in the treatment of periodontitis. When employed in the treatment of alveolar abscess, as an antiseptic, although the discharge of pus may be increased for a short time after its application, there is soon manifested a decided diminution in the quantity secreted. When applied to a suppurating pulp it arrests putrefaction, and induces a healthy action without irritation. It is also a valuable antiseptic application in ulcerations of the mucous membrane of

the mouth, gangrenous conditions and mercurial stomatitis; for such purposes being combined with glycerine and other agents. Applied to exposed pulps, it forms, by escharotic action, an eschar, which some regard as conducive to the recovery of the organ, while others regard the quiescent state it produces as an indication of the degeneration of the pulp, and hence prefer to use it in a diluted form, for the same object, objecting to its employment in its pure state, on account of its escharotic or caustic effect.

It is also useful as a styptic in case of superficial hemorrhage from the gums after the extraction of teeth, especially in combination with other agents. A preparation known as *phenol sodique* is often employed for such a purpose.

Oil of cloves, when added to an equal quantity of carbolic acid, will disguise, to some extent, its taste and odor. It can also be perfumed by adding to 1 part of carbolic acid 3 parts of oil of lemon and 100 parts of alcohol (36 degrees). Carbolic acid is also employed to check the hemorrhage resulting from the application of leeches to the mucous membrane of the mouth. When applied to an ulcerated surface, it should be repeated, as pus is formed or fungous growths appear; and having formed an eschar when applied to an exposed pulp, it should not be repeated until the eschar is detached from the surface. It has also been employed in the form of hypodermic injections, for the relief of neuralgia.

Carbolic acid is also useful as a local anæsthetic. Combined with glycerine (1 part to 12 of glycerine), it will stimulate the mucous secretion, and hence has been applied to the palate, in cases of deficiency of this secretion to promote the suction of upper dentures.

When properly diluted with alcohol, it renders soft and spongy gums firmer and less tender.

It will also correct fetor of the breath arising from carious teeth, smoking, etc., acting as a deodorizer.

In all fetid discharges from the mouth, throat, etc., carbolic acid, combined with glycerine or an aqueous solution, may be used with advantage. The pure acid is employed for bathing cav-

ities in teeth, preparatory to the introduction of the filling material, for its effect on sensitive or softened dentine and low organisms, although other agents prove more effective as germicides.

For use as a disinfectant, the form of carbolic acid which contains about ninety-four per cent. of the pure acid and known as "carbolic acid No. 4," is the best, and it may be used as an antiseptic in the following strength; for lotions or sponges, 2½ per cent. in water; for spray or vapor, 5 per cent. in water; for a dressing, 5 per cent. in olive oil. Carbolate of potash (unofficial—Robinson's remedy) is composed of equal parts of carbolic acid and caustic potassa rubbed together; it is employed in pyorrhœa alveolaris and hyper-sensitive dentine. Carbolic acid one-third and potassfusa two-thirds is escharotic, anæsthetic, obtundant and disinfectant; such a combination causes a definite slough, and is useful in suppurating surfaces, sloughing ulcers and dead tissue.

Synthetic Carbolic Acid.—Hitherto all carbolic acid used in medicine has been prepared from coal tar. But such an acid is never quite pure, always containing impurities derived from the coal-tar. Synthetic carbolic acid is produced during the process of sulphonizing benzol and subsequent fusion of the benzol-sulphonate with caustic alkali. The most characteristic difference between it and the acid prepared from coal-tar is the odor, the synthetic acid having a faint "pure" odor not like that of coal-tar, and almost unperceivable in a 5 per cent. aqueous solution, differing in this respect also from the commercial article. Synthetic carbolic acid is in two forms—in a coherent crystalline mass, and in loose crystals. Experiments made by Dr. Ohlmueller, of the German Health Dept., showed that the synthetic acid diminished the life activity of the bacteria experimented on rather less than the older acid, but that the difference was so small that the two kinds might be considered to be practically of the same value. One of the advantages claimed for synthetic carbolic acid is its greater solubility in water, thus enabling the operator to use it in greater strength without diminishing its causticity.

Phenol Sodique (unofficial) is a solution of sodium carbo-

late and is extensively employed in dental practice (See Phenate of Soda). It is composed of pure melted carbolic acid, 5 parts; solution of caustic soda (of a specific gravity of 1.332), 1 part; distilled water, 5 parts. Mix.

DENTAL FORMULÆ.

A Lotion for Soft and Spongy Gums.

℞. Acidi carbolici . . gr.xx
Spiriti rectificati (alcohol) . . . . . ℥ij
Aquæ destillatæ . . ℥vj. M.

It renders the gums less tender and firmer.

An Antiseptic Lotion or Injection.

℞. Acidi carbolici . . . ℥ss
Glycerini . . . . . ℥xv. M.

For alveolar abscess and ulcers of mouth. The glycerine modifies the caustic action of the acid.

A Stimulant and Antiseptic Lotion.

DR. J. STOCKEN.

℞. Acidi carbolici . . ℥j
Glycerini . . . . . ℥iv
Aquæ . . . . . ℥x. M.

Useful in ulceration of the gums and mucous membrane.

For Sensitive Dentine and Alveolar Pyorrhœa.

DR. J. A. ROBINSON.

℞. Acidi carbolici . . (cryst.).
Potasse caustic..āā...partes equal.

Misce, by triturating in a mortar until a crystalline paste is formed.

SIGNA.—Apply on a loosely rolled twist of cotton about neck of tooth, for alveolar pyorrhœa. It is known as the "*Robinson Remedy.*"

For Alveolar Pyorrhœa (Riggs' Disease).

℞. Acidi carbolici . . ♏xxv
Potassii iodidi . . . gr.v
Zinci chloridi . . . gr.xxv
Alcohol absolut . . ♏xxv
Aq. destillatæ . . . ♏x
Ol. menthæ pip . . ♏v.

Misce et filtra.

SIGNA.—As an injection in pockets of gum.

A Disinfectant Mouth Wash.

DR. J. B. PATRICK.

℞. Acidi carbolici (cryst.),
Glycerini,
Aquæ rosæ.....āā..... ℥ij. M.

SIGNA.—Five to eight drops in a wineglass of water.

A Stimulant and Antiseptic Mouth Wash.

℞. Acidi carbolici . . gtt.xx
Glycerini . . . . . ℥iv
Aquæ . . . . . ℥x. M.

SIGNA.—To be used as a gargle.

For Fetid Perspiration.

℞. Acidi carbolici . . . 2 parts
Glycerini . . . . . 3 parts M.

For Parasitic Skin Diseases.

℞. Acidi carbolici . . . ℥j.
Glycerini . . . . . ℥j. M.

Antiseptic Solution for Washing and Spraying Wounds, etc.

℞. Acidi carbolici (cryst.) partem j.
Aquæ . . . . . part. xxiv.

SIGNA.—Dilute the above solution with equal parts of water, which will make it equal to 1 part of the acid to 40 parts of water; for use in disinfecting instruments and sponges.

For Dry Mouth.

H. J. Fish.

℞. Acidi carbolici . . . gtt.x
Glycerini . . . . . ℥j. M.

Signa.—Apply on palate or mouth with a soft brush three times a day.

For Inhalation in Syphilitic Ulcerations.

℞. Acidi carbolici . . . ʒ xxj
Aqua destillatæ . . ʒ iij. M.

Signa.—Inhale the vapor. Antiseptic.

A Stimulant and Antiseptic Injection.

℞. Acidi carbolici . . . 1 part
Glycerini . . . . . 30 parts. M.

Useful as an injection in chronic forms of alveolar abscess.

For Odontalgia.

℞. Acidi carbolici,
Chloroform,
Liquid opii
Vel morphine hydrochloratis . . āā . . ʒ ij
Tincturæ benzoini . . ℥j. M.

Apply to exposed surface of pulp, on cotton.

A Stimulant and Antiseptic Lotion or Injection.

Percy Boulton.

℞. Acidi carbolici . . . ♏ vj
Tincture iodi . . . ♏ xlv
Glycerini . . . . . ℥j
Aquæ destillatæ . . ℥v. M.

For inflamed mucous membrane, and an injection for chronic alveolar abscess; also useful in acute abscess after the use of more powerful escharotic and antiseptic agents.

For Itching of the Skin.

℞. Acidi carbolici . . . ʒ ij
Glycerini . . . . . ℥j
Aquæ rosæ . . . . ℥viij. M.

Signa.—To be applied by means of a sponge.

The following preparation is recommended for the relief of odontalgia, by Dr. K. W. Millican:—

"Melt white wax or spermaceti, two parts, and when melted add carbolic acid crystals, one part, and chloral hydrate crystals, two parts; stir well till dissolved. While still liquid, immerse thin layers of carbolized absorbent cotton-wool, and allow them to dry. When required for use, a small piece may be cut off and slightly warmed, when it can be inserted into the carious cavity of the tooth, where it will solidify."

For Alveolar Pyorrhœa (Riggs' Disease.)

℞. Acidi carbolici . . . ♏ v
Spts. vini rectif. . . ʒ vj
Aq. menthæ pip . . ʒ ij
Ol. anisi . . . . . ♏ j
Ol. cinnamon . . . ♏ ss. M.

Signa.—Apply to gum with camel's-hair brush.

An Antiseptic and Disinfectant Dentifrice.

J. Stocken.

℞. Acidi carbolici . . . ♏ xxx
Pulvis ossis sepiæ . . ʒ ij
Pulvis radicis iridis . ʒ ij
Creta preparatæ . . . ℥iij
Olei caryophylli . . . gtt. iij. M.

For a Carbolized Styptic.

℞. Acidi carbolici . . . x parts
Collodii . . . . . c parts
Acidi tannici . . . . v parts
Acidi benzoici . . . v parts. M.

It coagulates blood and albumen, and cicatrizes the tissues.

For Chilblains.

℞. Acidi carbolici . . . ʒ j
Tincture iodi. . . . . ʒ ij

Acidi tannici . . . . ℥ij
Cereat simplicis . . . ℥iv. M.
Fiat unguentum.

For Odontalgia.

℞. Collodii (flexile) . . . ℥j
Acidi carbolici . . . ℥ij. M.
SIGNA.—Apply to surface of exposed and painful pulp.

For Odontalgia.

℞. Acidi carbolici . . . ℥ij
Morphinæ acetatis . . gr. xx.
SOLVE.—Applied to surface of exposed pulp, on cotton.

Dressing for Root-Canals and Abscesses.

DR. G. V. BLACK.

℞. Acidi carbolici . . . 1 part
Oleum cassiæ . . . . 2 parts
Oleum gaultheriæ . . 3 parts M.

Dressing for Children's Teeth.

DR. L. L. DAVIS.

℞. Acidi carbolici (cryst.) ℥j
Oleum cassiæ . . . . ℥j
Glycerini . . . . . ℥j
Alcoholis . . . . . ℥ij. M.
It quickly relieves pain, and does not nauseate.

ACIDUM CHROMICUM—CHROMIC ACID.

Formula.—CrO_3.

Derivation.—Chromic Acid is obtained in the form of brilliant, deep red, acicular crystals, by the reaction of strong sulphuric acid upon a solution of bichromate of potash. It is deliquescent, and very soluble in water and alcohol, forming an orange-yellow solution.

Medical Properties and Action.—It is a powerful caustic, decomposing the tissues by rapid oxidation; and although it is very slow and gradual in its action, yet it is deeply penetrating and when action ceases, sesquioxide of chromium remains. So destructive is its effect, that small animals are dissolved entirely, bones and all, by it, in fifteen or twenty minutes. On account of its penetrating deeply, without much pain, care is necessary in its use; and when used as a caustic, the surrounding tissues should be well protected. The part on which it acts first becomes yellow, then brown, and ultimately black, and the eschar is detached in from twenty-four to forty-eight hours. It is a powerful oxidizer, and gives up its oxygen readily to organic matter, which it thus dissolves. When in solution, more or less diluted, its action can be modified, according to the effect desired.

Therapeutic Uses.—Chromic acid is not given internally. In the form of paste, or solution with water, it is a valuable

caustic in cancerous and other ulcerations, malignant growths, hemorrhoids, warts, etc. Chromic acid has been employed with good effect in syphilitic sores, cases of secondary syphilis, deep and jagged ulcers of the tongue, and ulceration of inside of the cheek, mucous tubercles and condylomata. It has also been employed in the treatment of granular ophthalmia, uterine hemorrhage, uterine catarrh, etc. It causes less pain than nitric acid and other caustics, and should never be applied to a surface to be cauterized in a layer deeper than a line in thickness. For removal of warts, etc., it is employed in a solution of 100 grains to the ounce of distilled water.

Dental Uses.—In dental practice chromic acid has been employed for obtunding sensitive dentine; but its most valuable application is for the removal of tumors and morbid growths upon the gums, fungous growths of tooth pulp, etc. When applied to any part of the mouth, the surrounding parts should be carefully protected by folds of lint or strips of adhesive plaster. A glass rod, or a gold or platinum wire should be used for its application. It is also useful in ulceration and recession of the gums, beginning the treatment with a weak solution, and gradually increasing the strength. It is sometimes combined with glycerine, in which case the latter must be added to the acid drop by drop, in order to avoid explosion.

DENTAL FORMULA.

For Secondary Syphilitic Ulcers, and Ulceration of Mucous Membrane of Mouth and Tongue.

℞. Acidi chromici . . . . . gr. x
Aquæ . . . . . ℥j.
Misce solut.

SIG.—Paint the diseased parts three or four times a day, with a camel's-hair brush dipped in the solution.

CRESYLIC ACID—ACIDUM CRESYLICUM.

Cresylic Acid is an antiseptic and germicide upon the different kinds of pathogenic organisms. It is a colorless liquid having the odor of creasote. It boils at 203° and is slightly caustic. It is soluble in water, quite soluble in alcohol, glycerine, and

water of ammonia and very soluble in ether. When injected into rabbits it produced toxic symptoms, but to cause death a dose four times greater than that of carbolic acid was required. It has a marked effect in retarding the fermentation of urine and milk. Experiments on cultures of the various pathogenic micro-organisms demonstrated that cresylic acid is a powerful antiseptic and germicide, and quicker in its action than carbolic acid or its congeners.

ACIDUM GALLICUM—GALLIC ACID.

Formula.—$C_7H_6O_5$.

Derivation.—Gallic Acid is obtained from galls by exposing the powder, in water, to the action of the air, at a temperature of between 60° and 70° F., when the acid is deposited in the form of small, silky, almost colorless crystals, possessing a slightly acid and astringent taste. Gallic acid is slightly soluble in cold water, and freely soluble in hot water, glycerine or alcohol.

GALLS, from which gallic acid is prepared, are the excrescences caused by the punctures and deposited ova of a hymenopterous insect on the twigs of the gall oak (*Quercus Infectoria*).

Source.—Galls are obtained from Asia Minor and Persia.

Medical Properties and Action of Galls.—Powerfully astringent, this property depending upon the presence of tannic and gallic acids, as they contain 35 per cent. of tannic and 5 per cent. of gallic acids. The powder, which is obtained from the small, round, dark-blue or lead-colored excrescences, is of a light yellowish-gray color, inodorous and of a bitter taste.

Galls are used in various forms, such as powder, tincture, infusion, ointment, etc.

Therapeutic Uses.—Galls are employed in the treatment of chronic diarrhœa, dysentery, leucorrhœa, chronic gonorrhœa and gleet, diseases of the uterus and intermittent fevers, and externally in hemorrhagic disorders, hemorrhoids, relaxation of uvula, hypertrophy of the tonsils, etc.

Gallic acid is given directly for internal hemorrhage.

Dose.—Of powdered galls, gr. x to gr. xx. The ointment is composed of: powdered galls, gr. lxxx; benzoated lard, ℥j. It is combined with opium in the proportion of ointment of galls, ℥j; powdered opium, gr. xxxij.

Medical Properties and Action.—Gallic acid is a powerful astringent for arresting hemorrhage in which the bleeding vessels must be reached through the circulation. It is also a valuable styptic in cases of hemorrhage depending on a hemorrhagic diathesis, and in the form of a gargle it is very serviceable in acute inflammations of mucous membranes. It is also a strongly deodorizing agent; and, like tannic acid, it is capable of taking oxygen from the globules. Internally employed it produces constipation, which may be prevented by an occasional aperient. Although it is weaker than tannic acid, yet its properties are very similar. It is supposed to be converted into tannic acid in the blood.

Therapeutic Uses.—Gallic acid is employed in the treatment of hemorrhagic diseases, in their chronic stages especially, such as hæmoptysis, hemorrhage from ulcer of the stomach, hæmatemesis and hæmaturia, atonic menorrhagia; also, for the profuse perspirations and excessive expectoration of phthisis, for albuminuria, dyspepsia, chronic diarrhœa and gastric irritation in children, gonorrhœa, gleet, etc.

Dose.—Of gallic acid, gr. ij to gr. v, in pill, every two or three hours.

Glycerite of gallic acid (*Glyceritum Acidi Gallici*), for external use, is composed of gallic acid, ℥j; glycerine, ℥iv.

Ointment of galls (*Unguentum Gallæ*) is composed of galls in fine powder, ℥j; lard, 420 grains.

Dental Uses.—Powdered galls is useful as a styptic in superficial hemorrhages from the gums and mucous membrane; also in inflamed and ulcerated conditions of mucous membrane, and in relaxation of the uvula. Gallic acid, in the form of a gargle, is employed in acute inflammations of mucous membrane, as astringent and antiseptic, and in hemorrhages from mucous surfaces depending upon a hemorrhagic diathesis.

For hemorrhage following the extraction of teeth, Dr. Bar-

tholomew claims that one teaspoonful of gallic acid in a glass of water, internally administered, never fails.

DENTAL FORMULÆ.

For Acute Tonsillitis and Inflammation of the Mucous Membrane of the Mouth.

℞. Acidi gallici . . . . gr.xl
Liq. sodæ chlorinatæ ℥ij
Glycerini . . . . . ʒij
Aquæ destillatæ . . ℥viij M.

SIGNA.—To be used as an antiseptic and astringent gargle.

For Relaxation of Uvula and Hypertrophy of Tonsils.

℞. Infusi gallæ . . . . . ℥vj
Aluminis . . . . . gr.xl. M.

SIGNA.—Use as a gargle.

An Internal Astringent in Hemorrhagic Affections.

℞. Acidi gallici . . . ℥j
Glycerini . . . . ℥iv
Aquæ destillatæ . ℥vj. M.

SIGNA.—Take ℥j as a dose.

An Internal Astringent for Dental Hemorrhage.

OTTO ARNOLD.

℞. Acidi gallici . . . ʒj
Aquæ cinnamon . . ʒij. M.

SIGNA.—A teaspoonful every hour until bleeding is arrested.

For an Astringent Gargle or Lotion.

℞. Pulveris gallæ . . . . . ℥ss
Aquæ . . . . . Oj. M.

SIGNA.—As a gargle or lotion in inflamed or ulcerated condition of mucous membrane and gums.

ACIDUM HYDROBROMICUM—HYDROBROMIC ACID.

Formula.—HBr.

Derivation.—Diluted Hydrobromic Acid is prepared by adding ten per cent. of absolute hydrobromic acid to ninety per cent. of water. It is a clear, colorless liquid, having no odor, but a decidedly acid taste and an acid reaction.

Medical Properties and Therapeutic Uses.—Hydrobromic acid is often substituted for the bromides on account of its possessing many of their properties. It is employed in cerebral disorders from over-exertion, epilepsy, spasmodic cough, angina pectoris, affections of the heart, as it diminishes its action, to relieve the symptoms of quinine, and also of morphine, migraine or sick headache, neuralgia, spasmodic asthma, etc.

Dose.—♏xx to ʒij.

Dental Uses.—Diluted Hydrobromic Acid may be employed in facial neuralgia, infantile convulsions due to teething, and

to lessen the irritability of the fauces when impressions for obturators and artificial palates are being taken.

ACIDUM HYDROCHLORICUM—HYDROCHLORIC ACID.

MURIATIC ACID=ACIDUM MURIATICUM.

Formula.—HCl. Sp. gr. 1.16.

Derivation.—Hydrochloric or Muriatic Acid is obtained by the action of sulphuric acid on a solution of chloride of sodium or common salt. When pure, it is a transparent, colorless liquid, but when contaminated with chlorine, iron and other substances, it has a yellow color. It emits a dense, white vapor, with a pungent odor and a corrosive taste, being an active poison. The antidote is magnesia or soap.

Medical Properties and Action.—The strong acid is a powerful caustic and escharotic; also disinfectant and fumigant, but inferior in its disinfectant properties to those of chlorine. For internal use the dilute acid, which is tonic, refrigerant and astringent, is employed, acidum hydrochloricum dilutum—diluted hydrochloric acid, which is prepared by diluting the strong acid so that four ounces of the acid are contained in a pint of diluted acid. It is of a deep yellow color, and emits the odor of chlorine, which is its principal constituent.

Therapeutic Uses.—The dilute hydrochloric acid is internally employed in the treatment of calculous affections, gout, atonic dyspepsia, typhus and typhoid fevers, continued fevers of childhood, syphilis, chronic whooping cough, phthisis, etc., and externally in diphtheria, ulcerated sore throat, cynanche maligna, etc.

Dose.—Of dilute hydrochloric acid, ℿx to ℿxxx, freely diluted; otherwise, when swallowed, it is highly irritant and corrosive.

Dental Uses.—The strong acid is employed in the dental laboratory for dissolving zinc, in the preparation of flux for soldering certain metals.

The strong acid is also employed as a local application in gangrenous stomatitis or cancrum oris, for arresting the ulcerative process; but care is necessary in its use, on account of its

powerful action, in order to limit its application to the parts on which it is to act. In mild cases it should be diluted with an equal weight of honey.

In aphthous ulcerations of the mouth, in children, it is often a useful application.

DENTAL FORMULÆ.

For Aphthæ.

℞. Acidi hydrochlorici 1 part
Mellis . . . . . 8 parts. M.
SIGNA.—Apply with a camel-hair pencil

For Chronic Inflammation of Mucous Membrane and Gums.

℞. Acidi hydrochlorici
dilut . . . . . ♏x
Infusi cinchonæ . . f℥iv
Mellis . . . . . f℥j. M.
Fiat gargarysma.

For Ulceration of Mucous Membrane.

℞. Acidi hydrochlorici
diluti . . . . . ℥ij
Glycerini . . . . . ℥iv
Aquæ destillatæ . . ℥x. M.
SIGNA.—To be used as a gargle.

For Scorbutic Gums.

℞. Acidi hydrochlorici
dilut . . . . . ℥ss
Mellis,
Aquæ rosæ . āā . . f℥j. M.
SIGNA.—Apply with a camel-hair pencil three or four times a day.

ACIDUM NITRICUM—NITRIC ACID.

AQUA FORTIS.

Formula.—HNO_3. Sp. gr. 1.420.

Derivation.—Nitric acid is obtained by the action of sulphuric acid upon nitrate of potash or soda. When strong and pure it is colorless, but on account of the presence of nitric peroxide it is generally of a yellow color, and emits acrid, corrosive fumes.

Medical Properties and Action.—Pure nitric acid is a powerful caustic and escharotic, and leaves a permanent stain on the cuticle. It is not employed in its concentrated form internally, but externally, as an escharotic to destroy warts and stimulate sluggish sinuses; in a diluted form it is employed as an astringent wash or gargle. The antidotes in cases of poisoning are magnesia or soap, and mucilaginous drinks.

Therapeutic Uses.—The strong acid is employed externally in hospital gangrene, and phagedenic ulcerations; hemorrhoids and painful hemorrhoidal tumors, syphilitic condylomata, syphilitic sore throat, malignant ulcers, obstinate skin diseases, etc.

DILUTED NITRIC ACID.—*Acidum Nitricum Dilutum* contains three ounces of acid in a pint of the diluted acid.

Medical Properties and Action.—It is an antalkaline, alterative, tonic and refrigerant, and has a very direct action on the liver, and if its use is continued for a long time it causes salivation. Like all mineral acids, it injures the teeth; hence, proper care should be taken to prevent such action, such as the use of alkaline gargles before and after taking the acid into the mouth, which should be done through a glass tube or quill. As a tonic it is advantageously employed during convalescence and inflammation, and in cachexia following acute disease or habits of intemperance. It is also employed as an alterative after a long use of mercury, as it increases the strength and improves the tone of the system. It is also valuable as a disinfectant, but inferior to chlorine. It is not as agreeable to the stomach as diluted sulphuric acid.

Therapeutic Uses.—Dilute nitric acid is employed in the treatment of calculous disease, syphilis, chronic hepatitis, chronic diarrhœa, constipation, chronic affections of the spleen, chronic rheumatism, cardialgia, whooping cough, intermittent fevers, etc.

Dose.—Of diluted nitric acid, gtt. ij-xv, three times a day, diluted with water.

Dental Uses.—The strong acid, when mixed with two parts of hydrochloric acid, is a solvent for gold, and is known as *aqua regia.* It is also employed as one of the most effectual caustics in cancrum oris, the constitution being supported and quinine given at the same time; also for malignant ulcers of the mouth, and for devitalizing pulps of teeth when nearly exposed by mechanical abrasion, care being observed that the part of the surface immediately over the pulp is touched with the acid, and the neighboring parts protected.

DENTAL FORMULA.

For Sloughing and Ill-Conditioned Ulcers.

℞. Acidi nitrici . . . . . ♏l-lx.
Aquæ . . . . . Oj. M.

SIGNA.—Apply with a camel-hair brush.

ACIDUM PHOSPHORICUM—PHOSPHORIC ACID.

ACIDUM PHOSPHORICUM DILUTUM—*Diluted Phosphoric Acid*, is the principal form in which phosphoric acid is employed in medicine.

Formula.—H_3PO_4. Sp. gr. 1.056.

Derivation.—Phosphorus, a non-metallic element, obtained from bones, is a translucent, nearly colorless, wax-like solid, without taste, and emitting white vapors when exposed to the air. Sp. gr. 1.8.

It is insoluble in water, but soluble in ether and in hot oil of turpentine, and has a peculiar smell. It is nervine, tonic and stimulant and in over-doses, poisonous. The vapor is irritating to the conjunctiva and bronchial mucous membrane.

Derivation.—Diluted Phosphoric Acid is prepared by boiling phosphorus with nitric acid and distilled water until it is dissolved, evaporating and re-diluting it. It may also be obtained by dissolving an ounce of glacial phosphoric acid in three ounces of distilled water, afterwards adding forty grains of nitric acid, boiling to a syrup, and diluting with water until the solution measures twelve and a half ounces.

Medical Properties and Action.—It is tonic and refrigerant, and, in large doses, is a powerful stimulant to the nervous and vascular systems. It can be detected in the blood, owing to its absorption, and, in large doses, is an irritant poison.

Therapeutic Uses.—Diluted phosphoric acid is employed in scrofula, dropsy, hæmoptysis, calculous disease, diabetes and cardialgia. Externally it has been employed as a local application in the treatment of caries of the bones and osseous tumors.

Dose.—Of dilute phosphoric acid, gtt. ij–xv, diluted in sugar and water.

Dental Uses.—As a local application in the treatment of caries of the maxillary bones and osseous tumors of the jaws. Internally, it has been administered with a view of supplying a deficiency of phosphoric acid in the teeth. (*See Hypophosphites of Lime.*)

DENTAL FORMULÆ.

For Caries of the Maxillary Bones and Osseous Tumors of the Jaw.

℞. Acidi phosphor. dilut. . 1 part
Aquæ destillatæ . 8 to 10 parts. M.
SIGNA.—Apply as a lotion or injection.

For Ulcers over Carious Bones.

℞. Acidi phosphorici glacialis . . . . . ℥j
Aquæ destillatæ . . f℥viij.
Fiat solutio.
SIGNA.—To be applied on compresses to ulcers situated over carious bones.

PHOSPHORIC ACID IN THE ANHYDROUS STATE consists of one equivalent of phosphorus to five equivalents of oxygen (PO_5), and it is obtained by the direct union of its constituents, which takes place when phosphorus is burned in perfectly dry oxygen gas.

Thus procured it is in the form of a white amorphous powder, extremely deliquescent, volatilizable at a red heat, and assumes, when it cools, after fusion, a vitreous appearance.

Glacial Phosphoric Acid, or monohydrated phosphoric acid, is readily obtained from calcined bones, by first heating them with sulphuric acid, which produces an insoluble superphosphate of lime; then dissolving out the latter salt, and saturating it with carbonate of ammonia, which generates phosphate of ammonia in solution, and finally obtaining the phosphate of ammonia by evaporating it to dryness, and then igniting it in a platinum crucible. The ammonia and all of the water, except one equivalent for each equivalent of the acid, are driven off, and the glacial phosphoric acid remains, the formula of which is HO,PO_5, and contains 11.2 per cent. of water. It is a white, transparent fusible solid, generally in the form of sticks, inodorous and sour to the taste. It slowly deliquesces, and is sparingly soluble in water, but freely soluble in alcohol.

Dental Uses.—Glacial phosphoric acid and white oxide of zinc formed into an anhydrate, give the plastic material for filling teeth, known as oxy-phosphate of zinc. The powder or solid portion of this preparation is prepared by packing pure oxide of zinc in a clay crucible and subjecting it to almost a white heat for two hours, when it will have been reduced in bulk fifty per cent. It is then pulverized in a mortar to an almost impalpable powder. The burning of the oxide of zinc

colors it to a light yellow, and it is now in a condition for use, and may be kept in a covered vessel for any length of time.

The liquid portion of this filling material being glacial phosphoric acid, is prepared by dissolving the acid in pure water until a saturated solution is obtained, when it is reduced by boiling in a glass vessel until it is of the consistency of glycerine, in which operation it loses one-third in bulk. It is now ready for use, and must be kept in a close glass-stoppered bottle.

Formula for Fletcher's and Weston's preparations of oxyphosphate of zinc filling materials :—

FLETCHER'S.

Fluid.	*Solid.*
Phosphoric acid.	Basic oxide of zinc.
Phosphate of alumina.	

WESTON'S.

Fluid.	*Solid.*
Phosphoric acid.	Basic oxide of zinc—80 per cent.
(*See Oxide of Zinc.*)	Silicate of alumina—20 " "

Medicated Oxyphosphate Fillings.—Dr. Chas. B. Atkinson claims the following advantages for such filling material:

First.—A remedial agent in constant contact with the walls of the cavity.

Second.—Germicidal action of the filling on the tissue with which it comes in contact.

Third.—A neutral influence resisting solution.

Fourth.—Increased hardness, varying somewhat with the agent used. The medicaments for oxyphosphate fillings are; 1. Creasote and oil of cloves, equal parts; 2. Eugenol; 3. Deliquesced Carbolic acid; 4. Oil of cinnamon; 5. Oil of cloves; 6. Creasote, pure; 7. Creasote, oil of cloves and iodoform; 8. Creolin; 9. Campho-phenique; 10. Potassium chlorate (powdered); 11. Salicylic acid; 12. Camphor (pulverized); 13. Stick sulphur (pulverized); 14. Iodoform; 15. Oil of wintergreen. The first seven have been fairly tested by Dr. Atkinson and were found to be equal in durability, manipulative qualities and time of setting. He employs them also in retaining inlays, in setting retaining-fixtures in pyorrhœa cases, in setting crowns, etc. In capping pulps he always employs

a mixture of oxide of zinc, creasote and oil of cloves, and adds a remedial agent to the oxy-phosphate filling. He employs mostly the first-named on the list. If the medicament is a liquid he adds about an equal quantity of the medicament and phosphoric acid; if a powder, about equal parts of the medicament and oxide. The proportions may be varied as required. The average time of setting is about ten minutes.

ACIDUM SALICYLICUM—SALICYLIC ACID.

Formula.—$HC_7H_5O_3$ or $C_6H_4\{^{OH}_{COOH}\}$.

Derivation.—Salicylic Acid is obtained by combining carbolic acid with caustic soda, and subjecting this compound to dry carbonic acid under the influence of heat, the portion of salicylate of sodium remaining behind after the carbolic acid distills over being saturated, in the form of a hot, aqueous solution, with muriatic acid, which liberates the salicylic acid in small crystals. The crystals are washed, dissolved in hot water, and by re-crystalization, obtained in the form of a powder of a light brown color, which is then bleached until it is quite white; but most of that sold is of a light cream-color, with a reddish tinge. The coloring matter, however, which is present, does not interfere with its efficacy. It has no smell, a slight taste and is soluble in alcohol and ether and in hot water and glycerine. It can also be obtained from salicin, the vegetable principle existing in willow, poplar, etc., and from oil of gaultheria (winter green) and from spiræa ulmariæ (meadow sweet).

Medical Properties and Action.—Salicylic acid is a powerful antiseptic, and is said to be as effective in small quantities as any other antiseptic, in arresting the putrefactive and fermentative process. When properly reduced in strength, it causes no pain or irritation in the parts to which it is applied. It will destroy minute organisms, and a small quantity will arrest vinous fermentation and prevent the decomposition of animal fluids. Although free from any poisonous action when administered in a reasonable quantity, yet in large doses it will cause nausea and vomiting. It is thought to combine with

the soda of the blood, where it is present as a salicylate. It has little or no affinity for cold water, but the addition of certain alkaline salts, such as sodium phosphate, increases its solubility. Combined with sulphite of sodium, which is also antiseptic, and water, a solution is formed which is free from irritating properties, and especially applicable to the treatment of zymotic diseases. Glycerine warmed will dissolve $\frac{1}{50}$ its weight of salicylic acid, and the solution may then be diluted with water to any desirable extent.

Therapeutic Uses.—It is employed in fevers as an antipyretic or febrifuge; also for the same purpose in acute rheumatism, pneumonia, phthisis, diphtheria, etc. Externally it is employed as a disinfectant and deodorizer, many preferring it, on account of its freedom from odor, to carbolic acid. It is also employed as a local application in eczema of the head and face, syphilitic ulcers, and to cancer, gangrenous and sloughing wounds, in the form of powder, and as an ointment for burns.

Salipyrine.—Prof. Dr. von Hosengeil (Bonn, Germany) claims that the action of antipyrine in such cases of influenza which show no rise of temperature is that of a cardiac poison. Salicyl and quinine have also such action. By combining salicylic acid and antipyrine he claims to have found a preparation which he names salipyrine, which has proven itself to be a most excellent specific anti-influenzic remedy in just such cases. The dose he employs is from 15 to 30 grains.

Dose.—Of salicylic acid, gr. x to gr. xx or xxx.

Dental Uses.—Salicylic acid is employed in the treatment of suppurating and gangrenous pulps of teeth, in the form of the dry powder introduced into the pulp canals and permitted to remain for several days. An ethereal solution of salicylic acid, introduced on a small piece of punk, has also been employed for the same purpose, where it is difficult to introduce the dry powder; the ether volatilizes in a few minutes. Salicylic acid is also employed with advantage in inflamed conditions of the mucous membrane of the mouth and gums, and in the treatment of aphthæ, thrush and other ulcers, in the form of a solution. For such purposes its combination with

powdered cassia or cinnamon, equal parts, is recommended, to be applied with a soft brush. Salicylic acid has also been found efficacious in all inflammatory conditions resulting from decayed and dead teeth and roots. It has also been recommended as a dentifrice, in the form of an alcoholic solution of the acid perfumed with oil of gaultheria, but its use for such a purpose is questioned, on account of its softening effect upon the tooth structure. As tannic acid interferes with the action of salicylic acid, these agents should not be used in combination.

DENTAL FORMULÆ.

A Disinfectant Mouth Wash.

℞. Acidi salicylici . . . 1 part
Sodii phosphate . . . 3 parts
Aquæ destillatæ . . . 30 parts. M.

SIGNA.—Use as a gargle.

A Disinfectant and Stimulant Mouth Wash.

℞. Acidi salicylici . . ℥ ij
Spiriti vini rectificati ℥ x. M.

SIGNA.—Use as a gargle.

For Perspiration of Hands and Feet.

℞. Acidi salicylici . . 3 parts
Magnesii silicat . . 87 parts. M.

SIGNA.—Use in the form of a powder.

An Emollient and Antiseptic Gargle.

℞. Acidi salicyli . . ℥ ij
Sodii boratis . . . ℥ iij
Glycerini . . . . ℥ iiss
Aquæ destillatæ . . ℥ iij M.

SIGNA.—Add one or two drachms to half a pint of warm water.

For Warts.

UNNA.

℞. Acidi salicylici . . ℥ iij
Creasoti . . . . . ℥ vj
Ceræ, or Adipis . āā . q.s. to make a firm ointment that will adhere to the skin.

For Burns.

℞. Acidi salicylici . . ℥ j
Olei Olivæ . . . ℥ viij

SIGNA.—Apply as a lotion.

For Alveolar Pyorrhœa.

℞. Acidi salicylici . . . ℥ j
Eucalyptol . . . . ℥ vi. M.

SIGNA.—Apply to pockets by means of cotton or a broach.

ACIDUM SULPHURICUM—SULPHURIC ACID.

OIL OF VITRIOL.

Formula, H_2SO_4. Sp. gr. 1.843.

Derivation.—Sulphuric Acid is obtained by burning sulphur, mixed with one-eighth of its weight of nitre, over a stratum of water contained in a chamber lined with lead. It is a dense, colorless liquid, inodorous, with an acrid taste, oily consistence and very corrosive. On the addition of water, with which it unites in all proportions, there is an evolution of heat. In the

concentrated form it is only used externally as a caustic. Being an acid, corrosive poison, it causes death from asphyxia. The antidote is magnesia or chalk, or solution of soap, and mucilaginous drinks freely administered.

Medical Properties and Action.—It is a powerful escharotic, and when applied to living tissue, the parts first become white, and subsequently a brownish-black color. It is not used internally, on account of its corrosive action. It is considered to be one of the most effective caustics in the bites of rabid animals.

Diluted Sulphuric Acid—*Acidum Sulphuricum Dilutum.*

Derivation.—It is prepared by diluting sulphuric acid f℥vij with distilled water f℥lxxvij, and when the mixture has cooled to 60°, add more water ℥lxxxiiiss. Sp. gr. 1.094.

Medical Properties and Action.—It is refrigerant, astringent and tonic. It is employed as a refrigerant in fevers; as an astringent for arresting hemorrhage and passive mucous discharges; and as a tonic to improve digestion. As it is very injurious to the teeth, the proper precautions should be observed, as in the case of all acids administered as medicines—such as alkaline gargles used before as well as after their introduction in the mouth, and the use of a glass tube or quill.

Therapeutic Uses.—Diluted sulphuric acid is employed as an internal remedy in hemorrhage from the lungs, bowels and uterus, in calculous affections, certain skin diseases, diarrhœa, profuse perspiration of phthisis, in the advanced stages of typhus and typhoid fevers, scarlatina, lead poisoning, etc. Externally as a gargle and wash to ulcers.

Dose.—Of diluted sulphuric acid, ♏v to ♏xx, three times a day, in water.

Aromatic Sulphuric Acid—*Acidum Sulphuricum Aromaticum—Elixir of Vitriol.*

Derivation.—Aromatic sulphuric acid is prepared by mixing sulphuric acid f℥iij, with rectified spirit Oij, and adding cinnamon ℥ij, and ginger ℥i¼. It is a reddish-brown liquid, with an aromatic odor and a pleasant taste.

Medical Properties and Action.—It is tonic and astringent,

and is the most agreeable form of sulphuric acid for internal use.

Therapeutic Uses.—Aromatic sulphuric acid is employed as a substitute for the diluted form in debility with night sweats, loss of appetite during convalescence from fevers, hæmoptysis and other hemorrhages, and epidemic dysentery. Externally it is applied to carious bone, ulcers, in the treatment of pyorrhœa alveolaris, especially where there is necrosis of the alveolar walls, when it is applied on cotton packed in the pockets; also in chronic alveolar abscesses. For such purposes it must be kept in the pockets, sinuses and abscesses for several hours in order to insure its full effects. It is also employed locally in cancrum oris and gangrene of the mouth, and largely diluted, it forms an efficient astringent mouth-wash in simple stomatitis, etc.

Dose.—Of aromatic sulphuric acid, ℥v to ℥xxx, three times a day, in water.

Dental Uses of the Different Forms of Sulphuric Acid.—The concentrated sulphuric acid is employed as a caustic in malignant ulcers, cancrum oris, gangrene, etc., in the form of a paste, made by mixing it with powdered sulphate of sinc. The concentrated sulphuric acid is also used in the dental laboratory, to cleanse metal plates, preparatory to and after soldering, for which purpose it is generally diluted with one-third of water, its action being greater when it is in a warm state. The concentrated acid is also used in combination with nitric acid to reduce hemp paper to pyroxylin, in the preparation of the celluloid base.

The aromatic sulphuric acid is similar in its action to the diluted form, and is more agreeable for use about the mouth.

It is a valuable application in pyorrhœa alveolaris (Riggs' disease), and in caries and necrosis of the maxillary bones, as an injection or lotion, as it stimulates the parts to healthy action by favoring granulation. It may be applied to parts about the teeth, in cases of recession of the gums and absorption of the processes, on a properly-shaped piece of orange wood. It is also valuable in alveolar abscesses as an injection,

especially in sluggish cases, when the addition of a few drops of tincture of capsicum will prove serviceable. It has the power of dissolving the thin, carious portions of the bones, such as the margins of the alveolar cavities, and can be applied on cotton saturated with it and permitted to remain for several hours, when the parts should be perfectly cleansed with warm water. It is also employed as a gargle, properly diluted, in mercurial inflammation of the mouth and other forms of stomatitis, which do not yield to the influence of milder astringent washes. It is also employed in the treatment of aphthæ and other ulcers of the mouth.

Dr. W. H. Atkinson speaks very favorably of the action of aromatic sulphuric acid upon morbid growths and ulcerating surfaces, especially in pockets where the connective tissue has been destroyed and deep chasms exist along the line of teeth, between the cementum and alveolar walls. After drying out such pockets with bibulous paper, drops of sulphuric acid, in full strength, should be dropped into the open mouth of the pocket until it stands full, on a level with the surface of the gum and teeth. This is repeated when the contents of the pocket is absorbed, again and again; after which the mouth is washed with a saturated solution of bicarbonate of soda in distilled water. After drying the pocket with bibulous paper, a paste of tannin and glycerine, smoothly spread upon several folds of the same paper, is laid over the surface, and the patient directed to use hydronaphthol solution as a mouth-wash, frequently during the day. The following day, the pocket is washed out with Chas. Marchand's peroxide of hydrogen, fifteen volume medicinal, until it ceases to bubble; then repeat the application of the aromatic sulphuric acid in the same manner as first described. The hydronaphthol solution should be used frequently, and also a bichloride of mercury solution, three or four times a day, until there is no longer any evidence of pus when the peroxide is injected.

DENTAL FORMULÆ.

For Mercurial and Ulcerative Stomatitis—(THOMAS).

℞. Acidi sulphurici . . . ♏x
Decocti hordei . . . . f℥iv
Mellis . . . . . f℥ss. M.

SIGNA.—Use as a gargle.

For Alveolar Pyorrhœa.

DR. A. W. HARLAN.

℞. Acidi sulphurici . . . ♏xxx
Essence cinnamon. . . ℥ss
Aquæ . . . . . ℥ss. M.

SIGNA.—Inject with a syringe one or two minims in each pocket if they are deep and sinuous, or carious; repeat every 4th day.

For Aphthæ and other Ulcers of Mucous Membrane and Gums.

℞. Acidi sulphurici . . . . f℥ss
Mellis . . . . . f℥j. M.

SIGNA.—To be applied with a camel-hair brush.

For Diarrhœa during Dentition.

If the stools are serous and alkaline.

DR. JAMES W. WHITE.

℞. Acidi sulph. aromat. . . gtt. viij
Spt. vini gallici . . . . f℥ij
Syr. acaciæ . . . . .
Aquæ menth. pip. āā. . f℥ss. M.

SIGNA.—A teaspoonful every two hours in a little water.

For Carious Bone, Riggs' Disease, etc.

℞. Acidi sulphurici aromat . . . . . f℥iii
Tinctura capsici . . . . . gtt.x
Aquæ . . . . . f℥ii. M.

SIGNA.—To be used as an injection or lotion.

ACIDUM SULPHUROSUM—SULPHUROUS ACID.

Formula.—H_2SO_3.

Derivation.—Sulphurous Acid is made by dissolving sulphurous anhydride (SO_2) in water, The latter is made by burning sulphur. It is a colorless liquid, having the suffocating odor of burning sulphur, and a sour, astringent taste.

Medical Properties and Action.—It is a deodorizer and disinfectant, and destructive to micro-organisms, such as bacteria, fungi, etc.

Owing to its affinity for oxygen it acts upon organic matter with great energy.

Therapeutic Uses.—The diluted acid is locally applied to ulcers of the tonsils in diphtheria, syphilitic and tuberculous laryngitis, chilblains, parasitic skin diseases, ill-conditioned, sloughing or gangrenous wounds; also used in pyrosis, indigestion, etc.

Also, in the form of inhalations of the sulphurous-acid gas, in cases of chronic bronchitis, etc. In the form of spray, it is used as a local application in diseases of air passages.

Dose.—Of sulphurous acid, ♏ v to ʒj.

Dental Uses.—Dilute sulphurous acid is efficacious in mercurial stomatitis, aphthæ, and mucous patches, gangrene of the mouth, cancrum oris, ulcers of mucous membrane, and sloughing wounds. It is an efficient and convenient disinfectant.

For Chilblains.

BARTHOLOW.

℞. Acidi sulphurosi . . . ʒiij
Elycecint . . . . . ʒj
Aquæ . . . . . ℥iss. M.
SIGNA.—Apply as a lotion.

For Destroying Parasites in Skin Diseases.

STARTIN.

℞. Acidi sulphurosi, dil. . . ℥ss
Sodii hyposulphitis . . . ℥iij
Aquæ, q. s. ad. . . . . ℥xvj M.
SIGNA.—Apply as a lotion.

ACIDUM TANNICUM—TANNIC ACID.

TANNIN.

Formula.—$C_{27}H_{22}O_{17}$.

Derivation.—Tannic Acid is obtained by exposing powdered galls to a damp atmosphere for several days, when sufficient ether is added to form a soft paste, which is allowed to stand for twenty-four hours. It is then subjected to pressure as quickly as possible, and the mass again treated with ether, to which $\frac{1}{16}$ of its bulk of water has been added; this is allowed to stand as before, and is again subjected to pressure. The expressed liquids are now combined and allowed to evaporate spontaneously; then, by the aid of a little heat, brought to a syrupy consistence, when it is dried on plates in a hot air chamber, at a temperature not exceeding 212° F. Pure tannic acid is solid, uncrystallizable, either white or slightly yellowish, inodorous, astringent to the taste, but without bitterness, and with an acid reaction. It is obtained in the form of vesicular masses, or thin, glistening scales, or in the shape of fine threads of a pseudo-crystalline appearance. Tannic acid exists also in rhatany, catechu, and other vegetable astringents, as it is their chief principle.

Medical Properties and Action.—Tannic acid is considered to be the most active of all vegetable astringents and styptics, and especially powerful on albumen, gelatin and fibrin. It is very soluble in water, and less so in alcohol and ether. Taken

internally, it produces no nausea, is perfectly safe, and its use may be continued for a long time without any ill effects. It may also be administered before and after meals, at all times, and be combined with many other remedies, such as iron, cod-liver oil, bitters, etc. Like gallic acid, it is capable of taking oxygen even from the blood globules, when in contact with alkalies.

Tannic acid is converted into gallic acid in the blood, by absorbing oxygen from the red corpuscles; this absorption does not occur in the stomach.

Tannic acid unites with albumen, fibrin and gelatin, forming insoluble tannates, thus preserving the parts beneath from the influence of irritating agents until resolution occurs.

Its solution reddens litmus paper, and it is decomposed and entirely dissipated when thrown upon red-hot iron.

Therapeutic Uses.—Internally it is administered in hemorrhages of the lungs, stomach, kidneys or uterus, chronic bronchial catarrh, phthisis, after softening has taken place, intermittent fever, whooping cough, chronic diarrhœa, diseases of the genito-urinary organs, dyspepsia, diphtheria, nervous diseases, etc. Externally it is applied to hemorrhages and profuse secretions, mercurial salivation, diseases of the eye, nasal polypus, gonorrhœa and gleet, bed sores, relaxation of uvula, skin diseases, ulcers, etc.

Dose.—Of tannic acid, gr. j to ℈j, in pill.

Dental Uses.—In dental practice tannic acid is a valuable agent for local use in the treatment of such diseases as mercurial stomatitis, ulceration of the gums and mucous membrane of the mouth, hypertrophy of the gums, hemorrhage following the extraction of teeth and wounds of mucous membrane, fungous growth of pulp, sensitive dentine, sponginess of the gums, for the temporary relief of odontalgia, disease of the antrum. In mercurial salivation tannic acid, in the form of powder, moistened with water, will render the spongy gums firmer and more comfortable, causing contraction of the vessels and checking a tendency to absorption and the consequent loosening of the teeth. A strong solution of tannin in

alcohol is beneficial in obtunding the sensitiveness of dentine, or the tannin may be, in the form of a powder, combined with morphine and creasote. Tannic acid, in the form of a paste or ointment, made by rubbing two scruples of tannin with twenty drops of glycerine, and then with an ounce of lard, makes a good astringent application. A gargle composed of tannic acid and glycerine is a useful application for abrasions caused by artificial teeth and other irritants. A preparation known as *Elixir of Vitriol and Tannin*, saturated solution, is a powerful astringent and hæmostatic when applied to bleeding surfaces, fungous growths, etc.

An English preparation known as *Styptic Colloid*, is a saturated solution of tannin and gun cotton, and is highly recommended for its styptic and deodorizing properties, as it solidifies blood and albumen by mere contact, and can be applied directly by means of a camel-hair brush, or, mixed with an equal quantity of ether, in the form of spray. No irritation follows its use, and for hemorrhage from the extraction of teeth, or in the treatment of necrosed or carious maxillary bones, it is very efficient. Cold or warm water will not dissolve it, but an ether and alcohol solution may be used to remove the dressing.

Tannic acid, as an internal remedy, has also been successfully administered for checking hemorrhage after tooth-extraction. Dr. W. L. Roberts says: Tannic acid, administered internally in proper doses, will stop, I believe, any case of such hemorrhage, in from thirty minutes to one and one-half hours' time. He recommends three grains of tannic acid in one-third glass of water, giving as a dose two teaspoonfuls of the solution every five minutes until three doses are taken; then two teaspoonfuls every fifteen minutes if required. Dr. Roberts further says, that such treatment has never failed him.

A styptic and antiseptic cotton can be prepared by saturating purified cotton with tannic acid 5 parts; carbolic acid 4 parts; alcohol 50 parts. The cotton should be dried and preserved air-tight.

Glycerite of tannic acid—*Glyceritum Acidi Tannici*, for external use, is made of tannin, ℥ij ; glycerine, ℥viij.

Ointment of tannic acid—*Unguentum Acidi Tannici*, is made of tannin, ℥j ; lard, ℥j. Useful for a local application to ulcers.

DENTAL FORMULÆ.

For an Astringent Dentifrice.

℞. Acidi tannici . . . . . gr. xxx
Cretæ preparatæ . . . . ℥ij
Pulveris ossis sepiæ . . . ℥ij
Olei caryophylli . . . gtt. iij. M.

For Inflamed Mucous Membrane, Abrasions, Ulcers and Sensitive Dentine.

℞. Acidi tannici . . . . . ℥ij
Tincturæ arnicæ . . . . ℥ij
Tincturæ myrrhæ . . . ℥j. M.
SIGNA.—To be used as a lotion.

For same as above.

℞. Acidi tannici . . . . ℥j to ℥ij
Spiriti rectificati . . . . ℥j
Aquæ destillatæ . . . . ℥x. M.
SIGNA.—To be used as a gargle.

For Inflamed and Ulcerated Mucous Membrane.

℞. Acidi tannici . . . . . ℥ss
Spiriti vini rectificati . . ℥ss
Aquæ camphoræ . . . . f℥v. M.
SIGNA.—To be used as a gargle.

For Inflamed and Ulcerated Gums.

℞. Acidi tannici . . . . . ℥iv
Glycerini . . . . . ℥ij. M.
SIGNA.—To be used as a gargle or mouth-wash.

For same as above.

℞. Acidi tannici . . . . . ℥ij
Tinct. iodinii . . . . . ℈iv
Potassii iodidi . . . . gr. xx
Tinct. myrrhæ . . . . . ℈iv
Aqua rosæ . . . . . f℥viij. M.
SIGNA.—A dessert-spoonful in a wine-glass of water as a mouth-wash or gargle.

For Inflamed Mucous Membrane of Mouth.

℞. Acidi tannici . . . . ℈ij
Pulveris aluminis . . gr.xxx
Aquæ destillatæ . . ℥v. M.
SIGNA.—To be used as a gargle.

For Sensitiveness following the Removal of Salivary Calculus.

COLEMAN.

℞. Acidi tannici . . . ℥ss
Eau de Cologne . . f℥iv. M.
SIGNA.—Add 10 or 12 gtts. of above solution to a teaspoonful of tepid water, and use as a gargle 3 or 4 times a day.

For Loose Teeth and Spongy Gums.

℞. Acidi tannici . . . . ℥jss
Potassii iodidi . . . gr.xii
Tinct. iodi . . . . ℥j
Tinct. myrrhæ . . . ℥j
Aquæ rosæ . . . . ℥vj. M.
Dissolve the tannic acid and iodide of potassium in the rose water and add the tinctures and strain.
SIGNA.—A teaspoonful in a wine-glass of warm water, used every morning as a mouth wash.

For an Astringent Mouth Wash in Inflamed and Ulcerated Conditions of Gum and Mucous Membrane.

℞. Acidi tannici . . . . gr. xx
Tincturæ pyrethri . . ℥iij
Aquæ rosæ . . . ℥vj. M.
SIGNA.—To be used as a gargle.

For Ulcerations and Abrasions.

℞. Acidi tannici . . . . gr. xv
Glycerini . . . . . f℥j. M.
SIGNA.—To be used as a lotion.

For Inflamed Mucous Membrane of Mouth.

℞. Acidi tannici . . . . ℥ss
Sodii boratis . . . . ℥iij
Glycerini . . . . . ℥ij
Aquæ destillatæ . . ℥iv. M.

SIGNA.—Use as a gargle.

For Inflamed Mucous Membrane of Mouth and Fauces.

℞. Acidi tannici . . . . ℥j
Tinctura myrrhæ . . ℥iij
Pulv. acaciæ . . . . ℥ij
Glycerini . . . . . ℥ij
Aq. destil. q.s.ad . . ℥vj. M.

SIGNA.—Use as a gargle.

For Odontalgia.

DRUITT.

℞. Acidi tannici . . . . gr. xx
Gum mastich . . . . gr. x
Spt. æther sulph . . f℥ss. M.

SIGNA.—To be applied to carious cavity, on a pellet of cotton.

For Alveolar Hemorrhage.

℞. Acidi tannici . . . . gr. xl
Liq. plumb. subacet. dilut. . . . . f℥iss
Vin. opii . . . . . f℥ss. M.

SIGNA.—Apply on cotton or lint, or as an injection.

For Chronic Ulcers and Abscesses.

BEREL.

R. Acidi tannici . . . gr. xxxij
Aquæ destillatæ . . f℥viij. M.

SIGNA.—To be used as a lotion.

Astringent and Antiseptic Gargle.

℞. Tannin . . . . . 5 grammes.
Tincture iodine . .
Tincture myrrh . āā 2½ grammes.
Iodide of potassium 1 gramme.
Rose water . . . 180 grammes.
M.

SIGNA.—A teaspooonful in a glass of water.

ACIDUM TARTARICUM—TARTARIC ACID.

Formula.—$H_2C_4H_4O_6$.

Derivation.—Tartaric Acid is obtained from "tartar" (a peculiar substance which concentrates on the inside of wine casks, being deposited during the process of fermentation), or from crude cream of tartar.

It is in the form of white or colorless crystals, irregular, six-sided prisms, and is soluble in water and alcohol, and wholly dissipated by heat.

Medical Properties and Action.—It is refrigerant, and dissolved in water and sweetened, is a good substitute for lemonade.

In large doses it is an irritant poison, and when its internal use is followed by a red and dry tongue, it should be discontinued. It is often administered in the form of effervescing powders.

Therapeutic Uses.—Internally it is employed as a refrigerant in inflammatory and febrile diseases, irritability of the

stomach, nausea and vomiting, dyspepsia, and diseases attended with copious secretion of mucus, dysentery, etc., etc.

Dose.—Of tartaric acid, gr x to gr. xx, dissolved in water and sweetened.

Dental Uses.—In combination with an equal quantity of chloride of lime, it is employed for bleaching discolored teeth.

ACONITUM—ACONITE.

WOLFSBANE, MONKSHOOD.

Source.—Aconite is obtained from the dried, tuberous root of *Aconitum Napellus*, a perennial plant abounding in the mountains of Europe and Asia. The leaves and root are both used, but the latter is the most powerful. The alkaloid *Aconitia* or *Aconitine*, a sedative poison, is obtained from the root, and is externally employed for neuralgic affections, producing a sensation of heat and pricking, succeeded by a feeling of numbness and constriction in the part on which it is rubbed; and very satisfactory results have been obtained from the internal administration of Duquesnel's Aconitia, in neuralgia of the fifth pair of nerves. Another principle of aconite, suggested by Duquesnel, is known as *Napelline*, which is less powerful than aconitia, but possesses important hypnotic properties, and is substituted for opium and chloral, especially in cases of wakefulness and mental excitement during neuralgic attacks.

Medical Properties and Action.—Aconite is a powerful sedative to the nervous system, and reduces the force of the circulation. In large doses it is an active poison, lessening the heart's action, affecting its ganglia and muscle, and paralyzing the muscles of respiration. In moderate doses it produces warmth in the stomach, general warmth of the body, and sometimes nausea, numbness and tingling in the limbs and fingers, muscular weakness, diminished force and frequency of the pulse and diminished respiration. It proves fatal, in poisonous doses, by its powerfully sedative impression on the nervous system, by suspension of the respiratory function and by syncope.

Therapeutic Uses.—Aconite, in the form of an extract prepared from the leaves, and a tincture prepared from the root, is administered in all inflammatory and febrile affections, acute rheumatism, neuralgia, especially in chronic cases of neuralgia, where all the signs of active disease are absent, or have been relieved by other remedies; tetanus, sciatica, diseases of the heart, erysipelas, amenorrhœa, tonsillitis, acute congestion of liver, peritonitis, eruptive fevers, etc., etc. It is contra-indicated in inflammatory conditions of the gastro-intestinal mucous membrane. It is locally applied to painful sprains and bruises, and chronic arthritic swellings.

Dose.—Of the tincture of aconite—*tinctura aconiti*—gtt. j to gtt. v; of the extract of aconite—*extractum aconiti*—gr. j to gr. ij. The tincture of the root is composed of twelve troy-ounces to alcohol Oij. Dose of aconitia, gr. $\frac{1}{240}$.

Dental Uses.—Aconite, in the form of the tincture, is a valuable agent in dental practice. When locally applied it checks inflammation in its early stages, by paralyzing the nerves of the part and lessening the excitement to the local afflux of blood, favoring resolution and limiting the extent of an abscess where pus is already formed. Combined with an equal part of the tincture of iodine, it is a valuable application in the incipient stages of periodontitis, as it relieves the inflammation by retarding the circulation and stimulating lymphatic action. For such purpose the gum or root of the affected tooth should be painted with this combination until it assumes a dark brown color, taking the precaution to first remove all moisture from the surface to which it is to be applied, and after its application, protecting the adjoining parts, such as the lips or cheeks, until the remedy is absorbed. A drop or two of the tincture, introduced into the cavity of an aching tooth, will relieve odontalgia; and the same quantity will subdue the pain which follows the extraction of a tooth, especially when the cause has been the inflammation of the peridental membrane. Tincture of aconite is also serviceable in the conservative treatment of irritated or inflamed pulps of teeth. Combined with an equal quantity of chloroform, it is applied as a local anæsthetic for the extraction of teeth. For

the same purpose it is combined with chloral, pyrethrum, morphia, etc. (See Dental Formulæ.) It is also a useful dressing for the pulp canals of teeth, preventing the formation of inflammatory products. The alkaloid, *aconitia*, is a useful remedy in neuralgia of the fifth pair of nerves. (See Dental Formulæ). Care is necessary in the application of the tincture of aconite to large surfaces, or where the skin is abraded, as dangerous constitutional effects may result. Fifteen drops of the tincture, taken internally, have caused death. The symptoms of poisoning by aconite are as follows: Overpowering sense of fatigue in the lower extremities, great muscular weakness, dimness of vision, with diluted pupils; great dyspnœa, the respirations being short and labored; the pulse at first slow and small, and afterward imperceptible; surface of body; tongue and breath cold; a profuse perspiration; muscles of respiration paralyzed; ceasing of the heart's action. The antidotes are emetics and stimulants—heat, brandy and ammonia; keep flat on back.

DENTAL FORMULÆ.

For Neuralgia.

℞. Pulveris radicis aconiti ℥x
Camphoræ . . . . . ℥ss
Spiriti rectificati . . . q.s.

Moisten the aconite with some of the alcohol and macerate in a close vessel for 3 days, then percolate slowly into a receiver containing the camphor until the product measures half a pint.

SIGNA.—Apply with a camel-hair brush.

For Odontalgia.

℞. Tincturæ aconiti,
Chloroformi . . āā . . f℥iij.
Tinct. capsici . . . . f℥j
Tinct. pyrethri.,
Ol. caryophylli . āā . f℥ss
Gum camph . . . . ℥ss. M.

SIGNA.—To be applied on a pallet of cotton.

A Local Anæsthetic for the Extraction of Teeth.

℞. Tincturæ aconiti . . ℥iss
Pyrethri . . . . . ℥iij
Veratrinæ . . . . . gr.x
Morphinæ sulphas . gr.iv
Spiriti rectificati . . . ℥iv
Chloral hydratis . . . gr.iv M.

Let it stand 4 days and then filter.

SIGNA.—Apply to the gum over root of tooth to be removed for sixty seconds, by means of an applicator.

For a Local Anæsthetic for Extraction of Teeth.

℞. Tinctura aconiti . . . f℥j.
Menthol . . . . . gr.x.
Chloroformi . . . . f℥j. M.

SIGNA.—Apply freely to gum about tooth for several minutes.

For Neuralgia and Rheumatic Pains, Bruises, Etc.

℞. Tincturæ aconiti,
Chloroformi venalis,
Spiriti ammoniæ . āā . f℥ij
Oleo ricini . . . . . ℥i
Linimenti saponis . . f℥j. M.

SIGNA.—To be rubbed on the affected part.

For Neuralgia of Fifth Pair of Nerves.

(For internal use.)

℞. Aconitæ . . . . . gr.$\frac{1}{10}$
Glycerini,
Alcohol . . āā . . . ℥j
Aquæ menthæ pip . . ℥ij. M.

DOSE.—A teaspoonful.

For Neuralgia.

℞. Linimenti aconiti,
Lin. belladonnæ . āā . ℥vij
Chloroformi . . . . ℥ij. M.

SIGNA.—Apply on lint, to the part affected, and cover with a fine piece of sponge saturated with warm water.

For Trigeminal Neuralgia.

℞. Aconitinæ (Duquesnel's) . . . . . gr.$\frac{1}{10}$
Glycerini
Alcohol . . āā . . ℥j
Aquæ menthæ pip . . ℥ij M.

DOSE.—A teaspoonful, slowly and cautiously increased to ⅛.

For Periodontitis.

℞. Tincturæ iodi,
Tincturæ aconiti, . āā ℥ss. M.

SIGNA.—Apply to gum over root of affected tooth *with a camel-hair brush.*

To Abort an Abscess.

DR. GEO. WATT.

℞. Ext. aconiti, fl.
Ext. belladonnæ, fl.
Ext. opii., fl . āā . equal parts. M.

SIG.—Apply with brush as needed to ease pain; also give fluid extract of phytolaccæ internally.

For Odontalgia, Internal Treatment.

DR. DUNOGIER.

℞. Aconitine (crystallized) ¼ milligr.
Gelsemine . . . . . 1 milligr.
Valerianate of quinine . 5 centigr.
For one pill.

M. S.—One to three pills to an adult in the 24 hours.

ÆTHER—ETHER.

ÆTHER SULPHURICUS—SULPHURIC ETHER.

Formula.—$C_4H_{10}O$. Sp. gr.—Of pure ether, .0713: of stronger ether, 0.728; of ordinary officinal ether, 0.750.

Derivation.—Sulphuric Ether is obtained by the distillation of alcohol and sulphuric acid, and is rectified by re-distillation with solution of potassa. The form of sulphuric ether employed for inhalation is still further purified by agitation with water, and it is freed from this and from an excess of alcohol and deleterious acid substances by the action of chloride of lime and freshly calcined lime, when it is known as stronger ether—*Æther Fortior.* Sp. gr. 0.728. Sulphuric ether is a colorless, limpid, volatile and inflammable fluid, with a sweet

odor and a hot, pungent taste; on account of its great volatility, it should be kept securely in ground-glass-stoppered bottles. It usually reddens litmus paper slightly; when it does so strongly, the ether is impure. The impurities, besides acids and fixed substances, are heavy oil of wine, an excess of alcohol and water. Acids being detected by litmus paper, may be removed by agitation with potassa; fixed substances may be removed by evaporating the ether. Some alcohol is always found in ether, and it is only when it is present in too great a quantity that the density of the ether is rendered too high. The quantity of alcohol any preparation of ether may contain, can be determined by agitating it in a minim measure with half its volume of a concentrated solution of chloride of calcium. This will remove the alcohol, and the reduction of the volume of ether when it rises to the surface will indicate the amount of alcohol which has been present. Heavy oil of wine can be detected by the ether becoming milky when mixed with water. Ether boils at 98° F., and a cold of 166° below zero will not freeze it. When kept too long it undergoes decomposition, and is converted in part into acetic acid.

It evaporates so readily and completely in the air as to cause a great degree of cold; hence it has been employed in the form of spray, as a local anæsthetic. It combines with alcohol and chloroform in all proportions, and dissolves in ten times its volume of water.

Medical Properties and Action.—Ether is a diffusible stimulant, antispasmodic, anodyne and anæsthetic. It is administered internally in the form of ether or of Hoffmann's Anodyne, compound spirit of ether—*Spiritus Etheris Compositus* (composed of ether, Oss, ethereal oil, f℥vj, and alcohol, Oj), also, in the form of spirit of nitrous ether, *Spiritus Etheris Nitrosi*, and known as sweet spirit of nitre (a solution of nitrous ether in alcohol).

When ether is taken into the stomach, it causes a cooling sensation, after the subsidence of the burning, which is quickly diffused over the body; increased action of the heart, flushing of face and warmth of surface follow in a few minutes; the

senses are quickly excited; the mind becomes more active, and the phenomena of alcoholic intoxication result, which soon pass away, leaving a feeling of calmness and sleep.

Therapeutic Uses.—Ether is employed internally as an antispasmodic and anodyne, for angina pectoris, hysteria, asthma, flatulence, cramp of stomach and bowels, syncope, epilepsy, hiccough, nervous or hysterical headache. Hoffmann's Anodyne possesses the antispasmonic and stimulating effects of ether, and the anodyne effects of ethereal oil, or oil of wine, and is also carminative.

The Spirit of Nitrous Ether is antispasmodic, diaphoretic, and diuretic, and is employed in febrile affections, dropsies, etc., etc.

Dose—Of ether, f℥ss to f℥j; of Hoffmann's Anodyne, f℥ss to f℥ij, in sweetened water; of spirit of nitrous ether, f℥ss to f℥ss.

Dental Uses.—Ether is employed as a general and local anæsthetic; as a topical anodyne in neuralgia and odontalgia, for which purpose it is generally combined with other agents; in aphthæ and stomatitis; as a counter-irritant, evaporation being prevented.

Sulphuric Ether as an Anæsthetic Agent.—Sulphuric ether is generally considered to be a safer anæsthetic agent than chloroform, as but comparatively few deaths have resulted from its inhalation. The discovery of its anæsthetic properties was first made in 1844, by Dr. Horace Wells, a practicing dentist, of Hartford, Conn.; and Dr. Morton, of Boston, also a dentist, first demonstrated the application of its anæsthetic properties in dentistry and surgery, in 1846.

As the physiological actions of both ether and chloroform are similar, they may be considered as follows: When the vapor of ether or chloroform is inhaled, the first effect is faucial irritation, to a greater or less degree, according to the strength of the agent employed, a feeling of suffocation, with cough, a flow of mucus and the reflex act of swallowing. The desire for air may cause more or less struggling, especially in the case of children. The sensibility of the glottis, however,

is soon relieved, the cough ceases, and the inhalation of the agent proceeds without further resistance.

The primary effect is a general exhilaration; and, in the case of ether especially, it is often one of excitement, which, in the majority of cases, may continue for a short time only, while in other cases, it may, from its duration and violence, give rise to considerable trouble. But, if the inhalation can be continued and this stage of excitement passed over, insensibility soon occurs. The pulse increases in frequency, the respirations become more rapid, and may assume a convulsive character. There is flushing of the face, cerebral intoxication, to a greater or less degree, according to the temperament, such as talking, laughing, singing, crying, etc. In those of a mercurial or hysterical disposition this stage of excitement is more pronounced and persistent, and during its continuance sensibility to pain is considerably diminished, although the sense of touch is still preserved, while those of taste and smell are lost, and complete insensibility soon follows.

When the patient is of a full habit, and in robust health, and the inhalation of the anæsthetic agent has been rapid, the stage of complete insensibility is preceded by a convulsive stage, during which there is rigidity of the voluntary muscles, stertorous breathing and lividity of the face. If the inhalation of the agent be still further continued, the tetanic rigidity of the muscles subsides, the lividity of the face disappears, the breathing becomes quiet, complete muscular relaxation ensues, power of movement is lost, as shown by the arm, when raised, dropping without resistance, and the conjunctiva of the eye, under mechanical irritation, being perfectly insensible to pain. During complete anæsthesia the surface of the face is cool and bathed in abundant perspiration; the countenance is calm, the eyes closed and the pupils somewhat contracted, the respiration easy and the pulse slower. The functions of respiration and circulation continue, all others being suspended. From such a condition the patient will soon emerge, provided the further inhalation of the agent be stopped; on the other hand, if the inhalation be continued, the functions of respiration and circu-

lation will be suspended, and life will end with the cessation of the action of the heart and the respiratory organs. Sudden death from the inhalation of anæsthetic agents is due to paralysis of the cardiac ganglia. When death occurs during the stage of rigidity and stertorous breathing, it is due to tetanic fixation of the respiratory muscles and obstruction of the pulmonary circulation, accumulation of venous blood in the heart and the arrest of the heart's action.

Death may also ensue by paralysis of the respiratory muscles during the stage of complete muscular relaxation; also by paralysis of the heart during complete insensibility, the motor ganglia being paralyzed.

Death may also occur from depression of the functions and the shock of the accident, or of the surgical operation.

Mr. Woodhouse Braine divides anæsthetics into two classes: (1) Those which produce death through the lungs as well as through the heart; this class includes chloroform, bichloride of methylene, dichloride of ethidene, and many others of the chlorine series; (2) those which produce death through the lungs alone, the heart's action continuing for some time after respiration has quite ceased: this class includes ether and nitrous oxide; and he says, that in choosing an anæsthetic three factors are to be considered: (1). The nature of the operation; (2) the amount of insensibility necessary; (3) the length of time during which insensibility has to be kept up; and he sums up as follows: (1) It is well to avoid all anæsthetics which tend to depress the heart's action: (2) for short operations nitrous oxide is the best agent; (3) for long operations, except where it is desirable to avoid hemorrhage, or where the cautery is used, ether answers perfectly; (4) the best time for operating is the early morning; (5) nitrite of amyl is the best cardiac stimulant.

The Administration of Anæsthetics.—To administer ether or chloroform, take a folded piece of lint, of three or four thicknesses, and of a size that can be held conveniently in the hollow of the fingers and palm of the hand; and on it pour the anæsthetic agent—half an ounce of ether or a drachm of

chloroform. Some prefer a large napkin or towel, folded in the form of a cone, with an opening of an inch or an inch and a half at the apex, for the admission of air. The advantage, however, of the lint over the folded napkin is, that by holding the lint in the hand but little evaporation occurs. To give sufficient air to the patient when begining the administration of ether, Dr. D. B. Keefe recommends the use of a large towel, folding it first five times lengthwise, and placing a piece of paper the full length between the outside folds, then roll it up into a cylinder, the size to be governed by the face of the patient: it should be large enough to cover the face, but not too large. This makes a cylinder open at both ends, full size. Then saturate the lower part of the cylinder, that comes against the face with the ether and apply it to the face, and as the other end is open the patient receives considerable air as well as the ether vapor. Before commencing the inhalation, the condition of the pulse should be ascertained by placing the middle finger of the left hand on the left temporal artery, and at the same time endeavor to reassure the patient and allay fear by cheerful words. The clothes should be loose, and artificial teeth, if any are worn, as well as pins, if the habit of keeping them in the mouth is indulged in, should be removed before the administration of the anæsthetic is commenced. The inhalation should be commenced by holding the moistened lint or towel three or four inches from the patient's face, directing him to breathe quite naturally, always remembering that a strong atmosphere in the early stages of the inhalation is dangerous, and carefully watching for coughing or acts of swallowing, when, if any such occur, the lint or towel should be moved further away, and approached again more gradually. If the patient shows no signs of the anæsthetic vapor being too strong, the lint or towel may be gradually brought to within an inch and a half of the patient's mouth and nostrils; and to still more concentrate the atmosphere, if lint is used, the hand holding it may be covered with one fold of an ordinary large napkin, which may hang loose over the mouth and chin, but should be so arranged above that the patient's eyes and forehead may

remain uncovered and visible. The inhalation should be commenced cautiously, by instructing the patient to breathe quite naturally, and to obey any direction to raise the hand or open the eyes.

When the inhalation has fairly commenced, it should be continued until there is no winking when the margins of the eyelids are touched, or the hand cannot be raised, and the limbs are perfectly relaxed, when the patient is ready for the operation; what is termed the "surgical period" having arrived. An inhalation with chloroform generally takes about four minutes; often more; seldom less. With ether, the time required is longer and the quantity of the agent greater.

It should also be remembered that, in summer, chloroform and ether evaporate more readily than in the colder seasons.

The operator should devote his undivided attention to the patient, during the inhalation of anæsthetics. One finger should be kept on the pulse, and the respiration should be carefully noted; for the latter is of more importance than the former, although the pulse is by no means to be neglected. When the patient becomes excited, he should be watched very closely, and if the respiration becomes proportionately quickened, so must the vapor of the anæsthetic be proportionately weakened, by withdrawing the lint or towel slightly from the face.

When the muscles become rigid, and the patient holds his breath and becomes livid, the anæsthetic should be given very weak indeed, as such a state of semi-asphyxiation, due to the suspension of respiration, is often followed by extreme rapidity and depth of respiration, and a dangerous condition is apt to supervene, because anæsthesia is added to asphyxia. The cumulative action of these general anæsthetics should also be remembered, for a state of narcosis frequently intensifies for half a minute or more after the suspension of the administration, which is due to the vapor of the anæsthetic which was in the lungs entering the blood after the administration ceases.

Dr. Buxton points out that even admitting greater danger

from chloroform, its use is indicated in the following circumstances:

a. In protracted operations about the mouth, jaws, nose, or pharynx, which necessitates the mouth and nose being uncovered.

b. All operations needing the employment of the actual cautery, or lighted candles, lamps, etc., in the vicinity of the mouth; ether being highly inflammable, and when mixed with air, detonating, so that the incautious bringing of the apparatus near a light may lead to grave consequences.

c. Persons who are suffering from bronchitis, and those liable to that complaint; the emphysematous (if the condition be very pronounced) and, as a rule, asthmatics bear ether badly, since it creates cough, and may clog the bronchial tubes with a quantity of excessive secretion.

d. In renal disease, when extensive, ether is said to induce suppression of urine; so that if given at all in these cases, it should be with the utmost caution.

e. The vascular excitement to which ether gives rise, contra-indicates its use for persons whose arteries are presumably brittle, etc.

f. In infants and very young children.

g. As ether always provokes coughing and rapid breathing, it should not be used when these are prejudicial to the patient or to the success of the operation.

h. The presence of brain tumors, intestinal obstruction, and cancerous tumors is by some considered contra-indicatory of ether. To these the *Chronicle* adds two other large groups of conditions, viz.: 1st, all cases of brain surgery; 2d, where the circumstances of the patient or the requirements of the operation are such as to demand the securing of perfect rest by the free use of opiates, ether must be avoided on account of its action on the kidneys.

Prof. J. J. Chisholm, of the University of Maryland, gives the following five simple rules for the administration of chloroform, and which will apply to ether also:—

"1. I always, without a single exception, give a strong

drink of whiskey, from one to two ounces, to every adult to whom I intend to administer chloroform. This is done a few minutes before the operation.

"2. Always loose the neck and chest clothing, so as to have no impediment to respiration.

"3. Only administer chloroform in the recumbent posture, with body perfectly horizontal and head on a low pillow, this pillow to be removed as the anæsthesia progresses.

"4. Give chloroform on a thin towel, folded in conical form, with open apex, so that the vapor, before inhalation, will be freely diluted with atmospheric air. In holding this cone over the face of the patient, at some little distance from the nose, place the fingers under the borders of the cone, for the double purpose of allowing the air to enter freely, and also to prevent the chloroform liquid on the towel from coming in contact with the skin of the patient's face, and thereby avoid its blistering effects.

"5. Should loud snoring occur, force up the chin. This manipulation, by straightening the air passages from the nose to the larynx, makes easy breathing. The forcible elevation of the chin is far better in every respect than pulling out the tongue. It is easier of application, more quickly done, requires no instrument, and is much more efficient in removing the impediment to respiration.

"While operating, I have constantly in view both the color of the face and the respiration of the patient, which I consider even more important for the surgeon to observe than to feel the pulse." (See "Chloroform" for further directions and precautions to be observed during the administration of this agent.)

Dr. H. A. Hare states that if during anæsthesia, respiration stops, he has found that in a large number of instances, both in man and in the lower animals, the free use of ether poured upon the belly causes so great a shock, by the cold produced by its evaporation, as to cause a very deep inspiration, which is often followed by the normal respiratory movements.

Dr. H. I. Neilson gives the following conclusions concerning the pupil as a guide in the administration of chloroform:

1. The first effect of chloroform narcosis on the pupils consists in a dilatation which varies in intensity and duration in different individuals. As the anæsthesia becomes more profound the pupils begin to contract and finally become very small and immovable. If now the chloroform is pushed still further, a sudden dilatation occurs, which is the result of asphyxia, from which the patient seldom recovers.

2. As long as the pupil is observed to dilate in response to sensory stimuli, such as pinching the skin, the anæsthesia is not yet sufficient to allow the commencement of the operation.

3. As soon as the pupil becomes strongly contracted and immovable, the administration of the anæsthetic must be suspended until a commencing dilatation is observed, and the patient must be held at just this point as long as the operation continues.

4. Vomiting causes a dilatation similar to that occurring as the patient emerges from the narcotic condition, but it is usually more sudden in the former case. The contraction of the pupils does not appear to begin until the blood-pressure is somewhat reduced, and the dilatation proceeds *pari passu* with the increase in the blood-pressure. He therefore regards the appearance of the pupil as a very reliable guide for the administration of chloroform, as he is enabled to judge accurately concerning the condition of the patient.

When ether or chloroform is administered for the extraction of teeth, the operation should be performed in a dental chair so constructed as to admit of the patient being placed in as horizontal a position as is possible to operate successfully, and every instrument it is necessary to use should be within reach of the hand of the operator. As soon as the operation is completed the head of the patient should be gently inclined to the side, so as to permit the blood to run from the mouth and not pass down the throat. Any considerable change in the position of the patient should be avoided until recovery has taken place. Fresh air should be admitted by lowering the window, and the patient freely supplied with it by means of a fan.

M. Paul Bert instituted experiments with mixtures of ether, chloroform and air, or nitrous oxide and air, or nitrous oxide and oxygen, under pressure, which he claimed diminished the danger without lessening the advantages of the anæsthetic. A proportion of eight per cent., after six or seven minutes, sufficed to induce and maintain a state of surgical coma for fifteen to thirty minutes, and the symptoms of the stage of exhilaration were much less marked than usual. He also claimed that there is an absence of the feeling of suffocation common to the old method; that the face retains its natural color; that respiration is regular, but somewhat quickened and sometimes snoring; that the pulse shows no marked disturbance; that the buccal secretion is scanty; that the patient is spared violent coughing, which often seems to initiate the after vomiting; that the return to consciousness from complete anæsthesia takes from eight to ten minutes; that the quantity of chloroform used is small—in one case, where the anæsthesia lasted half an hour, it was only five grammes; that by means of the apparatus used the patient escapes any local irritation of the skin, and the operator does not receive the fumes of the drug in his face. The appliance used in Bert's method is the invention of Dr. H. Martin for analyzing the gases of respiration, and consists of a pair of reservoirs connected with a caoutchouc mouth-piece, and containing the required mixture of air and chloroform. By a special contrivance a constant supply of the anæsthetic is maintained, to make up for the loss by inhalation, and the pressure within the reservoirs remains, under all circumstances, equal to that of the surrounding air; and the respiratory movements can be accurately watched by means of a water manometer and scale affixed to the instrument. In operations on the mouth, anæsthesia is first produced by the aid of the mouth-piece, and afterward kept up by an occasional jet of the mixed vapor sent into the back of the mouth.

Some eminent surgeons, however, among the number Messrs. Gosselin and Richet, consider Bert's method a dangerous one, and the latter states of the cases at the St. Louis

Hospital, Paris, which he witnessed, one in three was accompanied with vomiting, discomfort, and, on one occasion, with great excitement.

What has been styled "vitalized air," is the vapor from a mixture composed of equal parts of chloroform and alcohol combined with the nitrous oxide gas. The vapor from two or three drops of the chloroform and alcohol mixture is used with each gallon of gas, the anæsthetic effect of which, it is claimed, is more lasting, and at the same time less dangerous, than from either of the two agents alone. An apparatus for combining these two agents is in use, which is attached to the gas cylinder, in place of the ordinary connection.

The administration of anæsthetics through the nose has been suggested by Dr. B. C. A. Windle, of England, a peculiar instrument being employed for pumping the vapor of the anæsthetic through a tube which passes into one nostril; wings, to close the outer surface of the nostril containing the tube and the opposite surface of the septum nasi, are attached to the tube, so that air may pass through the passage unoccluded by the tube. The inventor of this method claims that by its use perfect anæsthesia can be maintained throughout an operation about the face, of any length, without interfering with the operator's actions; also, that in operations about the mouth and palate the patient can be maintained at that point of anæsthesia which may be considered desirable, and that the supply can be regulated.

Dr. Axel Yversen, of Copenhagen, suggested etherization by the rectum, the vapor being conducted to the rectum by a rubber tube (attached to a bottle containing the ether, in a water bath of 120°), terminating in a recurrent catheter, the free or recurrent end being closed by pressure of the thumb during the inflation of the bowel; the expiratory act being performed by removing this pressure and the water bath. The principal advantage this method appears to possess is that it permits operations on the face without the ordinary obstacles of the common method.

THE DANGERS OF ANÆSTHESIA.—The conditions rendering

general anæsthetics dangerous are fatty degeneration of the heart (a prominent contra-indication); previous alcoholic habits; brain tumors and degenerations; respiratory obstruction from swollen epiglottis, enlarged tonsils, œdema glottidis, laryngeal paralysis, thoracic tumors or aneurism; emphysema and obstructed pulse circulation from engorgement of right heart and deficient heart power; valvular lesions; incomplete anæsthesia during painful surgical operations, causing death from shock, as the result of peripheral irritation. Muscular debility and weakness from exhaustion, if otherwise uncomplicated, are considered to be rather aids to anæsthesia than contra-indications.

Preventive Measures Against the Dangers of Anæsthesia.—A thorough examination for sources of danger should always be made previous to the administration of the anæsthetic. An anæsthetic should never be administered on a full stomach, as an anæsthesia of the glottis prevents the expulsion of vomited matter from the larynx, in case it enters by regurgitation. An anæsthetic should never be administered after long fasting, as absence of nutrition may tend toward cardiac paralysis. One or two ounces of whiskey should be administered immediately before the operation. All excitement should be avoided, to the patient, from fear, sight of instruments, too many spectators, etc., all of which tend to induce shock. All appliances for resuscitation should be at hand, and plenty of fresh air be available during the inhalation. In using chloroform mix only three and a half per cent. of the vapor with air, to ensure safety. In the administration of ether the respirations, according to some authorities, alone need be watched; in chloroform, however, both the respirations and the pulse should be carefully noted.

Treatment of Dangerous Symptoms of Anæsthesia.—The suspension of the heart's action necessitates the immediate withdrawal of the vapor and the immediate *inversion* of the patient, according to Nélaton's method. The failure of respiration necessitates the forcing up of the chin, or the forcible drawing out of the tongue to lift the epiglottis; the practice of

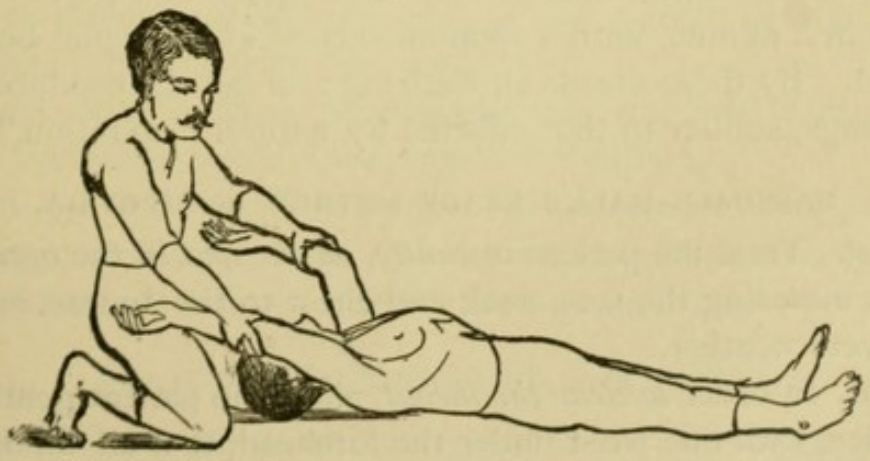
artificial respiration by the Sylvester method, and by faradization of the respiratory muscles; the inhalation of gtt. iij to gtt. iv of nitrite of amyl; ammonia to the nostrils; galvanism (the positive pole being placed to the nostril, and the negative pole over the diaphragm, to excite a reflex action between the fifth pair and the pneumo-gastric, or the poles may be placed directly over both phrenic nerves, on a line with the fourth cervical vertebra, in order to stimulate respirations; or one pole may be placed over the upper dorsal spinous process, and the other pole over the apex of the heart, to induce cardiac contraction). Artificial warmth should be applied, but no cold applications.

The inversion of the body, according to Nélaton's method, and artificial respiration, according to Sylvester's method or Marshall Hall's ready method, or Howard's method, are safe and are the most promising expedients. A simple method of producing artificial respiration is as follows :—

"With outspread palms, press the front of the chest forcibly down, whilst an assistant at the same time presses the abdomen. Make these movements not oftener than fifteen times in the minute."

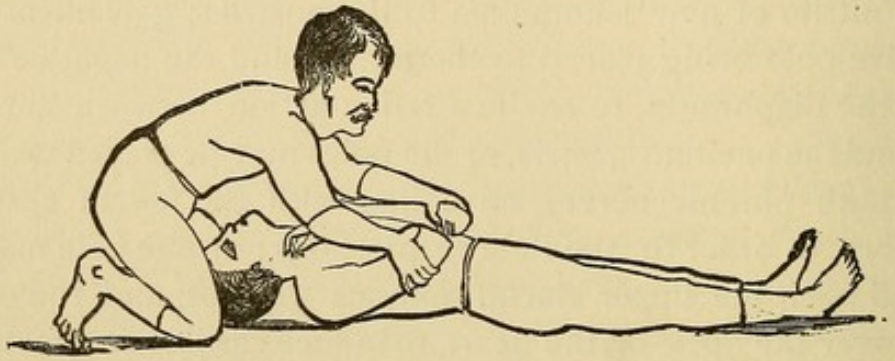
DR. H. R. SYLVESTER'S METHOD OF RESUSCITATION.

"*To Adjust the Patient's Position.*—Place the patient on his back, on a flat surface; raise and support the head and shoulders on a small, firm cushion, or folded article of dress, placed



under the shoulder-blades; remove all tight clothing about the neck and chest.

"*To Maintain a Free Entrance of Air into the Windpipe.*— Cleanse the mouth and nostrils; open the mouth; draw forward



the patient's tongue, and keep it forward; an elastic band over the tongue and under the chin will answer the purpose.

"*To Imitate the Movements of Breathing:*—

"*First, Induce Inspiration* Place yourself at the head of the patient; grasp his arms; raise them upward by the sides of his head; stretch them steadily but gently, upward and backward, for two seconds. By this means fresh air is drawn into the lungs, by raising the ribs.

"*Secondly, Induce Expiration.* Immediately turn down the patient's arms, and press them firmly, but gently, downward against the sides of his chest, for two seconds. By this means foul air is expelled from the lungs, by depressing the ribs.

"*Thirdly, continue these Movements.* Repeat these movements alternately, deliberately and perseveringly, fifteen times in a minute, until a spontaneous effort to respire be perceived. By these means an exchange of air is produced in the lungs, similar to that effected by natural respiration."

MARSHALL HALL'S READY METHOD IN ASPHYXIA.

"1st. Treat the patient *instantly, on the spot,* in the *open air,* freely exposing the face, neck and chest to the breeze, except in severe weather.

"2d. In order *to clear the throat,* place the patient gently on the face, with one wrist under the forehead, that all fluid, and the tongue itself, may fall forward, and leave the entrance into the windpipe free.

"3d. *To excite respiration*, turn the patient slightly on his side, and apply some irritating or stimulating agent to the nostrils, as *Veratrine*, *dilute Ammonia*, etc.

"4th. Make the face warm by brisk friction; then dash cold water upon it.

"5th. If not successful, lose no time; but, *to imitate respiration*, place the patient on his face, and turn the body gently, but completely, *on the side and a little beyond;* then again on the face, and so on, alternately. Repeat these movements deliberately and perseveringly, *fifteen times only* in a minute. (When the patient lies on the thorax, this cavity is *compressed* by the weight of the body, and *ex*piration takes place. When he is turned on the side, this pressure is removed, and *in*spiration occurs.)

"6th. When the prone position is resumed, make a uniform and efficient pressure *along the spine*, removing the pressure immediately before rotation on the side. (The pressure augments the *ex*piration; the rotation commences *in*spiration.) Continue these measures.

"7th. Rub the limbs *upward*, with *firm pressure* and with *energy*. (The object being to aid the return of venous blood to the heart.)

"8th. Substitute for the patient's wet clothing, if possible, such other covering as can be instantly procured, each bystander supplying a coat or cloak, etc. Meantime, and from time to time, *to excite inspiration*, let the surface of the body be *slapped* briskly with the hand.

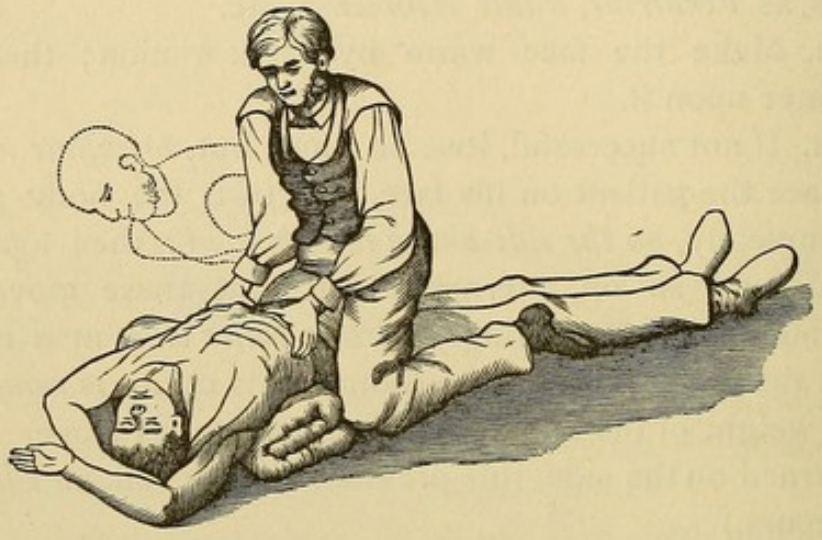
"9th. Rub the body briskly till it is dry and warm, then dash *cold* water upon it, and repeat the rubbing.

"AVOID the immediate removal of the patient, as it involves a *dangerous loss of time;* also the use of bellows, or any *forcing* instrument; also the *warm bath*, and *all rough treatment*."

DR. HOWARD'S METHOD OF RESUCITATION.

One of the most efficient, as well as the most recent method, is that of Dr. Howard for performing artificial respiration.

Position of Patient.—Face upward, a hard roll of clothing beneath the thorax, with shoulders slightly declining over it.



(One twist of handkerchief around the crossed wrists will keep them there.) Rip or strip clothing from waist and neck.

Position of Operator.—Kneel astride the patient's hips; place your hands upon his chest, so that the ball of each thumb and little finger rests upon the inner margin of the free border of the costal cartilages, the tip of each thumb near or upon the xiphoid cartilage, the fingers fitting in the corresponding intercostal spaces. Fix your elbows firmly, making them even with your sides and hips; then—

Action of Operator.—Pressing upward and inward toward the diaphragm, use your knees as a pivot, and throw your weight slowly forward two or three seconds until your face almost touches that of the patient, ending with a sharp push, which helps to jerk you back to your erect kneeling position. Rest three seconds, then repeat this bellows-blowing movement as before, continuing it at the rate of seven to ten times a minute, taking the utmost care on the occurrence of a natural gasp, gently to aid and deepen it into a longer breath until respiration becomes natural. When practicable, have the tongue held firmly out of one corner of the mouth with thumb and finger armed with a dry cotton rag.

Very frequently during the early stages of the administration of an anæsthetic the patient may "forget to breathe,"

even before the ability to perceive peripheral irritation is lost. Even later in the anæsthesia, when the breathing suddenly ceases, instead of using cold water externally and slapping the patient with wet towels, Dr. H. A. Hare recommends pouring a quantity of ether upon the belly, the shock caused by the cold produced by its evaporation bringing on a very deep inspiration, followed often by the normal respiratory movements.

LOCAL ANÆSTHESIA.—The fatality attending the use of general anæsthetics led to the introduction of what are termed "local anæsthetics," some of which depend upon the therapeutic property of cold, which is properly an anæsthetic only when it freezes the part to which it is applied. The use of cold for such a purpose must necessarily be limited to small parts of the body, and its utility depends upon the ease and rapidity with which a desired spot of living flesh can be frozen, in other words, temporarily deprived of its vitality, without inflicting mechanical injury on the delicate structure of the part.

According to Dr. Richardson, the proposer of the method, the principle consists in directing on the part of the body a volatile liquid, having a boiling point at or below blood heat, in a state of fine subdivision or spray, such subdivision being produced by the action of air or other gaseous substance on the volatile liquid to be dispersed. When it falls on a part of the body, it comes with force into the most minute contact with the surface upon which it strikes.

As a result, there is rapid evaporation of the volatile fluid, and so great an evolution of heat force from the surface of the part to which the spray is applied, that the blood cannot supply the equivalent loss. The part consequently dies for the moment, and is insensible; but as the power of the body is unaffected, the blood, as soon as the external reducing agency is withdrawn, quickly makes its way again through the dead parts, and restoration rapidly occurs.

The fluids used are ether, of a specific gravity not exceeding 0.723, highly rectified, and as free as is possible from either alcohol or water—what is known as "absolute ether"—and

rhigolene, a product of petroleum, and the lightest liquid known, and bromide of ethyl.

When a current of the volatile liquid, either atomized ether or rhigolene, comes in contact with the skin by the use of the spray apparatus, an intense degree of cold is produced, which deprives the nerves of the part of their power to transmit impressions to the sensorium. For the extraction of teeth, destruction of the pulps of teeth, opening abscesses, and other minor surgical operations, and neuralgia of superficial nerves, success has attended the use of such local anæsthetics. The greatest objections to such a method of inducing local anæsthesia, are the great pain which attends the first application, and the unpleasant burning sensation of the part when it is recovering from the freezing process. (See Rhigolene.) (See Aconite, for obtunding mixture.)

Liquefied chloride of methyl dissolved in ether and carefully applied by means of a hair pencil, is recommended for the painless extraction of teeth, the opening of alveolar abcesses, etc., etc. (See Cocaine as a local anæsthetic.)

A plan of local anæsthesia, known as *Voltaic Narcotism*, has been suggested by Dr. Richardson, of London. It consists in passing a galvanic current through a narcotic solution held in contact with the part to be operated upon. This plan appears to be successful only where the cavity of the tooth to be extracted is exposed.

Electro-magnetism has also been employed as a local anæsthetic, and it is a mooted question whether it relieves pain or complicates the sensations. It is well, however, to remember that some persons are so peculiarly constituted as to render them very susceptible to the influence of electricity. Dr. Scott describes his method of applying electricity for the extraction of teeth as follows: "Use a Kidder electro-magnetic machine, or any other giving very rapid vibrations of armature. Place the positive electrode on the gum of the tooth to be extracted, and the negative in the patient's hand, or at the back of the neck. Start with a light current and gradually increase the strength as much as can be borne without pro-

ducing pain. The electrode applied to the tooth should embrace each side, the better to convey the current. For this purpose it should be bifurcated at the end of the handle, the arms of sufficient length for convenience in operating. At the end of these solder small disks about the size of a dime. The handle and arms must be insulated to prevent the current passing off at any other point than the disks. Cover the disks with thin pads of fine sponge. A cylinder electrode, also covered with fine sponge or cloth is the proper one for the hand. Moisten each with saline water. Another method is to attach one pole of the battery to the extracting forceps, the handles of which are well insulated, the other pole being held in the hands of the patient. As soon as the forceps come in contact with the tissues about the tooth the circuit is completed, and the electrical effect produced, which is often painful. A Committee of the College of Dentists, England, in a recent report upon the anæsthetic value of electricity, were unanimous that in no case was local anæsthesia produced by such currents, but that the effects were due to "diversion of sensation, less difficulty of extraction as compared with other extractions, syncope more or less marked, and differences in methods of operating." (See Electricity as a Therapeutic Means, etc.)

Obtunding mixtures, consisting of a combination of cocaine, pyrethrum, aconite, chloral, veratria and alcohol, or chloroform, aconite, belladonna, opium and carbolic acid, etc., have been employed to produce local anæsthesia, and in many cases with satisfactory results. (See recipes for obtunding mixtures and local anæsthetics). For, although entire insensibility to pain cannot in all cases be brought about, yet some diminution of it may be effected by the use of such agents. They have the merit, at least, of being less dangerous than the general anæsthetics. Such pain obtunding mixtures are best applied to the parts about the neck and over the root of a tooth by means of a simple apparatus, devised by Von Bonhorst. It consists of two small metallic cups, attached to the free ends of a spring some seven inches long, and which contain sponges to hold the liquid. When used, the sponges in the

cup are saturated with the obtunding mixture and applied by pressing them on the gum on each side of the tooth to be removed, where they are retained from one-half to two minutes. Previous to the application the patient should be cautioned against swallowing any portion of the mixture. (See Cocaine, hyperdermic use of.)

Rapid Breathing as a Pain Obtunder.—A method first suggested by Dr. W. G. A. Bonwell, and from which he claims a similar effect to that of ether, chloroform and nitrous-oxide gas in their primary stages, and to render the patient sufficiently unconscious to any acute pain from any operation, where the time consumed is not over from twenty to thirty seconds. "While the special senses are in partial action, the sense of pain is obliterated and, in many cases, completely annulled, consciousness and general sensibility being preserved." "To accomplish this, each patient must be instructed how to act and what to expect. As simple as it may seem, there is a proper and consistent plan to enable you to reach full success. Before the patient commences to inhale he is informed of the fact that while he will be unconscious of pain, he will know full or partially well any touch upon his person; that the inhalation must be vigorously kept up during the whole operation, without for an instant stopping; that the more energetically and steadily he breathes, the more perfect the effect. It is obligatory to do so, on account of its evanescent effects, which demand that the patient be pushed by the operator over energetic appeals to 'go on.' It is very difficult for any one to respire over one hundred times to the minute, as he will become by that time so exhausted as not to be able to breathe at all. For the next minute following the completion of the operation, the subject will not breathe more than once or twice. Very few have force enough left to raise hand or foot. The voluntary muscles have nearly all been subjugated and overcome by the undue effort at forced inhalation of one hundred and seventeen, the normal standard.

"The heart's action is not increased more than from seventy (the average) to eighty and sometimes ninety, but is much

enfeebled, or throwing a lesser quantity of blood. The face becomes suffused, as in blowing a fire or in stooping, which continues until the breathing is suspended, when the face becomes paler. (Have not noticed any purple, as from asphyxia by a deprivation of oxygen.) The vision becomes darkened, and a giddiness soon appears. The voluntary muscles farthest from the heart seem first to be affected, and the feet and hands, particularly the latter, have a numbness at their extremities, which increases until, in many cases, there is partial paralysis as far as the elbow, while the limbs become fixed. The hands are so thoroughly affected, that when open the patient is powerless to close them and *vice versa*. There is a vacant gaze from the eyes, and a looking into space without blinking of the eyelids for a minute or more. The head seems incapable of being held erect, and there is no movement of the arms or legs, as is usual when in great pain. There is no disposition on the part of the patient to take hold of the operator's hand or interfere with the operation." Dr. Bonwell bases his method on the following theory:—

1. Diversion of the will-force in the act of forced respiration at a moment when the heart and lungs have been in normal reciprocal action (twenty respirations to eighty pulsations); which act could not be made and carried up to one hundred respirations per minute without such concentrated effort that ordinary pain could make no impression upon the brain while this abstraction was kept up.

2. There is a specific effect resulting from enforced respiration of one hundred to the minute, due to the *excess of carbonic acid gas set free from the tissues*, generated by this enforced normal act of throwing into the lungs *five times* the normal amount of oxygen demanded in one minute, when the heart has not been aroused to exalted action, which comes from violent action in running, or where one is suddenly startled; which excess of carbonic acid cannot escape in the same ratio from the lungs, since the heart does not respond to the proportionate overaction of the lungs.

3. "Hyperæmia is the last in the chain of effects; which is

due to the excessive amount of air passing into the lungs, preventing but little more than the normal quantity of blood from passing from the heart into the arterial circulation, but damming it up in the brain, as well as throughout the capillary and venous systems as well as upon the heart, the same as if it were suspended in that gas outside the body."

Dr. A. Hewson agrees with Dr. Bonwell as to the efficacy of rapid breathing as a pain obtunder, yet he differs with him as to the theory or nature of the changes in the different symptoms brought about during its progress. Says Dr. Hewson: "Every circumstance would therefore seem to indicate that this process of inducing insensibility to pain is one essentially of diminished oxidation and decarbonization of the blood, and recognizing such a state as belonging to the initiative stage of all anæsthetics, when *insensibility to pain* is positively marked, we have no necessity for begging any special theory for this process, as in its action it readily comes under the category of such agents, and is thus not either an *absurdity* or an impossibility from a scientific point of view."

ALCOHOL.

Formula.—C_2H_5HO. Sp. Gr. of officinal alcohol, 0.820; of rectified spirit—*Spiritus Rectificatus*, 0.838; of stronger alcohol,—*Alcohol Fortius*, 0.817; of diluted alcohol—*Alcohol Dilutum* (equal parts of alcohol and distilled water), 0.928.

Derivation.—Alcohol is obtained from vinous or fermented liquors by repeated distillations, and, in its officinal form, contains about fifteen per cent. of water. It is colorless, inflammable, wholly vaporizable by heat, and unites in all proportions with water and ether. It frequently contains such impurities as fusel oil or amylic alcohol (obtained from fermented grain or potatoes), the presence of which can be detected by agitating the alcohol with sulphuric acid, when the former becomes colored.

Stronger Alcohol.—*Alcohol Fortius—Absolute Alcohol*—is obtained by agitating the officinal alcohol with heated carbonate of potassium. Sp. Gr. 0.794, when containing no water.

Medical Properties and Action.—All the different forms of alcohol, including brandy—*Spiritus Vini Gallici* (the spirit obtained from fermented grapes by distillation, and containing 45 to 55 per cent., by volume, of absolute alcohol); whiskey—*Spiritus Frumenti* (the spirit obtained from fermented grain by distillation, and containing from 50 to 58 per cent., by volume, of absolute alcohol); wine—*Vinum* (the fermented juice of the grape, and containing alcohol in varying proportions), are powerful diffusible stimulants, increasing the action of the heart and arteries, exciting the nervous and vascular systems, and causing a general exhilaration of spirits. Excessive quantities produce the effect of narcotic poisons, ending in coma and death.

The habitual use of alcoholic drinks causes most injurious effects upon the system generally, and directly upon the mucous coats of the stomach, deranging and destroying its functions and structure, resulting in dyspepsia, followed by cirrhosis of the liver and kidneys, loss of mental and physical strength, derangement of the nervous system, and, at last, delirium tremens. When properly administered in diseased conditions, however, alcoholic preparations are valuable agents.

Therapeutic Uses.—The different forms of alcohol are employed as stimulants in acute inflammations, such as pneumonia, pleurisy, bronchitis, pulmonary affections of children, etc., etc., and in rheumatic pericarditis, in the latter stages of typhus and typhoid fevers, diphtheria, acute neuralgia, convulsions of dentition, tetanus, asphyxia from cold, pyæmia, etc., etc. Externally in superficial inflammation, bruises, sprains, ptyalism, gout, cerebral affections, bed-sores, etc., etc. According to Bartholow, alcohol is an excellent hæmostatic for restraining oozing from a large surface, and an efficient antiseptic dressing, as it destroys germs, removes fetor, and stimulates the tissues to more healthy growth.

Dental Uses.—Alcohol, as a narcotic, is employed to relieve pain. In combination with tannic acid or chloride of zinc, it obtunds the sensibility of dentine; as a styptic, it arrests hemorrhage from relaxed tissues, coagulating the blood by its

effect on albumen, and causing contraction of the mouths of the vessels by its astringent property. Equal parts of alcohol and water make an excellent application as an evaporating lotion, for the relief of superficial inflammations, its antiseptic properties rendering it useful as a mouth-wash when the secretions are vitiated and the surfaces of the mucous membrane soft and spongy. It is also useful for cleaning pulp-canals as a preparatory treatment to the use of the more active antiseptic agents, such as the bichloride of mercury. For suppurating wounds, it is a useful antiseptic dressing, as it destroys germs, removes fetor, and stimulates the tissues to a more healthy action. It also favors the cicatrization of open wounds, coagulating the albumen, and forming an impermeable covering. In mercurial salivation (mercurial stomatitis), it forms an excellent gargle.

For softened and sensitive dentine, and for drying cavities preparatory to filling them, the stronger or absolute alcohol is employed. A simple method of preparing this form of alcohol is to add one part of carbonate of potassa to four parts of the ordinary or officinal alcohol. Owing to the great affinity carbonate of potassa has for water, it abstracts the latter from the alcohol to a sufficient degree to answer all practical purposes.

The cavity of a tooth is first dried with cotton and bibulous paper, and then bathed with the absolute alcohol, which at once evaporates, and causes the almost perfect absorption of moisture.

Brandy and water form, in combination, an excellent lotion for mercurial and other forms of stomatitis.

DENTAL FORMULÆ.

For Obtunding Sensitive Dentine.

℞. Alcohol (absolute) . ℥ss
Acidi tannici . . . . ℥ss
Glycerini . . . . . ℥ss. M.

SIGNA.—To be applied as a lotion.

For Obtunding Sensitive Dentine.

℞. Alcohol (absolute) . ℥ss
Zinci chloridi . . . ℥ss
Glycerini . . . . . ℥ss. M.

For Superficial Inflammations.

℞. Alcohol,
Aquæ . . . āā . . ℥ss. M.

SIGNA.—To be applied as a lotion.

For Mercurial Stomatitis.

℞. Spts. vini gallici . . 1 part
Aqnæ . . . . 4 to 6 parts. M.

SIGNA.—To be used as a gargle.

Antiseptic Mouth Wash.

GALLIPE AND MALASSEZ.

℞. Alcohol . . . . . 370 parts;
Carbolic acid . . 10 parts;
Thymol . . . . . 5 parts;
Oil of peppermint . 15 parts;
Tincture of arnica . 100 parts. M.
This may be colored with tincture of cochineal.

SIGNA.—Use twice a day and at same time rinse out the mouth with a weak solution of boric acid.

For Pain After Extraction of Teeth.

DR. T. B. WELCH.

℞. Alcohol (best) . . . ℥j
Chloroform . . . . ℥ij
Sulphuric ether . . . ℥¾
Gum camphor . . . ℥ss
Tinct. opium . . . . ℥j
Oil cloves . . . . . ℥ss.
Apply in the cavity on a pledget of cotton.

For Odontalgia.

DR. J. N. HARRIS.

℞. Alcoholis (best) . . ℥j
Chloroformi . . . . ℥ij
Etheris Sulph. . . . ℥¾
Camphoræ (gum) . . ℥ss
Tinct. opii . . . . . ℥⅛
Oleum caryophilli . . ℥ss M.

SIGNA.—Apply to cavity, and soon as pain ceases, fill the cavity with cotton moistened with carbolic acid and oil of cloves; drop on this cotton sandarach varnish, and allow it to remain 20 or 30 minutes.

ALOE—ALOES.

Source.—Aloes is the inspissated juice of the leaves of the *Aloe Socotrina*, and contains a bitter precipitate known as *aloin*, and also a volatile oil, to which its odor is due. Its preparations are purified aloes—*aloe purificata;* watery Extract of Aloes—*Extractum Aloes Aquosum;* Tincture of Aloes—*Tinctura Aloes;* also a number of pilular forms, and a tincture combined with myrrh—Tinctura Aloes et Myrrhæ, and wine of aloes—Vinum Aloes. Purified Aloes is in the form of pieces of a dull or reddish-brown color, very brittle and soluble in alcohol, and a very bitter and disagreeable taste.

Medical Properties and Action.—Aloes is a stomachic tonic and purgative, being principally employed for the latter effect. In large doses its action is that of a powerful purgative, and hence it is contraindicated in irritable or inflammatory conditions of the stomach. It stimulates the functions of the liver, and increases the flow of bile as well as the intestinal secretions generally. Its chief effects are on the large intestine, increasing its peristaltic movement, and causing tormina and tenesmus with heat and irritation of the rectum. It also increases the menstrual flow and the blood supply of the pelvic

organs. It requires some ten or twelve hours to produce its cathartic effects. A purgative action may be induced by applying it to an exposed surface. In moderate laxative doses the stools are not liquid and but slightly altered in character. It is commonly administered in small doses in combination with nux vomica.

Therapeutic Uses.—Aloes is very efficient in constipation dependent on weakness of the muscular layer of the large intestine. It is also employed in jaundice, atonic dyspepsia, hemorrhoids without active pelvic congestion, amenorrhœa dependent upon anæmia, menorrhagia in debilitated conditions, gonorrhœa, catarrh of uterus, etc.

Dose.—Of *Aloe purificata*, grj to v; *extractum aloes aquosum*, gr. ss to iij; Tinctura Aloes, f℥ss to ij; Tinctura Aloes Myrrhæ, ℥ss to ℥ij; *Vinum Aloes*, ℥j to ℥ss.

ALUMEN—ALUM.

Formula.—$Al(NH_4)_2(SO_2)_12H_2O$.

Source.—It is found native in Italy, in the neighborhood of volcanoes, and is the mineral from which the metal aluminium is obtained.

Derivation.—Alum is also obtained from aluminous slate, shale or schist, from which it is obtained by the process of roasting and exposure to the air.

Alum is a white, slightly efflorescent salt, which crystallizes in regular octahedrons. It possesses an astringent, acid, and sweetish taste. It is insoluble in alcohol, but dissolves in from fourteen to fifteen times its weight in cold, and three-fourths of its weight of boiling water.

Medical Properties and Action.—Alum is astringent and styptic, and is employed both externally and internally. When taken internally, it is absorbed into the system, and has been detected in the liver, spleen and urine. Excessive doses cause vomiting, griping, purging, and inflammation of the gastro-enteric mucous membrane. Powdered alum, in doses of a teaspoonful, is an efficient emetic. It coagulates albumen, and causes an abundant flow of saliva, coagulating the albumen

of the saliva and buccal mucus in whitish, membranous flakes.

Its astringent influence is chiefly upon mucous surfaces. Applied locally to relaxed or bleeding parts, it corrugates the surrounding tissues and causes contraction of the capillaries, and, in this manner, acts as an astringent.

Therapeutic Uses.—Alum is internally administered in diarrhœa, chronic dysentery, colica pictonum, catarrh of the stomach, etc. Externally it is applied in ulcerated and relaxed throat affections, ptyalism, gonorrhœa and gleet, uterine hemorrhage, morbid growths, hæmaturia, ophthalmia, chronic whooping cough, chronic skin diseases, chilblains, ulcers, hospital gangrene, etc., etc.

Dose.—Of alum, gr. x to ℈j or ℈ij, in powder, or solution in water, or in some simple infusion.

Ammonia Alum—Sulphate of alumina and ammonia—*Aluminæ et Ammoniæ Sulphas*—is prepared by adding sulphate of ammonia to a solution of sulphate of alumina.

Dried Alum—*Alumen Exsiccatum* (alum deprived of its water of crystallization by heat)—is employed externally as a mild escharotic, to destroy exuberant granulations, etc.

Dental Uses.—Alum is employed in dental practice as a styptic in alveolar hemorrhage; as a gargle in stomatitis, ulceration, and sponginess of the gums, morbid or fungous growth of gums, dental pulp, etc., superficial hemorrhage from the mucous membrane of the mouth, ulcers of the mouth, cancrum oris, odontalgia, etc., etc. In congested conditions of the mucous membrane of the mouth and throat, alum gargles afford great relief. Powdered alum added to liquor sodæ chlorinatæ (Labarraque's Solution), is an excellent bleaching application for discolored necrosed teeth.

The habitual use of alum as an ingredient of a dentifrice is injurious to the teeth, on account of the sulphuric acid it contains.

Potassi alum—*Aluminii et Potassii Sulphas*—the alum of commerce (which has been superseded by ammonia alum,

will render plaster casts hard, when they are boiled in a strong solution for half an hour.

DENTAL FORMULÆ.

For Odontalgia.

℞. Pulveris aluminis . . ℥ij
Ætheris nitrici . . . ℥vij. M.

SIGNA.—To be applied on a pellet of cotton.

For Ulceration of the Gums and Mucous Membrane of the Mouth.

℞. Aluminis . . . . . ℥j
Zinci sulphatis . . . ℥ss
Sodii borat . . . . . gr.iv.
Aquæ rosæ . . . . . ℥viij. M.

SIGNA.—To be applied as a lotion.

For Inflamed and Ulcerated Mucous Membrane and Gums.

℞. Pulveris aluminis . . gr. lxxx
Aquæ destillatæ . . f℥x. M.

SIGNA.—To be applied as a mild, astringent gargle.

For Ulcerated and Spongy Gums.

℞. Aluminis . . . . . ℥j
Vini . . . . . Oj
Tinct. cinchonæ . . . ℥ss
Tinct. myrrhæ . . . . ℥ij
Mel. rosæ . . . . . ℥ij. M.

SIGNA.—To be used as a gargle.

For Inflammation and Ulceration of the Mouth and Throat.

℞. Infus. lini . . . . . ℥xv
Tinct. kino . . . . . ℥j
Aluminis . . . . . ℥ij. M.

SIGNA.—To be applied as a gargle.

ALUMINÆ ACETAS—ACETATE OF ALUMINA.

Formula.—$Al_2O_3 2C_4H_3O_3 + 4HO$.

Derivation.—The salt, Acetate of Alumina, is obtained by the direct combination of hydrated alumina with acetic acid, or by reaction between sulphate of alumina and acetate of lead. The solution, when properly prepared, is a clear fluid, of a sharp, sweetish, astringent taste, and a distinct odor of acetic acid. When it is evaporated, there is deposited light, fragile, glossy scales, which are perfectly soluble in water, and not readily affected by the atmosphere.

Medical Properties and Action.—It is disinfectant and antiseptic. In maximum doses it produces an unpleasant sensation of warmth and fulness in the stomach, and, at the same time, vertigo and confusion of the senses, which may continue for several hours.

Therapeutic Uses.—Acetate of alumina is rarely employed internally, and only for zymotic and contagious diseases. It is generally used externally, and is a very effectual remedy in

the treatment of wounds, preventing pyæmia in suppurating wounds and ulcers. It is also applied in parasitic skin affections, as an injection in gonorrhœa, and for the destruction of animalculæ in putrescent fluids. As a surgical dressing, it is used by keeping the wound saturated with a solution of moderate strength, or by irrigation. A concentrated solution will preserve anatomical subjects for a considerable time.

Dose.—Of acetate of alumina, gtt. xx to gtt. 60 of the solution.

Dental Uses.—Acetate of alumina is useful in dental practice, as an antiseptic and disinfectant in cancrum oris, ulcers of the mouth, suppurating wounds of mucous membrane, pyorrhœa alveolaris, alveolar abscess, etc. A very weak solution has been employed as a mouth wash for offensive breath depending on scrofulous ulcerations, aphthæ, caries of the teeth, or the wearing of artificial teeth.

SULPHITE OF ALUMINIUM—ALUMINII SULPHIS.

The sulphite of aluminium is a new antiseptic, being a sulphurous salt of aluminium; that metal uniting with acids to form salts in the proportion of two molecular equivalents of the base and three of the acid. The persulphite may be made by adding sulphurous acid to the undried sesquisulphite to solution and crystallizing without heat; or by precipitating the persulphite from solution with alcohol, filtering or decanting, washing the precipitate with alcohol and drying on bibulous paper. The sulphurous salts of aluminium are the best representatives of its antiseptic, therapeutic properties, two being produced—the sesquisulphite and the persulphite; the former being insoluble in water, while the sulphite is soluble. Three hundred times as much of the sesquisulphite of aluminium can be administered with safety as of the bichloride of mercury, and while the latter is two and a half times as active as the aluminium salt in equal quantity, the difference in dose permissible favors the relative efficiency of the latter; and the same relations exist in the topical use of these two agents. The insoluble sesquisulphite may be made by taking the theoretical quantities of

potassic alum and sulphite of sodium and mixing their solutions in water; the precipitate to be washed and carefully dried. The proportion is ten parts of alum and eight of sodium sulphite. These aluminium salts are applicable to almost every conceivable condition where an antiferment is indicated.

AMMONIUM—AMMONIA.

Formula.—NH_3.

Ammonia, often called ammoniacal, or ammonia gas, is colorless and readily soluble in water, and forms a number of volatile stimulants, such as *Aqua ammoniæ*—ammonia water, which is the stronger water of ammonia diluted with two parts of water; *Aqua ammoniæ fortior*—stronger water of ammonia, is made by passing ammonia gas into water to make its specific gravity, 0.900 at 59° F.; *Spiritus ammoniæ*—which is a ten per cent. solution of ammonia gas in alcohol; *Spiritus ammoniæ aromaticus*, which is an alcoholic solution of carbonate of ammonium, to which are added oils of lemon, nutmeg and lavender. (See also muriate of ammonia, sal ammoniac, carbonate of ammonium, solution of acetate of ammonia, spirit of mindererus, chloride of ammonium, and valerianate of ammonium.)

Medical Properties and Action.—Ammonia gas is very alkaline, and an irritant to mucous surfaces. Inhaled, it causes an overpowering sense of suffocation and spasm of the glottis, and when prolonged, violent inflammation of the air-passages. Solution of ammonia when swallowed causes destructive inflammation of the mucous membrane, extending to the stomach. The long-continued use of ammonia interferes with digestion by neutralizing the gastric juice, and by increased waste of tissue causes pallor, emaciation and feebleness. In the blood it injures the red blood globules, and thus affects the nutrition of the body, being largely converted into urea. The preparations of ammonia are stimulant expectorants.

Therapeutic Uses.—Aqua ammonia is administered by inhalation in syncope and shock, and as a counter-irritant; for which purpose ammonia liniment is also employed. The in-

cautious inhalation of ammonia may cause inflammation of the fauces and glottis, but when cautiously employed sometimes gives relief to acute catarrh and hay asthma. The diluted aqua ammonia will relieve the pain of stings of insects, and the strong aqua ammonia is an antidote, when at once applied, to the bite of venomous snakes, and of rabid animals. The aromatic spirits of ammonia is useful in acidity of stomach, gaseous eructations and abdominal distension; also in sick headache, and migraine; but the bromides are more effective in the latter affection. Ammonia salts stimulate the liver and increase the secretions of the kidneys and intestinal mucous glands and the action of the heart, hence are frequently used in adynamic states, constipation, coated tongue and scanty urine. The preparations of ammonia for internal use correct obstinate vomiting when the irritating substances are removed, and the matters vomited are acid.

Dose.—Of Aqua Ammoniæ, ♏v to ʒss, much diluted; of Spiritus Ammoniæ, ♏x to fʒj, greatly diluted; of Spiritus Ammoniæ Aromaticus, fʒss to fʒij.

Dental Uses.—Ammonia is used as a stimulant in dangerous narcosis; to prevent syncope or severe shock; in facial neuralgia, especially the chloride, and in periodontitis when it is combined with aconite and opium. Aqua ammonia is locally applied as a counter-irritant to the gums in acute inflammation of the peridental membrane. (See Acetate, Carbonate, Valerianate and Chloride of Ammonium).

LIQUOR AMMONII ACETATIS—SOLUTION OF ACETATE OF AMMONIA.

SPIRIT OF MINDERERUS.

Formula.—$NH_4C_2H_3O_2$.

Derivation.—Spirit of Mindererus is obtained by saturating diluted acetic acid with carbonate of ammonia, being a solution of the acetate of ammonia.

It is a colorless liquid, with a saline taste, and requires to be freshly made when about to be used.

Medical Properties and Action.—It is refrigerant, diaphoretic,

and diuretic, and its action can be greatly increased by combination with other remedies. Few medicines are in more general use.

Therapeutic Uses.—Spirit of mindererus is employed in the treatment of febrile and inflammatory affections, and exanthemata, sick headache, catarrh and influenza, etc., etc. Externally it is used as a lotion to sprains, bruises, glandular enlargements, etc.

Dose.—Of spirit of mindererus, f℥j to f℥j.

Dental Uses.—A lotion composed of one part to ten of water is a serviceable application in inflamed conditions of mucous membrane. Internally administered as a refrigerant, it is useful in acute periosteal inflammation, inflammation of the dental pulp—pulpitis, and is a diaphoretic and refrigerant in periodontitis, when it may be combined with either aconite or opium, or both.

AMMONII CARBONAS—CARBONATE OF AMMONIUM.

Formula.—$N_4H_{18}C_3O_9$.

Derivation.—Carbonate of Ammonium is a sesquicarbonate, and is obtained by subliming a mixture of chloride of ammonium and chalk. It is in the form of white, translucent masses, with a pungent, ammoniacal odor, and an acrid, alkaline taste. It is soluble in water, and on exposure to the air it becomes opaque and falls into powder, losing its ammonia.

Medical Properties and Action.—It is antacid, stimulant, diaphoretic and expectorant, and it is considered to be especially useful in cases where the vital powers are greatly depressed. In large doses it causes colic, convulsions and great disturbance of the nervous system, and when long continued, an annoying itching of the scalp, and skin over the surface of the body. It has a tendency to fluidify the blood. Internally, as a diffusible stimulant, it is preferred to solution of ammonia.

Therapeutic Uses.—It is internally administered in diabetes, scrofula with languid circulation, asthma, pneumonia, croup,

chorea, diseases of the skin, puerperal insanity, mercurial erethism, drunkenness, etc., etc.

Externally it is employed as a volatile or smelling salts, in syncope, hysteria, and asphyxia.

Dose.—Of carbonate of ammonium, gr. v. to gr. x, in pill or in solution with gum and sugar.

Dental Uses.—It is a useful internal remedy in cancrum oris, in doses of gr. v, gradually increased to gr. x, every two or three hours, using strong nitric acid as a local application. It is also a very useful remedy in mercurial erethism, in conjunction with camphor and other stimulants; also as a stimulant in dangerous narcosis from anæsthetic agents.

AMMONII VALERIANAS—VALERIANATE OF AMMONIUM.

Formula.—$NH_4C_5H_9O_2$.

Derivation.—Valerianate of ammonium is obtained by combining valerianic acid with a strong solution of ammonia and evaporating to a syrupy consistence; it is also obtained by subjecting the monohydrated acid to the action of dry, gaseous ammonia. It is in the form of a white salt, in quadrangular plates, with the odor of valerianic acid, and a sharp, sweetish taste. It is soluble in water and alcohol.

Medical Properties and Action.—It is stimulant, nervine, and antispasmodic.

Therapeutic Uses.—It is employed in neuralgia, nervous headache, hysteria, epilepsy, chorea, etc., etc., especially for females.

Dose.—Of valerianate of ammonium, gr. ij. to gr. viij, in pill or elixir, with aromatics (valerianate of ammonium ℥j, fluid extract of vanilla f℥ss, tincture of cardamom f℥vj, curacoa f℥ij, water f℥iv—*Misce.* Dose, a teaspoonful three times a day).

Dental Uses.—It is internally administered for neuralgia.

AMMONII CHLORIDUM—CHLORIDE OF AMMONIUM.

MURIATE OF AMMONIA—HYDROCHLORATE OF AMMONIA—SAL AMMONIAC.

Formula.—NH_4Cl.

Derivation.—Chloride of Ammonium is obtained by neu-

tralizing hydrochloric acid with ammonia, and evaporating to dryness. It is in the form of a snow-white, crystalline powder, soluble in two and a half parts of cold water, and sparingly soluble in alcohol. It has a pungent, saline taste.

Medical Properties and Action.—In large doses it is an irritant poison, with a purging action; but in small doses it is a powerful resolvent alterative; it is also refrigerant and anodyne. Its action upon the system closely resembles that of mercury as an alterative.

Externally it is used as a discutient application, and as a cold lotion in fevers, hernia, etc.

Therapeutic Uses.—It is employed internally in amenorrhœa, rheumatic affections, chronic bronchitis, pneumonia, dropsical affections, hemorrhages, whooping cough and myalgia. Externally in abscesses of the mamma, skin diseases, ecchymosis of the eye, hydrocele, senile gangrene, gonorrhœa, leucorrhœa, etc.

Dose.—Of chloride of ammonium, gr. v-xxx, every two or three hours, in powder or mucilage.

Dental Uses.—It is employed in facial neuralgia, in doses of ʒss, repeated four times daily. Externally it is used as an application to indolent ulcers, for its stimulating effect. As a gargle, it is employed in the strength of ʒss to ʒxij of water. It is also applied to cancerous tumors, and has been used to restore zinc which has become deteriorated from long use in laboratory work. Chloride of ammonium (sal ammoniac) is also used as a flux, in refining gold for laboratory use.

AMYLENE.

Formula C_5H_{10}.

Derivation.—Amylene is obtained by distilling amylic alcohol with chloride of zinc. It is a colorless, very mobile liquid, with a boiling point of 102°, and the density of its vapor 2.45. It has a very peculiar and disagreeable smell.

Medical Properties and Action.—Amylene was introduced as an anæsthetic in 1856, by the late Dr. Snow, who regarded it as possessing the following advantages: the safety of ether,

absence of pungency and irritating property, readiness with which the absence of pain is obtained, with less coma than with chloroform or ether, the speedy recovery from its effects, less nauseating, and less headache and rigidity and struggling than in the case of ether or chloroform. Others, however, have not been so much impressed with this anæsthetic agent as was Dr. Snow; hence, it has not been regarded with the same favor as other agents of this class. An extreme quantity being required to produce complete insensibility to pain, its operation is considered to be dangerous.

Therapeutic Use.—As an anæsthetic.

Hydrate of Amylene is a tertiary alcohol first prepared by Wurtz. It is a colorless, watery-looking fluid, with a sharp taste and smell, and is soluble in eight times its volume of alcohol. It is generally regarded as a safe and reliable narcotic and hypnotic, sleep being produced in from fifteen to forty-five minutes, and sometimes almost instantly. Where large doses are given, sleep may be induced in five or eight minutes, and as a rule its actions are prompt and safe. Contra-indications of the drug have not yet been observed, but in cases of severe gastric troubles and ulcerations of the pharynx, it should be given per anus. Its action may be briefly summed up as follows:

1. Hydrate of amylene is a hypnotic whose action can be confidently relied upon when sufficiently large doses are given. Experiments have shown that it is not so strong as chloral, yet stronger than paraldehyde.

2. Hydrate of amylene also acts upon persons who are accustomed to the use of hypnotics, although the dose employed in such cases must be comparatively large.

3. Sleep occurs soon after the administration of the drug, and is not preceded by any period of excitement. The sleep produced is light or heavy, according to the dose given; yet it is always easy to awaken the patient. Upon waking, the patient is perfectly sensible and bright, but if not disturbed further will at once fall asleep again.

4. Sleep lasts from two to three hours if small doses have

been given, or from six to eight hours under the influence of larger doses.

5. The awaking is similar to that from natural sleep. The patient feels rested and strengthened. No headache or weakness was ever observed.

6. The respiration remains unchanged.

7. The change in the pulse's frequency and in the pressure of blood is no more than that which accompanies natural sleep.

8. The patients were never observed to wake up with a bad taste in their mouths and complaining of a disagreeable smell, symptoms which nearly always follow the use of paraldehyde.

9. Whether or not a habit and tolerance for the drug may be formed remains yet to be seen. As yet, even when the dose has been used continually, an increase of dose was never found necessary.

Dose.—Of hydrate of amylene grs. xii to grs. xxxvii. It may be administered in gelatin capsules containing 15½ grains each, or in the fluid form mixed with claret and water, or raspberry syrup.

AMYL NITRIS—NITRITE OF AMYL.

Formula.—$C_5H_{11}NO_2$. Sp. gr. 0.877.

Derivation.—Nitrite of Amyl is obtained by heating one part of strong nitric acid with two parts of rectified fusel oil, until reaction commences, when the heat is withdrawn, and afterward re-applied. The distilled portion obtained below 212° F. is rectified by means of carbonate of potassium, and that portion only distilling between 200° and 206° F. is reserved, being a nitrate of the oxide of amyl. It is a yellowish or amber-colored liquid, somewhat oily, very volatile and inflammable, and boils at 182° F. It has an odor like that of ripe pears, and belongs to the class of compound ethers.

Medical Properties and Action.—It is used by inhalation, causing an accelerated action of the heart, sudden flushing of the face, dilatation of the arteries, paralysis of the action of the smaller arteries, a sense of great fullness of the brain, a lowering of the blood pressure and temperature, and com-

plete resolution of the muscular system. The vapor of nitrite of amyl, when applied directly to the muscular or nervous tissues, arrests their functional activity, and, circulating in the blood, appears to act most on the vaso-motor system and unstriped muscular fibre. It affects respiration and the composition of the blood, producing headache, which is often prolonged.

Therapeutic Uses.—Being a powerful stimulant to the heart, it is an antidote to chloroform and cocaine. A case is mentioned in the *British Medical Journal*, where, during chloroform narcosis, respiration ceased, and artificial respiration failed to restore the patient. Some nitrite of amyl was then poured on lint, and held to the patient's nostrils. In ten seconds there was a flushing of the face, the pulse was again felt, and respiration was restored.

When from two to five minims are poured on lint and applied to the nostrils, the heart's action will be accelerated, a sudden flushing of the face takes place, dilatation of the arteries results, also a fall in the blood pressure and a lowering of the temperature, and complete muscular relaxation. As a remedy for chloroform narcosis, it is supposed to antagonize cerebral anæmia by causing capillary dilatation and thus promoting the inflow of blood to the brain.

By inhalation, for relieving the pain of angina pectoris, and preventing epileptic seizures; also used in asthma, strychnia poisoning, hydrophobia, tetanus, epileptic attacks, and in many other convulsive or spasmodic diseases.

Dose.—Of nitrite of amyl, ℥ij to ℥v, by inhalation; not more than ℥. iij should be administered, unless the patient has been accustomed to its use.

Dental Uses.—As an antidote for chloroform narcosis, for the relief of epileptic attacks during the extraction of teeth, for relieving the pain of neuralgia of the fifth pair of nerves, and for restoration from syncope. As nitrite of amyl is a powerful and dangerous agent, care must be observed in its use, and but small doses applied at first, as some patients, especially the weak and nervous, are very susceptible to its influence.

ANTHEMIS—CHAMOMILE.

Source.—The flowers of the *Anthemis Nobilis.* A German variety is known as *Matricaria*, which is similar to Anthemis in its effects. The herb chamomile has a fragrant odor and a bitter aromatic taste. A volatile acid is obtained from the flowers, which is similar, if not identical, with valerianic acid.

Medical Properties and Therapeutic Uses.—Chamomile is a mild tonic in small doses, but in large doses may act as an emetic. It is used in the form of a cold infusion in enfeebled digestion, flatulent colic and infantile disorders connected with digestive derangement. It is also employed in the form of infusions prepared with hot water and vinegar, for the relief of pain of boils, abscesses, etc. When employed for the relief of odontalgia in the form of fomentations to the face, there is danger of the abscess pointing externally; it is also applied to flabby, ill-conditioned ulcers as a gentle incitant. The tepid infusion will promote the operation of emetics.

Dose.—Of the powder as a tonic, ℥ss to ℥j. It is generally employed in the form of infusion.

ANILINE.

Formula.—C_6H_7N.

Derivation.—Aniline is an alkaloid obtained by the destructive distillation of various organic substances. It is a volatile, colorless, pungent liquid generally derived from coal tar.

Medical Properties and Therapeutic Uses—Professor Stilling claims that wounds and suppurating ulcers, especially those in and about the eye, treated with aniline may be entirely sterilized by the solution penetrating everywhere, and the suppuration be entirely arrested. When the pus is deep in the tissue, injections of aniline solution should be employed, or the introduction of aniline crayons, or bathing with concentrated solutions. In many cases application of a powdered aniline is very efficacious. These aniline colors are destitute of all toxic action; they are very diffusible, and they do not coagulate albumen. These colors are, however, soon decom-

posed by exposure to light, and they should therefore be protected.

Dental Uses.—But two of the basic aniline coloring-matters, *methyl-violet* (pyoktanin) and *methyleneblue*, have been tested as antiseptics, and although highly recommended by Prof. Stilling, they have not, in the experiments of Prof. W. D. Miller, when employed as antiseptics in the treatment of the dental pulp, given satisfactory results, as they did not appear to penetrate the pulps to a depth of more than a quarter of an inch, and showed no preservative action. (See Pyoktanin.)

ANTIFEBRIN—ACETANILIDE.

Formula.—C_2H_3NO.

Antifebrin, as Acetanilide is commonly called, is a white crystalline powder composed of colorless scales or plates similar to boric acid. It is slightly soluble in water, but readily soluble in alcohol, and has a burning but not disagreeable taste. Chemically it is aniline.

Medical Properties and Therapeutic Uses.—In regard to its properties as an antipyretic opinions differ, but it is generally regarded as being more powerful than antipyrine. It increases the intra-vascular blood pressure, and the action of the central nervous apparatus, but a quantitative decline ensues in the functions of motility and sensibility until they are altogether suspended. The quantity required to produce antipyretic effects varies from four to eight grains, the latter dose lessening fever heat effectively, as it reduces the temperature and pulse-rate. It is employed in fevers, neuritis, neuralgia, myalgia, locomotor ataxis, herpes zoster, migraine, sciatica, epilepsy, etc. Three to five grain doses *ter die* will relieve the pains of inflammations, such as neuralgia, myalgia, migraine, etc.

Dental Uses.—Antefebrin has been employed successfully in acute periodontitis, five to eight grains causing a quiet sleep with no return of the pain. It is also administered for pulpitis, etc.

Dose of Antefibrin.—Grs. v to grs. viij.

A Convenient Prescription of Antifebrin.

DR. E. L. CLIFFORD.

℞. Antefibrin (Acetanilide) . . . . . ℥j
Sp. vini gallici . . . . . ℥iv. ss
Syr. Simp . . . . . .
Aquæ . . . . . āā ℥vj. M.

S. A tablespoonful contains five grains, an adult dose.

ANTIKAMNIA.

Formula.—C_nH_{2n-6}.

Antikamnia is a combination of coal tar derivatives into which the amnines have entered, forming various amido compounds. It has as its base the derivatives of the amido-benzoles so combined, it is claimed, as to obviate the bad effects caused by many of this series of organic bodies when administered alone. It is in the form of a white powder with a pungent taste.

Medical Properties and Therapeutic Uses.—Antikamnia is an antipyretic, analgesic and anodyne, and causes a quieting influence upon the nervous system, inducing and promoting sleep. It is employed in neuralgia, myalgia, sciatica, acute rheumatism, hemicrania, typhoid fever; also headache and other neuroses due to irregularities of menstruation; also in asthma, hay fever, influenza, la grippe and allied affections.

Dose.—grs. iij to grs. x, every three or four hours.

To Prevent the Disturbance of the Nervous System which accompanies the administration of quinine:

℞. Antikamnia . . . . . ℥ss
Sulphate of quinine . . ℈ij. M.
Make xii capsules, one every 2 or 4 hours as may be indicated.

Analgesic and Anodyne.

℞. Antikamnia . . . . . ℥ij
Spts. Vin. Gall . . . .
Syr. Aurantii Flor. āā . ℥iv. M.

SIG. Tablespoonful every 3 or 4 hours.

Anodyne and Analgesic.

℞. Antikamnia . . . .
Quinia Sulph. āā . . ℥ss
Pulv. Doveri . . . . grs viii
Soda bicarb. . . . . grs. xij
Ft. viij capsules.

DOSE. One capsule every 4 hours.

ANTIPYRINE—DIMETHYLOXYQUINIZINE.

Formula.—$C_{20}H_{18}N_4O_2$.

Antipyrine is in the form of whitish or grayish-white crystalline powder, slightly bitter sweetish taste, and soluble in water. It combines with acids to form salts.

Medical Properties and Therapeutic Uses.—Antipyrine is a powerful antipyretic, local anæsthetic, disinfectant, hemostatic and stomachic tonic, and acts as an antiseptic in preventing fermentative changes in the intestines. It is also slightly hypnotic. It stimulates the secretions and readily diffuses into the blood. It first stimulates and then paralyzes the nerve-centres, dilates the cutaneous vessels, and increases the loss of heat by radiation, reducing the temperature rapidly. Sometimes it may cause dangerous symptoms, such as a feeble pulse, profuse diaphoresis and collapse. It is employed in typhoid and malarial fevers, pneumonia, phthisis, neuritis, sciatica, locomotor ataxis, neuralgia of the fifth pair of nerves associated with neuritis and sciatica, migrain, acute rheumatism, epilepsy, chorea, etc., and as a substitute for morphine, and in the morphine habit.

Its administration is soon followed by profuse perspiration, coldness of the surface, slowed pulse, depression, and if fever is present by lowered temperature within a half hour after taking the drug. In health its use may cause slight nausea, singing in the ears, and a slight decrease in the temperature of the body. It has no effect upon respiration, but acts as a sedative upon the brain. It is eliminated by the kidneys, appearing in the urine about three hours after ingestion.

Dose.—Grs. v to grs. lx, being determined by its uses. Subcutaneously injected, it is very effective in painful affections originating in the nerves.

The hypodermic use of antipyrine has given very satisfactory results in the treatment of nervous articular and muscular pains, gastric affections, bronchial asthma, articular rheumatism, chronic lumbago. A painless injection may be made by half-filling a hypodermic syringe with a fifty per cent. solution

of antipyrine, which will amount to about five and a half grains; then immerse the syringe into a ten per cent. solution of cocaine, drawing up enough of the cocaine into the syringe to make it about three-fourths full; this will amount to one-third grain of cocaine. The two solutions readily mix and do not decompose, and may be used as a local anæsthetic.

Dental Uses.—Antipyrine is used hypodermically with great success in cases of severe neuralgia of the fifth pair of nerves. Also, in cases of acute pericemental irritation, and in reflex neuroses of dental origin it has given great relief. Fifteen grains in half an ounce of water have given relief in a case of pericementitis, ceasing in twenty minutes with no return of the pain: but many prefer antifebrin (acetanilide) as being safer than antipyrine. It also has a marked effect in controlling hemorrhage from the gums and alveolar cavities when used as a hæmostatic after the extraction of teeth. Prof. G. Cesari claims that antipyrine more or less speedily arrests hemorrhage from both large and small blood-vessels when applied in solutions of not less than forty, or, better, fifty per cent. The solution as well as the powder should be applied on pledgets of cotton wool. Antipyrine has also been administered internally with satisfactory results in the treatment of periodontitis; and in cases where, owing to the severity of the symptoms in the same affection, the internal administration has proven unsuccessful, the hypodermic injection of fifteen grains has afforded relief; or the hypodermic injection followed in one half hour by the internal administration of fifteen grains of the drug will afford relief in cases of acute periodontitis.

For Nervous Cases.

℞. Antipyrine . . . . . gr. xviij
Aq. destillat . . . . . q.s. ad ft. sol.
Ft. sol et adde
Acidi valerianici . . . gtt. xv.
Shake well and stand aside to allow salt to crystallize.

ANTISEPTIC AND STYPTIC COTTON-WOOL.

Antiseptic Cotton.—First free the ordinary cotton-wool from grease, by macerating it in benzine for ten minutes, press and dry in the air. Then steep the purified cotton, for ten

minutes, in a solution of tannin 5, carbolic acid 4, alcohol 50, and castor oil 8 parts.

Styptic-Cotton-Wool.—Purify, as before, with benzine, dry in air, and then steep it in a solution of alum 2, water 12, chloride of iron solution 2 parts; dry at 60° C.

AQUA DESTILLATA—DISTILLED WATER.

Derivation.—"Take of water 80 pints. Distill two pints, using a tin or glass condenser, and throw them away; then distill 64 pints, and keep them in glass bottles."—U.S.D.

Properties.—Distilled water has a vapid, and by no means pleasant taste, and is only perfectly pure when the vessel used in the distillation is of silver. It should evaporate without residue.

Therapeutic Uses.—It is very essential in the preparation of some formulæ, and of no use whatever in others, as the common pure water will answer. Such agents as tartar emetic, nitrate of silver, corrosive sublimate, chlorides of calcium, barium, acetate and subacetate of lead, permanganate of potassa, the sulphates of iron and zinc, sulphate of quinia, the salts of morphia, and all the alkaloids and their salts, require, when given in solution, distilled water.

Dental Uses.—Distilled water is required in the preparation of many formulæ for use in dental practice.

ARGENTI NITRAS—NITRATE OF SILVER.

LUNAR CAUSTIC.

Formula.—$AgNO_3$.

Derivation.—Nitrate of Silver is obtained by dissolving silver in nitric acid and distilled water, and evaporating the solution. It is in the form of a heavy, colorless, anhydrous salt, and crystallizes in shining, rhombic plates. The action of light and organic matters causes it to turn black. It is wholly soluble in distilled water, the only preparation of water that should be employed in forming solutions of this salt. It has a strong, metallic, styptic taste. In the preparation of the solid form of sticks, it is first melted and poured into moulds, exposure to the light causing the sticks to become gray, and

more or less dark, owing to the reduction of the silver by the sulphuretted hydrogen contained in the atmosphere; hence, on account of the decomposition of this salt, it should be carefully excluded from the light.

Medical Properties and Action.—Nitrate of silver is tonic, antispasmodic, sedative and astringent. When applied to the skin, mucous membrane, or ulcers, it produces, at first, a white appearance, owing to its union with the coagulated albumen of the cuticle, but this gradually changes to a bluish-gray, purple, and finally, black color, on account of the partial reduction of the silver by the sulphuretted hydrogen. Small doses, administered for a long time, give a peculiar blue appearance to the skin. When internally administered, it has an astringent action on the mucous coats of the intestines. It is a powerful tonic to the nervous system, and has been chiefly employed as an antispasmodic tonic. It is chiefly used externally, as a stimulant, vesicant, and escharotic. If applied, even lightly, three or four times, to the moistened skin, it will cause vesication in a few hours. The blue appearance on the skin, when small doses are long continued, is said to be preceded by a peculiar blue line on the gums, like that from lead poisoning. A very minute quantity of this salt, when internally administered, is eliminated by the kidneys, as most of it escapes by the liver and the intestinal glands, a portion remaining permanently deposited in the tissues, when its use has been long continued. Six weeks is the length of time it is safe to continue its internal use, and during that time occasional purgatives should be given, to promote its elimination. The persistent use of iodide of potassium and the hyposulphite of soda will cause the absorption and excretion of the silver deposits, in cases of skin discoloration from its long continued use, aided by baths of the hyposulphites, and the very careful use of lotions containing cyanide of potassium, which possesses a solvent power over silver deposits. As long as inflammation is present, it should not be internally administered, and during a course, it should be occasionally intermitted for a few days, and a purgative used. The gums and

fauces should be frequently examined, and if the slightest blue discoloration is observed, the remedy should be discontinued. Exposure to the sun should be avoided.

Therapeutic Uses.—Nitrate of silver is internally employed in dyspepsia, chronic gastritis, chronic diarrhœa and dysentery, cholera, diseases of the eye, chorea, epilepsy, asthma and whooping cough.

Externally in ophthalmia and other diseases of the eyes, cutaneous diseases, diphtheria, erysipelas, hydrophobia, enlargement of glands, diseases of the genito-urinary organs, diseases of the ear, burns, ulcers, hemorrhage, etc., etc.

Dose.—Of nitrate of silver, gr. $\frac{1}{6}$, gradually increased to gr. ½ three times a day, in pill made of some vegetable powder, or in solution. The fused nitrate of silver—*Argenti Nitras Fusa*—or solid form, is used externally.

Dental Uses.—For inflamed and ulcerated conditions of the mucous membrane of the mouth, nitrate of silver is a valuable application, in the form of injections or solutions of various strengths, from gr. ij to ℥ss of distilled water; also in diseases of the antrum and fistula, as an injection. It is also used as a styptic, for the arrest of alveolar hemorrhage, but is not so reliable as tannic acid, gallic acid, etc., on account of the coagulum or clot formed by it, being soluble in an excess of albumen. It is also employed to obtund the sensitiveness of dentine, especially where the cause is mechanical abrasion; also in aphthæ, mercurial stomatitis, ulceration of the gums, salivary fistula, alveolar abscess. For obtunding sensitive dentine, the stick form (one end of a stick inserted into a quill, or fused on the end of a platinum wire) is employed; or the end of a silver wire may be immersed in nitric acid, and applied to the sensitive surface, taking care to limit its action to the part on which it is to act. When applied to sensitive dentine, it acts on the gelatinous portion of the tooth, destroying its vitality to the extent of the combination which takes place. The objection to its use in such cases is the discoloration it causes.

As salt decomposes the nitrate of silver, a solution of the

chloride of sodium will relieve the excessive pain following its application to sensitive dentine, or to ulcers of the mouth; such a solution will also remove recent stains, if followed by the application of a solution of ammonia. Old stains may be removed with tincture of iodine, followed by cyanide of potassium.

The antidote in cases of poisoning by nitrate of silver is chloride of sodium (common salt), which converts it into chloride of silver, to be followed by emetics, and the proper antiphlogistic treatment.

DENTAL FORMULÆ.

For Inflamed and Ulcerated Mucous Membrane.

℞. Argenti nitratis . gr. ij to ʒss
Aquæ destillatæ . . . . fʒj. M.
SIGNA.—To be used as a lotion.

For Diseases of the Antrum.

℞. Argenti nitratis . gr.j to gr.v
Aquæ destillatæ. . . fʒj. M.
SIGNA.—To be used as an injection.

For Ulcers and Aphthæ.

℞. Argenti nitratis . . . . ʒss
Aquæ destillatæ . . . . ʒj. M.
SIGNA.—To be applied with a camel-hair brush.

For Mercurial Stomatitis.

℞. Argenti nitratis . . . . gr.ss
Aquæ destillatæ . . . fʒj. M.
SIGNA.—To be used as a mouth wash.

ARISTOL—DITHYMOL-DIODIDE—DITHYMOL-BINIODIDE.

Derivation.—Aristol is obtained by adding a solution of iodine in iodide of potassium, to an equal solution of hydrate of sodium, containing thymol. It is in the form of a red brown precipitated amorphous non-crystallizable powder. The proportion of iodine in aristol has been estimated by Carius at 45.80 per cent. Aristol is insoluble in water and glycerine, slightly soluble in alcohol, but readily soluble in chloroform, ether, and in the essential oils; but the solution must be made by friction without heat, as the aristol is decomposed by heat and also by light. It possesses but a slight odor, like that of thymol, and is not unpleasant.

Medical Properties and Therapeutic Uses.—Aristol possesses no irritant action upon the unbroken skin, and when applied to mucous membrane it promotes absorption. Not being absorbed, it has no toxic effect, and for such reason, together with its freedom from disagreeable odor, it possesses a great advantage over

iodoform. It produces rapid healing, and has been employed with benefit in varicose ulcers as a dusting powder; also in cutaneous diseases, gonorrhœa, gleet, in operations of anal fistula, abscess, lymphadenitis, periostitis, psoriasis, ulcers, etc., etc. It is chiefly employed as a dusting powder, or in ethereal solutions or ointments, epithelioma, burns and scalds. Aristol is considered to be an excellent and prompt antiseptic, but the name is merely an assumed one for dithymoldic iodine. Impurities in aristol would be all the by-products derived from unskilful treatment; it might contain potassium or sodium iodide, or free iodine; it might be adulterated even, for, as a patented article, it is above control, as patents have been granted by the U. S. Patent Office for its control, manufacture and sale under the name of "aristol," being a compound of thymol with iodine. The virtues of aristol over iodoform, etc., have as yet not been so pronounced as to exclude it from the general class of patented medicines.

Dental Use.—Aristol has been used as a substitute for iodoform, iodol, carbolic acid, etc., etc., in all cases when the ordinary antiseptics are indicated, as in gangrenous pulps, antisepticizing of root-canals, disinfection of cavities before the introduction of fillings, in the form of a 10 per cent. solution in sulphuric ether for disinfecting purposes; for gangrenous pulps, the aristol in solid form may be applied with a small brush. Sticks made of cacao butter 10 parts, and aristol 1 part, may be used to promote granulation and healing. Aristol has the advantage of being effective in small quantities, and may be diluted with sugar of milk.

Dr. E. C. Kirk highly recommends aristol for alveolar pyorrhœa, a ten per cent. solution being rubbed upon a glass plate with oil of cinnamon and introduced into each suppurating pocket, and around the root at the base of each pocket, on threads of absorbent cotton saturated with the solution; the oil of gaultheria may be substituted for the oil of cinnamon if desired. Dr. Kirk and others also recommend aristol in the essential oils as a medicament for canal-dressings, and as a topical dressing in acute pulpitis. Dr. Kirk recommends

that as a root-canal dressing, its use should be strictly confined to those cases where pericemental inflammation is not a present factor, as it does not possess antiseptic qualities sufficiently powerful to overcome quickly septic conditions due to the putrefactive changes common in root-canals. He also finds it extremely valuable in connection with gutta percha, as an antiseptic in conjunction with permanent root fillings—aristol with chloroform being used to dissolve the gutta percha. It is also recommended as an ingredient of nerve paste, being equal to iodoform for such a purpose, but free from the disagreeable odor of the latter substance; it is also used in chloroform solution, instead of sandarach varnish, for saturating cotton used for wedges or temporary fillings in retaining medicaments in cavities in the teeth; such a dressing or wedge may be retained for days or a week, and being antiseptic, it is free from disagreeable odor during that time. Aristol is also recommended as a dressing where approximal caries has extended beyond the gum margin, and where hypertrophy of the gum festoon occurs to the degree of forming a polypoid growth which invades the cavity; also in the form of a varnish it is combined with collodion as a pulp-capping material. To increase the adhesiveness of the aristol solution, a small quantity of Canada balsam may be added to it.

ARNICA.

LEOPARD'S BANE.

Source.—Arnica Montana is a perennial, herbaceous plant of which the dried flowers and root—*Arnicæ Flores and Arnicæ Radix*—are the medicinal portions, and is found in the mountains of Northern Europe and the Northwestern portions of America.

Medical Properties and Action.—Arnica is nervine, stimulant, and diaphoretic. In over-doses, it is an acro-narcotic poison, causing vomiting, purging, vertigo, tetanic twitching of the muscles, and convulsions. Moderate doses, when long continued, are liable to cause a very troublesome eruption. Its

activity depends upon an alkaloid—*Arnicina*, which is a bitter and acrid extractive.

Therapeutic Uses.—Arnica is administered internally in typhus and typhoid fevers, chronic dysentery, rheumatic gout, etc., etc. Externally to bruises, sprains, lacerations. chilblains, etc., in the form of tincture—*Tinctura Arnica.* The antidote for poison by arnica is common vinegar.

Dose.—Of the extract of arnica, gr. v to gr. x. Of the tincture of arnica (arnica root ℥j, rectified spirit Oj), the dose is ♏x to f℥ss.

Dental Uses.—In dental practice, the tincture of arnica is applied to irritable pulps of teeth, in periodontitis to prevent suppuration, to wounds of the mucous membrane of the mouth, combined with glycerine, to abraded surfaces caused by artificial teeth, and with tannic acid or glycerine of tannin for ulcers of the mouth.

The tincture of arnica, when largely diluted with water, forms an efficient mouth wash during operations upon the teeth. Equal parts of tincture of arnica and glycerine diluted with water form an effective mouth wash in inflammations of the mucous membrane of the mouth.

DENTAL FORMULÆ.

For Abraded Surfaces of the Mucous Membrane of the Mouth.

℞. Tincturæ arnicæ,
Glycerini . . āa . . . ℥j. M.
SIGNA.—To be used as a lotion.

Astringent Mouth Wash in Alveolar Pyorrhœa, etc.

DR. J. R. BELL.

℞. Tincturæ Arnicæ . . . ℥j
Acidi carbolici . . . . ♏xx
Tincturæ myrrhæ . . ℥ss
Olei gaultheriæ . . . . ℥jss
Alcoholis . . . . . ℥ijss M.

For Ecchymosis.

℞. Tincturæ Arnicæ . . . ℥ss
Liquor ammonii muriat. ℥ss
Aquæ. . . . . ℥v. M.
SIGNA.—To be used as a lotion.

For Inflamed and Ulcerated Mucous Membrane.

℞. Tincturæ arnicæ . . . ℥ij
Glycerini . . . . . ℥ij
Aquæ rosæ . . . . . ℥ij
Aquæ destillatæ . . . ℥x. M.
SIGNA.—To be used as a gargle.

ATROPINÆ SULPHAS—SULPHATE OF ATROPINE.

ATROPINE.

Formula.—$C_{17}H_{23}NO_3$.

Derivation.—Sulphate of Atropine is obtained by adding a mixture of sulphuric acid to an ethereal solution of atropine. It is in the form of a white, slightly crystalline powder, very soluble in water and alcohol, but insoluble in ether. It is inodorous, and of a bitter taste.

Medical Properties and Action.—Sulphate of atropine has the same medical properties and action as belladonna, of which it is the alkaloid, but is far more energetic in its action. It is an active poison, and should only be administered internally with the greatest care. Hypodermically employed, it is a useful anodyne and antispasmodic, and the quantity should be cautiously increased from a very small dose in the beginning. Such symptoms as dryness of the throat, vertigo, and diplopia, are indications that its use should be discontinued. Without being a direct hypnotic, it induces sleep by relieving pain. Although it is not so well tolerated, as a general rule, as is morphine, yet patients who cannot bear morphine will bear atropine.

Therapeutic Uses.—See Belladonna.

Dose.—Of sulphate of atropine, gr. $\frac{1}{120}$ to gr. $\frac{1}{60}$. For an anodyne and antispasmodic, hypodermically injected, the dose is ♏ij=gr. $\frac{1}{120}$, as a commencement. An ointment is made of atropine gr. viij, rectified spirit f℥ss, lard ℥j.

The antidote in cases of poisoning by Belladonna and its alkaloid is an infusion of galls and lime water, first evacuating the stomach as speedily as possible.

Dental Uses.—In dental practice, sulphate of atropine is applied externally to obtund the sensitiveness of inflamed pulps of teeth, preparatory to their treatment, and to their devitalization; it is also applied to acute inflammation, depending upon alveolar periostitis and abscess. It forms one of the ingredients of a nerve paste, for devitalizing pulps of teeth, being substituted for the acetate of morphine, but there is

doubt as to its being so effective as the morphine salts; in facial neuralgia, in the form of an ointment; in neuralgia and in profuse salivation. As an anodyne for internal use, it proves efficacious in relieving intense pain, such as may result from an inflamed pulp or periosteum; also internally, or in the form of hypodermic injections, for the relief of facial neuralgia; for such a purpose $\frac{1}{120}$ of a grain of the atropine sulphate is often combined with morphine sulphate.

DENTAL FORMULÆ.

For Facial Neuralgia.

℞. Atropinæ sulphat . . . gr.j
Adipis . . . . . ʒj. M.

SIGNA.—To be applied in the form of an ointment, over seat of pain.

For Neuralgia.

J. L. LUDLOW.

℞. Atropinæ sulphatis . . gr.ss
Aconitinæ . . . . . gr.iss
Olei tiglii . . . . . gtt.ij
Ung. petrolei . . . . . ʒij. M.

SIGNA.—Apply externally.

For Facial Neuralgia.

℞. Pulveris belladonnæ . . ℥x
Camphoræ . . . . . ℥ss
Spiritus rectificati . . . q.s. M.

SIGNA.—To be applied with a camel-hair brush.

For Neuralgia of Superficial Nerves.

AITKEN.

℞. Atropinæ sulphat . . . gr.v
Aquæ destillat . . . . f℥iii. M.

SIGNA.—Use on a compress and renew several times in 24 hours, and continue for at least one hour at a time, covering with oilskin, to prevent evaporation.

For Facial Neuralgia.

℞. Ext. belladonnæ . . . gr.ss
Quininæ sulphat . . . gr.ij. M.
Ft. pil. No. 1.

SIGNA.—Use three times daily.

For Facial Neuralgia.

℞. Linimenti belladonnæ,
Linimenti aconiti . āā . ʒvij
Chloroformi . . . . . fʒij. M.

SIGNA.—To be applied as a lotion, on lint saturated with it, and covered with oiled silk.

For Neuralgia in Superficial Nerves.

℞. Chloroformi,
Spts. vini rect. . āā . . ℥ss
Atropinæ sulphat . . . gr.v. M.

SIGNA.—To be applied on lint to painful part, and covered with oiled silk.

For Neuralgia.

℞. Ext. belladonnæ . . . . . gr.iv
Ext. stramonii . . . . . gr.v
Ext. hyoscyami . . . . . gr.v
Quininæ sulphat. . . . . ℈ij. M.
Ft. pil. No. xx.

SIGNA.—One pill two or three times a day.

AURUM TERCHLORIDUM—TERCHLORIDE OF GOLD.

Formula.— $AuCl_3$.

Derivation.—The Terchloride of Gold is obtained by dissolving gold in *aqua regia* (three parts, by measure, of hydrochloric acid, and one of nitric acid) using gentle heat to hasten the solution, the acids employed being chemically pure. The solution is then evaporated to dryness, when ruby-red, prismatic crystals of the terchloride of gold result.

Properties and Action.—Terchloride of gold is very deliquescent, and is soluble in water, alcohol and ether. It possesses a disagreeable, styptic taste, reddens blue litmus paper and will impart a purple stain to the skin, which may be removed by a solution of cyanide of potassium. It is readily decomposed by many metallic and non-metallic elements, and also by saline and organic compounds, on account of its elements being held together by a feeble affinity. It is escharotic and disinfectant, and its physiological effects are similar to those of corrosive sublimate. It is not used internally.

Dental Uses.—In dental practice, the terchloride of gold, in the form of an aqueous, alcoholic, or ethereal solution, is employed for the purpose of obtunding the sensitiveness of dentine, for which it is a valuable application: and the ethereal solution possesses some advantages over the aqueous or alcoholic solutions for such a purpose. To prepare an obtunding solution: "Dissolve the crystals of the gold in pure water; fill a test tube half full of the solution; then add an equal quantity of sulphuric ether, and agitate the mixture. Let it then rest for a few minutes, when the ethereal solution will rise to the surface, and may be poured off into another tube or phial, and securely stopped. It should be kept, as much as practicable, from the action of light and air. Applied to dentine, on pledgets of cotton, it acts like chloride of zinc, but more promptly and with less pain. Chlorine is more abundantly liberated during its action than from chloride of zinc; hence it is a better disinfectant than the latter. It has a fine yellow tint, and it is not absorbed by the dentine, but forms an in-

soluble compound with the gelatinous elements. As it is an irritant poison, care should be observed in its use. If not protected in a glass-stoppered bottle, the gold is precipitated in a metallic form.

BELLADONNÆ FOLIA—BELLADONNA LEAVES.

BELLADONNÆ RADIX—BELLADONNA ROOT.

DEADLY NIGHTSHADE.

Source.—Belladonna is a perennial, herbaceous plant, found in Europe, the leaves and root being the medicinal portions.

Medical Properties and Action.—Belladonna is anodyne and antispasmodic, its activity depending upon an alkaloid, *Atropine.* Belladonna, in small doses, is a valuable narcotic and anodyne stimulant. It causes a peculiar dryness of the mouth, fauces, stomach and intestines, but increased secretion follows, especially in the case of the latter organs, when atropine is administered or subcutaneously injected. In larger doses, it causes dilatation of the pupils, giddiness, loss of vision, difficult deglutition, constriction of the throat, difficult articulation, increased action of the heart, quickened respiration, nausea, vomiting, diuresis, purging, and sometimes a red eruption. It is eliminated chiefly by the urine.

Opium is the antidote, or hypodermic injections of morphine. When applied to the eyebrows, belladonna causes dilatation of the pupils.

Therapeutic Uses.—Belladonna is extensively employed, either alone or in combination with sulphate of quinia, in the treatment of neuralgia; also in mania, Bright's disease, epilepsy, lead colic, spasmodic affections, diseases of the cerebro-spinal system, as a preventive of scarlatina, night sweats of phthisis, etc.

Dose.—Of powdered belladonna, gr. ss to gr. j. daily; of the extract, gr. ¼ to gr. j; of the tincture, gtt. v to gtt. xx. (See Atropine.)

BENZOIC SULPHIDE OF SODIUM.

Benzoic Sulphide of Sodium is obtained by dissolving a large quantity of benzoic acid in a concentrated solution of

sulphide of sodium. It is a valuable antiseptic for dressing wounds, and may be used as a wash, lotion or injection, its antiseptic properties being very active and healing. Thirty to forty-five grains are used to the quart of water. Heckel considers it to be equal to carbolic acid, and superior both to sublimate and iodoform, as it is not poisonous like corrosive sublimate, and is free from the disagreeable effects of iodoform. It is very soluble in water and contains the antiseptic properties of its two principal ingredients—benzoic acid and sulphite of sodium. It is harmless, even when given in large doses.

BISMUTHI SUBNITRAS—SUBNITRATE OF BISMUTH.

Formula.—$BiONO_3H_2O$.

Derivation.—The metal Bismuth—*Bismuthum, Formula* Bi, from which the subnitrate is obtained, is found native in Europe and America, and generally in combination with sulphur and oxygen. It fuses at 476° F., and is brittle and pulverizable. It is employed in the dental laboratory for making fusible metal alloys for dies and counter-dies.

The Subnitrate of Bismuth is obtained by dissolving the metal bismuth in dilute nitric acid, and converting the nitrate thus formed into carbonate, by adding a solution of carbonate of sodium, which is then dissolved in nitric acid and the nitrate of bismuth again formed, which is washed in water and the nitric acid removed by ammonia. Such a process frees it from the arsenious acid which metallic bismuth generally contains. Subnitrate of bismuth is in the form of a heavy, white powder, with a faint acid odor and slightly metallic taste, and is insoluble in water. Large quantities are poisonous, with symptoms of arsenical poisoning.

Medical Properties and Action.—Subnitrate of bismuth is sedative, astringent and alterative. Owing to the formation of a sulphide, it coats the tongue black, and its continued use may give rise to the formation of a bluish-red line on the gums, similar to that resulting from the use of lead, except that the line is wider and deeper in color. In proper doses, it promotes the appetite and increases the digestive power. Being

somewhat astringent, it affects the intestinal movements, and can be detected in the blood, urine, and other secretions.

Therapeutic Uses.—Subnitrate of bismuth is employed in atonic dyspepsia, gastric irritations (milder forms), pyrosis, gastrodynia, ulcer of the stomach, diarrhœa from debility, etc., chronic laryngitis, epilepsy, ringworm (in form of an ointment ℥j to lard ℥j), chronic skin diseases, chlorosis, when iron is not tolerated, etc., etc. If not well borne by the stomach, it may be combined with aromatic powder, or if alkalies are indicated, with chalk and magnesia.

Bismuthi subnitras is also employed as an antiseptic dressing for wounds, to promote primary union. The subnitrate is held in suspension in water, in the proportion of 10 per cent., and during the operation the wound is, from time to time, sprinkled with the solution, and afterward sealed with a bismuth paste, and the subsequent dressings made in the same manner.

Dose.—Of subnitrate of bismuth, grs. v-x to ℥j, in powder or emulsion.

Dental Uses.—Subnitrate of bismuth is a valuable internal remedy in aphthæ, mercurial salivation, painful ulcers of the mucous membrane of the mouth, vomiting, cholera infantum, and diarrhœa of children during painful dentition. It is best given in milk, and before meals.

For cancrum oris, after using a disinfecting solution to cleanse the gangrenous part, the topical application of subnitrate of bismuth, every three hours, corrects the fetor, arrests the progress of the gangrene, and hastens cicatrization.

DENTAL FORMULÆ.

For Vomiting and Painful Digestion of Teething Children, Acidity and Pyrosis.

BARTHOLOW.

℞. Bismuthi subnitrat . ℥ iij
Acid carbol . . . . . gr. ij-gr. iv
Mucil. acaciæ . . . . ℥ j
Aquæ menthæ pip . . ℥ iij. M.

SIGNA.—A tablespoonful for adults, and proportionate quantity for children three or four times a day.

For Gangrene of Mouth (Cancrum Oris).

℞. Bismuthi subnitras (powd.).

SIGNA.—Applied to ulcerated surface, and covered with absorbent cotton.

For Diarrhœa of Dentition.

℞. Bismuthi subnitrat . . gr.lx
Extract rhei fluid . . gtt. viij
Syrup rubus . . . . f ℥ss
Elixir aurantii . . . . f ℥ss. M.

SIGNA.—A teaspoonful four or six times a day. Proper feeding—barley water, milk and lime water. Starchy food prohibited

For Internal Administration to Support the Strength.

℞. Quininæ sulphat . . . gr. iij to v
Tinct. ferri chloridi . . gtt. v. M.

SIGNA.—Three time daily.

BROMIDES.

Bromides are diffusible agents which rapidly pass into the blood, and in large doses can be detected in the fæces and intestinal mucus, owing to a portion of the agent not being absorbed. They depress the heart's action, and also respiration and animal temperature; in some cases large doses may cause transient excitement, giddiness and intoxication. Moderate doses have a tranquillizing effect and refreshing sleep, and lower the sensibility to pain and irritation. Their immoderate use will cause paralysis of the muscles, and a condition known as *bromism*, the symptoms of which may be extreme pallor and anæmia, dilated pupils, slow and feeble action of the heart, breathlessness and quickened pulse on slight exertion, acne, skin eruption, cool extremities, tremulous and uncertain movements, want of tactile feeling, relaxation of the genitals, dry fauces, difficult deglutition, and weak mind.

AMMONII BROMIDUM—BROMIDE OF AMMONIUM. Formula.—NH_4Br. In the form of colorless, transparent crystals, or a white granular salt, with a pungent, saline taste, neutral reaction, and no odor. Ammonii Bromidum is soluble in 1.5 parts of water, in 150 parts of alcohol at 60° F., and in 0.7 part of boiling water.

Dose.—Gr. x to ℈ss, considerably diluted.

CALCII BROMIDUM—BROMIDE OF CALCIUM. Formula.—$CaBr_2$. In the form of a white granular, deliquescent salt, with a pungent, saline, bitter taste, and no odor. It has a neutral reaction, and is soluble in 0.7 part of water, and in 1 part of alcohol.

Dose.—℈j to ℥ij.

LITHII BROMIDUM—BROMIDE OF LITHIUM. Formula.—LBr. In the form of white, granular, deliquescent salt, with a pungent, bitter taste, and a neutral reaction. Quite soluble in water and alcohol.

Dose.—Gr. v to ℈ij.

SODII BROMIDUM—BROMIDE OF SODIUM. Formula.—NaBr. In the form of small, colorless crystals, or a white crystalline powder, with a saline taste, neutral reaction, and no odor. It is soluble in 1.6 parts of water, and in 200 parts of water at 60° F.

Dose.—℈j to ʒii. (See Bromides of Potassium, Camphor and Ethyl.)

Medical Properties and Therapeutic Uses.—The bromides have the same general action and are employed for the same purposes. The bromide of lithium is considered to have a more hypnotic influence than the others; and the bromide of sodium is generally given in full doses; the others in rather smaller doses. Prof. Bartholow considers the bromide of potassium to possess more toxic power, and the bromide of sodium the least. As regards their influence on the pulse, body-head, and respiration, the same author places the bromides in the following order: bromide of sodium, bromide of lithium, bromide of potassium, bromide of ammonium. The bromides are eliminated through the kidneys chiefly; also through the mucous membrane of fauces, bronchi, intestinal canal and the skin; several days being required for their diffusion outwardly from the blood. The bromides are administered in delirium tremens, insanity, increased action of the heart, tetanus, neuralgia, epilepsy, vaso-motor disturbances, spasmodic asthma, abnormal sexual excitement, nocturnal seminal emissions, vomiting of cerebral congestion, pregnancy and sea-sickness, cholera infantum, migraine, strychnine-poisoning, etc., etc. Locally in pruritus, prurigo, eczema, epithelioma, old ulcers, etc. (For Dental Uses, see Bromide of Potassium.)

BROMOL—TRI-BROM-PHENOL, BROMO-PHENOL.

Formula.—$C_6H_2Br._3HO$.

Derivation.—Bromol is a compound of bromine and carbolic acid. It is in the form of soft, white needles, and is prepared by treating phenol or carbolic acid with an excess of bromine in aqueous solution.

Medical Properties and Therapeutic Uses.—Bromol possesses strong antiseptic properties, and at the same time is non-toxic. Rademaker recommends it for external use, either dissolved in olive oil (1 in 30) or mixed with vaseline (4 in 40). It may also be employed in the form of powder like iodoform, for sprinkling in wounds.

It is also used internally in cholera infantum, typhoid fever, etc., etc.

Dose.—For internal administration, the dose of bromol is from $\frac{1}{12}$ to $\frac{1}{4}$ grain.

Dental Uses.—The uses of bromol in dental practice are the same as iodol, iodoform and other antiseptics. Good results have been obtained by its application to teeth affected with alveolar abscess and gangrenous pulps.

CADMII SULPHAS—SULPHATE OF CADMIUM.

Formula.—$3\ (CdO.SO_3) + SHO$.

Derivation.—Sulphate of Cadmium is obtained by the action of nitric acid, diluted with distilled water, on the metal cadmium, the solution filtered and mixed with carbonate of soda, and again dissolved in sulphuric acid diluted with distilled water. It is in the form of transparent, colorless crystals, like those of sulphate of zinc.

Medical Properties and Action.—Sulphate of cadmium is emetic and astringent, and closely resembles sulphate of zinc in its action, but is stronger, with a caustic astringent taste. It is very nauseant and depresses greatly. Locally it is an irritant poison, and produces the cerebro-spinal symptoms of coma and convulsions; it is not administered internally, as the preparations of zinc are preferable for such use.

Therapeutic Uses.—Sulphate of cadmium is employed locally in affections of the eye, being valuable as a collyrium; it has the power of causing absorption of opacities of the cornea to a remarkable degree. It is also used as an injection in gonorrhœa, in the strength of one grain to four ounces of water. It is also used in the form of ointment, two grains with four scruples of lard.

Dental Uses.—Sulphate of cadmium has been employed in ulcerations of mucous membrane, gangrene of the mouth, or cancrum oris, indolent ulcers, purulent diseases of the antrum, in the form of injections and lotions, of a strength about one grain of the sulphate to four ounces of water.

CALCII HYPOPHOSPHIS—HYPOPHOSPHITE OF LIME.

Formula.—$Ca_2PH_2O_2$.

Derivation.—The salt, Hypophosphite of Lime, is obtained by boiling phosphorus in a mixture of hydrate of lime in boiling water, until phosphoretted hydrogen escapes, and phosphate and hypophosphite of lime are formed in the solution, which is then filtered and evaporated over sulphuric acid, when the salt is crystallized out in the form of white, pearly crystals, with a nauseous, bitter taste. It is soluble in six parts of water, but is insoluble in alcohol.

Medical Properties and Action.—The hypophosphite of lime, with those of soda and potassa, are all included under the term "alkaline sulphites." Taken internally, they are readily absorbed, and are partially changed in the system into sulphates. They combine with acids to form salts, and they dissolve albumen, and increase the formation of saliva. Being regarded as tonic, alterative, stimulant and nervine, they are employed in cases of debility, more especially where the phosphates are deficient, as they possess the therapeutic properties of phosphorus.

Therapeutic Uses.—The different sulphites of lime, soda, and potassa, are employed in intermittent and malarious fevers, typhus fever, smallpox, and other exanthematous diseases, pyæmia, dyspepsia, neuralgia with nervous depression, anæmia,

for which affections they are combined with iron and quinine; diphtheria, cystitis, phthisis, etc., etc. Externally, the sulphites are efficient as local applications (especially the sulphites of soda), in gangrenous and other ulcerations, diseases of the skin, etc. One or two ounces to the pint of water form a stimulant and deodorizing lotion, which is promotive of healthy action.

Dose.—Of the hypophosphites, gr. iij to gr. xv, three times a day in syrup.

Dental Uses.—The hypophosphite of lime is the most eligible salt, but the different sulphites are often administered together, in the form of a syrup. Where there is nervous depression, as a result of trigeminal neuralgia, the hypophosphites prove serviceable. In the case of delicate children, where there is reason for believing the phosphate of lime, or the lime salts generally of the teeth, are deficient in quantity.

CALENDULA.

MARIGOLD.

Source.—Calendula is a well-known garden plant, sometimes growing wild, with a peculiar and rather disagreeable odor, and a bitter, rough, saline taste. Both the leaves and the flowers are employed.

Medical Properties and Action.—It is slightly stimulant, diaphoretic, antispasmodic, sudorific, and emmenagogue, but is seldom used internally. It contains a bitter principle known as *calendulin.*

Therapeutic Uses.—Calendula has been employed in low forms of fevers, scrofula, jaundice, amenorrhœa, etc. Externally it is used in the form of tincture—*Tinctura Calendula*—in its full strength or diluted, and is very serviceable in exercising a curative influence in the treatment of incised wounds and contusions, preventing inflammation and suppuration. Some writers consider it to be unequaled as a local application after surgical operations, as it promotes union by first intention. It is applied as a lotion on lint. It is also thought to be a preventive against gangrene and tetanus.

Dose.—Of the tincture of calendula, f℥j to f℥ij.

Dental Uses.—Calendula, in the form of tincture, is employed in dental practice as an application to wounded or irritated pulps of teeth, when partially exposed; also after the extraction of teeth; wounds about the mouth; and in such cases it proves a very useful remedy. A few drops added to a wine-glass of water form a soothing and efficient mouth-wash for the soreness resulting from the removal of salivary calculus; also useful in superficial inflammations of the mucous membrane of the mouth, etc.

CALX—CALCIUM.

LIME.

Formula.—CaO.

Derivation.—Lime is obtained by calcining limestone or chalk, until the carbonic acid is driven off. Lime is more soluble in cold than in hot water, and a compound of lime and sugar is more soluble in water than pure lime alone. Calcium is the metallic base of lime.

Medical Properties and Action.—Quicklime is a powerful escharotic and irritant.

Liquor Calcis—*Lime Water.*—It is prepared by adding cold water to freshly slacked lime, and the clear fluid poured off.

The officinal preparation consists of four troy ounces of saturated solution of lime in eight pints of distilled water. It is a colorless, inodorous liquid, possessing a disagreeable alkaline taste.

Exposure to the air causes it to gradually absorb carbonic acid, with the formation of insoluble carbonate of lime, and it should therefore be preserved in glass-stoppered bottles. The addition of liquorice or coriander seed will disguise its taste.

Medical Properties and Action.—Lime water is antacid, astringent, antiseptic and detergent. It is applicable to all cases where antacids are indicated, and where an astringent effect is not objectionable.

Therapeutic Uses.—Lime water is an excellent remedy in gastric irritation, accompanied with nausea and vomiting;

also in dyspepsia, attended with vomiting of food; also in diarrhœa, after the inflammatory action has been relieved; also in glandular affections, as an alterative resolvent. Externally, as a wash for foul ulcers, diseases of the skin, and as an injection in gleet and leucorrhœa. Atomized inhalations have been found useful in diphtheria and membranous croup.

Dose.—Of lime water, f℥ss to f℥iij or iv, several times a day. It may be mixed with an equal quantity of milk for internal use.

Lime liniment—*Linimentum Calcis* (lime water f℥viij, flaxseed oil ℥vij)—is a valuable application to burns, scalds and in small-pox.

Dental Uses.—In dental practice lime water is a useful agent in the form of a gargle, where the secretions of the mouth are viscid and fetid, and especially where the teeth are soft in structure and exceedingly sensitive, owing to the condition of the oral fluids, and especially in mucous secretions, which act readily on teeth deficient in earthy constituents. For young patients, the use of lime water is very beneficial to the teeth, owing to an acid condition of the oral fluids, common to an early period of life. It is also useful where the teeth are very sensitive, on account of the recession of the gum and absorption of the process.

When lime water is applied to inflamed mucous membrane, or to suppurating surfaces, it arrests secretion. It is also useful in sickness and irritability of the stomach during dentition; also to relieve the superficial ulceration of the mucous membrane of the mouth, caused by the acid eructations attending dyspepsia, in the proportion of one part of lime water to two or three of milk.

Syrup of the Lacto-phosphate of Lime.—*Syrupus Calcii Lacto-phosphatis*—is composed of precipitated phosphate of calcium 22 parts; lactic acid 33 parts; orange flower water 80 parts; sugar 600 parts; hydrochloric acid, water of ammonia and water, each, a sufficient quantity.

Dose.—f℥j to f℥j.

This syrup is especially useful in rickets, mollities ossium,

delayed union of fractures, caries and necrosis in bone, anæmia of nursing mothers, mammary abscesses or boils, carbuncles, chronic bronchitis, leucorrhœa, early decay of the teeth in children, etc.

CALX CHLORATA—CHLORINATED LIME.

CHLORIDE OF LIME.

Formula.—$CaCl_2O_2CaCl_2$.

Derivation.—Chloride of Lime is obtained by passing chlorine over hydrate of lime till saturation is effected. It is in the form of a grayish-white substance, either in powder or friable masses, dry or but slightly moist. It is readily soluble in water, and will absorb moisture when exposed to the air. It has a bitter, caustic taste, and a slight odor of chlorine.

Medical Properties and Action.—Chloride of lime is a stimulant, deodorizer, disinfectant, antiseptic and bleaching agent. In small doses it increases the action of the secreting organs, and if long continued it acts specifically upon the lymphatic glandular system, causing the reduction or absorption of glandular and other tumors. In large doses it acts as an acro-narcotic poison, and its use should always be commenced in small doses, carefully increased, and discontinued when such symptoms as nausea, vomiting or giddiness appear. It is chiefly used as a disinfectant.

Therapeutic Uses.—Solutions of chlorinated lime are employed locally in scarlet fever, diphtheria, aphthæ, gangrene; and it has been administered internally in scrofula, typhus, malignant scarlet fever, syphilis, etc.

Dose.—Of chloride of lime, gr. j to gr. v, in solution, several times a day. As a wash, 1 part dissolved in 100 parts of water.

Dental Uses.—Chloride of lime is employed in dental practice in the treatment of cancrum oris; one method of application being the introduction of the dry powder, with the point of the finger, to the ulcerated surface, and the mouth well washed out immediately afterward; also, in the form of a gargle composed of 1 part of powdered chloride of lime to 30

parts of mucilage and 15 parts of syrup. Solutions of chloride of lime are also efficient in scorbutic and other ulcerations of the mouth. It is also employed to correct the fetor of the breath, in the form of a mouth wash, prepared as a weak solution.

One of the most important uses in dental practice is as a bleaching agent, either alone or in combination with other substances, to restore the color of devitalized teeth. When chlorinated lime is employed for bleaching discolored teeth, a good quality should be obtained, and no steel instrument used for its introduction; wood or gold instruments are to be preferred, and the chloride should be perfectly dry, and have been kept so from the time it was made. An efficient bleaching preparation is composed of equal parts of dry chlorinated lime and tartaric acid, mixing them together dry, and adding a little of the acid at a time. When prepared, the mixture should be kept in a glass-stoppered bottle. For bleaching purposes, chlorinated lime is also combined with chloroform, in the form of a thin paste. When chlorinated lime, or its combinations, is introduced into the cavity of a tooth, it should be secured by a temporary filling of gutta percha, Hill's Stopping, or one of the zinc preparations, and be secured from passing beyond the foramen of the root, by a filling introduced near the apex of the root. More than one application may be required, after which the cavity should be thoroughly cleansed, and a temporary filling of the whitest shade of the oxychloride of zinc filling material be introduced and worn for some time, after which a more durable gold filling can be inserted.

DENTAL FORMULÆ.

For Gangrene of the Mouth—Cancrum Oris.

BARTHOLOW.

℞. Calc. chlorat . . . . . ℥ss
Mucilaginis . . . . . ℥ss
Aquæ destil. . . . . ℥iiiss. M.

SIGNA.—To be used as a lotion.

For Fetor of the Breath.

BARTHOLOW.

℞. Calc. chlorat . . . . ℥iij
Aquæ destil . . . . ℥ij
Alcoholis . . . . . ℥ij
Ol. rosæ . . . . . gtt.iv. M.

SIGNA.—A teaspoonful in a tumblerful of water; used as a gargle.

CAMPHO-PHENIQUE.

Formula.—$C_8H_{11}O$.

Derivation.—A limpid, volatile fluid with a hot, aromatic taste, and the odor of camphor, obtained from the chemical union of carbolic acid and camphor. Dissolve 9 parts of the acid in one part of alcohol and mix with 25 parts of camphor, forming a clear oily solution.

Medical Properties and Therapeutic Uses.—Campho-phénique is an antiseptic, local anæsthetic, germicide and parasiticide. It is also non-irritant, non-poisonous, insoluble in water or glycerine, does not discolor or stain, and possesses an agreeable odor and taste. It prevents suppuration in fresh wounds, controls it in wounds in all stages, and as a local anæsthetic obtunds pain. It is claimed that campho-phénique, pure, is equal to 1 to 85 of bichloride of mercury which is six times as strong as it can be used even on the unbroken skin, and about 25 times as strong as is considered safe on cut surfaces. Campho-phénique is altogether free from toxic or caustic properties, and is one of the safest of germicides; it also maintains an unchanged integrity, and is well adapted to a large proportion of pathological dental cases. It should never be combined with water or glycerin, but it will mix in all proportions with alcohol, ether, chloroform, and all fatty substances.

Employed as an antiseptic, it penetrates the tissue as rapidly as carbolic acid, and also slightly hardens the tissue.

Dental Uses.—As a pulp-canal dressing, campho-phénique has given very satisfactory results as a substitute for corrosive sublimate, carbolic acid, creosote, oil of cloves, iodoform, etc. If thoroughly applied to the gum or injected with a hypodermic syringe, it acts as an efficient local anæsthetic, causes no constitutional disturbance. It is also employed as an obtunder of sensitive dentine, and relieves the pain following the extraction of abscessed teeth when applied on a pledget of cotton: it also relieves the pain attending the separation of teeth, and irritation of the dental pulp. It is also used as the

menstruum for the arsenic and morphia of pulp devitalizing preparations: also for putrescent pulps, and as an antiphlogistic in the earlier stages of periodontitis. It will mitigate the pain attending the induction of suppuration, and either in full strength or diluted, give satisfactory results when injected into fistulæ. It is also useful as an antiphlogistic in the earlier stages of sthenic pericementitis applied to the gum on small pads of linen and renewed. Also useful in eczema, intolerable itchings, burns, sprains, etc.

For Chapped Hands.

J. W. DOWNEY, M. D.

℞. Campho-phénique.
Oil of cade . . . . . āā ʒj
Rose cosmoline . . . . . ʒj M.
SIG.—Apply frequently.

To Sterilize Instruments.—For the purpose of sterilizing or disinfecting instruments, such as broaches, nerve-canal instruments, etc., a solution of campho-phénique, or of eugenol, or of oil of cassia, or oil of turpentine, or of terpinol may be kept in a small large-mouthed bottle into which the instrument may be dipped before using. Bichloride of mercury injures steel instruments. Dr. W. D. Miller recommends a boiling solution of bicarbonate of sodium as the most effective sterilizer (see Dr. Miller's experiments in sterilizing dental instruments in the chapter on Antiseptics in Dental Practice).

CAMPHORA—CAMPHOR.

Formula.—$C_{10}H_{16}O$.

Source.—Camphor is a concrete substance obtained from the camphor laurel, an evergreen tree of China, Japan and Formosa, by sublimation, the crude gum being purified by resublimation with quicklime. Refined camphor is in the form of large circular cakes, one or two inches thick, and has a strong, penetrating, fragrant odor and a bitter, pungent taste, attended with a slight sense of coolness. It is white, pellucid, and somewhat unctuous to the touch.

Medical Properties and Action.—Camphor is anodyne, stim-

ulant, refrigerant, diuretic and diaphoretic. It increases the action of the heart and arteries, and renders the pulse softer and fuller; but such effects are very transitory, and are followed by depression. In large, but not over-doses, it allays pain and spasm, and induces sleep. In over-doses, it excites narcotic symptoms, with those of an irritant poison, and has proved fatal. It acts chiefly on the nervous system.

Therapeutic Uses.—Camphor is administered in fevers of an asthenic type, acute inflammations, inflammation of the brain, delirium tremens, asthma, rheumatic and nervous headaches, diseases of the heart, hysteria, dysentery, diarrhœa, cholera, etc., etc. Externally as an anodyne in rheumatism, and as a discutient in chronic inflammatory affections; also, the powder as a snuff in coryza and influenza, and in the form of CAMPHOR LINIMENT—*Linimentum Camphoræ*—(camphor 1 part, olive oil 4 parts).

CAMPHOR WATER—*Aqua Camphoræ*—(camphor gr. cxx, alcohol ♏xl, carbonate of magnesia ℥ss, distilled water Oij).

SOAP LINIMENT—*Linimentum Saponis*—(camphor ℥iv, oil of rosemary f℥ss, alcohol Oij, water ℥vj) is an anodyne and gentle rubefacient for sprains, rheumatic and gouty pains.

SPIRIT OF CAMPHOR—*Spiritus Camphoræ*—(camphor ℥iv, alcohol Oij).

Dose.—Of camphor in substance, gr. ij to gr. x, in form of an emulsion, made of sugar, gum arabic, myrrh and water. Of camphor water ℥j to ℥j; of spirit of camphor, ♏v to ♏xx.

Dental Uses.—In dental practice, the spirit of camphor is locally employed to allay the pain arising from the near exposure of the pulps of teeth: also the pain of sensitive dentine, and that following the extraction of teeth affected with periodontitis; also to arrest the hemorrhage and allay the pain of wounded pulps of teeth. It forms an efficient anodyne when in the form of a strong solution of camphor in chloroform. Camphor has also been employed in the treatment of putrescent pulps of teeth.

Combined with creosote or carbolic acid, camphor is

thought to have the power of modifying the escharotic action of these agents. For such a purpose, 20 grains of camphor are combined with 1 ounce of the creosote or carbolic acid.

The Oil of Camphor—*Oleum Camphoræ*—is preferred by some to answer such indications. Camphor also forms one of the ingredients of the celluloid base of artificial teeth, which is composed of pyroxylin 100 parts, camphor 40 parts, oxide of zinc 2 parts, and vermillion 0.6 part. With ether, camphor is also used as a local anæsthetic. A cataplasm of camphor, morphia and flaxseed, applied to the cheek, has been used for the relief of odontalgia.

Phenol-Camphor—is made by mixing together 1 part of carbolic acid and 3 parts of camphor. After 24 hours this becomes a liquid, having a specific gravity of 990. It is used with oil as an antiseptic, and in the form of spray may be applied to the skin as a local anæsthetic. It is also employed to disinfect or sterilize surgical and dental instruments, and on wool and gauze for dressing wounds. It is soluble in ether, alcohol and oils, but insoluble in water or glycerine. Menthol, cocaine, salicylic acid, iodoform, chloral hydrate and mercuric chloride are solublein phenol-camphor. (See *Campho-Phenique.*)

Nausea from Impression Taking.—Dr. A. W. McCandless recommends a gargle of camphor water. Should this fail, a four per cent. solution of cocaine painted over surface of the tongue and palate will produce the desired result except in very obstinate cases.

DENTAL FORMULÆ.

For a Local Anæsthetic.

℞. Pulv. camphoræ . . . . ʒviij
Æther. sulph . . . . fʒj. M.

Signa.—Applied to the gum over the tooth to be removed, until it turns white or becomes blanched.

For a Local Anæsthetic.

℞. Chloral,
Camphoræ . . aā . . ʒ
Morphiæ sulph . . . ʒss
Chloroformi . . . . ʒj. M.

Signa.—Apply with camel's-hair brush, allow to dry and reapply as freely as is necessary to render part insensible to pain.

For a Stimulant and Anodyne Lotion.

℞. Spiritus rosmarini . . ʒj
Camphoræ . . . . . ʒj
Saponis albæ . . . . ʒiv. M.

Signa.—To be applied as a lotion.

For a Local Anæsthetic.

℞. Camphoræ . . . . . ʒj
Æther vel chloroformi ʒij. M.

SIGNA.—Apply with a camel's-hair brush.

For Neuralgia.

℞. Camphoræ,
Chlor. hydratis āā equal parts. M.

SIGNA.—Apply as a lotion.

For Neuralgia and Exposed Pulps.

℞. Camphoræ . . . . . 5 parts.
Chlor. hydratis . . . 2 parts.
Cocaine hydrochlor . 1 part. M.

SIGNA.—Heat to boiling point of water, when it liquefies; use as a local application.

For Pain of Tooth Extraction.

℞. Camphor . . . . . ʒj.
Chloroform . . . . f ʒij. M.

SIGNA.—Apply on cotton.

CAMPHORA MONOBROMATA—MONOBROMATED CAMPHOR.

Formula.—$C_{10}H_{15}BrO_2$.

Derivation.—Monobromated Camphor is obtained by the action of bromine on camphor, and subsequent purification with animal charcoal and repeated crystallization. It is a colorless, crystalline substance, with the odor of camphor and turpentine, and a slightly bitter taste. It is insoluble in water, but soluble in alcohol and ether.

Medical Properties and Action.—It produces a sedative effect upon the circulatory system, and especially upon the cerebro-spinal nervous system, and is also an antispasmodic.

Therapeutic Uses.—Bromide of camphor is employed as a sedative and antispasmodic, in affections of the nervous system, and where camphor is indicated, as in asthma, neuralgia, hysteria, delirium tremens, etc.

Dose.—Of bromide of camphor, gr. ij to gr. x, for an adult.

Dental Uses.—In dental practice, the bromide of camphor is employed as a sedative in convulsions of dentition, neuralgia, etc. For children suffering from the convulsions of dentition, gr. j of the bromide of camphor in acacia mucilage, and administered every hour, has been very serviceable in arresting the paroxysms.

CAPSICUM.

CAYENNE PEPPER.

Source.—Capsicum is obtained from the tropics of both hemispheres, being the fruit of capsicum annuum, and of

other species of capsicum. The crimson or yellow pods are dried and ground to powder, which has a bright red color, and an aromatic smell, with a bitter, acrid, burning taste. Its acrid, pungent qualities are due to a peculiar substance in the form of a thick, yellowish-red fluid, called *capsicine*.

Medical Properties and Action.—Capsicum is a powerful stimulant, producing, when small doses are taken, a sensation of warmth in the stomach, and a general glow over the body. It promotes the digestive process, and stimulates the circulation, and also the genito-urinary organs. In excessive doses, capsicum is an irritant poison.

Therapeutic Uses.—It is employed in certain forms of dyspepsia, flatulent colic, scarlet fever, yellow fever, delirium tremens, opium habit, etc., etc. Externally or locally as a gargle, in putrid or other forms of sore throat, chronic inflammation of the fauces, hoarseness due to a relaxed condition of the vocal cords, relaxed uvula, and in poisoning by opium, belladonna and aconite, it has proved useful as a stimulant.

Dose.—Of powdered capsicum, gr. v to gr. x, in pill. Of the tincture of capsicum—*Tinctura Capsici* (capsicum ℥j, to diluted alcohol Oij)—the dose is ♏x to f℥j. Of the infusion—*Infusum Capsici* (capsicum ℥ss; boiling water Oj)—the dose is f℥ss. The infusion is also used as a gargle.

Dental Uses.—In dental practice the tincture of capsicum is serviceable in the early stages of acute periodontitis; and also where it is necessary to hasten suppuration as quickly as possible, on account of the increasing severity of the attack—a solution composed of gtt. xxv, in a glass of warm water, of which a mouthful is to be retained for some minutes.

The tincture of capsicum is also useful in chronic dental periodontitis, to resolve the inflammatory products. It is also used to stimulate the gums and mucous membrane of the mouth in chronic inflammation and ulceration, and for looseness of the teeth as a result of salivation; also in cases of turgidity and puffiness of the gums. It is often serviceable in

chronic alveolar abscess as an injection, after the sac has been destroyed, also in recession of the gums from the necks of the teeth, for the purpose of stimulating them. A few drops added to a solution of aromatic sulphuric acid will prove serviceable in caries of the maxillary bones and in disease of the antrum. An efficacious stimulant gargle may be made of the tincture of capsicum ℥ss, to rose water ℥viij. Dr. Kirk recommends capsicum as a local stimulant and counter-irritant in the initial stages of pericemental inflammation before the formation of pus has taken place; in cases of soreness about roots of pulpless teeth, due to external violence, cold, etc., and not to septic irritation; for relief of severe neuralgias following the extraction of lower molar teeth, in the form of a cataplasm applied to the affected side of the face, or by moistening a piece of heavy blotting paper and applying this to the side of face. Dr. J. F. Flagg recommends the use of capsicum for pericemental inflammation in the form of the powder sewed in small linen bags to be placed in the mouth over root of affected tooth. Dr. Leffman recommends small oval disks cut from capsicum plaster (Seabury & Johnson's), the surface of which has been lightly anointed with the ethereal extract, or oleoresin of capsicum, which can be nicely adapted to the gum.

CARBO ANIMALIS PURIFICATUS—PURIFIED ANIMAL CHARCOAL.

Source.—Animal Charcoal, called "bone black," is obtained by exposing bones to a red heat, protected from the air. It consists of charcoal, phosphate and carbonate of lime.

PURIFIED ANIMAL CHARCOAL.—*Carbo Animalis Purificatus*—is obtained by digesting bone black in hydrochloric acid and water to a moderate heat, when it is dried and heated to redness in a covered crucible.

Properties and Action.—Animal charcoal is an absorbent, and is used to counteract the effects of poisonous agents, such as the alkaloids and acids.

Dose.—Of animal charcoal as an absorbent, ℥ss, to neutralize

the effects of each grain of such agents and strychnia and morphia.

CARBO LIGNI—WOOD CHARCOAL.

Source.—Wood Charcoal is obtained by subjecting soft wood to a red heat with but a limited supply of air, by which the water, etc., are removed, allowing the carbon to remain.

Properties and Action.—Wood charcoal is antiseptic and disinfectant and detergent, and is very serviceable in correcting the fetor of discharges and arresting the process of ulceration, especially when in the form of the dry powder, or mixed with linseed as a poultice.

Therapeutic Uses.—For foul and gangrenous ulcers, gangrene, phagedæna, suppurating surfaces, cancerous tumors, etc., etc.

Dental Uses.—The powdered charcoal added to water, in the proportion of one or two drachms to a glass of water, forms an efficient disinfectant gargle for the offensive fetor of mercurial stomatitis; also useful in foul and gangrenous ulcers of the mouth, diseased gums, offensive ulcerations, offensive fetor of cancrum oris, etc., etc. Notwithstanding its detergent properties, injury results from its use as a dentifrice, on account of its tendency to cause recession of the gums from the necks of the teeth.

CARVACROL.

Source.—The caraway plant, a native of Europe.

Derivation.—Carvacrol is a product of the essential oil of caraway, which is obtained from the seeds of the plant. Caraway—*carum*—seeds are of a light yellow color, with a pleasant aromatic smell, and a sweetish, warm, spicy taste. They are stomachic and carminative, and are occasionally used in flatulent colic, as a corrective of other medicines. The volatile oil of caraway is most employed in doses of gtt. j to gtt. x. CARVACROL is obtained by treating the oil of caraway with iodine, and washing the product with potassa, when it is mixed with carvene, which is one of the liquid oils of caraway.

Carvacrol is also found among the products of the action of iodine on camphor. When pure, it is a colorless, viscid oil, lighter than water, in which it is nearly insoluble. Its odor is like that of creasote, and its taste is persistent, strong and acrid.

Medical Properties and Action.—Carvacrol is antiseptic, carminative, disinfectant and escharotic. Combined, it forms an efficient gargle in inflammatory conditions. It is not employed internally.

Dental Uses.—In dental practice, carvacrol has been employed as a substitute for creasote, carbolic acid, and glycerole of thymol, in the treatment of odontalgia, sensitive dentine, alveolar abscess, and as an antiseptic in the pulp canals of teeth; also as a gargle in inflamed and ulcerated conditions of the mucous membrane of the mouth, tonsillitis, etc. Combined with water, in the proportion of 3 drops to the ounce, it forms an efficient gargle in stomatitis, tonsillitis, etc.; the strength of the solution may be increased, when a more powerful action is required. It is also employed with advantage in sensitive cavities of the teeth, in operating with the dental engine, to lessen the pain from friction of the instrument. As an application in odontalgia, from an exposed and irritable pulp, it affords almost instantaneous relief. It is claimed for carvacrol, that it is not so liable to cause inflammation as creasote; especially when it is applied through the pulp canals. When employed to obtund the sensitiveness of dentine, it is necessary to confine it in the cavity of the tooth for a few days, by means of a temporary filling of zinc preparation, as it readily dissolves Hill's Stopping and gutta percha. When it is used in the form of an injection in alveolar abscess, a sharp, burning sensation is experienced as soon as it reaches the seat of the affection, when the crown cavity of the tooth should be immediately closed.

In patients of a scrofulous diathesis, it is necessary to exercise care in the use of carvacrol. When applied to cavities before the introduction of the filling, and to exposed pulps, it is introduced on a pellet of cotton.

CHINOLINE OR QUINOLINE.

Formula.—C_6H_5N.

Derivation.—Chinoline was first obtained from coal tar, but afterward from the cinchona alkaloids. More recently it has been produced by the action of glycerin on aniline, or nitrobenzol. It is an oily liquid, with highly refracting property, and it combines with acids to form salts. The salt, *Tartrate of Chinoline*, is not so deliquescent as the other salts formed by its combination with acids, and is in the form of lustrous crystals, which preserve their form even in a damp atmosphere, although they are soluble in water. Chinoline is very soluble in alcohol and sparingly soluble in water.

Medical Properties and Action.—Chinoline, like other phenol derivatives, such as resorcin, hydroquinone, etc., possesses the power to lower fever heat, but does not affect the normal temperature.

Therapeutic Uses.—Like resorcin, chinoline has been used in intermittent and remittent fevers with great success; also in septic disorders. Topically, chinoline is a valuable antiseptic, and successfully acts upon minute organisms, preventing their increase and septic decomposition. A five per cent. solution of the tartrate of chinoline, the salt generally employed has been applied locally in diphtheria, with marked effect.

Dose.—Of chinoline, gr. v to xv.

Dental Uses.—Chinoline is used in dental practice as an antiseptic, belonging to the same class as resorcin, the salt tartrate of chinoline, in the form of a five per cent. solution, being preferable for local application. It is also used in combination with carbolic acid, for application on cotton to an aching cavity from which a tooth has been extracted.

CHLORIDE OF ALUMINIUM—ALUMINII CHLORIDUM—CHLORALUM.

The chloride of aluminium, also known as *Chloralum*, is prepared by passing chlorine, at high temperatures, over a mixture of aluminium and charcoal. By placing the anhydrous chloride of aluminium in water, it is converted into hydrated

chloride. It is said to be quite as potent as chloride of zinc or carbolic acid, and devoid of poisonous properties and unpleasant odor, and is unirritating, rendering it a useful antiseptic and disinfectant. As it does not cauterize, it is especially convenient for applications to the mouth. The taste is sharply saline, like that of alum, and its action closely approximates that of chloride of zinc.

In dental practice it has been used in the treatment of periodontitis, alveolar abscess, caries of bones, putrid pulps, alveolar pyorrhœa, and other diseases of mucous membrane.

CHLORIDE OF MAGNESIA—MAGNESII CHLORIDUM,

Chloride of Magnesia is prepared by evaporating to dryness a concentrated solution of muriate of magnesia, the chloride being obtained in the state of a fused hydrate. It is a bitter, very deliquescent salt, which acts mildly and favorably as a purgative, causing a flow of bile, and an increase of appetite. On account of its extreme deliquescence the liquid form, prepared by dissolving the salt in its weight of water, is preferred. The dose, diluted, is ℥ss to ℥j. In dental practice the chloride and hypochlorite of magnesia have been employed for bleaching teeth.

CHLORIDE OF TIN—STANNUM CHLORIDUM.

Chloride of tin is prepared by heating tin and hydrochloric acid together, and has been recommended for local application in purulent discharges. According to M. Mallez, chloride of tin has a direct action upon purulent secretions from mucous surfaces, without any substitutive action, like nitrate of silver for instance. Placed in contact with pus globules, under the microscope, these are seen to immediately disappear. In purulent diseases of the eye, also, it was successful. A solution consisting of ℥ss of the salt in f℥iij of distilled water, is used for injections.

CHLORIDE OF METHYL—METHYL CHLORIDE.

Formula.—CH_3Cl.

Derivation.—Chloride of Methyl is produced by the action of chlorine upon marsh gas; by heating together common

salt, sulphuric acid and methyl alcohol; or it is more cheaply manufactured by using the waste products of beets used in the manufacture of sugar. It is the chloride of a hydrocarbon in the form of methyl chloride, and resembles ether in appearance, taste and smell, but is less inflammable. Chloride of Methyl is generally employed as a local anæsthetic in the form of spray, although it possesses general anæsthetic properties also, and being very volatile and ether-like, rapid evaporation occurs when it is applied over an affected area. To avoid producing inflammation of the skin, or an erythema in persons having an irritable skin, caution is necessary; and it should be applied over as many nerve filaments as possible. The special advantage of chloride of methyl is its external application, which may never cause more than a temporary irritation of the skin. In order to produce local anæsthesia with this agent, M. Bardet proposes before spraying a surface with it, to paint it with glycerine, the revulsive action being less severe, and the glycerine forming a surface on which the drops of the refrigerant mixture collect, and which may be readily removed after the desired effect has been produced; the use of glycerine is also said to prevent the dangers of sloughing. Dr. Ch. Bailly recommends the following method of applying this agent as a local anæsthetic: A tampon of dry cotton covered with dry silk is sprayed with the anæsthetic until its temperature is reduced to 23°–55°C. below zero. The tampon is then grasped with ebony pincers and applied for a few seconds to the parts to be anæsthetized, and perfect abolition of pain at once secured. Drs. Daboll and Rhein recommend chloride of methyl as an application for trigeminal neuralgia, giving immediate relief by paralyzing the small filaments of the nerve. The spray is also used for obtunding sensitive dentine; it produces a more intense cold than ether, and with less pain, its obtunding effect lasting a longer time.

CHLORAL.

CHLORAL HYDRAS—HYDRATE OF CHLORAL.

Formula.—$C_2HCl_3OH_2O$.

Derivation.—Chloral is obtained by the action of dry

chlorine gas on absolute alcohol, and is purified by sulphuric acid and a small quantity of lime; a small quantity of water converts it into solid crystalline hydrate of chloral. It is in the form of a snow-white, crystalline mass, with a pungent odor and taste, soluble in its own weight of distilled water, and very soluble in alcohol. When heated, it fuses and evaporates, leaving no residue, and in the air without combustion.

Medical Properties and Action.—Hydrate of chloral is hypnotic and anæsthetic, possessing more of the former and less of the latter property than chloroform, and, unlike chloroform, after its administration there is no elimination by the breath or urine. It diffuses into the blood rapidly, causing an abundant flow of saliva, and a cooling sensation in the stomach, followed by warmth. Very large quantities cause a high degree of gastric irritation, nausea and vomiting. Taken in moderate quantity it stimulates the appetite, and produces muscular relaxation. It is uniformly certain in its action as a hypnotic, has no depressing influence, and does not cause constipation. Administered in doses of gr. x to gr. xxx, it causes unconsciousness to pain, and a profound sleep, lasting over several hours. The sleep it produces is quiet and gentle, and induced without distress. Liebreich claims to have produced sleep which lasted from five to fifteen hours, with from 25 to 30 grains of hydrate of chloral.

The habitual use of chloral leads to a disorder which is somewhat similar to the "opium habit," although it may not be as persistent. When there is present no susceptibility to its hypnotic action, it is liable to cause headache, and in some cases, a delirious excitement. Its hypnotic action is immediately preceded by a stage of excitement, generally of short duration, which is followed by sudden and complete sleep, very much like natural sleep, calm, dreamless and refreshing. It differs from a condition of narcotism from the fact that the patient can be easily roused to partake of nourishment, and will readily fall asleep again.

There are no unpleasant after-effects resulting from a mod-

erate dose of chloral, differing in this respect from morphine, which often causes headache, faintness, giddiness, nausea and constipation. Chloral is not capable of producing insensibility to pain, unless the quantity administered is sufficient to suspend the functions of the cerebrum. Great care is necessary in its use where symptoms of pulmonary disease, fatty heart or degenerated blood-vessels are apparent.

When a proper dose is administered the pupil contracts slightly, but the pulse may remain unaltered or become slower, and the respiration unaffected. When an improper or dangerous dose is taken, profound narcotism ensues, the respiration becomes slower, the pulse weak, rapid and irregular, sensibility is lost, all reflex movements are impossible, and complete muscular relaxation follows. It destroys life by the suspension of the functions of the cerebrum, and by paralysis of the respiratory centre, and of the cardiac ganglia; also death may suddenly follow by paralysis of the heart, in cases of fatty degeneration, and the lower lobes of the brain remain unaffected. The paralytic phenomena caused by chloral are due to its direct action on the nervous centres. The congestion of the meninges of the brain and cord, and distention of the right cavities of the heart, have been observed after poisoning by chloral. The antidote in cases of poisoning is strychnia, and the same treatment as in opium poisoning.

Therapeutic Uses.—The most important uses of chloral are in diseases of the nervous system, such as delirium tremens, insanity, tetanus, acute mania, neuralgia, chorea, whooping cough, and in rheumatism, cholera morbus, sea-sickness, etc., etc. Having no direct pain-relieving power, except by suspending the functions of the cerebrum and in dangerous doses, sleep can be procured and pain relieved by combining the chloral with morphine, when it is very effective.

Dose.—Of hydrate of chloral, gr. v to ℈j; but it must be remembered that one half drachm has produced poisonous symptoms. Thirty grains of hydrate of chloral are equal in effect to gr. j of opium. For adults, if short intervals of sleep are required, from gr. xx to xxx will answer; for young

children, gr. vij is the dose recommended. Moderate and frequently repeated doses are better than a single large one.

Dental Uses.—In dental practice, the hydrate of chloral, in the form of from gr. ss to gr. j, is applied to inflamed pulps for the relief of odontalgia, and is an efficient remedy; it is also employed for the relief of neuralgia of the fifth pair of nerves; as a stimulant and deodorizing application to foul and fetid indolent ulcers; also as a local anæsthetic, for this purpose being combined with camphor and other agents (see Aconite), (see Camphor); also as an anodyne, for the relief of the pain of periodontitis; and as an injection, for alveolar abscesses. It is also used as a lotion (when diluted with water) for inflammations of the oral mucous membrane, and as an antiseptic (chloral, ℥j; aqua, f℥ij) for injecting putrid pulp-canals and chronic alveolar abscesses. Although it is employed hypodermically, yet painful phlegmons have resulted from its repeated application.

Chloral Phenol.—When chloral is combined with carbolic acid it liquefies, and a preparation composed of equal parts of phenol and chloral is used for odontalgia as well as for its antiseptic qualities. *Chloral Phenol* is a colorless, clear liquid, soluble in alcohol, acetic acid, amyl-alcohol, chloroform, carbon, glycerin and ether. It possesses the odor and taste of its constituents.

Chloral has the property, when rubbed with certain bodies, such as camphor, of forming therewith syrup liquids. With phenol (absolute carbolic acid) it also liquefies, and a preparation composed of equal parts of phenol and chloral is used in medicine for allaying toothache, as well as for its antiseptic properties. A recent study by Fabini, says the *Chemist and Druggist*, shows that chloral-phenol possesses the odor and taste of its constituents, and when applied to the skin produces inflammation and an eruption of small blisters. It is a colorless and clear liquid, having a sp. gr. at 20° C. of 1.289, so that it sinks in anhydrous glycerin. It is soluble in alcohol, acetic acid, amyl-alcohol, chloroform, carbon bisulphide, and glycerin, as well as in ether when slightly warmed. It is only partially

soluble in petroleum ether, and benzine only dissolves a little of the fluid, and what is dissolved is chloral phenol. Fabini tested the fluid thoroughly, with a view to determining whether it is a mechanical mixture, and it behaved in every way towards re-agents as carbolic acid does, while with sulphuric acid some of the chloral-phenol yielded, after twenty-four hours, a velvet-colored plaster-like mass, which consisted of meta-chloral and phenol-sulphonic acid. There seems to be no doubt, therefore, that chloral-phenol is a mixture.

This preparation should not be confounded with the phenol camphor devised by Cockrane (not campho-phénique), and made by mixing together 1 part of carbolic acid and 3 parts of camphor. After twenty-four hours this becomes a liquid, having a sp. gr. of .990. It is used with oil as an antiseptic. As a spray it may be applied to the skin to produce local anæsthesia. It may be employed for disinfecting surgical instruments, and upon wool and gauze for wound dressing. It is soluble in alcohol, ether and oils, but not in water or glycerin. Menthol, cocaine, salicylic acid, iodoform, chloral hydrate, and mercuric chloride are soluble in phenol camphor.

DENTAL FORMULÆ.

For Foul and Fetid Indolent Ulcers.

℞. Chloral hydratis . . . gr.x
Aquæ destillatæ . . . f℥j. M.
SIGNA.—To be applied as a lotion.

For a Local Anæsthetic.

℞. Chloral hydratis . . . ℥ij
Pulveris camphoræ . . ℥ij. M.
SIGNA.—To be applied as an obtunding mixture, by means of an applicator.

For Odontalgia—Pulpitis.

FLAGG.

℞. Chloral hydratis . . . ℥iij
Aquæ destill . . . . f℥j. M.
SIGNA.—Apply on cotton.

For Foul and Fetid Indolent Ulcers.

℞. Chloral hydratis . . . ℥ss
Adipis . . . . . ℥j. M.
SIGNA.—To be used as an ointment.

Local Anæsthetic.

DR. STORIE.

℞. Chloral hydratis.
Camphoræ (gum) . equal parts.
Rub well in a mortar to liquefaction and add gtt.v of carbolic acid.

For a Hypnotic.

℞. Chloral hydratis . . . ℥ij
Syrupi aurantii flores . ℥iv
Syrupi tolutani . . . ℥iv
Aquæ destillatæ . . . ℥vj. M.
SIGNA.—Dose ⅙ part, largely diluted.

For Neuralgia.

℞. Chloral hydratis, . partes 3
Camphoræ . . . partem 1. M.

SIGNA.—To be applied over seat of pain.

For a Local Anæsthetic.

℞. Chloral hydratis,
Pulveris camphoræ . āā . ℥ij
Morphinæ sulph . . . ℥ss
Chloroformi . . . . . ℥j. M.

SIGNA.—Apply with camel's-hair brush; dry rapidly, and reapply.

For Neuralgia and Exposed Pulps.

℞. Chloral hydratis . . 2 parts
Camphoræ . . . . . 5 parts
Cocaini hydrochloratis 1 part. M.

Heat to about boiling point of water till liquefied.

SIGNA.—Apply locally.

CHLORALAMIDE. CHLORALAMID.

Formula.—$CCl_3CH\frac{OH}{NH.CHO}$

Derivation.—Formed by the combination of two parts of chloral hydrate and one part of formamide.

Medical Properties and Action.—Chloralamide has been used with good results in hysteria, chorea, acute mania, monomania, typhoid fever, senility, neurasthenia, insomnia, phthisis, and diseases not attended by much pain. Mupfenbach, from a number of trials, regards it a useful hypnotic, but with the disadvantage that its certainty of action can never be relied upon. No bad effects upon the circulation or in the feelings of the patients have been observed by Reichmann, although vomiting may occur. According to Langaard, this drug produced a decided reduction of blood-pressure, which is developed more gradually and is later in making its appearance than that caused by chloral. Compared with chloral, chloralamid is more agreeable to the taste, and more easily administered, rarely causes digestive disorders, does not depress the heart or the circulation, seldom produces cerebral disturbances. Compared with sulfonal, it is more prompt in its action, more soluble, more easily administered, the sleep it produces always passes away by morning, and it is less expensive.

The action of chloralamide upon digestion is as follows:

1. Large quantities retarded the digestion of fibrin in the ratio of the quantity employed.

2. Small quantities, for example, up to 0.02 gramme, did

not have any marked influence either in accelerating or in delaying the digestion of fibrin.

3. Putrefaction was not retarded by either large or small quantities.

Therapeutic Uses.—The most important uses of chloralamid are in diseases of the nervous system not attended by much pain, such as have before been enumerated.

Dose.—Of chloralamid, gr. 30 to 45. In doses of twenty to thirty grains, it produces better effects than sulphonal, but caution in the use of this drug is necessary in diseases of the heart, on account of its causing decided reduction of blood-pressure.

For Use as a Hypnotic.

℞. Chloralamid . . . . . ℥iv
Spts. vini gallici . . . . . ℥ij
Curacao . . . . . ℥ij. M.

S.—A tablespoonful (30 grains chloralamid) in water and repeated in four hours if necessary.

CHLORINIUM—CHLORINE.

Derivation.—Chlorine is a greenish-colored gas, of a penetrating and suffocating odor, very persistent and characteristic. It is soluble in water, in the proportion of two volumes of the gas to one of water, and is a supporter of combustion. It is generated from black oxide of manganese, hydrochloric acid and water, is an active irritant, and, when breathed, excites cough, a sense of suffocation and irritation of the mucous membrane of the nostrils and bronchial tubes, and, when considerable quantities are inhaled, it induces spitting of blood, violent pains, and sometimes death. It is a deodorizer and disinfectant, and has been used to destroy disease germs and offensive effluvia.

Chlorine Water.—*Aqua Chlori*—is an aqueous solution of chlorine, formed by passing the gas through water. It is a greenish-yellow liquid, with an astringent taste and the suffocating odor of chlorine gas. It should be kept in glass-stoppered bottles, in a cool place, and protected from the light.

Therapeutic Uses.—Chlorine water is used internally in

malignant fevers, such as scarlet fever, typhus, and in diphtheria, aphthæ, gangrene, syphilis, diseases of the liver, skin diseases, etc.; and as an antidote for hydrocyanic acid. The poisonous effects of chlorine gas may be prevented by ammoniacal gas. Albumen is the antidote for chlorine water, given freely, in the form of milk, flour, eggs, etc.

Dose.—Of chlorine water, f℥j to f℥iv, diluted.

Dental Uses,—Chlorine water is employed in dental practice as a local application in gangrene of the mouth and fauces, aphthæ, cancrum oris, and fetor of the breath. Chlorine gas has been employed to bleach discolored teeth, care being taken that it reaches no other part than the cavity of the tooth undergoing such treatment, which may be accomplished by the application of a large rubber dam, such as is used in the operation of filling teeth.

DENTAL FORMULÆ.

For Aphthæ and Gangrene of the Mouth.

℞. Aquæ chlori . . . . . ℥ss
Aquæ destillatæ . . . ℥iiiss
Syrupi simp . . . . . ℥ss. M.

SIGNA.—To be used as a gargle or lotion.

For Fetor of the Breath and an Antiseptic.

℞. Liquoris chlori . . . . ℥iv
Mellis . . . . . ℥iv
Aquæ destillatæ . . . ℥x. M.

SIGNA.—To be applied as a gargle.

For Aphthæ, Stomatitis, and Cancrum Oris.

℞. Liquoris chlori
Mellis . . . āā . . . ℥ij. M.

SIGNA.—To be applied as a lotion.

For Mercurial Stomatitis.

℞. Liquoris chlori . . . part j
Aquæ destillatæ . . parts viij. M.

SIGNA.—To be used as a gargle for correcting the fetor, and diminishing slightly the discharge.

CHLOROFORMUM—CHLOROFORM.

Formula.—$CHCl_3$. Sp. gr. 1.480.

Derivation.—Chloroform is obtained by the distillation of alcohol with chlorinated lime. The form for medicinal use (*Chloroformum Purificatum*) is purified by agitation with sulphuric acid, which frees the crude chloroform from such deleterious agents as chlorinated pyrogenous oil; the lighter liquid is then separated, and carbonate of sodium, previously dissolved in water, is added to it. The mixture is then agitated, the chloroform separated from the supernatant layer, alcohol

mixed with it, and lime in coarse powder added. It is a colorless, volatile liquid, of an agreeable ethereal odor, and a hot, aromatic, sweet taste. It is slightly soluble in water, and dissolves very readily in alcohol and ether in all proportions. The boiling point is 142° F. The purest form of chloroform has a specific gravity of 1.5022, while the officinal contains a little alcohol; it is a terchloride of formyl. The purest chloroform for internal use is obtained from the hydrate of chloral. The purity of chloroform may be ascertained by agitating it with the binitro-sulphuret of iron, which shows the presence of alcohol by the production of a brown tint; chlorinated pyrogenous oil may be detected and removed by strong sulphuric acid, which gives the solution a yellowish or reddish-brown color, if such an impurity is present.

Medical Properties and Action.—Chloróform, when inhaled, is an anæsthetic; and when administered internally, is anodyne and antispasmodic. Its effects on the system are similar to those of ether, but more powerful and more rapidly produced, and it requires more care in its administration, both internally and by inhalation of the vapor. Undiluted, it excites great irritation and inflammation of the mucous membrane, and the vapor, passing through the fauces in quantity, may enter the larynx and cause great heat, inflammation and even œdema. When taken internally it causes a feeling of warmth in the stomach, followed by coldness, similar to ether, and if taken in large quantity, undiluted, it acts as an irritant poison, inducing violent gastritis. It is diffused into the blood, and affects remote parts. It increases the action of the circulatory system, producing excitement of the brain, followed by a deep, heavy sleep; and in poisonous doses, stupor and insensibility. The first effect of the inhalation of the vapor of chloroform is a feeling of warmth and excitement extending to the extremities, which is succeeded by noises in the ears and a vibratory thrilling and benumbing sensation throughout the body, followed by a loss of feeling, motion and consciousness, with general paralysis of the respiratory muscles, stertorous breathing, quick pulse, which may become irregular

and weak, owing to the sedative action on the heart. The pupils, at first contracted, become dilated, and there is complete relaxation of the muscular system.

The following are the practical conclusions of the second Hyderabad Commission: "The recumbent position on the back and absolute freedom of respiration are essential. If during an operation this position cannot be from any cause maintained during the administration of chloroform, the utmost attention to the respiration is necessary to prevent asphyxia or an overdose. If there is any doubt about the state of respiration, the patient should be at once restored to the recumbent position on the back. To insure absolute freedom of respiration, tight clothing of every kind, either on the neck, chest, or abdomen, is to be strictly avoided; and no assistants or bystanders should be allowed to exert pressure on any part of the patient's thorax or abdomen, even though the patient be struggling violently. If struggling does occur, it is always possible to hold the patient down by the shoulders, pelvis, or legs, without doing anything that can possibly interfere with the free movements of respiration. An apparatus is not essential, and should not be used, as, being made to fit the face, it must tend to produce a certain amount of asphyxia, and take up part of the attention required elsewhere. However it is made, it introduces an element of danger into the administration. A convenient form of inhaler is an open cone or cap with a little absorbent cotton inside at the apex. At the commencement of inhalation care should be taken by not holding the cap very close over the mouth and nose, to avoid exciting, struggling or holding the breath. If struggling or holding the breath does occur, great care is necessary to avoid an over-dose during the deep inspirations which follow. When quiet breathing ensues, as the patient begins to go over, there is no reason why the inhaler should not be applied close to the face; and all that is then necessary is to watch the cornea and see that the respiration is not interfered with.

In children, crying ensures free admission of chloroform into the lungs; but as the struggling and holding the breath

can hardly be avoided, and one or two whiffs of chloroform may be sufficient to produce complete insensibility. They should always be allowed to inhale a little fresh air during the first deep inspirations which follow.

In struggling persons, but especially in children, it is essential to remove the inhaler after the first or second deep inspiration, as enough chloroform may have been inhaled to produce deep anæsthesia, and this may only appear, or may deepen, after the chloroform is stopped. Struggling is best avoided in adults by making them blow out hard after each inspiration during the inhalation. The patient is, as a rule, anæsthetized and ready for the operation to be commenced when unconscious winking is no longer produced by touching the surface of the eye with the tip of the finger.

The anæsthesia should never, under any circumstances, be pushed until respiration stops; but when once the cornea is insensitive, the patient should be kept gently under by occasional inhalations, and not be allowed to come out and renew the stage of struggling and resistance.

As a rule no operation should be commenced till the patient is fully under the influence of the anæsthetic, so as to avoid all chances of death from surgical shock or fright. The administrator should be guided as to the effect entirely by the respiration; and his only object, while producing anæsthesia, is to see that the respiration is not interfered with. If possible the patient's chest and abdomen should be exposed during chloroform inhalation, so that the respiratory movements can be seen by the administrator. If any thing interferes with the respiration in any way, however slightly, even if this occurs at the commencement of the administration, if breath is held, or if there is stertor, the inhalation should be stopped till the breathing is natural again. This may sometimes create delay and inconvenience, but experience will make any administrator so familiar with the respiratory functions under chloroform, that he will in a short time know almost by intuition whether anything is going wrong, and be able to put it right without delay, before any danger arises. If the breathing be-

comes embarrassed, the lower jaw should be pulled or pushed from behind the angles, forward, so that the lower teeth protrude in front of the upper. This raises the epiglottis and frees the larynx. At the same time it is well to assist the respiration artificially till the embarrassment passes off. If by any accident the respiration stops, artificial respiration should be commenced at once, while an assistant lowers the head and draws forward the tongue with catch forceps, by Howard's method, assisted by compression and relaxation of the thoracic walls. Artificial respiration should be continued till there is no doubt whatever that natural respiration is completely re-established. A small dose of morphia may be injected subcutaneously before chloroform inhalation, as it helps to keep the patient in a state of anæsthesia in prolonged operation. There is nothing to show that atropine does any good in connection with the administration of chloroform, and it may do much harm. Alcohol may be given with much advantage before operations under chloroform, provided it does not cause excitement, and merely has the effect of giving a patient confidence and steadying the circulation. And it is the opinion of the Commission that "if the above rules be followed, chloroform may be given in any case requiring an operation, with perfect ease and absolute safety, so as to do good without the risk of evil."

[As the physiological actions and mode of administration of chloroform and ether are similar, the reader is referred to the article on Sulphuric Ether.]

Therapeutic Uses.—Besides its use as a general anæsthetic agent, chloroform is internally administered in substance, as an anodyne and antispasmodic, for non-inflammatory affections, such as nausea and vomiting, sea-sickness, sick headache, flatulent colic, intermittent fevers, and in cholera, for which it is very efficient. The vapor is employed for the relief of hay asthma, whooping cough, spasmodic asthma, and as a hypnotic in delirium tremens, and as an injection and lotion in neuralgia, and as a counter-irritant or vesicant, for which purposes it is applied to the skin, and evaporation pre-

vented. Great care is necessary in the administration of chloroform in substance, as fatal effects have followed such use; 15 drops have destroyed life. Externally, chloroform is employed as a stimulating application to foul and indolent ulcers.

Dr. Spark recommends highly, as a hæmostatic agent, a solution composed of chloroform 2 parts, water 100 parts. He claims that it acts with a rapidity that is truly marvelous, and it has not the slightest disagreeable taste. It is useful in all operations upon the mouth and throat.

Dose.—Of chloroform, ♏j to v, in sweetened water or mucilage. Dose of chloroform for inhalation, ʒj to ʒij.

Spirit of Chloroform—*Spiritus Chloroformi*—is composed of chloroform ℥j; diluted alcohol ʒij. Dose of spirit of chloroform, ʒss to ʒj.

Mixed Chloroform-Morphia Narcosis.—A method practiced by Prof. Thiersch, of Leipsic, succeeds often in inducing a perfect analgesia without unconsciousness. Morphine is first hypodermically injected, and in from five to seven minutes afterwards the patient is very lightly chloroformed till near the stage of excitement; the operation is performed; as soon as pain is felt, if the operation is a prolonged one, a little chloroform is added. In this manner not the tenth part of chloroform is needed, and it is claimed that the operation is as painless as under full chloroform narcosis, and there is no risk of danger incurred. Men receive one-half a grain of morphine, women one-quarter of a grain, children one-twelfth to one-eighth of a grain.

Cocaine-Chloroform Narcosis.—This consists essentially in the combined use of cocaine and chloroform, and is strongly favored by Prof. Obolinski, of Cracow, who injects either before or after the anæsthesia is obtained, from one to three centigrammes of cocaine; or he injects in the neighborhood o the seat of the operation, and during its progress, from three to seven centigrammes. Cocaine is used on the ground that it is a complete antagonist of chloroform and chloral; but it is not so regarded by others, who represent it to be a general ex-

citor of the central nervous gray matter, rather than a direct and powerful stimulator of the heart, while its stimulant effect upon respiration is not to be depended upon. Prof. Obolinski claims that this mixed narcosis secures anæsthesia with the use of less chloroform, and that vomiting is prevented, and there are fewer disagreeable after-effects.

Dental Uses.—Chloroform is employed in dental practice as a general anæsthetic, also as a local anæsthetic, for which purpose it is generally combined with other agents; as an anodyne and antispasmodic, either locally applied or the vapor inhaled, as in the treatment of convulsions of dentition, for which it is a very efficient remedy.

DENTAL FORMULÆ.

For Neuralgic Affections.

℞. Chloroformi,
Spiriti ammoniæ,
Tincturæ aconiti āā f ʒ j
Olei ricini . . . . ʒ ij
Linimenti saponis . f ℥ j. M.

SIGNA.—To be applied as a liniment over seat of pain.

For a Local Anæsthetic.

℞. Chloroformi purificati,
Tincturæ aconiti,
Alcoholis . . āā . . f ℥ j
Morphinæ sulphat . gr. vj. M.

SIGNA.—To be applied to gum over root of tooth to be extracted.

For a Local Anæsthetic.

VON BONHORST.

℞. Chloroformi,
Ætheris sulph.,
Spiriti lavandulæ,
Pyrethri (fluid ext.) . āā f ℥ j. M.

SIGNA.—Apply for one or two minutes to gum over root of tooth to be extracted.

For Odontalgia—Pulpitis.

℞. Chloroformi . . . . ℥ ij
Alcoholis . . . . . ℥ j
Æther . . . . . ℥ ss
Camphoræ (pulv) . . ℥ ss
Tinct. opii . . . . ℥ ss
Oleum caryophylli . ℥ j. M.

SIGNA.—Apply on cotton wool, to exposed pulp.

For Neuralgic Affections of the Teeth.

℞. Chloroformi . . . . f ʒ j or ij
Aquæ . . . . . Oj. M.

SIGNA.—To be used as a wash or a gargle.

For Neuralgic Affections.

℞. Chloroformi . . . . ʒ ij
Camphoræ . . . . ℥ iss
Olei olivæ . . . . ℥ ij. M.

SIGNA.—To be applied as a liniment over seat of pain.

For Odontalgia—Pulpitis.

℞. Chloroformi,
Tinct. aconiti . āā . f ʒ iij
Tinct. capsici . . . f ℥ j
Tinct. pyrethri
Oleum caryoph . āā . f ℥ ss
Camphoræ (pulv.) . ℥ ss. M.

SIGNA.—Apply on cotton wool.

For an Anodyne Application in Neuralgia.

℞. Chloroformi . . . . f ℥ j
Linimenti camphoræ f ℥ ij. M.

SIGNA.—To be applied over seat of pain, and covered with oiled silk, to prevent evaporation.

For Earache of Dentition.

℞. Chloroformi . . . . ℥ j
Olei olivæ . . . . . ℥ j M.

SIGNA.—Pour from gtt. x to xx in ear, and close orifice with cotton.

For a Local Anæsthetic.

℞. Chloroformi . . . . part. xx
Acidi acetici (cryst.) part. j. M.

SIGNA.—Apply with camel's-hair brush, or by applicator.

For excessive vomiting and irritability during Infantile Diarrhœa.

DR. JAS. W. WHITE.

℞. Spt. chloroformi . . . ℥ j
Creasote . . . . . ♏ij
Vin. ipecac . . . . . ♏v
Aquæ anisi . . . q. s ad ℥ ij. M.

SIGNA.—A teaspoonful in a little water for a child one year old.

Local Anæsthetic.

DR. PARSON.

℞. Chloroformi . . . 12 parts,
Tinct. aconiti . . 12 "
Tinct. capsici . . 4 "
Tinct. pyrethri . . 2 "
Olei caryophilli . 2 "
Camphoræ . . . 2 "

Dissolve the camphor in the chloroform, then add the oil of cloves, then the tinctures.

CREOLIN—CREOLINE

Creolin is a product of the decomposition of coal tar.

Derivation.—It is obtained from English pit-coal by distillation, and is in the form of a brownish, syrupy liquid, complex and very impure, with an odor like tar; and in its impure state is slightly irritating, slightly caustic and strongly acid, and resembles in its properties the phenols. A purified preparation of creolin is, however, as neutral as vaseline, and quite as inoffensive to man and animals. It is insoluble in water, but soluble in ether, chloroform, and absolute alcohol.

Therapeutic Uses and Medical Properties.—Creolin is both antiseptic, germicide and hæmostatic, being employed for the latter purpose in obstetrical practice; it is also employed in tonsillitis. It is employed with great benefit in ulers of the cornea. Its germicidal powers are said to be ten times superior to those of carbolic acid, and its action on the spores is even more pronounced than corrosive sublimate. The addition of from eight to ten drops of a three per cent. aqueous solution is sufficient to completely sterilize and prevent the development of the comma-bacillus, and from one to three

drops of a one per cent. solution will retard the development of the micro-organisms, and four drops will prevent it completely. Its antiseptic properties are said to be superior to all other drugs at our command. It is soluble in water, alcohol and glycerine, and it does not affect the skin nor corrode instruments, and the odor of the purified preparation is not disagreeable. It appears to have an anodyne effect, and is curative when applied to open wounds. Creolin has also been employed in antral disease. An aqueous solution of creolin is made of: ℞. Creolin, gr. iss; aquæ destil., ♏cl, which may be applied with a brush or in the form of spray. For dental use it may be injected, or applied on floss-silk or cotton wool.

Creolin is considered to be a good deodorizer of iodoform. One or two drops of creolin may be added to half a glass of water for a mouth-wash, to correct disagreeable odors from the teeth and mouth. It will also hold in check acid-producing germs; it is also recommended for its action on mucous surfaces in soft and congested mouths, and to correct acid conditions, and the treatment of fistulous tracts of suppurating surfaces; also in root canals to deodorize dead tissue. It will also remove the rust on instruments when applied by means of a felt wheel of a lathe. To sterilize instruments a two per cent. solution may be used; also on the hands, and a one per cent. solution for irrigation of wounds and treatment of mucous surfaces.

DENTAL FORMULÆ.

For Alveolar Pyorrhœa.

DR. A. W. HARLAN.

℞. Creolin . . . . . ℥ j
Sodium fluo. silicate . . . . . gr. xx
Olei Cassiæ . . . . . ♏ xx
Glycerinæ . . . . . ℥iv. M.
Dilute with water to suit.

SIGNA.—Use as a mouth-wash on a soft brush, during the intervals between sittings when escharotic and antiseptic agents have been applied.

CINCHONA FLAVA—YELLOW CINCHONA.

CALISAYA BARK, PERUVIAN BARK.

Source.—Cinchona is the bark of the tree cinchona calisaya, which grows on the western coast of South America, especially of Bolivia and Southern Peru. Different varieties are named, according to their color, as *Cinchona Flava*, yellow cinchona; *Cinchona Pallida*, pale cinchona; *Cinchona Rubra*, red cinchona. The medical properties of these barks depend upon the alkaloids they contain in varying proportions, *Quinina* being the most important.

Medical Properties and Action.—The yellow bark has a much more bitter taste than the others, but is comparatively free from acidity. It is brownish yellow, the powder being of an orange color, and it contains more of the alkaloid quinine than the other barks.

Cinchona is tonic, astringent and antiperiodic, and the different varieties owe their tonic and antiperiodic properties to the alkaloids *quinina*, *cinchonina* and *cinchonidina*. On account of the large quantity of the powdered barks it is necessary to take in order to obtain the full effects, and which cause, in some cases, derangement of the stomach, vomiting, headache and constipation, the alkaloid quinine, in the form of sulphate of quinina, is preferable.

Sulphate of Quinina—*Quininæ Sulphas*, is prepared by boiling the yellow bark in water acidulated with hydrochloric acid, by which the alkaloid is separated from its combination with kinic and other acids, to form a soluble hydrochlorate. This salt is decomposed, and the quinine is precipitated by the addition of lime, and afterwards washed in boiling alcohol.

Sulphate of quinine is in the form of colorless, very light and silky crystals, and is readily soluble in alcohol, and in water acidulated with sulphuric acid. It is insoluble in ether, and requires 740 parts of cold, or 30 parts of boiling water to entirely dissolve it.

Cinchona is also antiseptic, as the powder dusted over unhealthy wounds will arrest putrefaction, and promote healthy

cicatrization. Quinina will destroy minute organisms, and preserve substances from decomposition. The cinchona alkaloids are readily diffused into the blood, and when hypodermically injected, are absorbed by the blood. Cinchona and its alkaloids increase the action of the heart slightly, but in large doses quinine depresses the heart's action and enfeebles the pulse. As quinine accumulates in the brain, a sense of fullness in the head, a tightness and constriction about the forehead, a ringing in the ears (*tinnitus aurium*), giddiness and vertigo are experienced. Deafness also occurs, as the effect of considerable doses, and, if continued, permanent injury may result. Poisonous doses cause intense headache, dilated pupils, delirium, coma and convulsions.

Peruvian bark and its alkaloids are the most reliable tonics and antiperiodics.

Therapeutic Uses.—Cinchona, and its alkaloid, quinine, are internally employed in the treatment of intermittent fevers, and also other fevers, such as remittent, typhus, puerperal and scarlet; also in influenza, neuralgias of a malarial origin, acute rheumatism, phthisis, advanced stages of pneumonia and pleurisy, erysipelas, urticaria, diseases of the eye, epilepsy, gangrene and mortification, scurvy, pyæmia, malarial dysentery, passive hemorrhages, and as an anthelmintic, etc., etc.

Dose.—Of powdered cinchona, ℈j to ʒiij, given in infusion of liquorice; of the extract of cinchona, gr. j to gr. x, in pill; of sulphate of quinine, gr. j to ℈j.

Dental Uses.—Cinchona and its alkaloid, quinine, are employed in dental practice, in the treatment of neuralgia of the fifth pair of nerves, when due to malaria, in from five to ten grain doses of quinine; in aphthous ulcerations, in one or two grain doses every two or three hours, especially when there is great debility; and in cancrum oris; also in the form of gargles and lotions, in gangrenous ulcerations of the mouth. Cinchona is also employed in the form of powder, as an ingredient of certain dentifrices, for its tonic and antiseptic properties.

DENTAL FORMULÆ.

Dentifrice.

℞. Pulv. cinchonæ flav . . ℥iv
Pulv. saponis cas. albi . ℥iv
Cretæ prep. . . . . ℥ij
Magnesiæ calc. . . . . ℥iij
Otto rosæ . . . . . gtt. viij
Olei caryophylli . . . gtt. vj. M.

Dentifrice.

℞. Pulv. cinchonæ flav. . . ℥iij
Cretæ prep. . . . . ℥iij
Sacchari albi . . . . . ℥j
Pulv. cinnamom . . . . ℥j
Pulv. saponis cas. albi. . ℥ij
Pulv. myrrhæ . . . . . ℥j. M.

For Mercurial Stomatitis.

GARRETTSON.

℞. Tinct. cinchonæ . . . ℥ij
Potassæ chloratis . . . ℥ss
Sodæ bibor . . . . . ℥ij
Aluminis pulv. . . . . ℥ij
Potassæ permanganatis . gr.xxv
Aquæ coloniæ . . . . ℥j
Tinct. myrrhæ . . . . ℥j
Tinct. capsici . . . . ℥j
Tinct. krameriæ . . . ℥j
Aquæ . . . . . ℥viij. M.

SIGNA.—Use as a gargle.

Dentifrice.

℞. Pulv. cinchonæ flav . . lb.ss
Cretæ prep . . . . . lb.ss
Pulv. myrrhæ . . . . ℥iv
Pulv. radicis iridis . . ℥iv. M.

For Ulceration of Gums.

℞. Pulv. cinchonæ . . . . ℥ij
Cupri sulph. . . . . gr.x
Acaciæ (pulv.) . . . . ℥j
Mellis . . . . . ℥ij
Aquæ puræ . . . . . ℥iij. M.

SIG.—Apply with a camel's-hair brush to ulcerated surface of mucous membrane.

For a Wash after the Extraction of Teeth.

℞. Cinchonæ (decoct.) . . f℥ij
Aluminæ . . . . . ℥ij
Infus. rosæ . . . . . f℥ij. M.

SIGNA.—Use as a gargle.

For Digestive Stimulation in Pyorrhœa Alveolaris.

DR. CHAS. B. ATKINSON.

℞. Cinchonidinæ sulph. . ℥ss;
Acid. sulph. arom . . ℥ij;
Alcohol, 95 per cent. ℥iij;
Aquæ dest. q. s. ad. . ℥xv. M.

S.—One teaspoonful ter die.

CINNAMOMUM—CINNAMON.

CASSIA BARK.

Source.—The best variety of cinnamon is obtained from Ceylon, and is the prepared bark of a tree of the natural order *Lauraceæ.*

It is in the form of long, cylindrical pieces, thin, smooth, and of a yellow-brown color, with a fragrant odor, and a warm, sweetish, aromatic and slightly astringent taste. It contains a volatile oil, a slight amount of tannic acid, an acid peculiar to itself, *cinnamic acid*, mucilage, lignin, etc.

Medical Properties and Action. Cinnamon is an aromatic stimulant and astringent, being more powerful as a local than as a general stimulant. Its medicinal virtues principally reside in a volatile oil, oleum cinnamomi.

Therapeutic Uses.—Cinnamon is chiefly used as an adjunct to other medicines, being seldom prescribed alone, though it is capable of allaying nausea and vomiting, and also relieving flatulence. Combined with chalk and with other astringents, it is well adapted for the treatment of diarrhœa.

Dose.—Of cinnamon, gr. x to ℥ss of the powder; of the tincture, the dose is f℥j to f℥iij.

Oil of Cinnamon—*Oleum Cinnamomi*—is obtained by distillation, and when fresh, is of a light yellow color, which becomes deeper by age, and ultimately red. It has an excessively hot, pungent taste. It is often employed to conceal the taste of other medicines, and is a powerful local stimulant. Large doses of the oil of cinnamon are poisonous, producing an inflamed and corroded condition of the gastric and intestinal mucous membrane.

Dose.—Of the oil of cinnamon, gtt. j or gtt. ij, administered in the form of an emulsion.

Oil of Cassia.—The oil of cassia is prepared from the bud, and the oil of cinnamon from the bark of the same order of tree *Lauraceæ*. The oil of cassia is preferred by many to the oil of cinnamon. (See Essential Oils, also Antiseptics in Dental Practice).

Cinnamon water—*Aqua Cinnamomi*—(cinnamon, carbonate of magnesia and distilled water), is used as a vehicle for other medicines.

Spirit of cinnamon—*Spiritus Cinnamomi*—(oil of cinnamon, 1 part, stronger alcohol 15 parts). Dose, gtt. x to gtt. xx.

Dental Uses.—Cinnamon, in the form of powder, is employed as an ingredient of dentifrices, for its stimulant, astringent and aromatic properties. Oil of cinnamon is employed as an ingredient of dentifrices, for its stimulant, astringent and aromatic properties. Oil of cinnamon is employed in dental practice for the relief of odontalgia. One drop

applied to an inflamed dental pulp will afford temporary relief; it is, also, combined with iodoform, in the treatment of alveolar pyorrhœa.

COCAINE.

Source.—Cocaine is the alkaloid obtained from the leaves of the *Erythroxylon Coca*, a shrub indigenous to certain parts of South America, as Peru and Chili. The leaves resemble those of Chinese tea, and in the preparation of the alkaloid it is necessary that they should be of the best quality, which depends upon their being gathered at a proper time, carefully dried and not injured by age or by exposure to the air, as moisture deprives them of all value. Cocaine being extremely susceptible to the influence of acids, A. Castaing, Ph.G., devised a method by which one grain of cocaine can be extracted from four hundred and eighty grains of the leaves without using acidulated fluids, which is as follows: "On one part by weight of coca leaves pour eight parts of boiling water, and let them steep for half an hour in a closed vessel, in a water bath; pour the whole into a percolator, and when all the liquid part is strained off, continue the exhaustion of the leaves by pouring on them eight parts of alcohol, at 85°; mix the two liquids and precipitate them by means of acetate of lead, draw off with a siphon, and then add sulphate of sodium to remove the salts of lead; filter and evaporate, at a gentle heat, until the liquid has attained the consistence of syrup; treat the whole with water, to separate the resinous part, and then precipitate with carbonate of sodium; the precipitate is then to be exhausted by sulphuric ether, and the ethereal solution, after the ether is distilled, is exposed to the air until every trace of ether has completely disappeared; by this means is obtained a crystallized residue, of a brownish-yellow color, and of a disagreeable smell. This is impure cocaine. The coloring matter is removed by washing once or twice with cold alcohol. The cocaine thus purified, appears in the form of transparent prisms, without smell, bitter to the taste, soluble in seven hundred parts of cold water, more soluble in alcohol, and entirely soluble in ether. The solution has an

alkaline reaction, and, when applied to the tongue, it imparts a bitter taste, and a certain insensibility, followed by a slight sensation of cold, recalling the effect of ether spray upon the epidermis. Heated to 208° F., the cocaine becomes liquid, and under the influence of cold, it becomes a transparent mass, which gradually assumes a crystalline form. If it be exposed to a higher heat than 208° F., cocaine changes its color and decomposes. It is inflammable, and burns with a brilliant flame, leaving an ash. It forms soluble salts with acids (its hydrochlorate is one of the best), and all these salts are more bitter than the alkaloid. It is a compound of carbon, hydrogen, nitrogen and oxygen. Pure cocaine is in the form of colorless, transparent prisms, without odor, but with a slight bitter taste. The chemical composition of the alkaloid is $C_{17}H_{21}NO_4$; its reaction is strongly alkaline.

The two forms in which cocaine is most generally used are the *hydrochlorate* or *muriate* and the *oleate*. The hydrochlorate of cocaine is generally employed in surgery, and is in the form of a white crystalline powder, which is sparingly soluble in water, but readily soluble in alcohol, ether, oil and vaseline. At first a 2 per cent. solution was used, but subsequently it was increased to four, five, ten, and twenty per cent. Merck has, however, introduced a new preparation known as the *Citrate of Cocaine*, in the form of pills, made by incorporating it with gum tragacanth dissolved in glycerine, each pill containing ⅛ grain of the citrate, in which form it retains its strength. The citrate of cocaine, however, in solution, will decompose in three or four days.

Dr. John S. Marshall, from experiments made with the citrate of cocaine, is of the opinion that it is more reliable when applied to hypersensitive dentine or to the dental pulp, than the first two forms, but appears to possess no special advantages over them for operations on submucous tissues or in the extraction of teeth.

Another new salt of cocaine, the *hydrobromate*, has been produced by Dr. Lyons by a combination of hydrobromic acid, with cocaine, in the form of slender, translucent prisms, of

snowy whiteness. It is claimed that the local anæsthetic effect of this preparation is greater, for the same amount of solution, than that of any of the other salts employed.

Medical Properties and Action.—Dr. Niemann, of Goslar, as early as 1860, noted the fact that cocaine, when applied to the tongue, produced local anæsthesia but his investigations, as well as those of others at a later period, appear to have been forgotten, until 1884, when Dr. Koller, of Vienna, demonstrated the action of cocaine, in solution, on the eye. Apparently very little is known concerning the physiological action of cocaine, but that it is a valuable local anæsthetic and local anodyne is beyond question. It appears to paralyze the nerves of the vessels, causing, at the same time, a constriction, as is evident from the blanching of the part acted on. Many are of the opinion that its effects are mainly due to its influence upon the sympathetic. When one drop of a 2 or 4 per cent. solution of cocaine is applied to the eye, a slight burning sensation is felt, and a minute or two later the cornea and conjunctiva become anæsthetized, and lose all reflex excitability, The finger can be passed over the cornea and conjunctiva, and the latter can be taken up with the forceps, without pain. At the same time there is a feeling of tension in the lids, and the eyes seem protruding. These effects last about ten minutes and gradually disappear. Dr. Kōnigstein reports having removed the eyeball of a dog cocainized, without the animal feeling any pain. A ten or twenty per cent. solution is used, according to the sensitiveness of the parts and the nature of the operation, when less sensitive organs than the eye have to be obtunded. For the larynx, it should be applied three or four times, at intervals of ninety seconds; for the eye, a drop of the two per cent. solution, at intervals of two minutes, the maximum effect being reached in fifteen minutes. Dr. Jelinek recommends a dilute alcoholic solution of ten or twenty per cent. For the former strength the proportion of alcohol to water should be one to four; for the latter, two to three.

Therapeutic Uses.—Cocaine is employed in some forms of insanity, melancholia, neurasthenia, gastralgia and in wasting

diseases, pruritic skin affections and hoarseness. The leaves in cigarettes have relieved hay fever and throat affections. Cocaine is employed as a local anæsthetic and local anodyne in all painful affections of the eye, the operation for cataract, although the evidence as to its reliability in such deep operations as iridectomy, cataract, squint, etc., is conflicting. (There are, however, cases reported by Dr. Kōnigstein of even the surfaces of the eyelids entirely losing their sensitiveness when hydrochlorate of cocaine was applied in solid form.) It is also employed in painful affections of the pharynx and larynx, or of any other excitable mucous membrane or of nerve tissue. Prof. Engle reports a case of trigeminal neuralgia successfully treated by hypodermic injections of the hydrochlorate of cocaine. Dr. Wagner of Vienna, basing a theory upon the established principle that fluids move from the positive to the negative pole in a galvanic current, saturated the positive electrode with a strong cocaine solution, applied it to the skin, and applied the negative pole a short distance from the positive, and found that incisions could be made without producing any pain.

Dr. Lewis H. Adler, Jr.. writing on the status of hydrochlorate of cocaine in minor surgery says :

"*In minor surgery*, cocaine, when used hypodermically, is of value in all operations in which the circulation can be temporarily arrested, in order to prevent undue absorption of the drug, and in which free bleeding can be encouraged at the completion of the operation previous to the tying of the sutures, to allow as much of the unabsorbed cocaine to be washed out as is possible. Attention paid to these two essential points will, as a rule, obviate any untoward results from the use of cocaine employed hypodermically for anæsthetic purposes. It is likewise important to make use of freshly-prepared solutions, as otherwise the formation of fungi is liable to occur and the preparation to be spoiled. To prevent this alteration, antiseptic agents are added, the best one being boracic acid, as it is the least irritating. Such a solution usually consists of about twenty grains of cocaine and ten grains of boracic acid, dissolved in an ounce of distilled water. A preparation of this

character has been used by the writer with perfectly satisfactory results, even when it has been over two months old.

Another point of considerable importance in using cocaine hypodermically is to make use of a perfectly aseptic syringe; frequently in cases where the drug is so used and suppuration follows, it is the fault of want of cleanliness in this particular, and not to the employment of the drug.

A four per cent. solution is as strong as need be used for hypodermic injections. The principal advantages in using a solution of no greater strength are, that the anæsthetic property of cocaine can be made to reach to a larger area with a less amount of the drug than is the case when a more concentrated one is employed; and, furthermore, the dilution of the drug renders it less liable to produce toxic symptoms.

When the circulation cannot be controlled, extreme caution must be observed in the use of the drug, especially is this the case when any considerable quantity is required.

The quantity of cocaine required to produce anæsthesia varies with the operation and its extent; as a rule for ordinary minor operations from 25 to 40 minims of a four per cent. solution are needed. The length of time necessary for the production of local anæsthesia or insensibility under cocaine varies from three to ten minutes,

Individual susceptibility to the toxic influence of cocaine is a complication of sufficiently frequent occurrence to surround the use of the drug with due care and caution, but it is not a contraindication to the employment of the agent as an anæsthetic. Untoward effects may arise from the use of any one of the anæsthetic substances.

Another objection urged by some surgeons to the employment of cocaine for anæsthetic purposes is based on its asserted power of inducing the so-called "cocaine habit." As yet, this influence of the drug is extremely rare. It is most liable to occur among the patients who are informed of the nature of the remedy used, and especially is this the case when it is employed internally for medicinal purposes. I hardly believe that this action of cocaine can be produced when it is employed

for its local anæsthetic effect and in the small quantity needed to induce local insensibility." Dr. Edward T. Reichert, from a careful study of the actions of cocaine on the circulation in animals, deduced the following conclusions: 1. The discrepancies in the testimony offered by different experimenters, in their investigations of the action of cocaine on the circulation, are almost wholly due to variations in the absolute doses employed, and to the individual susceptibility of the animals. 2. The minimal fatal dose, when injected intravenously in divided doses in the form of a one per cent. solution, varies from 0.004 to 0.03 gramme to the kilo of the body weight. Owing to the great differences in the sensitiveness of different dogs to the poison, a moderate dose in one animal might prove a small or a large one in another of similar weight. 3. When the full train of effects on the heart-beat is slowly developed by the repeated injection of very small doses (0.001 gramme to the kilo of body weight), the pulse rate is at first decreased, then increased, and finally decreased. A single very small dose causes a decrease, a small to a moderate dose an increase; large doses a transient decrease followed by an increase; very large doses a more or less permanent decrease. The primary decrease, which only can be developed by very small doses, is due to a stimulation of the cardio-inhibitory centres; the secondary increase to a depression of the same centres, and which may be assisted by a similar action on the cardio-inhibitory peripheries; and the final decrease to a depression either of the accelerator or automatic motor-ganglion in the heart. The height of the pulse curves during these changes is always in adverse relation to the frequency of the beat. 4. The cardio-inhibitory centres are invariably affected, being primarly stimulated, and secondarily depressed; but the action on the peripheries is of a very inconsistent character, although a primary stimulant action is never manifest the depressant action is sometimes present to a profound degree very early in the poisoning, and, at others, absolutely absent up to the time of death. 5. The arterial pressure is always increased, unless it be after large doses, when it may tempor-

arily be diminished, followed by a rise above the normal; or after very large doses, be permanently lowered. The increase may be decided long after the development of the third stage of the actions of the heart, and, therefore, may outlast the period of the acceleration of the heart's beat. The increase is chiefly due to a stimulation of the vaso-motor centres in the medulla oblongata: to a slight stimulation direct of the vessel-walls; and to the acceleration of the pulse. The final fall of pressure is chiefly dependent upon a depression of the heart, and partly to vaso-motor depression. 6. The effects of cocaine in normal and curarized animals are identical, unless, in the latter, the curare has been used to excess. 7. Cocaine is a decided circulatory stimulant.

Dental Uses.—In operations in the mouth, affecting the mucous membrane and the immediately subjacent tissues, the salts of cocaine have proven efficient for their local anæsthetic and anodyne effects. But for operations on deep-seated tissues, such as are involved in the extraction of teeth, the action of cocaine has been, as Dr. W. W. Allport remarks, "so uncertain as to render its practicable benefits questionable." Cocaine has, however, proven very efficient in relieving the pain of the surgical treatment of alveolar pyorrhœa, the extirpation of the pulps of teeth, and, in some cases, that of hypersensitive dentine. Exposed pulps are rendered less painful after being treated with a five per cent. solution of cocaine, to which, in some cases, morphine has been added. In some cases also, it is claimed, highly inflamed pulps have been successfully capped, as an experiment, with a paste of cocaine and glycerine, although, as was foreseen, the anæsthetic did not arrest the course of the pulpitis. In treating hypersensitive dentine, the more sensitive the structure the stronger the solution of cocaine to be employed. The pure cocaine in the form of crystals, of the hydrochlorate or other salts, in the form of powder, have proven efficient when applied to hypersensitive dentine; while the twenty per cent. solution of the salts have relieved the acute pain which is common to such a condition. It is also claimed that the crystals of cocaine, applied to the gum, close

to a tooth to be extracted, three times, at intervals of two minutes each, has secured a painless operation. It has been suggested that immediately after the application of the cocaine crystals to the gum, three or four minims of a four per cent. solution be injected with a hypodermic syringe, between the gum and the neck of the tooth to be extracted. For the extirpation of pulps of teeth, it is recommended first to anæsthetize the pulps superficially, with a paste of cocaine and glycerine, and then to introduce, by means of a syringe, a twenty per cent. solution of cocaine directly on the exposed portion of the pulp, when it can be removed with a nerve extractor without causing any pain. Dr. John S. Marshall, from his experiments with the pills of citrate of cocaine, found that under favorable circumstances, the citrate, in such a form, produces anæsthesia, when applied to sensitive dentine, in from five to ten minutes, and that the obtunding effect is of a duration sufficient for the preparation of the cavity. He was also able to extirpate the pulp of a tooth, after the citrate had been applied, in from three to twelve minutes. In using the citrate in the form of pills, one pill is introduced into the sensitive cavity, and, after being secured with a pledget of cotton, moistened in tepid water, is permitted to remain from five to twelve minutes. Dr. Marshall suggests the use of granules, containing one-sixteenth of a grain of pure citrate of cocaine, instead of pills containing glycerine and saccharine matters. A solution of the salts of cocaine has also been subcutaneously injected, with favorable results, for the relief of the pain resulting from periodontitis and dental exostosis; and Dr. Hillischer recommends the rubbing in of concaine, either in substance or in concentrated solution, after the epithelium has been macerated with tincture of iodine, to promote absorption, to relieve the pain of chronic periodontitis; also the repeated application of the concentrated solution to relieve the ulcers of thrush, aphthæ, etc. In the surgical treatment of alveolar pyorrhœa, the pain may be relieved by first applying dilute alcohol to the gums, by means of a camel's hair brush, and then in the same manner. a ten per cent. solution of cocaine, repeating the application of the

cocaine once or twice during the space of five minutes. The slowness of the action of cocaine is a great objection to its use as an anæsthetic.

The four per cent. or five per cent. solution applied to a tooth unprotected by a rubber dam (as the rubber prevents the anæsthetic action of the agent), for the space of twenty minutes, repeating the application if necessary, is recommended by Dr. Thompson. Dr. A. W. Harlan recommends a solution composed of cocaine hydrochlorate, ten grains, in sulphuric ether, ninety minims, which is to be applied for four or five minutes, for the painless extirpation of an exposed pulp.

Dr. Harper recommends the following method for removing pulps of teeth by the use of crystals of cocaine: "Take a drop of the oil of cloves and add enough cocaine to make a thick paste and introduce it into the pulp, after having first put the rubber dam on the tooth; then with a broach slowly work it down; with a bur open up the opening slowly, and in ten or fifteen minutes the pulp may be removed from any of the anterior teeth." Where arsenic has been applied to the pulp and the patient returns with pain, he finds that he can get better satisfaction from the application of cocaine.

Herbst's Obtundent consists of a saturated solution of cocaine hydrochlorate in chemically pure sulphuric acid, to which sulphuric ether is added to the point of saturation, the excess of the ether floating upon the surface and evaporating. Several applications are necessary to produce anæsthetic effects, and seventy grains of cocaine hydrochlorate are required to saturate two drachms of the sulphuric acid.

Cocaine, owing to the unsatisfactory results which have attended its use as a local application, is now generally applied by hypodermic injection, for the extraction of teeth. Owing to the necessity for introducing the agent deeply into the tissues, Dr. Walb's method is to inject a two per cent. solution of the hydrochlorate of cocaine hypodermically over the root of the tooth to be extracted, the injections being usually made on each side of the gum, above the root of the tooth, and as

many as the number of teeth to be extracted may indicate; the same method is employed for obtunding hypersensitive dentine, and in removing pulps. The full anæsthetic effect is developed in from five to ten minutes, and continues ten or fifteen minutes. It has also been suggested to hypodermically inject the solutions of cocaine upon both the lingual branch and the inferior dental branch of the inferior maxillary nerve, the former being preferred by some, on account of its supplying the alveoli and gums; but greater success appears to result from injecting the gum on each side of the tooth. Dr. Raymond recommends charging the syringe with thirteen minims of a four per cent. solution of cocaine, and to direct the needle-point on a line extending about midway between the angle and the coronoid process of the inferior maxillary, passing through the internal pterygoid muscle, and, using the finger on the internal oblique line as a guide, to carry the needle-point along inner surface of ramus until the nerve is reached, where it enters the inferior dental foramen, for operations on the inferior molar teeth.

Dr. Raymond also suggests the following method of preparing and applying cocaine: Obtain a quantity of the soluble alkaloid, and mix it at the time of using it (as it deteriorates when long kept). The requisites are a minim glass, pair of scales, some filtering paper, and a little water that has been boiled. It is necessary to have an easy-working syringe, with a perfectly smooth, sharp needle. Care must be taken to exhaust the air from the syringe when charged ready for use. This can be done by drawing in more of the solution than is needed, and pressing it out to the required number of minims. Hold the needle-point up, so as to allow the air to get above the solution, then press the piston.

The needle of the hypodermic syringe should be fine, sharp, and clean, and rendered thoroughly aseptic previous to its employment, which may be accomplished by drawing up through it a few drops of any good antiseptic solution, such as strong carbolic acid, and the solution should be freshly prepared for each operation as the salts of cocaine rapidly de-

compose. The salt should be dissolved in slightly warm water, and the strength of the solution vary from 5 to 20 per cent. A five per cent. solution is made by dissolving ½ grain in 10 minims of water. Previous to the injection, the gum should be dried about the tooth, and a folded napkin so placed as to exclude the saliva. All air must be expelled from the syringe, and the gum at the point the needle of syringe is to enter, should be obtunded by applying a few drops of the solution to the mucous membrane, so as to render the puncture painless. It is recommended to inject the solution at three points, two punctures on the labial or buccal surface, and one on the palatine or lingual surface. The point of the needle should be inserted about one-sixth of an inch below the free margin of the gum, and pressed in obliquely, upwards or downwards, as the case may be, in a direction towards the apex of the tooth, until the point of the needle rests against the bone; all of the soft tissues must be penetrated. With the needle in position, and a finger placed on either side and pressed with some force against the gum to keep the tissues in place, the solution should be slowly injected, when the gum should appear completely blanched in the neighborhood of the puncture. After injecting the solution, the needle should not be withdrawn for several seconds, and then a finger should be placed over the puncture to prevent any escape of the solution. Some six or seven minutes elapse before the full anæsthetic effects of the cocaine are obtained. Dr. Gask recommends placing a few crystals of the salt just around the neck of the tooth to render painless the application of the forceps, and he prefers for injection hydrochlorate of cocaine in the form of half-grain tabloids.

The combined use of cocaine and chloroform is advocated by Obolinski, who injects, either before or after the anæsthesia is obtained, from one to three centigrammes of cocaine; or he injects in the neighborhood of the seat of operation, and during its progress, from three to seven centigrammes. Cocaine is thus used on the ground that it is a complete antagonist to chloroform, of which, however, there is some doubt, as cocaine

is rather a general excitant of the central nervous gray matter than a direct and powerful stimulator of the heart, while its stimulant effect upon respiration is not to be depended upon. Obolinski claims that this mixed narcosis requires the use of less chloroform, that vomiting is prevented, and that there are few disagreeable after-effects. Dr. Gordon White recommends a saturated solution of cocaine hydrochlorate in ether as an excellent preparation for sensitive dentine and pulp-extirpation.

Dr. A. C. Gask recommends painting the palate with a five per cent. solution of cocaine for obtaining impressions of mouths which exhibit great intolerance to the introduction of all impression materials; also a 20 per cent. solution applied to the mucous membrane on cotton, for service in wedging and separating teeth, in forcing silk, etc., up in high conical edges, in removing portions of overhanging gum, in lancing abscesses, in treating alveolar pyorrhœa, in extirpation of pulps, and in the treatment of teeth very sensitive from periodontitis; also in the form of a ¼ grain compressed tabloid placed in the cavity, to relieve the pain following extraction.

The dangers from the use of cocaine are enumerated as follows: Certain persons possess an idiosyncrasy to cocaine, which cannot be foreseen or entirely guarded against; it exerts its toxic effects upon the nervous centres and, secondarily, the heart; its evil effects are most liable in neurotic subjects; the danger in cocaine poisoning is mainly from paralysis of the heart, syncope; special care is necessary in "weak heart" and organic heart disease; many regard its subcutaneous administration as dangerous, and that it should be avoided; the use of the strongest solutions is dangerous and unnecessary; that it may be well to precede its use by the administration of alcohol or other cardiac stimulant, as is done with chloroform.

Patients of a sanguine temperament and in good health are the most favorable subjects in the use of cocaine; while the nervous, hysterical, and those exhibiting great dread of the impending operation, as well as pregnant women, may be regarded as unfavorable subjects. Great care should also be taken to prevent even the weakest solution of cocaine from

running down into the fauces, and restorative agents should always be at hand.

Cocaine appears to be absorbed with extraordinary rapidity, and the stronger the solution which is locally applied, the greater the danger of toxic symptoms. The rapidity of the absorption varies in the different tissues, absorption occurring most rapidly through the conjunctiva, then through the nose, larynx, mouth, and ear. A ten per cent. solution is sufficiently strong for most purposes, and is less dangerous than one of greater strength.

The treatment of cocaine poisoning consists of measures to rouse the heart, especially inhalations of the nitrite of amyl, and such restoratives as brandy, whiskey, aromatic spirits of ammonia, strychnine, atropine, digitalis, ether and chloroform (when convulsions are present), or five minims of carbonate of ammonia by injection, also nitrite of amyl by inhalation. The hot-baths, hot drinks, and hot sinapisms over the heart, and friction are often serviceable; also artificial respiration.

Cocaine is also employed in combination with arsenious acid for a devitalizing mixture. (See *Arsenious Acid*).

Cocaine Incompatibles.—When combined with nitrate of silver, decomposition of the hydrochloride occurs with the formation of an insoluble chloride of silver, and a corresponding change in the cocaine. If calomel and hydrochlorate of cocaine are rubbed together, chemical reaction begins. Added to mercuric oxide, an irritating instead of an anæsthetic action is produced, due to the formation of oxychloride of mercury.

DENTAL FORMULÆ.

To Make a Solution of Hydrochlorate of Cocaine (four per cent.).

℞. Cocaini hydrochloratis (cryst.) . . . . . gr. 2¼
Aquæ destillatæ . . . . ʒj. M.

For Exposed Pulps.

℞. Cocaini hydrochloratis (cryst.) . . . . . gr.vj
Spiritus menthæ pip . . ʒj. M.

SIGNA.—Apply on a pledget of cotton.

For Local Anæsthesia.

H. J. MCKELLOPS.

℞. Mur. cocaini . . . . . gr.iss
Spts. alcoholis . . . . . ʒj
Chloroformi . . . . . ℥j. M.

For Neuralgia and Odontalgia.

℞. Cocaini hydrochloratis (cryst.) . . . . . gr.vj
Menthol . . . . . gr.xxx
Alcoholis . qs. . ad . . f℥j. M.

SIGNA.—Apply as a lotion, or on a pledget of cotton.

Chloroform or bromide of ethyl may be substituted for the alcohol.

To Make Oleate of Cocaine.
(Five per cent.)

℞. Cocaine (alkaloid) . . . gr.2½
Acidi oleic (pure) . . . ♏xx
Olei amygdalæ . . . . ♏xl.

Dissolve the alkaloid in the oleic acid and add the almond oil.

For Pain of Difficult Dentition.
M. VIQUIER.

℞. Cocaini hydrochloratis . gr.ij
Syrup simp. . . . . ℥ijss
Tinct. saffron . . . . . gtt.x. M.

SIGNA.—Rub the painful gums frequently during the day.

For Local Anæsthesia.
J. M. LEWIS.

℞. Cocaini hydrochloratis. grs.viii
Chloralis hydrat . . . gr.v
Acidi carbolici . . . . gtt.iij
Aquæ destil . . . . . f℥iij. M.

SIGNA.—Inject two or three drops into the gum.

For Hypersensitive Dentine.

℞. Cocaini hydrochloratis (cryst.) . . . . . gr.x
Tragacanth. glyceritum q.s.

Form a mass.

SIGNA.—Insert a minute portion in cavity half an hour before operating.

For Neuralgia and Odontalgia.

℞. Cocaini hydrochloratis (cryst.) . . . . . gr.xv
Olei caryophylli . . . . f℥j. M.

SIGNA.—Apply as a lotion, or on a pledget of cotton.

Local Anæsthetic.

℞. Cocaine hydrate (4 per cent. solution) . . . . ℥iij
Carbolic acid. . . . . gtt.v
Chloral hydrate . . . . gr.v. M.

S.—Use hypodermically around tooth with care.

Local Anæsthetic for Extraction of Teeth.
Dr. J. W. HOPE.

℞. Cocaini hydrochloratis . 5 parts
Acidi carbolici . . . . . 6 "
Camphoræ (Pine gum) . 6 "
Alcoholis (95 pr. ct.) q.s. to make 120 parts. M.

S.—Inject with a hypodermic syringe one to three minims deeply into inner and outer surfaces of gum. Apply over the gum absorbent cotton saturated with the solution. Wait 4 or 5 minutes.

Local Anæsthetic for Gums and Sensitive Dentine.
DR. MARTIN.

℞. Cocaine . . . . . gr.¾
Antipyrine . . . . . gr.vj
Aq. destil . . . . . ♏xvj.M.

Prof. J. E. Michael suggests 2 grains of acetanilid as a substitute for the antipyrine.

For Stomatitis and Difficult Teething of Children.
INTERNAT. KLIN. RUNDSCHAU.

1. Paint the gums with the following mixture:

℞. Cocainæ mur. . . . . gr. iss.
Sodii chlor . . . . . gr. xv.
Glycerini,
Aquæ dest . . . . . aa ℥iiss.

2. Spray a boracic acid solution on the inflamed parts.

3. To prevent spasms give internally:

℞. Potassii brom . . . . . gr. xv.
Syr. alth . . . . . ℥v.
Salep. gummos. . . . . ℥j-℥ij.

M.—S. Teaspoonful every hour.

For Irritation of the Gums.

M. F. BESNIER.

℞. Hydrochlorate of Cocaine . . . . . gr. $\frac{5}{6}$
Bromide of Potassium . . . . . gr. vii ss.
Distilled water . . . . . .
Glycerine . . . . . āā ℥cl. M.

COLCHICUM—MEADOW SAFFRON.

Source.—Colchicum root—*Colchici radix;* Colchicum seed—*Colchici semen*, the bulb and seed of the *Colchicum Autumnali.* Colchicum contains tannic and gallic acids and an alkaloid known as *colchicine*, which is the active principle; colchicum also contains starch, sugar and gum. It has a bitter taste, and imparts its medicinal virtues to water, alcohol and ether; wine and vinegar extracting all its properties.

Medical Properties and Therapeutic Uses.—Colchicum, in the forms of fluid extract, wine and tincture, increases the mucous and glandular secretions of the stomach, intestines, liver, kidneys and skin, and causes an increased flow of saliva, and also of urine. A large dose may produce heat in the epigastrium, nausea, vomiting, depression of the circulation, muscular feebleness and pain in the head, large, watery stools and an increased secretion of biliary matters. In poisonous doses it produces all the symptoms of an irritant poison, such as acute pain in abdomen, profuse watery and mucous discharges, suppression of urine, cold extremities and feeble pulse; also muscular cramps, in some cases. Colchicum is principally employed in gout, when a quantity sufficient to shorten the duration of an acute attack and reduce the swelling by an increased secretion from the skin, intestines and kidneys, is only required. It is often combined with an alkali, such as aromatic spirits of ammonia, bicarbonate of potassium, or carbonate of magnesia, to increase its effect. The active principle, *colchicine*, is generally more efficacious than the crude colchicum. It is very serviceable in rheumatic gout when combined with alkalies, and also in all affections dependent upon a gouty diathesis, such as constipation, congestion of the liver, and headache from torpor of the portal circula-

tion. It is now rarely used in acute rheumatism, but in chronic rheumatism it often proves serviceable. Its use is indicated in plethora, constipation and deficient action of the liver, kidneys and skin.

Dose.—Of the fluid of colchicum root—*Extractum Colchici Radicis Fluidum*, ♏ij to ♏v. Of wine of colchicum root—*Vinum Colchici Radicis*, ♏v to ♏xxx. Of acetous extract of colchicum root—*Extractum Colchici Radicis*, gr. ss to gr. ij. Of tincture of colchicum (seed)—*Tinctura Colchici*, ♏x to ℥j.

COLLODIUM—COLLODION.

Derivation.—Collodion is a solution of 4 parts of pyroxylin in 70 parts of stronger ether, and 26 parts of alcohol. Pyroxylin or gun cotton, is prepared by adding a mixture of nitric and sulphuric acids to cotton freed from impurities.

Collodion is a colorless, syrupy, and very inflammable liquid, with a strong ethereal odor. By long standing and exposure, or when applied to a surface, it deposits a thin, transparent and strongly contractile film, which is insoluble in water or alcohol. It should be kept in glass-stoppered bottles. It is applied by means of a camel-hair brush. When it becomes too thick, it may be diluted by a solution consisting of ether, 3 parts, alcohol, 1 part.

Medical Properties and Action.—It is serviceable as an emollient, and its action is mechanical, as it draws together and holds in apposition divided parts, and protects such, as well as abraded or denuded surfaces, from contact with the air. As the ether it contains evaporates, the surface of the part to which it is applied is constringed, and a degree of pressure is thus established, which is very useful in moderating vascular action, promoting absorption, and changing the course of pus which may already be formed into a direction more desirable. On account of the liability of collodion to crack and peel off, these objections have been obviated by the use of what is known as FLEXIBLE COLLODION—*Collodium Flexile*—(collodion, 92 parts, Canada turpentine, 5 parts, castor oil 3 parts), which is softer and more pliable and elastic.

Therapeutic Uses.—Collodion is very useful in ulcers, fissures, incised wounds, abraded surfaces, erysipelas, skin, diseases, etc.

Dental Uses.—Collodion is a very useful application in dental practice, to prevent alveolar abscesses from discharging externally on the face; for such a purpose, it is applied in successive layers, so as to act as a compress, and, by moderating the vascular action, cause absorption, or such a change in the direction of the discharge as will induce it to open in the mouth. It is also employed in combination with carbolic acid, as an application for odontalgia; when introduced on cotton, it acts as a temporary filling; it has also been employed for arresting the mucous secretion during the operation of filling cavities near to or under the margin of the gum, but the rubber dam has superseded it in this respect. Combined with iron and other agents, it forms a styptic preparation.

In the dental laboratory, collodion, in the form of a colored preparation, is employed to coat the surfaces of the plaster models of plastic work, and when not applied too thick, it protects the plaster surface, and also prevents an unsightly rubber surface on that part of the plate which is adapted to the mucous surface of the mouth. When this preparation becomes too thick for use, it may be diluted with a solution of 3 parts of ether to 1 part of alcohol.

Collodion is precipitated by carbolic acid.

CANTHARIDAL COLLODION—*Collodium cum Cantharide*—is composed of cantharides (Spanish flies), in powder 60 parts, flexible collodion, 85 parts, commercial chloroform, q. s. The addition of one per cent. of Venice turpentine to cantharidal collodion will prevent the disagreeable, and, at times, painful contraction of the preparation on drying.

Like cantharides, cantharidal collodion, when locally applied, excites inflammation of the skin and mucous membrane, which terminates in a copious secretion of serum under the cuticle. It produces a blister in the same time as the ordinary blistering plaster, and is applied with greater facility, and is better adapted to cover uneven surfaces, and retains its place more

certainly. It acts much more readily if the evaporation of the ether is prevented by a piece of oiled silk placed over the surface immediately after the application of the collodion.

Dental Uses.—Cantharidal collodion is a valuable application in periodontitis, applied to the gum over the root of the affected tooth, by means of a camel-hair brush, previously removing all moisture from the surface, and protecting the lips and cheeks, until the ether it contains has evaporated, and an artificial cuticle is formed. The blister which rises on the gum should be punctured with a needle. The counter-irritation thus produced relieves the periosteal inflammation.

IODIZED COLLODION—*Collodium Iodidum*—(collodion, ℥j, iodine, gr. xx), forms a good solution of iodine for external use.

DENTAL FORMULÆ.

For Odontalgia.

℞. Acidi carbolici cryst.,
Collodii . . āā . . . ℥j. M.
SIGNA.—To be applied on cotton.

For a Styptic.

℞. Collodii . . . . . partes 100
Acidi carbolici . . partes 10
Acidi tannici . . . partes 5
Acidi benzoici . . partes 5. M.
SIGNA.—To be applied to the bleeding surface by means of a camel-hair brush.

For a Styptic.

℞. Collodii . . . . . ℥iij
Tinct. ferri perchloridi. ℥j
Olei ricini . . . . . gtt.ij. M.
SIGNA.—To be applied to the bleeding surface, or, on cotton, to the alveolar cavity.

For a Styptic.

℞. Acidi tannici,
Alcoholis,
Ætheris . . āā . . partes æq. M.
Then add as much pyroxylin as the solution will dissolve.

CONIUM—HEMLOCK.

Derivation.—Hemlock is the fruit of the *Conium maculatum*, or spotted (not the common) hemlock, which is an umbelliferous plant. The principal one of its three alkaloids is conine, $C_8H_{15}N$, which is very powerful.

Medical Properties and Action.—Conium is a depressing agent producing motor paralysis, first causing, as the effects of a large dose, nausea and vomiting with a general weakness of the voluntary muscles, but with no direct action on the heart. In fatal cases of poisoning death follows from paralysis

of the respiratory muscles causing asphyxia. The antidotes are nux vomica, picrotoxin, and active muscular exercise. It is quickly decomposed by heat.

Therapeutic Uses.—Conium is employed in mania, chorea, tetanus, hydrophobia, whooping-cough, asthma, laryngismus stridulus, diseases of the eye and strychnine poison. For nerve-pain with muscular spasm, the best results may be expected from the combined administration of morphine and conine, subcutaneously applied, as the effects of conine are greatly heightened by morphine. Conium is also used in dislocations to relax muscles.

Dose.—Of Abstractum conii, gr. ss to gr. ij; Extractum conii alcoholicum, gr. ij to gr. iv; Extractum conii fluidum, ♏ij to ♏v; Tinctura conii, ♏x to f℥j; Conine, ♏ $\frac{1}{10}$ to ♏ij.

Dental Uses.—Conium is employed in neuralgias, locally applied; inflamed dental pulps; also in cases of artificial teeth lodging in the œsophagus, to produce relaxation of the muscles.

CREASOTUM—CREASOTE.

Formula.—$C_8H_{10}O_2$. Sp. gr. 1.071.

Derivation.—Creasote is a product of the distillation of wood tar, its name being derived from the Greek κρέας, "flesh," and σωτης, "preserver," as animal substances, when saturated with it, are preserved from putrefaction. It is also obtained from crude pyroligneous acid.

Creasote, when fresh and pure, is a colorless, oleaginous fluid, with a strong, empyreumatic odor, resembling closely carbolic acid, and a caustic, burning taste. After exposure, it has a yellowish or brownish tinge. Its purity may be tested by strong acetic acid, which dissolves the creasote, and leaves behind the impurities floating above the creasote solution. It may also be tested by dropping it on paper, when, if pure, it will, after being volatilized by heat, leave no stain. Creasote may be distinguished from carbolic acid, which it closely resembles in many respects, by not coagulating collodion when mixed with it, and by not imparting a blue color to

a piece of pine wood dipped first into an alkaline solution of creasote, and then, after drying, into muriatic acid.

Medical Properties and Action.—Creasote is stimulant, sedative, rubefacient, escharotic, styptic and antiseptic. It possesses the property of immediately coagulating albumen, and to this property is ascribed many of its effects on the living system. In large doses it is an acro-narcotic poison: but in small doses, it is styptic and astringent, and for the latter property it is more generally administered than for any other. When creasote comes in contact with the blood, the latter changes from a bright red to a reddish-brown color, with small spots of coagulated albumen, and also becomes thicker. Applied to the tongue, it causes severe pain, but without redness or tumefaction; it also causes a strong taste of smoke, and a copious flow of saliva. When administered internally in small doses, it causes a sensation of warmth in the stomach, and exercises a decided sedative action. In large and poisonous doses it produces profound stupor, flushed countenance, fixed eyes, slow and labored pulse, irritable stomach, nausea, vertigo, but has no effect, such as dilatation or contraction, on the pupils. The treatment in cases of poisoning by creasote consists in administering albumen, such as white of eggs, milk, or wheat flour; also the administration of ammonia and other stimulants, mustard, emetics, etc. Death from creasote is caused by its coagulating the albumen of the blood, and preventing its circulation through the arterial system.

Therapeutic Uses.—Creasote is administered internally for gastric irritability and vomiting, flatulence, diarrhœa, diabetes, hæmoptysis, pulmonary consumption, chronic bronchitis, epilepsy, neuralgia, etc. Externally, it is applied to ulcers, eruptions, diseases of the skin, wounds, hemorrhage from wounds or leech bites, warts; also in putrid sore throat, as a gargle.

Dose.—Of creasote, gtt. j or gtt. ij, several times a day, either in mucilage, in the proportion of half a fluid ounce to a drop of the creasote; or it may be given in pill form. For external

use, from gtt. ij to gtt. vj, or more may be added to a fluid ounce of water.

Creasote Water.—*Aquæ Creasoti* (creasote, ℥j, distilled water, Oj). Dose of creasote water, f℥j to f℥iv.

Solidified Creasote.—For the purpose of making the application of creasote to the teeth more convenient, and preventing the effects upon the mucous membrane of the mouth when applying it to carious cavities in teeth, a gelatinous solidity may be given to it by adding 10 parts of collodion to 15 parts of creasote.

Dental Uses.—Creasote, like carbolic acid, is a valuable agent in dental practice, although the use of the latter has, in some respects, superseded that of the former, the two being very similar in their action, with some advantages in the case of carbolic acid. Creasote is employed for the relief of odontalgia, obtunding the sensitiveness of dentine, alveolar abscess, periodontitis, suppurating pulps of teeth, devitalizing pulps of teeth, treatment of exposed pulps of teeth, mercurial, and other forms of stomatitis, ulcers of the mouth, diseases of the gums; as a styptic for hemorrhage from the gums, mucous membrane and leech bites, and after the extraction of teeth. Creasote, like carbolic acid, has a peculiar power as an antiseptic, hence it is a valuable application in cases attended with offensive purulent discharges. It promotes the growth of healthy granulations, and hastens the healing of wounds, and arrests the process of suppuration. When applied to ulcerated surfaces, it should be repeated as pus is formed, or fungous growths appear. It is a painful escharotic upon mucous membrane, with, however, a soothing reaction. An ointment—*Unguentum Creasoti*—is composed of creasote, f℥ss, lard, ℥j, and is useful in cutaneous affections.

For the treatment of exposed pulps it is employed either diluted or in its full strength; for periodontitis and alveolar abscess, in its full strength, or in combination with such agents as glycerine, iodine, etc.; also in devitalized teeth, and as an antiseptic application in ulceration of the mouth, and recession of gums from the neck of the teeth. When used as a

styptic after the extraction of teeth it is applied on lint or cotton, with pressure; and diluted with water, it is employed in the treatment of caries and necrosis of the maxillary bones. To dilute it for injections it is often mixed with alcohol, and the strength reduced by adding water. Mixed with an equal quantity of oil of cloves its odor and taste are modified. Creasote is also employed to neutralize any acid remaining in the cavity of a tooth about to be filled, and to harden and render imperishable the contents of the dentinal tubuli, for which purpose it is applied to the walls of the cavity on a pellet of cotton. Equal quantities by bulk of creasote and oil of cloves are applied to aching teeth, painful gums, ulcerous surfaces, and also where pulps are not exposed; also for saturating cavities before the insertion of fillings, as a disinfectant and coagulant.

DENTAL FORMULÆ.

For Pulpitis.

GARRETSON.

℞. Creasoti . . . . . gtt.vj
Tinct. iodinii . . . . ℥j
Liq. plumb. subacet . ℥j
Chloroformi
Tinct. opii . . āā . . ℥ss. M.

SIGNA.—Apply on cotton to exposed surface of pulp.

For Alveolar Abscesses.

℞. Creasoti,
Linimenti iodi, partes æquales. M.

SIGNA.—To be used as an injection.

For Odontalgia.

℞. Creasoti . . . . . ℥ss
Camphoræ . . . . . gr. x. M.

SIGNA.—To be applied, on a pellet of cotton, to carious cavity.

For Odontalgia.

℞. Creasoti . . . . . ℥ij
Morphinæ acetatis . gr. xx. M.

SIGNA.—To be applied, on cotton, to carious cavity.

For Odontalgia.

℞. Creasoti,
Chloroformi,
Liquidi opii . . āā . . ℥iij
Tinctura benzoini . . ℥j M.

SIGNA.—To be applied on a pellet of cotton, to carious cavity.

For Odontalgia.

℞. Creasoti,
Chloroformi,
Morphinæ hydrochloratis . . . āā . . . ℥iij
Tinctura benzoini . . ℥j. M.

SIGNA.—To be applied, on a pellet of cotton, to carious cavity. (See formulæ of Carbolic Acid.)

GUIACOL is a derivation of wood creasote, in the form of an oily liquid with an odor of cassia and resorcin.

It possesses the active principle of creasote, and the power to

destroy microbes in the human mouth. It is claimed to possess the same therapeutic value as creasote and to be a better disinfectant, especially in cases of decomposed pulps. "Guiacol may be sealed up in a pulp cavity from one to three months or more, and the contents be found perfectly disinfected."

CRETA PRÆPARATA—PREPARED CHALK.

PRECIPITATED CHALK, CARBONATE OF LIME.

Formula.—$CaCO_3$.

Derivation.—Prepared chalk is obtained by freeing chalk from such impurities as gritty and flinty substances and soluble saline matter, by elutriation, and afterward drying it. It is the only form in which chalk is used medicinally.

Medical Properties and Action.—Prepared chalk is antacid, absorbent and astringent. It diminishes the secretion of the mucous membrane, and at the same time acts as an antacid in correcting any acidity present. When internally administered for a considerable time, like magnesia, it accumulates in the bowels and forms intestinal concretions; hence an occasional aperient is necessary.

Therapeutic Uses.—Prepared chalk is an excellent antacid in diarrhœa from acidity, in acidity attending dyspepsia and gout, chronic bronchitis in advanced stages, rachitis, etc. Externally, it is employed in the treatment of ulcers, burns, excoriations and skin diseases. It moderately stimulates ulcers and absorbs the discharge, thus preventing them from spreading.

It is an antidote for poisoning by oxalic and most of the vegetable and mineral acids.

Dose.—Of prepared chalk, gr. v to ℈j, in powder or suspended in water by the aid of mucilage and sugar

Chalk Mixture—*Mistura Cretæ*—(prepared chalk, ℥ss; acacia gr. cxx; water, f℥iv) is often combined with opiates and astringents, such as laudanum and tincture of kino, or of catechu, in the treatment of diarrhœa. Dose, ℥j to ℥ss.

Dental Uses.—Prepared chalk is used in dental practice chiefly for its antacid property, and generally as an ingredient of dentifrices; it is also employed in the form of powder as an antacid in acidity of the oral fluids, for which purpose it is rubbed between the teeth and permitted to remain during the night; it is also employed to obtund the sensitiveness of dentine, on account of its absorbent and antacid properties; for such a purpose it should be applied repeatedly, for several days, to the sensitive surface. In the dental laboratory it is used as a polishing powder for metal and plastic work; also for polishing the surfaces of gold fillings. The precipitated chalk of the Pharmacopœia is the preparation to be preferred, on account of its freedom from gritty particles.

DENTAL FORMULÆ.

Dentifrice in the form of Troches.

℞. Cretæ preparatæ . . . . ℔.iv
Sodii boratis (pulv.) . . ℥x
Saponis Castil " . . ℥x
Sacch. albæ " . . ℔.iss
Ossis sepiæ " . . ℔.i¼
Olei rosæ . . . . . gtt.xxx
Millefleurs . . . . . ℥j
Essentiæ jasmin . . . . ℥¼

Mix with a solution of gum syrup.

Dentifrice in the form of Camphorated Paste.

(Keller Medicine Co.)

Pts. by Wt.

℞. Magnes. carb. 2
Glycerini 1
Potas. chlorat 3
Tr. camphora 1
Ol. gaultheriæ . . . . . q. s.
Cretæ præp. . . . . q. s.

To make desired number of parts.

Syr. simplic . . . . . q. s. M.

To make a thick paste.

Dentifrice.

(Am. Dent. Association.)

℞. Cretæ præparatæ. . . . . ℔iiij
Pulv. cinchonæ . . . . . ℔j
Pulv. radicis iridis . . . . ℔j
Pulv. sacchari albi . . . ℔iss
Pulv. saponis cas . . . . ℥j
Sodii carb. . . . . ℥j
Olei sassafras . . . . . gtt.lxxx.

Dentifrice.

(Am. Dent. Association.)

℞. Cretæ præp. . . . . ℔iij
Pulv. cinchonæ . . . . . ℔j
Pulv. radicis iridis . . . . ℔j
Pulv. sacchari albi . . . ℔iss
Pulv. saponis cas . . . . ℥j
Sodii carb. . . . . ℥j
Glycerini . . . . . f℥iij
Mellis . . . . . q. s.

And form into a paste.

Dentifrice.

℞. Pulv. radicis iridis . . . . ℔ss
Cretæ præparatæ . . . . ℥iv
Sodii carb. . . . . ℥ss
Pulv. cinchonæ . . . . ℥iv
Pulv. sacchari albi . . . ℥ij
Pulv. myrrhæ . . . . . ℥j
Pulv. ossis sepiæ . . . ℥ij
Otto rosæ . . . . . gtt.iv.

With rose pink, q. s. to color.

Dentifrice in the form of Glycerine Tablets.

(KELLER MEDICINE CO.)

Pts. by Wt.

℞. Solut. magnes. carb . . . 2
" sodii bicarb . . . 1
" potas. chlorat. . . . 3
" sapo. cas. albi . . . 6
Glycerini 1
Cal. carb. 10
Ol. gaultheria,
Cassiæ. . . . āā. . . . . q. s. M.
To flavor.

Dentifrice.

℞. Cretæ præp. . . . . ℥iij
Pulv. radicis iridis . . . ℥ij
Pulv. sacchari albi . . . ℥j
Pulv. cinnamon . . . . ʒiij
Pulv. saponis cas. . . . ʒij
Pulv. myrrhæ . . . . . ʒj
Ol. gaultheriæ. . . . . gtt. x. M.

Dentifrice.

(A. W. HARLAN.)

℞. Cretæ præparatæ,
Pulv. radicis iridis . āā . ℥ij
Pulv. saponis cas.,
Pulv. sodii biboratis āā ℥ss
Pulv. myrrhæ . . . . . ʒij
Mellis et glycerini . . . q. s.

To make a soft paste.
Color rose pink. Perfume to suit.

Dentifrice.

(CHAPIN A. HARRIS.)

℞. Cretæ præparatæ . . . . ℥iv
Pulv. radicis iridis . . . ℥iv
Pulv. cinnamon . . . . ʒiv
Sodii carbonatis exsiccatæ ʒss
Pulv. sacchari albi . . . ℥j
Olei limonis . . . . . gtt. xv.
Olei Rosæ . . . . . gtt. ij

SIGNA.—Ingredients to be thoroughly pulverized and well mixed.

Dentifrice.

℞. Cretæ præparatæ . . . . ℔iss
Pulv. sodii boratis,
Pulv. radicis iridis . āā . ℔ss
Semen cardamom . . . ℥j
Pulv. sacchari albi . . . ℔ss
Otto rosæ . . . . . q. s. M.
To flavor.

Dentifrice.

(W. D. MILLER.)

℞. Precipitated carbonate of calcium . . . . . ℥iii¾
Cinchona bark. . . . . ʒxv
Prepared oyster shell . . ʒxv
Powd. myrrh. . . . . ʒvii½
" cloves . . . . . ʒiij¾
Oil of cinnamon . . . . gtt. x to xv
Mix well.

Dentifrice in the form of a Paste for Compressible Tubes.

(KELLER MEDICINE CO.)

Pts. by Wt.

℞. Magnes. carbonat. . . . 2
Sodii bicarb 3
Potas. chlorat 5
Calcii carbonat 20
Sapo. cas. pulv. 6
Glycerini 1
Olei gaultheriæ,
Olei limonis . . āā . . q. s.
Syr. simplic. . . . . q. s.

SIGNA.—To make a paste.

For Fetor of Breath.

(MILLIRON.)

℞. Sulphur powd.,
Creta prep. pulv. . . āā . ℥j
Spts. rectificatus . . . . ℥jss
Aquæ distill. . . . . ℥iij
Peppermint . . . . . q. s. M.

SIGNA.—After removal of all calcic deposits, use with a tooth-brush morning and evening.

Dentifrice.

(Dr. Darby.)

℞. Cretæ præparatæ . . . . ℥viij
Pulv. radicis iridis . . . ℥iv
Pulv. ossis sepiæ . . . .
Pulv. sacchari albi . . .
Saponis castil . . . . āā ℥j
Sodæ bicarb . . . . . ℥ss
Pulv. cinchonæ flava . . ℥j
Cochineal . . . . . ʒj
Olei rosæ . . . . . gtt. xx. M.

Dentifrice.

(Rose.)

℞. Cretæ præparatæ . . . . ℥xv
Pulv. saponis . . . . . ℥j
Saccharin . . . . . gr. x
Thymolis . . . . . gr. xv
Camphoræ . . . . . gr. xxx
Vanillin . . . . . gr. v
Olei Rosæ . . . . . gtt. vj. M.

Rub the camphor and thymol together in a mortar, and warm gently so as to render the mixture liquid; then add the chalk in small portions at a time, reserving about one ounce; next add the other ingredients, the perfumes being first separately rubbed with the remainder of the chalk.

Dentifrice, Antacid, Tonic and Antiseptic

℞. Cretæ præparatæ . . . . ℥iv
Quininæ disulph . . . . gr. iv
Pulv. ossis sepiæ . . . . ʒiv
Otto rosæ . . . . . gtt. iv. M.

Dentifrice.

(Dr. A. W. Harlan.)

℞. Cretæ præparatæ . . . .
Pulv. radicis iridis . āā . ℥iij
Resorcin . . . . . ʒj
Saccharine . . . . . gr. v
Pulv. ossis sepiæ . . . . ʒj
Olei menthæ piperitæ . . ♏v M.

Signa.—Use on a brush moistened with tepid water.

Dentifrice.

(Dr. A. W. Harlan.)

℞. Cretæ præparatæ . . . . ℥iij
Sodium fluo. silicate . . ℥ss
Acidi tanpici . . . . . gr. xxx
Pulv. sacchari albi . . . ℥jss
Pulv. ossis sepiæ . . . ℥ss
Olei gaultheriæ . . . . ♏x. M.

To make a paste of the above, add glycerine 2 parts and honey 1 part.

Dentifrices may be pleasantly flavored with wintergreen, cassia, sassafras, lemon, peppermint, anise, lavender, penny-royal, cloves, calamus, attar of roses, oil of neroli, etc.

CROTON-CHLORAL HYDRATE.

BUTYL-CHLORAL HYDRATE.

Formula.—$C_4H_5Cl_3OH_2O$.

Derivation—Croton-chloral Hydrate is obtained by the action of chlorine upon aldehyde. It is in the form of small, brilliant, white, silvery crystals of a sweetish taste, like that of melons. It is slightly soluble in water, and resembles hydrate of chloral in its hypnotic effects; but its action in this respect is not so powerful, nor so certain. It differs from hydrate of

chloral in the singular property of causing anæsthesia of the head. To relieve pain and induce sleep, the best effects are obtained from a combination of the two agents.

Medical Properties and Action.—It is a sedative, hypnotic and anæsthetic. It resembles chloral hydrate, but is not so certain in its effects as a hypnotic. Its action commences in the head and face.

Therapeutic Uses.—Croton-chloral hydrate is highly recommended in dysmenorrhœa, sciatica, chronic cough, and in neuralgia as an anodyne. One or two grains will relieve severe neuralgia of the fifth pair of nerves; it is frequently necessary, however, to administer from five to fifteen grains, but it is not safe to exceed this amount at one time.

Dose.—Of croton-chloral hydrate, gr. j to gr. x; as an anæsthetic, gr. xv, dissolved in warm water.

Dental Uses.—It is employed with effect in facial neuralgia, in doses of from two to five grains every hour or two, until fifteen grains have been taken; also as a sedative, in doses of from three to five grains, in periodontitis, pulpitis, etc., etc.

DENTAL FORMULA.

For Neuralgic Odontalgia.

VON KIRCHBAUER.

℞. Croton chloral . . . . . ʒj
Glycerini . . . . . ʒvj
Aquæ destill . . . . . ʒiiss
Syr. aurantii . . . . . ʒiv
Oleum fœniculæ . . . . . gtt. vj. M.

SIGNA.—A tablespoonful, and if pain continues severe, repeat the dose in an hour.

CUPRI SULPHAS—SULPHATE OF COPPER.

BLUE VITRIOL, BLUE STONE.

Formula.—$CuSO_4,5H_2O$.

Derivation.—Sulphate of Copper is obtained by roasting the native sulphuret, or by the combination of oxide of copper and sulphuric acid, filtering and crystallizing. It is in the form of blue prismatic crystals which, after exposure to the air, effloresce to a slight degree, and become covered with a greenish-white powder. It has an astringent, metallic taste.

Medical Properties and Action.—Sulphate of Copper is emetic, tonic, nervine, stimulant and astringent, and is quite soluble in water, but insoluble in alcohol. It is a prompt and efficient emetic, the emesis commencing a few minutes after it reaches the stomach, and the copper comes up with the vomited matter. Little or no depression follows its administration as an emetic, and it is especially adapted to cases of narcotic poisoning.

Therapeutic Uses.—Sulphate of Copper is employed as a prompt and efficient emetic in cases of poisoning; it is also administered in intermittent fever, neuralgia, diarrhœa, dysentery, croup, epilepsy, hysteria, etc., etc. Externally it is applied in ulcerative and gangrenous affections, superficial hemorrhage, leucorrhœa, gonorrhœa, ringworm, purulent ophthalmia, mucous discharges, diseases of the skin, indolent ulcers, fungous granulations, warts, etc.

Dose.—Of sulphate of copper as an emetic, gr. iij to gr. v; or dissolve 20 grains in two ounces of distilled water and give a tablespoonful every 15 minutes until vomiting occurs. For internal use other than emetic the dose is gr. $\frac{1}{6}$ to gr. ss. in pill.

Dental Uses.—Sulphate of copper is employed in dental practice, in the form of the ammoniacal solution, for long-standing cases of neuralgia; and externally it is applied to ulcers of the mouth, cancrum oris, aphthous ulceration, ulceration of the gums and mucous membrane of the mouth, hemorrhage from leech bites, fungous growths of the gums, etc., etc.

Dr. Templeton recommends powdered sulphate of copper for suppurating teeth, applying it on a stick of wood which is wet and dipped in the powder, which is thus thoroughly applied to the diseased parts; the mouth is then rinsed with tinct. of gaultheria or tinct. of krameria.

DENTAL FORMULÆ.

For Cancrum Oris, Aphthæ and Gangrenous Affections of the Mouth.

℞. Cupri sulph (powdered) gr. v
Mellis . . . . . ℥ss. M.
SIGNA.—Apply as a lotion, or by means of a camel's hair brush.

For Gangrenous Ulcers of the Mouth and Cancrum Oris.

℞. Cupri sulph. . . . . ℥ij
Pulv. cinchonæ . . . . ℥ss
Aquæ . . . . . ℥iv. M.
SIGNA.—Brush over ulcerated surface twice daily.

For Ulcerative Stomatitis.

℞. Cupri sulph . . . . . gr.x
Pulv. cinchonæ . . . . . ℥ij
Pulv. gum acaciæ . . . . ℥j
Mellis . . . . . ℥ij
Aquæ . . . . . ℥iij. M.
SIGNA.—Apply, by means of a camel's-hair brush, to the ulcerated surface.

For Caries of the Maxillary Bones.
(BARTHOLOW.)

℞. Cupri sulph,
Zinci chloridi . . āā . partes xv
Liquor plumbi . . . . " xxx
Aquæ destillatæ . . . " cc.
SIGNA.—To be applied for 30 minutes at a time.

ERGOTA—ERGOT.

Derivation.—Ergot is a fungous growth which replaces the grain of the common rye. It is bitter, and excites heat and dryness, followed by pain in stomach, thirst, vomiting and intestinal pain and sometimes purging. Small doses, long continued, cause spasms and death by coma and asphyxia; gangrene of the lower extremities may follow its prolonged use.

Medical Properties and Action.—Ergot causes contraction of the involuntary muscular fibre, the uterus, and smaller blood vessels, and dilates the pupils. It is employed to produce contraction of the uterus in child-birth. It is also administered in chronic diarrhœa and dysentery, enlarged heart without valvular lesion, gonorrhœa, acne rosacea, etc., etc. It is very serviceable in the hemorrhagic diathesis where there is a want of tonicity of the vessels; also used in epistaxis, uterine, renal, and intestinal hemorrhage, and in hæmoptysis; bleeding of hemorrhoids, etc.

Dose.—Of the fluid extract for internal use, f℥ss to ij; of the wine of ergot, ℥j to ℥ss; of the aqueous extract dissolved in water the hypodermic dose is gr. ¼ to gr. iij.

Dental Uses.—Ergot is useful in the treatment of hemorrhage of the gums, and that following the extraction of teeth when it is excessive and persistent.

ESSENTIAL OILS.

The volatile or essential oils are compounds of carbon and hydrogen, and differ from the fixed oils, which are compounds of carbon, hydrogen and oxygen, the molecular arrangements of which are similar to the metallic salts and compound ethers —possessing the radicals of certain acids united with hydrocarbons. The essential oils are generally absorbers of oxygen, and such of them as the oils of peppermint, cloves, caraway, cajeput, mustard and turpentine are useful obtunders of hypersensitive dentine; and some are also efficient germicides and antiseptics. From experiments noticed by Dr. Harlan, the essential oils are not miscible with water; hence when they are used as a root-dressing they are not contaminated or dissipated by the saliva or the mixed fluids of the mouth. They are capable of depositing vaporizable camphors that are powerful disinfectants, and are soluble at a temperature below body heat. They are good menstrua for iodine compounds, and oily dressings, when not too tightly confined in a pulp-chamber, are not vitiated like substances which are soluble in water. They may be allowed to remain for longer periods in the roots of teeth, when it is not possible to fill such roots at once. When an oily dressing (such as oil of peppermint or oil of cassia) is applied in a root canal, after the removal of a pulp by extirpation or its devitalization by arsenic, it acts as an anodyne and also as an antiseptic, preventing the formation of mephitic gases. The oily dressings may be pumped through roots and fistulous tracts with impunity, and will not clog delicate canals. The solutions of the essential oils are all made as follows (Dr. Black): "An excess of the oil is mixed with water by violent shaking continued for some minutes. It is then placed in the incubating oven, where the temperature is 99° F., for twelve hours. It is then again violently shaken and returned to the oven for another twelve hours, twenty-four hours in all. It is then carefully filtered, and if not perfectly clear and free from all appearance of oil, it is refiltered until it is clear. The filtrate is then used as the solution of the oil. The same plan is used in making saturated solutions of the crystalline substances."

The prominent essential oils are those of cajeput, cassia, cinnamon, cloves, eugenol, eucalyptol, fennel, mustard, caraway, peppermint, sassafras, turpentine, thyme, pennyroyal, valerian, wintergreen. In dental practice the oil of cassia diluted with a bland oil like that of wintergreen is a valuable dressing for putrid root canals and abscesses. Dr. Black recommends the following mixture:

℞. Carbolic acid (melted crystals), 1 part; oil of cassia, 2 parts; oil of wintergreen, 3 parts. Mix the oils and add the melted crystals of carbolic acid. This is known as the 1, 2, 3 mixture.

Dr. Black also says: "After thorough cleaning with the watery form of the antiseptic we need something that will be more enduring in its effects, and according to conditions should choose between the oils and the powders. If it is an abscess with which we have to deal, an oil which is in itself an antiseptic, or an oil holding the antiseptic drug in solution in effective proportions, may be introduced into the cavity and so agitated as best to bring it in contact with all of its parts. This will, on account of its sparing solubility, remain in position very much longer than the watery forms, and the essential oils are very much more diffusible than the fixed oils, or, indeed any other of the simple forms of the antiseptics with which I am yet acquainted. At the same time a sufficient amount for very extended work is contained in small compass. These are of especial value in such positions as the roots of teeth. In this position any but the most irritating of the antiseptic essential oils may be used to good advantage, and may be relied upon for many days together. In the choice of the essential oils it is by no means necessary that the most powerful of them be selected. It should be remembered in making the choice that the more powerful antiseptics are the more irritating, as a rule. It is therefore often best to choose antiseptics of very moderate range, especially where it is only required to preserve a condition of asepsis. For instance, when a very foul root canal is opened such an antiseptic as the oil of cassia is indicated. After appropriate cleaning, and

especially in case cleaning is to be deferred for fear of forcing poisonous material through the apical foramen, it may be used in full strength; in which form it may be relied upon as a disinfectant as well. But afterward, when it is only a matter of holding an aseptic condition during the healing of the parts, an antiseptic of shorter range, that is not so liable to injure the tissues, is to be preferred. For this purpose the eucalypti extract in substance is a very useful agent. Its range of actual inhibition is very short, but its injurious effects on the tissues are also very slight, so that the healing process may go on in its presence without hindrance. Furthermore, this oil has a very extended range of restraining influence beyond its range of actual inhibition that is undoubtedly of much use. This oil may be exchanged for terpinol where a little more stimulating effect is regarded as beneficial. The oil of cloves and the oil of cinnamon seem to occupy a middle ground and may be made useful in a large class of cases if the others are in any wise distasteful to the dentist or his patient. The oil of mustard, though a good antiseptic of short range, has an irritant action that limits its use. Yet in cases where it is desirable to arouse the tissues from a state of inactivity this action, in a high degree, is combined with the antiseptic property. It is also one of the most diffusible of the antiseptic oils thus far studied.

"Any of these oils may be used in the emulsion, if, for any reason, it is not thought well to use the oil in substance. This form is especially recommended for surfaces of suppurating wounds and the washing of abscesses. In this way small quantities of the oil may be widely diffused and left in a multitude of minute globules to gradually dissolve where it is most wanted, forming a kind of connecting link between the true solutions and the oils in substance. For this purpose a little of the oil selected may be diffused through water by severe shaking, or better, by repeatedly filling and violently emptying the syringe. The milky emulsion thus formed may be used in the same manner as the solution.

"I have said that all antiseptics are poisons. I wish to

emphasize this statement. They are antiseptic by virtue of their power of restraining life forces; and their use as antiseptics is permitted only by shades of difference in the action of certain poisons toward the different forms of life, by which they affect the fungi more prominently than the animal tissues."

ETHIDENE DICHLORIDUM—DICHLORIDE OF ETHIDENE.

Formula.—$C_2H_4Cl_2$. Sp. gr. 1.225.

Derivation.—Dichloride of Ethidene is obtained in the preparation of chloral, from the waste products, and is very much like chloroform in appearance, odor and taste. It has a variable boiling point of about 115° F., and is readily soluble in alcohol, sparingly soluble in water, and but slightly soluble in chloroform. It is inflammable, but less so than alcohol.

Medical Properties and Action.—Dichloride of ethidene is a general anæsthetic, and is said to occupy an intermediate rank between chloroform and ether. It reduces the action of the heart to a less degree than chloroform, with, however, considerable depression of the pulse.

It has been somewhat employed in England, where it is regarded as being safer than chloroform for inhalation, and requiring less quantity to produce anæsthesia than ether.

Methods of Administration.—It is recommended to administer nitrous oxide until the patient is nearly unconscious, and then to add the vapor of ethidene. The effects of this agent are described as follows: The pupils dilate, and at the same time stertorous breathing commences; the pulse falls, and should be carefully watched, and insensibility to pain continues for some time after the patient becomes conscious. It is also claimed for this agent that there are no unpleasant after-effects, the patient recovering as if from a natural sleep, with a clear mind and a distinct utterance. It is also recommended to combine the vapor of ethidene with that of nitrous oxide, by loosely inserting a sponge containing half an ounce of ethidene in the nitrous oxide gas-inhaling tube, or in the

rubber supply-bag, when the effect is said to be more profound and agreeable than when nitrous oxide alone is administered, with no nausea and but little lividity of the lips. It is also said to produce relaxation of the muscles rather than rigidity, differing in this respect from nitrous oxide gas.

Dichloride of ethidene is also employed as a local anæsthetic, in the same manner as chloroform, aconite, etc., for the relief of facial neuralgia, etc.

It has not been introduced to any extent into this country.

ETHYL BROMIDUM—BROMIDE OF ETHYL.

HYDROBROMIC ETHER.

Formula.—C_2H_5Br. Sp. gr. 1.420.

Derivation.—Bromide of Ethyl is obtained from bromide of potassium, sulphuric acid, alcohol and water, by distillation, and is re-distilled by chloride of calcium. It is a colorless and very volatile liquid, boiling at 40° C., heavier than water, and possesses an agreeable ethereal odor, and a pungent taste, strong and sweetish, with a somewhat burning after-taste. It is readily soluble in alcohol and ether, and but sparingly soluble in water.

Medical Properties and Action.—Bromide of ethyl is considered to be a very effective and pleasant general anæsthetic, but, like all other agents of this class, it must be administered with great care, and a pure article employed. There is no doubt but that it is pleasanter to inhale than chloroform, exceedingly rapid in producing complete unconsciousness, and very evanescent in its action. That it is any safer than some other and older agents of this class, clinical experience has not demonstrated, as several deaths occurred in a very limited number of the administrations attending its introduction. Bromide of ethyl is not inflammable, nor caustic, nor even irritant, in this respect being preferable to chloroform, which is very caustic, and to sulphuric ether, of which the ingestion is nearly impossible. Dr. Isaac Ott, comparing bromide of ethyl with other anæsthetics, says: (*a*) Chloroform increases the pulse, then slows it by a cardiac inhibitory stimulation;

ether increases the pulse; nitrous oxide also increases it by paralysis of cardiac inhibitory apparatus; whilst bromide of ethyl increases the pulse by an action on the heart itself. (*b*) Chloroform reduces the blood pressure by paralysis of the main vaso-motor centre, and cardiac debility; ether greatly increases it and keeps it increased; and nitrous oxide also increases it; bromide of ethyl increases it either by a stimulation of the spinal or peripheral vaso motor system. (*c*) Chloroform increases, and then decreases, respiration; nitrous oxide reduces it; bromide of ethyl decreases it by central action." He also draws the following conclusions: "1. Bromide of ethyl, either by inhalation or subcutaneous uses, kills, by a toxic action on the centres of respiration. 2. That the decrease of force and frequency of the heart contributes to the paralysis of the respiratory centres. 3. That injections of ethyl into the jugular, towards the heart, kill, by cardiac arrest, probably due to an action on the cardiac muscle. 4. Bromide of ethyl, in toxic doses, depresses momentarily the frequency of the heart, which is followed by a subsequent rise to a normal rate. 5. Bromide of ethyl, in toxic doses, depresses the arterial tension, due, in major part, to the depressant action of the drug upon the heart, and in a minor part, to a partial loss of tone of either the spinal vaso-motor centres of the peripheral vaso-motor system. 6. The inhibitory power of the pneumogastric is not paralyzed."

Introduced into the stomach, bromide of ethyl does not produce anæsthesia, as when absorbed by the respiratory organs, and does not increase the pulse over its normal heat; and in the second stage, causes an intermission of the pulse every second beat.

Administration.—Bromide of ethyl is best administered in a folded starched napkin, so as to cover the face, and having inside of it a soft linen handkerchief. On the linen handkerchief one measured drachm of the agent should be poured, and the patient directed to take long, deep inspirations, or, what is better, to make prolonged and forced expirations. In two minutes from the time of administration of the first

drachm, a second should be given, and this should be repeated at intervals of two minutes. Like all general anæsthetics, however, the quantity of inhalation differs according to the susceptibility of the patient. One drachm (or in some cases two drachms may be required, according to the susceptibility of the patient) of the bromide of ethyl will generally, in from one to three minutes, produce an anæsthesia as profound as that produced by an ounce of sulphuric ether. As it produces an anæsthetic effect on the muscles of the throat and upper parts of the pharynx, it is useful for operations on the mouth and throat.

The effect of an anæsthetic, however, is to be more regarded than the mere quantity of the agent poured upon a napkin or sponge, as the degree of anæsthesia should be governed, in most cases, by the nature of the operation to be performed under its influence.

Prof. Chisholm says: "I have found the action of bromide of ethyl so very evanescent that it can never take the place of either chloroform or of sulphuric ether for any surgical operation which requires some time for its performance; but for all quick work, which can be done in one or two minutes, the use of this anæsthetic agent leaves nothing to be desired. These really magical effects must be obtained from the first inhalation, what I call the primary anæsthesia. If the operation be protracted, and a second or even third dose of the bromide of ethyl be inhaled, and I find nausea, vomiting and heaviness in all respects as if chloroform or ether had been used—under this repetition, bromide of ethyl loses all its advantages."

The odor of bromide of ethyl is more rapidly removed, and is more agreeable than that of sulphuric ether, and its effects more rapid than even those of chloroform, as it is eliminated by respiration, and by the kidneys, more speedily than any other general anæsthetic agent. It requires excessive quantities to affect the heart and respiration to any great degree. Having no caustic action, it can be safely applied subcutaneously, and also to the external auditory meatus and to the mucous membrane. It evaporates upon the skin very rapidly,

producing a very sensible feeling of cold. As a rule, its general effects are as follows: Moderate acceleration of the pulse and respiration; slight excitement or talking, and seldom any struggling; flushing of face; dilatation, sometimes preceded by contraction of pupil; diaphoresis, generally profuse; complete anæsthesia in two or three minutes; recovery of consciousness in from one to two minutes after the withdrawal of the anæsthetic agent; no after-vomiting.

Any specimen of bromide of ethyl which has a disagreeable odor, or which, on standing, becomes brown, or any that will explode and burn, is impure and should not be employed for inhalation. A common impurity is *bromoform*, produced by the action of bromine and caustic potassa on alcohol or wood spirit. Bromide of ethyl possesses properties intermediate between those of chloroform and ether. As a local anæsthetic it is highly spoken of, and, owing to its non-inflammability, is the only anæsthetic which can be used in connection with the actual cautery. Dr. Byrd strongly recommends an anæsthetic mixture of bromide of ethyl 1 part, chloroform 3 parts and alcohol 4 parts, a drachm of which is poured upon the sponge of the inhaler, which the patient is allowed to inhale with the stopper out, after which the stopper is replaced and the full strength of the mixture inhaled. Generally in five minutes the patient is fully anæsthetized, when the stopper may be taken out to permit a greater admixture of air, and replaced as the judgment of the operator may dictate. This mixture, it is claimed, is safer and less disagreeable in its effects than the bromide alone. For use as a local anæsthetic, the bromide of ethyl is atomized with the "spray apparatus," which should furnish enough of the liquid to moisten the skin. The extremity of the tube should be held some two or three inches from the surface on which the spray is to be thrown. Within two or three minutes after its first application, anæsthesia of the part occurs, which is shown by the appearance of a white spot. The formation of this spot may be hastened by superficially puncturing or scratching the skin. The sensation of cold thus

produced is sometimes disagreeable, but is rarely painful. The skin, or even the thin layer of the subjacent tissue, may be painlessly incised while the white spot lasts. This anæsthetic appears to be very well adapted for short operations, requiring simple anæsthesia and not complete resolution; hence it is now preferred by some, for the extraction of teeth, to either chloroform or ether. Internally, bromide of ethyl has lately been recommended for whooping cough, in the form of a solution of 1 part of bromide of ethyl in 200 parts of water; also in angina pectoris, the dose being one-half to two ounces.

Given internally, it is also said to relieve gastric pain without affecting the appetite. Inhalations readily relieve convulsive cough; and, introduced on cotton wool into the external meatus, it relieves the pain of otalgia, without causing any irritation.

EUCALYPTUS.

Source.—Eucalyptus is obtained from the eucalyptus globulus, a tree of large size, and of the natural order Myrtaceæ, found originally in Australia, and known as the "Blue Gum Tree." These trees are now growing in the southern parts of Europe and the United States, and northern Africa, and their presence is thought to be preventive of malaria. The leaves, which are ensiform, of a grayish-green color, and parchment-like, are the only part which possesses medicinal qualities. They have a pleasant, aromatic odor, with a warm, bitter and somewhat pungent taste, like that of cubebs, the fresh being more active than the dried leaves. Their medicinal virtue is owing to a volatile oil—*Oleum Eucalypti*—which contains three principles, called *eucalyptene*, *turpene*, and *cymol.* Tannic acid, and a peculiar crystalline fatty acid, are also found in eucalyptus; but eucalyptene is the most important constituent.

Medical Properties and Action.—Eucalyptus is antiseptic, disinfectant, sedative, tonic, diaphoretic and somewhat astringent. When taken into the mouth, it excites a flow of saliva, and leaves a hot, pungent, persistent and disagreeable odor.

When introduced into the stomach, it causes a sensation of warmth, and promotes the secretion of the gastric juice. Being stomachic, it increases the appetite and the digestive action, with increased intestinal secretion. Large doses produce offensive eructations, a feeling of weight and tension at the epigastrium, and indigestion, followed by diarrhœa, and irritation and congestion of the kidneys. It increases the action of the heart, lessening the arterial tension, and causes a feverish condition. It accelerates the respiratory movements, and although it induces sleep in the weak and anæmic, it has the opposite effect on the strong and healthy. The secretions of the skin, mucous membrane and kidneys are increased by it, and become strongly odorous, owing to the presence of eucalyptol, a name given to the oil. The inhalation of large quantities of the vapor produces effects analogous to those of the agent when taken in substance, and the essential oil is readily diffusible and readily impregnates the blood.

Therapeutic Uses.—While the internal use of eucalyptus is contra-indicated in inflammatory conditions, it is a very efficient remedy in atonic dyspepsia; chronic, gastric and intestinal catarrh, cachectic conditions, flatulence, palpitation of the heart, hysteria, chorea, asthma, catarrhal broncho-pulmonary affections, chronic diseases of the liver and bladder, etc. It is also employed in intermittent fever, and during convalescence from remittent fever. Externally, it is an efficient application to chronic forms of angina and tonsillitis, to foul ulcers and wounds, etc.

Dose.—Of the fluid extract of eucalyptus, ʒss-ʒj; of the tincture of eucalyptus—*Tinctura Eucalypti*—fʒss to fʒij; of the extract—*Extractum Eucalypti*—gr. j to ℈j; of eucalyptol, the dose is ♏v to ʒss, in capsules or emulsion.

Dental Uses.—In dental practice, the decoction of the leaves is an efficient local application in the different forms of stomatitis, after the acute stage has subsided. The tincture and the distilled water of eucalyptus, or fluid extract, are used as disinfectant applications in indolent offensive ulcers of the mucous membrane of the mouth, stomatitis, pharyngitis, etc. The

tincture of eucalyptus has been employed with advantage to obtund the sensibility of dentine. The oil of eucalyptus, either alone or combined with iodoform, forms one of the most effective antiseptics in use, for the treatment of putrescent pulps of teeth, alveolar abscess, of the chronic form, pyorrhœa alveolaris, foul ulcers of the mouth, etc.

No other preparation appears to prove more efficient as an antiseptic than the combination of eucalyptus oil and iodoform, in the treatment of suppurating conditions, putrescent pulp-canals, necrosis, and caries of the bones of the jaws, etc. The oil can be introduced as an injection, with an abscess syringe, or by means of a fine broach armed with cotton, taking care that the agent is carried to the seat of the disease, and the application repeated as often as necessary. It may also be applied by dipping a pledget of cotton in the oil and then in finely pulverized iodoform (Truman), and carried to the tooth, as in cases of putrescent pulps. It is also employed as a local anæsthetic for odontalgia, and as an astringent or styptic in superficial hemorrhages, mucous discharges, ulcerating mucous membrane of the mouth, and for spongy, ulcerating gums.

Eucalyptus has a solvent effect upon gutta percha, a fact which should be remembered when using it in connection with temporary fillings of the former material, or of Hill's stopping.

DENTAL FORMULÆ.

For Abscess of Antrum.

℞. Olei eucalypti . . . . ℥ij
Acidi carbolici . . . gtt.x
Glycerini . . . . . ℥ij
Olei gaultheriæ . . . ℥ss. M.

SIGNA.—Use as an injection.

For Suppurating Pulps, Ulcers, etc.

℞. Olei eucalypti . . . . ℥j
Iodoformi . . . . . gr.xv M.

SIGNA.—Apply as an injection, by means of a syringe; or on cotton wrapped on the end of a fine broach; or on a strand of floss-silk.

For Root Canals as an Antiseptic.

R. D. PEDLEY.

Ol. eucalypti . . . . . 2 parts
Ol. caryoph . . . . . 3 parts
Creasoti . . . . . 10 parts M.

Into this dissolve gum mastich to saturation, filter through cotton-wool and thoroughly incorporate with iodoform in a mortar until it becomes a solid mass

SIGNA.—Introduce on floss silk or wisps of cotton, and cap it with a disk of metal and insert temporary filling.

For Abscess of Antrum.

GEO. L. PARMELE.

℞. Eucalypti . . . . . ℥j
Iodoformi . . . . . gr. x
Aquæ . . . . . ℥j M.

SIGNA.—To be used as an injection in connection with a tent of floss silk saturated with glycerine and eucalyptus.

For Alveolar Pyorrhœa.

(*Riggs' Disease.*)

G. V. BLACK.

℞. Olei eucalypti . . . ♏xc
Acidi carbolici . . . ♏xc
Olei gaultheriæ . . . ♏xxx. M.

SIGNA.—Apply by means of an abscess syringe.

FERRUM—IRON.

Chemical analysis demonstrates the presence of iron in the blood, the gastric juice, chyle, lymph, bile, milk, urine and the pigment of the eye; and, although metallic iron is inert, yet, when it reaches the stomach, it is dissolved by the acids, and thus acquires molecular activity. By its oxidation in the stomach hydrogen is set free, which in its nascent state unites with sulphur, forming sulphuretted hydrogen.

Medical Properties and Action.—The salts of iron act through and upon the blood, improving its quality and increasing its quantity, and hence they are termed "hæmatinic." These salts of iron are absorbed into the system, and are detected in the blood, urine, etc., and under their use the appetite increases, the digestion is improved, the pulse increases in frequency and fullness, the health becomes better, and there is an increase in flesh and an improvement in color; hence they are "restoratives." As these salts of iron in large doses cause nausea and vomiting, being irritant poisons, and even small doses, when administered for a long period, exhaust the gastric glands by over-stimulation, their use is contra-indicated in a plethoric condition, especially when accompanied with a hemorrhagic tendency, or when there is an atheromatous state of the cerebral vessels. Certain of these salts, such as the sulphates, the chlorides, and the nitrates, possess a high degree of astringency, and when taken internally produce constipation. Brought in contact with the blood, they coagulate it, and solidify the albuminous elements of the tissues, being powerful "hæmostatics."

Without great care is exercised in the internal administra-

tion of iron, owing to the acidity and astringent property of many of these preparations, injury results to the teeth, upon which they act with great energy. The tincture of the chloride and the sulphate, as shown by the experiments of Dr. Smith, of Edinburg, Scotland, are more corrosive than the wine of iron, and even more injurious than the compounds of iron with the vegetable acids. The use of an alkaline gargle of carbonate of soda, or prepared chalk, or solution of ammonia, before and after the taking of the iron preparation into the mouth, and the subsequent employment of an antacid dentifrice, will obviate the injurious effects of these salts of iron upon the teeth. While the carbonate of iron in the form of pill, nor the reduced iron, are injurious to the teeth by direct action, yet eructations of hydrogen compounds produced by their ingestion may injure the teeth.

The use of a tube carried well back in the mouth and the iron preparation well diluted, should be preceded and followed by the alkaline solution. The preparation known as dialysed iron—*Ferrum Dialysatum*—which is iron in the colloid state, made by the process of diffusion, is odorless, without the styptic taste of the other preparations, and does not discolor the teeth, being free from irritant action; neither does it cause constipation, and hence it is the best form in which to administer iron. The dose of dialysed iron is ℥v to ℥j.

Therapeutic Uses of Iron.—Iron is an efficient tonic, and promotes the appetite and the digestion; hence it is employed in anæmia, chlorosis, combined with quinine, in chronic malarial affections; syphilitic cachexia, acute rheumatism, erysipelas, diphtheria, scrofula, rickets, neuralgia depending on anæmia, epilepsy in weak, anæmic subjects, fatty degeneration of the heart, passive forms of hemorrhage due to anæmia, albuminuria, etc., etc. Externally, the styptic preparations of iron are employed to arrest hemorrhage—hemorrhage from leech bites, hemorrhage following the extraction of teeth, hemorrhage resulting from wounds and surgical operations, etc., etc.

[For doses of the various preparations of iron, see "Table of Doses."]

Chloride of Iron—*Ferri Chloridum*—Perchloride of iron. *Formula*, $Fe_2Cl_6 12H_2O$. Is obtained by heating iron wire with hydrochloric acid, and afterwards converting the ferrous chloride thus formed into ferric chloride by heating it with hydrochloric and nitric acids. It is in the form of crystalline masses of an orange yellow color, inodorous and of a strong styptic taste. It is deliquescent and readily soluble in water, alcohol and ether. It is used internally in the form of a tincture—*Tinctura Ferri Chloridi. Dose*, ♏v-xx.

Externally the chloride of iron is employed as a styptic and for an astringent, for the latter purpose being in solution of various strength.

Dental Uses.—In dental practice the chloride of iron is used internally for the treatment of neuralgia when it is attended with anæmia; also externally, for the arrest of alveolar hemorrhage, although the preference is given to the solution or powder of the subsulphate. The chloride of iron may be used in the semi-deliquesced or crystallized form, or in solution—*Liquor Ferri Perchloridi*—which is preferred by some to the crystallized. To bleeding surfaces it is applied in the proportion of ℥ss to ℥vj to the ounce of water. One part of the chloride gradually added to six parts of collodion, in the form of a yellowish-red, limpid liquid, makes a valuable styptic. Chloride of iron is also useful as an application to fungous tumors.

Reduced Iron—*Ferrum Reductum*—is metallic iron in the form of a fine powder, obtained by the reduction of ferric oxide by hydrogen. *Dose.*—Gr. j to gr. v.

Solution of Subsulphate of Iron—*Liquor Ferri Subsulphatis*—Monsel's Solution—is composed of sulphate of iron, ℥xij; sulphuric acid, ℥j, and gr. xxx; nitric acid, gr. ccclx. It is of a syrupy consistence and a ruby red or dark brown color, no odor or acrid taste, but possesses powerful astringent properties. When employed for the arrest of alveolar hemorrhage from tooth-extraction, it is liable to cause sloughing of the bleeding tissues, and if used it should be in weak solution, and carefully watched.

Powdered Subsulphate of Iron—*Pulvis Ferri Subsulphatis*—Monsel's Powder—is in the form of a yellow powder, and possesses the same astringent and other properties as the solution, and is applied as a styptic in alveolar hemorrhage with much greater convenience.

Medical Properties and Action.—Monsel's solution and powder act topically as powerful astringents and mild caustics, and are considered to be among the best styptics in use. These styptics combine with albumen and form a pale yellow compound, and on this property depends their chemical action on the tissues of the body. Internally administered they act like the sulphate of iron, their remote effect being tonic and hæmostatic. In small doses they exert an astringent effect on the gastro-intestinal mucous membrane, diminishing the quantity of fluids secreted or exhaled; hence their constant use will cause constipation.

Monsel's preparations of iron are principally used externally for hemorrhage from bleeding vessels. When employed internally it is for the arrest of hemorrhage from remote organs.

Therapeutic Uses.—The solution and powder of the subsulphate of iron are used internally for hemorrhage from the stomach and bowels. Externally, for hemorrhage, varicose ulcers, etc., etc.

Dose.—Of the solution of subsulphate of iron, gtt. v to gtt. x, twice a day in some bitter infusion. Of the powdered subsulphate of iron the dose is gr. v to gr. xv. The solution is also given in small doses with the sulphate of magnesia, and as an artificial chalybeate purging water.

Dental Uses.—In dental practice Monsel's solution and powder are principally employed for arresting hemorrhage following the extraction of teeth, hemorrhage from leech bites, and also from other causes, such as wounds of the gums and mucous membrane, in the treatment of ulcers of the mouth; and the solution, diluted with water, forms a serviceable application for abraded and inflamed mucous surfaces.

For Hemorrhage following the Extraction of Teeth.—After carefully cleansing the bleeding cavity as thoroughly

as possible, the styptic should be applied on a pellet of cotton, or, in case the powdered subsulphate of iron is employed, on a pellet of cotton previously dipped in sandarach varnish, to which the powder will adhere, and inserted over the mouth of the bleeding vessel at the apex of the alveolar cavity. Cotton should then be inserted over the styptic preparation, and the alveolar cavity be thoroughly filled up. If necessary, a compress, made from a cork, or softened modeling composition, should be applied over the cotton filling the cavity and held in place by the opposing teeth, when the mouth is closed.

DENTAL FORMULA.

For Hemorrhage from Extraction of Teeth.

STEERE.

℞. Liq. ferri persulph.,
Sodium chlor . . . . . āā . . . . . partes æquales. M.

SIGNA.—Apply on cotton to bleeding cavity and secure by covering with a roll of cotton cloth.

For Hemorrhage after Lancing the Gums of Children.

DR. J. W. WHITE.

Where oozing of blood persists in spite of local treatment:

℞. Tinct ferri chloridi . . . . . f ℥ss;
Acid.acetic dil. . . . . f ℥j;
Liq. ammonii acet. . . . . f ℥j;
Ext. ergot, fld. . . . . f ℥ij;
Syr. simp . . . . . f ℥ss;
Aquæ q. s. ad. . . . . f ℥iij M.

S.—A teaspoonful every 3 hours for a child six months old.

GELSEMIUM—YELLOW JASMINE.

Source.—Gelsemium is obtained from the root of the *gelsemium sempervirens*—yellow jasmine—woodbine, belonging to the natural order Apocynaceæ, which grows plentifully in the southern United States. The root is of a brownish color externally, and a grayish color within, and is sold in small pieces, from one-half to two inches in length, and a quarter of an inch in thickness, being hard and slightly cracked longitudinally. It has a bitter taste, and an aromatic odor, somewhat like that of green tea.

Medical Properties and Action.—Gelsemium has a depressing and sedative influence upon the nervous centres, and diminishes the force and frequency of the heart's action. It contains a very powerful alkaloid, *gelsemia* or *gelsemina*, which is colorless, odorless, with an intensely bitter taste

Gelsemium, in moderate doses, causes a languid feeling, attended with mental calmness, slow action of the heart, drooping eyelids, dilatation of the pupil, and some feebleness of muscular movements. In larger doses it causes vertigo, double vision, amblyopia, paralysis of the muscle that elevates the upper eyelid, so that it cannot be raised, dilated pupil, labored respiration, on account of its effect upon the respiratory muscles, slow and feeble movement of the heart, great muscular weakness, and a reduced sensibility to pain and touch. Such effects occur about half an hour after the gelsemium is taken, and continue for two or three hours, when they disappear.

When poisonous doses are taken, all of the symptoms described above occur in a more intense degree, and there is first an unsteady gait, until all muscular power is lost, the lower jaw drops, the muscles of the tongue are paralyzed, speech being impossible, the respirations are very labored, slight and irregular, and the action of the heart weak, feeble and intermittent, and generally the skin is covered with a profuse perspiration. Death occurs from asphyxia, but consciousness is preserved until near the end, which is generally calm, and not disturbed by convulsions.

Therapeutic Uses.—Gelsemium is internally administered in tetanus, mania, convulsive or spasmodic cough, such as whooping cough; pneumonia, remittent and typho-malarial fevers, ovarian and other forms of neuralgia, cerebro-spinal meningitis, pleuritis, etc., etc.

Dose.—Of the fluid extract of gelsemium—*Extractum Gelsemii Fluidum*—the only officinal preparation, ℥v to ℥xv. Of the tincture of gelsemium—*Tinctura Gelsemii*—(gelsemium ʒiv, alcohol, Oj), the dose is gtt. x to gtt. xx. The fluid extract is preferable for administration, but one fluidrachm

of this has caused death. Dose of the alkaloid *gelsemia*, gr. $\frac{1}{60}$ to gr. $\frac{1}{20}$.

Dental Uses.—Gelsemium is greatly extolled as a remedy for neuralgia of the fifth nerve, often affording permanent relief, especially when the affection is associated with diseased teeth. The dose may be repeated at any time after an hour and a half, if the pain is not relieved; a third dose is seldom required. In neuralgia of the face or head, three-minim doses of the tincture of gelsemium every half-hour, will often act very beneficially, and leave no ill effects. Owing to the toxic effects of this drug, care is necessary that the dose is a moderate one, and the symptoms carefully observed.

DENTAL FORMULÆ.

For Neuralgia from Devitalized Teeth.

℞. Tinct. gelsemii . . . . . gtt.x
Tinct. aconiti . . . . . gtt.v
Aquæ . . . . . ℥iv. M.

SIGNA.—One teaspoonful every hour.

For Odontalgia, Internal Remedy.

DR. DUNOYCER.

℞. Gelsemine . . . . . 1 milligramme;
Aconitine (cryst) . . . . . ¼ milligramme;
Valerianate of quinine . . . . . 5 centigrammes.

For one pill.

S.—Give one to three pills to an adult in the twenty-four hours.

GLYCERINUM—GLYCERIN.

Formula.—C_3H_53HO. Sp. gr. 1.25.

Source.—Glycerin is obtained from the saponification of fats and fixed oils, and contains a small percentage of water. It is a colorless, inodorous, syrupy liquid, of a sweet taste, and freely soluble in water and alcohol, but not in ether or chloroform.

Medical Properties and Action.—Glycerin is nutrient and emollient, possessing considerable power as a solvent and preservative. The addition of ¼, ⅛, or even $\frac{1}{16}$ part of glycerin to a lotion or poultice, or an external application, renders it particularly emollient and soothing. It keeps the parts moist-

ened and soft, and corrects or prevents the disagreeable odor of discharges, and it does not evaporate or dry at an ordinary temperature. Glycerin dissolves carbolic acid, creasote, tannic acid, borax, iodine, quinine, iodide of potassium, gallic acid, etc., and its uses as a solvent and a vehicle for other remedies are very numerous. It has been prescribed as a substitute for cod-liver oil, where the latter nauseates. Officinal solutions of medicinal agents in glycerin are known as glycerites (*glycerita*).

Therapeutic Uses.—Glycerin is rarely used alone as an internal remedy, its chief use being external, or in combination with other medicinal substances. It has been prescribed in phthisis, diabetes, acne; externally, as an emollient in acute coryza, chronic follicular pharyngitis, chapped hands and face, fissures, skin diseases, dressing for wounds and ulcerated surfaces, and as a vehicle for the application of astringents to the eye; also to soften cerumen and for the removal of insects from the ear, and for diminishing the secretion of pus; also in burns, abraded surfaces, erysipelas, etc. It has also been employed in smallpox as an emollient and to prevent pitting, a mixture of one part of glycerin and two parts of rose water being applied, after the pustules have broken and the discharge has commenced to dry. It is applied for a few days until the scabs begin to loosen. Glycerin is also used in croup, locally applied to the glottis; also in deafness, where the auditory canal is dry and inelastic. For an emollient application it is frequently combined with other agents, and used in the form of an ointment or embrocation. Five parts of glycerin rubbed up in a mortar with four parts of yolk of egg, forms a compound which prevents the action of the air on irritated broken or abraded surfaces, and is soothing in erysipelas, cutaneous affections, etc. Although glycerin is so bland in its general character, yet it produces a smarting sensation when first applied to an abraded surface of the skin; such an effect is thought to be due to the affinity of glycerin for moisture, which it abstracts from the skin so rapidly as to cause the smarting sensation; mixing the glycerin with a little water

will obviate this. Pure glycerin, when mixed with water, will raise the temperature eight or ten degrees, and hence the two should be combined previous to the application.

Dose.—Of glycerin, ℥j to ℥ij.

Dental Uses.—Glycerin is a useful agent in dental practice as a solvent and emollient, as a solvent alone, and as both solvent and emollient, when combined with other substances.

It is employed with great benefit in such diseases of the mucous membrane of the mouth, as the different forms of stomatitis, ulcers of the mouth, aphthæ, alveolar abscess, abraded surfaces from the irritation of acrid substances, artificial teeth, etc.

In the treatment of inflamed and ulcerated conditions of the mucuous membrane, it is frequently combined with borax, and for chronic alveolar abscess, after the use of more active agents, and diseases of mucous membrane, it is combined with carbolic acid, iodine, sulphite of soda, etc. As an anodyne and emollient application, glycerin is combined with morphine, atropine, acetate of lead, etc., etc. To form ointments and embrocations, it is combined with gum tragacanth, lime water, oil of almonds, rose water, etc., etc.

DENTAL FORMULÆ.

For Chronic Abscess, Ulcerations, etc.

℞. Glycerini . . . . . ℥j
Tinct. iodi. comp . . . ♏xlv
Acidi carbolici cryst . . ♏vj
Aquæ destillatæ . . . . ℥v. M.

SIGNA.—Apply as a lotion or injection.

For Inflammation and Ulceration of the Mucous Membrane.

℞. Glycerini . . . . . ℥j
Sodii boratis . . . . . ʒij M.

SIGNA.—Apply as a lotion.

For Aphthous Ulceration of the Mouth.

℞. Glycerini . . . . . ℥j
Sodii sulphitis . . . . . ʒj.

SIGNA.—Apply as a lotion.

For Chronic Alveolar Abscess, Ulceration of Mucous Membrane, etc.

℞. Glycerini . . . . . partem 1
Acidi tannici . . . partes 2.

For Pulpitis.

℞. Glycerini . . . . . gtt. ij
Acidi carbolici . . . . gr. v.
Tr. aconit. rad.,
Aq. menth. pip. . āā . gtt. ij.
Acidi tannici . . . . gr. j
Ol. menth. pip.,
Ol. caryophylli . āā . gtt. xxv. M.

SIGNA.—Apply on cotton.

For a Sedative Application in Inflamed Mucous Membrane.

℞. Glycerini
Chloroformi . . āā . . ℥ss M.

SIGNA.—Apply as a lotion.

For Aphthous Sore Mouth of Infants.

℞. Glycerini,
Aquæ . . . āā . . . . ℥ss
Sodium sulph . . . gr. xxx M.
SIGNA.—Use on swab, every 2 hours.

For Pulp Canals of Abscessed Teeth.
FAUGHT.

℞. Glycerini . . . . . f℥ij
Acidi tannici . . . . . ℥ij
Morphiæ acetatis . . . ℥j
Iodoformi . . . . . ℈j. M.
SIGNA.—Apply on floss silk or cotton.

GLYCEROBORATE OF CALCIUM.

Glyceroborate of Calcium is a powerful antiseptic, and is prepared by mixing equal parts of borate of calcium and glycerine, and heating the mixture to about 160°, with constant stirring, which is kept up until a drop of the mixture falling from the end of a stirring-rod upon a glass plate solidifies, on cooling, to a clear, colorless, brittle bead; the mass is then poured out, and after cooling, is broken up and the fragments at once put into a well-stoppered and dry bottle. It is soluble in all proportions of water, and on exposure to the air will rapidly become liquid, taking up its weight of water. Even when in a very dilute solution it is a powerful antiseptic, with no odor and no poisonous properties.

GLYCEROBORATE OF SODIUM.

Glyceroborate of Sodium is prepared in the same manner as the glyceroborate of calcium, simply substituting the borate of sodium. It possesses the same properties as the glyceroborate of calcium, and is somewhat preferable to the latter, as even concentrated solutions of the glyceroborate of sodium can be applied to the eye without inconvenience. Both preparations will preserve meat for a long time.

HAMAMELIS.

WITCH HAZEL.

Source.—Hamamelis Virginica is an indigenous shrub, common to all parts of the United States and Canada, and usually found in stony places and on the banks of streams. The bark and leaves are the medicinal portions.

Medical Properties and Action.—It is tonic, astringent, sedative, and anodyne. The bark has a bitter, astringent, and

somewhat sweetish and pungent taste, and was first employed by the Indians as a sedative and discutient application, in painful tumors and other cases of superficial inflammation. The bark contains from eight to ten per cent. of tannic acid, and also a bitter principle.

Therapeutic Uses.—Hamamelis Virginica, although not until recently officinal, has for some time been employed in hemorrhage of the lungs, hæmatemesis, and in phthisis. Externally, it is applied to tumors, inflamed and painful parts, etc., etc., in the form of a fluid extract, decoction and tincture. Two minims of the tincture of hamamelis every half hour, will often control hemorrhages from nose, uterus, and from hemorrhoids.

Dose.—Of the fluid extract of hamamelis, ℥ss to ℥ij; of the decoction, ℥ss to ℥j.

Dental Uses.—Hamamelis is employed in dental practice as a sedative or anodyne application, in incipient periodontitis, in the form of the fluid extract, applied *warm* on lint or cotton, as a lotion; also as an anodyne, to irritated and painful exposed pulps of teeth; also for passive hemorrhage from the mucous membrane of the mouth; also for the soreness arising from the removal and effects of salivary calculus. The tincture may be applied as a sedative lotion, in the proportion of one part to ten of water.

HYDRARGYRUM—MERCURY.

QUICKSILVER.

Formula.—Hg. Sp. gr. 13.5.

Sources.—Mercury is a metal of a nearly silver-white color, and a very high degree of lustre. It is liquid at all ordinary temperatures, and only solidifies when cooled to 40°. It fuses at 39° F., and readily volatilizes at 66° F.; it boils and yields a transparent, colorless vapor, of great density. It also volatilizes somewhat at ordinary temperatures, and especially above 68° F. The ordinary ore from which metallic mercury is obtained is the *mercuric sulphide*, although it is occasionally met with in globules disseminated through this native sulphide,

and which is noted as *cinnabar*. There is also a form known as *horn silver* or native calomel, and a native amalgam of silver and mercury. California furnishes metallic mercury of a peculiar purity, in large quantities. The metal is obtained from the sulphide by the process of "roasting." When pure, metallic mercury does not readily tarnish in the air, and it can be purified by re-distillation, or by adding to it a small quantity of a strong solution of nitrate of mercury.

The impurities are generally dirt, dust, lead, tin, bismuth or zinc.

Dental Uses.—Metallic mercury is employed in dental practice, as an ingredient of amalgam filling material, being combined for such a purpose with silver, tin and zinc, and sometimes with gold and platinum, in addition to the other metals named.

HYDRARGYRI CHLORIDUM CORROSIVUM.—*Corrosive Chloride of Mercury—Corrosive Sublimate. Mercury Chloride, Bichloride of Mercury. Formula,* $HgCl_2$.

Derivation.—Corrosive sublimate is obtained by subliming a mixture of chloride of sodium and mercuric sulphate, the latter made by boiling together sulphuric acid and mercury; double decomposition takes place, forming mercuric chloride and sulphate of sodium. Corrosive sublimate is in the form of colorless crystals, or crystalline masses, which are inodorous, fusible and sublime without residue, and of an acrid, styptic taste. It is readily soluble in 15 parts of water, 7 parts of alcohol and ether.

Medical Properties and Action.—It is one of the most active salts of mercury, and is a corrosive poison, but the therapeutic dose now used is less liable to cause the disagreeable and dangerous effects of mercury than almost any other preparation employed for the same purposes. It is in the form of colorless crystals, and is entirely soluble in water. Corrosive sublimate is an effective germicide in the strength of one part to 2500 parts of water, being 250 times more powerful than carbolic acid. An aqueous solution of 1 in 20,000 destroys the spores of bacilli in ten minutes, and a solution of 1–5000 is a certain

disinfectant, when the exposure is very short, and it is now regarded as one of the most powerful germicides in use and is very extensively employed in antiseptic surgery.

Dr. F. Abbott regards the bichloride of mercury as being the simplest antiseptic in use. Dr. W. D. Miller, of Berlin, also testifies to the power of the bichloride as an antiseptic in the treatment of the oral cavity as follows: "The experiments show that bichloride of mercury is about two hundred times as powerful as carbolic acid, and demonstrate very clearly the mistake of substituting weak solutions of this antiseptic (1–1000, as I have seen recommended) for concentrated carbolic acid. One one-thousandth is only one-fifth as powerful as pure carbolic acid, which in many cases may be used with impunity. It is consequently useless to attempt to introduce the sublimate solution for the purpose of sterilizing root-canals, cavities before filling, etc., unless we may use at least a ½ per cent., if not a one per cent. solution. I see no reason why this may not be done. In a few cases I have used a 1 per cent. solution for treating root-canals, and do not hesitate, particularly with the rubber dam adjusted, to wipe out cavities before filling with a two per cent. solution, and see no possible evil which would result from it." "As a mouth wash I have frequently used a $\frac{1}{1000}$ per cent. (1.000) solution myself, and have seen no bad results from it; I would not, however, recommend it to my patients in this strength.

It is often employed in solution in water, 1 part to 2000, which would aproximate 1 grain to 4½ ounces of water.

Dr. Black recommends the following combination: Mercuric chloride, gr. ij; peroxide of hydrogen, f℥j. M. For use as an injection in alveolar abscess and the pus pockets of pyorrhœa alveolaris. As a solution of bichloride of mercury is prone to undergo chemical changes, powders or tablets containing equal quantities of the bichloride and ammonium chloride may be prepared and a solution made by adding one of these to an ounce of distilled water.

Another method is to take one drachm each of the bichloride and hydrochloric acid, and add enough of distilled water to

make one ounce, which forms a permanent solution, strong enough in the proportion of a teaspoonful to a pint of water, to make a sterilizing and disinfectant solution of 1 to 1000, for washing out pus sacs and pus pockets in alveolar abscess and alveolar pyrrhœa.

Referring to the bichloride of mercury, benzoic and salicylic acids and listerine, Dr. Miller says: Of these four, which are available for the prophylactic treatment of the oral cavity, particularly of the teeth, the bichloride is, without doubt, the most effective, because its action continues longer; and he further says: "Unfortunately the bichloride of mercury possesses one great disadvantage in its highly poisonous character. It seems, however, scarcely possible that any harm could result from its use in so dilute a form." (See Hydrargyri Chloridum Mite.)

Therapeutic Uses.—Corrosive sublimate is alterative in small doses, and in large quantities it is a powerful irritant poison, corroding the stomach and causing death in a very few hours. Its continued use has caused salivation, but it has a less tendency to produce such an effect than the other preparations of mercury. Internally it is employed in secondary syphilis, chronic diarrhœa and dysentery. Externally in diseases of the eye, diseases of the skin, ulcers, gonorrhœa and gleet, etc., etc. The external application to large surfaces is dangerous. Its use is contra-indicated in patients affected with pulmonary disease. Drs. Yates and Kingsford report three cases of cancrum oris in children cured by wiping the affected parts with a solution of the bichloride of mercury (1 to 500) and afterwards dressing them with lint soaked in a similar solution (1 to 1000). Healthy granulations soon made their appearance and the wound quickly contracted.

For cases of poisoning the antidotes are albumen, white of egg, wheat flour, milk, etc.

Dose.—Of corrosive sublimate gr. $\frac{1}{30}$ to gr. $\frac{1}{10}$, in pill or solution.

Dental Uses.—It is employed as a lotion, injection or gargle, in chronic diseases of the mucous membrane, ulcers, ulitis, etc. Dr. C. T. Stockwell reports a case of acute ulitis

in which bichloride of mercury, in solution 1-1000, was used to bathe the parts, and the pockets about the teeth injected with it, the result being very satisfactory; and the same solution used as a sterilizing agent is considered to be very efficient.

Test for Bichloride of Mercury.—Dr. Chas. Mayr recommends the following to determine whether a solution of bichloride of mercury is still reliable or not; Saturate a nice grade of paper with a solution of a given amount of iodide of potassium in water; with the proper gauging of this solution, after it has dried on the paper, a drop of the solution of the bichloride (1 to 5000) will produce a scarlet spot when dropped on the paper; a solution of 1 to 1000, a yellow spot; a more dilute solution, no spot at all. To obtain this result, a certain strength of the solution of iodide of potash gauged for the paper to be used is required. The solution of iodide of potash should be made slightly alkaline which will prevent, to a great extent, the papers from turning blue. Diluting a solution of bichloride of mercury with lime water will remove the disagreeable taste.

For Chronic Alveolar Pyorrhœa.

A. W. HARLAN.

℞. Bichloride of mercury . . . . . grs. ij
Tartaric acid . . . . . grs. x
Distilled water . . . . . f℥ iv. M,

SIGNA.—First cleanse with injections of peroxide of hydrogen, and then inject the above with a hypodermic syringe.

Antiseptic Solution.

EMIL ROTTER.

℞. Corrosive sublimate, 1 to 20,000 . . . . . gr. j.
Sodii chlorid . . . . . gr. vss.
Acid, carbolic . . . . . gr.xxx
Zinci chlorid
Zinci carbolat . . . . . āā ʒj ¼.
Acid, boric . . . . . gr.xl
Acid, salicylic . . . . . gr.x
Thymoli . . . . . ♏ij.
Acid, citric . . . . . gr.ij
Aquæ . . . . . q. s. ad 1,000,00. M.

Said to be powerful, yet not toxic to any dangerous extent, and to have a more potent effect on pyrogenic microbes than sublimate in solutions of 1 to 1000. If a weak solution is desired the sublimate and carbolic acid may be omitted.

Antiseptic and Stimulant Mouth Wash.

For use especially in Alveolar Pyorrhœa.

DR. CHAS. B. ATKINSON.

℞. Hydrarg. bichlor . . . . . gr.ij
Tinct. Calendulæ . . . . . ℥iv
Aquæ dest. q. s.; ad . . . . . ℥viij. M.
S. Use daily.

To Disinfect Softened Dentine in Cavities.

DR. A. W. HARLAN.

℞. Corrosive Sublimate . . . . . gr. ij
Peroxide of hydrogen . . . . . ℥j
Tartaric acid . . . . . ♏v. M.
Aqueous solutions of Labarraque's solution, permanganate of potash or boro-glycerine, may also answer.

Prof. W. D. Miller, of Berlin, in a list of remedies with which he made careful experiments, places the relative powers of well-known agents in preventing the development of fungi as follows:

Bichloride of mercury	1–100,000
Peroxide of hydrogen	1– 50,000
Iodine	1– 6,000
Iodoform	1– 5,000
Salicylic acid	1– 2,000
Eucalyptus	1– 1,600
Carbolic acid	1– 1,500
Chloride of zinc	1– 1,250
Permanganate of potash	1– 1,000
Listerine	1– 120

HYDRARGYRI CHLORIDUM MITE—*Mild Chloride of Mercury. Calomel. Mercurous Chloride. Formula,* HgCl.

Derivation.—Calomel is obtained by subliming a mixture of mercurous sulphate and chloride of sodium, a double decomposition taking place, by which mercurous chloride and sulphate of sodium are formed. The mercurous sulphate thus employed is obtained by boiling mercury in sulphuric acid and triturating the resulting mercuric sulphate with mercury.

To remove any corrosive sublimate which the calomel may contain, it is washed with hot distilled water until the absence of a white precipitate with ammonia shows that the poisonous ingredient has been removed. Calomel is in the form of a white, inodorous, tasteless powder, insoluble in

water, alcohol and ether, and wholly volatilized by heat. Calomel is incompatible with the alkalies, and alkaline earths and alkaline carbonates, with lead, copper and iron. When nitro-muriatic acid is combined with it, corrosive sublimate is formed; neither should it be given in combination with iodine.

Medical Properties and Action.—Calomel and the other mercurials are employed as alteratives, sialagogues, purgatives, diuretics, etc., and moderate doses increase the action of the secreting glands and organs, stimulating the salivary glands in a very decided manner. When large doses are administered the effects are manifested on the gums, which become tender and swollen, the salivary glands take on increased action, the saliva and buccal mucus flow profusely, the mucous membrane of the mouth becomes inflamed and ulcerated, the tongue swollen and the breath fetid, with a metallic, copper taste, and the teeth become loose; such symptoms constitute the condition known as salivation. When the use of the drug is discontinued these symptoms disappear, but the mucous membrane and gums are ever after more susceptible to irritation, and the stability of the teeth is more or less impaired, as is shown by the recession of the gums and the absorption of the alveolar processes. In many cases the gums, especially about the necks of the teeth, remain somewhat tumefied, with a tendency to ulceration.

If the use of the mercury is continued beyond the stage which the symptoms just described indicate, or even as the effects of small doses in persons very susceptible to the influence of mercury, an excessive salivation ensues, with serious ulceration of the gums and mucous membrane of the mouth, loss of the teeth, and even necrosis of the bones of the jaws. Mercury has also the effect of causing considerable emaciation, from the absorption of fat, and sometimes a peculiar febrile state known as mercurial fever; and also diarrhœa, skin diseases, rheumatism, neuralgia and disorder of nervous system. Mercury, after it is absorbed, has a decided effect upon the blood, which it impoverishes, destroying the red

blood globules (hematine and globuline); the blood contains more water, is more prone to putrefaction, and the unnatural fluidity predisposes to hemorrhage, which may become dangerous.

Therapeutic Uses.—Mercury in the form of calomel, blue mass (*Pilulæ Hydrargyri*—pills of mercury—mercury ℥ij; confection of rose ℥iij, and powdered liquorice root ℥j,) are employed as sialagogues, indirect tonics and cholagogues, and purgatives in syphilis, diseases of the skin, bilious derangements, dyspepsia, acute glandular affections, diarrhœa and dysentery of infants, hepatic disorders, croup and membranous laryngitis, cholera, etc., etc.

Dose.—Of calomel, gr. $\frac{1}{10}$ to gr. x; of blue pills, or mass, gr. ss to gr. xv. Mercurials are administered by the mouth, by inunction, by fumigation, and by the hypodermic method.

Mercurial Ointment—*Unguentum Hydrargyri.* Blue ointment is made by rubbing two parts of mercury with one part of suet and lard each, until the globules disappear. When rubbed into the skin, it produces the constitutional effects of mercury, and is applied to tumors, syphilitic sores, blistered surfaces, and is used to destroy pediculi, and also to prevent pitting in small-pox.

Mercury with Chalk—*Hydrargyrum cum Creta,* a gray powder, consists of mercury, three parts, prepared chalk, five parts. It is a gentle laxative, when given in full doses, and is antacid, and employed chiefly as an alterative in infantile diarrhœa, etc.

Dose.—Of mercury with chalk, for adults, gr. v to xx; for children, gr. ss to ij, iij or x.

The effect of mercurial preparations upon children is sometimes very serious, as a profuse, or even gentle salivation will, at times, cause mortification and destruction of the bones of the jaw, the teeth, the cheek, and lip; and although such cases may not be common, yet, to avoid such a powerful action, the gums should be frequently and carefully examined, when a course of such remedies is being pursued.

PROTIODIDE OF MERCURY—*Hydrargyrum Iodidum Viride*, known also as Green Iodide of Mercury—is prepared by rubbing mercury and iodine together with the addition of a little alcohol. The formula is HgI, and it is in the form of a greenish-yellow powder, insoluble in water and alcohol, but soluble in ether. Exposure to the light partially decomposes it, when it becomes of a dark olive color.

Protiodide of mercury is internally administered in scrofula and scrofulous syphilis. It exercises a specific influence over the lymphatic and glandular system. It should never be given at the same time as iodide of potassium, as it converts it into biniodide and metallic mercury.

Dose.—Gr. $\frac{1}{6}$ to j.

Externally, protiodide of mercury is applied, in the form of ointment, to syphilitic ulcers, acne, pityriasis, etc., etc.

BINIODIDE OF MERCURY—*Hydrargyri Iodidum Rubrum.*—Red Iodide of Mercury. Mercuric Iodide. A red powder which becomes yellow when heated and red again when cold. It is wholly volatilized by heat, and condenses in scales, which are first yellow, but afterwards red. It is insoluble in water, but soluble in boiling alcohol and solutions of iodide of potassium and chloride of sodium. Poisonous.

Dose.—Gr. $\frac{1}{50}$ to $\frac{1}{10}$. It is a powerful germicide.

RED SULPHURET OF MERCURY—*Hydrargyri Sulphidum Rubrum.*—Vermilion. Cinnabar. In brilliant crystalline masses of a deep-red color and fibrous texture. It is entirely volatilized by heat. It is not soluble in either nitric or muriatic acid, but a mixture of the two acids will dissolve it. Cases have been cited in support of the asserted poisonous effects of vermilion, where it has been used as a coloring-matter for dental vulcanite, but a careful analysis as well as evidence based upon scientific investigation, fails to establish the truth of such a theory. Vulcanite composed only of pure caoutchouc and sulphur, known as "black vulcanite," possesses advantages over the red vulcanite, in being of finer texture, more dense, and less spongy, and consequently less liable to absorb and retain the secretions of the mouth, in the case of an artificial denture constructed of it.

DENTAL FORMULÆ.

For Diarrhœa of Dentition.

℞. Calomel . . . . . gr.ij ad vj
Cretæ ppt . . . . . gr.xviij
Ipecacuanhæ pulv . . gr.ij
Extract hyoscyami . . gr.iij ad vj
F. chart, No. vj.

SIGNA.—One every two or three hours, according to circumstances.

For Febrile Excitement of Dentition.

℞. Calomel . . . . . gr.ij ad iij
Magnes. calc . . . . . gr.xxiv
Ipecacuanhæ pulv . . . gr.ij to iij
F. ch. No. xij.

SIGNA.—One to be given every three hours.

For Venereal Sore Mouth and Throat.

℞. Hydrar. chlor. corrosi . gr.j
Mellis despumati . . . . f ℥ss
Aquæ destillatæ . . . . f ℥iv. M.

SIGNA.—To be used as a gargle.

For Warts, Condylomata, etc.

℞. Hydrar. chlor. corrosi . ℥j
Collodii . . . . . ℥j. Solve.

SIGNA.—To be applied as a caustic, with a camel's-hair brush.

For Diarrhœa of Teething Children.

℞. Hydrargyri cum cretæ,
Pulv. ipecac. et opii āā gr. j. M.

SIGNA.—One powder.

IODOFORMUM—IODOFORM.

TERIODIDE OF FORMYL.

Formula.—CHI_3.

Derivation.—Iodoform is a preparation of iodine, being obtained by the action of chlorinated lime upon an alcoholic solution of iodide of potassium, heated at 104° F., the product being iodoform and iodate of lime, the iodoform being separated by boiling alcohol. It is in the form of small, pearly crystals, of a yellow color, with an unpleasant odor, like that of saffron, and a sweetish taste, and soft to the touch. It is volatile, and soluble in alcohol, chloroform, ether and the fixed and volatile oils, but insoluble in water.

Medical Properties and Action.—Iodoform has no irritant action, and, in small doses is tonic, stimulant, anodyne, alterative and disinfectant, having great influence on the nervous system; it is also antiseptic. In large doses, it causes a form of intoxication, followed by convulsions and fatal effects. In the form of vapor, it possesses anæsthetic properties, but not equal to those of the general anæsthetics in common use. It has also been used as a local anæsthetic, aud also as an antiseptic. Its odor can be detected in the blood, the brain and the muscles.

Therapeutic Uses.—Iodoform produces the constitutional effects of iodine, but is chiefly used externally for painful cancerous and phagedenic ulcerations, irritable ulcers, ill-conditioned wounds, obstinate skin diseases, scrofulous glandular enlargements, to allay the pain of gout and neuralgia, and for phthisis, mixed with starch and spread on paper, so that the vapor may be inhaled. Dusted over a diseased surface, it allays pain and changes the morbid action. A saturated solution of iodoform in chloroform is recommended for neuralgia; also a saturated solution in any of the essential oils is used for the same affection. In the form of an ointment, it is used as an application to irritable ulcers. For ulcerated surfaces, it may be sprinkled over the part, and lint, coated with glycerine, applied as a dressing.

Dose.—Of iodoform, gr. j to gr. iij, three times a day, in the form of a pill.

Dental Uses.—Iodoform is highly recommended in dental practice, as an antiseptic, either alone, or what is better, combined with eucalyptus oil. It possesses no escharotic property sufficient to cause irritation or the destruction of parts. In the treatment of alveolar abscess, iodoform, in combination with oil of eucalyptus, has given great satisfaction; also in cases of putrescent pulps, applied as an injection. It is recommended to be used as follows: First, an injection of eucalyptus oil, followed by the introduction of the mixture of iodoform and eucalyptus into the root canal, on cotton, or on a strand of floss silk, which is charged by first dipping it into the oil, and then in the iodoform; or the two may be combined in a solution (see Eucalyptus), and in this form introduced into the sac or root canal. Dr. C. N. Pierce recommends iodoform ground up with equal parts of oil of cloves and oil of eucalyptus, which forms a substance of a soft cheesy consistence, a portion of which can be introduced to the inflamed part, on the point of a small broach. Iodoform is also a very serviceable application in alveolar pyorrhœa. A saturated solution in eucalyptus oil is also serviceable as an external application in neuralgia. Iodoform is also employed as an anodyne, for the

relief of the pain following the extraction of teeth affected with periodontitis and alveolar abscess; also as an injection in diseases of the antrum, and as a packing for the pus pockets in alveolar pyorrhœa, for which purpose it is often combined with oil of eucalyptus, or oil of cinnamon. Also for filling the canals of pulpless teeth, for which purpose a paste of iodoform and carbolic acid is used, and allowed to remain for a few days, and, if no soreness follows, a permanent root-filling can then be introduced. When iodoform is used alone, a pellet of cotton or a strand of floss silk may be dipped into glycerine, and the iodoform be thus taken up. To disguise the unpleasant odor of iodoform, it may be incorporated with a little oil of rose, as one drop of the oil will remove the odor of half a drachm of iodoform; the odor is also disguised by balsam of Peru, oil of cinnamon, oil of lavender, or oil of sassafras. Three grains of cumurin (a derivative of the Tonka bean) will disguise the odor of one drachm of iodoform; or the addition of attar of rose, one minim to the drachm; or of essence of rose geranium, three or four minims to the drachm. Creolin is also a very good deodorizer of iodoform; also aqua heliotrope, for the hands also, one or two drops of creasote or carbolic acid to the ounce of iodoform, is also recommended. According to some, it is not a matter of indifference whether iodoform be applied as a dressing for wounds and ulcers, in the form of crystals, as amorphous powder dissolved in ether, or as an ointment. Iodoform acts not only as a chemical combination, allowing the escape of iodine in a free state, but it has certain mechanical properties. When the surface of an ulcer or wound is covered with a layer of iodoform in crystals, a certain degree of absorption of the fluids secreted takes place. These products of secretion penetrating the interstices between the minute crystals of iodoform soon lose the liquid form, and produce with them an impermeable crust. Under this crust cicatrization soon occurs, without any retraction of the tissues; hence they suppose that the best form in which to employ iodoform for ulcers and wounds is that of the crystals. As toxic effects have followed the internal administra-

tion of iodoform, it should be prescribed with care, and also the application of it to extensive surfaces should be avoided. The toxic symptoms have been manifested as follows, the maximum dose which caused them in a certain case being 12½ grains:

"Giddiness, vomiting and deep sleep, from which the patient could be roused with difficulty. The somnolence was interrupted by periods of excitement, each lasting several hours, and was followed by delirium, intense headache, sense of impending death, spasmodic contractions of the facial muscles, and in the case of the younger patient, diplopia. The functions of the other sensory organs were not disturbed, and the pupils, presented a normal reaction. Deep inspirations alternated with apnœa of about a minute's duration. After five or six days, the toxic symptoms gradually lessened and passed away."

Iodoform has been used for odontalgia, on account of its gently caustic and anodyne action on exposed pulps of teeth. Combined with arsenious acid and creasote in a devitalizing mixture, iodoform is supposed to lessen the pain caused by the arsenical paste.

M. Rummo, of the Academy of Science, regards iodoform as exerting an anæsthetic action when applied to wounds, but without the power to destroy germs in putrescent matter, although it prevents their development; but dissolved in oil of turpentine, it will destroy bacteria in their fullest proliferation. M. Sauvat says that iodoform, when applied to wounds, reduces effusion and favors cicatrization, and exerts an anæsthetic action; but if carelessly used it may cause erythema or even erysipelas. Iodoform in powder is now a popular dressing for wounds.

DENTAL FORMULÆ.

New Methods for Deodorizing Iodoform.

1.—Carbolic acid . . . . . 1 part.
Iodoform . . . . . 2 parts.
Powder and mix well.

No change appears to take place in the iodoform, but the odor is marked by that of carbolic acid.

2.—Iodoform . . . . . 100 parts
Oil of peppermint . . . . 5 parts
Oil of neroli . . . . . 1 part
Oil of lemon . . . . . 2 parts
Tinct. benzoin . . . . . 2 parts
Acetic acid . . . . . 1 part.
Powder the iodoform, and mix thoroughly with the other ingredients. Transfer to a well stoppered flask, and keep at a temperature of from 120° F. to 140° F., over a water bath, for two days. The mixture has a pleasant odor of Eau de Cologne.

3.—Camphor . . . . . 5 parts
Charcoal . . . . . 10 parts
Iodoform . . . . . 15 parts.
Powder and mix intimately.

For Pulpless Teeth.

℞. Iodoformi . . . . . gr.x
Acidi tannici . . . . . gr.iij
Glycerini . . . . . gtt.xv. M.

SIGNA.—Apply on floss silk, or by syringe.

PREPARATION.—Rub iodoform to fine powder, in a mortar, and add the tannin, and after mixing thoroughly, add the glycerin. One drop of oil of cinnamon will disguise the odor.

For Devitalizing Pulps of Teeth.

℞. Iodoformi . . . . . gr.v
Acidi arsenios . . . . gr.x
Creasoti . . . . . q.s. M.
To make a paste.

SIGNA.—Apply on cotton, or on point of a broach.

For Putrid Pulps.

A. P. JOHNSTON.

℞. Iodoformi . . . . . gr. $\frac{1}{25}$
Camphoræ . . . . . ℥ ¼
Alcoholis . . . . . ℥ j.

Misce by dissolving the camphor in the alcohol, and then add the iodoform.

SIGNA.—Use as an injection.

As a capping for an exposed pulp, it is suggested to dissolve the filings of celluloid in the above mixture and form a thick paste.

For Odontalgia.

SCHAFF.

℞. Pulv. iodoformi . . . . gr.lx
Kaolin . . . . . gr.lx
Acidi carbolici . . . . gr.viij
Glycerini . . . . . q.s.
Olei menthæ piperit . . gtt.x.

Triturate the iodoform, kaolin, and oil of peppermint, with enough glycerine to form a thick paste.

SIGNA.—Apply to exposed surface of pulp.

For Pulpless Teeth with a Fistulous Opening.

FAUGHT.

℞. Iodoformi . . . . . ℈ j
Acidi tannici . . . . . ℥ ij
Glycerini . . . . . f℥ ij
Morphinæ acetat . . . . ℥ j. M.

SIGNA.—Apply on floss silk.

For Neuralgia and Tumors of the Gums.

℞. Iodoformi . . . . . gr.xv.
Bals. Peru . . . . . gr.xxx
Glycerini vel vaselin . . q.s. M.
To make a solution or ointment.

SIGNA.—To be applied as a solution; or, if the vaseline is used, as an ointment.

For Pulpitis, as a Capping.
PASCHKIS.

℞. Iodoformi pulv.,
Kaolin pulv . . āā . . gr.lx
Acidi carbolici (cryst.) gr.viij.
Mix, and add sufficient glycerine to form a paste, then add:—
Ol. menth pip . . . . gtt.x.
SIGNA.—Apply, on point of broach over inflamed portion.

For Tumors, Enlarged Glands, etc.

℞. Iodoformi . . . . . part. j
Collodii . . . . . part. x. M.
SIGNA.—To be applied as a lotion.

For Pulpless Teeth—Canal-Dressing.
PIERCE.

℞. Iodoformi,
Olei caryophilli,
Olei Eucalypti . āā . . ℥vj. M.
SIGNA.—Apply by injection or on floss-silk.

For an Ointment of Iodoform and Eucalyptus.

℞. Pulv. iodoformi . . . ℥ss
Olei eucalypti . . . . f℥ss
Vaselin . . . . . ℥iv. M.
SIGNA.—To be used as an ointment.

IODOL—TETRAIODOPYRROL.

Formula.—C_4HNI_4.

Derivation.—Iodol is obtained by the action of iodine on certain constituents of animal oil. It is in the form of a grayish-white powder, which becomes dark on exposure to light.

It is odorless and has little taste, and contains 90 per cent. of iodine. It is quite soluble in alcohol, ether, chloroform, carbolic acid, olive oil and alkaline solutions, but insoluble in water; combination with an equal part of glycerine does not affect its properties.

Medical Properties and Therapeutic Uses.—Iodol is antiseptic, deodorant and anæsthetic. It is an efficient germicide without poisonous effects, and is free from the disagreeable odor and taste of iodoform. Its physiological action and therapeutic uses are the same as those of iodoform. When applied to an abraded or wounded surface, it can soon be detected in the urine and saliva; also the same effects are apparent when it is administered by the stomach.

Its action is slower than that of iodide of potassium, but more prolonged, and its elimination is slower. It has a slight caustic action, but a larger quantity can be used when it is substituted for iodoform; no quantity applied to a wound will cause toxic symptoms.

It is used on wounds, ulcers, etc., in the form of an impalpable powder, which is dusted on the part. It is also employed in the form of an ethereal solution, and also in solution with alcohol and glycerine; also in the forms of iodol cotton and gauze, pastils, bougies and ointments. It improves morbid conditions, and can be advantageously substituted for iodoform. It has been administered with good results in the treatment of laryngeal tuberculosis by insufflation of the powder; and the loss of appetite, so common as a result of the use of iodoform, does not occur, ulcers become rapidly clean and the tendency to form scars is scarcely observed.

Iodol is also employed internally, in the form of pills of 3 grains in the treatment of substernal struma. In the treatment of syphilitic ulcers, round ulcers, suppurating buboes, and after opening the pustules of acne, it has also given favorable results, as it lessens the secretion, possesses great disinfectant power and is non-irritating.

Dose.—For internal administrations, gr. ¼ to gr. v. in wafer pill, or pellet, or in powder.

Dental Uses.—Same as those of Iodoform (which see).

For a Topical Application.
MAZZONI.

℞. Iodol . . . . . 1 part.
Alcoholis . . . . . 16 parts.
Glycerini . . . . . 34 parts.

SIGNA.—Apply with a camel's-hair brush or in the form of spray.

Dental Varnish.

℞. Saturated solution of iodol in alcohol . . . . . 1 part.
Hubbard's negative varnish 6 parts. M.

A good, quick drying varnish.

For Root-Canals of Abscessed Teeth.
VAN WORT.

℞. Iodol . . . . . gr.x.
Zinci oxidi . . . . gr.xx.
Vaseline carbol. q.s. to form a thick paste. M.

SIGNA.—Place in canal and seal with an oxyphosphate filling.

For a Topical Application.
Evaporating quickly.

℞. Iodol . . . . . 1 part.
Æther sulph . . . . 8 parts. M.

IODUM—IODINE.

Formula.—I.

Derivation.—Iodine is a non-metallic, metalloid element, obtained principally from kelp (made by burning seaweed, and

in the form of impure soda), which is subjected to distillation in iron retorts, after which it is mixed with sulphuric acid and black oxide of manganese. It is evolved in the form of vapor, which is condensed. The vapor is readily recognized by its beautiful violet color. Iodine is usually in the form of bluish-black crystalline scales, with a metallic lustre, a strong, peculiar odor and a hot, acrid taste. It is slightly soluble in water and soluble in alcohol, ether, solution of chloride of sodium and a solution of iodide of potassium.

Medical Properties and Action.—Iodine in small doses is alterative, stimulant and tonic, and acts locally as an irritant, causing redness, itching and desquamation; exhaled in the form of vapor, it excites cough and warmth in the air passages. Taken internally it excites a sensation of heat or burning in the stomach, and in large doses is an irritant poison, inflaming the mucous membrane of the stomach and causing superficial eschars. The internal use of the iodides gives rise to an eruption of acne, especially on the face, thighs and shoulders; they have also anaphrodisiac powers when long continued. The influence of the iodides in producing iodism may be prevented by large draughts of water being used during their administration.

The odor of iodine can be detected in the blood, brain and muscles.

When combined with potassium its local irritant effect is diminished; hence, the preparation known as IODIDE OF POTASSIUM, *Potassii Iodidum* (obtained by treating an aqueous solution of potassa with iodine), is employed whenever the constitutional effects of iodine are desired, as the iodide of potassium possesses many advantages over iodine for internal use, such as being less irritant, and for this reason may be administered in larger doses and for a greater length of time; it is also more soluble than iodine alone, and when taken into the stomach is absorbed much more rapidly. The formula is Ki, and it is in the form of white crystals, of an acrid, saline taste. Some persons are peculiarly susceptible to the influence of iodine, even small doses causing unpleasant effects,

such as headache, vertigo, derangement of the digestive organs, etc.

Iodide of potassium, like iodine, produces a very decided effect on the secretions, increasing them, and occasionally to the degree of ptyalism. The antidote for poisoning by iodine is starch.

Therapeutic Uses.—Iodine and its preparations are valuable resolvents in the treatment of glandular enlargements, indurations, tumors, thickening of membranes, etc., etc.; also in scrofula, scrofulous ophthalmia, tubercular meningitis, advanced stage of pleurisy, chronic affections of the liver, etc., etc.

Iodide of potassium is much employed in mercurial poisoning and in syphilis, especially in the secondary and tertiary forms, and after the employment of mercury has proved useful; also in affections of the nervous system of a syphilitic origin, together with the other affections already referred to as indicating iodine. Externally iodine is used in the form of tincture in the treatment of enlarged scrofulous glands, cutaneous affections, erysipelas, rheumatism, gout, phlegmons, syphilitic gummatæ and nodes, phagedænic ulcerations, carbuncles, diseases of the joints, wounds and parts poisoned; and as a counter-irritant in pneumonia, phthisis and pleurisy; and as injections in hydrocele and bronchocele. The vapor is inhaled with benefit in chronic bronchitis and phthisis. Iodine also ranks highly as a disinfectant.

Dose.—Of iodine alone, gr. ¼ to gr. j two or three times a day, in the form of a pill, directly after eating, on account of its irritant effect; the best form of administration, however, is iodide of potassium. Dose of the iodide of potassium, gr. iij to gr. x.

Tincture of Iodine—*Tinctura Iodi* (iodine, ℥j; alcohol, Oj). Dose, ♏j to ♏v.

Compound Tincture of Iodine—*Tinctura Iodi Composita* (iodine, ℥ss; iodide of potassium, ℥j; alcohol, Oj). Dose, ♏ij to ♏x.

Colorless Iodine—Iodine is bleached by carbolic acid, and

the colorless carbolate combines all the advantages of both base and acid. One of the easiest methods to decolorize iodine is to add forty minims of a saturated solution of hyposulphite of soda to each fluid ounce of the tincture of iodine. Forty minims of the saturated solution contain about thirty-two grains of sodic hyposulphite. Another method of decolorizing iodine is to put into an open vessel a drachm of the tincture of iodine and six ounces of *hot* water; add twelve grains of phenol and stir with a glass rod, when the solution will be at once bleached.

Dental Uses.—In dental practice iodine and its preparations are valuable agents, the official and compound tinctures being employed in the treatment of periodontitis, alveolar abscess, mercurial stomatitis and other forms of stomatitis, inflammation and ulceration of the gums, fungous growths of gum and tooth pulp, necrosed teeth and suppurating pulps of teeth, diseases of the antrum, caries of maxillary bones, dentigerous cysts, recession of gums and absorption of alveolar processes.

For the different forms of stomatitis, and especially mercurial stomatitis, the tincture of iodine is used in the form of a gargle; for an injection in alveolar abscess it is diluted or combined with carbolic acid, glycerine and other agents; for fungous growths it may be used alone, or combined with rectified alcohol; for ulcerations of gum and mucous membrane it is generally combined with carbolic acid; for periodontitis it is combined with the tincture of aconite root, and is regarded as being almost a specific for the incipient stages of this affection, as it relieves the inflammation by retarding the circulation and stimulating lymphatic action. Either the officinal or compound tincture is employed with an equal quantity of the tincture of aconite, the preparation being applied to the gum over root of affected tooth, which should be previously dried of moisture, by means of a camel's-hair brush or cotton on the point of an excavator. The mouth should be kept open and the part protected until a metallic pellicle is formed. Iodine is also a valuable disinfectant and germicide in the treatment

of alveolar abscess (in the form of the compound tincture), used as injections throughout the pus tract, and for root canals and the pus-pockets of alveolar pyorrhœa.

A valuable combination of iodine, carbolic acid, glycerin and water is known as "Boulton's Preparation," and is a useful application in the form of injections, gargles and lotions. For the chronic form of alveolar abscess, and also for the acute form, after more powerful agents have been employed, it is a useful remedy, possessing antiseptic and stimulant properties in a marked degree; it also possesses the property of modifying mucous membrane and diminishing sensibility; hence it is useful in ulcerations, etc. Tincture of iodine combined with creasote or carbolic acid is a powerful application in periodontitis, suppuration of necrosed teeth, ulceration of margins of the gums and for fungous growth, as it stimulates debilitated parts and destroys such as are too weak to be restored. A colorless tincture of iodine is composed of glycerin and aqua ammonia in combination with the iodine, but the presence of the ammonia restricts its use. Another colorless tincture, in which sulphate of soda is substituted for the ammonia, is less irritating in its effects.

The addition of water and honey to the officinal tincture of iodine will render it suitable for a gargle for inflamed and ulcerated parts. The iodide of potassium is employed internally in mercurial stomatitis, dental exostosis, facial neuralgia, convulsions of dentition, periodontitis, looseness of the teeth, tumefaction and sponginess of the gums, syphilitic and scrofulous ulcerations of the mouth, caries and necrosis of the maxillary bones.

Tincture of iodine mixed with glycerin is claimed by Dr. Hammond to be more effective as a local application than the plain tincture. This is due to the retardation of the dissipation of the iodine, or more probably to the skin remaining soft, and therefore in a better condition for absorbing the drug.

DENTAL FORMULÆ.

For Chronic Alveolar Abscess, Ulcerations, Inflammations, etc., etc.

BOULTON.

℞. Tinct. iodi. comp . . . ♏xlv
Acidi carbolici (cryst) . ♏vj
Glycerinæ . . . . . ℥j
Aquæ destillatæ . . . . ℥v M.
It becomes colorless in from 8 to 10 hours.

SIGNA.—To be used as an injection, gargle or lotion.

For Ulceration of Gums.

℞. Tinct. iodi . . . . . ♏xlv
Acidi carbolici . . . ♏vj
Glycerini . . . . . ℥j
Aquæ destillatæ . . ℥v. M.

SIGNA.—Apply as a lotion.

For Periodontitis.

℞. Tinct. iodi. . . . . ℥j
Creasoti vel.,
Acidi carbolici . . . ℥ss. M.

SIGNA.—To be applied to gum about neck of tooth, as a counter-irritant.

For Ulcerated Gums and Mucous Membrane.

℞. Tinct. iodi . . . . partem j
Mellis . . . . . partes ij
Aquæ . . . . . partes vij. M.

SIGNA.—To be used as a gargle.

For Periodontitis.

℞. Tinct. iodi . . . . . ℥x
Potassii iodidi . . . . ℥ss
Camphoræ . . . . . ℥ij
Spiriti rectificati . . . f℥x. M.

SIGNA.—Apply with a camel's hair brush to gum over root of affected tooth.

For Fungous Growths and Suppurating Surfaces.

℞. Tinct. iodi . . . . . ℥ij
Spiriti rectificati . . . ℥j. M.

SIGNA.—To be applied with a camel's-hair brush.

For Mercurial Stomatitis.

℞. Tinct. iodi . . . . ℥iij vel vj
Potassii iodidi . . gr.xv vel xxx
Aquæ . . . . . Oss. M.

SIGNA.—To be used as a gargle.

For Periodontitis.

℞. Tinct. iodi.,
Tinct. aconiti . . āā . . ℥ss. M.

SIGNA.—To be applied by means of a camel's-hair brush until a metallic pellicle is formed, three times daily.

For Excessive Sweating of the Hands.

℞. Tinct. iodi . . . . . ℥j
Lin. camphoræ comp.,
Glycerinæ . . āā . . . ℥iss
Lin. belladonna comp . ℥j
Eau de cologne . . . . ℥j. M.

SIGNA.—Apply as an embrocation twice a day, having previously well bathed the hands in warm water, in which is dissolved two drachms or half an ounce of chloride of ammonia and four drachms of carbonate of soda crystals, enough water being used to well cover the hands.

For Putrescent Pulps and Chronic Alveolar Abscess.

℞. Iodi . . . . . ℥ij
Alcoholis . . . . . f℥ij. M.

For Same and Pyorrhœa Alveolaris.

℞. Iodi,
Acidi carbolici (crystals)āā ℥j
Alcoholis . . . . . f℥ij.M.

IODINE TRI-CHLORIDE—TRICHLORIDE OF IODINE.

Formula.— ICl_3.

Derivation.—Iodine tri-chloride is obtained by the action of chlorine on iodine. It is an orange-red powder, whose odor strongly irritates the mucous membrane. Usual dilution 1 : 1200.

Medical Properties and Therapeutic Uses.—Tri-chloride of iodine is antiseptic and disinfectant, being highly efficient as such, through the liberation of chlorine whose nascent energetic effect is still further enhanced by the presence of iodine. The antiseptic power of tri-chloride of iodine was officially tested by the Imperial Sanitary Bureau of Germany, and the following result was ascertained: "An aqueous solution of 1 in 1000 destroys resistant bacillus-spores within a comparatively short time; but only the aqueous solution does this. Alcoholic or oily solutions proved ineffective. Iodine tri-chloride far surpasses carbolic acid, and is next to corrosive sublimate (bi-chloride of mercury), in antiseptic power." It may be obtained in quantities of ten grammes in hermetically sealed tubes, and is best kept in five per cent. aqueous solutions which appear to remain unchanged for some months. Langebuch claims that a 0.1 to 0.15 per cent. solution is equal in antiseptic action to a 0.5 to 1.0 per cent. solution of bi-chloride of mercury; in other words that it is about five times as efficient as the bi-chloride. It is also claimed to be relatively the least poisonous of all antiseptics. Behring found that in *aqueous solutions*, having equal action upon the spores of anthrax bacilli, sublimate is five to six times, and carbolic acid and creasote seven to eight times, as poisonous as the tri-chloride.

Dental Uses.—Dr. W. D. Miller says: "We have consequently reasons to hope that the tri-chloride of iodine may prove a valuable remedy in the treatment of diseased conditions of the teeth and mouth." Its efficiency as a disinfectant for carious dentine has been clearly shown in the experiments of Dr. Miller, and his impression was that the five per cent. solution of the tri-chloride of iodine is one of the

most active agents for sterilizing carious cavities, and disinfecting carious dentine preparatory to filling teeth.

IODOPHENACETIN.

Derivation.—A new derivation of phenacetin described by Dr. Scholvein, obtained when a cold-saturated solution of phenacetin, acidulated with hydrochloric acid, is treated with iodine. It first forms as a gray precipitate, which afterwards appears as a mass of crystalline needles or an amorphous mass. It forms, when dry, a chocolate-brown powder. When recrystallized from glacial acetic acid, it may be obtained in steel-blue crystals. By dissolving the phenacetin in glacial acetic acid and afterwards diluting with water, less quantities of liquid are required in its preparation than would be the case if a mere aqueous solution of phenacetin was employed. The resulting product, called "*iodophenin*," melts at 130°C., decomposing at the same time. It contains one portion of its iodine in a more intimate combination than the other. It is soluble in 20 parts of cold glacial acetic acid, more easily in the same liquid when hot, and is soluble in alcohol, but not readily soluble in benzole and chloroform. If heated with water, it is decomposed. It has a strong odor of iodine, and a burning taste. Ordinarily it contains 50.5 per cent. of iodine.

Medical Properties and Therapeutic Uses.—Iodophenacetin is an antiseptic, and possesses marked powers as a bactericide; but when given subcutaneously it produces marked local irritation, and when given internally it forms combinations with the alkalies of the intestinal canal, and consequently, from the readiness with which iodine is given up, iodine-poisoning may readily follow the administration of even small doses.

IRIDIS RHIZOME—ORRIS RHIZOME—ORRIS ROOT.

Source.—The plant from which Orris Root is obtained is a native of Italy and the south of Europe. It belongs to the natural order Iridaceæ, of which there are three varieties of the species of Iris—*Iris Rhizoma*, *Iris Florentina* and *Iris Ger-*

manica. The root, which is the officinal portion of the plant, is of various forms and sizes, often branched, usually knotty and flattened, white, heavy, and of the thickness of the finger. It has a pleasant odor, like that of violet, and a bitter, acrid taste.

Medical Properties and Action.—Orris root is cathartic and diuretic, and in large doses emetic. It has been employed with some benefit in dropsies, but is not often administered as a general remedy at the present time. It is valued for its pleasant, violet odor.

Dental Uses.—In dental practice it is employed as a very common ingredient of dentifrices, and also to correct an offensive breath.

DENTAL FORMULA.

Dentifrice.

DR. SEWELL.

R. Pulv. radicis iridis . . . . . ℥ ss
Pulv. saponis cas . . . . . ℥ ij
Pulv. sodii boratis . . . . . ℥ ij
Cretæ preparatæ . . . . . ℥ ij. M.

Flavor with a few drops of oil of cloves and lavender.
Or, add a few drops of carbolic acid to each ounce of the powder, and flavor the whole with eucalyptus oil.

ISONANDRA GUTTA—GUTTA PERCHA.

Source.—Gutta Percha is the inspissated juice of the tree *Isonandra Gutta*, extensive forests of which are found in the East Indies. It belongs to the natural order *Sapotaceæ.* It is in the form of tough, flexible pieces, which have been freed from impurities by cutting it into thin slices, and then washing and tearing it into shreds by heavy machinery while it is softened in boiling water. It may be more thoroughly purified by dissolving it in either chloroform, benzol or hot turpentine, thus causing the impurities to separate, when it is evaporated to dryness. Crude gutta percha is of a chocolate or reddish-brown color; commercial gutta percha is of a grayish-white color, and the variety which has been purified by dissolving it in chloroform, etc., is almost white, greasy to the touch, and of

a leathery smell, like that of India rubber. It is insoluble in water at any temperature, and is a bad conductor of heat and electricity. At ordinary temperatures it is tough, hard and inelastic, but toward 120° F. it softens, and at 150° it becomes soft and plastic, and may be moulded into any form, which it will retain on cooling, having, however, a perceptible shrinkage. Gutta percha is dissolved cold by chloroform and sulphide of carbon; benzol requires the aid of heat and oil of turpentine requires to be quite hot. The alkalies have no action upon it; but concentrated nitric acid attacks it rapidly, with effervescence and the escape of nitrous fumes.

Dental Uses.—Combined with mineral substances it forms a plastic material for temporary fillings of teeth, and, colored with vermilion, is used for taking impressions of the mouth and for the base plates of plastic work. It is often employed as a filling material, on account of its non-conducting property, protecting a partially exposed pulp or sensitive dentine surface from irritation when metallic fillings would not be tolerated. Gutta percha has also been used for interdental splints.

The preparation known as "Hill's Stopping" is composed of gutta percha, quicklime and feldspar, the mineral ingredients being incorporated with the gutta percha while the latter is in a plastic condition from the effects of heat.

Solution of Gutta Percha—*Liquor Gutta Percha, Chloropercha*, is composed of gutta percha, ℥iss; chloroform, ℥xvij; or a thick solution may be made by dissolving as much gutta percha in chloroform as will give the desired consistence (like that of thick cream).

Solution of gutta percha is a useful application for the relief of odontalgia arising from an exposed and inflamed pulp; also for capping an exposed pulp, a more durable material being inserted over it. The chloroform of the solution quickly evaporates, leaving an impermeable covering of the gutta percha, which is non-irritable, non-conducting and protective. It is also a useful application for inflamed or abraded surfaces, chaps, skin affections, etc. Gutta percha dissolved in chloro-

form is a popular and efficient material for root fillings, as are also cones of gutta percha softened by heat or in chloroform.

KANDOL.

Kandol is a product formed by the distillation of naphtha, and is a perfectly clear, colorless fluid, extremely volatile, burns easily, and has a slight odor of benzine. It can be mixed with a small quantity of water or alcohol, and its preparation is cheap and simple. Dr. Njuschkon advocates the use of kandol in the place of ether or cocaine as a local anæsthetic in the form of spray. In one minute kandol will reduce the temperature to 10° C., and keep it nearly uniform at that temperature for some time, while ether reduces the temperature to 17° C. As an effect of the spray of kandol, the skin becomes very hard and is completely anæsthetized, and there is no bleeding, or else the blood coagulates as soon as it makes its appearance, so that all operations may be performed with ease and rapidity.

KRAMERIA.

RHATANY.

Source.—Krameria is obtained from the root of the shrub krameria triandra, of the natural order *Polygaleæ*, native of Peru. It is in the form of cylindrical pieces, of the thickness of a quill, with many branches of a light red color within and crossed by a reddish-brown bark. The root is without odor, and of an astringent and somewhat bitter-sweetish taste.

Medical Properties and Action.—Krameria is a powerful astringent, its medicinal property being due to tannic acid, of which it contains about forty per cent. There is also present an odorous principle, wax gum, and a peculiar acid known as *krameric acid.* When chewed it imparts a red tinge to the saliva. It imparts its properties very readily to alcohol, but less so to both cold and boiling water.

Therapeutic Uses.—Krameria is employed internally for its astringent and a slightly tonic effect in the treatment of diarrhœa, dysentery, passive hemorrhages, menorrhagia, leucor-

rhœa, etc. Externally, in the form of powder, tincture and infusion, in the treatment of ozæna, ophthalmia, etc., and as an enema in hemorrhoids, fissures of the anus, sore nipples, leucorrhœa, etc., etc.

Dose.—Of powdered krameria, gr. xx to gr. xxx; of the extract—*extractum krameriæ*, the dose is gr. v to gr. x; of the infusion—*infusum krameriæ*—(krameriæ ℥j; water, Oj), the dose is ℥ss to ℥j; of the tincture—*tinctura krameriæ*—(krameriæ, ℥vj; diluted alcohol, Oij), the dose is ℥j to ℥ij. Of the fluid extract—*extractum krameriæ fluidum*, the dose is ♏ v to ℥ss; of the syrup—*syrupus krameriæ*, the dose is ℥j to ℥iv.

Dental Uses.—Krameria is a valuable astringent in dental practice, being employed in the form of the tincture, in ulcerated and spongy gums; in the form of the infusion, as a gargle in inflammation of the gums and mucous membrane; in the form of the powder and also tincture, in spongy and bleeding gums, as an astringent; and also in the form of the powder as an ingredient of dentifrices, for its astringent property.

DENTAL FORMULA.

Astringent and Stimulant Mouth-Wash.

℞. Tr. krameriæ.
Boro-glyceride.
Eau de cologne . . . . . āā . . . . . ℥j
Spts. vini rect. . . . . ad . . . . . ℥viij M.
S.—A teaspoonful to be added to a little water.

For Inflamed Gums and Mucous Membrane.

THOMAS.

℞. Pulv. krameriæ,
Pulv. cinnamomi . . . . . aa . . . . . ℥j.
Aquæ bullientis . . . . . f ℥ vii.
Macerate for two hours, strain, and add sacchari ℥ ij.
SIGNA.—To be used as a gargle.

LANOLIN

Lanolin is the natural fat of wool, and is used as a substitute for ordinary fat for local use. On account of its being analogous to the natural fat of the skin, it is supposed to be more freely

absorbed by the tissues than the ordinary fats; hence it is employed as a vehicle for remedies which are to be absorbed, and for such a purpose has been combined with arsenious acid and hydrochlorate of cocaine in a devitalizing mixture.

LIQUOR SODÆ CHLORATÆ—SOLUTION OF CHLORINATED SODA.

LABARRAQUE'S SOLUTION.

Formula.—NaCl, NaClO.

Derivation.—Solution of Chlorinated Soda is obtained by decomposing a solution of carbonate of sodium by one of chlorinated lime. It is a transparent liquid, of a greenish-yellow color, having a faint odor of chlorine and a sharp saline taste.

Medical Properties and Action.—Solution of chlorinated soda internally is stimulant, tonic and antiseptic. Externally it is a stimulant, astringent and deodorizer, and is generally applied in the form of a lotion.

Therapeutic Uses.—Solution of chlorinated soda is employed internally in typhus and typhoid and malignant scarlet fevers, mesenteric affections of children, etc. Externally it is used as an application to all forms of foul and indolent ulcers, ulcerations of membranes, ozæna, coryza, otorrhœa, syphilitic eruptions of scalp and other skin diseases, burns, etc., etc. It is used diluted, and has an alkaline reaction. It is a powerful disinfectant, and is useful in all affections attended with fetor. The concentrated solution is an irritant poison and caustic; largely diluted it is tonic and stimulant.

Dose.—A solution of chlorinated soda, gtt. xxx to ℥j, diluted, several times a day; it fulfills the same indications as chlorinated lime.

Dental Uses.—Solution of chlorinated soda is a valuable agent in dental practice as a disinfectant, deodorizer and antiseptic. It is employed in mercurial stomatitis, ulcerated gums, fetid discharges from carious teeth, and all affections of the mouth attended with fetid discharge, and is useful for its stimulating property, thus inducing healthy action; also in aphthæ,

cancrum oris, diseases of the antrum, necrosis of the bones of the jaws, scurvy, offensive breath, and as a bleaching agent for discolored teeth, especially in combination with powdered alum. It should be kept in glass-stoppered bottles and protected from the light and heat.

DENTAL FORMULÆ.

For Aphthæ and Ulceration of the Mouth of Children.

℞. Liquor sodæ chlor.,
Myrrhæ . . . āā . . . f℥ss
Aquæ rosæ . . . . . f℥j
Aquæ . . . . . f℥vj M.
SIGNA.—To be used as a lotion.

For Mercurial Stomatitis.

℞. Liquor sodæ chlor . . ℥ss
Mellis . . . . . ℥ss
Aquæ destillatæ . . ℥x M.
SIGNA.—To be used as a mouth wash.

For Phagedenic and Sloughing Ulcers.

℞. Liquor sodæ chlor . . f ℥j
Aquæ . . . . . f℥viij. M.
SIGNA.—To be applied as a lotion.

For Mercurial Stomatitis, Fetid Discharges from Carious Teeth, Ulcerated Gums, etc.

℞. Liquor sodæ chlor. . . f℥vj
Aquæ . . . . . f℥xij. M.
SIGNA.—To be used as a lotion.

For Offensive Breath and Deodorizer Generally.

℞. Liquor sodæ chlor.
(concent.) . . . . gtt.vj to x
Aquæ puræ . . . . . ℥ij. M.
SIGNA.—To be used as a gargle.

For Offensive Breath.

℞. Liquor sodæ chlor. . . ℥j
Aquæ . . . . . ℥iv. M.
SIGNA.—To be used as a gargle.

KINO—KINO.

Source.—The inspissated juice of the *Pterocarpus Marsupium*, and of other plants.

Medical Properties and Therapeutic Uses.—With Krameria, Galla, and Catechu, Kino is one of the substances containing forms of tannic acid, and has the same physiological action and uses, being powerfully astringent. The tincture, "*Tincturæ Kino*," compound of ten parts of kino to one hundred parts of alcohol, is the only preparation employed.

Dose.—Of *Tincturæ Kino*, ♏x to ʒij. (See Tannic and Gallic Acids, Krameria.)

LITHIUM—LITHIUM.

Source.—From the alkali Lithium, which is rare in nature.

Preparations—Lithii Carbonas—carbonate of lithium, a white

powder but slightly soluble in water, and having a feeble alkaline reaction.

Dose.—Grs. ij to grs. x.

Lithii Citras—Citrate of Lithium, a deliquescent white powder, soluble in twenty-five parts of water.

Dose.—Grs. v to grs. xxx.

Lithii Salicylas.—Salicylate of Lithium, a deliquescent white powder with a sweetish taste, feeble acid reaction and very soluble in alcohol and water.

Dose.—Gr. v to ℈j.

Lithii Benzoas.—Benzoate of Lithium, either in the form of a white powder or small, shining scales, not deliquescent in the air, and having a sweetish, cooling taste and a feeble acid reaction.

It is soluble in twelve parts of alcohol at 60° F., and in four parts of water.

Dose.—Gr. ij to gr. xv.

Medical Properties and Therapeutic Uses.—These lithium salts have strong alkaline properties, and produce effects similar to those of the potassium and sodium compounds; and hence are very effective antacid agents. The salts of lithium are employed with great benefit in rheumatic gout, uric acid diathesis, rheumatism, uric acid calculi of kidneys and bladder, irritable bladder from an excess of acid in the urine, etc.

Dental Uses.—The lithium salts are effective in preventing and correcting the effects of a gouty diathesis upon the teeth, and in periodontitis dependent upon gout. The carbonate of lithium is employed to arrest the abrasion or erosion of the teeth, when due to an excess of uric acid in the saliva; for such a purpose the agent can be dissolved in carbonic acid water.

LITMUS—LACMUS.

Source.—Litmus is a peculiar coloring matter obtained from various species of rocella, of the natural order *Lichenes*—the Lichen order, which grow on Alpine or maritime rocks in various parts of the world. The varieties used for chemical purposes are obtained from the European and African coasts

and Northern Europe. They yield coloring substances by the reaction of water, air, and ammonia. Litmus is prepared chiefly in Holland; the lichens being coarsely powdered and macerated for several weeks, with occasional agitation in a mixture of urine, lime and potassa or soda, fermentation ensuing; the mass becomes first red and ultimately blue, and is then mixed with calcareous or siliceous matter, to give it consistence. A tincture is formed from this product (litmus 1 part to distilled water 20 parts), and blue litmus paper is made by steeping unsized paper in the liquid and afterwards drying it. The blue tincture is rendered deeper in color by indigo. Red litmus paper is prepared in the same manner, except that the tincture, into which the unsized paper is steeped, is reddened by the addition of sulphuric acid.

Dose.—The chief use of litmus in medicine and dentistry is as a test of acids and alkalies; *blue* litmus paper being turned *red* by acids, while *red* litmus paper is turned blue by alkalies. In dental practice litmus paper is employed to determine the nature of the oral fluids—whether acid or alkaline.

A single color, viz., purple, has recently been substituted for the ordinary blue and red litmus paper. This purple litmus paper turns red with acids, blue with alkalies. It is claimed to be much more delicate and convenient.

LYSOL.

Derivation.—Lysol is obtained by boiling coal tar with fat, alkali, resinous acid and resin, and contains no phenol, but principally cresol. It is readily soluble in water, and has a strong pungent odor. It is of the consistence of soft or potash soap, or in the form of a clear oily liquid.

Lysol is a very complex substance (not homogeneous), without any definite formula.

Medical Properties and Therapeutic Uses.—It is claimed that lysol is superior as a germicide to corrosive sublimate, carbolic acid, iodoform, and creolin, its bactericide properties being very great. As an antiseptic, etc., in the treatment of wounds a 1 per cent. solution is employed; for internal wash-

ings ½ per cent. solutions are recommended. It sometimes exerts an irritant action on the skin.

Dr. F. Haenel lays special stress upon the simplicity of its use—a few minutes energetic brushing with the solution being all that is required to prepare a surface for operation, instead of the usually complicated process of cleaning and disinfection of the skin. For this purpose Lysol answers as well as the best soap, removing not only visible dirt, but fatty or resinous spots on the skin, instruments, etc. The soapy feeling it imparts to the hands, instruments, and sutures is best avoided by drying the hands and the prepared area of operation with a sterilized cloth before beginning to operate.

With respect to the bactericidal properties of the preparation Schotellius found that in 15 to 20 minutes a one-third per cent. solution destroyed all kinds of germs. The investigations of Gerlach led to similar results, and the experiences of Dr. F. Haenel are also in accordance with these statements. He used solutions varying in strength from ½ to ⅓ per cent., and on all grounds concludes that Lysol is superior to sublimate, carbolic acid, iodoform, and the other ordinary antiseptics, either by virtue of its non-poisonousness, or odorlessness, or the clearness of its solutions. It forms, he points out, clear mixtures with distilled water, or with ordinary water which does not contain much chalk. In solutions made with spring or tap water which contains much lime, a turbidity appears which increases in the progress of time, and is less conspicuous in strong than in weak solutions. As the disinfectant constituents remain in solution, the bactericidal action of the liquid is in no way prejudiced. For some purposes, this turbidity is a disadvantage, however, and the author states that the best way to avoid it, is to prepare the solutions immediately before use, if necessary, to avoid the employment of the weaker dilutions.

Dental Uses.—Lysol may be employed in dental practice as an antiseptic, disinfectant, and germicide in the case of putrescent or gangrenous pulps, to disinfect root-canals, and carious cavities of teeth; also in the form of a 1 per cent. solution for

unhealthy wounds and ulcers of the oral mucous membrane, upon which it has an astringent effect. It is advisable to employ lysol in from ½ to 1 per cent. solution whenever an antiseptic or aseptic operation is desired.

MAGNESIA—CALCINED MAGNESIA.

Formula.—MgO.

Derivation.—Magnesia is obtained by exposing carbonate of magnesium to a red heat, and thus expelling all of the carbonic acid, which is shown by a want of effervescence on the addition of dilute sulphuric acid. It is very light, and of white color and odorless, and in the form of powder, with an earthy taste, and slightly soluble in water, more so in cold than in hot water.

Medical Properties and Action.—Magnesia is antacid and laxative, its laxative effect being the result of the combination it forms with the free acids of the stomach and intestines. After its effects are exerted in the intestinal canal, it becomes absorbed and renders the urine alkaline. Large doses, when administered for a considerable time, may accumulate in the bowels; such an effect may be avoided by administering it with lemonade, which renders it more soluble. Being mild and unirritating, it is well adapted for children, and is an excellent remedy for great acidity in the stomach. It is the antidote in poisoning by the mineral acids.

Therapeutic Uses.—Magnesia is administered in acidity of the stomach, heartburn, sick headache and kidney affections, as an antacid, and in combination with other agents in the diarrhœa of children. It is also an efficient aperient, alone or in a little milk.

Dose.—Of magnesia, as a laxative, gr. x to ℥j; as an antacid, ℈j. Of a preparation known as "Henry's," the dose is half the quantity just given.

Dental Uses.—Magnesia is employed in dental practice, chiefly for its antacid properties, as an ingredient of dentifrices; in solution in the form of a gargle, to counteract the effect of acid medicines upon the teeth; also as an ingredient of reme-

dies for infantile diarrhœa during the period of dentition; and also to change an acid condition of the oral fluids, by being rubbed between the teeth and permitted to remain for a short time.

DENTAL FORMULÆ.

For Infantile Bilious Diarrhœa.

CONDIE.

℞. Magnesiæ calc . . . gr.xxiv
Calomel . . . . . gr.ij–iij
Ipecacuanha . . . . gr.ij–iij
Ext. hyoscyami . . . gr.iv–vj. M.
F. ch. No. xij.

SIGNA.—One to be given every two or three hours.

For Infantile Mucous Diarrhœa.

EHERLE.

℞. Magnesiæ calc . . . . gr.x
Bals. copaibæ . . . . . ℥j
Spir. æther 'nit . . . . ℥iij
Sacch. alb . . . . . ℥ij
Aq. cinnamon . . . . . ℥iij. M.

SIGNA.—A teaspoonful every two or three hours; each dose to be followed in the course of an hour by the fifth of a grain of Dover's Powder.

MAGNESII SULPHAS—SULPHATE OF MAGNESIUM.

(EPSOM SALT).

Formula.—$MgSO_47H_2O$.

Derivation.—Epsom Salt is obtained by the action of sulphuric acid on *magnesite*, the siliceous hydrate of magnesium. It is in the form of small, colorless crystals, which effloresce on exposure to the air, and are very soluble in water. It is odorless, but has a very bitter taste.

Medical Properties and Action.—Sulphate of magnesia is a refrigerant purgative, safe and mild in its action, and is perhaps more commonly employed as a cathartic than any other. It is at times combined with other agents.

Therapeutic Uses.—Sulphate of magnesia is administered as a saline purgative in acute inflammatory and febrile affections, to depress the arterial tension, and also to relieve the kidneys where they are hyperæmic; hence it is a valuable remedy in renal and cardiac dropsy, constipation of lead colic, acute dysentery, dyspepsia with constipation, etc., etc.

Dose.—Of sulphate of magnesia, ℥j to ℥j, in water or carbonic acid water.

Dental Uses.—Sulphate of magnesia is employed internally

in dental practice, to reduce the arterial tension in acute inflammations of the dental organs, such as acute pulpitis, acute periodontitis, etc.

To disguise the bitter taste of Epsom salts, the following formula may be employed:—

℞. Magnesii sulphatis . . . . . ℥v
Essentiæ menthæ . . . . . gtt.iij. M.

DENTAL FORMULA.

For Dysuria of Difficult Dentition.

℞. Sulph. magnes . . . . . ℥ij to ℥iij
Aquæ puræ . . . . . ℥j *dein adde*
Spir. æther. nitrici . . . . . ℥ij
Tinct. opii . . . . . ♏vij to xv. M.

SIGNA.—A teaspoonful, to be repeated according to circumstances.

MATICO.

Source.—Matico—*maticæ foliæ*, are the dried leaves of the shrub artanthe elongata, of the natural order *Piperaceæ*—pepper order, and is a native of Peru. They are from two to eight inches long by an inch in breadth, strongly reticulated, and of a bright green on the upper surface and lighter in color beneath when fresh, with an agreeable aromatic odor and a strong astringent taste. They contain a trace of tannic acid, a peculiar acid, *artanthic*, a volatile oil, resin, and a very bitter principle—*maticin*.

Medical Properties and Action.—Matico is an aromatic tonic, an alterative stimulant, an internal hæmostatic and local styptic. It has a special determination to the mucous membranes, and although as an internal remedy its astringent properties are not so well marked, it acts externally as a reliable hæmostatic and styptic. The powder made from the under side of the leaf is more powerfully styptic than that from the upper side.

Therapeutic Uses.—Matico in the form of powder, infusion and fluid extract, is employed in internal hemorrhages, epistaxis, atonic diarrhœa and diseases of the urinary passages, etc.; externally as a hæmostatic in superficial hemorrhages, and also in leucorrhœa, in the form of an injection.

Dose.—Of powdered matico, ℥ss to ℥j, three times a day; of the infusion the dose is f℥ij; of the fluid extract the dose is f℥ss to f℥j.

Dental Uses.—The powder and tincture are valuable styptics in hemorrhage following the extraction of teeth, hemorrhage from leech bites and superficial wounds of mucous membrane.

MENTHOL—JAPANESE CAMPHOR.

(PEPPERMINT CAMPHOR.)

Formula.—$C_{10}H_{20}O$.

Derivation.—Menthol is the stearoptene of peppermint oil, and is obtained from this oil either by long keeping or by being cooled at a low temperature. Chemically, menthol occupies the position of an alcohol, having in its composition four atoms more of hydrogen than the ordinary camphor, and containing the radical menthyl. It is in the form of a crystalline solid, composed of small white crystals of a peppermint odor and resembling sulphate of magnesia. It is imported as Japanese camphor, its chief source being the Japanese and Chinese peppermint oils. In a liquid state it has a specific gravity less than that of water. It is rendered liquid and volatile at a temperature one or two degrees below that of the body. It is sparingly soluble in cold water, liquefying slowly in water at 82° F., quickly at 120° F., but remains mostly as a separate body. It is freely soluble in alcohol, ether, glycerine, and in the fixed and volatile oils.

Medical Properties and Action.—Menthol is anodyne, antispasmodic, and antiseptic. In doses of gr. $\frac{1}{10}$ to $\frac{1}{6}$ it steadies the contractions of an excited heart, and causes tranquillity, and at the same time slight cerebral drowsiness.

Half a grain may cause vomiting from gastric irritation, hence care should be observed in its administration, either internally or externally, about the mouth. Its internal use is not advocated, unless well diluted, but its principal use is as an external application.

Therapeutic Uses.—Menthol is said to prove as effectual as

aconite, veratria and atropine for such diseases as neuralgia, brachalgia and gout; more so it is claimed by some. It is also used in chronic rheumatism and in headache. It is also applied to putrefactive wounds, as an antiseptic.

Dental Uses.—In dental practice, menthol has given satisfaction as an external remedy in facial neuralgia, odontalgia, as an obtunder of sensitive dentine, and as a local anæsthetic. For relieving the pain of sensitive dentine, a small portion of the crystals is applied to the sensitive surface, and in a few minutes the local anæsthetic effect is produced. As an antiseptic it has been employed in the treatment of decomposing pulps of teeth, necrosed teeth, etc. When applied to mucous surfaces for its anæsthetic effect, a twenty to thirty per cent. solution is used, but it is more evanescent than cocaine. Menthol also forms an ingredient of a devitalizing mixture.

The oil of the ordinary peppermint is considered to be a germicide and antiseptic of considerable power and rapidity. It is readily diffusible, does not evaporate quickly, and is non-poisonous. It is useful in root canals and fistulous tracts after removal of pulps, and for hypersensitive dentine.

DENTAL FORMULÆ.

For Facial Neuralgia and Odontalgia.

℞. Menthol . . . . . gr. j
Spts. vini rectificati . . ♏ j
Olei caryophylli . . . ♏ x. M.

SIGNA.—For facial neuralgia, painted on the affected part. For odontalgia, applied on cotton to carious cavity.

For Neuralgia and Odontalgia.

℞. Menthol . . . . . gr. v
Olei caryophylli (or oil of cajeput) . . . . . f ʒ j. M.

SIGNA.—To be painted on affected part, or, for odontalgia, applied on cotton.

LOCAL ANÆSTHETIC.

For Abscesses, Boils, Felons, etc.

℞. Chloroformi . . . . . ʒ v
Ether sulphurici . . . . . ʒ j
Menthol . . . . . ʒ ss. M.

SIGNA.—Use with spray apparatus.

METHYLENE—BICHLORIDE OF METHYLENE.

Formula.—$CHCl_3 \times H_2 = CH_2Cl_2 \times HCl$.

Derivation.—Methylene is obtained by the action on chloroform of nascent hydrogen. It boils at 104° F. and 40° C. and

is a colorless, volatile liquid with the odor of chloroform. It was introduced in 1840 by Dr. B. W. Richardson. It is pleasant to inhale in the form of vapor. Its specific gravity is 1.344, and evaporates more easily than chloroform, and the vapor being denser, it requires a less quantity than ether. It is soluble in alcohol and ether and is frequently combined with other agents to lessen its cost.

Medical Properties and Therapeutic Uses.—Methylene possesses many of the dangerous qualities of chloroform when used as a general anæsthetic, and death results from syncope with dilated pupils. It was a favorite anæsthetic with Dr. Richardson, and Sir Spencer Wells believes that it has all the advantages of complete anæsthesia with fewer drawbacks than any other. He gives it diluted with air by Junker's apparatus, and it is supposed that he employs a mixture of methylic alcohol and chloroform.

Despite the fact that so eminent a surgeon as Sir T. Spencer Wells uses methylene as an anæsthetic, and has continued to advocate its use for twenty years, very few have followed his example. This is because the statistics of mortality from this anæsthetic apparently show it to be considerably more dangerous than ether.

A recent fatal case at the Plymouth Hospital has called out a letter from Sir Spencer, in which he states that this and other accidents have been due to improper administration. He says: "I have never, either in hospital or private practice, since I began to operate in 1870 under methylene, seen anything approaching to danger under its influence, nor have I had a moment's uneasiness or apprehension such as I have repeatedly suffered during the administration of chloroform, ether, the A. C. E. mixture, laughing-gas followed by ether, or the mixtures of chloroform and alcohol which some have supposed to be identical with, or substitutes for, methylene. And it is very seldom that in the most prolonged operations—say, for an hour—more than from six to eight drachms of methylene are used; while I have repeatedly found that in operations of fifteen or twenty minutes, not more than from two to three drachms have been evaporated."

METHYLIC ETHER—METHYL-ETHYLIC ETHER.

Formula.—$(CH_2)_2O$.

Derivation.—Methylic Ether is obtained by digesting methylic alcohol with strong sulphuric acid. It is a gaseous substance, of an ethereal odor, and under the name of *methyl-ethylic ether*, it has been used as a general anæsthetic. The methylic ether is prepared for use as methyl-ethylic ether by frequent washings in a strong solution of potassa, and is afterwards dissolved in absolute ethylic ether. In order that it may be fit for use it is necessary to keep it for some time securely stopped.

Dental Uses.—According to Dr. B. W. Richardson, of England, methylic ether is a superior anæsthetic for dental operations—better, he says, than nitrous oxide gas, because it allows air to be given with it, and does not asphyxiate nor produce muscular spasms and syncope. Under its influence the patient is in a state of semi-consciousness, but is not conscious of pain from an operation.

MICROCIDIN—MICROCIDINE.

Derivation.—Microcidin is a combination of naphthol and soda. Naphthol 25 per cent. and sodium naphtholate 75 per cent., one part being soluble in three parts of water. Microcidine does not corrode instruments or dressing materials, and is without odor or taste.

Medical Properties and Therapeutic Uses.—Microcidin has a very feeble toxicity, is caustic in large quantities, but in medicinal doses, even the largest required, is not irritating when applied to wounds as an antiseptic and disinfectant; it may also be used for toilet purposes. It reduces fever rapidly, and is excreted by the urine, which is rendered aseptic. It has been employed successfully in a large number of cases of infected and operative wounds. It is used in aqueous solution in the strength of 5 to 1000 (strong solution) and 3 to 1000.

Dental Uses.—As an antiseptic and disinfectant, microcidin may be employed in dental practice on gangrenous pulps, carious cavities in pulp-canals, and wounds and ulcers of mucous membrane; and as a disinfectant and antiseptic generally.

MORPHINA—MORPHINE.

Formula.—$C_{17}H_{19}NO_3$, H_2O.

Derivation.—Morphine is the alkaloid which constitutes the chief narcotic principle of opium, the proportion varying from 10 to 15 per cent. It is present in opium in combination with meconic acid and the meconate of morphia is separated by repeated macerations with water, after which the salt is decomposed by alcohol and water of ammonia, the latter precipitating the morphine and the former taking up the coloring matter as soon as it is freed from the alkali. The crystals of morphine are then boiled in alcohol and the solution filtered through animal charcoal. Morphine is in the form of white, or colorless crystals, which are inflammable and freely soluble in boiling alcohol, scarcely soluble in cold water, and somewhat so in boiling water. The salts of morphine, however, are freely soluble in water. It is without odor, and has a very bitter taste. Morphine differs somewhat in its mode of action from opium, which may arise from the peculiar state of combination in which it exists in opium. Morphine is more insoluble than its salts, and for this reason the latter are preferred for administration.

Medical Properties and Action.—Morphine is more powerful than opium; but it causes less vascular and arterial excitement, less headache and vertigo, less subsequent depression, less constipation, and often it will be retained on an irritable stomach, when opium or its tincture (laudanum) would be rejected.

Morphine is indicated when the object is to relieve nervous irritability and induce tranquillity. The effects of morphine differ according to the peculiarities of nervous constitution. The hypnotic effect may be produced and the stimulant action be confined to the heart; in some cases the excitant effect prevails, or the two effects may be equal. The excitant effect may counteract the hypnotic effect to a greater or less degree, resulting in insomnia with restlessness, or even delirium. Females appear to be more liable to its excitant effects than males; and if there is present a highly emotional, excitable

and energetic temperament, it causes great distress, and dangerous effects when hypodermically administered.

Therapeutic Uses.—Morphine, in the form of salts, is employed as an anodyne and hypnotic in neuralgic affections, diseases of the heart, painful uterine affections, and in all cases of painful affections. (See Opium.)

The principal salts of morphine are the acetate, the hydrochlorate and the sulphate.

MORPHINÆ ACETAS—ACETATE OF MORPHINE.

Formula.—$C_{17}H_{19}NO_3$, $HC_2H_3O_2$.

Derivation.—Acetate of Morphine is obtained by precipitating morphine from the hydrochlorate of morphine, by the aid of ammonia, the precipitate resulting being washed in distilled water and dissolved and neutralized by acetic acid, after which it is evaporated and dried by heat. It is in the form of a white or yellowish-white, amorphous or crystalline powder, altogether soluble in water and alcohol, and of a bitter taste.

MORPHINÆ HYDROCHLORAS OR MURIAS—HYDROCHLORATE OR MURIATE OF MORPHINE.

Formula.—$C_{17}H_{19}NO_2$, HCl $3H_2O$

Derivation.—Hydrochlorate or Muriate of Morphine is obtained by macerating opium in distilled water, evaporating to a small quantity, and adding chloride of lime, and concentrating the solution until it becomes solid when cool, after which it is pressed, washed with distilled water, again evaporated, cooled and pressed, and again dissolved in distilled water, when it is subjected to animal charcoal, to remove the coloring matter, filtered and precipitated by ammonia, the codeia of the opium remaining in solution. The crystals resulting are then dissolved in muriatic acid, and the morphine allowed to crystallize into hydrochlorate or muriate of morphine. It is in the form of snow-white, feathery, flexible and acicular crystals, of a bitter taste and silky lustre, and altogether soluble in water and alcohol.

MORPHINÆ SULPHAS—SULPHATE OF MORPHINE.

Formula.—$C_{17}H_{19}NO_3$, $2H_2SO_4$, $5H_2O$.

Derivation.—Sulphate of Morphine is obtained by dissolving morphine in boiling alcohol, and saturating it while hot with sulphuric acid, the coloring matter being removed by animal charcoal; it is then boiled and filtered while at the boiling temperature. Upon cooling the sulphate is deposited in the form of white, feathery, acicular crystals, of a silky lustre, odorless, with a bitter taste and a neutral reaction. It is soluble in water and alcohol.

Medical Properties and Action of the Salts of Morphine.—The salts of morphine possess anodyne, hypnotic and antispasmodic properties, and are less stimulating, less convulsant, and more hypnotic and anodyne than opium, and they also produce less constipation, and less diaphoretic action than opium. After the administration or insertion of the ordinary dose, which is one-sixth to one-fourth of a grain, there is experienced a sense of heat and flushing of the face, which may be preceded by some pallor, a fullness of the head, giddiness, noise in the ears, and frequently nausea, sometimes epigastric pain. The vertigo may cause a staggering walk and inability to maintain an upright position. Injection of the conjunctiva and contraction of the pupils occur at the same time that the cerebral effects are felt. The lips have a bluish appearance, the mouth and tongue dry, deglutition is painful and the voice becomes husky. During these symptoms the anodyne effects are manifested by the relief of pain and spasm, with perfect calmness of mind and tranquillity. While the effect is generally hypnotic, yet in some cases there is extreme wakefulness, with great mental activity, and when sleep occurs, instead of its being calm, the respirations are slow, noisy and labored, the patient being disturbed by dreams and visions. While the action of the heart is diminished in frequency, there is a considerable rise in the arterial tension. When a hypodermic injection of morphine has been made, there is experienced an itching of the nose, which may extend to the entire cutaneous surface. The skin, which is at first dry, becomes moist, from

diaphoresis, which is sometimes profuse. The secretions of the mucous surface are also arrested as a primary effect.

If morphine is administered after a full meal, its effect is to suspend digestion for some time, and also to temporarily arrest the intestinal movements and diminish the urinal discharge, and make its emission difficult on account of the temporary loss of contractile power of the bladder and of the ejaculatory muscles. When the narcotic effects of morphine decline, there is generally experienced headache, confusion of mind, anorexia and nausea. When a poisonous dose is administered, a profound state of narcotism quickly ensues, the pulse becomes slow and feeble, the respiration slow and indistinct, the skin cold and covered with perspiration, the face pale, blue and ghastly, the conjunctiva deeply injected, the pupils greatly contracted, the reflex movements entirely destroyed. Half a grain of morphia is the smallest dose which has proved fatal to an adult, but other cases are recorded where one grain destroyed life. It chiefly affects the cerebro-spinal functions, and causes death by paralyzing the respiratory muscles.

The antidotes in cases of poisoning are the stomach pump, emetics, cold effusions, counter-irritation, strong coffee, active stimulants, atropine by hypodermic injection, electro-magnetism, and artificial respiration.

Therapeutic Uses.—The salts of morphine are employed in all neuralgic affections, for the relief of pain from whatever cause, and to induce sleep; also in diseases of the heart, chronic gastritis, delirium tremens, tetanus, colic, spasms, dysentery, cholera, cough of pulmonary affections, cerebro-spinal meningitis, puerperal fever, convulsive diseases, vomiting, colica pictonum, diarrhœa, diabetes, gangrene, etc., etc. For hypodermic injection, the acetate of morphine is supposed to possess some advantages over the other salts, such as the sulphate and muriate, one of which is its greater solubility. Morphine is contra-indicated where there is a tendency to apoplexy or coma.

Dose.—Of the salts of morphine, gr. $\frac{1}{6}$ to gr. $\frac{1}{4}$. One

sixth of a grain of either of the salts of morphine is equivalent to a grain of opium, or twenty-five drops of the tincture of opium (laudanum).

For hypodermic injections the dose of salts of morphine is gr. $\frac{1}{8}$ to $\frac{1}{6}$. The use of morphine hypodermically frequently leads to the morphine habit, which, once formed, is rarely abandoned; and which, independent of its fatal systemic effects, has very injurious effects upon the teeth—the enamel and dentine becoming thoroughly disintegrated, owing to the presence of erosive acids.

For endermic application, gr. $\frac{1}{2}$ to j of morphine may be sprinkled on a surface (which has been blistered to remove the cuticle) over the seat of pain; but the hypodermic method is the most effectual.

Dental Uses.—For dental use the acetate of morphine and the muriate of morphine are preferable to the sulphate, on account of their greater solubility and greater chemical affinity with the tissues on which they are to act. The acetate of morphine is also preferred to the other salts as an ingredient of nerve paste for destroying the vitality of the pulps of teeth, on account of its chemical and mechanical compatibility with the pulp tissue, giving relief as an anodyne when the sulphate would irritate. Concerning the action of morphine when combined with arsenious acid, its effect is anodyne, modifying the irritant action of the arsenic, and preventing to a considerable degree the intense pain which follows its application to vitalized structures. Besides its use in devitalizing mixtures and as an obtunder of sensitive dentine, morphine is employed for the temporary relief of odontalgia, for such a purpose being combined with carbolic acid, sweet spirits of nitre, oil of cloves and other anodyne agents.

A paste made of acetate of morphine and creasote (or carbolic acid) is much used for obtunding the sensitiveness of dentine. A thin paste, made of acetate of morphine rubbed up with oil of cloves is an excellent application for exposed pulps; also a mixture of acetate of morphine, grs. v; oil of cajeput, f℥j; applied on a pledget of cotton. The latter is

also effective for the pain following tooth extraction; it is applied on cotton in the alveolar cavity.

For internal administration in facial and other neuralgias, morphine is combined with atropine in the proportion of atropine, gr. $\frac{1}{120}$ to $\frac{1}{100}$; morphine, gr. $\frac{1}{6}$ to $\frac{1}{4}$; hypodermically injected. Morphine in combination with carbolic acid is also employed to relieve the pain of an exposed and painful pulp.

DENTAL FORMULÆ.

For Odontalgia.

WHITE.

℞. Morphinæ acetatis . . . gr.xx
Olei caryophylli
Spiritus ætheris nitrosi . . . . āā . . . . ℥ij. M.

SIGNA.—Apply on a pellet of cotton.

For Odontalgia.

℞. Morphinæ acetatis . . . gr.xx
Creasoti (vel acidi carbolici) . . . . . ℥ij. M.

SIGNA.—Apply to carious cavity on a pellet of cotton.

For Itching of Inflamed Surfaces.

℞. Morphinæ sulph. . . . gr.vj
Sodii boratis . . . . . ℥ss
Aquæ rosæ . . . . . f℥viij. M.

SIGNA.—To be used as a lotion.

For Devitalizing Pulps of Teeth.

℞. Morphinæ acetatis . . gr.j
Acidi arseniosi . . . . gr.ij
Creasoti . . . . . q.s. M.
Fiat massa.

SIGNA.—Apply a sufficient quantity to exposed surface of pulp, on cotton.

For Abraded Surfaces of Mouth.

DR. A. C. HUGENSCHMIDT.

To prevent friction.

℞. Morphinæ murias . . . gr.ij
Mur. cocaini . . . . gr.ij
Sodii boras . . . . . ℥j
Mellis . . . . . ℥j. M.

To Relieve the Pain following the Extraction of Teeth and a Local Anæsthetic.

℞. Morphinæ . . . . . gr.vj
Tincturæ aconiti,
Chloroformi,
Alcoholis . . . . . āā . . . . . f℥j. M.

SIGNA.—Apply on cotton, or with an applicator, as a local anæsthetic.

(See Formulæ under Arsenious Acid.)

MYRRHA—MYRRH.

Source.—Myrrh is a gum-resinous exudation from a small, shrubby tree—Balsamodendron Myrrha, of the natural order *Amyridaceæ*, growing in Arabia and the northeastern coast of Africa. It is obtained in the form of small, irregular fragments or tears, or in larger masses, composed of agglutinated

portions. The juice exudes spontaneously from the stem of the tree, and concretes upon the bark. When pure, myrrh is of a reddish-yellow or reddish-brown color, translucent, with a strong, peculiar fragrant odor and a bitter aromatic taste, brittle and pulverizable, Its powder is of a light yellow color; when of a dark color it is impure. When powdered myrrh is rubbed up for fifteen minutes with an equal weight of muriate of ammonia and fifteen times its weight of water gradually added, and it dissolves quickly and entirely, it may be considered pure.

Medical Properties and Action.—Myrrh is stumulant, astringent, expectorant and emmenagogue. It stimulates the digestive organs and improves the appetite. In large doses of a half ounce, it causes a burning sensation in the stomach, increased arterial excitement, and profuse diaphoresis, with a great influence on the urinary passages. It diminishes discharges from mucous membrane when internally administered, and is a useful external application for relaxed tissues.

Therapeutic Uses.—Myrrh is internally administered in chronic catarrh, humoral asthma, amenorrhœa, chlorosis, leucorrhœa, chronic bronchitis, etc., etc.; and in combination with chalybeates and aloes in uterine affections.

Locally, myrrh is applied to inflamed, ulcerated and aphthous surfaces.

Dose—Of powdered myrrh, gr. x to ℥ss, in pill or suspended in water.

Tincture of Myrrh—*Tinctura Myrrhæ* (myrrh, ℥iij; alcohol, Oij). *Dose.*—f℥ss to f℥j. Is used internally and externally.

Dental Uses.—Myrrh, in the form of the powder and tincture, is employed as a local application to inflamed, ulcerated and spongy gums, ulcerations of mucous membrane of the mouth and throat, in the form of a gargle; also in alveolar pyorrhœa, mercurial stomatitis, indolent ulcers, aphthous sore mouth of children. The diluted tincture forms a stimulating gargle or mouth-wash, and the powder is employed as an ingredient of dentifrices, for its stimulating and astringent properties.

Van Valzah's Obtunder and Local Anæsthetic.

℞. Pip. menthol . . . . . ℥ij
Tinct. myrrh . . . . . ℥vj
Alcohol . . . . . ℥x. M.

MYRTOL. RECTIFIED MYRTLE OIL.

Derivation.—Myrtol is obtained from the leaves and berries of the Myrtus Communis (Myrtaceæ) an evergreen shrub native of the Mediterranean countries. It is a volatile oil containing various terpenes, cineol, and a camphor-like substance.

Medical Properties and Therapeutic Uses.—Myrtol is a disinfectant and antiseptic, and causes no irritation to the skin. Upon a denuded or abraded surface it causes a slight burning sensation, which soon passes off. It is claimed that a 9 per cent. solution of myrtol will completely arrest the growth of the micro organisms of pus; and myrtol will also prevent the decomposition of organic matters. Internally myrtol promotes digestion, but large doses cause headache and nausea. It communicates a violet odor to the breath and urine, and is eliminated from the system by the lungs and kidneys.

Myrtol has been employed with success as a disinfectant for wounds and ulcers; also in cutaneous diseases of a vegetable parasitic origin, and as a local remedy in psoriasis. Internally, myrtol has proved useful in the destruction of intestinal worms; also in chronic bronchitis, gangrene of lungs, pulmonary tuberculosis, chronic pyelitis and cystitis; also in passive hemorrhage.

Dose.—gr. iv.

Dental Uses.—Myrtol is employed in dental practice as a disinfectant of pulp canals and as an antiseptic for gangrenous pulps, also to destroy the growth of micro-organisms in alveolar abscesses, and to disinfect carious cavities in teeth, etc, etc.

NAPHTHALENE—NAPHTHALIN.

Formula—$C_{10}H_8$.

Derivation.—*Naphthalene* may be obtained by subjecting coal-tar to a distillation, when it passes over the coal naphtha. It is purified by subliming it with charcoal, and is then in the

form of a white, crystalline body. It has a slightly aromatic taste and the odor of coal-tar. While it has no poisonous effect on man and the higher animals, it is destructive to fungi spores, small insects, etc. It is soluble in alcohol, ether, naphtha and the oils, but insoluble in water. As an expectorant it has been used in humoral asthma and in chronic pulmonary catarrh, in doses of from gr. viii to xxx, in syrup or emulsions, and as an ointment in skin diseases of a scaly nature; also as a vermifuge in doses for adults of gr. xv. followed immediately by 2 ounces of castor oil. Naphthalin is a powerful antiseptic, and can be used as a substitute for iodoform, with the advantage of not producing any constitutional action. Its application causes a slight pain of short duration. As an antiseptic and disinfectant it is applied to indolent ulcers, septic and unhealthy wounds, ulcerating cancerous growths, phagedenic ulcers, etc. It is said that its antiseptic property is superior to that of carbolic acid, and as an odorless preparation, it will no doubt become a desirable substitute, as it has no corrosive action and will not injure textile fabrics. To deodorize naphthalin, simple mixture with benzoic acid or tincture of benzoin does not suffice; but if mixed with benzoin and then sublimed, it loses its tarry odor and acquires a pleasant smell which it retains.

NAPHTHOL—NAPHTHOL.

Formula—$C_{10}H_7HO$.

Derivation.—Naphthol is an alcohol derived from *Naphthalene* ($C_{10}H_8$), which is obtained from coal-tar in the form of white shining crystals of a strong, disagreeable odor, soluble in alcohol, but insoluble in water and employed locally in indolent ulcers and a disinfectant in pus-pockets and wounds and skin diseases. (See Naphthalene.)

Medical Properties and Therapeutic Uses.—There are two forms of Naphthol, known as *a* and *b* Naphthol, the latter being employed medicinally on account of its less irritating and injurious action. It is in the form of light-brown crystals, soluble in hot water, and possessing antiseptic properties, and

employed internally and locally in the form of ointment with vaselin dissolved in alcohol, ether or olive oil, in the proportion of two per cent. It is employed in parasitic diseases of the skin, and as a general antiseptic.

Hydronaphthol.—The chemistry of this agent, which is supposed to be a form of *b* naphthol, is not well known. It is in the form of light fawn-colored crystalline flakes, having a feeble odor and taste. As a germicide it apparently possesses the power of preventing the development of germs and their spores. It resembles capsicum in possessing slight stimulating and counter-irritant properties, but is not so powerful.

Dental Uses.—Hydronaphthol is employed for treating the canals of pulpless teeth, pericemental inflammation of septic origin, especially in the early stages before pus has formed. Dr. Jas. Truman recommends a solution of 1 : 1000 of water for injection into pulp-canals; and Dr. E. C. Kirk recommends a paste of hydronaphthol and glycerine, pumped into a thoroughly cleansed pulp-canal in pericemental inflammation from septic causes, to remove the soreness and inflammation in a few hours: it should be retained by a temporary filling of gutta percha. It is also recommended as an ingredient for a mouth-wash for diseased gums and mucous membrane.

Alpha-oxynaphthoic acid (or *alpha-naphthol-carbonic acid*) is prepared in a similar manner to salicylic acid, naphthol being substituted for phenol. Its formula is $C_{10}H_6$, COOH. It is obtained by bringing together under strong pressure, and at an elevated temperature, alpha-naphthol, sodium and carbonic acid gas. It is nearly insoluble in water, but soluble in the alkalies and alkaline carbonates, forming salts, which are colorless and of neutral reaction, and more soluble in hot and cold water than the acid itself. It is antiseptic and germicide, experiments upon bacteria giving favorable results.

Antiseptic and Stimulant Mouth-Wash.

For use especially in Alveolar Pyorrhoea.

DR. CHAS. B. ATKINSON.

R.	Hydronaphthol	℥ ij
	Tinct, Calendulæ	℥ iv
	Aquæ dest. q. s. ad	℥ viij. M

S.—Use daily.

Fragrant and Antiseptic Mouth-Wash.

DR. A. W. HARLAN.

R.	Safrol	360 min
	Oil of pinus pomilia	120 min
	Oil of curacoa	120 min
	Oil of vetivert	6 drops
	Oil of wintergreen	24 drops
	Oil of anise, Saxony	6 drops
	Oil of rose geranium, Af	6 drops
	Naphthol	60 grs
	Deodorized alcohol	24 f. oz
	Solution of saccharine	½ f. oz
	Glycerine	8 f. oz
	Purified talcum	2 troy oz. M.

NITROUS OXIDE—PROTOXIDE OF NITROGEN.

LAUGHING GAS.

Formula.—N_2O. Sp. gr. compared with air is about 1.6.

Derivation.—The discovery of Nitrous Oxide Gas was made by Dr. Priestly in 1776, and scientific investigation demonstrating its respirability, by Sir Humphrey Davy, the results of which were published some twenty years afterwards. To Dr. Horace Wells, a dentist of Hartford, Connecticut, is due the credit of having demonstrated its property as an anæsthetic agent for the relief of pain during surgical operations, in the year 1844. Nitrous oxide is obtained by heating the salt nitrate of ammonia in a glass retort until it melts, and then boils, dissolving into a vapor of water and into a permanent gas.

The salt nitrate of ammonia is obtained in three forms—the crystallized, the granulated and the fused. The fused form is prepared by melting the crystallized nitrate of ammonia, and allowing it to solidify on cooling; the granulated is prepared

by evaporating the solution to a density sufficient to solidify on cooling, and agitating the mass until it becomes cool.

As it is very important to use a pure form of the nitrate of ammonia in the generation of nitrous oxide gas, the salt, either in the fused or granulated state, may be tested by heating it on platinum, when the nitrate, if pure, should volatilize perfectly. It may also be tested by a few drops of chloride of barium, which should not give a precipitate when added to the nitrate of ammonia; should it do so, then sulphuric acid is present; or, the nitrate of ammonia may be tested by a solution of nitrate of silver, which will also give a precipitate, if chlorine is present. The test with nitrate of silver may be made by dissolving a drachm of the nitrate of ammonia in half a glass of distilled water and adding a few crystals of the nitrate of silver. If the nitrate of ammonia is pure, the solution will remain perfectly clear; but should chlorine be present, it will show a clouded appearance, and should be discarded, as it is not fit to generate the gas from.

The salt nitrate of ammonia is a white, crystalline substance, formed by neutralizing dilute nitric acid by means of carbonate of ammonia, and is so constituted as to be resolved into nitrous oxide and water. A pound of the salt will generate about thirty gallons of the gas. In generating nitrous oxide gas, care must be taken to preserve its purity; consequently it becomes important to maintain, as nearly as possible, an equal temperature during its manufacture; and should any *nitric oxide*—binoxide of nitrogen—be formed, which may be done by too high a heat under the retort, it is necessary to remove it and other impurities, by the aid of solutions of caustic potash and copperas; the caustic potash neutralizing any free nitric acid present, and the copperas removing either chlorine or nitric oxide. The salt nitrate of ammonia is perfectly fused at 226° F., emits white fumes at 302° F., and begins to evolve gas at 460° F. At 500° F. the impurity, *nitric oxide*, is given off; hence the temperature during the process should not be permitted to rise above 482° F, which can be determined by thermometers prepared for the purpose. No red fumes should pass from the retort.

Liquefied Nitrous Oxide.—Nitrous oxide gas, as principally used at the present time, is in the form of condensed gas, being liquefied and solidified under great pressure, and secured in iron cylinders, from which it escapes into an inhaling bag when needed for use, by turning a stop-cock. Liquefied nitrous oxide is a colorless fluid, having a specific gravity of 0.908, and at a very low temperature (148° F.) it congeals into a transparent crystalline solid. It is prepared by condensing the gas by a pressure of fifty atmospheres at a temperature of 40° F., and may be kept in the iron cylinders for an indefinite period. The advantages of the condensed form of the gas are its purity, convenience for use whenever needed, the large supply which can be kept for use, and the freedom from deterioration notwithstanding its age.

Nitrous oxide is an elastic, colorless gas, with a faint, but agreeable odor, and a sweetish taste, which it imparts to water. Under a pressure of 50 atmospheres at about 40° F. it becomes a clear, colorless liquid, and at about 148° F. below zero it freezes into a beautiful, clear, crystalline solid. By the evaporation of this solid, a degree of cold may be produced far below that of carbonic acid bath in vacuo, or lower than 170° F. The washing of nitrous oxide gas, and the retention of it over water for any length of time, is attended with considerable loss, as much of it is absorbed, especially if the water is cold; such loss may be avoided to a great extent by using water of an elevated temperature or a strong solution of common salt. The impurities of nitrous oxide gas are air, water, nitric oxide or binoxide of nitrogen, chlorine and hyponitric acid. The mixture with air, which may occur in the receiver or when the patient is inhaling the gas, merely dilutes it, as does also the vapor of water. Nitric oxide, however, is a dangerous impurity, and with others may be generated even when pure nitrate of ammonia is used in preparing the gas; this impurity is also one of the most difficult to separate from the gas. Like nitrous oxide, nitric oxide is a colorless gas, lighter and less soluble in water, and if it is generated, is liable to pass through the washing solu-

tions into the gasometer or receiver; nitric oxide, however, need not be generated if the proper care is observed with regard to the degree of heat under the retort which contains the nitrate of ammonia.

Chlorine is also a dangerous impurity, and may be set free if the salt nitrate of ammonia contains muriate of ammonia (sal-ammoniac) and chloride of ammonium. To prevent such contamination, the tests of the salt before referred to may be made. Nitrous oxide gas supports combustion with almost the same promptness as pure oxygen; and although nearly identical in constitution with atmospheric air, it differs from it both in the proportion of its constitutional elements and in the manner of their association. Nitrous oxide contains about one-third of oxygen to two-thirds of nitrogen, while atmospheric air has only about one-fifth of oxygen to four-fifths of nitrogen.

Again, in nitrous oxide, the elements nitrogen and oxygen are in chemical combination with each other, while in atmospheric air there is no apparent chemical union whatever.

Medical Properties and Action.—Concerning the therapeutic application of nitrous oxide, Dr. L. Turnbull says: "Neuralgia, uncomplicated, will sometimes be relieved by a few inhalations of nitrous oxide gas. Nervous aphonia, this peculiar form of loss of power over the voice, usually the result of hysteria, will be much improved by the patient inhaling sufficient nitrous oxide gas to produce a partial loss of sensation and muscular relaxation. Local paralysis has been benefited, when there was no brain lesion, by the gentle stimulation by the first stages of the gas, or the tingling and stimulating effect on the muscles. Asthma, when of a spasmodic character, is often much improved by causing the patient to pass into the stage of relaxation, employing it every other day for a week or two. It also tends to expand the lungs." Dr. George J. Ziegler found the solution of the gas, in water, of much utility in diseases of the lungs, kidneys and other diseases of this class. Dr. M. Price claims to have employed nitrous oxide gas in many cases of phthisis with advantage,

and a number of dentists have been told by consumptive patients that they have been benefited by the inhalation of nitrous oxide gas.

Nitrous oxide gas is not only the most pleasant, but is the safest general anæsthetic in use, and the greatest objection to its administration is the very short anæsthetic stage which it induces, unless the inhalation of the gas be continued, which is impossible in operations upon the mouth. When inhaled, the first effect is dizziness, with ringing noises in the ears, a tingling sensation, extending to the extremities, an uplifting of the whole system, followed by fullness or expansion of the chest, and a loss of sensation throughout the entire body. According to the temperament, the stage of excitement is transient or prolonged; in some cases there are strange illusions, with a form of intoxication, which may be manifested by declamation, singing, laughing or crying, or melancholy, with a disposition at times to assault all near. Such effects, if the administration is interrupted, soon pass off. For surgical operations, the gas is given with less admixture of air, and the inhalation persisted in until the stage of excitement is overcome and insensibility produced, when the face becomes extremely pale, the respirations, at first shallow, become deep and stertorous, the jaw fixed, the eyes protruding, and a bluish and purplish color about the lips and face, the patient presenting a very alarming and death-like appearance, a condition of which Bartholow says: "So far as the exterior phenomena can afford any indication of the nature of the action, is *an asphyxiated state.* The blood ceases to be oxygenated, carbonic acid accumulates, and the centres of conscious impressions are rendered inactive in consequence of the deficient supply of oxygen and the excess of carbonic acid. The rational indications of the nature of the narcosis produced by nitrous oxide are confirmed by physiological experiment. It has been found that the exhalation of carbonic acid is decidedly diminished by the inhalation of nitrous oxide, and that animals live no longer in an atmosphere of this gas than in an atmosphere of hydrogen." The same author speaks of the

fatal cases that have occurred, as being with propriety attributable to the lethal action of this gas, and refers to various cases under his own observation in which nervousness, vague mental symptoms and headache have been experienced after the inhalations; at the same time he pronounces nitrous oxide to be almost free from danger. There is no doubt but that the prompt action of nitrous oxide gas, and the rapid subsidence of the narcosis, have much to do with its safety, and account for the impunity with which it is used. Nitrous oxide gas has the advantages of safety; also rapid anæsthesia, which is generally induced in from thirty seconds to a minute and a half, insensibility often occurring before complete unconsciousness; also the pleasant odor and taste, thereby preventing repugnance and nausea; and the complete recovery from its influence without unpleasant after-effects. It generally requires six gallons or less to produce anæsthesia with nitrous oxide gas; hence the rubber bag from which it is inhaled should have a capacity of about eight gallons.

Mode of Administration.—The most improved apparatus consists of an iron cylinder containing 100 gallons or more of the condensed or liquefied nitrous oxide, to which is attached a rubber gas bag and inhaling tube with a double valve and mouth-piece. The patient, for dental operations, is seated in a suitable chair which will admit of the back being lowered to such a degree as will bring the patient to an almost horizontal posture, and the head well supported. A piece of India rubber or a firm cork to which a thin, strong cord is attached, to prevent its slipping down the throat, is placed between the teeth, so as to prevent the closure of the jaws, for, unlike chloroform and ether, the muscles become rigidly contracted under the influence of this gas; such a prop also prevents injury to the front teeth by the patient biting too hard on the mouth-piece of the inhaling tube. The patient is then directed to breathe deeply and regularly, the nose being held, to prevent the admixture of atmospheric air, and the same precautions observed as are necessary when administering ether or chloroform. (See Ether.) The anæsthetic state, or "surgical period,"

as it is termed, is generally manifested by snoring, although this symptom does not invariably occur; when it does, however, it indicates a state of profound anæsthesia, to which it is necessary to carry the patient when performing many minor surgical operations.

As more or less excitement follows the inhalation of this gas, when it is largely mixed with atmospheric air, such a condition is either prevented or abbreviated by holding the nose of the patient during the inhalation. The patient should not partake of food for at least two hours before the administration of the gas, but at the same time should not be in a weakened condition for want of it; and the dress, if tight, should be previously loosened, and as soon as the operation is completed the head should be gently moved to one side, to allow the blood to escape from the mouth. Fresh air should then be admitted into the room, and the patient supplied with it by means of a fan. (See Administration of Anæsthetics.)

Therapeutic and Dental Uses.—According to the investigations of Dr. Ziegler, nitrous oxide is an efficient restorative when administered either in its gaseous state by the lungs, or in conjunction with liquids by the alimentary canal. He recommends the use of this gas in moderate quantities, so as not to generate too much carbonic acid. Regarding nitrous oxide and oxygen as of primary importance in asphyxia, and the natural antidotes to narcotizing agents and asphyxiated conditions, he advocates their use whenever practicable, either alone or in combination with heat, and claims that they will often save life in apparently hopeless cases.

The rapid action of nitrous oxide and the transient nature of its effects on the system, render it a very useful anæsthetic agent for all minor surgical operations—such as extracting teeth, lancing abscesses, devitalizing nerves of teeth, etc., etc. It has also been successfully employed in the performance of some capital surgical operations, where the anæsthesia has been kept up from fifteen minutes to half an hour. It has recently been recommended to use, during the first part of an

inhalation, the pure nitrous oxide gas, and for the purpose of prolonging the anæsthesia with less danger, to dispense with the pure gas and administer a mixture of oxygen and nitrous oxide in proportions very similar to the air we breathe.

NUX VOMICA.

Source.—The seed of the *Strychnos nux vomica*, which contains two alkaloids, *strychnine* and *brucine*, the amount of strychnine being one-fourth to one-half per cent., and of brucine from one-eighth to one per cent.

STRYCHNINE—*Strychnina* ($C_{21}H_{22}N_2O_2$)—is a white or grayish white powder of a very bitter taste, almost insoluble in water, and very soluble in boiling alcohol.

SULPHATE OF STRYCHNINE—*Strychninæ Sulphas*—is a white salt in the form of colorless prismatic crystals, which are very bitter and odorless, soluble in ten parts of water, somewhat so in alcohol, but insoluble in ether.

Medical Properties and Therapeutic Uses.—Nux vomica and strychnine are bitter stomachic and muscular tonics. In small doses strychnine increases the gastro-intestinal secretions, hastens intestinal movements, and elevates arterial tension. In larger doses the pupils are dilated and the muscles spasmodically contracted. Poisonous doses cause muscular tremors, intermittent tetanic spasms, and death from rigidity of the respiratory muscles, without any inpairment of the mind.

Poisonous quantities of strychnine accumulate in the system, on account of the agent being slowly excreted, from very small doses frequently administered. The antidotes are free evacuation of the stomach, vegetable astringents to precipitate the strychnine, and the inhalation of ether or chloroform, and the hypodermic injection of chloral. Strychnine is employed in anæmia, atonic dyspepsia, constipation, vomiting of pregnancy, gastralgia, gastric catarrh, etc., of drunkards, chlorosis, purpura, hemorrhagic diathesis, local paralysis, poisoning by lead, spasmodic asthma, etc., etc. It is an antidote to chloral, and nux vomica is used in intermittent fever as an

adjunct to quinine. Brucine is much weaker than strychnine but similar in its action, and the pure agent is analogous to cocaine, possessing local anæsthetic properties. For hypodermic injection it is resorted to in paraplegia, infantile paralysis, facial paralysis, etc., and also in diseases of the eye, and infraorbital paralysis. A half-grain of strychnine has produced a fatal result, and one-twelfth of a grain will produce muscular twitchings, and one-sixteenth of a grain has proved fatal in the case of a child.

Dose.—Of *Abstractum nucis vomicæ, gr.* $\frac{1}{2}$; of *Extractum nucis vomicæ*, gr. $\frac{1}{8}$ to gr. $\frac{1}{2}$; of *Extractum nucis vomicæ fluidum*, ♏j to v; of *Tinctura nucis vomicæ*, ♏v to x; of *Strychnina*, gr. $\frac{1}{60}$ to $\frac{1}{20}$; of *Strychninæ Sulphas*, gr. $\frac{1}{60}$ to $\frac{1}{30}$; of *Brucine*, gr. $\frac{1}{10}$ to $\frac{1}{3}$.

DENTAL FORMULA.

For Neuralgia.

℞. Ext. nucis vom . . . . . gr. v
Zinci valerian . . . . . ℈ij
Ext. gentianæ . . . . . ℈j. M.
Fiat pill No. XX.
SIGNA.—One pill three or four times a day.

OLEATES.

Medicinal oleates are, according to Dr. J. D. Shoemaker, definite chemical compounds or salts, having no excess of either their acid or basic radicals, and Dr. Lawrence Wolff finds that the best and readiest method of preparing oleates is by the double decomposition of sodium oleates with solutions of neutral salts. The sodium oleate is made by the saponification of oleic acid with sodium hydrate. Dr. Squibb, however, is of the opinion that in the preparation of oleates, none are so good as those made by the direct union of the acid with the dry base, without heating, and that the preparation should always be either a liquid or semi-solid which is easily and completely liquefied by the natural temperature of the surface to which it is applied; and he further says that in the rare cases where the excess of acid as a solvent of the oleates proves an irritant to the skin, dilution with a bland oil becomes

admissible. The most common oleates in use are those of mercury, zinc, lead, copper, aluminium, bismuth, iron, arsenic, silver, aconite, atropine, morphine, veratria and strychnine. Oleates of the more active alkaloids, namely, aconitia, atropia, strychnia and veratria, are usually made of the strength of two per cent. of the alkaloid; the oleate of morphia usually contains five per cent. of the alkaloid; the oleate of quinine usually contains twenty per cent. of the alkaloid. Dr. Squibb says that all of these are very simply and easily made by putting the weighed quantity of the alkaloid into a mortar, adding a small quantity of the oleic acid, little by little, and triturating until the alkaloid is completely dissolved. The strong solution thus made is then poured into a tarred bottle, and the mortar and pestle rinsed twice into the bottle with small quantities of oleic acid. The proper weight is then made up by the addition of oleic acid.

According to the preparation of oleates as recommended by Dr. Shoemaker—

Oleate of Mercury is prepared by precipitating a solution of sodium oleate with mercuric chloride, and is the best local stimulant and alterative application of all the mercurials. It may be diluted with either the paraffinates, or, better still, with lard or lard oils. When applied to the unbroken skin it causes marked stimulation, bordering on congestion. It has great penetrating power, is readily absorbed by the skin, and does not become rancid nor stain the linen. It is a valuable remedy in syphilis, the treatment of indurations after abscesses, skin diseases of a scaly nature, obstinate ulcers, parasitic affections, etc., and may be employed advantageously with other oleates. As it is capable of producing the constitutional effects, it must be employed carefully.

A mixture of oleate of mercury gr. x to xx, with the ointment of oleate of zinc ℥j, is very effective in chronic acne and eczema, especially in the fissured variety of the latter common to the palmar and plantar surfaces. For syphilitic skin eruptions and in superficial ulcers, oleate of mercury ℥j, with oleate of bismuth ℥iij, or the same quantity of the ointment

of the oleate of lead, acts promptly and efficiently. For one of the best and most efficacious oily applications for loss of hair, especially when the scalp is harsh and dry, and the hairs dull and without lustre, a preparation composed of oleate of mercury ℥j to ij, with oil of ergot ℥j, is highly recommended.

Oleate of Zinc is prepared by decomposing a sodium oleate with a saturated solution of zinc sulphate, boiling out and drying the precipitate and then reducing it to an impalpable powder. One part of oleate of zinc melted with three parts of lard or oil gives a most useful ointment, but the best results are obtained from the oleate of zinc alone. It is in the form of a fine, pearl-colored powder, having a soft, soapy feel, much like powdered French chalk. It is valuable in all forms of sweating.

Oleate of Lead is prepared by precipitating a sodium oleate with a solution of lead subacetate. To form the ointment of lead oleate, the washed and dried precipitate is melted with equal parts of lard. Oleate of lead exerts a combined sedative and astringent action when applied to denuded skin, and also arrests morbid discharges, protects the surface, and allays irritation. It is useful in eczema, acne and other skin diseases. For skin diseases, oleate of lead ℥ij, with oleate of bismuth ℥j, is very effectual, especially in the fissured form of palmar and plantar eczema; and when the cracking is very deep, to cause stimulation, oil of cade gtt. xx to xxx may be added. In scabies, oleate of lead ℥iv with sulphur ℥ss is an excellent application.

Oleate of Aluminum is prepared by decomposing sodium oleate with aluminum sulphate. The washed precipitate, mixed with equal parts of lard, forms an ointment of a semi-solid, dark-brown color, which is very astringent in its action. It rapidly arrests all muco-purulent discharges, and is an efficient dressing for foul ulcers, sinuses, burns and scabs.

Oleate of Bismuth is prepared by first obtaining crystallized bismuth nitrate, and dissolving it in glycerine and decomposing with this the sodium oleate. It is of the consistence of oint-

ment, and of a pearly-gray color and a soft, bland substance. It has an emollient and somewhat astringent action, and is an excellent application for relieving cutaneous irritation. In pustular eruptions, especially sycosis, it is a useful application; also in superficial erysipelas, sunburn and chronic inflammation of a portion of the face.

Oleate of Copper is prepared in a similar way to the oleate of lead, by double decomposition with a saturated solution of copper sulphate. A ten or twenty per cent. ointment can be made with either cosmoline, fat or lard. When applied to the unbroken skin, it penetrates deeply, and causes a slight stimulation; and when applied to broken skin, it coats it with an insoluble albuminate. It is very efficient for ringworm, and in the most obstinate cases usually effects a cure. It is also used with advantage on indolent ulcerated surfaces, and with effect on hard, horny warts and corns.

Oleate of Arsenic is obtained from arsenious chloride, made by the careful saturation of hydrochloric acid with arsenic. This solution is mixed with sodium oleate, when the arsenic oleate is precipitated. In the proportion of gr. xx to an ounce of fatty base, it forms oleate of arsenic ointment, which is soft and yellow, having no action on the skin. When applied to wounds, or ulcerating surfaces, it destroys the tissue to some depth. It is used in lupus, the ulcerating variety of epithelioma, and, after scraping the surface, to destroy warts, corns, old granulations, etc. It may be combined with arnica, opium, belladonna or hyoscyamus.

A number of other oleates are in use, among them *Nickel oleate*, which is a greenish, waxy mass, which is used in the form of an ointment, containing from five to fifteen grains to the ounce of lard, is astringent and somewhat escharotic, and useful for hard, horny, granulating surfaces; *Silver oleate*, a brownish pulverent substance, and, in the form of ointment, valuable for application to ulcers, erysipelas, etc.; *Cadmium oleate*, a yellowish-white mass, and in the form of ointment (five to fifteen grains to the ounce), has an astringent and escharotic action, and is useful in glandular enlargements and thickening of the integument.

OLEUM AMYGDALÆ DULCIS—OIL OF SWEET ALMONDS.

Derivation.—The Oil of Sweet Almonds is obtained by first depriving the almonds of the brown powder adhering to their surface, and rubbing them together in a piece of coarse linen, then grinding in a mill or mortar, and then submitting them to pressure in canvas sacks between slightly heated plates of iron. The oil, which is at first turbid, is clarified by rest and filtration. It is clear, colorless, or of a slight greenish-yellow tinge, nearly inodorous, with a bland, sweetish taste. It will remain liquid at temperatures below the freezing point of water.

Medical Properties and Action.—The oil of sweet almonds is demulcent.

Therapeutic Uses.—It is employed as an emulsion in pulmonary affections with cough, and as a vehicle for other medicines.

Dental Uses.—The oil of sweet almonds forms a pleasant and soothing application for excoriations of the lips and inflamed mucous membranes; also for a soothing application to the small, simple, but painful ulcers which sometimes appear upon the gums, mucous membrane of the cheeks, and the tongue. Almond mixture—*Mistura Amygdalæ*—is made by dissolving a mixture of half an ounce of blanched sweet almonds, 30 grains of gum Arabic and 120 grains of sugar, in half a pint of distilled water. It forms a pleasant demulcent.

OLEUM CAJUPUTI—OIL OF CAJUPUT.

Source.—The volatile oil of the leaves of melaleuca cajuputi, a tree indigenous in Batavia and Singapore. It is transparent, of a green color, with an odor like camphor, and a warm, pungent taste.

Medical Properties and Action.—Cajuput Oil is a diffusible stimulant, antispasmodic and diaphoretic. Internally administered it causes a sensation of warmth in the stomach, and excites the action of the heart and arteries, afterward producing copious diaphoresis. Externally, either alone or in combination with equal parts of soap liniment or olive oil, it is an ef-

ficient rubefacient and stimulant embrocation. Its use is becoming more common.

Therapeutic Uses.—It is employed internally as an antispasmodic stimulant in typhus and other low fevers, spasmodic cholera, gout and rheumatism, neuralgic affections, hysteria, flatulence and flatulent colic, headache, nausea, etc. Externally, in neuralgia, headache, gout, rheumatism, lumbago, sprains, contusions, paralysis, etc., etc.

Dose.—Of cajuput oil, gtt. j to gtt. v, in emulsion, or on sugar.

Dental Uses.—Cajuput oil is an efficacious remedy for the relief of odontalgia, applied on lint or cotton to the carious cavity of the tooth; also in neuralgic affections, if they are not connected with inflammatory action.

OLEUM CARYOPHYLLI—OIL OF CLOVES.

Source.—Oil of Cloves is obtained from the dried flower buds of the caryophyllus aromaticus, an evergreen tree, of the natural order Myrtacea—myrtle order—a native of the Indies. The unexpanded buds are of a dark-brown color, with a yellowish red tint.

The oil is prepared by distilling cloves with water, to which common salt is added, in order to raise the temperature to the boiling point. It has a fragrant odor, and a hot, acrid taste.

Medical Properties and Action.—Oil of cloves contains tannic acid, a pungent, volatile oil, resin, etc., and two substances —a hydro-carbon, *caryophyllin*, and an oxygenated oil, *eugenol*, called an acid on account of its possessing acid properties. Oil of cloves is an aromatic and powerful stimulant. Although it is a very fluid, clear and colorless preparation when fresh, it becomes yellow by exposure, and ultimately reddish brown, with the odor of cloves, and a hot, aromatic taste. Like cloves, the oil acts less upon the system at large than on the part to which it is immediately applied.

Therapeutic Uses.—Oil of cloves is sometimes administered to relieve nausea and vomiting, to correct flatulence and excite

digestion when languid; but its chief use is to modify the action of other medicines.

Dose.—Of oil of cloves, gtt. ij to gtt. vj.

Dental Uses.—In dental practice, oil of cloves is employed to relieve odontalgia, either alone, as in the form of a drop or two upon cotton, introduced into the carious cavity of a tooth, and obtunds the pain by an over-stimulating effect upon the irritable pulp. It is also employed for the same purpose in combination with other agents, such as morphia, sweet spirits of nitre, etc. When the use of creasote or carbolic acid is prohibited, owing to the patient's idiosyncrasy, the oil of cloves may be substituted.

The oil of cloves has also the effect of rendering creasote and carbolic acid more pleasant, without interfering with their action, being added in equal admixture. It is also employed in the treatment of alveolar abscess, putrid pulps being applied like creasote or carbolic acid, or combined with other agents

Eugenol, $C_{10}H_{12}O_2$, also called eugenic acid, is an active principle of oil of cloves, and is prepared by decomposing eugenate of potassium with sulphuric acid. It is in the form of a colorless oil, of the specific gravity of 1.076. Its odor resembles that of oil of cloves, and it has a sharp, penetrating taste. It does not decompose at ordinary temperatures, and is not affected by exposure to the air. It is soluble in water and alcohol, but the aqueous solution is the more potent as a germicide. It is not poisonous, and when pure will coagulate albumen. For dental uses eugenol is of considerable value. When applied to exposed or partially exposed pulps of teeth it usually relieves the pain in from one to two minutes. For inflamed and congested pulps, it has been suggested to first apply a solution of borax and then eugenol. It also answers well as a dressing for root canals, especially after the removal of a recently devitalized pulp. In alveolar pyorrhœa, it is used in solution, 1 part of eugenol to 1000 of water, for the purpose of cleansing the pus pockets. In alveolar abscesses it has been suggested as an injection, after the use of peroxide of hydrogen, taking the precaution, in cases of abscesses with a

fistulous tract, to seal the root at the apex. It has also been successfully employed in the treatment of benign tumors of the mouth, in the form of an injection of two drops.

OLEUM MORRHUÆ—COD-LIVER OIL.

Source.—Cod-liver oil is obtained from the liver of the cod, *Gadus morrhuæ*, and is in the form of a fixed oil, containing biliary principles, traces of iodine, bromine, phosphorus, lime, magnesia, iron, soda and sulphuric and phosphoric acids; also a principle known as *gaduin*. By distillation with ammonia, it yields *propylamin*. The pale oil is considered to be the best for internal use, and is the official preparation. Iodine, phosphorus, bromine and iron are often combined with cod-liver oil, but are considered to add nothing to its therapeutical powers. The special medicinal value of this oil depends upon the gaduin and propylamin, which are constituents of bile, iodine, phosphorus, bromine, etc., as well as upon the common ingredients of animal fat. The phosphates, hypo-phosphites, or the lacto-phosphate of lime are often combined with cod-liver oil, with excellent effects.

Medical Properties and Therapeutic Uses.—Cod-liver oil is considered to be a valuable remedy in certain forms of phthisis, such as the chronic forms,—chronic tuberculosis and fibroid lung; but not in acute phthisis and caseous pneumonia; also in chronic affections of the brain and nervous system, and such skin diseases as lupus, ecthyma, psoriasis, etc. It is also employed in sequelæ of scarlet fever, chronic bronchitis, emphysema, chronic rheumatism and rheumatic arthritis, strumous synovitis, scrofula, caries and necrosis of bone, scrofulous, rickety infants and chlorotic girls derive benefit from warm baths and inunctions of the oil; also lean persons. Inunction with cod-liver oil is also useful in rubeola, scarlatina, erysipelas, high fevers, catarrhal attacks, scrofula, phthisis, chronic dysentery, etc. It builds up the tissues, repairs waste and supplies nervous, muscular and digestive power. It may be administered in ale, beer, coffee, lemon juice, hot whiskey punch, compound spirits of lavender and brandy, or washing

out the mouth with whiskey or brandy, or as an emulsion made with glycerine and yolks of eggs, and flavored. It is also used in the preparation of bread in form of rolls; ether added to it promotes its digestion; fifteen minims of ether to every half-ounce of the oil.

Dose.—Of cod-liver oil, f℥j to ℥iv.

OPIUM.

Source.—Opium is obtained from the unripe capsules of the papaver somniferum, of the natural order *Papaveraceæ*—poppy order, in the form of a concrete juice, which exudes from incisions, and which is permitted to evaporate spontaneously. Commercial opium is in the form of irregular masses, of from a few ounces to several pounds in weight, with a moist, brown or chestnut surface, and a peculiar odor and nauseous taste. The purest form should have a chestnut color, a strong aromatic flavor, and a dense consistence, and break with a deeply notched fracture, and when drawn across white paper leave an uninterrupted line. The alkaloid morphine is the most important of the chemical constituents of opium. (See Morphine.)

Medical Properties and Uses.—As an anodyne and hypnotic opium possesses the power of relieving pain and inducing sleep; it relaxes muscular spasm, and hence is a very efficient remedy in tetanus, spasms, nervous irritability and discharges of a morbid nature. It excites the circulation as a first action, and increases the temperature of the skin, and causes an agreeable exhilaration of the intellectual faculties, so much so as to be used by some as an habitual narcotic, which is finally destructive to both the physical and mental functions. But the stage of excitement is very transient, and is succeeded by a falling of the pulse, a diminished susceptibility to external impressions, confusion of mind and the loss of consciousness in deep sleep. Other effects are also manifested, such as dryness of the throat, thirst, and, in some cases, nausea and vomiting, with an itching miliary eruption on the skin.

Taken in large or poisonous doses, opium does not cause any excitement, but giddiness and stupor rapidly supervene,

with a lessening in the frequency of the pulse, but not in fullness, a tendency to sleep, which is irresistible, and finally coma, in which the breathing is heavy and stertorous, the pulse slow, and the pupils contracted, with a sinking of the pulse and relaxation of the muscles immediately preceding death; in the case of children death is often preceded by violent convulsions.

The antidotes in poisoning by opium are the stomach pump, emetics in double doses, such as sulphate of zinc, in doses of gr. xx to gr. xxx, or sulphate of copper, gr. v to gr. x; also mustard in powder, ℥ss, or powdered alum, answer as emetics, strong coffee, keeping the patient in motion, counter-irritation to nape of neck, flagellation to the palms of the hands and soles of the feet, and the electro-magnetic battery, which is often efficient when other measures fail, artificial respiration, and belladonna, in hypodermic injections of its alkaloid atropine, in solution. No local lesions are found after death.

Therapeutic Uses.—Opium as an anodyne and hypnotic is employed in almost all diseases where the necessity of assuaging pain and inducing sleep is required. (See Morphine.) Opium is contra-indicated where there is a tendency to apoplexy or coma, or where an unusual susceptibility to its influence exists, and it should be administered to the very young and very old with great caution. When long administered it is necessary to increase the dose. Externally, in the form of powder, it is applied to irritable ulcers, etc., and to the rectum, as suppositories.

Dose.—Of opium, in powder or pill, as an anodyne and hypnotic, gr. j.

Dental Uses.—Opium is employed as an anodyne in convulsions of teething, but must be administered with great care and in small doses; also as an anodyne preparatory to lancing the gums of children; also in mercurial salivation, to arrest the excessive secretion, in doses of gr. j every four hours; also in neuralgia; but it is inferior to aconite. A small lump of opium in contact with an aching tooth pulp will relieve the pain, or the powder may be used for the same purpose. In the

form of wine and tincture, opium is serviceable in odontalgia, periodontitis, inflamed gums and mucous membrane of the mouth; in injections, for alveolar abscess, when it is often used in combination with tincture of iodine. The wine of opium is a more soothing and pleasant application than the tincture of opium.

VINUM OPII—*Wine of Opium*, is obtained by macerating two ounces of powdered opium, together with cinnamon and cloves, in one pint of white wine. *Dose*, ℥v to ʒj.

Dental Uses.—Employed as a soothing and anodyne application to inflamed and tender gums and mucous membrane, odontalgia, ulcerations of mouth, alveolar abscess, periodontitis, pulpitis, etc. Dr. W. H. Atkinson recommended wine of opium by means of injection, into pockets and cavities, where such exist, in case of aching gums or teeth.

DOVER'S POWDER—*Pulvis ipecacuanhæ et opii. Dose*, gr. x. Ten grains contain one grain each of ipecac and of opium, and eight grains of sugar of milk. For influenza or "common cold," a dose of Dover's powder taken at bed-time, with such adjuncts as warm clothing, hot drinks, foot-baths, etc., to promote profuse diaphoresis, proves very effective. Ten grains at bed-time is also a very serviceable remedy for inflammations of the peridental membrane.

TINCTURA OPII—*Tincture of Opium*—laudanum, is composed of powdered opium, ʒiiss; diluted alcohol, Oj. Dose, ℥v to ℥xxx; 25 drops are equivalent to one grain of opium. Its strength increases with age. Tincture of opium in hot water (fʒij, to aquæ ferv. fʒx), held for some minutes in the mouth, is useful in peridental inflammation.

One drachm of the tincture contains 120 drops. The dental uses are the same as for wine of opium, but the latter is the most pleasant application for the mouth.

TINCTURA OPII CAMPHORATA—*Camphorated Tincture of Opium*—paregoric elixir, is prepared by macerating sixty grains of opium in two pints of diluted alcohol, with sixty grains of benzoic acid, a fluidrachm of oil of anise, two ounces of clarified honey, and forty grains of camphor. *Dose*, fʒj to

f℥j or a tablespoonful, containing a little less than one grain of opium. Dose for an infant, gtt. v. to xx. This is an agreeable preparation for children.

TINCTURA OPII DEODORATA—*Deodorized Tincture of Opium*, is composed of the watery extract of opium, washed with ether, which is afterward separated, and the residue dissolved in water and mixed with enough alcohol to preserve it. This preparation of opium is free from the narcotina and many other injurious ingredients of opium, and is a valuable preparation. *Dose*, ♏v to ♏xxx.

DENTAL FORMULÆ.

A Stimulating Injection for Abscess of Antrum.

J. S. SMITH.

℞. Glycerinæ . . . . . f℥j
Tinct. opii camph . . f℥ij
Eau de cologne . . . ℥iv. M.

SIGNA.—Inject daily.

For Infantile Diarrhœa During Dentition.

When there is a tendency to an acid fermentation of the food.

DR. JAS. W. WHITE.

First give a grain of bicarbonate of sodium or of potassium with anise, cinnamon, or caraway, with each meal. If undigested food or vitiated secretions in alimentary tract are suspected, a dose of castor oil and aromatic syrup of rhubarb in equal portions—dose, a teaspoonful; if torpidity of liver, a few doses at intervals of two hours, of the twelfth or sixteenth of a grain of calomel with one or two grains of sodium bicarbonate. If the diarrhœa persists use the following, first prohibiting the use of farinaceous or milk food:

℞. Tinct. opii. . . . . gtt. viij
Bismuth subnitrat. . . ℥j
Mucilag. acaciæ. . . f℥ss
Aquæ menth. pip. . . f℥iss. M.

SIG.—A teaspoonful every 3 hours to a child 6 months old. Opium is indicated only after all offending matters have been expelled from the alimentary canal.

For Infantile Diarrhœa during Dentition.

If it is due to relaxation from long continued warm weather, or following cholera infantum, and no fever is present.

DR JAS. W. WHITE.

℞. Tinct. opii camph. . . . f℥j
Ext. hæmatoxyli. . . . gr. xvj
Mist cretæ
Aquæ cinnamomi . āā . f℥j. M.

SIG.—A teaspoonful in water every 4 hours for a child six months old.

PAPAIN OR PAPAIVA.

Source.—Papain is a ferment obtained from the *Carica papaya*, from which exudes, on incision, a white, slightly astringent and milky juice, which contains the papain.

Medical Properties and Action.—Papain is a digestive ferment like pepsin, its active digestive power causing the solution of albuminous substances. Catillon denies that it is a true ferment, with power to convert albuminoids into peptones; hence it cannot be substituted for pepsin in affections of the stomach.

Therapeutic Uses.—It is an active solvent of false membranes, intestinal worms, ascarides and tænias, hence it is employed in diphtheria, ascarides, vermiculares, tapeworm. Locally, like pepsin, it is employed in the form of injections made with the hypodermic syringe, in the treatment of fatty tumors and other benign growths, and to retard the growth of cancerous and other malignant tumors, the solution being injected well into the substance of the tumor.

Dental Uses.—Papain is employed in the treatment of tumors of the mouth, both benign and malignant, the solution being injected into the substance of the growth by means of a hypodermic syringe.

PARALDEHYDE—PARALDEHYDE.

Formula.—$C_6H_{12}O_3$.

Derivation.—Paraldehyde is a polymeric modification of aldehyde (C_2H_4O). It is a colorless liquid of an ethereal odor, pungent taste and insoluble in eight parts of water, which is a proper menstruum. It is frequently combined with chloroform, oil of almonds and syrup of orange peel, or cinnamon.

Medical Properties and Therapeutic Uses.—Paraldehyde is an efficient hypnotic, similar in its effects to chloral, although the sleep caused by it is not so deep nor so prolonged. As it does not weaken or paralyze the heart or lungs, it is considered to be safer than chloral. It is employed as a hypnotic in fevers, rheumatism, gout, prurigo, insomnia, hysterics, delirium tremens, some cases of neuralgia, and all mental and nervous disorders. It is also used as an expectorant. Poisonous doses cause respiratory paralysis. The action of paraldehyde upon digestion is as follows:

a. Large quantities considerably accelerated the digestion

of fibrin, and that the rate of this acceleration was distinctly in ratio with the quantity used.

b. Small quantities also increased, but to a less degree, the digestion of fibrin.

c. Putrefaction was prevented by the larger quantities of paraldehyde, and was delayed by the smaller quantities.

Dose.—Of Paraldehyde, ♏ xv to ʒj, repeated if necessary.

PEPSINUM—PEPSIN.

Source.—Pepsin is obtained by digesting the mucous membrane of the stomach of the pig, calf or sheep, which has been scraped off, chopped finely, and macerated for several days in water, in a solution of muriatic acid, from which the pepsin is precipitated with chloride of sodium. The medicinal preparation is in the form of a nitrogenized, light, amorphous, grayish-white or fawn-colored powder, soluble in water and alcohol, and of a peculiar odor and bitter, nauseous taste. When quite pure, it is both tasteless and inodorous. When decomposed by heat it no longer possesses digestive properties, and much of what is sold is almost or wholly inert. Pure pepsin is an artificial digestive.

Medical Properties and Action.—Pepsin is an essential constituent of the gastric juice, and digests the nitrogenous constituents of the food, converting them into peptones. Taken internally, as a medicinal preparation, pepsin increases the appetite and allays irritability of the stomach. It should be administered immediately before meals, and no hot food taken for some time afterward.

Therapeutic Uses.—Pepsin is employed in dyspepsia, gastralgia, obstinate vomiting, infantile diarrhœa, apepsia of infants, vomiting of pregnancy, cancer and chronic ulcer of the stomach, anæmia, chlorosis, atrophy, etc. Externally, it is injected into cancerous tumors and morbid growths with the hypodermic syringe, to retard their progress.

Dose.—Of pepsin suspended in syrup, saccharated pepsin—*Pepsinum saccharatum*—gr. v to gr. x. Syrup of orange peel

will disguise its odor. *Vinum Pepsini.* Dose, ℥ss to ℥j. *Glycerinum Pepsini.* Dose, ℥ss to ℥j.

Both the saccharated pepsin and the glycerole are unchangeable.

Pepsin appears to be especially efficient in cases of children; and when pepsin and a small quantity of hydrochloric acid are added to animal broths given by the rectum, in cases where food is rejected by the stomach, such nourishment is very beneficial.

Dental Uses.—In dental practice, pepsin is successfully employed in the treatment of putrid pulps of teeth, as an antiseptic and deodorizer. In the form of a thin paste made by mixing pepsin with water containing some two per cent. of hydrochloric acid, it is introduced into the pulp canal after the removal of the decomposed matter, and confined by a temporary filling in the crown cavity, being permitted to remain for twenty-four hours, when it is removed and the canal syringed with tepid water, and if necessary, the application of the pepsin paste repeated until the odor of decomposition can no longer be detected. Pepsin, in the form of the paste, is also applied to partially decomposed dentine, which may, for good reasons, be permitted to remain immediately over the pulp of the tooth, and the action of the pepsin is confined to dead matter alone. The hydrochloric acid and pepsin paste has also been recommended for devitalizing the pulps of teeth where rapid action is not desired, the quantity employed being about one-fifteenth of a grain.

DENTAL FORMULÆ.

For Suppurating Dental Pulps.

OAKLEY COLES.

℞. Acidi hydrochlorici . . . ♏j
Aquæ destillatæ . . . . ♏xl
Pepsini porci . . . . . q.s.
To make a paste

SIGNA.—To be applied to suppurating pulps.

For Indigestion.

MIALHE.

℞. Pepsini . . . . . ʒiss
Aquæ . . . . . fʒviss
Vini xerici . . . . . fʒxiiss
Alcoholis . . . . . fʒiij
Sacchari . . . . . ʒj.

SIGNA.—A tablespoonful immediately after each meal.

INGLUVIN is a ferment prepared from the gizzard of the chicken, and its effects are analogous to those of pepsin. It is employed internally for indigestion, etc., and to prevent nausea and vomiting.

Dose.—Of Ingluvin, grs. v to ℈j.

PEROXIDE OF HYDROGEN—HYDROGEN PEROXIDE.

HYDROGEN DIOXIDE.

Formula.—H_2O_2.

Derivation.—Peroxide of Hydrogen is obtained by rubbing up peroxide of barium with distilled water, so as to form a liquid paste, which is added gradually, with constant stirring, to distilled water acidulated with one-third of its weight of hydrochloric acid, contained in a vessel immersed in a freezing mixture. When the muriatic acid is saturated, a fresh quantity of the acid in a concentrated state is added, and then more of the peroxide of barium, and the operation repeated till the solution will hold no more chloride of barium, which is deposited by a mixture of ice and salt, except a small portion which is gotten rid of by adding sulphate of silver to precipitate the sulphate of baryta and chloride of silver. The filtered liquid is then concentrated by sulphuric acid, and the water rising in vapor is absorbed and protoxide of hydrogen is obtained nearly pure, in the form of a colorless liquid of a fluid consistence.

Medical Properties and Action.—Dr. B. W. Richardson, of London, found that peroxide of hydrogen imparts oxygen to venous blood deprived of its fibrin, with an increase of heat and a change of the color to red. Fibrin and cellular tissue cause it to evolve oxygen, while albumen, gelatin, urea, and cutaneous tissue have no effect upon it.

Topically, it acts by imparting oxygen to the diseased tissues, and thus destroying them. It arrests, immediately and definitely, all fermentation due to an organized ferment, and Bert and Reynard found, on the other hand, that soluble ferments do not seem to be affected by it; saliva, diastase, the gastric and pancreatic fluids, continue to act in solutions con-

taining peroxide of hydrogen. The conclusions, therefore, that these, as well as Péau and Baldy, have arrived at are that peroxide of hydrogen, even when very dilute, arrests fermentations due to the development of living organisms, and the putrefaction of all substances which do not decompose it; that, containing, according to circumstances, from two to six times its volume of oxygen, it is capable of advantageously replacing alcohol and carbolic acid; that it can be employed externally for dressing wounds and ulcerations of all natures, in injections and in vaporizations, and internally; that the results obtained in the case of the largest operations, up to the present, are in the highest degree satisfactory; that not only fresh wounds, but old ones, proceed rapidly to cicatrization, and reunion by first intention appears to be encouraged by its use as a dressing; that the general as well as the local state appears to be favorably influenced; that the advantages over carbolized water are its not having any poisonous effect nor unpleasant odor, while its application is entirely painless. It is an effective application in a large class of diseases in which mucous membrane tissue is chiefly affected, and for cleansing purposes is considered to be unequaled. Dr. Prince remarks that a drop of pus will decompose peroxide of hydrogen and liberate nascent oxygen, which adheres to and attacks all the adjacent tissues for which it has an affinity, and it thus becomes a powerful bacterial destroyer. Peroxide of hydrogen for surgical use must be entirely neutral, as that obtained generally often contains sulphuric acid, so that its use would not be without danger.

Therapeutic Uses.—Peroxide of hydrogen is employed as an internal remedy in low forms of fevers, chronic and subacute rheumatism, whooping cough, chronic bronchitis, dyspepsia, as it improves digestion, diabetes, etc., etc. Locally employed, peroxide of hydrogen is an effective antiseptic, and, according to Dr. Prince, owes its importance as a therapeutic agent to its instability, being decomposed, in the presence of a variety of agents, into water and oxygen. He considers peroxide of hydrogen to be inferior to iodoform as an antiseptic, but it resembles it in producing little or no irritation when used

about tender organs, and can be successfully applied in an unirritating form, so that it comes in contact with and destroys diseased germs; hence its applicability to dental uses, and in ocular and oral therapeutics, as in gonorrhœal ophthalmia and mastoid abscess, for example. Peroxide of hydrogen acts very promptly and beneficially in feeble, flabby, or ill-conditioned ulcers, chancre, and diphtheritic sores, ozæna, wounds, both fresh and putrid, etc., etc. Peroxide of hydrogen appears to have no injurious effect upon animal cells, but has a very energetic destructive action upon vegetable cells—microbes. It has no toxic properties, and is also harmless when given by the mouth. It is especially applicable in the treatment of diseases caused by germs if the microbian element is directly accessible, and is particularly useful in the treatment of infectious diseases of the mouth and throat.

To obtain the best results from peroxide of hydrogen, it should be kept in a cool place, tightly stopped, and when required for use as much as desired should be poured from a large bottle into a small receptacle, and only the quantity to be used at a time be exposed to the light. For injection, a small glass or rubber syringe should be used, as contact with metal destroys its utility.

As a test for peroxide of hydrogen Dr. Chas. Mayr suggests a paper saturated with a mixed solution of iodide of potassium and dithionate of soda. The peroxide of hydrogen liberates the iodine in the iodide of potash, but this liberated iodine is immediately seized by the dithionate of soda and a colorless solution is the result. But if enough of the peroxide is applied the blue spot will appear, because more iodine is liberated than can be used in oxidizing the dithionate of soda to tetrathionate of soda; to make the reaction more pronounced still, a little starch-paste is added. By this paper one drop of peroxide of hydrogen of 12 volumes of oxygen, produces a blue spot in 20 seconds; with six volumes in from one to two minutes; and with four volumes no blue spot is produced, only possibly a blue rim.

Dose.—Of peroxide of hydrogen, gr. iij to gr. v, containing

six times its volume of oxygen, or two per cent. In operations on mucous membrane, a strong solution of peroxide of hydrogen—twelve per cent.—greatly facilitates by decolorizing the blood and by its cleansing, styptic action.

Dental Uses.—Peroxide of hydrogen is a valuable remedy in dental therapeutics, especially in the treatment of alveolar abscess, alveolar pyorrhœa, ulcerations of oral mucous membrane, gangrene or cancrum oris, fungous growths, bleaching discolored teeth, putrescent pulps, etc., etc.

A twenty per cent. solution has been recommended for the arrest of hemorrhage after tooth extraction, by Mr. Bennett.

Dr. A. H. Prince's method of treatment, in the case of alveolar abscess, illustrates the properties of peroxide of hydrogen. "The septic abscess is caused to heal by one application made in the following manner: After removing the pulp and passing a broach through the canal of the root into the abscess cavity a drop of the liquid is injected by means of Farrar's syringe. The cavity of the crown is then immediately closed with softened gutta percha, before which, under pressure of the finger, the liquid is driven into the abscess cavity. Upon coming into contact with the pus in the fetid cavity, the liberated gas permeates it throughout, and by the continued evolution of the gas the cavity is emptied of its contents, which boil out at the fistulous opening so thoroughly mixed that the appearance is that of foam or froth; while the remnant thus removed is rendered so thoroughly antiseptic that the healing process proceeds uninterruptedly." Dr. A. W. Harlan has successfully employed the peroxide of hydrogen, in connection with iodide of zinc solution and other agents, in the treatment of alveolar pyorrhœa.

Dr. Harlan's treatment is as follows: First pack the pus pockets with iodoform and eucalyptus, iodoform and oil of cinnamon, or thoroughly syringe with a one to three grain solution to the ounce of water of chloride of alumina, a method which will relieve the suffering and reduce the swollen gums to their normal size. In three or four days the sanguinary deposits may be removed, and the edges of the alveoli scraped

or burred off. The pockets are then syringed with peroxide of hydrogen, and, after drying the gums, injected with one, two or three drops of a solution of iodide of zinc, grs. xii to the ounce of water. On the fourth day the gums are carefully dried, and a fine cone of cotton or bibulous paper moistened with peroxide of hydrogen, gently pressed into each pocket. If any effervescence occurs, it denotes the presence of pus, when each pocket should again be injected with the iodide of zinc solution. In chronic cases, after syringing with the peroxide of hydrogen, a stronger injection of the iodide of zinc (grs. xxiv to the ounce of water) is made, and in very bad or hopeless cases even a stronger solution of the zinc (grs. xlviii to the ounce of water); and when the gingival margins present a ragged border or cone-shaped slit, pure granular iodide of zinc is applied to such edges. The injection into the pocket is repeated every fourth day. In some cases constitutional treatment is also required. Peroxide of hydrogen has also been successfully used for bleaching discolored teeth, first adjusting the rubber dam and repeatedly washing out the cavity with the peroxide of hydrogen, and then carefully drying with the hot-blast syringe. A small quantity of chloride of alumina is then placed in the cavity and moistened with peroxide of hydrogen and allowed to remain for five minutes and then washed out with a clear solution of sodæ biboras.

To Render the Hands Aseptic.—Dr. Noble says: Trim the nails reasonably short, and clear the subungual spaces with the knife blade. Then thoroughly wash the hands and forearms in warm water, a good lather being made with soap, and a stiff brush vigorously applied. Renew the water three times. Next soak the hands in a saturated solution of oxalic acid. According to circumstances the finger tips are then soaked in peroxide of hydrogen. For the final bath, corrosive sublimate solution, 1 to 1000, is employed; allow the hands to remain in this solution three minutes.

Antiseptic and Stimulant Mouth Wash. For use in Alveolar Pyorrhœa, etc., etc.

DR. CHAS. B. ATKINSON.

℞. Hydrogen perox. . . . ℥iv
Tinct. calendulæ . . . ℥ij. M.

SIGNA.—Use daily.

For Alveolar Pyorrhœa.

DR. A. W. HARLAN.

℞. Hydrogen perox . . . . ℥j
Corrosive sublimate . . . ℥j. M.

SIGNA.—Inject into pockets until they are free of all foreign matter.

PHENACETINE—PARAACETPHENITIDINE.

Formula.—$C_6H_4{>}OC_2H_5$
$NH(CO-CH_3.)$

Medical Properties and Therapeutic Uses.—Phenacetine is slightly soluble in water, but freely soluble in alcohol, and has proven to be a most reliable antineuralgic without deleterious effects. It causes no nausea, vomiting or diarrhœa; no collapse, no cyanosis or depressing after effects. It is thought to produce its effects by slowly dissolving in the lactic acid of the stomach.

Prof. Rumpf considers phenacetine to be not a narcotic, but an antineuralgic acid from its strong antipyretic action.

The mode of action is probably a direct influence on the central nervous system—that of the vaso-motor more especially, for phenacetine acts especially on the vaso-motor neuroses, which indicates a powerful effect on the circulation. Phenacetine is a strong analgesic, and thought to be more powerful in its action than either antipyrine or antifebrin, and it acts very rapidly notwithstanding its insolubility in the gastric juice. About twenty minutes after its administration its effects may be observed. It is employed in the various forms of neuralgia, hemicrania, acute rheumatism, vaso-motor neuroses, neurasthenia, locomotor ataxia, etc., etc.

Dose.—As an antineuralgic the dose ranges from eight to twenty-two and a half grains (one-half to one and one-half grams). Fifteen grains is the average dose. Good results are obtained by administering phenacetine in gr. v doses, once in an hour until gr. xv-xx are taken.

Dental Uses.—Phenacetine is employed in neuralgias of dental origin, acute periodontitis, and pericemental irritation.

PHOSPHATES AND PHOSPHITES.

The Phosphates are ingredients of most of the animal and vegetable foods, and a sufficient amount of phosphorus is, under normal conditions, appropriated by digestive action for the supply of the system. Every part of the body contains phosphate of lime, and rickets and softening of the bones and defective teeth result when too little is supplied during the formative period. The blood, saliva, gastric juice, urine, milk and the entire intercellular fluid contain phosphate of lime in solution. When this agent is administered by the stomach, diffusion into the blood results as a consequence of its being to some extent soluble in lactic and hydrochloric acids; hence it is very essential to the nutrition of the body, and small doses are as effective as large ones, as all in excess of the quantity soluble in the acids of the stomach is not appropriated, but passes off or forms concretions in the intestines. Phosphate of sodium is also a constituent of the blood, and by removing morbid states of the mucous membrane it promotes digestion and improves nutrition and the tone of the nervous system. Large doses, on the other hand, when administered in health, will impair digestion. Phosphorus exists generally as a phosphate, and has a strong affinity for oxygen, compounds being rapidly formed in the stomach; but some of it may enter the blood uncombined. It is a powerful irritant poison, the dose being no larger than $\frac{1}{100}$ to $\frac{1}{20}$ of a grain.

The preparations of the Phosphates and Phosphites are:

Syrupus Calcii Lacto-phosphatis.—Syrup of the lacto-phosphate of lime. *Dose.*—f℥j to f℥j. (See Syrup of lacto-phosphate of lime.)

Compound Syrup of the Phosphates.—Each drachm contains two and a half grains of phosphate of iron and one grain of phosphate of lime.

Sodii Phosphas—Phosphate of Sodium.—In the form of large, colorless, transparent prisms, with a cooling saline taste, feebly alkaline and no odor, and a slightly alkaline reaction. Soluble in six parts of water at 60° F. and in two parts of boiling water. *Dose.*—f℥j to f℥j.

Calcii Phosphas Præcipitatus.—Precipitated Phosphate of Lime. In the form of a white powder, with no taste or odor and insoluble in water or alcohol. *Dose.*—Gr. ij to gr. v.

Syrupus Hypophosphitum.—Syrup of Hypophosphites. Composed of hypophosphites of calcium, sodium and potassium. *Dose.*—f℥j.

Sodii Pyrophosphas.—Pyrophosphate of Sodium. In the form of colorless, translucent prisms, with a cooling saline taste and a feeble alkaline reaction, but no odor, soluble in water, but insoluble in alcohol. *Dose.*—f℥ss to f℥ss.

Calcii Hypophosphis.—(See Hypophosphite of Lime.)

Sodii Hypophosphis—Hypophosphite of Sodium. In the form of small, colorless or white prisms, or a white granular powder with a sweetish saline taste, and a neutral reaction, and soluble in water. *Dose.*—Gr. v. to gr. x.

Therapeutic Uses.—The phosphates are useful in rickets, mollities ossium, non-union of fractures, soft teeth of children, caries and necrosis of bone, anæmia of nursing mothers, chronic bronchitis, leucorrhœa. The phosphate of soda in bilious sick headache, hepatic colic, jaundice, carbuncles, boils, etc., etc. The hypophosphites in phthisis, emphysema, fibroid lung, chronic tuberculosis, dilated bronchi, skin diseases, and all diseases characterized by mal-nutrition. Phosphoric and hypophosphoric acids are frequently combined with many vegetable and mineral tonics. The hypophosphites fulfill nearly all the indications of phosphorus itself.

PILOCARPUS—JABORANDI.

Source.—From the leaflets of the *Pilocarpus pennatifolius*, a Brazilian plant. The alkaloid on which the properties of the substance depends is *pilocarpine*, which combines with acids to form salts. Another alkaloid is *jaborine*, both having the same chemical composltion, $C_{11}H_{16}N_2O_2$, and pilocarpine "by heat, merely by concentration of an acid solution," is converted into jaborine; washing with absolute alcohol will separate them when united: The principal preparations are: Hydrochlorate of pilocarpine—*pilocarpinæ hydrochloras*,—which

is in the form of white crystals, deliquescent, with a slightly bitter taste, a neutral reaction, and no odor. It is very soluble in alcohol, but not soluble in ether or chloroform; and the fluid extract of pilocarpus—*extractum pilocarpi fluidum.* Belladonna and its alkaloid *atropine* are antagonistic to pilocarpine.

Medical Properties and Therapeutic Uses.—Large doses of crude jaborandi cause nausea and vomiting on an empty stomach, and the use of the alkaloid appears to have the same effect under similar circumstances. It increases the perspiration and saliva, Ringer stating that the secretion of the salivary glands is augmented as much as twenty-seven fluid ounces as the result of a full dose. The nauseating effects of the alkaloid pilocarpus appear to depend upon its action on the muscular layers of the stomach and intestines; and the increased secretion of the mucous membrane doubtless results from the stimulation of the pancreas and the glands of the mucous membrane.

Children do not appear to experience its influence to the same degree, in regard to salivation, perspiration and temperature, as do adults. As a general rule, drowsiness follows the profuse perspiration, and pallor the flushings caused by the drug: and the languor and debility it occasions continue for some hours. The pupil of the eye is contracted, but this organ generally recovers from its diminished vision after the space of one hour and a half. Jaborandi is employed in dropsies of the heart and kidneys, mumps, diseases of the eye, to increase the secretion of milk, diabetes insipidus, diphtheria, skin diseases, etc. It is also employed in ptyalism with advantage, in the form of the hydrochlorate of pilocarpine, one-third of a grain three or four times daily.

Dose.—Of Infusion, *Infusum Pilocarpi*, ℥ss to ℥ij. Of Fluid Extract—*Extractum Pilocarpi Fluidum*, ℥ss to ℥ij. Of Tincture—*Tinctura Pilocarpi*, ℥ss to ℥ij. Of Hydrochlorate—*Pilocarpinæ Hydrochloras*, gr. $\frac{1}{12}$ to gr. ss.

PINUS CANADENSIS—ABIES CANADENSIS,

Hemlock, hemlock spruce of the United States and Canada. The medicinal portions are the juice and bark. The concrete juice, which is known as *Pix Canadensis*—Canada pitch, is a yellowish or faintly greenish, transparent, viscid liquid, when fresh, but afterward becomes an opaque, reddish-brown, hard and brittle mass, which contains resin and a volatile oil. It is used to make rubefacient plasters. The bark is rough and deeply furrowed, and is very astringent, possessing properties similar to those of the white-oak bark. An extract prepared from the bark is used as a topical astringent, but it is not considered to have any advantages over other common vegetable astringents

For Inflamed Mucous Membrane, and for Use after the Removal of Salivary Calculus.

A. W. HARLAN.

℞. Pinus canadensis (white) . . . . . ℥ss
Aquæ rosæ . . . . . ℥iijss
Eugenol . . . . . ♏xxx. M.

SIGNA.—Use as a lotion or on a tooth-brush, three times daily.

PISCIDIA ERYTHRINA—JAMAICA DOGWOOD.

Source.—Jamaica Dogwood is a plant indigenous to the West Indies, where it has been used as an intoxicant in taking fish. The bark is the officinal portion, and is smooth and bright-colored.

Medical Properties and Action.—Jamaica dogwood is a powerful narcotic, and, in a measure, tonic and diuretic. Its narcotic properties are supposed to be superior to opium, as it does not cause the disagreeable after-effects common to that drug. When chewed, Jamaica dogwood has an unpleasant, acrimonious taste. It yields its virtues to alcohol, but not to water. Its internal use is generally followed by a sensation of heat, gradually extending to the surface, and succeeded by profuse perspiration, with profound sleep. In large doses it produces general paralysis, and death from asphyxia. It has

been used as a substitute for morphine, which it resembles in many respects.

Therapeutic Uses.—The principal use of Jamaica dogwood is in neuralgia, in the form of a tincture composed of Jamaica dogwood ℥j, rectified spirits f℥iv. It is effectual in acute pains usually, and is said to be efficacious in lunacy, and cough of phthisis.

Dose.—Of the tincture of Jamaica dogwood, f℥j.

Dental Uses.—Jamaica dogwood, in the form of the tincture, is efficacious in trigeminal neuralgia, and in odontalgia resulting from an irritable pulp, for which purposes a fluid drachm in cold water may be taken internally, and externally in the case of odontalgia, introduced on a dossil of cotton into the carious tooth.

PLUMBI ACETAS—ACETATE OF LEAD.

SUGAR OF LEAD.

Formula.—$Pb2C_2H_3O_2$, $3H_2O$.

Derivation.—Acetate of Lead is obtained by immersing lead in distilled vinegar, or litharge in pyroligneous or crude acetic acid; when the acid has become saturated, the solution is permitted to cool and crystallize.

Acetate of lead is a white salt, in the form of beautiful, brilliant, needle-shaped crystals, like long prisms, which effloresce on exposure to the air. It has a sweet, astringent taste, and an odor of acetic acid, and is soluble in water and alcohol.

Medical Properties and Action.—Acetate of lead is sedative and astringent, checking the secretions and reducing the activity of the capillary system, and diminishing the force and frequency of the pulse. Like all the salts of lead, it is an irritant and corrosive poison, causing gastro-enteric inflammation. It requires, however, a large quantity (not less than half an ounce) of the acetate of lead to destroy life, as much of it is rejected by vomiting. The symptoms of lead poisoning, when the lead is slowly introduced into the system, are loss of appetite and strength, wasting of flesh, paleness of the face, con-

stipation, pain in the joints, dry colic, which is relieved by pressure, neuralgia of the abdominal muscles, contraction of the intestines, belly drawn toward the spinal column, contraction of the liver, jaundiced skin, yellow conjunctiva, urine colored with biliary coloring matter, a blue line along the margin of the gum, about the incisor teeth; also at times a bluish discoloration of the mucous membrane of the lips and mouth, dimness of vision, paralysis of the extensor muscles of the fingers and arms, death resulting from the gradual failure of nutrition and the paralysis of the muscles of respiration.

When the poisonous dose is large, there is intense gastric irritation, numbness, paralysis, coma and collapse. Iodide of potassium in large doses, also Epsom salts and sulphur baths, are the antidotes in chronic cases of lead poisoning, and for the lead colic, alum in doses of one or two drachms every three or four hours, dissolved in some demulcent liquid, is considered to be the best remedy. For the treatment of lead paralysis, strychnia and electricity are employed. The blue or slate-colored line on the gums is supposed to be due to a deposition of the sulphide of lead.

Therapeutic Uses.—Acetate of lead is internally administered in dysentery, diarrhœa, cholera, cholera morbus, phthisis, chronic bronchitis, pneumonia, diseases of the heart, hemorrhage from the lungs, stomach, kidneys, nose, etc.; diseases of the eye, erysipelas, skin diseases, chronic gastric catarrh, gastralgia, pyrosis, summer diarrhœa of children, humid asthma, whooping cough, etc.: but the danger of producing toxic effects must be remembered in its internal use.

Externally, solutions of lead are employed to relieve superficial inflammations, arrest morbid discharges, and allay the pain of acute inflammations. Lead should not be given with natural waters containing lime, carbonic acid, mineral acids and salts, vegetable acids, or vegetable astringents, iodide of potassium, and preparations of opium.

Dose.—Of plumbi acetas, gr. ss or j to gr. v, two or three times a day.

LIQUOR PLUMBI SUBACETATIS DILUTUS—*Diluted Solution of Subacetate of Lead.—Lead water* is composed of subacetate of lead solution, f℥ij; distilled water, Oj; and is a mild astringent and sedative when applied externally; it is never prescribed internally. It arrests discharges from suppurating and ulcerated mucous surfaces, and promotes the resolution of acute superficial inflammations.

Dental Uses.—Lead water is employed in dental practice, to relieve inflamed gums and mucous membrane of the mouth; as an application to indolent and foul ulcers; also in the treatment of teeth after the devitalization and removal of the pulps, to prevent peridental trouble.

It proves serviceable when applied to chapped hands and lips. A good ointment for such a purpose is composed of a combination of lead water, camphor, white wax and oil of almonds.

DENTAL FORMULÆ.

For Acute Inflammation of the Mucous Membrane of the Mouth and the Gums.

℞. Plumbi acetatis . . . ʒj
Tinct. opii . . . . . ℥ss
Aquæ . . . . . ℥x. M.

SIGNA.—Apply as a lotion, on lint.

For Periodontitis.

McQUILLEN.

℞. Liq. plumbi subacetatis ℈j
Tinct. opii . . . . ʒij. M.

SIGNA.—Apply to cavity on cotton and to gum externally.

For Chapped Hands and Lips.

℞. Liq. plumbi subacetatis dilutus . . . . . ℥vj
Camphoræ . . . . . gr. xl
Ceræ albæ . . . . . ℥viij
Olei amygdalæ dulcis. Oj. M.
Fiat cerat.

SIGNA.—Apply as an ointment.

For Inflamed Gums and After Tooth Extraction.

℞. Plumbi acetatis . . . gr. xv
Tinct. opii . . . . . fʒij
Aquæ . . . . . fʒiij. M.

SIGNA.—Use as lotion and mouth-wash.

PODOPHYLLUM—MAY APPLE.

Source.—The rhizoma and rootlets of *Podophyllum peltatum*, or May Apple. It contains the alkaloid *berberine*, which is also peculiar to other plants, and two resinous substances soluble, one in alcohol and ether and the other in alcohol only, and on which its medicinal properties depend. Both are purgatives. It has a bitter taste, with a sense of acidity.

Medical Properties and Therapeutic Uses.—Podophyllum is a useful cathartic and cholagogue. In cases of constipation, due to deficient secretions of the intestinal canal and liver, it is a useful cathartic, and for habitual constipation small doses combined with belladonna are very effective. It is also employed in catarrhal and malarial jaundice, ascites, hemorrhoids, bleeding from stasis of the portal circulation, and torpidity of liver, as a substitute for calomel and blue mass. It is slow in its action and is therefore often combined with other cathartics. *Podophyllin* is the *resina podophylli.*

Dose.—Of *Resina Podophylli*—Resin of podophyllum, gr. ¼ to gr. j. Of *Extractum Podophylli Fluidum*—Fluid extract of podophyllum, ♏j to ʒss. Of *Abstractum Podophylli*—Abstract of podophyllum, gr. ¼ to gr. j.

POTASSA CAUSTICA—CAUSTIC POTASH.

HYDRATE OF POTASH—FUSED POTASH—OXIDE OF POTASSIUM.

Formula.—HKO.

Derivation.—Caustic Potash is prepared by boiling a solution of potash until ebullition ceases, and the potassa melts or assumes a solidified consistence, when it is poured into suitable moulds and kept in well-stoppered bottles, as it rapidly deliquesces when exposed to the air. It dissolves in water and alcohol, and attracts moisture. Its officinal form is that of sticks of a white and somewhat transparent color, but upon exposure to the air, or if it is impure, it becomes a dingy gray, greenish or bluish color, and has the odor of slaking lime. When it is digested in alcohol, so as to free it from such impurities as are insoluble in alcohol, it is called *alcoholic potassa.*

Medical Properties and Action.—Caustic potash is the most powerful caustic and escharotic in use, and, when taken internally, is a corrosive poison. It is only employed externally. When applied to a part, it rapidly destroys its vitality to a considerable depth, differing in this respect from nitrate of silver (lunar caustic), as the latter is more limited in its action, and does not liquefy when it comes in contact with the tissues.

From the penetrating action of caustic potash, it is necessary to use it with great care. It is very deliquescent, which is a great objection to its use in some cases, but when mixed with an equal quantity of lime, the deliquescent action is in a measure prevented; it is then known as *potassa cum calce*—potassa with lime, and is in the form of a grayish-white powder, which is sometimes made into a paste, under the name of *Vienna Paste*, which is milder and less deliquescent.

Therapeutic Uses.—Caustic potassa is chiefly employed to open abscesses, and in the treatment of chancres, hospital gangrene, eczema, malignant growths, to arrest the sloughing of carbuncles; in tetanus, applied to the spine; bites of rabid animals and venomous reptiles; phlegmons and incipient carbuncles, to arrest their progress; to form issues, etc. To prevent its coming in contact with neighboring parts, a piece of adhesive plaster is used, with an opening corresponding in size to the surface on which the caustic is to act. When mixed with water, in the proportion of caustic potash, ℥iss to water, f℥ij, it forms a rubefacient solution.

Dental Uses.—In dental practice, caustic potassa is employed in gangrene of the mouth (cancrum oris), malignant growths, fungous growths of gum, ulcers, etc.; for opening abscesses, when it is not prudent to use the lancet.

POTASSIUM BICARBONAS—BICARBONATE OF POTASSIUM.

Formula.—$KHCO_3$.

Derivation.—Bicarbonate of potassium is obtained by passing carbonic acid through an aqueous solution of carbonate of potassium, until it is completely saturated. The solution is then filtered and evaporated, the product being bicarbonate of potassium, in the form of transparent, colorless crystals, of the shape of irregular eight-sided prisms. It is inodorous, with a saline and somewhat alkaline taste, and is soluble in water, but insoluble in alcohol. Its incompatibles are acids and acidulous salts, etc.

Medical Properties and Action.—Bicarbonate of potassium

is antacid, diuretic and antilithic. In large quantities it is a corrosive poison.

Therapeutic Uses.—It is employed internally in acute rheumatism, gout, and uric acid lithiasis, diseases of the skin, calculous affections, etc., etc.

Dose.—Of bicarbonate of potassium, gr. v to ℈j.

Dental Uses.—Bicarbonate of potassium is employed in dental practice, as an antacid, a solution being serviceable as a mouth-wash, to prevent injury to the teeth from acid medicines.

DENTAL FORMULÆ.

For Facial Neuralgia.

WALES.

℞. Potassii bicarb . . . . ℥ss
Ext. ergotæ fluidi . . . f℥j
Infusi ergotæ . . . . . f℥vj. M.

SIGNA.—Two tablespoonfuls every four hours.

For Neuralgia.

J. E. GARRETSON.

℞. Ferri sulphatis exsic.
Potassii carbonatis. āā . gr. ccl
Syrup acaciæ . . . . . q.s. M.
Ft. pil. No. 100.

SIGNA.—Begin with three a day and increase to six; take several hundred.

POTASSI BROMIDUM—BROMIDE OF POTASSIUM.

Formula.—KBr.

Derivation.—Bromide of Potassium is obtained by adding a solution of pure carbonate of potassium to a solution of bromide of iron. The iron being precipitated, the bromide of potassium is obtained from the solution by evaporation. It is in the form of white crystals, without odor, wholly soluble in water, and but sparingly soluble in alcohol, and having a pungent, saline taste.

Medical Properties and Action.—Bromide of potassium is stimulant, sedative, narcotic and antispasmodic, and, being absorbed into the system, can be detected in the blood, urine, fæces and mucus. If administered in considerable quantity, the action of the heart, respiration, and the temperature are depressed, and although in some cases a transient excitement may be caused by large doses, the effect of this agent is to induce a sound and refreshing sleep, and if its use is long continued, a constant drowsiness is experienced. Bromide of

potassium has also the power of lessening the sensibility to pain, especially causing a loss of sensibility of touch in the case of the mucous membrane and skin, which is due to the local action of the salt as it is eliminated, The long-continued use of this agent also causes a loss of motion, and if it is injected into the tissues of a limb, it will cause paralysis of motion and sensibility. It also diminishes the sexual feeling, and the condition which a long course of the bromides develop is known as *bromism*, which is characterized by weakness of mind, confusion, headache, pallor and anæmia, uncertain gait, etc.

Therapeutic Uses.—Bromide of potassium is employed as an internal remedy in cerebral affections, acute rheumatism, cholera infantum, sea-sickness, vomiting of pregnancy; affections of the heart, as shown by increased action; neuralgia, maniacal excitement, tetanus, strychnia poisoning, epilepsy, spasmodic asthma, spasmodic cough, etc., etc.

Dose.—Of bromide of potassium, gr. v to ℥j.

Dental Uses.—Bromide of potassium is a useful remedy in infantile convulsions from the irritation of dentition, and is also efficacious in preventing such conditions by relieving the irritation; also in neuralgia, due to diseased teeth, and in facial neuralgia when congestive in character.

As its local effect is to diminish sensibility, it has been applied to the pharynx and velum palati, in order to prepare such parts for the taking of impressions for artificial palates, and to overcome extreme susceptibility of the mucous membrane of the roof of the mouth in first wearing artificial dentures. For such purposes the agent is administered in one-half drachm doses 3 times daily for two or three weeks previously; or doses of grs. xx to xxx may be given, repeated two or three times.

DENTAL FORMULA.

For Infantile Diarrhœa from Reflex Nervous Impressions.

DR. JAS. W. WHITE.

℞. Potassi bromidi . . . . . gr. xviij to ℥ss
Potassi nitratis . . . . . gr. vj.
Sacchari lactis . . . . . ℥ss. M.

Ft. pulv. vj. S.—One powder every 3 or 4 hours to a child one year of age.

POTASSII CHLORAS—CHLORATE OF POTASSIUM.

Formula.—$KClO_3$.

Derivation.—Chlorate of Potassium is obtained by passing an excess of chlorine through a solution of carbonate of potassa and slaked lime; the chlorine being converted into chloric acid by the hydrogen of the lime and the acid combining with the potassa, forming chlorate of potassium. It is in the form of colorless or white crystals, of a pearly lustre, altogether soluble in distilled water, and in twelve parts of cold and two parts of boiling water. It is inodorous, with a cool, saline taste, and when applied to animal fluids does not decompose them nor undergo any change, although perfectly soluble in such fluids. It is absorbed by the blood, and is eliminated by the kidneys.

Medical Properties and Action.—Chlorate of Potassium is detergent, refrigerant, diuretic and stimulant, and its action as a refrigerant and diuretic is similar to that of nitrate of potassa. It improves the appetite, and on account of the large quantity of oxygen it contains has been employed in contaminated conditions of the blood as an oxidizing agent. Although it may be administered with impunity in very large doses, yet excessive quantities have given rise to gastro-enteric inflammation, with fatal effects.

Therapeutic Uses.—Chlorate of potassium is employed in continued and typhoid fevers, neuralgia, croup, diphtheria, sore throat, chronic bronchitis, phthisis, scrofula, erysipelas, scurvy, mercurial salivation, etc., etc. Externally, it is employed in the treatment of ozæna, sore throat of scarlatina, pharyngitis, cancerous sores, ulcerated surfaces, fetid and scrofulous ulcers, etc., etc. Poisonous symptoms have resulted from the habitual use of chlorate of potassium, and several cases of death have been recorded.

Dose.—Of chlorate of potassium, gr. v to ℈j, every three or four hours; for children, gr. iij in sweetened water every four hours for a child three years of age; gr. v for one of eight or nine years, with due attention to the bowels and constitution,

regulating the former and supporting the latter. In the case of teething children, gr. ij may be administered to a child of one year of age.

Troches of Chlorate of Potassium are prepared by a combination of chlorate of potassium, ℥v; sugar, ℥xviij; tragacanth, ℥ij; vanilla, gr. xxx; mixed together with water into a mass and divided into 480 troches, each of which contains gr. v. of chlorate of potassium; useful for sore throat, etc.

Dental Uses.—Chlorate of potassium is a valuable agent in dental practice as an internal and external resolvent and detergent remedy in the various forms of stomatis,—inflammation of the gums, aphthæ and other ulcerative affections, gangrenous stomatitis, mercurial stomatitis, erysipelatous inflammation of the mouth, scurvy, ulcers of the gums, cheeks and tongue, abraded surfaces of mucous membrane, secondary syphilitic ulcerations of the mouth, indolent and scrofulous ulcers, etc., for such purposes being used alone in the form of mouth-washes or gargles, or in combination with tannic acid, alum, borax, glycerine, etc. In the treatment of mercurial stomatitis, great benefit is derived from both its internal and external use. For the inflamed gums of teething children it is employed as a lotion, with beneficial effects. In the form of powder it is a useful application to ulcerated and abraded surfaces. A simple gargle or mouth-wash may be made by dissolving one drachm of chlorate of potassium in four ounces of water, or half an ounce may be dissolved in a pint of water.

DENTAL FORMULÆ.

For Inflamed Gums After the Extraction of Teeth.

℞. Potassii chloratis . . . ℥ij
Tincturæ krameriæ,
Glycerini . . āā . . . f℥ss
Aquæ rosæ . . . . . ℥viij. M.

SIGNA.—To be used as a gargle 6 or 8 times daily, to harden the gums.

For Ulcers and Suppurating Wounds.

℞. Potassii chloratis . . . ℥j
Glycerini . . . . . ℥iss M.

SIGNA.—To be used as a lotion.

For Aphthous and Secondary Syphilitic Ulceration of the Mouth and Fauces.

℞. Potassii chlorat . . . . ℥iv
Aquæ destillatæ . . . . ℥x. M.

SIGNA.—To be used as an antiseptic mouth wash.

For Ulceration of the Mouth.
BARTHOLOW.

℞. Potassii chloratis . . . ℥j
Acidi carbolici . . . . ℥ss
Aquæ destillatæ . . . . ℥iv. M.

SIGNA.—To be used as a lotion.

For Ulceration and Inflammation of the Gums and Mucous Membrane.

STOCKEN.

℞. Potassii chloratis . . . ℥ij
Sodii biboratis . . . . ℥j
Potasii nitratis . . . . ℥ss
Aquæ destillatæ . . . . ℥viij. M.

SIGNA.—To be used as a gargle.

For Inflammation of Gums and Mucous Membrane.

STOCKEN.

℞. Potassii chloratis . . . ℥ij
Sodii biboratis . . . ℥j
Potassii nitratis . . . . ℥ss
Tinct. arnicæ . . . . . ℥ij
Aquæ rosæ . . . . . ℥vij. M.

SIGNA.—To be used as a gargle.

For Inflamed Gums, Mucous Membrane, etc.

℞. Potassii chlorat . . . . ℥j
Sodii biboratis . . . . ℥j
Aquæ destillatæ . . . . ℥ij. M.

SIGNA.—To be used as a mouth wash or gargle.

For Inflamed Gums and Mouth.

℞. Potassii chlorat . . . . ℥ij
Pulv. aluminis . . . . ℥ij
Aquæ destillatæ . . . . ℥x. M.

SIGNA.—To be used as a gargle.

For Inflamed Mucous Membrane.

℞. Potassii chlorat . . . . ℥j
Aluminæ Sulph . . . . ℥j
Aquæ destillatæ . . . . ℥iv. M.

SIGNA.—To be applied as a mouth wash.

For Periodontitis.

℞. Potassii chlorat . . . . ℥j
Plumbi acetas . . . . ℈j
Aquæ font . . . . . ℥ij. M.

SIGNA.—To be used as a mouth wash.

For Ulceration of Gums and Mucous Membrane of Mouth.

℞. Potassii chloras . . . . ℥ij
Aquæ . . . . . ℥v. M.

SIGNA.—A tablespoonful three times a day; also as a gargle four or five times a day.

POTASSII NITRAS—NITRATE OF POTASSIUM.

SALTPETRE—NITRE.

Formula.—KNO_3.

Derivation.—Nitrate of Potassium is obtained in the native state in various portions of the world; but the variety employed for medicinal purposes is prepared by purifying the native production of India. It can also be artificially made by combining decayed organic animal and vegetable matters, or by the double decomposition of nitrate of sodium and chloride of potassium. The crude nitre is refined by re-solution and crystallization. It is in the form of white, crystalline, six-sided prisms, odorless, with a sharp, saline, cooling and slightly bitter taste, wholly soluble in water, but insoluble in alcohol.

Medical Properties and Action.—Nitrate of potassium is refrigerant, sedative, antiseptic, diuretic and diaphoretic. It

promotes the secretions, lessens the heat of the body and the frequency of the pulse. For allaying febrile excitement it is frequently employed in the form of *nitrous* powders (nitre, gr. x; tartar emetic, gr. ⅛; calomel, gr. ¼ to ½).

In overdoses, nitrate of potassium causes pain and heat in the stomach, vomiting and purging of blood, inflammation of the bowels, great prostration, convulsions, and sometimes death.

The antidotes are emetics, mucilaginous and demulcent drinks, and stimulants to sustain the sinking powers of the system.

Therapeutic Uses.—Nitrate of potassium is employed internally as a refrigerant in febrile affections; in inflammatory diseases, acute rheumatism, scurvy, purpura, hæmoptysis, passive hemorrhages, asthma, etc. In fevers it is frequently combined with other remedies. The vapor is used in spasmodic asthma.

Dose.—Of nitrate of potassium, gr. ij to gr. x.

Dental Uses.—In dental practice, nitrate of potassium has been recommended in the incipient stages of alveolar abscess being introduced into the pulp canal and secured by a temporary filling in the crown cavity of the tooth. It is also employed in inflammatory conditions of the mucous membrane of the mouth and throat in the form of gargles.

DENTAL FORMULÆ.

For Inflammation of the Mouth and Throat.

J. W. WHITE.

℞. Potassii nitratis . . . ℥ij to ℥iv
Aquæ destillatæ . . . Oj. M.
SIGNA.—To be used as a gargle.

For Inflamed Mucous Membrane and Gums.

℞. Potassii Nitratis . . . ℥ss
Potassii chloratis . . . ℥ij
Sodii biboratis . . . ℥j
Aquæ destillatæ . . . ℥viij. M.
SIGNA.—To be used as an antiseptic and refrigerant mouth wash.

POTASSII PERMANGANAS—PERMANGANATE OF POTASSIUM.

Formula.—$K_2Mn_2O_8$.

Derivation.—Permanganate of potassium is obtained by the mixture of equal parts of black oxide of manganese and chlorate of potassium, with a slight excess of caustic potassa, dissolving in water, and evaporating to dryness, when it is

exposed to a nearly red heat; the chlorate of potassium yields oxygen, which changes the black oxide of manganese into permanganic acid, and this acid, combining with the potassa, gives as a product the permanganate of potassium. It is in the form of dark purple, slender, prismatic crystals, inodorous, very soluble in water, forming a solution of a beautiful lilac color, even in very minute proportion, and with a sweet, astringent taste.

Medical Properties and Action.—Permanganate of potassium, when taken internally, is supposed to oxidize the blood. It is a stimulant, mild escharotic, and is a powerful disinfectant, as it has a remarkable power of destroying fetid odors from organic sources, and proves useful in preventing the spread of infectious disease. It yields up its oxygen readily, in the form of ozone, and its use depends upon this property. It is instantly decomposed on reaching the stomach.

Therapeutic Uses.—Permanganate of potassium is employed with advantage in dyspepsia, flatulence, excessive deposition of fat, uric acid diathesis, acute rheumatism, diabetes, scarlatina, petechial fever, spinal meningitis. Condy's Fluid is a favorite preparation with some, for both internal and external use. The most important uses for permanganate of potassium are externally, as a deodorizer and disinfectant, to correct the fetor of cancer, abscesses, ulcers, caries of bone, ozæna, otorrhœa, gonorrhœa, leucorrhœa, ulcerated sore throat, etc., in the form of injections, lotions and spray. It is also used externally in the treatment of diphtheria, in the proportion of a drachm of Condy's Fluid to the ounce of water. In solution, permanganate of potassium is applied in varying strength, according to the effect desired. As a local stimulant, as well as deodorizer, it is useful in chronic and indolent ulcers, carbuncles, hospital gangrene, etc. The powder may be sprinkled on gangrenous surfaces. In concentrated solution permanganate of potassium acts as a caustic. A strong solution is composed of 10 parts dissolved in 90 parts of water, and is employed in its full strength in cancerous, phagedenic and atomic ulcers. For dressing simple wounds, or as an injection

in abscesses, ozæna, leucorrhœa, etc., half a fluid ounce of the solution may be added to a pint of water; in gangrenous and diphtheritic wounds and scrofulous ulcers, a fluid ounce of the solution to a pint of water.

Dose.—Of permanganate of potassium for internal use, gr. ¼ to gr. j, three times a day. *Condy's Fluid* is composed of 32 grains of permanganate of potassium in one pint of distilled water; half a fluid ounce contains one grain. Dose of Condy's Fluid, ♏v. For external application, f℥j, to water, f℥ v to x. Solution of permanganate of potassium—*Liquor Potassii Permanganatis*, is composed of 64 grains of permanganate of potassium to one pint of distilled water. M. de Lacerda has recently discovered that permanganate of potassium is one of the most energetic antidotes to the venom of snakes.

Dental Uses.—In dental practice the permanganate of potassium is employed in the treatment of fetid and gangrenous ulcerations of the mouth, such as cancrum oris, foul abscesses, ulcerations of mucous membrane attended with fetid discharges, offensive breath; as an antiseptic for decomposing pulps of teeth (grs. ij to water ℥j); in diseases of the antrum, such as abscess, and caries and necrosis of the maxillary bones, Riggs' disease, ulcers of the mouth, pyorrhœa alveolaris, etc. (grs. x to water ℥j). The powdered crystals introduced into a carious cavity will relieve odontalgia. The stains of permanganate of potassium can be removed by dilute hydrochloric acid.

DENTAL FORMULÆ.

For Unhealthy Ulcers of the Mouth, and Offensive Breath.

J. W. White.

℞. Potas. permanganatis . ℈j to iv
Aquæ destillatæ . . Oj. M.

Signa.—To be used as a gargle.

For Gangrenous Ulceration of the Mouth—Cancrum Oris.

℞. Potassii permanganatis . gr. xxx
Aquæ destillatæ . . . ℥j. M.

Signa.—Apply as a lotion.

For Fetid Perspiration and Foul Breath.

℞. Potassii permanganatis . gr. j
Aquæ destillatæ . . . f℥j. M.

Signa.—To be used as a lotion and gargle.

For a Disinfectant in Mercurial Salivation.

℞. Potassii permanganatis gr. xv
Aquæ destillatæ . . . f℥viij. M.

Signa.—Use as a gargle

For Ulcers, Abscesses, Decomposing Pulps of Teeth, etc.

℞. Liquoris potassii permanganatis . . . . . ℥j
Aquæ destillatæ . . . . . ℥vj to x. M.
SIGNA.—To be used as a gargle or as an injection.

PRUNUS VIRGINIANA—WILD CHERRY.

Source.—Prunus Virginiana is obtained from the bark of the Prunus Serotina, and is composed of amygdalin an emulsion, from which, by their reaction, tannic, gallic and hydrocyanic acids are produced. The preparations of wild cherry are: *Infusum Pruni Virginianæ*—Infusion of wild cherry; *Extractum Pruni Virginianæ Fluidum*—Fluid extract of wild cherry; *Syrupus Pruni Virginianæ*—Syrup of wild cherry.

Medical Properties and Therapeutic Uses.—Wild cherry is an aromatic bitter stomachic, tonic and expectorant. It is employed as a stomachic, tonic and in catarrhal conditions of the bronchial mucous membrane, phthisis, etc. The syrup forms one of the ingredients of many cough mixtures.

Dose.—Of tincture of wild cherry, ℥ss to ℥ij; fluid extract, ℥ss to ℥ij; infusion, ℥ss to ℥j.

PYOKTANIN—METHYL-VIOLET.

Derivation.—Pyoktanin is only a name applied to the well known aniline color methyl-violet, an aniline dye, which is in the form of a paste and in crystals.

It is without color, but slightly irritant, and non-intoxicating. It has been employed in the form of powder, solution and pencil. The powder is made by mixing 2 parts of pyoktanin or methyl-violet with 100 parts of talc or other inert substance. The solution is of any strength from 1 part in 100 to 1 in 2000. Pyoktanin is also used in the form of ointment containing from 2 to 10 per cent. There is also another aniline color—the yellow— to which the same name has been given; but the violet is the stronger.

Medical Properties and Therapeutic Uses.—Pyoktanin is considered by many to be an efficient germicide. According to Fessler, the micro-organisms of pus are destroyed by it in fifteen minutes when the solution is of the strength of 1 to 1000.

This action is, however, denied by Trojé, who considers pyoktanin to be less powerful than bichloride of mercury, or even carbolic acid. It does not coagulate albumen, and when applied to the eye causes dilatation of the pupil without paralysis of accommodation. Pyoktanin is employed topically to disinfect suppurating or ulcerated wounds, to stimulate chronic ulcers. As an application to open buboes, boils, carbuncles, chancroids, etc.; also in the form of weak solution in gonorrhœa, and chronic cystitis. And as a dusting powder in moist eczema, and also in other affections of the eye, the ear, nose and throat.

It has no odor, and in this respect is preferable to iodoform, but it stains the skin; the discoloration may be removed by cologne water, alcohol, dilute hydrochloric or nitric acids.

Dental Uses.—Pyoktanin is employed in dental practice in all cases where ordinary antiseptics are indicated, as in gangrenous pulps, root-canals, disinfecting cavities before filling, alveolar abscess, etc.

PYRETHRUM—PELLITORY.

Source—Pyrethrum is a native of the Mediterranean coast, and the root is the medicinal portion—*pyrethri radix*, in the form of cylindrical, wrinkled pieces, of the size of the little finger, hard and brittle, which, when dried, has little or no odor. Externally, it is of an ash-brown color, within white, and possesses an extremely acrid taste, with a burning and tingling sensation over the whole mouth and throat, which continues for some time, and excites a copious flow of saliva.

Medical Properties and Action—Pyrethrum root is an irritant and sialagogue, and when it is rubbed on the skin it causes much irritation, and may even excite inflammation.

Its activity depends upon an acrid oil and a compound resin called *pyrethrin.* It is rarely used internally, and only as a masticatory.

Therapeutic Uses.—Pyrethrum has been employed as an excitant in paralysis of the tongue and muscles of the throat, relaxed sore throat, spontaneous salivation, certain forms of

headache; for such purposes being chewed, or employed in the form of a gargle, in tincture or decoction.

Dose.—Of pyrethrum as a masticatory, gr. xv to ℥j. *Tinctura Pyrethri*, TINCTURE PYRETHRUM, is composed of pyrethrum ℥iv, rectified spirit Oj.

Dental Uses.—Pyrethrum is employed in dental practice for neuralgic affections of the face, for which it is chewed; for the relief of odontalgia, in the form of the tincture applied to the irritable pulp on a pellet of cotton; as a stimulant to the gums and mucous membrane of the mouth in relaxed conditions; for obtunding sensitive dentine, in the form of a strong alcoholic extract. The *ethereal oil of pyrethrum* is recommended as a pleasant and efficacious remedy in odontalgia, applied in the same manner as the tincture; the fluid extract is also employed as an ingredient for local anæsthetic preparations, combined with chloroform, ether and lavender. (See Chloroform.)

DENTAL FORMULA.

For Relaxed Conditions of Mucous Membrane of Mouth and Gums.

℞. Tinctura pyrethri . . . . . f℥ iij
Aquæ . . . . . ℥ viij. M.

SIGNA.—To be used as a stimulant gargle.

QUERCUS ALBA—WHITE OAK.

Source.—White oak, the dried inner bark of which is the medicinal portion, is a common tree of the natural order *Amentaceæ*. The bark has a light-brown color, fibrous texture and an astringent, bitter taste. Its medicinal virtues depend upon the presence of tannic and gallic acids, and a bitter principle known as *quercin*. Water and alcohol form with it decotions and tinctures.

Medical Properties and Action.—White oak bark is tonic, astringent and antiperiodic. It is principally used as an external application.

Therapeutic Uses.—White oak bark is employed internally in the treatment of diarrhœa, dysentery and hemorrhoids. Externally in relaxation of the uvula, tonsils, etc.; gangrene, indolent ulcers, leucorrhœa, atonic menorrhagia, fissure of the

anus, etc., etc., in the form of tincture, decoction, gargles, lotions and injections.

DECOCTION OF WHITE OAK BARK, *Decoctum Quercus Albæ*, is composed of oak bark, ℥j ; water, Oj.

Dose.—Of powdered white oak bark, gr. xxx to gr. xl. Of the decoction the dose is f℥ss to f ℥j.

Dental Uses.—In dental practice the decoction and tincture are employed externally in the various forms of stomatitis, sponginess of the gums, and relaxed condition of the mucous membrane of the mouth and fauces.

QUILLAYA SAPONARIA—QUILLAIA BARK.

SOUTH AMERICAN SOAP TREE BARK.

Source—Quillaia Bark is obtained from an evergreen tree of the natural order *Rosaceæ*—rose order, growing in Chili and Peru, the inner bark being employed.

Medical Properties and Action. Quillaia bark, when bruised and macerated in water, imparts to that liquid the property of frothing like soap solution when agitated, which is owing to the saponaria in the bark, the same principle which imparts a similar property to soapwort—*saponaria officinalis.* Quillaia contains no tannic acid or other bitter principle, and is an article of commerce, being imported in large quantities for cleansing grease from cloth, as it does not change the color of silken or woolen goods ; it is also used for cleansing the hair, which it is supposed to preserve and beautify. When the powder is snuffed up the nostrils, it causes sneezing and a profuse nasal discharge.

Therapeutic Uses.—Quillaia bark has been employed as a febrifuge, to arrest excessive secretion, as an application to ulcers, as a remedy for colds in the head, when it is used as a sternutatory, in the form of powder.

The tincture is composed of quillaia bark 1 part ; alcohol 5 parts ; it is also used in the form of infusion and fluid extract.

Dental Uses---Quillaia bark, in the form of powder, tincture and fluid extract, is employed as an ingredient of mouth-washes, for its frothy and detergent properties ; it is also used

as an application to chronic ulcers of the mouth, and to arrest excessive secretion of the mucous membrane of the mouth.

DENTAL FORMULÆ.

Detergent Mouth Wash.

AM. JOURN. PHARM.

℞ Pulv. potassii bicarbonatis . . . . . ℥ss
Mellis . . . . . ℥iv
Alcoholis . . . . . ℥ij
Olei caryophylli . . . q.s.
Olei gaultheriæ,
Quillaiæ saponariæ (fluid ext.) . . āā . . ℥j
Aquæ destillatæ . . . ℥ix. M.

To be used after the removal of salivary calculus.

For a Mouth Wash.

℞ Pulv. quillaiæ saponariæ . . . . . ℥iv
Glycerini . . . . . ℥iij
Alcoholis dilutus sufficient for 2 pints.
Olei gaultheriæ . . . gtt.xx.
Olei menthæ . . . . gtt.xx. M.

Macerate the soap bark in the mixture of glycerine and alcohol for three days, and filter through a little magnesia previously triturated with the volatile oils.

For Inflamed Gums and Mucous Membrane.

CHAPIN A. HARRIS.

℞ Quillaiæ saponariæ . . . . . ℥viij
Pyrethri,
Radicis iridis,
Acidi benzoici,
Cinnamom . . . . . āā . . . . . ℥j
Acidi tannici . . . . . ℥iv
Sodii boratis . . . . . ℈iv
Olei gaultheriæ . . . . . f℥ij
Olei menthæ . . . . . f℥iv
Cochineal . . . . . ℥iij
Sacchari albi . . . . . ℔j
Alcoholis . . . . . Oiij
Aquæ puræ . . . . . Ov. M.

Digest for six days and filter.

SIGNA.—To be used as a gargle or mouth wash.

QUININÆ SULPHAS—SULPHATE OF QUININE.

Formula.—$C_{20}H_{24}N_2O_2$, $3H_2O$.

Derivation.—The two important alkaloid principles of cinchona are *quinia* and *cinchonia*, which exists in combination with *kinic* acid. (See Cinchona.)

Sulphate of Quinine is obtained by boiling the powdered yellow cinchona bark in water acidulated with hydrochloric

acid, by which the alkaloid quinine is separated from kinic and other acids, and forms a soluble hydrochlorate or muriate, the salt being decomposed and the quinine precipitated by the addition of lime; sulphuric acid is added, after digestion in boiling alcohol, which dissolves the quinine, and the solution is boiled with animal charcoal, filtered and allowed to crystallize. Sulphate of quinine is in the form of colorless, very light and silky crystals, which are readily soluble in alcohol and in water acidulated with sulphuric acid, but insoluble in ether. It has an intensely bitter taste, and is inodorous.

Medical Properties and Action.—Sulphate of quinine is a very valuable tonic and antiperiodic, also antiseptic and stimulant. In small doses it increases the fullness of the pulse and action of the heart, and improves the tonicity of the capillary vessels, and is diffused into various parts of the system with great rapidity. In large doses it depresses the action of the heart, lowers the blood pressure, and enfeebles as well as diminishes the beats of the pulse. As it accumulates in the brain, it causes a fullness in the head, a constricted feeling about the forehead, a buzzing or ringing in the ears—*tinnitus aurium*, giddiness, vertigo and deafness, which may be permanent if the agent is taken in excessive quantity; also amaurosis and amblyopia may be caused by full doses. Poisonous doses cause intense headache, dilated pupils, delirium, coma and convulsions. Some five hours are required to bring about the greatest effect of quinine, although it can be detected in the urine in about half an hour after it is taken into the stomach, and elimination, chiefly by the kidneys, is not completed in a less time than 48 hours, although the principal portion is excreted in 12 hours.

Therapeutic Uses.—Quinine is extensively employed in periodical diseases of a malarial origin, such as intermittent fever, neuralgia of various forms, as enteralgia, hepatalgia, nephralgia, gastralgia, sciatica, angina pectoris, and in cases of debility, pneumonia, pleurisy, endocarditis, pyæmia, erysipelas, puerperal fever, cerebro-spinal meningitis, eruptive fevers,

etc., etc., but the most important use of quinia is for the treatment of malarial diseases.

Dose.—Of sulphate of quinine, gr. j to ℈j, in aromatic water, by the aid of aromatic sulphuric acid, and also as an enema, or hypodermically. Pills may be made by combining 24 grains of sulphate of quinine with 14 grains of clarified honey, and dividing into 24 pills. Pills can also be made with glycerine.

Dental Uses.—Sulphate of quinine is internally employed in dental practice in reducing inflammation of the peridental membrane when resorted to in the early stages of the disease, and before effusion of inflammatory products, cell-proliferation and escape of the white blood corpuscles have occurred; also in hypersensitiveness of dentine—three or four grain doses every four hours until thirty grains have been taken (Klump). The treatment of facial and other neuralgic affections, especially when of malarial origin, in cancrum oris, for its tonic and stimulant effects, in aphthous ulcerations of the mouth and in scurvy, where the system is much debilitated, and externally as an ingredient of dentifrices, for its tonic and stimulating properties.

QUININÆ HYPOPHOSPHIS—HYPOPHOSPHITE OF QUININE.

Formla.—$C_{22}H_{24}NO_4PH_2O_2$.

Derivation.—Hypophosphite of Quinine is obtained by dissolving quinine with hypophosphorous acid, or by decomposing sulphate of quinine with hypophosphite of baryta, filtering and evaporating the solution.

Medical Properties and Action.—Same as those of sulphate of quinine, but not so powerful in its action.

Therapeutic Uses.—Hypophosphite of quinine is used in all cases where hypophosphites are indicated, and its action is milder, on account of its containing less acid. It is employed as an antiperiodic, and is especially adapted for the treatment of children during the period of dentition when it is accompanied with emaciation, loss of appetite and strength, and when convulsions are threatened.

Dose.—Of hypophosphite of quinine, gr. j to gr. iij.

DENTAL FORMULÆ.

For Facial Neuralgia from Dental Disturbance.

BARRETT.

℞. Ferri et quin (cit) . . ℥ij
Syrup aurantii . . . ℥ j
Aqua dest . . . . . ℥ j
Elixir calisayæ . . ℥ij M.

SIGNA.—Coch. parv. ter in die.

For Neuralgia Associated with Anæmia.

GARRETSON.

℞. Tinct. ferri chloridi . . ℥ j
Quininæ sulphatis . . . ℥j M.

SIGNA.—Teaspoonful four times daily.

For Neuralgia from Dental Disturbance.

L. DE L. GORGAS.

℞. Quininæ sulphatis . . gr.x
Ferri sulphat. exsic . . gr.v
Acidi arseniosi . . . gr.ss
Ext. nucis vomicæ . gr.v. M.
Ft. pil. No. xx.

SIGNA.—One pill every four hours.

For Acute Periodontitis.

℞. Quininæ sulph . . . ℥ss
Acidi sulph. aromat. . ℥ij
Elix. calisaya bark . . ℥xiv. M.

SIGNA.—A teaspoonful every two or three hours.

RESORCIN.

Derivation.—Resorcin is a chemical compound of the phenol group and aromatic series, to which carbolic acid belongs. It is obtained from certain resins by the action of fusing alkalies, and is of the form of tabular, prismatic, shining crystals somewhat sweetish to the taste, followed by a slight pungency. Resorcin is very soluble in water, 95 parts in 100, and to a less degree in alcohol, ether, glycerine and vaseline; chloroform and carbon sulphide will not dissolve it. It darkens on exposure to the air, and is phosphorescent when rubbed in the dark. Its odor is somewhat similar to that of phenol, but not so strong,

Medical Properties and Uses.—Resorcin acts somewhat similar to quinine, although it differs from the latter in its lethal effects. Quinine, carbolic acid and salicylic acid promote its effects; atropine antagonizes it. Through its action on the nervous system, it greatly increases in frequency the respiration, which becomes convulsive and spasmodic, and afterward weak but rapid. It also increases the action of the heart, causes the pulse to become weak and irregular. It is eliminated by the urine quite rapidly. It has no irritating action on mucous membranes.

Therapeutic Uses.—Resorcin, on account of its less irritating property is considered preferable to carbolic acid for internal use and subcutaneous injection. It is employed internally in catarrh of the stomach, ulceration, gastralgia, fermentative indigestion, fevers, for its antiseptic and antipyretic actions, and ulcerative endocarditis, etc., etc. Locally on account of its antiseptic properties, in diphtheria, in syphilitic and other sloughing sores, and anthrax, in the form of crystals or powder, and in the form of spray in catarrhal and ulcerating affections of the nose and throat; in solution, on account of its antiseptic action, it is used for dressing putrid and atonic wounds, and is combined with water, glycerine and alcohol; it is also used in pomades.

A compound composed of resorcin and salicylic acid heated together, is known as "Salicyl Resorcin-Ketone," and is antiseptic to a degree, as it limits the development of, rather than destroys, septic germs. It is soluble in glycerin and alcohol, and is neither poisonous nor disagreeable to the taste.

Dose.—Of resorcin, gr. v-xv. Five grains every two hours in an ordinary case.

Dental Uses.—Resorcin is a valuable antiseptic in dental practice, and may be applied with advantage in all cases where antiseptics are indicated. A ten per cent. solution of resorcin is recommended in cases of chronic alveolar pyorrhœa (after cleansing the pockets with peroxide of hydrogen) where there is impaired circulation of the tissues. (See Antiseptic Uses of Carbolic Acid.)

DENTAL FORMULÆ.

For Alveolar Pyorrhœa.

DR. A. W. HARLAN.

℞. Resorcin . . . . . ʒij
Acidi carbolici . . . ʒj
Glycerini . . . . . ℥iij
Aquæ q.s . . . . ℥viij. M.

SIGNA.—Use as mouth-wash after removing all deposits, and the adjacent carious or necrosed bone.

A few drops of oil of peppermint or any other desirable oil may be added to the above.

For Alveolar Pyorrhœa.

DR. A. W. HARLAN.

℞. Resorcin . . . . . gr. xxx
Acidi tannici . . . . gr. v
Olei cassia . . . . . ♏x
Glycerini . . . . . ʒj
Aquæ dest . . . . . ʒij M.

SIGNA.—Inject with a syringe into the remains of the pockets in the after treatment.

For Mucous Patches of the Mouth.

DR. A. W. HARLAN.

℞. Resorcin . . . . . gr. xl
Aquæ dest . . . . . ℥ss. M.

SIGNA.—Dry surface and paint with above.

RHEUM—RHUBARB.

Source.—The root of *Rheum officinale*. It contains two acids, *rheo-tannic* and *rheumic*, a resin, *phæoretin* and an acid, *chrysophan* or *chrysophani*.

Medical Properties and Therapeutic Uses.—Rhubarb possesses tonic and astringent as well as purgative properties. In small doses, as a tonic, it promotes the appetite and digestive power, and by virtue of the tannic acid it contains, is astringent. The purgative principle it possesses enables sufficient doses of rhubarb to act as a cathartic, producing stools which are of a yellowish brown color, and soft but not watery. It has no tendency to cause gastro-enteric inflammation. It is now classed among the cholagogues, as it increases the flow of bile and the intestinal secretions, which is due to phæoretin—rhubarb resin. Its coloring matter not only stains the stools, but also the perspiration, milk of nursing women, to which it gives a bitter taste and purgative principles, and the urine. It is employed with benefit in diarrhœa caused by the accumulation of undigested food in the intestines, hemorrhoids accompanied by constipation, dyspepsia with deficient biliary and intestinal secretions, the summer diarrhœa of children in the form of the aromatic syrup and in catarrh of biliary ducts with jaundice; and the chewing of rhubarb-root is beneficial in habitual constipation; its frequent use, however, is objectionable on account of the astringent after-effect, which in the rhubarb pill is remedied by the soap.

Dose.—Of *Extractum Rhei*—Extract of Rhubarb, grs. x to grs. xv. Of *Extractum Rhei Fluidum*—Fluid extract of rhubarb, ʒss to ʒij. Of *Pilulæ Rhei*—Rhubarb pills, each pill consists of grs. iij of rhubarb and gr. j of soap. Of *Pilulæ Rhei Compositæ*—Compound pills of rhubarb, consisting of rhubarb,

aloes and myrrh. Dose, 2 to four pills. Of *Syrupus Rhei*—Syrup of rhubarb, ℥ss to ℥ij. Of *Tinctura Rhei Aromaticus*—Aromatic tincture of rhubarb, ℥ss to ℥ij. Of *Tinctura Rhei Dulcis*—Sweet tincture of rhubarb, ℥ss to ℥ij. Of *Vinum Rhei*—Wine of rhubarb, ℥j to ℥ss. Of *Pulvis Rhei Compositus*—Compound powder of rhubarb, a teaspoonful.

RHIGOLENE.

Derivation.—Rhigolene is a product of the distillation of petroleum. In its composition it is a hydrocarbon, and is destitute of oxygen, being extremely volatile and inflammable, and is the lightest of all liquids, with a specific gravity of 0.625. It is a petroleum naphtha, and boils at 70° F., and when perfectly pure should be almost odorless; but it is difficult to procure any specimen that does not have the unpleasant odor of petroleum. It is colorless, and on account of its great volatility and inflammability requires to be kept tightly stoppered, in a cool place. The storage of large quantities, except in very secure places, is attended with considerable risk, and on this account it is somewhat difficult to procure it outside of the manufactories. It is dangerous to use it at night, or near a light.

Dental Uses.—Rhigolene is employed, like absolute ether, to produce local anæsthesia, by dispersing it in the form of spray, with the spray apparatus, being the most rapid in its congealing effects, and also the most easily controlled and convenient of all of the freezing mixtures. As a local anæsthetic it is employed in the operation of extracting teeth, by applying it, in the form of spray, to the parts about the tooth to be removed until a blanched surface of gum is produced. The spray of rhigolene is also applied to the gum over the root of a tooth affected with incipient periodontitis.

SALOL—PHENYLIC ETHER OF SALICYLIC ACID.

Derivation.—Salol is obtained by the combination of salicylic acid and phenol, consisting of 60 parts of weight of salicylic acid and forty parts of phenol. It is a white, crystalline powder,

insoluble in water, without odor and nearly tasteless. In the system it becomes decomposed, yielding salicylic and carbolic acids in nascent forms.

Medical Properties and Therapeutic Uses.—Salol is antiseptic, germicide and antipyretic, and possesses less poisonous properties than either salicylic acid or carbolic acid alone; large doses of salol, however, cannot be administered without danger of phenol poisoning. It is accumulative, owing to its being absorbed and eliminated slowly, and hence cannot be given too frequently.

In acute and chronic renal diseases, salol is contra-indicated. It is employed internally in disorders of stomach, acute gastro-enteritis, tonsillitis, gonorrhœa, skin diseases, gleet, etc. Externally used, salol is an excellent dressing for wounds, ulcers, burns, erysipelas and skin diseases. Camphorated salol is highly recommended by Cuirllier in the treatment of otitis. It can be mixed with iodoform or iodol, and the action of both be had simultaneously.

Dose.—Gr. v to ʒj.

For Erythema.

DR. A. EICHLER.

℞. Saloli . . . . . ʒij
Zinci oxidi . . . . . .
Pulv. amyli . . . . . āā ʒiv
Lanoline . . . . . ʒj. M.

SANDARACA—SANDARACH.

Source.—Sandarach is a resinous substance obtained from an evergreen tree—*Thuya Articulata*—which grows in the northern part of Africa. The gum is in the form of small, irregular, round and oblong tears, of a pale yellow color, sometimes brown, and more or less transparent, dry and brittle. It has a faint, agreeable odor, which is increased by warmth, and a resinous, somewhat acrid taste. It melts with heat, diffusing a strong balsam odor, and is inflammable. It is soluble in alcohol and ether, and slowly dissolves in warm oil of turpentine. It consists of three resins, varying in their relations to alcohol, ether and oil of turpentine. The *sandaracin* which

remains after sandarach has been exposed to the action of ordinary alcohol is a mixture of two of these resins.

Uses.—Sandarach was formerly employed as a medicinal agent, and entered into the composition of various ointments and plasters, but its use is now restricted to such purposes as the composition of a varnish, ingredient of incense, etc. After the erasion of ink marks, its powder, if rubbed on such a surface, will prevent fresh ink marks from spreading.

Dental Uses.—In dental practice, sandarach, dissolved in alcohol forms a varnish for coating the surface of plaster models, etc.; it is also used for checking secretions from the gums during the operation of filling teeth, either applied as a coating to the surface, or on bibulous paper saturated with it. It is also employed to saturate cotton to be used as a temporary filling in cavities of the teeth, for the protection of medicinal applications.

DENTAL FORMULA.

Transparent Sandarach Varnish.

℞. Gum sandarach . . . . . ℥v.
Alcohol . . . . . qt.j.

Mix and digest over a moderate heat until the sandarach is dissolved.

SERPENTARIA—VIRGINIA SNAKEROOT.

Source.—Serpentaria is prepared from the rhizoma and rootlets of the *Aristolochia serpentaria* and of the *Aristolochia reticulata*, and is composed of a volatile oil, resin and bitter principle. Its preparations are: *Infusum Serpentaria*—Infusion of Serpentaria; *Tinctura Serpentariæ*—Tincture of Serpentaria; *Extractum Serpentariæ Fluidum*—Fluid extract of serpentaria.

Medical Properties and Therapeutic Uses.—Serpentaria is a bitter, aromatic, stimulating tonic, employed in typhoid and typho-malarial fevers, and as a stimulant expectorant in capillary bronchitis; also combined with the carbonate of ammonia in a low form of pneumonia, chlorosis, anæmia and diphtheria. Large doses cause diarrhœa, nausea, vertigo and headache.

Dose.—Of Infusion, ℥ss to ℥j; Tincture, ℥ss to ℥ij; Fluid extract, ℥ss to ℥ij.

SHELL-LAC—SHELLAC.

Source.—Lac is a resinous substance, obtained from several varieties of trees which grow in the East Indies, and particularly from the *Croton Lacciferum*, and two species of the *Ficus*. It is supposed to be an exudation from the bark, owing to the puncture of an insect belonging to the genus *Coccus;* it is also said to be the exudation from the bodies of the insects themselves. Several varieties are known in commerce, the most common being the *stick-lac*, the *seed-lac* and the *shell-lac*. Lac, in its crude state, consists of resin, coloring matter, and a peculiar principle, insoluble in water, alcohol or ether, and known as *lacin*, a little wax, and various saline matters in small proportion.

Uses.—It is slightly astringent, and has been recommended as an adhesive substance for dressing ulcers, wounds, etc., being used by simply spreading it on the bandages after it is dissolved in alcohol by a gentle heat. Shellac is prepared by melting the crude lac, straining it, and pouring it upon a flat, smooth surface to harden. It is in the form of thin fragments of various sizes, from half a line to a line in thickness, and of a light and also a dark brown color, shining, hard, brittle and inodorous. It is insoluble in water, but freely soluble in alcohol, especially with the aid of heat. It is employed as a varnish. In dental practice its uses are the same as those of sandarach, but owing to the dark brown color of the solution, it is not so sightly, and does not make a transparent varnish.

DENTAL FORMULÆ.

For a Colored Varnish.

℞. Gum shellac . . . . . ℥v
Alcohol . . . . . qt.j.
Mix and digest over a moderate heat until thoroughly dissolved.

For an Aqueous Varnish.

℞. Pulv. shellac . . . . partes j
Sat. solut. boracis . . partes ij
Mix by shaking together; it will give a starch gloss.

Shellac may be dissolved, without the aid of alcohol, by a saturated solution of borax in water. This, however, does not

give a very strong solution. To prevent cracking when the shellac is dissolved in alcohol, add a little castor oil; if in water, add glycerine. Clear shellac varnish may be prepared by first making an alcoholic solution of shellac in the usual way, and then adding a little benzole, and the mixture well shaken. In from 24 to 48 hours the fluid will have separated into two distinct layers, an upper alcoholic stratum, perfectly clear, and of a dark-red color, while under it is a turbid mixture containing the impurities. The clear solution is drawn off with a pipe, or may be decanted.

SODÆ PHENAS—PHENATE OF SODIUM.

CARBOLATE OF SODIUM—PHENOL SODIQUE.

Formula.—NaC_6H_5O.

Derivation.—Phenate or Carbolate of Soda is obtained by mixing caustic soda with carbolic acid and a small quantity of water, and evaporating the solution, the result being a saponaceous mass of acicular crystals of a light pinkish color, which are converted by the heat into a fluid of an oily consistence. It is freely soluble in creasote, carbolic acid and water.

Medical Properties and Action.—Phenate of soda is hæmostatic, antiseptic and disinfectant.

Therapeutic Uses.—It is internally administered in the form known by the French name of *Phenol Sodique*, in doses of gtt. viij or gtt. x in a glass of water, in typhus and typhoid fevers, as a preventive of cholera, in plagues, cholera infantum, etc.; externally, it is a valuable styptic in local hemorrhage, and as a dressing for wounds, burns, chilblains, excoriations, varicose veins, venomous stings and bites, and as a disinfectant in throat affections, leucorrhœa, diphtheria, scarlatina, smallpox, ozæna, etc.

Dental Uses.—Phenate of soda is useful in dental practice, as an astringent and styptic in hemorrhage following the extraction of teeth, and to relieve the soreness of such an operation, as it promotes the rapid absorption of the extravasated blood, and the healing and hardening of the gums. It is ap-

plied on a pellet of cotton, or in solution with water, and acts as a sedative and antiphlogistic as well as a hæmostatic, and has little or no escharotic action. For soft and spongy gums it forms an efficient gargle or mouth-wash, and can be employed for this purpose in its full strength, in the form of phenol sodique, or diluted with from one to twelve parts of water. When applied on cotton, to an exposed and inflamed pulp, it relieves odontalgia. It is also employed in aphthous ulcerations of the mouth, and as a disinfectant in offensive breath, in the proportion of a teaspoonful to a glass of water.

DENTAL FORMULÆ.

Phenol Sodique.

Pure melted carbolic acid . . . . . 5 parts
Solution of caustic soda, specific gravity 1:332 . . . . 1 part
Distilled water . . . . . 5 parts.
Mix.

A Phenol Sodique Preparation.

℞. Acidi carbolici . . . . . gr. clxxxviij
Sodæ caustic . . . . . gr. xxxj
Aquæ . . . . . ℥iv. M.

SIGNA.—To be applied on a pellet of cotton, or, as a mouth wash, diluted to meet requirements of case.

SODII BICARBONAS—BICARBONATE OF SODIUM.

SESQUICARBONATE OF SODIUM.

Formula.—$NaHCO_3$.

Derivation.—Bicarbonate of Sodium is obtained by saturating the carbonate of sodium with carbonic acid. It is in the form of a white, opaque powder, freely soluble in water, with a mild, slightly alkaline taste.

Medical Properties and Action.—Bicarbonate of sodium is antacid, alterative, lithontriptic, and from its mildness and non-irritating qualities is more pleasant to the taste and to the stomach than the carbonate. It is extensively used in the preparation of soda and seidlitz powders.

Therapeutic Uses.—Bicarbonate of sodium is internally administered in neuralgia connected with acidity of the stomach, cardialgia, flatulence and vomiting, dyspepsia, diarrhœa, dis-

eases of the skin, albuminuria, calculous disease, etc. Externally in diseases of the skin of a scaly and papular nature, ecthyma, ringworm, and sprinkled over burns and scalds, and combined with an equal part of common salt, for stings of venomous insects.

Dose.—Of bicarbonate of sodium, gr. v. to ʒj, in carbonic acid water, or with sugar and mucilage.

Effervescing Powders.—*Pulveris Effervescentes*, are composed of tartaric acid, gr. xxv, in one paper, and bicarbonate of sodium, gr. xxx, in another paper.

Dental Uses.—Bicarbonate of sodium is employed in dental practice to relieve neuralgia of an acid origin, in which a full dose often proves very serviceable; in aphthæ of children it is often combined with a little rhubarb and proves very efficacious. Externally it instantly relieves odontalgia when a small portion of the powder is applied to the irritable pulp and properly secured. It is also useful for neutralizing the acidity of the oral fluids, especially when such a condition is the result of pregnancy. It also forms an antacid ingredient in dentifrices.

Dr. E. C. Kirk recommends a thick paste of sodium carbonate as a local sedative and obtundent of hypersensitive dentine, its application to be made to a dry cavity and repeated when necessary. In acute periodontitis, applied to the gums after a slight puncture, it will often afford speedy relief from the pain. As a chemical disinfectant and antiseptic, Dr. Leffman considers sodium carbonate to be of great value in the treatment of devitalized teeth containing semi-putrescent pulps and food *débris*, to be followed by injections of warm water.

DENTAL FORMULA.

For Periodontitis, etc.

Carl Seiler.

℞. Sodii bicarb . . . . . ʒ viij
Sodii bibor . . . . . ʒ viij
Sodii benzoate . . . . . .
Sodii salicylate . . . . . āā . . . . . gr. xx
Eucalyptol . . . . . .

30

Thymol	āā	gr.x
Menthol		gr.v
Ol. gaultheria		gtt.vj
Glycerine		℥viiiss
Alcoholis		℥ij
Aquæ,	q.s.	16 pints. M.

SIGNA.—Use as an antiseptic spray.

SODII BORAS—BORATE OF SODIUM.

BORAX.

Formula.—$2NaBO_2$, $2HBO_2$, $9H_2O$.

Source.—Borax is a native salt, but can be obtained artificially by boiling together native boracic acid (found in Italy), and carbonate of soda. California furnishes the borax used in this country. It is in the form of colorless crystals, which effloresce somewhat in dry air, and are freely soluble in water and glycerine, but insoluble in alcohol, with an alkaline reaction, and a sweetish alkaline taste. It dissolves fibrine, albumen, casein and uric acid.

Medical Properties and Action.—Borax is refrigerant, diuretic, detergent, antacid and emmenagogue, and has been employed as a solvent for calculi. It resembles in its action carbonate of soda, and by its mild alkaline qualities it improves the condition of the skin and mucous membranes. In excessive or large repeated doses it is injurious, causing nausea and vomiting, and a scorbutic condition of the body.

Therapeutic Uses.—Borax is internally administered in infantile diarrhœa, in the form of an enema; also as a solvent for calculi, and in dropsy, etc., but its chief use is as an external application. Externally it is applied as a detergent in cutaneous affections, ulcerations, pityriasis, to remove freckles, to allay itching, etc., etc.

Dose.—Of borate of sodium, gr. ij to ℈j.

GLYCERITE OF BORATE OF SODIUM—*Glyceritum Sodii Boratis*—Glycerinum Boracis—is composed of borax, ℥ij; glycerine, Oss, and is a useful application to the mouth and throat.

HONEY OF BORATE OF SODIUM—*Mel Sodii Boratis*—*Mel Boracis*—is composed of borax, ℥j; clarified honey, ℥j, and

is also useful as a detergent application to the mouth and throat.

Dental Uses.—Borax, mixed with sugar or honey, is a very useful application for aphthæ and other ulcerations of the mouth, for which it may be mixed with sugar in the proportion of one part to seven, or in the form of *mel boracis.* In mercurial stomatitis, an aqueous solution of borax, or the *mel boracis*, forms an efficient gargle. Borax is also a useful application in fissured or cracked tongue. Borax is also added to sage and balm teas, to form gargles.

In the dental laboratory, borax is employed as a flux in melting metals, such as gold and silver, and in the process of soldering metals. It is also employed to harden plaster casts or models, the model being well dried and then immersed for a few minutes in a solution of borax in boiling water, which renders it, when cool, hard and durable. (Solutions of carbonate of soda and alum are used for the same purpose.) Dr. J. L. Williams considers borax a valuable application to the teeth of pregnant women to counteract acidity of the fluids of the mouth. He recommends the use of the powder applied to the teeth and allowed to remain half a minute or so, and then brushed off by a whirling motion of the brush, not with a horizontal movement. Also useful to sterilize instruments.

DENTAL FORMULÆ.

A Mild Detergent Gargle.

℞. Sodii biboratis . . . . ℥j
Glycerini . . . . . ℥vj. M.

For Aphthous Ulcerations, Parasitic Formations, and Diphtheritic Conditions.

℞. Sodii biboratis . . . . ℥ij
Syrupi aurantii . . . ℥iv
Aquæ destillatæ . . . ℥iv. M.

SIGNA.—To be applied as a lotion or mouth wash, stimulant and antiseptic.

For Aphthous Ulcerations, etc., etc.

℞. Sodii sulphitis . . . . ℥j
Glycerini . . . . . ℥j. M.

SIGNA.—To be used as a lotion or mouth wash.

For Fissured or Cracked Tongue.

℞. Sodii biboratis . . . . ℈j
Glycerini . . . . . ℥j. M.

To be used as a lotion or gargle.

For Fissured Tongue.

J. W. WHITE.

℞. Sodii biboratis . . . . gr.xl
Glycerini . . . . . ℥j
Aquæ destillatæ . . . ℥iv. M.

To be used as a gargle.

A Detergent Alkaline Gargle.

℞. Sodii biboratis . . . . ℥iv
Glycerini,
Tincturæ myrrhæ āā . ℥ss
Aquæ destillatæ . . . ℥x. M.

SODII SALICYLAS—SALICYLATE OF SODIUM.

Derivation.—Salicylate of Sodium is prepared by the addition of salicylic acid to a solution of bicarbonate of sodium; when the latter is in excess the solution is brownish or purplish in color, and has a strong odor of wintergreen. The formula is as follows: ℞. Acidi salicylici ℥ij; sodii bicarb. ℥j; aquæ ℥ij. M.

Dose.—A teaspoonful every 2, 3 or four hours.

Dental Uses.—Employed as an internal remedy for odontalgia, periodontitis and the pain of carious dentine, affording temporary relief for several days. Dr. Thomas recommends doses of ten grains every half-hour for the relief of odontalgia.

For Aphthous Stomatitis.

℞. Salicylate of soda . . . . . 20 parts.
Distilled water . . . . . 100 ". dissolve.

SIGNA.—Paint the inflamed parts five or six times a day, particularly after meals. The mouth should previously be well rinsed out with tepid water.

SODII SULPHIS—SULPHITE OF SODA.

Formula.—Na_2SO_3.

Derivation.—Sulphite of Soda is prepared by passing sulphurous acid into a solution of carbonate of soda, and evaporating free from air. The sulphurous acid unites with the soda of the carbonate, to form the sulphite of soda, and the carbonic acid escapes. On cooling, the salt crystallizes in white prismatic crystals, and should be kept well stoppered, as it changes on exposure into sulphate of soda.

Medical Properties and Action.—Sulphite of soda is a disinfectant and deodorizer, and its action and uses are similar to those of the other sulphites, hyposulphites and sulphurous acid.

Dose.—Of sulphite of soda, gr. xv to ℥j, three times a day.

Dental Uses.—Sulphite of soda is sometimes employed in the form of a lotion for aphthous sore mouth due to a parasitic vegetable; also in ulcerous stomatitis, gangrenous stomatitis, and all suppurative affections of mucous membrane, especially when they are sustained by zymotic influences or

invisible organisms. Dr. E. C. Kirk has successfully employed sulphite of soda in combination with boracic acid, for bleaching discolored teeth. (See Formula.) His method is as follows:—

Having adjusted the rubber dam to the tooth to be treated, and one adjoining it on each side, the cavity of decay is cleansed of all *débris* and the root filled with gold or gutta percha for one-half its length. The powder, composed of sulphite of soda and boracic acid, is packed into the remaining portion of the pulp canal and cavity of decay, leaving just sufficient space to insert a temporary filling of gutta percha or Hill's Stopping. After the powder has been properly packed, a drop of water is permitted to fall upon it from a drop-tube or a pellet of cotton wrapped around a broach, the object being to dampen the powder, not to wash it out. The cavity of decay is then filled with gutta percha, and the patient dismissed until the next sitting, when a second application can be made, which is usually sufficient, except in cases where the walls of the tooth are very thick and much discolored, when a third application may be necessary. When the water is added to the powder a chemical reaction takes place, the boracic acid unites with the sodium of the sulphite to form sodium borate, at the same time liberating the sulphurous acid, upon which the bleaching powder depends.

DENTAL FORMULÆ.

For Aphthous Sore Mouth.

℞. Sodii sulphitis . . . . . ℥j
Aquæ . . . . . f℥j. M.

SIGNA.—Apply as a lotion.

For Same.

WALLACE.

℞. Sodii sulphitis . . . gr.xxx
Glycerinæ,
Aquæ . . . āā . . . ℥ss.

SIGNA.—To be used on a swab every two hours.

For Bleaching Discolored Teeth.

E. C. KIRK.

℞. Sodii sulphitis gr.100
Acidi boracis gr.70

Mix by grinding together in a warm, dry mortar, to a fine powder, which is preserved in an air-tight stoppered bottle, and kept in a dry place.

SIGNA.—(See Dental Uses of Sulphite of Soda.)

SODIUM SILICO—FLUORIDE.

Derivation.—A mixture of fluor-spar and any silicious substance, as sand, is heated in a retort with H_2SO_4; the resulting gas being distilled over through mercury into water, which holds it in solution, and which is then filtered to remove the free silicon which precipitates. This should give a perfectly neutral reaction to litmus paper.

Medical Properties and Therapeutic Uses.—Experiments with this salt by Mr. Wm. Thomson, F. B. F. C., F. C. S., showed that the compounds of fluorine were powerful disinfectants, and of these the sodium silico-fluoride was the most serviceable. It has been employed as a substitute for peroxide of hydrogen on account of the changeable nature of the latter agent. Even in a saturated solution, sodium silico-fluoride is not an escharotic coagulant, but it is a slight irritant in such a form, which is not a positive disadvantage in the treatment of some affections, such as alveolar pyorrhœa for example.

Dental Uses.—Sodium silico-fluoride has been used with good results in cases of putrescent pulps, chronic alveolar abscesses, pyorrhœa alveolaris. Also as a deodorizer in pulp canals by destroying the putrescent matter by removing its hydrogen. As a disinfectant, it is powerful enough, even in weak solution, to antagonize, in a marked degree, the germs of putrefaction; as a coagulant, it is non-escharotic; as a deodorant, it is strong enough to destroy the most penetrating of putrefactive odors; as a stimulant, it is powerful enough in full solution to bring about the formation of new tissue, and not act as an irritant to surrounding tissue; it is comparatively unchangeable. Such properties may render it one of the most useful salts in the dental pharmacopœia.

STENOCARPINE, or GLEDITSCHINE.

Stenocarpine is an alkaloid obtained from the tree *Gleditschia triacanthus*. As a local anæsthetic, Dr. Herman Knapp, in his experiments as to its physiological action, found it to be fully as

energetic as a cocaine solution of equal strength in producing anæsthesia of the cornea and conjunctiva. Dr. Jackson found that the instillation of one drop of a two per cent. solution of stenocarpine caused a slight smarting, followed by dryness of the conjunctiva, dilatation of the pupil, and within two and a half minutes complete anæsthesia of the conjunctiva and cornea, lasting for about twenty minutes. These results were obtained in sixteen different individuals, in all complete anæsthesia being obtained in one or two minutes, and passing off mostly within half an hour. Stenocarpine also appears to produce a wider dilatation of the pupil than other local anæsthetics used upon the eye. Applied to mucous membrane of the nose, throat, etc., anæsthesia can be readily produced to an equal, if not more marked, degree than can be obtained by the employment of a solution of cocaine of equal strength; and when applied to the throat or nose the senses of taste and smell are respectively suspended. Applied to the skin externally, it causes complete anæsthesia, the method of application being to simply moisten the surface, and keep it continually moist with the solution, when, after ten minutes, a needle may be plunged into the skin without the slightest sensation. To produce painless operations on the healthy skin, the incisions must pass but gradually through the skin, and as each layer is divided, the wound must be freely moistened with the solution. As regards the toxicological action of stenocarpine when given in large doses, the nature of the symptoms of poisoning which it produces does not appear to be as yet clearly established. Dr. Knapp states that its action is analogous to strychnine, while Dr. Jackson describes stenocarpine as a depressor motor poison, and in no case in his experiments does he refer to the production of convulsions. As far as has yet been determined, the physiological action of stenocarpine appears to be closely similar to that of cocaine.

SULFONAL—SULPHONAL.

Formula.—$(CH_3)_2=C=(C_2H_5SO_2)_2$.

Sulfonal is in the form of colorless prisms, odorless and

tasteless. It is easily soluble in hot water and in alcohol, and but slightly soluble in cold water, and melts at 258° F. It appears to possess hypnotic properties of considerable power, and is regarded as prompt and reliable, producing a quiet, natural sleep, lasting a number of hours. It appears to have no unfavorable effects on the heart or the circulation, nor on the temperature, the pulse or the respiration, and to produce no disagreeable secondary symptoms, nor to interfere with the process of digestion.

It is best administered in hot liquids, such as a bowl of soup or broth, a cup of milk, tea, coffee, cocoa, etc.

The conclusions drawn by Mathes are as follows: 1. Sulfonal is a useful hypnotic agent, though it is not always efficacious. 2. It has the advantage over other agents of having no odor or taste, and no influence on the essential organs of life. 3. The worst of its disagreeable effects are insignificant. 4. The dose depends upon the individual susceptibility, and is therefore variable. Generally a gramme is sufficient to cause sleep without accessory manifestations. When these are produced the dose should be diminished. On account of its slow action, it should be given at least an hour before the time for sleep. 5. When the insomnia is due to irritating cough or to pains not clearly neuralgic, the use of sulfonal is contra-indicated. In most true neuralgias, on the contrary, it may be used with benefit.

It is a valuable remedy for persistent neuralgia in doses of gr. x-xxx; it may be administered in hot liquids such as tea, in the form of tablets of five and fifteen grains. Dr. Chase recommends sulphonal very highly for nervous patients after a protracted dental operation, as a small dose will give a quiet night's rest.

Dose.—Grs. v to grs. xxx; but variable, depending upon the individual susceptibility.

Although sulphonal is probably one of the safest, as it is one of the most efficacious among the recent hypnotics, the series of cases published by Bresslauer, of Vienna, show clearly that it has certain dangers. Out of seventy-seven feeble

lunatic patients who were treated with this drug, no less than seven showed serious symptoms, and in five of these there was a fatal termination; but it should be stated that the patients had been taking the drug for a considerable time in good doses, and had borne it well until symptoms of disturbance appeared, such as great constipation, dark-brown urine, slow, but in some cases rapid but feeble pulse, discolored patches resembling purpura on the limbs, and great prostration. In the cases which ended fatally, the cause of death was heart-failure, with œdema of the lungs.

The action of sulphonal upon digestion is as follows:

a. Strong solutions, saturated or half saturated, considerably delayed digestion, and that the stronger the solution the greater was the retardation.

b. Weak solutions, such as $\frac{1}{16}$ or $\frac{1}{8}$ of a saturated solution, had little effect either in accelerating or delaying digestion, but when $\frac{1}{4}$ of a saturated solution was employed, delay in digestion took place.

c. Strong or weak solutions had no marked effect in retarding putrefaction.

TERCHLORIDE OF PHENOL.

Derivation.—Terchloride of Phenol has recently been introduced as a disinfectant and antiseptic. It is prepared by passing a stream of chlorine gas through chemically pure carbolic acid, previously melted, until it acquires a violet hue. When carbolic acid is acted upon by chlorine gas a number of compounds are produced; such as a monochloride, a bichloride and a tri-or ter-chloride of carbolic acid (phenol).

Medical Properties and Action.—It is not an irritant, and has no acid reaction.

Therapeutic and Dental Uses.—Terchloride of phenol is claimed to be a valuable antiseptic and disinfectant in the treatment of gangrenous ulcers, etc. In dental practice it has been very recently recommended in combination with iodoform, as a material for capping exposed pulps and as a filling

for root canals of teeth, and the advantages claimed for it are, that it will be resorbed when in contact with living tissues; it is easily introduced into pulp canals; it absorbs exudations; it becomes hard when mixed with certain chemical substances, but is destroyed by pus; it is a very bad conductor of heat; and it is absolutely a non-irritant. The method recommended for its use as a capping and filling material is, to incorporate iodoform and terchloride of phenol with decalcified dead bone, as follows: dead bone or ivory shavings are decalcified in a ten per cent. solution of chemically pure hydrochloric acid, and after all the lime salts are extracted, the residue is collected upon a filter, washed, dried and rubbed to a fine powder in a porcelain or glass mortar. Upon this powder ten times its weight of a ten per cent. solution of iodoform in sulphuric ether is gradually poured and constantly rubbed until a fine yellow powder is obtained, which contains about fifty per cent. of iodoform. When used as a capping for pulps, or a filling material for root canals of teeth, this powder is made into a paste by the addition of carbolic acid or terchloride of phenol, being worked or rubbed together like ordinary cement. For hyperæmic conditions of the dental pulp success has attended the application of a cap of the iodoform and decalcified bone paste mixed with terchloride of phenol. For inflamed pulps the application of terchloride of phenol is to be repeated every third or fifth day, until no more pain is felt, and the pulp is then to be capped with the decalcified bone, iodoform and terchloride of phenol material, and a temporary filling introduced into the crown cavity. The treatment of ulcerated and gangrenous pulps of teeth consists in treating with the terchloride of phenol, and after the second or third application, if no trouble occurs from a temporary closure of the root canals, to fill with the decalcified bone, iodoform and terchloride material, using whalebone instruments for its introduction, until congelation is occasioned, and the congested condition of the capillaries of the part relieved, acting as a counter-irritant and antiphlogistic.

TEREBINTHINA—TURPENTINE.

Source.—The concrete oleo-resin of *Pinus australis* and various species of pine.

Oleum Terebinthinæ.—Oil of Turpentine obtained by distillation.

Formula.—$C_{10}H_{16}$.

Oil of Turpentine is a limpid, volatile, colorless oil, with a hot pungent taste and a strong peculiar odor. It is slightly soluble in water. In small doses it increases the action of the heart, elevates the arterial tension and causes a sense of warmth and exhilaration.

In large doses it causes thirst, fever, vomiting, weakness, and a species of intoxication. In poisonous doses there is complete muscular relaxation, insensibility, flushed face, dilated pupils, labored and stertorous breathing. It stimulates the vaso-motor system, and has marked antiseptic properties, arresting fermentation and putrefaction, and destroying micro-organisms. Inhalation of the vapor of turpentine causes headache, nasal and bronchial irritation, ecchymosis of the air-passages, hyperæmia of the kidneys and congestion of the lungs.

The ozonized oil of turpentine is an antidote to phosphorus, by the power it possesses of converting the agent into an insoluble substance; and a vial of turpentine worn about the neck prevents necrosis of the jaw and steatosis in workmen using phosphorus in manufactories.

Sanitas is a highly ozonized preparation of turpentine, and is used as an antidote to phosphorus poisoning. (See Oil of Sanitas.)

Oil of turpentine is employed in flatulence, colic, chronic intestinal catarrh, constipation and as an anthelmintic; also in passive hemorrhages from mucous surfaces, tænia and as a stimulant in low fevers. In the form of enemata for colic, tympanitic distension and impaction of fæces, etc.; in the form of liniment for myalgia, neuralgia, lumbago, etc.; also for burns, erysipelas and chilblains.

Terebinthene ($C_{10}H_{16}$) is a hydrocarbon formed by the distillation of turpentine with an alkali. Terebinthene is converted by hydration into a solid crystalline body, known as *terpine;* and terpine is converted into *terpinol* by an acid. *Terebene* is derived from turpentine by the action of sulphuric acid. These derivations are used in bronchitis, bronchopneumonia, asthma, etc. In dental practice *terpinol* is employed as an antiseptic, disinfectant and sterilizer.

Dose.—Oil of turpentine, ♏v to ʒss; of terebinthene-terpine, gr. v to gr. xx; of terpinol, gr. ij to gr. v; of terebene, ♏v to xx.

Linimentum Terebinthinæ—Liniment of Turpentine, is composed of oil of turpentine thirty-five parts and resin cerate sixty-five parts.

Oil of Sanitas—Oleum Sanitas, is obtained by the oxidation of oil of turpentine floating on water, by directing a stream of heated air on its surface. Sanitas oil is an antiseptic and disinfectant, possessing considerable oxidizing power. It is non-irritant and non-poisonous, and its odor is similar to that of fresh pine. The oils of cinnamon, gaultheria and sassafras will disguise its odor. In dental practice, the oil of sanitas has been very successfully employed in alveolar pyorrhœa, alveolar abscess, diseases of mucous membrane, exposed pulps, abscess of the antrum, foul ulcers, wounds and ulcerated sore throat; also as a protection against phosphorus poisoning and phosphor-necrosis of the jaw.

Oil of Turpentine is also employed as a sterilizer of surgical and dental instruments, gauze, bandages, towels, etc. The method, which is simple, consists in placing the oil of turpentine in flat, large-mouthed bottles at the bottom of each case or drawer, the volatility of the agent causing the vapor to impregnate the surrounding air.

THYMOL.

Formula.—$C_{10}H_{14}O$.

Derivation.—Thymol, or thymic acid, is obtained from the herb *thymus vulgaris*, or common thyme, which is cultivated

in this country for the same purpose as sage, lavender, etc. Thyme yields a volatile oil, *oleum thymi*, from which thymol, or thymic acid, is obtained by treating the oil with an aqueous solution of potassa or soda, which separates it from a principle called *thymene*, with which it is mixed in the oil, and which is not affected by the alkalies. The thymate thus formed is decomposed by an acid, and the liberated thymol, or thymic acid, is purified by repeated washings, desiccation and distillation. Thymol is in the form of aromatic white crystals, soluble in one thousand parts of hot water.

Medical Properties and Action.—In a concentrated state, thymol has an acrid and caustic taste; but when very much diluted, the only taste experienced is that of thyme.

Thymol has acrid properties, and is similar in its action to carbolic acid. It imparts a sense of coolness to the mouth, like that of oil of peppermint, and when once melted, it remains indefinitely in the liquid state.

While it is only slightly soluble in water, it is freely soluble in alcohol, and is dissolved by ether and the fixed oils. The alkalies unite with it to form soluble salts. Like creasote, it has the property of combining with animal tissues, and thus prevents putrefaction. While it has the important practical properties of carbolic acid, it is free from disagreeable odor, and it is claimed to be as efficient an antiseptic as that agent.

Therapeutic Uses.—Thymol is almost exclusively employed as an external application, and is often substituted for the oil of origanum, which is obtained from the common marjoram. It is considered to be a valuable antiseptic and antifermentative agent.

Dental Uses.—Thymol, when combined with glycerine, in a form known as *Glycerole of Thymol*, is a valuable antiseptic in the treatment of suppurating pulps of teeth, as a dressing for ulcers of the mouth, wounds, etc.; also in the treatment of teeth after the devitalization of the pulp, chronic inflammation of the pulp, and alveolar abscess, as it arrests the putrefactive process; also in stomatitis and abrasion of mucous membrane.

DENTAL FORMULÆ.

Glycerole of Thymol.

℞. Thymolis (cryst.) . . . gr. xx
Glycerini,
Alcoholis . . āā . . . f℥j
Aquæ destillatæ . . . . Oj. M.

For Alveolar Abscess, Suppurating Pulps, etc.

ALVIN.

℞. Thymolis (cryst.) . . . ptm. j
Iodi . . . . . ptm. j
Potassii iodidi . . . . ptm. j
Glycerini . . . . . pts. v to xv.

SIGNA.—Apply as in use of carbolic acid.

For Stomatitis.

ALVIN.

℞. Thymolis (cryst.) . . . ptm. j
Glycerini . . . . . pts. 100.

SIGNA.—To be used as a lotion and gargle.

For an Antiseptic in Suppurating Pulps, Alveolar Abscess, etc.

℞. Thymolis (cryst.) . . . ptm. 1
Glycerini . . . . . pts. ij to iv.

SIGNA.—Applied in the same manner as carbolic acid.

Antiseptic and Germicide Mouth-Wash.

W. D. MILLER.

℞. Thymol . . . . . grs. iv
Benzoic acid . . . . grs. 45
Eucalyptol . . . . . ℥3½
Alcohol . . . . . ℥25
Oil of wintergreen . . gtt. 25. M.

An Antiseptic Gargle.

℞. Thymol . . . . . 3½ grs.
Benzoic acid . . . . 45 grs.
Tinc. of Eucalyptus 180 grs.
Water . . . . . 11,250 grs. M.

SIGNA.—After cleansing the teeth, use as a gargle for half a minute or a minute.

Antiseptic Fluid.

VOLKMANN.

℞. Thymol . . . . . 1 part
Alcohol . . . . . 10 parts
Glycerin . . . . . 20 parts
Water . . . . . 100 parts. M.

SIGNA.—Apply as a lotion.

For Stomatitis.

DAVID.

℞. Thymol . . . . . gr. vij
Borax . . . . . gr. xv
Water . . . . . ℥iss. M.

SIGNA.—Use as a tonic and antiseptic mouth-wash, by placing a few drops in a wine-glass of warm water.

For Fetid Breath from Deposits about Tonsils and Gums.

DAVID.

℞. Borate of Sodium . . . gr. xv
Alcohol . . . . . ℥ss
Thymol . . . . . gr. vij
Water . . . . . Oj. M.

SIGNA.—Use as a mouth wash.

Antiseptic Mouth Wash.

DR. W. D. MILLER.

℞. Thymolis . . . . . gr. ij
Acidi benzoici . . . gr. xlvj
Hydrarg. bichlor. . . gr. ix
Tinct. eucalypti . . . ℥ss
Olei peppermint . . gr. xj
Alcoholis . . . . . ℥xxvj. M.

Filter and add sufficient of the solution to a wine-glass of water.

SIGNA.—Rinse with this mixture twice sufficiently to sterilize mouth.

For a Nerve Paste.

DR. S. H. MCNAUGHTON.

℞. Thymolis . . . . . gr. xxiv
Camphoræ . . . . . gr. xij
Acidum arseniosum . gr. iij. M.

If much pain follows the application of the above, apply at once without washing out the cavity:

℞. Camphoræ . . . . . gr. 60
Acidi tannici . . . . . gr. 30
Alcoholis . . . . . ℥j M.

TRICHLOROACETIC ACID—ACIDUM TRICHLOROACETICUM.

Formula.—CCl_3Co_2H.

Trichloroacetic acid is a crystalline body, readily soluble in water and alcohol, with an agreeable odor. It coagulates albumen, and its concentrated solutions are caustic. Diluted solutions cause an increased secretion of saliva, and destroy its power to convert starch into sugar; it also arrests the digestive action of pepsine. As an antiseptic it has been employed in putrid and indolent wounds, in the form of weak solutions, which are unirritating, and promotes healthy granulations and cicatrization; it has also been employed externally in erysipelas and venereal sores. Internally it has been recommended by Dr. Filippowitch as a preventive of cholera, in doses of gr. ij to iij, three or four times daily. Externally, it is employed in one or two per cent. solutions. The common dose is gr. ij to v. in very dilute solution, three times a day. It has also been used internally for gastric catarrh, and the summer complaint of children; for the latter, in doses of gr. ½ to 1, three times daily. In a two per cent. solution it destroys all forms of organic life; in five per cent. solution it arrests the growth of bacteria and micrococci.

TRICHLORPHENOL.

Derivation.—Trichlorphenol is obtained by combining chlorinated lime and carbolic acid. One pound of a solution of carbolic acid (four per cent. solution), is mixed with five pounds of solution of chlorinated lime and then filtered. If too strong, it can be diluted with boiling water to the required strength.

Medical Properties and Therapeutic Uses.—Trichlorphenol has, according to Diannin, an antiseptic power twenty-five times greater than carbolic acid, and also exceeding that of thymol, salicylic acid, and chlorinated lime. A one per cent. solution has been employed in the treatment of ulcers. It has also been employed in the form of solution in erysipelas, and as an injection in leucorrhœa and dysentery.

URETHAN. URETHANE.

Derivation.—Urethan is a combination of carbonic acid and ethylic ether. It occurs in white crystals, without odor, tasteless and insoluble in water.

Medical Properties and Therapeutic Uses.—Urethan is a hypnotic which may be employed to cause quiet and sleep when the conditions are favorable to its action. It is similar to paraldehyde and has no irritating effect upon the stomach nor does it impair digestion. Although insoluble in water, the fluids of the stomach dissolve it readily, and it promptly diffuses into the blood. The first effect of its action is stimulating, which is of brief duration, then a diminution of action, slowing of circulation and respiration, decline of temperature and weakening of the reflexes which finally disappear, then drowsiness and tranquil sleep, and, if the quantity given be toxic, coma and insensibility. Fifteen and one half grains are held sufficient to cause sleep. It is not an analgesic, hence pain will prevent its hypnotic action. Unpleasant after effects do not occur, except when stomachal troubles are present and it is seldom that there is headache, nausea, or vertigo. Sleep is produced in fifteen minutes to an hour, and continues from six to eight hours. It has been employed with benefit in epilepsy, chorea, spasms, cramp, delirium tremens, tetanus, etc. Its action upon digestion is as follows:

a. Strong solutions—that is, 0.5 gramme, 0.25 gramme, 0.175 gramme—delayed digestion; that the stronger the solution the greater was the delay.

b. Weak solutions—that is, 1, 2 and 3 milligrammes—neither delayed nor accelerated digestion.

c. Neither strong nor weak solutions retarded decomposition.

VALERIANA—VALERIAN.

Source.—Rhizoma and rootlets of *Valeriana officinalis.* Valerian contains a volatile oil, and from it are several preparations, among them valeric acid, $HC_5H_9O_2$, to which the virtues

of the agent are principally due. This acid is now prepared from fusel oil, and is not the same as that from valerian although it is largely used as a substitute.

Valerianates are made from the acid prepared from fusel oil, but are not as good as the preparations from valerian. The official valerianates are *Ammonii valerianas* $(N.H_4)C_5H_9O_2$; dose, gr. ij to x. Ferri valerianas, $Fe(C_5H_9O_2)_6$; dose, gr. j to iij. Quininæ valerianas; dose, gr. j to iij. Zinci valerianas $(C_5\dot{H}_9O_2)H_2O$; dose, gr. ½ to ij.

Medical Properties and Uses.—Valerian and its preparations have a peculiar, disagreeable odor and a hot, pungent taste, with a sensation of warmth at the epigastrium, being a gentle stimulant and antispasmodic. In moderate doses the action of the heart is increased, with a rise of temperature and diaphoresis. Large doses cause nausea, hiccough, eructations, vomiting and diarrhœa. Small doses have no apparent physiological effects. It antagonizes strychnine. Valerianic acid is apparent in the breath, perspiration and urine. Valerian is frequently employed in hysteria and general nervousness, as are also the valerianates; also in flatulence, whooping-cough, neuroses of the respiratory organs, epilepsy, chorea, paralysis agitans, diabetes, etc. Valerianate of ammonia is used in nervous headache and in dental and other neuralgias. (See Valerianate of Ammonia.)

Dose.—Of *Abstractum Valerianæ*—Abstract of valerian, gr. v to ℈j. Of *Extractum Valerianæ Fluidum*—Fluid extract of valerian, ʒss to ʒss. Of *Tinctura Valerianæ*—Tincture of valerian, ʒss to ʒij. Of *Oleum Valerianæ*—Oil of valerian, ♏ij to ♏iv.

VASELIN—VASELINE.

PETROLEUM OINTMENT—PETROLATUM, COSMOLINE.

Derivation.—Vaseline is obtained from crude petroleum, in the form of a petroleum jelly. In distillation of crude petroleum there remains in the apparatus, after the separation of the light oils, a semi-liquid tar, which constitutes crude vaseline, which, in such a state, has a disagreeable odor like petroleum, of a strong taste and black color. This compound is heated

in the open air, and decolorized by animal charcoal, the product being the petroleum jelly known as vaseline, which is a mixture of several hydrocarbons.

When pure, vaseline is white, inodorous and insipid, and of the consistence of jelly, or very unctuous fat. It melts at 35° C., boils at 150° C., and distills at 200° C., and burns without residue. Exposed for a considerable time to light, it acquires a slight odor of petroleum. It is insoluble in water, sparingly soluble in alcohol, and very soluble in warm ether, chloroform, fats, volatile oils, and sulphide of carbon. It sensibly dissolves iodine, bromine, sulphur, phosphorus, carbolic acid, benzoic acid, atrophine and strychnine.

Medical Properties and Action.—By its composition, vaseline is not capable of becoming rancid, nor of being saponified; hence it is a very useful agent or excipient for caustic alkalies, oxides, metallic salts, and even acids in the cold without action by them, and without modifying their therapeutic properties. Incorporated in ointments, a certain quantity of vaseline will preserve them and obviate rancidity, being preferable to lard, butter, glycerine and glyceroles. The addition of paraffin will give it any consistency desired.

Therapeutic Uses.—Vaseline is used externally as a dressing for wounds, cuts, bruises, sprains, piles, rheumatism, skin diseases, eczema, inflamed surfaces, diseases of the eye, etc., etc. Combined with carbolic acid, it forms a very useful ointment for affections of the skin, etc., etc.

Dental Uses.—Vaseline is an efficacious application to inflamed and excoriated surfaces of the gums and mucous membrane of the mouth; also as a dressing introduced into the canals of teeth affected with periodontitis, and as an emollient application after the devitalization and removal of dental pulps. Carbolated cosmoline on cotton has been employed for filling root canals, but the results have not in all cases been satisfactory.

In the form of *Vaseline Camphor Ice*, it is a pleasant and efficacious application to chapped lips and hands, being bland and non-irritating in its action.

An ointment made by dissolving and incorporating thoroughly by the aid of heat, equal parts of vaseline and lead plaster, to which a little bergamot may be added for perfume, is very serviceable for the treatment of excoriated surfaces, and dry desquamating surfaces of certain skin diseases, and especially the form of skin affection which may result from the constant use of scented soaps on the hands.

DENTAL FORMULA.

Local Anæsthetic.

DR. POINSOT.

℞. Oleo-naphthine (liquid vaseline),
Arachis oil . . . . . āā . . . . . 50 centigrammes.
Pure cocaine . . . . . 5 centigrammes.

M.—Dissolve the cocaine in a hot water bath and wash gum where the injection is to be made with absolute alcohol. Make a number of injections around tooth slowly, and wait 8 minutes.

VERATRINA—VERATRINE.

Source.—Veratrine is an alkaloid, or a mixture of alkaloids, obtained from the seeds of *asagræa officinalis*, of the natural order *Melanthaceæ*. It is in the form of a white, or grayish-white amorphous powder, of an acrid taste, imparting a sensation of tingling and numbness to the tongue, and causing constriction of the fauces and violent sneezing. It is but slightly soluble in cold or hot water, to which it imparts an acrid taste and a somewhat alkaline reaction.

It is soluble in three parts of alcohol at 59° F., and very soluble in boiling alcohol; also soluble in 6 parts of ether, in 2 parts of chloroform, and in 96 parts of glycerin; it melts when heated.

VERATRINE OINTMENT—*Unguentum Veratrinæ*—is composed of veratrine, 4 parts; alcohol, 6 parts; benzoinated lard, 96 parts. The veratrine is rubbed with the alcohol in a warm mortar until dissolved, and the benzoinated lard gradually added and thoroughly mixed.

Therapeutic Uses.—Veratrine is only used externally in neu-

ralgia, myalgia, headache, rheumatism, paralysis, etc., in the form of the ointment, or dissolved in alcohol.

Dental Uses.—Veratrine, in the form of the ointment, is used for facial and other forms of neuralgia, a small quantity being rubbed over the seat of pain. It is also used as an obtundent of sensitive dentine.

DENTAL FORMULÆ.

For Sensitive Dentine.

BOGUE.

℞. Veratrinæ . . . . . gr.iv
Acidum tannicum . . gr.j
Alcoholis . . . . . gtt.xx
Glycerini . . . . . f℥j
Acidi carbolici . . . . ℥ij. M.

SIGNA.—Dry the tooth thoroughly and apply to sensitive surface.

For Facial Neuralgia.

GARRETSON.

℞. Veratrinæ . . . . . gr.iv
Aconitinæ . . . . . gr.ij
Olei tiglii . . . . . gtt.ij
Olei olivæ . . . . . ℥ij. M.

SIGNA.—Rub over affected spot thrice daily.

VERATRUM VIRIDE—AMERICAN HELLEBORE.

POKE ROOT.

Source.—Veratrum Viride, of the natural order *Melanthaceæ*, the officinal portion of which is the root, is indigenous to the swampy portions of the United States, and is prepared in the form of slices or fragments, of a dark or blackish-gray color externally, and of a grayish-white color internally. Its odor is peculiar, especially when it is moistened, and its taste is bitter and acrid. It is inodorous, but in the form of powder is sternutatory. It is similar in chemical composition to veratrum album— white hellebore and veratrum sabadillæ. Like veratrum album, it contains a quantity of soft resin, and two alkaloids—*jervia and veratroidia.*

Medical Properties and Action.—Veratrum viride is acrid and sedative, causing redness and heat when applied to the skin, and has a violent sternutatory effect on the Schneiderian membrane. Small doses stimulate the secretions and depress the pulse. Although a prompt emetic, its operation is attended with intense nausea and depression, and violent, persistent vomiting. Large doses occasion great depression, with a weak action of the heart and pulse, vomiting, retching, cold sur-

face of body, a cold perspiration, faintness, dimness of sight, dilatation of the pupils, great muscular weakness, slow respiration, and sometimes coma, insensibility and stertorous breathing, but notwithstanding such symptoms, fatal results are rare. The antidotes are free stimulants. The tincture—*Tinctura Veratri Viridis*, is the best preparation for internal administration.

Therapeutic Uses.—Veratrum viride is not employed for its emetic effect, on account of its violent action. Internally it is administered in diseases of the heart, active hemorrhage in the plethoric, to reduce the temperature and pulse in "typhoid and other fevers," in acute mania and delirium, in puerperal convulsions, neuralgia, neuralgic headache, etc. Externally it is employed for neuralgia, myalgia, headache, rheumatism, paralysis, etc.

Dose.—Of the tincture of veratrum viride, ♏i to ♏v; of the fluid extract of veratrum viride—*Extractum Veratri Viridis Fluidum*, ♏ij to ♏v; veratrina, gr. $\frac{1}{50}$ to gr. $\frac{1}{10}$.

Dental Uses—In dental practice, the tincture of veratrum viride has been employed internally for neuralgia of the fifth nerve; also in periodontitis, as a sedative; also in severe hemorrhage from the extraction of teeth, to depress the heart's action.

DENTAL FORMULA.

For Facial Neuralgia.

DA COSTA.

℞. Veratriæ . . . . . gr.xv
Aconitiæ . . . . . gr.ij
Glycerinæ . . . . . f℥ij
Cerati adipis . . . . . f℥vj. M.

SIG.—To be rubbed over painful part, care being taken to see that there is no abrasion of the skin.

XANTHOXYLUM—PRICKLY ASH.

Source.—Xanthoxylum is a shrub growing in the northern, middle and western States of North America. The bark is the officinal portion, and is obtained in the form of pieces, more or less quilled, of one or two lines in thickness and of a

whitish color, with an ash-colored epidermis. It is quite inodorous and has a taste at first sweetish and slightly aromatic and afterwards bitter and acrid.

Medical Properties and Action.—Xanthoxylum is aromatic, stimulant and sialagogue, and when swallowed occasions a sense of heat in the stomach, more or less general arterial excitement, and a tendency to diaphoresis.

Therapeutic Uses.—Xanthoxylum has been administered with considerable benefit in the chronic form of rheumatism.

Dose.—Of powdered xanthoxylum, gr. x to ℥ss, three or four times a day.

Dental Uses.—Xanthoxylum, in the form of the powder, has been applied with success to an aching pulp for the relief of odontalgia, and a decoction of the bark is employed as a wash for foul ulcers; in the form of a tincture it is efficacious in relieving the soreness which remains after the extirpation of the dental pulp; it is applied on floss silk or cotton. In the southern States the Angelica Tree—*Aralia Spinosa*, sometimes called "Toothache Tree," is often called prickly-ash, but it differs from xanthoxylum, although its tincture answers for the relief of odontalgia.

ZINCI CHLORIDUM—CHLORIDE OF ZINC.

Formula.—$ZnCl_2$.

Derivation.—Chloride of Zinc is obtained by the action of hydrochloric acid on granulated zinc, the solution thus made being purified by a solution of chlorine and carbonate of zinc, when it is evaporated till it assumes a solid form. It is in the form of a white deliquescent salt, freely soluble in water, alcohol and ether, as soft as wax, and capable of being melted and sublimed by heat. As it rapidly deliquesces when exposed to the air, it should be kept in glass-stoppered bottles. It has a styptic, metallic taste, which is very disagreeable.

Medical Properties and Action.—Chloride of zinc is the most active of the zinc preparations, being a powerful and penetrating escharotic. Its local action as a caustic depends upon its affinity for albumen and gelatin, and when in contact with living

parts it destroys their vitality, and uniting with the albuminous and gelatinous matters present, forms an eschar. It is also a useful deodorizer and disinfectant, and largely diluted has been employed as a nervine tonic; but as the milder preparations of zinc answer the same purpose, it is rarely employed internally. On account of the great affinity for water and its power of combination with albumen, chloride of zinc penetrates and spreads deeply, and produces an eschar which is white, thick and hard. When applied to malignant and indolent ulcers, it promotes healthy granulations, and when topically applied it not only destroys the diseased structure, but excites a new and healthy action in the surrounding parts. When employed as a caustic, it does not give rise to constitutional disorder from absorption, an effect which is sometimes caused by arsenical preparations. In over-doses it causes a burning pain in the throat and stomach, nausea, vomiting, cold sweats, decrease of pulse, cramps of the limbs, etc., being a powerful irritant poison. The antidotes in poisoning by zinc salts are albumen, carbonate of soda, magnesia and soap.

Therapeutic Uses.—Chloride of zinc has been employed internally in chorea, epilepsy, neuralgia, scrofula, and combined with hydrocyanic acid in facial neuralgia. Externally it is applied to malignant growths, gonorrhœa, indolent ulcers, etc. A solution of the chloride of zinc is used as an antiseptic and disinfectant.

Liquor Zinci Chloridi—*Solution of Chloride of Zinc*, known as "Burnett's Disinfecting Fluid," is composed of chloride of zinc, gr. cc, water, ℥j.

Dose.—Of Chloride of zinc, gr. ss. or gr. j, or gr. ij, largely diluted.

Dental Uses.—Chloride of zinc is a valuable agent in dental practice, being employed as an external application to sensitive dentine. As an obtunding agent a drop of the deliquescent chloride is placed in contact with the sensitive dentinal surface (which has previously been dried and is protected from all moisture), and allowed to remain from two to four minutes. Considerable pain follows the application of the chloride, which

is of a steady continuous character, without the throbbing nature which characterizes the pain of an irritated dental pulp. Its painful action may be modified by bathing the sensitive surface, prior to the application of the chloride, with chloroform, tincture of aconite or atropine solution, or a combination made. When the pain has subsided the excavation of the cavity can be proceeded with until the layer of dentine affected by the chloride has been removed, when another application may be necessary. As it is not absorbed by the dentine to any great degree, its action being superficial, it is not so dangerous an agent as is arsenious acid when employed for the same purpose.

In no case should the chloride of zinc be used as an obtunding agent, when there is danger of irritating the pulp of the tooth.

Chloride of zinc applied to dentine as an obtunder of sensibility, is superficial in its action It is also employed to arrest superficial hemorrhage from a wound of the gum during the filling of teeth; it will also temporarily arrest the secretion of mucus from the surface of the mucous membrane of the mouth. When applied to a cut surface it induces union by first intention, by its effect upon the glutinous matter.

It has also been successfully employed as an injection for chronic alveolar abscesses, and in the treatment of ulceration of the gums attended with recession of gum and absorption of process from the necks of teeth; also as an injection in disease of the antrum. It has been claimed that its application in a diluted form will promote the formation of secondary dentine over a nearly exposed pulp, but its escharotic action must be considered in using the agent for such a purpose. When applied to the sulcus which often forms during ulceration and recession of the gum from the neck of a tooth, the application can be safely and conveniently made by means of a camel's hair brush, or by a piece of orange wood so shaped as to permit of its being introduced to the bottom of such a sulcus. Chloride of zinc in a properly diluted form is an efficient

disinfectant, and has been employed for such a purpose in gangrenous conditions of the mouth.

Chloride of zinc is one of the ingredients of the temporary filling material composed of the chloride of zinc in solution and the oxide of zinc, which has been employed to cap the exposed pulps of teeth. But owing to the escharotic action of the chloride this method has not been uniformly successful. The zinc preparations, however, answer good purposes as temporary filling materials, especially in sensitive cavities where the presence of metallic fillings would not be tolerated. (See Oxide of Zinc.)

ZINCI IODIDUM—IODIDE OF ZINC.

Formula.—ZnI_2.

Derivation.—Iodide of Zinc is obtained by digesting an excess of zinc with iodide diffused in water. It is in the form of fine, white, deliquescent needles, very soluble in water, and of a metallic, styptic taste, resembling that of sulphate of zinc, and is very liable to spontaneous combustion.

Medical Properties and Action.—Iodide of zinc is tonic, astringent and antispasmodic.

Therapeutic Uses.—Iodide of zinc has been favorably employed in chorea, cachexia, scrofula and hysteria. It has been used for strumous inflammations and enlargements, both externally and internally. Externally it is an efficient local stimulant and escharotic, and is considered to be equal, if not superior, to chloride of zinc. In enlarged tonsils it has been advantageously employed in a solution of 10 to 30 grains to the ounce of water. In the form of an ointment composed of a drachm of the iodide to the ounce of lard, it has been used in the treatment of tumors.

Dose.—Of iodide of zinc, gr. j, gradually increased to gr. vj, given in the form of syrup.

Dental Uses.—Iodide of zinc is a valuable local application in alveolar pyorrhœa, tumors of the mouth, enlargement of the tonsils, etc. In alveolar pyorrhœa it is used in connection with peroxide of hydrogen, which see.

DENTAL FORMULÆ.

For Alveolar Pyorrhœa.

A. W. HARLAN.

℞. Zinci iodi . . . gr. xij to xxiv.
Aquæ . . . . f℥j. M.

SIGNA.—After drying the gums, inject each pus-pocket with one, two or three drops of this solution.

For Alveolar Pyorrhœa.

A. W. HARLAN.

℞. Zinci iodi . . . . . gr. x;
Aquæ . . . . . ℥xc. M.

SIGNA.—Inject with a syringe if the pockets are shallow without much carious process.

ZINCI OXIDUM—OXIDE OF ZINC.

Formula.—ZnO.

Derivation.—Oxide of zinc is obtained by subjecting precipitated carbonate of zinc to a red heat, till the whole of the carbonic acid and water are expelled.

It is in the form of a yellowish-white powder, insoluble in water, but soluble in dilute sulphuric and hydrochloric acids, without effervescence. It is inodorous and tasteless.

Medical Properties and Action.—Oxide of zinc is tonic and antispasmodic, but in large doses causes vomiting and purging; by gradually increasing the dose, large quantities can be taken without injurious effects. It should never be given on an empty stomach, as it may cause nausea.

Therapeutic Uses.—It is employed in spasmodic asthma, convulsions of children, epilepsy, chorea, whooping-cough, hysteria, and is an excellent remedy for gastralgia; also in chronic diarrhœa and chronic dysentery.

Dose.—Of oxide of zinc, gr. ss to gr. x.

Dental Uses.—Oxide of zinc may be employed in the treatment of convulsions of children during dentition, given in doses of gr. ss to gr. v, gradually increased to gr. viij, in powder, with a little sugar. It is also combined with carbolic acid, in a fluid form, for capping exposed pulps, being applied in the form of a paste to the exposed surface of the dental pulp. It also forms an ingredient of the zinc-filling materials, and of the celluloid base for artificial teeth. It is generally supposed that alkalies, especially ammonia, have more effect in disintegrating oxyphosphate fillings in the mouth than have acids

DENTAL FORMULÆ.

Oxyphosphate of Zinc Preparation for Filling Teeth.

POWDER.

℞. Zinci oxidi . . . . . partes 200
Silicii (fine powd.) . . partes viij
Sodii boratis . . . . . partes iv
Pulv. glass. . . . . partes v.

Levigate under water, to ensure complete admixture, and dry by evaporation; then calcine at a white heat; then reduce to powder.

LIQUID.

℞. Acidi phosphorici,
Aquæ . . . . . q.s. to dissolve,

and evaporate the solution by aid of heat, until it is of the consistence of glycerin.

Another Formula for the Oxyphosphate Preparation, in which simply the calcined oxide of zinc and glacial phosphoric acid are employed, is prepared as follows:—

Calcine the oxide of zinc for two hours, at a white heat, or until it becomes a hard, yellowish mass; then pulverize in a mortar, and sieve through fine bolting cloth. For the liquid take ℥j of glacial phosphoric acid (German), in crystals, and dissolve in f℥j of water, and then evaporate to one-third, on a sand bath.

Oxychloride of Zinc Preparation for Filling Teeth.

FOR THE POWDER.

℞. Zinci oxidi . . . . . gr.xxx.
Sodii boratis . . . . . gr.ij
Silicii (fine powd.) . . gr.j.

Mix thoroughly and subject to a bright-red heat in a crucible. Then grind this frit to a powder, and mix it with three times its weight of calcined oxide of zinc.

FOR THE LIQUID.

℞. Zinci chloridi (deliq.) . f℥j
Aquæ . . . . . f℥v to vj.

For Neuralgia of the Head.

VON NIEMEYER.

℞. Ext. hyoscyami,
Zinci oxidi . . . āā . . . ℈ij. M. SIGNA.—Fiat pill. xj.

Begin with one pill morning and evening, and increase to xx or xxx daily.

ZINCI SULPHAS—SULPHATE OF ZINC.

Formula.—$ZnSO_4 7H_2O$.

Derivation.—Sulphate of zinc is obtained by the action of sulphuric acid on granulated zinc, the solution being purified by means of chlorine and carbonate of zinc, and afterwards evaporated, the product being crystals of sulphate of zinc. It is in the form of colorless crystals, which effloresce on exposure to air, and are soluble in water and insoluble in alcohol, resembling in appearance Epsom salts. It has a disagreeable, metallic, styptic taste.

Medical Properties and Action.—Sulphate of zinc is tonic, astringent, antispasmodic, and, in large doses, emetic. Exter-

nally, it is stimulant and astringent. When its use is long continued, it produces symptoms like those of lead. When administered in proper doses, it exerts an antispasmodic influence on the nervous system, and where there is spasm and convulsion, it is very serviceable.

Therapeutic Uses.—It is internally administered in epilepsy, chorea, hysteria, angina pectoris, chronic dysentery, flatulence, night sweats of phthisis, etc., and is a prompt emetic in cases of narcotic poisoning. Internally, it is employed in the treatment of gonorrhœa of the eye, chronic skin diseases, epithelioma, ulcers, gangrene, etc.

Dose.—Of sulphate of zinc, gr. ¼ to gr. vi. For an emetic in cases of poisoning six grains will prove sufficient, well diluted with water, and repeated every fifteen minutes until emesis occurs.

Dental Uses.—Sulphate of zinc is employed externally in dental practice, in gangrene of the mouth, disease of the antrum, ulcerations of mucous membrane, and indolent ulcers, acting as a stimulant and astringent.

DENTAL FORMULÆ.

For Gangrene of the Mouth (Cancrum Oris).

℞. Zinci sulphat . . . . . gr.xx
Mellis . . . . . ℥j. M.

SIGNA—To be applied with a camel's hair brush.

For Ulceration of Mucous Membrane of the Mouth.

℞. Zinci sulphat . . . . . gr. j to v
Aquæ destillatæ . . . . ℥j M.

SIGNA.—To be used as a gargle or lotion.

For Chronic Alveolar Abscesses, Abscess of Antrum, etc.

G. L. PARMELE.

℞. Zinci sulphat . . . . . gr.iij
Plumbi acetatis . . . . . gr. v
Tinct. catechu . . . . . gtt. x
Aquæ . . . . . f℥j. M.

SIGNA.—Use as a stimulating injection.

ANTISEPTICS IN DENTAL PRACTICE.

The term *antisepsis* implies the prevention of septic influence or putrefaction in wounds, and the healing of wounds by first intention or without suppuration.

Antiseptics are medicinal substances which possess the power of arresting the process of putrefaction, and they embrace such drugs as organic (vegetable) acids, inorganic (mineral) acids, the former, such as carbolic, salicylic and benzoic acids being applicable to tooth-structures and tooth-tissues; while the latter, such as nitric, sulphuric, hydrochloric, boracic and chromic acids are restricted to the treatment of tooth-tissues; also, the iodides, which include the tincture of iodine, iodoform, iodol, potassium iodide, aseptol, aristol; also the mercurials, such as the bichloride and biniodide of mercury; also such oxidizing agents as peroxide of hydrogen and permanganate of potash; also the essential oils, such as cajuput, cassia, peppermint, cloves, thyme, turpentine, caraway mustard, eucalyptus, juniper, gaultheria, cinnamon, eugenol, sassafras, pennyroyal, valerian, etc.; also the wood and coal-tar derivatives, such as creasot, hydronaphthol, resorcin, lysol, etc.; also heat. The methods of using antiseptics in dental practice are by irrigation, disinfection, and as antiseptic dressings. Irrigation consists in washing out cavities in teeth, applications to inflamed and infected surfaces, syringing abscesses, and the use of mouth-washes or lotions, diluted aqueous solutions of antiseptic agents being considered preferable to concentrated solutions for such purposes.

Disinfection consists in the destruction of micro-organisms and the products of fermentation and putrefaction in carious cavities, pulp-canals, gangrenous pulps, etc.

Antiseptic dressings or applications are in the form of powders, solutions, and pastes, or mixed with filling materials, such as the preparations of zinc. When acids are used as antiseptics, they must be so diluted as to deprive them of their caustic properties or action, and the mercurials, such as the bichloride, must be in such weak solutions as will prevent toxic effects on the system. Different antiseptics are required according to the anatomical structure of the part on which they are to act, and also its physical condition, as the inflammation present may be either acute, or chronic, or the tissue be in a septic or putrescent state; hence, each con-

dition demands a particular class of antiseptics. The strength of the antiseptic employed will also depend upon the condition of the tissue or structure at the time of application. Dr. W. D. Miller has established the relationship of micro-organisms to the etiology of dental caries, and also shown that all fermentative and putrefactive processes of the dental pulp and oral mucous membrane are conditioned by the presence of living bacteria. From recent experiments made by Dr. Miller on the comparative value of antiseptics for sterilizing cavities, etc., he concludes that bichloride of mercury, "which usually ranks as the king among antiseptics," and gave uniformly good results, in one method he employed, fell considerably short of the striking action shown by the trichloride of iodine, and he further remarks that "we have consequently reasons to hope that the trichloride of iodine may prove a valuable remedy in the treatment of diseased conditions of the teeth and mouth, and that the five per cent. solution is one of the most active agents at our demand for disinfecting carious dentine. Of carbolic acid, he says, while it is a very active antiseptic agent, it falls considerably behind the bichloride of mercury and trichloride of iodine in its penetrating power. Of lysol and trichlorphenol, he says that the results were very similar to those obtained by carbolic acid. Of peroxide of hydrogen, he says, that although it is an excellent sterilizer for thin layers of carious dentine, it fails when applied to thicker ones, as antiseptics applied to cavities of decay on cotton naturally retain their power but a few hours; pledgets of cotton saturated with carbolic acid and placed in large cavities near the gums, lose their antiseptic action in twenty-four hours. Of chloride of zinc, he thinks that although it penetrates the tissue quite rapidly, yet its antiseptic power is inferior to that of many other available antiseptics, and that the pain attending its application to the nearly exposed pulp, more than counterbalances any slight advantage it might otherwise have over carbolic acid.

Hydronaphthol showed considerable penetrating, antiseptic and consequently preservative action. Iodoform he considers

to be one of the most worthless antiseptics, and that this fact has not been revealed long ago is in part due to the circumstance that it is nearly always employed in conjunction with some other material, such as carbolic acid, oil of cloves, etc.

The essential oils, pyoktanin, benzoic acid, alcohol, thymol and resorcin, all fell far short of the standard of efficiency maintained by other antiseptics for sterilizing carious cavities. He found that thymol and salicylic acid manifested an evident preservative action upon the dental pulp, but the effects were confined to a small portion of the pulp. Of the two, thymol gave the better results. Of the aniline colors methyl violet and methylene blue, neither, he says, has the slightest preservative action, nor did they penetrate the pulps to a depth of more than a quarter of an inch. Campho-phenique, he says, appeared to penetrate the pulp-tissue about as rapidly as carbolic acid, and moderately hardened the tissue, giving to it antiseptic properties by the absorption of the solution, but not equal to that imparted by carbolic acid alone.

The antiseptics Dr. Miller found to be pre-eminently active in preventing decomposition of pulp-tissue, were: bichloride of mercury, cyanide of mercury (?), trichlorphenol, sulphate of copper, carbolic acid, oil of cloves, chloride of zinc, campho-phenique (?), hydronaphthol (?).

Those of doubtful value: thymol, salicylic acid, eugenol, *a* and *b* naphthol, acetico-tartrate of aluminium, five per cent. solution of bichloride of mercury, and possibly some essential oils.

According to Dr. Black, "infectious matter contains living particles that will grow and reproduce themselves. Septic matter may be in solution; it is poisonous. It is the product of the growth of micro-organisms, and it is this product of the dentine that is dangerous in many cases, to the exclusion of infectious matter; for while infectious matter may be in the dentine, may live there for a time, it certainly will not live there very long if communication by which it receives food is cut off. It must receive food in any case, and must get clear of its waste products or it will soon be choked. Though

microbes may not be present in the dentine, there is danger of poisoning from the septic matter that is absorbed, filling the dentinal tubules. We have a different set of conditions when we leave a little bit of softened dentine over a pulp nearly exposed. We may cover in the anærobic microbes. In a short time they produce products that will destroy the pulp, or they may pass through and penetrate into the pulp, and we may have an infected pulp presently from the microbes we have covered in. This action is brought about rapidly and the poisonous matter escapes toward the pulp. If we have covered them in with the filling we have sealed up the elements for destroying that pulp. It is not necessary that the dentine be softened more; it may not be a class of microbes that soften dentine. It is a microbe that attacks the sarcous elements of the body; the contents of the dentinal tubes are attacked just as well. So here we need a disinfectant. What shall we use? Certainly not one of the coagulants (such as carbolic acid, creasote and chloride of zinc—agents which seal the septic matters within the teeth); certainly not one that places a barrier to its own penetration by coagulating the albumen. These are not the antiseptics you should use in this place, but something we can depend upon to penetrate in the presence of albumen, and we find that to-day in the use of the essential oils, and among them the oil of cassia is the most potent. There are many of the essential oils that when used in substance will destroy microbes just as quickly as the oil of cassia, and among them may be mentioned the oil of turpentine, but there is none of them that will destroy microbes so rapidly and so certainly with that proportion of the oil that will dissolve in water, or the fluid with which they come in contact in their application in practice as the oil of cassia. In bacteriology, the terms *germ*, *bacteria*, *microbe*, *schizomycetes*, are used almost as synonymous names, but microbe seems preferable to germ or bacteria, and schizomycetes is considered to be a better scientific term than either. It is also conceded that these are unicellular and assimilate nourishment apparently by absorption in the media in which

they live, but they must alter their foods found proper, and yet unfit in nature for their use and appropriation. Bacteria living or dead matter encounter no living resistance, while those feeding on living tissues, or fluids in living tissues, meet the living cells of the body and have to combat them. The diastases secreted by the various beings, whether highly organized, or unicellular and microscopic, have something in common as to their respective objects and their properties of transforming matter. The roll of microbes in existence is complex and necessary, though some are injurious. They act as scavengers, return to the air and water the organizable elements abstracted daily by the vegetables and indirectly by animals, and are indispensable to life. The bacteria that invade living organisms which happen to be fit for their nourishment and growth are considered to be parasites. The spontaneous generation of living organisms, no matter how little, is now regarded as a fallacy.

Formerly, when the root-canal of a tooth was opened and found to be empty and dry, peridental trouble resulted. But the treatment of such cases, as now pursued, consists in excluding the saliva and atmospheric microbes, the removal of every particle of debris, and the application of antiseptics and disinfectants. To render a pulp-canal permanently aseptic, it should be thoroughly cleansed with either alcohol, peroxide of hydrogen or ammonia, using a syringe to prevent septic matter being forced through the foramen. After the alcohol has evaporated, or the canal thoroughly dried of the peroxide of hydrogen or ammonia, by means of a hot air syringe, an application of the bichloride of mercury or other antiseptic is then made, and the canal rendered permanently aseptic. In an open pulp-canal containing partly devitalized pulp-tissue, the same care must be exercised to cleanse, disinfect and render aseptic. When alveolar abscess exists as the result of a devitalized pulp, similar treatment is indicated; and in all cases where a pulp has been destroyed by therapeutic remedies or agents, the treatment consists in cleansing, disinfecting and filling the pulp-canals.

Dr. A. W. Harlan remarks: "All cavities in living and pulpless teeth are infected through the agency of pathogenic bacteria or micrococci. (Black, Milles, and Underwood and Miller.) These micro-organisms and other septic matters cannot be destroyed in excavating a cavity in a living tooth short of destruction of the pulp by coagulating drugs save in rare instances. Dilute solutions of bichloride of mercury, peroxide of hydrogen and some of the naphthol compounds, belong to this class; coagulators cannot be used in a sufficiently diluted state to accomplish disinfection without injury to the parts to which they are applied. Diffusible drugs will destroy septic materials, including cause of infection, without injury to the living hard or soft tissues. The above will apply as well to infected pulpless teeth, and this is even true with reference to the coagulation of the exposed organic matrix in the interior of a tooth partly softened by caries. Coagulating agents simply coagulate and leave the coagulum to become a source of food supply to the ærobic and anærobic microbes."

Dr. Harlan recommends the following for softened dentine: Corrosive sublimate, peroxide of hydrogen and tartaric acid combined, applied with wood or platinum points; then dry the cavity and apply myrtol in full strength and dry it again. He also says: If it is deemed a necessity to apply an antiseptic agent to a cavity in a tooth having a living pulp, an oil (one of the essential oils, such as peppermint, camphor, turpentine, thyme, cassia, cinnamon, caraway, eugenol, cajuput, eucalyptol, terpinol, myrtol, sassafras,) may be left in contact with the cavity, sealed with gutta percha, or the cavity may be stopped with oxysulphate of zinc for any number of days. The cavity should be well dried before introducing the oil. He also remarks that there is no theoretical objection to the use of carbolic acid in a living tooth, if it is reapplied from time to time perfectly warmed. It should not be used to protect the pulp from the invasion of micro-organisms or deep-seated cavities, as it will prove inadequate by lack of diffusibility.

"It is a mistaken idea to suppose that an agent like carbolic acid, liquefied or diluted with water, will prove a permanent

antiseptic in the presence of moisture, such as is nearly always present in a tooth. It does not possess embalming properties because it is easily absorbed and disappears. It should form no part of root-filling, nor should it be introduced into roots permanently. Copal, Canada balsam, or other agents of this class, may be used on an exposed pulp in its stead, and for injection into abscesses, using the root of the tooth as a channel, potass-permanganate, silico-fluoride of sodium, boro-glycerine, the oil of cloves, cassia, cinnamon, myrtol, and agents of this class, are far more powerful, with better stimulating, antiseptic and disinfectant properties, and they do not possess the coagulating properties of carbolic acid, or its disagreeable odor, and under no circumstances will they clog a delicate canal or destroy the soft tissue to which they are applied. Carbolic acid should take its legitimate place as a spray, a local anæsthetic and component of mouth-washes in dental practice, and as an adjuvant to the oils where local medication around the roots of teeth may be indicated, or for injection into the antrum of Highmore, combined with tannin, glycerine, camphor or potash, or be relegated to the laboratory as a component of sodium phenate, or in other chemical uses."

Dr. W. D. Miller, in a recent article on the disinfection of dental and surgical instruments, says: "There is no department of surgery in which the demand for antiseptic procedure is more urgent than in dentistry, for the reason that all of our operations are performed upon septic or infected tissues, and we have no means of rendering the territory to be operated upon aseptic except by the use of antiseptics of the highest character. We cannot extract a tooth, cleanse the canal of a pulpless tooth, excavate a cavity of decay or lance the gums; we cannot even touch any point in the oral cavity without our instruments becoming coated with a layer of infectious material. We are therefore bound to use antiseptics, not only for the purpose of disinfecting the already infected tissues, but for sterilizing our instruments to avoid the transmission of infectious matter from one patient to another." "The necessity

for absolute cleanliness on the part of the dentist, of his hands as well as of his instruments, napkins, drinking-glasses, rubber-dam, in short of everything with which he comes in contact with the patient's mouth, is universally recognized; at least there can be no one who has the courage to express a contrary opinion." "We can never know what virus may be clinging to our instruments, nor can we with certainty predict the result of a wound upon the gums, cheeks or lips with an unclean instrument."

From Dr. Miller's experiments we deduct the following: Boiling napkins for 10 or 15 minutes in soap-water completely sterilizes them. Small pieces of rubber-dam can be sterilized as a rule by exposing them for 30 minutes to a five per cent. solution of carbolic acid; but boiling small and large pieces of the dam are completely sterilized by subjecting them to boiling water for from six to fifteen minutes, according to size.

Drinking or rinsing glasses can be sterilized by boiling in pure water. Concerning instruments, he says: The ideal antiseptic is a liquid which acts immediately upon bacteria without in any way injuring the instrument. His results were as follows: A five per cent. solution of carbolic acid required one hour to sterilize instruments, and even after such a time the result was not certain; and of twenty-one pieces placed in concentrated carbolic acid for varying periods of time ranging from one to twelve minutes, only two were sterilized.

A five per cent. solution of trichlorphenol required an hour's time to sterilize. Lysol gave results nearly identical with those of trichlorphenol. An action of from fifteen to twenty minutes in a five per cent. aqueous solution of the bichloride of mercury gave the most promising result and can be relied upon to produce thorough sterilization; but he considers the time required to be so long as to render a five per cent. solution of the bichloride of mercury unsuitable for the purpose; besides the powerful action of this agent upon steel or iron is a serious objection to its use as a sterilizer. A ten per cent. solution of the peroxide of hydrogen came next to car-

bolic acid, but is considerably inferior to it. The essential oils in emulsion, as well as in pure form utterly failed to sterilize. A mixed antiseptic solution, composed of a five per cent. solution of trichlorphenol in peroxide of hydrogen, acted slightly more rapidly than the simple five per cent. aqueous solution of trichlorphenol, but the improvement was not encouraging. He finally concluded that boiling water is far superior to chemical antiseptics, and all other means, for sterilizing dental instruments, and that its easy application and rapid action should recommend it to every practicing dentist and physician. He regards an exposure of three minutes to boiling water sufficient for sterilizing the smaller dental instruments, and five minutes for any other. The addition of soda will prevent the rusting which is liable to occur when the instruments are boiled in water alone; hence a boiling solution of carbonate of sodium appears to be the most promising, Dr. Miller recommending an exposure of three to five minutes to a boiling one or two per cent. solution of soda for sterilizing dental and surgical instruments. The solution must not be simply hot, but boiling, since the motion of the boiling water materially assists in rapidly raising the temperature of the instruments to 100° C., and at the same time loosens up any matter that may be clinging to them.

Incompatible Antiseptics.—Corrosive sublimate and iodine; corrosive sublimate and soap; iodine and soap; carbolic acid and iodine; carbolic acid and permanganate of potassium; salicylic acid and soap; salicylic acid and permanganate of potassium; permanganate of potassium and oils soap, or glycerine; aristol and caustic alkalies, ammonia, mercuric chloride, metallic oxides, starch, or any substance which possesses a powerful affinity for iodine.

TEST-PAPERS FOR DENTISTS.

Very frequently it is important to the dentist to know whether his peroxide of hydrogen, which is so liable to change, is still good or has become decomposed; or whether his solution of bichloride of mercury has become inert by the

reducing action of organic matter in the water under the influence of sunlight. And so of many other chemicals used in the dental office which are apt to change in strength.

Prof. Chas. Mayr, of Springfield, Mass., has prepared a series of test-papers, which will enable the dentist to learn quickly and accurately whether his preparations are good or worthless, and without the use of cumbersome methods. They are put up in neat little books, each containing eight different papers (of some, like litmus, several papers are provided), affording sixty-four different reactions. The papers are as follows:

Phenyl-Carbinol, for strong acids and alkalies.
Turmeric, for alkalies.
Sulphide, for solution of metals.
Potassium Iodide, for H_2O_2, bichloride $\frac{1}{500}$.
Iodide Starch, for hydrogen peroxide.
Litmus, for weak acids and alkalies.
Erythroine, for salts and alkalies.
Lacmoid, substitute for litmus, not affected by carbonic acid.

Each paper has printed upon it the reactions it gives, so that even the inexperienced have a safe guide as to its uses.

NEW REMEDIES.

The following is a list of the new remedies more recently introduced, their action and posology, which will be found useful as a matter of reference:

	Therapeutic Uses.	*Dose.*
Acetanilide	Analgesic and antipyretic	2 to 5 grs. per os.
Acetylphenylhydrazin	Antipyretic and analgesic	3 to 5 grs. per os.
Agaricine	Antisudorific in phthisis	½ gr. per os.
Amylene hydrate	Hypnotic anodyne	½ gr. to 1 dr.
Anthrarobin	Against skin diseases	
Antipyrine	Antifebrile and anodyne	15 to 30 grs. per os. or subcutaneously.
Aristol	Antiseptic and in skin diseases	
Benzoyl-anilide	Antipyretic	1½ to 5 grs. per os.
Benzoylgaiacol	Antituberculotic	4 to 10 grs. per os.
Betol	Antigonorrhoic	In bougie.

	Therapeutic Uses.	*Dose.*
Bismuth salicylate	Against gastric affections	6 to 15 grs. per os.
Bromoform	Against pertussis	1 to 2 min. per os.
Camphoric acid	Antisudorific in phthisis, etc.	30 grs. per os.
Cetrarin	Stomachic	2 grs. per os.
Chloralamide	Hypnotic	30 to 45 grs. per os.
Chloralurethan	Hypnotic	15 to 45 grs. per os.
Creolin	Antiseptic	5 min. internally.
Ethylenimine hydrochloride	General stimulant	⅙ to ⅓ gr. subcutaneously.
Exalgine	Analgesic	4 grs.
Guaiacol	Antituberculotic	1 min. per os.
Hydrastinine	Against uterine hemorrhage	1 gm. subcutaneously.
Hydroxylamine	Against skin diseases	Externally.
Hydracetin	See acetylphenylhydrazine	
Hypnone	Hypnotic	3 to 8 min. per os.
Ichthyol	Antirheumatic; against sciatica, erysipelas, skin diseases	Externally and 4 to 20 min. per os.
Iodine trichloride	Antiseptic	Externally in 1 per cent. of solution.
Iodoform bituminate	Antiseptic	Externally.
Iodol	Antiseptic	Externally.
Lanoline	As an ointment base or vehicle for other medicaments	
Mercury phenate	Antisyphilitic	⅓ to ½ gr. subcutaneously.
Mercury peptoglutine	Antisyphilitic	⅙ gr. subcutaneously.
Mercury salicylate	Antisyphilitic	⅙ to ⅓ gr. subcutaneously.
Mercury succinimate	Antisyphilitic	
Methacetin	Antipyretic	3 grs. per os. for children.
Methylal	Hypnotic and anæsthetic	15 to 30 grs. per os.
Methylene blue	Analgesic	8 to 15 grs. per os.
Methylene chloride	Narcotic anæsthetic	
Monobromacetanilide	Analgesic	1 to 8 grs. per os.
Myrtol	Antiseptic in phthisis	5 min. per os.
Naphthalene	Antiseptic	2 to 8 grs. per os.
Naphtholic acid	Antiseptic and antiparasitic	
Naphthol	Antiseptic	
Naphthol camphoratum	Antiseptic antituberculotic	Subcutaneously.
Orexin hydrochloride	Stomachic	⅝ grs. per os.
Paraldehyde	Hypnotic and sedative	15 to 45 min. per os.
Phenacetin	Antipyretic, antineuralgic	8 to 20 grs. per os.

	Therapeutic Uses.	*Dose.*
Phenylurethan	Antifebrile, antirheumatic.	6 to 8 grs. per os.
Piperazide hydrochloride	General stimulant	Externally.
Pyoctanin	Antiseptic	
Pyridine	Antiseptic	1 to 1½ drs. by inhalation.
Pyrodin	See acetylphenylhydrazine	
Resorcin	Antiseptic antifermentative	
Rubidium ammonium bromide	Antiepileptic	½ to 1½ drs. per os.
Salipyrin	Antifebrile, antirheumatic.	15 grs. per os.
Salol	Antiseptic antigonorrhoic	15 to 30 grs. per os.
Sodium theobromine salicylate	Diuretic	8 to 15 grs per os.
Sodium anisate	Antipyretic, antirheumatic	15 grs. per os.
Sodium dithiosalicylate	Antipyretic, antirheumatic	3 grs. per os.
Sodium paracresotate	Antipyretic, antirheumatic	8 to 15 grs. per os.
Somnal	Hypnotic	30 min. per os.
Sozoiodol	Antiseptic	Externally.
Sulphaminol	Antiseptic	Externally.
Sulphonal	Hypnotic	15 to 30 grs. per os.
Terpene hydrate	Against pulmonary affections	3 to 16 grs. per os.
Terpinol	Against pulmonary affections	2 min. per os.
Tetronal	Hypnotic	15 to 30 grs. per os.
Thallin sulphate.	Antigonorrhoic	Injection.
Thiol	Ichthyol substitute q. v.	
Tribromphenol	Antiseptic	Externally.
Trional	Hypnotic	15 to 30 grs. per os.
Thioresorcin	Antiseptic	
Urethane.	Hypnotic	15 to 40 grs. per os.

ERUPTION OF THE TEETH.

TEMPORARY TEETH.

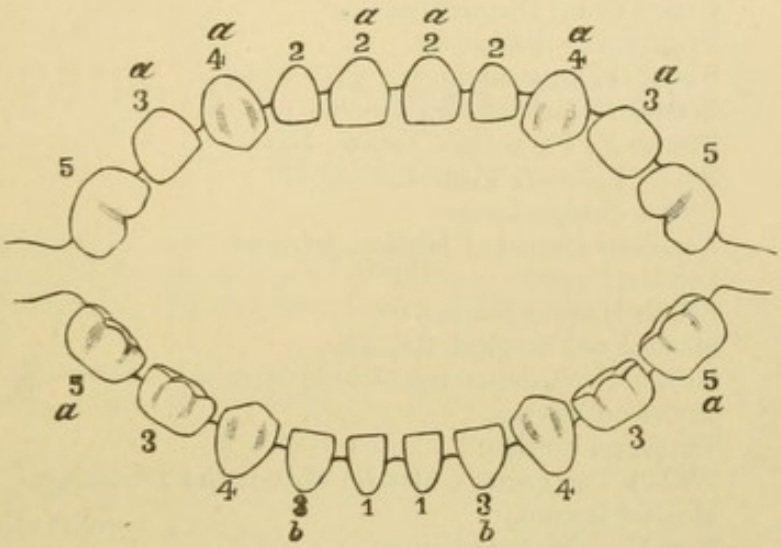
(The inferior generally precede the superior by two or three months.)

Central incisors	5 to 8 months
Lateral	7 to 10 "
First molars	12 to 16 "
Canines	14 to 20 "
Second molars	20 to 36 "

The following diagram, by Dr. Louis Starr,* shows the grouping, the date of eruption and the duration of the pauses between the appearance of each group of temporary teeth.

* Diseases of the Digestive Organs in Children, Philadelphia, 1891.

The numbers 1 to 5 indicate the groups to which the individual teeth belong and their order of appearance, and the letters *a* and *b* the precedence of eruption in the different groups.



EXPLANATION OF DIAGRAM.

1. 1. Between the fourth and seventh months. Pause of 3 to 9 weeks.

2. 2. 2. 2 Between the eighth and tenth months. Pause of 6 to 12 weeks.

3. 3. 3. 3. 3. 3. Between the twelfth and fifteenth months. Pause until the eighteenth month.

4. 4. 4. 4. Between the eighteenth and twenty-fourth months. Pause of 2 to 3 months.

5. 5. 5. 5. Between the twentieth and thirtieth months.

PERMANENT TEETH.

First molars	5 to 6 years	Second bicuspids .	10 to 12 years.
Central incisors	6 to 8 "	Canines	11 to 13 "
Lateral	7 to 9 "	Second molars . .	12 to 14 "
First bicuspids	9 to 10 "	Third molars . . .	17 to 21 "

AUTHORITIES CONSULTED.

Pharmacopœia of the United States.
Bartholow's Materia Medica and Therapeutics.
United States Dispensatory.
Braithwaite's Retrospect.
National Dispensatory.
Waring's Practical Therapeutics.
Blakiston's Physician's Visiting List.
Biddle's Materia Medica.
British Pharmacopœia.
American Journal of Medical Sciences.
London Lancet.
British Medical Journal.
Medical and Surgical Reporter.
Stillé's Therapeutics and Materia Medica.
Taylor on Poisons.
Tanner on Poisons.
Wood's Therapeutics, Materia Medica and Toxicology.
Medical Record.
New York Medical Journal.
Medico-Chirurgical Transactions.
Ure's Dictionary.
Therapeutic Handbook of the United States Pharmacopœia.
Universal Cyclopædia—A. McLane Hamilton.
Ellis' Medical Formulary.
Compendium of Medical Science.
American Journal of Dental Science.
Dental Cosmos.
Dental Register.
Ohio State Journal of Dental Science.
London Dental Record.
British Journal of Dental Science.
Garretson's Oral Surgery.
Tanner's Index to Diseases.
Pareira's Materia Medica and Therapeutics.
American System of Dentistry.
The Epitome.
Western Dental Journal.
Items of Interest.
Dental Advertiser.
Odontographic Journal.
Dental Review.
International Dental Journal.
Therapeutic Gazette.
Items of Interest.
Merck's Bulletin.
Shoemaker's Materia Medica and Therapeutics.
Turnbull's Artificial Anæsthesia.

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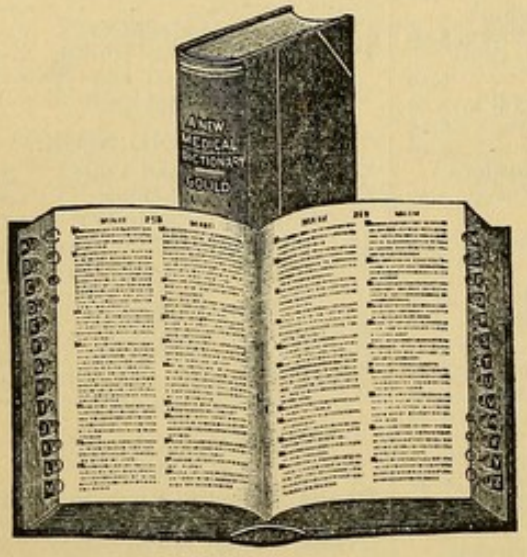
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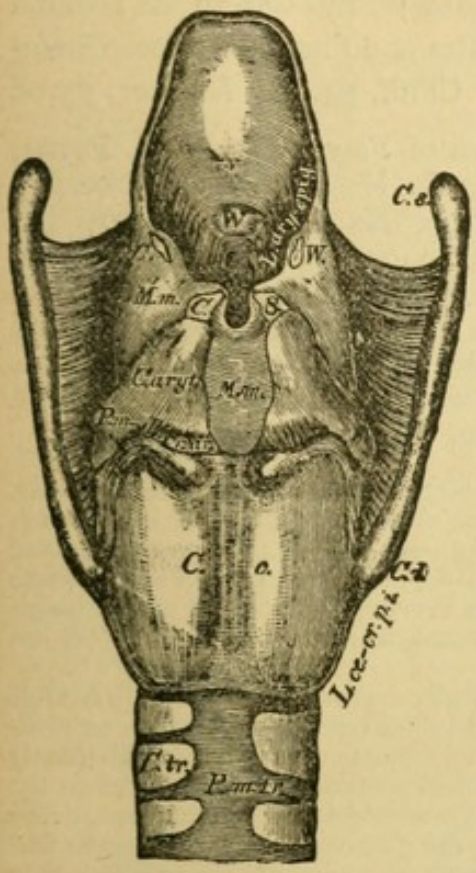
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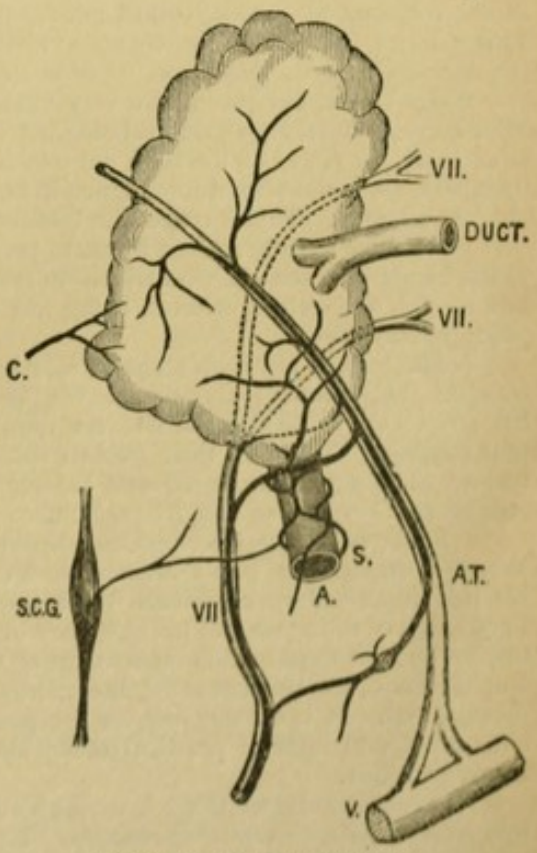
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