Dental materia medica and therapeutics / by James Stocken.

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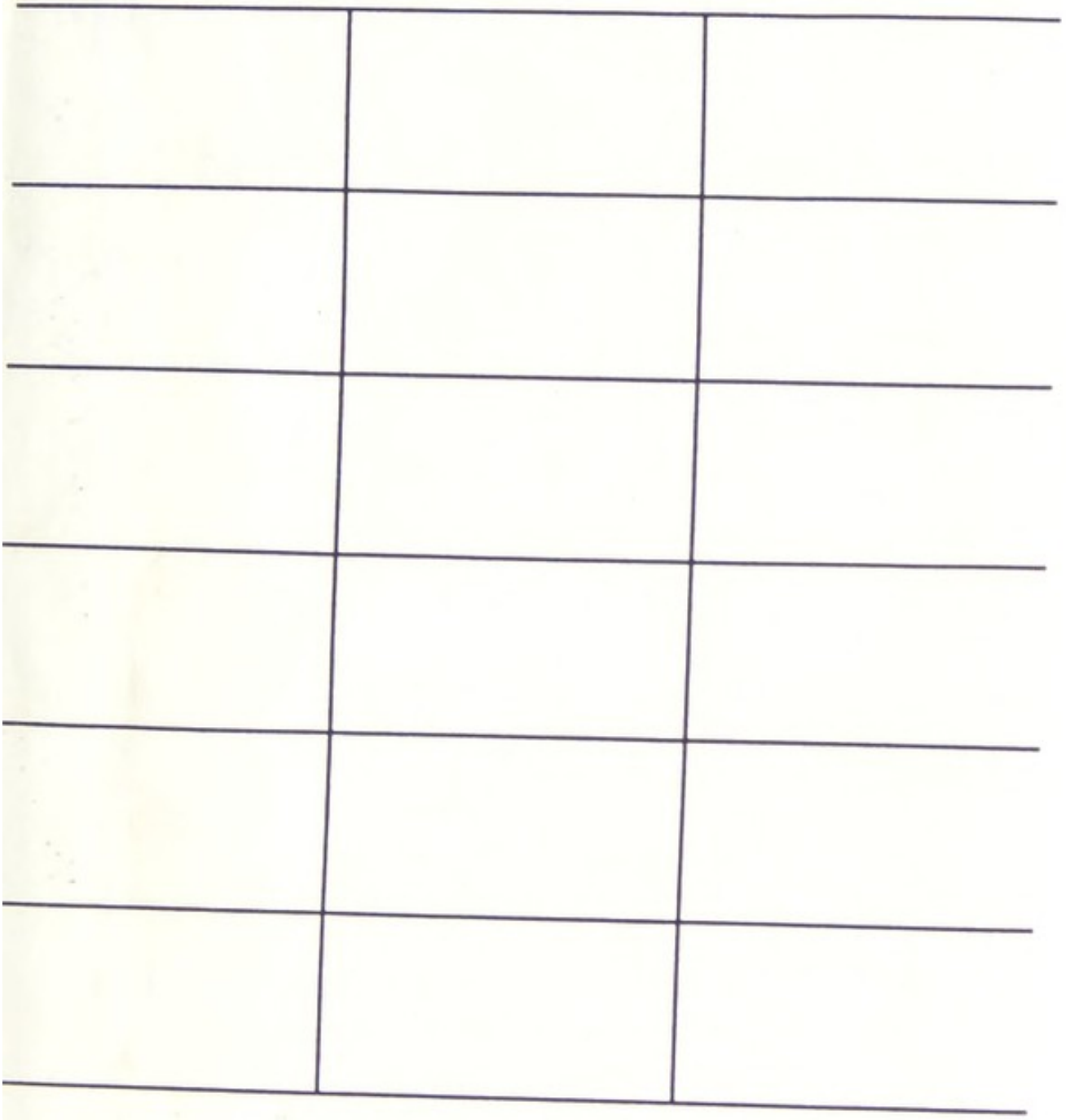

DENTAL
TERIA MEDICA
AND
THERAPEUTICS

BY

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FOURTH EDITION

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PREFACE TO FIRST EDITION.

THIS work is presented to the Dental Profession in the hope of supplying a long felt desideratum. There are elaborate works on general Materia Medica and Pharmacology, but none having special reference to Dentistry. This fact induced the Medical Staff of the National Dental Hospital to depute the Author to compile a manual for the use of the Hospital, and he undertook the task for that particular purpose. Subsequently, however, it was urged upon him to extend its scope with a view to publication.

Since its appearance in sections in *The Monthly Review of Dental Surgery*, the matter has been thoroughly revised, and several additions have been made.

The Author has received, and here desires gratefully to acknowledge, the valuable assistance so kindly proffered by his friends, Mr. Braithwaite and Mr. Gaddes.

He has also to acknowledge his obligations to the various writers whose works he has consulted.

September 28, 1877.

TABLE OF CONTENTS

DENTAL MATERIA MEDICA AND THERAPEUTICS.

THE subject of Materia Medica may, for the convenience of study, be divided into—

I. MATERIA MEDICA proper.
II. PHARMACY.
III. PHARMACOLOGY, and
IV. THERAPEUTICS.

I. MATERIA MEDICA proper comprises a knowledge of the sources, characters, and purity of drugs. The materiæ medicæ are either inorganic, consisting of substances obtained from metallic and non-metallic bodies, and their various chemical combinations; or organic, being materials derived from the vegetable and animal kingdoms, comparatively few being obtained from the latter.

Sulphur, carbon, and phosphorus are examples of the non-metallic division of inorganic substances, while in the metallic division salts of the metals or acids are usually employed, the metals themselves being rarely prescribed.

Ether, alcohol, and hydrocyanic acid are examples of special chemical combinations of inorganic substances used as drugs.

The vegetable kingdom yields many prepara-

tions included in the materiæ medicæ which are obtained from parts of plants, such as the leaves, roots, bark, or seeds; in some instances the whole of a plant is used, and the active principles or alkaloids, such as morphine, cocaine, atropine, are also extracted, forming many valuable preparations.

The animal kingdom yields comparatively few remedies. The entire animal, as in the case of leeches or cantharides, is sometimes used, or parts only, such as isinglass or suet. The secretions, such as musk or honey, and sometimes the eggs, are frequently employed as remedies, the white of hens' eggs being a valuable convenient antidote for many poisons.

Special preparations are also made from the organs and secretions of animals, such as cod liver oil, wax, and pepsin.

This part of the subject will be more fully considered when describing the drug individually.

II. PHARMACY embraces everything connected with the preparation, combination, and dispensing of drugs, and may be divided into—

α. Modes of administering and using therapeutic agents.
β. Incompatibles: (i.) Chemical; (ii.) Physiological.
γ. Weights and measures.
δ. Modes of conducting pharmaceutical operations.
ε. Groups of preparations and general methods of manufacture.
ρ. Dispensing of prescriptions.

α. *Modes of Administering Drugs.*

(i.) *By the mucous membranes.*—This division includes the principal and most frequently adopted

methods of administering drugs, namely, by the mouth, in the form of mixtures, pills, etc., to the stomach and other parts of the digestive tract, and so to distant organs by absorption; by the rectum, in the form of suppositories and enemata, and to the genito-urinary tract, the latter generally for producing local effects; by the respiratory mucous membrane, chiefly by inhalation and insufflation, and also to other mucous membranes such as that of the eye.

(ii.) *By the subcutaneous tissues* (hypodermic injection).—The best mode of making the injection is to pick up a fold of loose skin, and push the needle right through till its point works loosely in the subcutaneous tissue; then inject slowly. After the withdrawal of the needle, press firmly with the finger on the track, keeping it applied to the puncture for a minute or two.

The medicine to be so used should be in solution, and perfectly clear, neither acid nor alkaline, but as nearly neutral as possible—no irritant medicine should be so administered. The chief physiological and therapeutical effects of nearly every medicinal substance are the same, when it is hypodermically administered, as when swallowed; but they are more rapidly produced by the hypodermic method.

(iii.) *By the skin.*—Drugs are applied to the skin in the form of ointments, plasters, or liniments, usually for local effects.

(iv.) *To serous cavities.*—Drugs are applied to serous membranes for antiseptic purposes, and sometimes in the form of irritants to produce adhesive inflammation.

(v.) *Into the blood vessels as in intravenous injection* (*rarely used*).

(vi.) *To wounds and diseased surfaces.*

β. Incompatibles.

The incompatibility of drugs may be classified under the following heads: physical, chemical, and physiological.

Physical incompatibility occurs when drugs are prescribed which do not dissolve one another or intimately mix together, such as powders which are insoluble in water, or the mixture of oil with water.

Chemical incompatibility occurs when two drugs are prescribed together, one of which will decompose the other.

The chemical incompatibles are very numerous, and many of them are not easily avoided; indeed in some cases the incompatibility is intentional, with the object of producing a new substance which is the desired remedy; and, similarly, physiological incompatibles are often prescribed together in order that one drug may control or modify the action of another.

γ. Weights and Measures.

The initial weight, or grain, is the same in both troy and avoirdupois.

Troy weight is no longer recognised in the Pharmacopœia, but physicians still employ the old ℥j, and ℈j, equal to 60 and 20 grains respectively.

Weights.

1 Grain	gr.	
1 Ounce	oz.	= 437·5 grains.
1 Pound	lb.	= 16 ounces = 7,000 ,,

Measures of Capacity.

1 Minim	min. or m.	
1 Fluid drachm	fl. drm. or f ℥	= 60 minims.
1 Fluid ounce	fl. oz. or f ℥	= 8 fluid drachms
1 Pint	O.	= 20 fluid ounces.
1 Gallon	C.	= 8 pints.

Relation of Measures to Weights.

1 Minim	is the measure of	0·91	grs. of water.
1 Fluid drachm	„	54·68	„
1 Fluid ounce	„ 1 ounce or	437·5	„
1 Pint	„ 1¼ pound or	8.750	„
1 Gallon	„ 10 pounds or	70,000	„

Equivalents.

1 Pound = 453·5925 grammes.
1 Ounce = 28·3495 „
1 Grain = ·0648 „

1 Milligramme = ·015432 grains.
1 Centigramme = ·15432 „
1 Decigramme = 1·5432 „
1 Gramme = 15·432 „
1 Kilogramme = 15432·348 (2 lbs. 3 ozs.—119·8 grains).

1 Gallon	= 4·543487	litres.	
1 Pint	= 0·567936	„	= 567·936 c.c.
1 Fluid ounce	= 0·028396	„	= 28·396 „
1 „ drachm	= ·003549	„	= 3·549 „
1 Minim	= ·000059	„	= ·059 „

Approximate Measurement.

A teacup	4 ounces (fluid).
A wineglass	2 „ „
A tablespoon of liquid	½ „ „
A tablespoon of powder	2 drachms.
A teaspoon of liquid	1 fluid drachm.
A teaspoon of powder...	About ½ drachm.
A teaspoon of magnesia	About 12 grains.
One drop of water	1 minim.
One drop of essent. oils and tinct. ...	About ½ minim.
One drop of chloroform	About ⅓ minim.

Note.—The teaspoon and tablespoon in ordinary use vary in size, and are usually much too large; therefore a graduated measure-glass ought to be used.

δ. *Modes of conducting Pharmaceutical Operations.*

The processes of preparing drugs are chiefly chemical, and need not be described here. A few

of the more important pharmaceutical operations it will be necessary to explain briefly.

Elutriation is a process whereby the finer particles of a powder are separated from the coarser. The powder is suspended in water; when the coarser particles have fallen to the bottom, the supernatant liquid containing the finer particles is decanted, and the process repeated until the powder is sufficiently fine.

Lixiviation.—The insoluble matter in ash, etc., is separated from the soluble by means of water. The solution is called a "lye."

Maceration.—A coarsely powdered organic substance is placed in a liquid at the ordinary temperature of the air till the desired solution is obtained.

Percolation.—Fluid is filtered through a cylinder tightly packed with the drug, and so arranged that the resulting solution is collected as it drops through.

Standardizing.—Some preparations are made to contain (by B.P.) a certain percentage of the active constituents, in order that the strength may be constant.

ϵ. *Groups of Preparations.*

The principal forms in which medicines are used are contained in the following list:—

Aquæ are volatile and other substances in water.

Cataplasmata are soft pultaceous preparations for external use, and are made extemporaneously.

Chartæ are active compounds spread on paper.

Decocta are solutions of the active parts of vegetable substances obtained by boiling in water.

Emplastra are combinations of wax, resin, fat, soap, etc., with active ingredients, spread on calico or leather.

Essentiæ are solutions of volatile oil in rectified spirit (1 in 5).

Extracta are preparations obtained by concentrating the juices, infusions, or decoctions of plants.

Glycerina are solutions of drugs in glycerine.

Infusa are solutions made by pouring boiling water upon the drug and straining.

Injectiones hypodermicæ are strong neutral solutions used for subcutaneous injection.

Lamellæ are thin discs consisting of drugs combined with glycerine and gelatine.

Linimenta are liquid preparations for external use, compounded of strong drugs with spirit.

Liquores are solutions of drugs in distilled water.

Lotiones are aqueous preparations for external use, including collyria (for the eyes), gargarismata (for the mouth), and fomenta.

Mellata are mixtures in which honey is used as a vehicle.

Misturæ are aqueous preparations of various combinations administered by the mouth.

Olea are fixed and volatile; the former are obtained by expression, the latter by distillation.

Pilulæ are masses of various ingredients of a sufficient consistence to retain a globular form, and of a convenient size for deglutition.

Pulveres are composed of drugs finely powdered.

Spiritûs.—Simple spirits are solutions of volatile oils or ethers in rectified or proof spirit; the complex spirits are of varying composition.

Suppositoria are solid conical bodies composed of active ingredients with a basis, for insertion into the rectum.

Syrupi are watery infusions, etc., combined with sugar.

Tincturæ are solutions of the active constituents of drugs in rectified or proof spirits.

Trochisci.—Lozenges are solid preparations of drugs with gum and sugar, intended to be dissolved slowly in the mouth.

Unguenta are preparations for local use of the consistence of butter, being combinations of lard, wax, or resin, with solid or liquid ingredients.

Vina.—Solutions in sherry or orange wine.

PHARMACOLOGY AND THERAPEUTICS.

There is a most important difference between the effects which medicines produce in health and those which they give rise to in disease, and a knowledge of the action of medicines on the healthy body by no means enables us to determine what will be their effects in disease.

The changes which medicines undergo by the action of the forces residing in the organism are either physical, or chemical, or both. They are affected by the mutual affinities which exist between the medicines, or their parts, and the substances with which they are brought into contact, and are modified by the temperature of the body and by the relative proportions of the reacting agents. The result of these influences is, that the medicinal substance may either disappear, or pass out of the system unchanged and undiminished, or it may be decomposed and recognisable in another form. The medicinal activity of a substance is sometimes greatly modified by the chemical changes effected in it: thus, chemical antidotes are effective by rendering poisons insoluble, or forming inert compounds; and insoluble substances, by becoming soluble, acquire medicinal activity.

III. PHARMACOLOGY.—The action of drugs may be primary or secondary. The primary action is that which arises from the drug as administered, the secondary from the compounds formed from the drug and the constituents of the tissues, blood, secretions, etc.

Again, the action of drugs may be direct or indirect: that is to say, a drug may be applied or carried to a part of the body and produce direct or local effects; the altered functions of this part, due to the direct action of the drug, may materially alter the action of other and remote organs, this being called Indirect or Remote action.

But so close and intimate are the relations which exist between the different organs and functions, that it is frequently difficult, and sometimes perhaps impossible, to distinguish the direct and indirect effects from each other.

It is generally supposed that there are two modes by which medicines or poisons affect remote parts, namely, by absorption, or the passage of medicinal molecules into the blood; and by impressions transmitted through the nerves.

THE ABSORPTION OF MEDICINES AND POISONS is proved by the following facts:—

1. The disappearance of the medicine or poison from the part to which it was applied.
2. Its detection in a remote part, as in the blood, chyle, animal solids and excretions.
3. The promotion, or retardation, or prevention of its remote effects by the promotion, or retardation, or prevention of its circulation.
4. The similarity of remote and topical effects.
5. The medicinal or poisonous quality communicated to the animal solids and fluids.
6. The occurrence of remote effects after the

division of the spinal cord, or of all parts except the blood-vessels.

7. The production of the remote effects by the injection of a medicine into the blood.

Action of Medicine subsequent to Absorption:

(*a*) *On the Blood.*—The blood acts as a vehicle to carry drugs to different tissues and organs; but its coagulability, consistence, alkalinity, and the condition of its corpuscles, may be modified by medicines. Thus, the alkalinity of the plasma can be increased by potassium salts. The white corpuscles can be either increased or reduced in number. The red corpuscles can be increased, both in number and in the quantity of hæmoglobin which they contain.

(*b*) *On the Tissues of Organs.*—The specific operation of medicines after their absorption is well known. Opium acts on the brain, strychnia on the spinal cord, etc. Attempts have been made to explain these facts on physical or chemical principles; but neither physics nor chemistry appears capable of furnishing a satisfactory explanation of the specific effects of medicines.

(*c*) *On the Excreting Organs.* — Medicines, after they have been taken up and conveyed into the blood, are expelled by the different excreting organs. But the same substances are not expelled with equal facility by all the excreting surfaces; some showing a preference for one, others for another organ. Camphor and alcohol pass out of the system by the lungs, saline and colouring substances by the kidneys.

(*d*) *Operation of Medicines by Nervous Agency.* —A considerable number of remedial agents ope-

rate physically on the body and affect remote parts through the agency of the nervous system. The most important of these are electricity, heat, cold, light, mechanical irritants, and corrosives. They act on the principle of shock, and affect remote parts by the agency of the cerebro-spinal and ganglionic systems. Their mode of action through the cerebro-spinal system is excitor and reflex; that is, an impression is made on, and carried by, the incident, excitor, or afferent nerves to the nerve-centre, which, by its peculiar power, affects a remote part through the medium of its reflex, motor, or efferent nerves.

The velocity of operation of some poisons (*e.g.* hydrocyanic acid, conia, etc.) has been thought to be incompatible with any other mode of operation than that by nervous impression. Dr. Blake has met this argument by declaring that poisons are not instantaneous in their action, but that sufficient time always elapses between the application of a poison and the first symptom of its operation to admit of its contact with the tissue which it affects.

(*e*) *Circumstances which Modify the Effects of Medicines.*—These may be arranged under two heads:—1. Those relating to the medicine. 2. Those relating to the organism.

1. Those relating to the Medicine.—The *state of aggregation* of a medicine modifies its effect: thus morphia is more active in solution than in the solid form. *Chemical combination*, as with the soluble salts of the vegetable alkaloids, which are more active than the uncombined alkaloids; and vice versâ, the insoluble salts are less active. Lead and baryta are rendered inert by combination with sulphuric acid. *Pharmaceutical combination* also modifies the action of medicines.

This is done to promote the action of the medicines; to correct their operation, or, by the joint actions of two or more medicines, to gain an effect which could not be attained by one of them.

The modifications produced in the effects of medicines by differences of dose are well seen in the case of opium and mercurials.

2. THOSE RELATING TO THE ORGANISM.—Under this head are included several circumstances, of which the most important are age, sex, mode of life, occupation, habit, diseased conditions of the body, climate, mind, race, temperament, idiosyncrasy, tissue, or organ.

(α) *Age.*—The effects of medicine are modified by the age of the individual; as a general rule, it may be stated that the dose should be augmented or diminished according to the age of the patient.*

(β) *Sex.*—Sex has an influence on the operations of medicines. Females possess greater susceptibility of the nervous system, more excitability of the vascular system, and less energy or power, than males; and medicines act on them more rapidly, powerfully, and for a shorter period, than on males. In these respects, indeed, they simulate children. Hence, therefore, medicines should

* TABLE OF DOSES.

For females the dose is somewhat less, and in advancing age the dose is gradually lessened.

Adult male	...	...	... 1 drachm or 1
Fourteen years	...	...	... ½ „ „ ½
Seven „	...	...	... 20 grains „ ⅓
Five „	...	minims or grains	15 „ ¼
Three „	...	„	„ 10 „ ⅙
One year	...	„	„ 6 „ 1/10
Six months	...	„	„ 3 „ 1/20
Three „	...	„	„ 2 „ 1/30

be administered in smaller doses, and at somewhat shorter intervals, than to males.

During the periods of menstruation, pregnancy, and lactation, drastic purgatives should be avoided, especially during the two first conditions. Agents which may communicate injurious qualities to the blood are also to be avoided during pregnancy and lactation.

(γ) *Habit.*—The habitual use of certain drugs, especially narcotics, lessens the influence which they would ordinarily possess over the body.

(δ) *Diseased Conditions of the Body.* — Diseases of various kinds sometimes have a remarkable influence in modifying the effects of medicines, a fact of considerable importance in practice. Two of the best known instances of this are the diminished influence of opium in peritonitis, and of mercury in fever.

(ε) *Climate.* — The well-known influence of climate in modifying functions of the animal economy, and in promoting or alleviating certain morbid conditions, necessarily induces us to ascribe to it a power of modifying the effects of medicines.

(ς) *Mind.*—The effects of medicines are very much modified by the influence of the mind. Much of the success obtained by empirical practitioners depends on the confidence that patients have in the medicines they administer.

(κ) *Idiosyncrasy.* — The influence of idiosyncrasy in modifying the effects of medicines and poisons is, in general, to increase their activity. Thus some individuals are peculiarly susceptible to the action of opium, others of mercury, and some of alcohol.

Temperature. — Temperature modifies the

effects of drugs probably by its influence on the chemical reaction between the drugs and the constituents of the organism, so that, although the temperature of the body has little variation, its influence cannot be ignored.

Mode of Administration.—The effects produced by medicines are influenced by the mode of administration, and vary according to the nature of the part which the drugs affect. The stomach, for example, is much more susceptible to medicinal impressions than the skin. Opium acts more powerfully when applied to the serous than to the mucous membranes. Carbonic acid operates as a positive poison when inhaled, but it acts as a grateful stimulant when taken into the stomach. The modifications effected in the actions of medicines by the differences of tissue or organ depend partly on the relative rapidity and power of absorption and excretion, and partly perhaps on the unequal degree of decomposition which these agents undergo in different tissues; and when this process of absorption is more rapid than the excretory organs can neutralize, the result will be an accumulation of the drug in the system, with possibly poisonous effects. This result is called cumulative action.

Time of Administration.—When the effects of medicines are intended to be immediate, they should be administered in the form of solution, and upon an empty stomach, rather than in a solid form and full state of stomach.

In cases where we seek to allay irritation of the stomach, or give tone to that organ, the medicine should be taken from half an hour to an hour, or more, before food.

Alkaline medicines should be taken an hour before, or three or four hours after meals.

Medicines taken with a view to their absorption, and thereby the improvement of the state of the blood, or general nutrition of the body, are perhaps best administered either at the time of meals or soon after. Iron taken at such periods appears to be absorbed into the blood with the chyle, and is therefore present during the production of the blood cells, the formation of which it probably aids.

Medicines which are apt to irritate the stomach should be taken soon after food.

Purgatives are usually intended to act on the lower portions of the alimentary canal, and not on the stomach; therefore they should be given either half an hour or so before a meal (when their effect is more marked), or, at least, four hours afterwards.

IV. THERAPEUTICS.—Of general therapeutics we need say little; it will suffice to enumerate the general principles which govern treatment, and take special notice of the methods which are of use to the dental surgeon.

Therapeutics is the art which teaches the treatment of disease, and includes all that relates to the science and art of healing, and embraces not merely the application of materia medica, but also hygiene and surgical treatment.

It is divided into the treatment of established disease, and its prevention, and the recognised fact of the undoubted superiority of prevention to cure has resulted in great attention being directed of late years to preventive medicine.

Hygiene is a most valuable agent in preventive therapeutics; consequently the necessity of perfect sanitation, the regulation of the quantity and quality of food, the selection of suitable climate

and clothing, with attention to cleanliness and exercise, are matters of paramount importance.

Miller has carefully investigated the local effects of foods on the teeth, and has found that a mixture of meat and saliva is always alkaline; and therefore meat is harmless, and tends to prevent caries, especially when lodged between the teeth; but the carbo-hydrates, more particularly bread, potatoes, etc., owing to their glutinous consistence, on account of their fermentation being accompanied by the development of acid are injurious; but in the form of sugar he considers them less harmful, because sugar, being quickly dissolved, is soon washed away and swallowed.

The prevention of disease by prophylaxis is of great value, and our increased knowledge of bacteria, and of the methods of counteracting their influence by means of antiseptic measures and by inoculation, has enabled us to make considerable advance towards modifying and preventing many diseases.

Certain drugs also have marked prophylactic power; as, for instance, the prevention of ague by quinine, and of scurvy by lemon-juice. The protective influence of vaccination is also well known.

In dental practice much can be done by preventive treatment. We can largely influence the formation of the teeth by careful dietetic and medicinal remedies, and also by avoiding the use of any drugs which are known to interfere with and injure the calcifying teeth; many malformed teeth are, no doubt, caused by the administration of mercury, which is the chief constituent of most teething powders.

In rickets and conditions in which there are indications of imperfect supply of lime salts to the developing bones and teeth, much benefit is

frequently derived from the use of a therapeutic dietary which contains a percentage of earthy salts. The calcification of certain of the permanent teeth begins *in utero*, and of others during the first year of life, while the infant is yet dependent upon the mother. In such cases the dietetic treatment must be directed to the mother. It is not the food taken, but rather that which is digested and assimilated, which is of service and therapeutic value.

After the eruption of the teeth it is still possible to check or prevent the predisposition to caries by systematic treatment and local remedies. Of these methods, perhaps, one of the most important is the treatment of acidity, when caused by gastric disturbance, by the administration of suitable drugs and the regulation of the diet; or if the acidity is due to local causes, by treating them.

Strict cleanliness should also in every case be maintained by means of suitable brushes and tooth powders.

These preventive measures can frequently be materially aided by operations for the relief of overcrowding, and for the correction of defective formation of the enamel.

Disease may, however, supervene either through neglect of preventive treatment, or in spite of its influence; and then the disease itself must be treated, that is to say, *immediate treatment* must be adopted; and in this branch of therapeutics the dental surgeon is especially favoured, in that he is able almost invariably to apply the more satisfactory method of immediate treatment, namely, removal of the cause; and has seldom to resort to the less thorough and scientific method of symptomatic treatment.

The treatment adopted in local dental perios-

titis arising from a putrid tooth pulp illustrates this. The putrid or septic pulp is removed, as far as possible by mechanical means, and the tissues infected by it are rendered aseptic by suitable drugs.

It frequently happens that it is impossible to remove the cause of disease, and then symptomatic treatment must be employed; that is, the symptoms of the disease are treated, and not the disease itself; for instance, the cause of Rigg's disease being unknown, treatment is directed to the symptoms it gives rise to, by removing any deposit from the teeth, and by checking the inflammation which takes place in the socket.

Although the treatment in dental practice is mainly surgical, the use of drugs is essential; other remedies are of value, such as electricity, the local application of heat and cold, and, as in general therapeutics, dental treatment may be either: rational, a remedy employed because of its known chemical and physiological action; or empirical, when the only reason for its administration is that experience has proved it to be useful.

DENTAL MATERIA MEDICA.

ACETANILIDUM.

ACETANILIDE.

Synonyms.—Phenyl-acetamide, antifebrin.

Formula.—C_6H_5,NH,C_2H_3O.

Characters.—A white, crystalline powder, without odour, and with a slight pungent taste. Almost insoluble in water, freely in alcohol, ether, and chloroform.

Preparation.—Made by heating glacial acetic acid and aniline, distilling, purifying, and crystallizing.

Physiological Effects and Therapeutics.—This drug is similar in its action to phenazone, but much more powerful, so that smaller doses—about one fourth—should be given. Its antipyretic action is generally evanescent.

It has been successfully administered as an anodyne in neuralgia, and to relieve the pain caused by the action of arsenic on the dental pulp.

Care must be taken to prescribe small doses at first, as it sometimes produces very depressing symptoms, due to its action on the heart, such as profuse sweating, cyanosis, rigors, and collapse.

Dose.—3 to 10 grains.

ACIDUM BENZOICUM.

BENZOIC ACID.

Formula.—$HC_7H_5O_2$.

Characters. — Colourless flexible crystals, having an aromatic odour resembling benzoin. Slightly soluble in cold water, more soluble in boiling water. Soluble in ether, chloroform, and rectified spirit.

Preparation.—Prepared from benzoin by sublimation.

Physiological Effects and Therapeutics.—Benzoic acid is stimulant, expectorant, and diuretic, and it also increases the action of the salivary glands.

Externally it is a powerful and prompt antiseptic, and having no deleterious action on the teeth, it forms an invaluable ingredient in mouth washes, especially when these are prescribed for constant use.

A 1 in 20 solution in rectified spirit, to be diluted with water as required, forms a convenient lotion.

Dose.—5 to 15 grains.

ACIDUM BORICUM.

BORIC ACID.

Synonym.—Boracic acid.

Formula.—H_3BO_3.

Characters.—In white pearly plates, odourless with a slightly bitter taste; soluble in glycerine, rectified spirit, and water.

Preparation.—By the action of sulphuric acid on borax.

Physiological Effects and Therapeutics—

A mild and non-irritant antiseptic, and may be used with advantage in mouth washes and tooth powders.

Prescribed with glycerine or honey, it is useful in some forms of stomatitis.

It is used mixed with sodium sulphite for bleaching teeth.

Dose.—5 to 30 grains.

ACIDUM CARBOLICUM.

CARBOLIC ACID.

Formula.—C_6H_5OH.

Synonyms.—Phenol, phenic acid, phenyl alcohol.

Characters.—In colourless acicular crystals (or pinkish from impurities), which, at a temperature of 95° F., becomes an oily liquid, having a strong tarry odour. Sp. gr. 1·065; boiling point 370° F. Does not redden litmus. Slightly soluble in water, freely so in alcohol, ether, and glycerine. It may be liquefied by the addition of a few drops of glycerine, or by immersing the bottle containing it in hot water.

Preparation.—Obtained from coal-tar by fractional distillation, and subsequent purification.

Physiological Effects and Therapeutics.—It possesses antizymotic, antiseptic, caustic, and deodorising properties, and is a local anæsthetic.

In large doses it acts as an irritant poison.

It obtunds sensitive dentine, and it is frequently used to mop out the prepared cavities of teeth prior to filling them. A mixture of four parts of the acid and three of collodion is likewise recommended for painting carious cavities. It also markedly relieves toothache arising from an exposed, or nearly exposed pulp. When suppuration

of the pulp has set in, it arrests that process, inducing a healthy reaction without irritation, its application being repeated so long as pus forms; but the treatment should not be continued if the eschar previously produced still remains attached.

In a paper read before the Odontological Society, in 1878, by Mr. C. S. Tomes, there was a very general expression of opinion in favour of the use of dilute carbolic acid in the treatment of exposed pulp.

It is a useful agent in the treatment of alveolar abscess, and in different degrees of dilution it forms an invaluable antiseptic lotion in ulcerations of the mouth, etc.

A mixture of one part of acid and twelve parts of glycerine may be applied to the palate by means of a brush to stimulate the mucous secretion where deficient, and thereby aid the suction of an upper denture.

Antidotes.—Sulphate of sodium and sulphate of magnesium, white of egg, olive oil, emetics, sulphate of atropine ($\frac{1}{5}$ grain hypodermically).

ACIDUM CHROMICUM.

CHROMIC ACID.

Synonym.—Chromic anhydride.

Formula.—CrO_3.

Characters.—This acid occurs in the form of brilliant crimson-red crystals. It is deliquescent, and very soluble in water, forming an acid solution of chromic acid.

It may explode if mixed with glycerine or alcohol.

Preparation.—Obtained in acicular crystals, by dissolving bichromate of potassium in sulphuric acid and water; decanting from the acid sulphate

of potassium; heating with more sulphuric acid; cooling, and crystallizing.

Properties and Uses.—It is one of the most powerful escharotics known, and acts as a rapid destroyer of organic matter. It has been recommended for bleaching discoloured teeth, and to obtund sensitive dentine; but its application produces so much pain, and it is so destructive to the tissues, that its use requires great skill and judgment not to do more mischief than good.

For morbid growths upon the gums it is a valuable remedy (1 in 4). It may be conveniently applied by means of a gold or platinum wire. Great care should be exercised to protect the healthy parts.

In ulceration of the gums, chromic acid has been recommended as one of the best applications. A mild solution (1 in 40) may be used at first, and afterwards one containing one part of the acid to eight parts of water, or even twice that strength, to be applied by means of a sponge.

Antidotes. — Stomach pump, emetics, chalk and milk.

ACIDUM HYDROCHLORICUM.

HYDROCHLORIC ACID.

Synonyms.—Muriatic acid, spirits of salts.

Formula.—HCl.

Characters.—A nearly colourless and strongly acid liquid, emitting white vapours, having a pungent odour. Sp. gr. 1·16.

Preparation.—Obtained by the distillation of a mixture of chloride of sodium, sulphuric acid, and water. The gaseous product, previously washed, is conducted into a receiver containing

water until the density of the same has become 1·16.

Physiological Effects and Therapeutics.—It is a powerful caustic, and has been employed in cancrum oris.

Internally it is useful as a tonic and digestive, diluted and generally combined with some vegetable bitter.

Its action upon the teeth being deleterious, its use should be followed by an alkaline mouth wash. Used in the laboratory as a "pickle" for gold and platinum plates, zinc and borax being dissolved by it.

Dose.—Of the diluted acid, 10 to 30 minims.

Antidotes.—Bicarbonate of sodium or potassium. Chalk and white of egg.

ACIDUM NITRICUM.

NITRIC ACID.

Synonym.—Aquafortis.

Formula.—HNO_3.

Characters.—A colourless liquid, which, when exposed to the air, emits an acrid, corrosive vapour. Sp. gr. 1·42.

Preparation.—Prepared from nitrate of potassium, or nitrate of sodium, by distillation with sulphuric acid and water. It contains 70 per cent. by weight of nitric acid, or 60 per cent. of nitric anhydride.

Physiological Effects and Therapeutics.—In the concentrated form the acid is powerfully escharotic and corrosive, which property it derives in part from its affinity for water, but more especially from the facility with which it gives out oxygen. The permanent yellow stain which it communicates to the cuticle is peculiar to it, and

this is illustrated in the condition of the tongue and pharynx in cases of poisoning, as represented by Dr. Roupell. Like sulphuric acid it chars the animal tissues. In sloughing phagedœna (cancrum oris, etc.) its application is attended with most successful results.

It is useful for destroying a small remnant of the pulp, in a root canal, which has survived the action of an arsenic dressing, but it should be employed with great caution, as it causes disintegration of the dentine.

Diluted it is a tonic and refrigerant. Its action upon the teeth being deleterious, an alkaline mouth wash should be used to correct it.

It readily dissolves silver, but not gold, except when mixed with hydrochloric acid in the proportion of four parts of nitric acid to fifteen parts of hydrochloric acid, forming aqua regia.

Dose.—Of the diluted acid 10 to 30 minims.

Antidotes.—See those for Ac. Hydrochloricum.

ACIDUM OXALICUM.

OXALIC ACID.

Synonym.—Hydrogen oxalate.

Formula.—$H_2C_2O_4 2H_2O$.

Characters.—In white transparent crystals, resembling sulphate of magnesia (Epsom salts), poisonous.

Preparation.—Made by roasting sawdust with alkalies, treating with lime, and digesting the result with sulphuric acid, and purifying by recrystallizing.

Uses.—Oxalic acid is never employed medicinally, but has been used as a bleaching agent for discoloured teeth.

Antidotes.—Emetics, chalk, lime water; and stimulants hypodermically.

ACIDUM PHOSPHORICUM CONCENTRATUM.

CONCENTRATED PHOSPHORIC ACID.

Formula.—H_3PO_4.

Characters.—A colourless syrupy liquid with a sour taste.

Preparation.—Made by boiling phosphorus with nitric acid and water.

Physiological Effects and Therapeutics.—It is applied locally to painful erosions and sensitive dentine. Internally the dilute acid is used as a nerve tonic and stimulant.

It is the chief, and sometimes the only, constituent of the fluid portion of the oxyphosphate cements.

Dose.—Of the diluted acid (1 part acid to $5\frac{2}{3}$ water) 10 to 30 minims.

ACIDUM SALICYLICUM.

SALICYLIC ACID.

Formula.—$HC_7H_5O_3$.

Characters.—Salicylic acid is met with in minute white acicular crystals, often of a cream colour, owing to the presence of colouring matter. It is odourless; has a sweet and afterwards an acid taste, slightly soluble in water, freely in hot water, alcohol and ether; also in solutions of citrate or acetate of ammonium, sodium phosphate, or borax. An aqueous solution of salicylic acid gives a deep violet colouration with persalts of iron.

Preparation.—Salicylic acid is produced by passing carbonic acid into a mixture of carbolic acid and caustic soda at a high temperature, and

decomposing the resulting salicylate of soda with hydrochloric acid, or it may be obtained from natural salicylates such as the oil of wintergreen (*Gaultheria procumbens*).

Physiological Effects and Therapeutics.—It has been largely used as an antipyretic in acute rheumatism, etc. It is also used in chronic rheumatism to relieve the swelling and pain of affected parts. In neuralgia of a periodic type, when not amenable to quinine, salicylic acid has proved beneficial in 10 to 40 grains every three or four hours.

It is a powerful antiseptic and disinfectant. In solution it has been recommended in the treatment of aphtha, thrush, and other ulcers of the mouth. But by some practitioners it is considered to have a prejudicial effect upon the teeth, causing a grittiness and softening of their surface. The safe use of the acid as a dentifrice is, therefore, questionable.

Dose.—5 to 30 grains.

ACIDUM SULPHURICUM.

SULPHURIC ACID.

Synonym.—Oil of vitriol.

Formula.—H_2SO_4.

Characters.—A colourless, oily liquid, intensely acid and corrosive. Sp. gr. 1·843. It evolves much heat on the addition of water. It contains 98 per cent. by weight of real sulphuric acid.

Preparation.—Sulphurous acid gas, obtained by the combustion of sulphur, is oxidized by nitrous acid fumes and hydrated by aqueous vapour.

Physiological Effects and Therapeutics.—

The strong acid is a corrosive poison; the parts touched with it first become white, but subsequently assume a brownish-black appearance. The dilute acid (strength 1 in 11 of water) is refrigerant, astringent, and tonic, and is used in lead poisoning. In hæmorrhage, although less certain in its action than the acetate of lead, gallic acid, and other remedies, it is a very useful adjunct.

Dose.—Of the dilute acid, 5 to 30 minims.

Antidotes.—Soap and water; see also those for Ac. hydrochloricum.

ACIDUM SULPHURICUM AROMATICUM.

AROMATIC SULPHURIC ACID.

Synonym.—Elixir of vitriol.

Preparation.—By mixing sulphuric acid, 1½; spirit, 18; spirit of cinnamon, 1; strong tincture of ginger, 1. Sp. gr. 0·911.

Physiological Effects and Therapeutics.—The local use of this preparation is of great value in the treatment of pyorrhœa alveolaris (Rigg's disease). It has the power of removing any remains of calcareous deposit which may have been left on the roots of the teeth after the operation of scaling, and of dissolving the carious portions of the alveolar border; its stimulating action also favours healthy granulation.

When the gum is only slightly separated from the teeth it should be applied on a small-pointed or chisel-shaped piece of wood, but in more advanced cases it should be used on shreds or pledgets of cotton packed in the pockets which exist beneath the free edge of the gum. The first application should be left *in situ* from a few

minutes to two or three hours; after removal the parts should be thoroughly cleansed and syringed.

It has also been used as an injection into the sinuses leading to carious and necrosed bone, and in alveolar abscesses which do not readily yield to treatment.

There is usually some pain caused by the application. Internally it is used as an astringent.

Dose.—5 to 30 minims.

ACIDUM TANNICUM.

TANNIC ACID.

Formula.—$C_{27}H_{22}O_{17}$.

Characters.—In pale yellow, vesicular, uncrystallizable masses, or thin glistening scales, with a strongly astringent taste and an acid reaction; readily soluble in water, rectified spirit, and glycerine, very sparingly soluble in ether. It forms a dense white precipitate with lime water; an aqueous solution becomes a bluish-black colour upon the addition of the persalts of iron; and with a solution of gelatine a yellowish-white precipitate is thrown down. It is entirely volatilized by heat.

Preparation.—Powdered galls are exposed to a damp atmosphere for two or three days, and then sufficient ether is added to form a soft paste, the liquid is expressed and then evaporated to dryness.

Physiological Effects and Therapeutics.—Tannic acid is the most powerful of all the vegetable astringents or styptics, it has also slight antiseptic properties. As a topical astringent it is far more powerful than gallic acid, because its action in precipitating albumen, gelatine and

fibrin is energetic, while gallic acid exerts no influence on these substances.

Tannic acid is used as an astringent chiefly in hæmorrhages and profuse secretions. Its remote action is probably due to its conversion into gallic acid in its passage through the system. Applied to spongy gums, it causes contraction of the vessels, and, furthermore, checks the tendency to retraction of the gum and consequent loosening of the teeth. It is a useful application to abrasions, aphthous and other ulcers of the mouth.

As an injection (1 to 5 grains in 1 oz. of water) in some diseased conditions of the antrum it has been found serviceable.

A concentrated solution in alcohol, glycerine, carbolic acid, or oil of cloves, when applied to a carious cavity and allowed to remain two or three days, allays the sensitiveness of, and hardens softened dentine. It is also employed to "tan" or harden the pulp to facilitate its removal after devitalization.

Dose.—2 to 10 grains.

ACONITUM NAPELLUS.

ACONITE.

Synonyms.—Common monkshood, wolfsbane.

A perennial plant belonging to the natural order *Ranunculaceæ*.

The leaves and flowering tops of plants cultivated in Britain; they should be gathered when the flowers are about two-thirds expanded. The roots from plants grown in Britain or Germany should be collected in winter or early spring.

The leaves and flower (*Aconiti folia*) are used for making the extract; the root (*Aconiti radix*)

for the tincture, liniment, and the alkaloid aconitine. The latter is used in the form of an ointment.

The strength of the tincture is 1 in 8 of spirit, the liniment 1 in 1½, the ointment 1 (aconitine) in 55. Fleming's tincture is about five times the strength of the B.P. tincture.

Physiological Effects and Therapeutics.—This drug first irritates the peripheral endings of the sensory nerves, causing a sensation of tingling, especially about the mouth and throat, and then acting as a sedative producing numbness; it has no direct action on the brain, and its effect on the cord is doubtful. It is a powerful cardiac depressant, the blood pressure is lowered, the temperature is steadily reduced, and the respiration becomes slow and irregular. Applied locally as an ointment or liniment, or given internally, it is most serviceable in the treatment of neuralgia. Some practitioners go so far as to assert that in facial neuralgia they find no remedy equal to it. It has also been used with some success in the treatment of rheumatism. When the effects of the drug are desired to be produced quickly, a drop of the tincture should be given every quarter of an hour for two hours, and afterwards hourly; but if prostration and a weak pulse exist a smaller dose must be given. The power of aconite, when given in repeated and small doses, to control, or at times to cut short inflammation, is remarkable. Combined with iodine it is frequently used as a local application in periodontitis. One or two drops of the tincture on cotton wool introduced into the socket of a tooth after extraction will relieve the pain.

Fleming's tincture is a potent dressing in the canals of teeth as a preventive to periodic irritation, and is sometimes a useful application to an

inflamed pulp. Care should be taken not to apply an excess.

Dose.—Tincture, 1 to 15 minims: extract, $\frac{1}{4}$ to 1 grain.

Antidotes.—Emetics, stomach pump, digitalis (20 minims of the tincture), sulphate of atropine ($\frac{1}{50}$ grain hypodermically), warmth.

ÆTHER.

OXIDE OF ETHYL.

Synonyms.—Ether, sulphuric ether, ethyl ether.

Formula.—$(C_2H_5)_2O$.

Characters.—It is a colourless, very volatile and inflammable liquid, having a strong and peculiar odour, boiling below 105°F., having a sp. gr. of 0·735, and containing 92 per cent. of pure ether. It evaporates without residue. Alcohol dissolves it in all proportions. Volatile oils, fatty and resinous substances, some of the alkaloids, caoutchouc, and gun-cotton, are soluble in ether, the last named forming collodion. If pure, ether will not redden litmus paper.

Preparation.—Obtained by distilling a mixture of rectified spirit and sulphuric acid, agitating the distillate with chloride of calcium and slaked lime, and re-distilling. *Pure ether* is prepared by washing the above with water to remove any spirit, decanting the supernatant ether and digesting it with recently burned lime and chloride of calcium, and, lastly, re-distilling.

Physiological Effects and Therapeutics.—Local anæsthesia is frequently produced by means of ether applied in the form of spray, the insensibility being caused by the intense cold resulting

from its rapid evaporation, and it has a vesicant action when rubbed into the skin, or when its vapour is confined. In the mouth it stimulates the secretion of the saliva; when administered internally it acts as a carminative, antispasmodic, and is a powerful cardiac stimulant. It may be injected hypodermically in syncope.

As ether readily dissolves fats, it may be used with advantage to remove fatty particles from the pulp canals of teeth.

The vapour of ether is a valuable general anæsthetic, and is administered mixed with air, the proportion of ether being gradually increased to about 70 per cent., until the patient is narcotized, when the percentage of ether is reduced; it is also administered with other anæsthetics such as nitrous oxide gas or chloroform, a favourite mixture being composed of alcohol, chloroform, and ether. The inhalation of ether causes a temporary excitement of the heart's action, which may be followed by slight but never marked depression: the peripheral blood vessels become dilated, causing a characteristic flushing of the skin; and the breathing, at first rapid and deep, becomes slight and shallow.

The first influence of ether on the nervous system is on the cerebrum, then on the sensory and motor nerves of the cord, and lastly on the medulla; thus marked excitement and hallucinations are produced, speech becomes affected, and all voluntary control is lost, unconsciousness with loss of sensation, and the muscles become flaccid; this is followed by depression of the lower nerve centres in the cord and medulla, which control the action of the sphincters, the cardiac, respiratory, and vaso-motor systems; finally, if the administration is pushed, the respiration ceases, and the heart stops.

Ether and chloroform are very similar in their action as anæsthetics. The chief differences to be noted in favour of ether are, its greater and more lasting stimulating power on the action of the heart and respiration, and total absence of any depression, while against its use are the comparatively minor objections that it is more difficult to administer, its inflammability, and the irritating effect of its vapour on the air passages, its unpleasant odour, and finally the anæsthesia produced is not so lasting.

From these conclusions it will be seen that ether is one of the safest and most reliable anæsthetics known, its use being contraindicated only in cases of bronchitis, asthma, emphysema, and advanced renal disease. It cannot be used near a flame or when the actual cautery is employed.

Dose.—20 to 60 minims.

Antidotes.—*See* Chloroformum and Nitrosum oxidum.

ÆTHYL CHLORIDUM.

CHLORIDE OF ETHYL.

Synonym.—Hydrochloric ether.

Formula.—C_2H_5Cl.

Characters.—It is a colourless liquid, extremely volatile, with an agreeable ethereal odour, boils at 52° F., and is highly inflammable.

Preparation.—Made by saturating absolute alcohol with vapourized hydrochloric acid.

Physiological Effects and Therapeutics.—It is used locally as an anæsthetic, the intense cold produced by its rapid evaporation causing considerable numbness of the part to which it is applied.

The best and most rapid result is obtained by

using it in the form of a fine spray, the part to which it is applied being first carefully dried.

The vapour should not be allowed to approach the eyes.

ALCOHOL ETHYLICUM.

ALCOHOL.

Formula.—C_2H_5HO.

Synonyms.—Absolute alcohol, ethylic alcohol.

Characters.—A colourless, limpid liquid, free from empyreumatic odour, entirely volatilised by heat, and not rendered turbid by admixture with water. Sp. gr. 0·795. When placed in contact with anhydrous sulphate of copper it does not give rise to any blue colour, thus showing the absence of water.

Preparation.—Prepared by macerating rectified spirit with carbonate of potassium, and then with freshly fused chloride of calcium and distilling.

Physiological Effects and Therapeutics.—Locally applied alcohol is a disinfectant and antiseptic. Diluted in the form of lotion it has powerful refrigerant properties. It readily evaporates, and the part to which it is applied is cooled, and by the consequent contraction of the blood vessels inflammation is checked; if the evaporation is prevented it stimulates the flow of blood to the part, and in this manner acts as a rubefacient. It has a slight local anæsthetic action.

To whatever part it is applied it gives rise to contraction and condensation of the tissues. The affinity it has for water causes it to abstract the latter from the soft living tissues, with which it comes in contact, and when these are of an albu-

minous nature, it coagulates the albumen and causes increased density and firmness. Hence it is very serviceable in mouth washes, in the treatment of softened and sensitive dentine, and for drying cavities and root canals.

Internally administered it is very useful as a temporary cardiac and nerve stimulant. It is also used for its diaphoretic, diuretic, and astringent properties, and in small quantities probably aids digestion.

Alcohol as an internal remedy is usually prescribed in the form of sal volatile, brandy, or other spirits and wines.

Antidotes.—Stomach pump, emetics, coffee, liquor ammoniæ.

ALUMEN.

ALUM.

Formula. — $Al_2 3SO_4$, K_2SO_4, $24H_2O$ (potassium alum). $Al_2 3SO_4\,(NH_4)_2SO_4$, $24H_2O$ (ammonium alum).

Characters.—Alum occurs in colourless, transparent, crystalline masses exhibiting the focus of the regular octahedron, and having a sweetish astringent taste.

Preparation.—Made from alum schist by roasting and exposing to air, lixiviating, crystallising out the ferrous sulphate by means of chloride of ammonium, and treating with sulphate of potassium or sulphate of ammonium.

Alumen Exsiccatum.—*Dried alum* is simply the salt deprived of its water of crystallization.

Physiological and Therapeutic Effects.—The immediate topical effect is that of an astringent, by virtue of which it checks or temporarily

stops exhalation and secretion, and produces paleness of the part by diminishing the diameter of the small blood vessels. It is also a powerful styptic, being used in the form of a strong solution or powder to arrest local hæmorrhage.

The dried or burnt alum when applied to young tissues is escharotic, hence it is useful to repress fungous granulations. As a gargle (grains 2 to 10 to the ounce) it forms a useful remedy in relaxation of the throat, and congestion of the gums and mucous membranes; it is also used occasionally as an ingredient of tooth powders.

Internally given in large doses it is an emetic, also has astringent properties, and yet in lead colic it acts as a purgative probably by forming an innocuous sulphate.

Dose.—10 to 20 grains.

AMMONII CARBONAS.

CARBONATE OF AMMONIA.

Synonym.—Sesquicarbonate of ammonia.

Formula.—$N_2H_{11}C_2O_5$.

Characters.—It occurs in translucent crystalline masses having a strong ammoniacal odour and an alkaline reaction. It is soluble in cold water, more sparingly so in spirit, and volatilizes entirely when subjected to heat.

Preparation.—By submitting a mixture of chloride or sulphate of ammonium and carbonate of calcium to sublimation in a suitable apparatus.

Physiological Effects and Therapeutics.—It is a stimulant, antacid and expectorant; also an emetic in large doses. It is the principal component of smelling salts.

Dose.—3 to 10 grains; emetic dose, 30 grains.

AMMONII CHLORIDUM.

CHLORIDE OF AMMONIUM.

Synonym.—Sal ammoniac.

Formula.—NH_4Cl.

Characters.—In colourless, odourless, translucent, fibrous masses, tough and difficult to powder, soluble in water and in rectified spirit.

Preparation.—Formed by neutralizing hydrochloric acid with ammonia, and evaporating to dryness. It may be obtained in a fine state of division by dissolving the salt in boiling water to saturation, and evaporating the solution to dryness, constantly stirring during the process.

Physiological Effects and Therapeutics.—A powerful alterative and stimulant to the absorbents; it increases considerably the secretion from the mucous membranes, and for this purpose it is frequently applied as a vapour by means of an inhaler. It is useful in certain glandular affections, in chronic periostitis and rheumatism, and particularly in neuralgia, for which purpose Dr. Brunton recommends half-drachm doses several times a day, and if no relief is obtained after four or five doses advises the discontinuance of the drug. It is used in the laboratory to "clean" zinc which has become unworkable.

Dose.—5 to 20 grains.

AMYL NITRIS.

NITRITE OF AMYL.

Formula.—$C_5H_{11}NO_2$.

Characters.—An ethereal liquid of a yellowish colour and peculiar fruity odour. Sp. gr. 0·880,

volatilizes between 262° and 270°. Insoluble in water; soluble in rectified spirit, chloroform and ether.

Preparations.—Made by distilling nitric acid with amylic alcohol, sulphuric acid and copper, and purifying with caustic soda, carbonate of potassium and fractional distillation.

Physiological Effects and Therapeutics.—The heart's action is accelerated, accompanied by dilatation of the peripheral blood vessels and fall of blood pressure.

It is an anodyne, useful in asthma, nervous headache, and sea-sickness, and also in angina pectoris. It is a restorative in cases of defective breathing, and weakness of the heart's action. Most beneficial in cases of profound, prolonged, and apparently fatal *syncope*, whether arising from chloroform or other causes. If breathing has ceased, artificial respiration should be resorted to as a means to effect its entrance into the lungs.

By dilating the peripheral arterioles, this agent is also beneficial in those ailments which depend upon increased arterial tension—as in angina pectoris, and in some forms of neuralgic headache, etc.

It is useful in neuralgia, particularly of the fifth pair, often easing the pain at once. In thirty or forty seconds, whether inhaled, subcutaneously injected, or swallowed, it flushes the face, and increases the heat and perspiration of the head, face, and neck; therefore neuralgia arising from anæmia is strikingly relieved by it. To Dr. Brunton belongs the credit of first using this remedy, and he recommends that the patient be placed in a recumbent posture when this drug is administered, to avoid faintness, which might otherwise occur.

Dose. — Usually administered by inhalation from capsules containing 2 to 5 minims.

Internally, $\frac{1}{2}$ to 1 minim.

AMYLENE.

AMYLENE.

Formula.—C_5H_{10}.

Synonym.—Pental.

Characters.—A colourless, mobile liquid, possessing a peculiar unpleasant odour, has a variable boiling point about 102° F.; burns with a luminous white flame, insoluble in water. Mixes well with chloroform, alcohol and ether; must not be used near a flame.

Preparation.—By submitting amyl alcohol to distillation with chloride of zinc, and subsequently purifying.

Physiological Effects and Therapeutics.—Introduced as an anæsthetic, in 1856, by the late Dr. Snow. It was considered by him to possess the following advantages over chloroform and ether:—(1) The greater ease with which it could be breathed, owing to the entire absence of pungent and irritating properties. (2) The greater readiness with which absence of pain is obtained, with less profound coma than usually accompanies chloroform or ether. (3) The greater promptitude with which patients recover from its effects. (4) The greater infrequency of vomiting. (5) The less amount of rigidity and struggling during its operation; and (6) The small amount of headache which results from its use.

Other practitioners have not formed so high an estimate of the value or safety of amylene as Dr. Snow, but lately in Germany results have appar-

ently been more favourable. It is administered in the same way as chloroform.

ARGENTI NITRAS.

NITRATE OF SILVER.

Synonym.—Lunar caustic.

Formula.—$AgNO_3$.

Characters.—Colourless, tabular right rhombic prisms, usually moulded into cylindrical sticks, blackened by exposure to light; solubility, 2 in 1 of water.

Preparation.—Prepared by dissolving silver in nitric acid and distilled water, evaporating the solution and setting aside to crystallize. The *stick* or *lunar caustic* is prepared by fusing the crystallized nitrate, and pouring into moulds.

Physiological Effects and Therapeutics.—The local action is that of a caustic. Applied to the skin it produces at first a white mark, owing to its union with the albumen of the cuticle; this gradually becomes bluish-grey, purple, and ultimately black, owing to the partial reduction of the silver. Its caustic effects are limited to the part to which it is applied.

As a styptic it is not so reliable as the preparations of iron or tannic acid, the coagulum which is formed being soluble in excess of albumen, while that formed by iron or tannic acid is not.

It has been suggested as a suitable application to destroy the pulps of temporary teeth when it is inadvisable to use arsenic, and is a certain remedy in the treatment of sensitive dentine; but in the latter case its use is limited on account of the discoloration which follows: in such cases it may also tend to check caries by its action on organic matter, and by the formation of a metallic film.

Fused upon a platinum wire, it may be applied with greater facility and safety to the cavities of teeth, or in awkward positions, where fracture of the stick caustic might be dangerous.

It is sometimes employed as an internal remedy, especially for its astringent properties. In inflammatory affections and ulcerations of the mucous membrane of the mouth and fauces, it is a valuable remedy, the strength varying from 1 to 60 grains to a fluid ounce of distilled water.

Recent stains of the cuticle may be removed by washing with a solution of common salt, followed by a solution of ammonia; and also stains of long standing by wetting them with tincture of iodine, and subsequently with cyanide of potassium.

Stains on the teeth may be removed by making a mixture of iodide of potassium and ground pumice and manipulating the same with an orange-wood stick.

Should the pain produced by its external use be excessive, it can be allayed by washing the part with solution of common salt.

Dose.—$\frac{1}{6}$ to $\frac{1}{3}$ grain in a pill, or with dilute nitric acid.

Antidotes. — Common salt, stomach pump, emetic, white of egg, milk.

ARISTOL.

Synonym.—Di-thymol iodide.

Characters.—A reddish brown powder soluble in ether, chloroform and oils, insoluble in water, glycerine and alcohol, has a pleasant faint odour. It contains 45·8 per cent. of iodine.

Preparation.—It is made by adding a solution of iodine in iodide of potassium to an alkaline solution of thymol.

Physiological Effects and Therapeutics.—It is an antiseptic, and similar in its action to, but probably less powerful than, iodoform. It has the advantage of being almost odourless.

ARSENIOSUM OXIDUM.

ARSENIOUS OXIDE.

Synonyms.—Arsenious acid, white arsenic.

Formula.—As_2O_3.

Characters.—A heavy white powder, or in porcelain-like masses with a stratified appearance, inodorous, and almost tasteless; hardly soluble in water or alcohol, more readily in acids and alkaline fluids, creasote, and most ethereal oils. It is strongly poisonous.

Preparation.—Made by roasting arsenical ore and purifying by sublimation.

Physiological Effects and Therapeutics.—Arsenious oxide is an antiperiodic, alterative, tonic, astringent and antispasmodic; also an escharotic and antiseptic. Chronic affections of the nervous system are benefited by its use. In chorea, arsenious oxide is a remedy of established value. In cancrum oris and malignant ulcers of the tongue, its internal use is stated to be highly efficacious, and in neuralgia, especially when due to malaria or anæmia; it is also of great value given internally in the treatment of some chronic skin diseases. Externally it is a powerful caustic, and should be applied in a concentrated form, in order to prevent its absorption by the rapid formation of a slough; in a dilute form and applied over a large area it may be quickly absorbed and produce toxic symptoms.

In 1879 Binz and Schultz made experiments

with arsenic, the results of which are supposed to show that, when incorporated into the organism, arsenious acid changes into arsenic acid, and *vice versâ*. Both changes are effected by the protoplasmic tissue, and arise from the oscillation of the oxygen atoms of the albumen molecules; the quantity of these atoms deciding as to the therapeutic or toxic action of arsenic.

It is employed to devitalize the dental pulp, and also to obtund the pain of sensitive dentine. For this purpose it is usually combined with acetate of morphia and carbolic acid, in the form of a paste; a small portion of which is introduced into the carious tooth, and kept *in situ* by cotton and mastic, plaster of paris, or other agent.

The quantity inserted should be about the sixteenth part of a grain of arsenic, and it should be allowed to remain in the tooth from two to thirty-six hours, according to the effect desired to be produced.

As the result of experiments, Dr. Arkövy ascertained that arsenious acid, when brought into contact with the tooth pulp, produces hyperæmia, which varies according to the quantity of the agent applied; the blood-vessels become dilated and have a tendency to thrombosis. It has a specific effect upon the blood corpuscles, combining with the hæmoglobin, but produces no coagulation of tissue. The connective fibres and odontoblasts undergo no change whatever, but the connective tissue cells increase in size. The axis cylinder of the nerve elements here and there disappears. The whole or certain parts of the pulp, as well as the neighbouring dentine and cementum, assume a brownish red tinge. The arsenious acid is liable to permeate the dentine and cementum when thin, and also to be taken up in the collateral circulation, and produce periostitis;

hence the necessity of not allowing this powerful and toxic agent to remain *in situ* longer than twenty-four or thirty-six hours, and also of the entire extirpation of the pulp so destroyed. The larger the pulp (as in young teeth) the greater the liability to periostitis ensuing.

The action of arsenic may be considerably modified by its admixture with other drugs, and as the result of a series of experiments Dr. Miller has arrived at the following conclusions:—

1. The rapidity and intensity of the action of arsenious acid depends, under certain circumstances, to a very considerable degree upon the substance or substances with which it is incorporated.

2. Where there is but a small point of exposure, and in particular where extensive calcification has taken place in the pulp, escharotics should be avoided, since the contraction of the tissue retards the absorption of the arsenic. This retardation is but slight where there is a broad surface of exposure.

In stubborn cases, where applications of the ordinary paste fail to effect the devitalization, a paste consisting of arsenious acid in oil of cloves, glycerine, or salt solution should be employed, undiluted by any third constituent.

3. Thymol is worthy of a trial as a substitute for morphia, on account of its anæsthetic and antiseptic properties.

4. For devitalizing pulps of milk-teeth or remains of pulp-tissue in root-canals, arsenious acid, if employed at all, should be diluted by two to three parts of some other constituent (thymol, oxide of zinc, morphia, iodoform).

Arsenic appears to be very variable in its effects, both as to the amount of pain produced, and in the extent of its action, so much so that

in no case is one justified in promising an absence of pain during the devitalization of a pulp. A free exposure should, if possible, be made under the influence of cocaine; the authors have had excellent results by using a mixture of arsenious acid, oil of cloves, and hydrochlorate of cocaine. They also recommend plaster of paris, to which a little alum has been added to quicken the setting, for retaining the mixture in position; it can be easily inserted without using any pressure, and when set forms a hard unyielding filling, preventing pressure being transmitted to the pulp, and so obviating the use of a cap.

Dose.—$\frac{1}{60}$ to $\frac{1}{12}$ of a grain in solution.

Antidotes.—Stomach pump, emetic, milk, eggs, oil, lime water, solution of dialysed iron.

ATROPA BELLADONNA.

BELLADONNA.

Synonym.—Deadly nightshade.

This plant is a member of the natural order *Atropaceæ*—the deadly nightshade order.

Both leaves and roots are obtained from plants grown in Britain, but the roots are also imported from Germany. From the leaves are made the extract, juice and tincture; from the root the plaster, alcoholic extract, liniment, ointment, and the alkaloid atropine.

Physiological Effects and Therapeutics.—Belladonna has a depressing effect on the terminal ends of the nerves; it also has first a stimulating, followed by a depressant effect on the respiratory, cardiac, and vasomotor centres.

In moderate doses it causes dryness of the mouth and throat with thirst, and in larger doses

dilatation of the pupils and flushing of the face, and a characteristic delirium.

Internally it checks the secretion of milk, sweat, and saliva. It is useful in whooping-cough and asthma; it has also been given in epilepsy, rheumatism, and chorea, incontinence of urine, and in some forms of cardiac disease; it is also useful as a narcotic; alone or in combination with aloes, or sulphate of iron and nux vomica, it is often prescribed for habitual constipation.

It has been used internally in facial neuralgia, and by some authorities is highly spoken of, especially when combined with quinine.

Belladonna in the form of liniment, plaster, ointment, etc., or its alkaloid atropine, in the form of an ointment, is largely used as a local sedative and anodyne.

Dose (Belladonna).—

Succus ...	...	5 to 15 minims.
Tincture	...	5 to 20 „
Extract	...	¼ to 1 gr.

Antidotes:—Stomach pump, emetic, coffee, pilocarpine, morphine.

BUTYL-CHLORAL HYDRAS.

HYDRATE OF BUTYL-CHLORAL.

Synonym.—Croton chloral hydrate.

Formula.—$C_4H_5Cl_3O,H_2O$.

Characters.—Pearly white crystalline scales, pungent odour, and nauseous taste, slightly soluble in cold water, more so in glycerine, and in alcohol and ether.

Preparation.—Made by passing chlorine gas through aldehyde and adding water to the butyl-chloral formed.

Physiological Effects and Therapeutics.—

It is a hypnotic and anæsthetic, and is similar to, but not so powerful in its action as, chloral-hydrate.

It does not depress the heart's action like chloral hydrate, and therefore is indicated in cases of cardiac disease where the use of the latter remedy is unsafe.

The action of this anæsthetic first begins in the head and face, and is complete before any trace of narcosis manifests itself; in other words, its practical value lies in its property of diminishing sensibility before producing narcosis.

It is of especial value in the treatment of neuralgia of the fifth nerve and of paroxysmal toothache.

Dose.—To lessen pain, 1½ to 5 grains; as hypnotic, 5 to 15 grains.

CALCII CARBONAS PRÆCIPITATA.

PRECIPITATED CARBONATE OF CALCIUM.

Synonym.—Precipitated chalk.

Formula.—$CaCO_3$.

Characters. — White crystalline powder insoluble in water.

Preparation. — Dissolve chloride of calcium and carbonate of soda in water, boil and dry the product at a temperature of 212° F.

Physiological Effects and Therapeutics.—Antacid and astringent. It is good for obtunding the sensitiveness of dentine; its application for a few days greatly facilitates the excavation of the cavity. It is an antidote for oxalic acid.

This agent forms the basis of most tooth powders. It is also employed for polishing fillings, artificial plates, etc.

Dose.—10 to 60 grains.

CALCII HYDRAS.

HYDRATE OF CALCIUM.

Synonym.—Slaked lime.

Formula.—$Ca(HO)_2$.

Characters.—A white powder, strongly alkaline and caustic, sparingly soluble in water; the solubility is increased by the addition of sugar.

Preparation. — The hydrate is formed by adding water to lime.

From hydrate of lime are prepared liquor calcis (made by shaking slaked lime in water); liquor calcis saccharatus (made by shaking slaked lime and sugar in water, giving a more concentrated solution); and linimentum calcus (equal parts of lime water and olive oil).

Physiological Effects and Therapeutics.—Hydrate of lime, like other fixed alkalies, is a powerful escharotic and irritant, and in combination with caustic potash is used as such, under the name of Vienna paste. Liquor calcis, when applied to suppurating mucous surfaces, checks or stops secretion, and produces dryness of the parts; hence it is a desiccant. It is given internally as the Liquor Calcis, and Liquor Calcis Saccharatus for its astringent, antacid, and antemetic properties, and probably has a specific action in rickets and fractures of bone. Its administration is therefore indicated during the development of the teeth.

The liniment is used for burns and scalds.

Dose.—Liquor, $\frac{1}{2}$ to 4 fluid ounces; liquor saccharatus, 15 to 60 minims.

CALCII HYPOPHOSPHIS.

HYPOPHOSPHITE OF CALCIUM.

Formula.—$Ca(PH_2O_2)_2$.

Characters.—Colourless crystals, which have a pearly lustre and bitter taste; soluble in about six parts of water, insoluble in spirit.

Preparation.—Obtained by heating phosphorus with hydrate of lime and water, until phosphuretted hydrogen gas ceases to be evolved, then filtering the liquid, and separating the uncombined lime by means of carbonic acid gas; lastly, evaporating and crystallising.

Physiological Effects and Therapeutics.—The hypophosphites of lime, potash, and soda are the principal alkaline hypophosphites, and as they are closely allied in medicinal properties and uses, they may be conveniently considered together. Either of these, in the form of syrups, will prove an active tonic, removing neuralgic pains and languor of circulation in a very evident way.

In all cases, where there is reason to suppose the phosphates to be morbidly deficient, they may be prescribed with a good prospect of success. The demand for phosphate of lime in the construction of the teeth contributes to the disturbing influences called the fever of dentition. In these cases, whether they occur in weakly, ill-fed children, or in the robust, the hypophosphites have been employed with marked success.

They are especially valuable in cases of general and nervous debility, especially when combined with cod-liver oil.

Dose.—1 to 5 grains.

CALX CHLORINATA.

CHLORINATED LIME.

Synonyms. — Chloride of lime; bleaching powder.

Formula.—$CaCl_2O_2$, $CaCl_2$.

Characters.—A soft, dull-white powder, which possesses a peculiar odour resembling chlorine.

Preparation.—By subjecting slightly moist hydrate of lime to the action of chlorine.

Physiological Effects and Therapeutics.—Deodorizer, disinfectant, and antiseptic. These properties are largely due to the evolution of chlorine. It is used for drains, etc.

Its solutions are useful in ulceration of the mouth and in foul breath. It is also a very valuable bleaching agent for stained teeth. The successful insertion of the chlorinated lime is attended with some little difficulty, and proper instruments, which must on no account be made of steel, but of hard wood, ivory, or platinum, should be used. The tooth should be thoroughly cleansed of all foreign matters, and then encircled with the rubber dam, and the apical foramen should be most carefully plugged.

The chlorinated lime is also used in conjunction with a solution of oxalic acid (10 grs. to 1 ounce of water); or acetic acid, a 50 per cent. solution, that the liberation of the chlorine may be more gradual. The difficult point is to bury the acid in connection with the lime, so that, while it may accomplish the work effectually, there may be no loss of chlorine. This may be accomplished by dipping the instrument in the weak acid solution, then in the lime, and inserting the mass rapidly into the cavity. Another method is to use the lime made into a paste with

distilled water, and when sufficient has been inserted, to apply the acid by means of cotton wrapped around one of the platinum points. When the cavity is sufficiently full, it should be immediately sealed with gutta percha. After remaining for several days, the dressing may be repeated if necessary, the canal being first thoroughly cleansed with water.

CALX SULPHURATA.

SULPHURATED LIME.

Synonyms.—Sulphide of calcium; Canton's phosphorus.

Formula.—CaS.

Characters.—A pale, brownish-white, amorphous powder. Exposed to the air, more especially damp air, it absorbs oxygen. When very freshly prepared, it is phosphorescent; hence its old name, *Canton's phosphorus*, containing not less than 50 per cent. of sulphide of calcium.

Preparation.—By heating sulphate of calcium (7), and charcoal (1).

Physiological Effects and Therapeutics.—In small doses it excites a sensation of warmth at the epigastrium, and acts as a slight irritant to the intestines, and determines gentle relaxation of the bowels; but in excessive doses it produces active inflammation in the digestive canal.

It is supposed to check inflammation and prevent suppuration in incipient boils and carbuncles and in scrofulous sores and acne, and it is most useful in periodontitis and alveolar abscess.

Dose.—$\frac{1}{10}$ to 1 grain.

CAMPHORA.

CAMPHOR.

Formula.—$C_{10}H_{16}O$.

A concrete volatile oil obtained from the wood of *Cinnamomum camphora.* Imported in the crude form from China and Japan.

Characters. — In the form of white translucent, tough, crystalline masses, with a powerful odour and pungent taste; lighter than water. Readily soluble in spirit, ether, and chloroform; slightly in water.

Physiological Effects and Therapeutics.—Internally, it is a carminative, diaphoretic, anaphrodisiac, and nerve sedative.

Externally, it is used as an obtundent, and may for this purpose be advantageously combined with carbolic acid, chloral hydrate or thymol, with all of which it forms a fluid compound; it is also used locally as a stimulant and counter-irritant.

A strong solution in chloroform applied on cotton relieves the pain following extraction where there is severe periostitis.

It is a common ingredient in tooth powders, but is of very doubtful efficiency.

Dose.—1 to 10 grs.; spirit, 10 to 30 minims.

Antidotes.—Stomach pump, emetics, purgatives, warmth.

CANNABIS INDICA.

INDIAN HEMP.

The dried flowering tops of the female plant of the *Cannabis sativa.*

That grown in India, and from which the resin

has not been extracted, is alone to be employed for medicinal use.

The active principle is a resin, to which the name *cannabinon* has been given. It also contains some volatile and fixed oils.

Physiological Effects and Therapeutics.—Cannabis indica has been given in tetanus, and might be tried in large doses for hydrophobia.

The action of Cannabis indica appears to be little understood. It is a hypnotic, anodyne, and sedative.

It has been recommended for migraine, spasm, sciatica, tic douloureux, and other forms of neuralgia.

Locally, it is a useful application to sensitive dentine.

Dose.—Of the extract, $\frac{1}{4}$ to 1 grain; of the tincture, 5 to 20 minims, with 1 drachm of mucilage.

Antidotes. — Hot brandy and water, lemon juice, or vinegar.

CAPSICI FRUCTUS.

CAPSICUM FRUIT.

Synonyms.—Guinea pepper; pod pepper.

Characters.—The dried ripe fruit of *Capsium fastigiatum*. Natural order, *Solanaceæ*.

Obtained from Zanzibar. The seeds have a very pungent odour and taste.

Physiological Effects and Therapeutics.—Internally capsicum is administered in the form of a tincture, or it may be taken in the form of cayenne pepper as a condiment, for its stimulant and stomachic properties.

Locally applied as a plaster or liniment it has powerful counter-irritant properties, and hence it

is very useful for relieving pain in periodontitis. The plaster should be cut to a convenient size, and, the gum being first dried, pressed in position over the root of the affected tooth, and retained there for one or two hours: being easily applied, the plasters can be safely recommended for the patient's own use when other treatment is not available.

Dose.—Of the tincture, 2 to 10 minims.

CATECHU.

CATECHU.

Synonym.—Pale catechu.

An extract of the leaves and young shoots of *Uncaria Gambir*, belonging to the natural order *Cinchonaceæ*.

Imported from Singapore and other places.

Characters.—In masses formed of coherent cubes; externally, brown; internally, ochre-yellow, or pale brick-red; breaking easily with a dull earthy fracture; taste, bitter, very astringent and mucilaginous, succeeded by a slight sweetness; entirely soluble in boiling water.

Physiological Effects and Therapeutics.—Catechu produces the local and remote effects of astringent medicines generally. When of good quality, it is more powerful than kino. In its operation it is closely allied to tannic acid and rhatany.

As a local astringent it is of value in the treatment of spongy gums, especially when they have a tendency to recede from the necks of the teeth. For this purpose a piece of catechu allowed slowly to dissolve in the mouth is often of the greatest service.

Dose.—Of the tincture, ½ to 2 fluid drachms.

CERA FLAVA.

YELLOW WAX.

The prepared honeycomb of the hive bee, *Apis mellifica*, belonging to the class *Insecta*; order *Hymenoptera*.

Characters.—Firm, breaking with a granular fracture, yellowish, having an agreeable honey-like odour. Not unctuous to the touch, does not melt under 140° F., yields nothing to cold rectified spirit, but is entirely soluble in oil of turpentine. Boiling water in which it has been agitated, when cooled, is not rendered blue by iodine.

Uses.—Mainly used in medicine as an ingredient of ointments and plasters, and in dental practice as a root filling mixed with iodoform or other antiseptics.

It is also used for taking impressions of the mouth; in softening the wax the temperature should be gradually increased to, and not exceed, 140° F.

CHLORAL HYDRAS.

HYDRATE OF CHLORAL.

Formula.—C_2HCl_3O,H_2O.

Characters. — Colourless crystals, having a pungent odour and bitter taste.

Preparation.—It is made by the action of dry chlorine gas on absolute alcohol, and purified by treatment, first with sulphuric acid, and afterwards with a small quantity of lime. It is converted into the solid crystalline hydrate by the addition of a small quantity of water.

Physiological Effects and Therapeutics.—Chloral hydrate depresses the heart and vaso-

motor centre, causing fall of blood pressure. It probably acts directly on the heart; the brain may be at first excited, but the excitement is soon followed by depression; the action of the drug on the spinal motor and sensory nerves is not direct, but of spinal origin.

Locally, in dilute solutions, it is an antiseptic; concentrated, it is an irritant and vesicant.

Internally it is a rapid and powerful hypnotic; and in large doses has been used as an anæsthetic, but with doubtful results.

It may be employed in cases of sleeplessness and excitement, where opium or other narcotics are objectionable. It acts more quickly and surely than opium, and leaves no unpleasant after-effects, but must be used with extreme caution in cardiac disease.

From half a grain, to at most a grain, of the granules of chloral, wrapped in a little wool to hold them together, and placed in the cavity of a tooth, has been found to relieve the most violent toothache in a few minutes. When equal parts of chloral and powdered camphor are rubbed together a syrupy liquid is formed, which when rubbed upon a painful part often affords relief, as in neuralgia.

As it lessens sensibility and produces muscular relaxation, it may be employed in various medical and surgical cases where it is necessary to overcome muscular resistance or spasm, as in dislocation of the jaw, tetanus, etc.

Dose.—5 to 30 grains.

Antidotes.—Stomach pump, emetic, strychnine (hypodermically $\frac{1}{20}$ grain), hot coffee.

CHLOROFORMUM.

CHLOROFORM.

Formula.—$CACl_3$.

Characters.—A limpid, colourless, heavy liquid of an agreeable ethereal odour and sweet taste.

Soluble in alcohol and ether in all proportions, slightly so in water, communicating to it a sweetish taste. Sp. gr. 1·49.

It is exceedingly volatile, producing by its rapid evaporation great cold, with a slight tingling sensation.

Chloroform dissolves volatile oils, camphor, and certain alkaloids, mastic and most resins, gutta percha, and india-rubber.

It has the power of separating iodine, bromine, and certain alkaloids from their watery solutions.

It sinks in water forming globules, imparting no opalescence to it, which would indicate the non-presence of alcohol.

One per cent. of absolute alcohol is added to prevent decomposition.

Preparation.—By distillation of a mixture of rectified spirit, chlorinated lime and slaked lime, and subsequent purification and redistillation.

Physiological Effects and Therapeutics.—It is a stimulant, antispasmodic, carminative, local and general anæsthetic.

It has been advantageously employed in neuralgia, spasm of the glottis, and convulsions during dentition, croup, etc.

It is frequently used on account of its pleasant taste and odour to disguise the taste of nauseous medicines.

The LOCAL application of chloroform to the gum prior to the extraction of a tooth very greatly lessens the pain of the operation. That the action

may be purely local, cut a piece of pattern lead, or tinfoil, about an inch and a half square, line it with cotton or lint, which saturate with chloroform, adapt this closely to the tooth and adjacent gum, and allow it to remain in close contact about two minutes, then immediately extract the tooth.

It is also used locally for its counter-irritant effects. When used as a general anæsthetic, chloroform vapour mixed with air is inhaled, and thus absorbed by the blood.

Some administrators have used special forms of inhalers for regulating the supply of chloroform vapour. One was designed by Clover, which allows not more than 4·5 per cent. of chloroform to be inhaled; but in the hands of other experts this result is obtained by using it in what is called the open method, that is, the chloroform vapour is inhaled from a piece of lint or the corner of a towel, the amount of concentration being regulated by the distance at which it is held from the face, and the degree of saturation.

Chloroform anæsthesia is usually described as being divided into three stages—stimulation, depression, and loss of reflex excitability; but these gradually and sometimes imperceptibly pass from one stage to the next.

First Stage.—After the first two or three full inspirations there is a feeling of warmth extending from the chest to the extremities, and a general excitation and exaltation of sensations possibly producing ejaculations. This is succeeded by whizzing noises in the ears, a sensation of vibratory thrilling, and a numbing throughout the body and a general dulling of the ordinary sensations. Almost coincidently the drug stimulates the motor centres, producing struggling and jactitations; the cardiac and respiratory centres are also stimulated, resulting in an accelerated pulse and rapid

and sometimes shallow inspirations. The blood pressure is raised, and the pupil is dilated.

Second Stage.—This stage is one of depression, affecting all the functions; the patient becomes insensible to any painful stimulus and completely unconscious to all external influences. There is a general paralysis and relaxation of the voluntary muscles. The cardiac and respiratory centres are depressed, so that the pulse becomes slow and perhaps irregular, the arterial tension being lowered. The respiration is also slow and laboured. The pupil is contracted.

The depressing effect extends also to the reflexes, which are so much inhibited that operations can be safely performed without risk of stopping the heart's action by reflex stimulus.

Third Stage.—This is usually indicated by the action of the chloroform on the respiratory and cardiac centres, which will soon cease to respond to any reflex stimulation if the administration of the drug is continued. Thus the respirations become weak, slow, and irregular, and the action of the heart is much lowered both in the rate and power of its contraction; at the same time there is complete and universal relaxation of the muscular system, including the sphincters. The pupil is widely dilated.

As already indicated, surgical operations are usually performed during the second stage, except those requiring complete relaxation of muscular control, such as the reduction of a hernia or dislocation, which are more easily carried out during the third stage of anæsthesia.

There is a considerable difference of opinion amongst authorities as to whether chloroform kills by paralysis of the cardiac or respiratory centres, many deaths having occurred from the failure of each, and some from failure of both simultaneously.

Experiments upon animals seem to point to the conclusion that it poisons through the respiratory centre, while clinical experience points to a certain proportion of deaths due to primary cardiac failure.

Among the unpleasant secondary results of its administration may be mentioned vomiting, headache, and severe collapse; but such cases may be regarded as exceptional.

Dose.—3 to 8 minims.

Antidotes.—Fresh air, artificial respiration, inversion, faradism, stimulants hypodermically, nitrite of amyl inhalation, brandy enema.

COCAINÆ HYDROCHLORAS.

HYDROCHLORATE OF COCAINE.

Formula.—$C_{17}H_{21}NO_4$, HCl.

Characters.—In colourless, acicular crystals, or a crystalline powder with a bitter taste. Soluble in water, alcohol, and glycerine; scarcely soluble in ether.

Preparation.—Made by agitating ether with an aqueous solution of an acidulated alcoholic extract (from the dried leaves of the *Erythroxylon coca*), which is made alkaline with carbonate of sodium. The ethereal liquid is separated and evaporated, and the product purified by repeating the process, decolourizing, neutralizing with hydrochloric acid, and recrystallizing.

Physiological Effects and Therapeutics.—Internally cocaine in small doses stimulates, but in large doses paralyses the nerve centres. Death occurs by asphyxia, due to the paralysing effect of the drug on the respiratory centre.

Taken into the stomach, it has a powerful local anæsthetic effect, relieving the pain of gastritis,

etc. It frequently checks vomiting, and has been given for sea-sickness. It has a marked control over the sensation of hunger, and being a general stimulant, it conduces to great powers of endurance. Locally, it has a direct anæsthetic effect on the sensory nerve endings, and may be administered subcutaneously or applied directly to mucous surfaces.

Subcutaneously used, it is of much value for annulling the pain of extraction of the teeth, and for this purpose should be injected deeply into the gum on either side of the tooth to be removed.

Solutions of varying strength have been used, a favourite one having 2 per cent. of cocaine.

They should be freshly prepared at each injection to ensure purity (as fungi are apt to form in those which have been kept some time). After a lapse of five minutes the operation can be almost painlessly performed. Care should be taken not to inject large doses, as toxic effects are not infrequent. ($\frac{1}{4}$ grain at each injection is recommended.)

The "liquor cocainæ hydrochloratis" contains about 10 per cent. of the hydrochlorate and about 1·5 per cent. of salicylic acid, making a reliable solution for injection which is not liable to deterioration when kept.

Cocaine is inferior to the caustic anæsthetics as an obtundent of sensitive dentine, but may be advantageously used for this purpose in solution in oil of cloves.

For making a thorough exposure of the pulp previous to the application of arsenic, it is invaluable, and it is best applied in crystalline form, its action as a local anæsthetic for this purpose being prompt and thorough.

It has been incorporated in some devitalising pastes for the relief of pain following the application, with satisfactory results.

The operation of modelling in cases of highly sensitive palates is often made easy by previously painting the parts with a solution of cocaine.

Dose.—$\frac{1}{5}$ to 1 grain. Of liquor, 2 to 10 minims.

Antidotes.—Stomach pump, stimulants, nitrite of amyl inhalation.

COLLODIUM.

COLLODION.

Characters.—A colourless highly-inflammable liquid with ethereal odour, which dries rapidly, accompanied with some contraction, upon exposure to the air, and leaves a thin transparent film, insoluble in water or rectified spirit.

Preparation.—By adding one part of pyroxylin to a mixture of 12 ounces of rectified spirit with 36 of ether.

Uses.—Collodion is applied to many uses in medicine, surgery, and pharmacy. It has been used in cases of alveolar abscess threatening to point externally. It should be applied over the tumour by painting on successive layers with a camel-hair pencil, so as to aid by its pressure the resolution of the abscess, or cause it to point into the mouth.

Applied on cotton, it is also used as a stopping, or to secure more potent agents in a carious tooth.

COLLODIUM FLEXILE.

FLEXIBLE COLLODION.

Characters.—Similar to collodion, but, as the name suggests, this preparation is less liable to crack after drying.

Preparation.—By mixing collodion 48, Canada balsam 2, castor oil 1.

Uses.—Used for the same purposes as collodion, and is to be preferred when pressure after drying is undesirable and greater strength of film is needed.

COLLODIUM HÆMOSTATICUM.

HÆMOSTATIC COLLODION (UNOFFICIAL).

(*Dr. Pavesi.*)

Preparation.—By mixing collodion 100, carbolic acid 10, tannic acid 5, benzoic acid 5. Dissolve.

Uses.—A useful local hæmostatic, and should be applied by means of a pencil or on strips of lint. The tannic acid forms a coagulum, and the collodion a protecting film.

COLLODIUM STYPTICUM.

STYPTIC COLLOID (UNOFFICIAL).

(*Dr. Richardson's.*)

Preparation.—A solution of tannic acid 10, gun cotton 2, and benzoin 1; in rectified spirit 10, and ether 40.

Uses.—Similar to the above. This preparation, or the hæmostatic colloid, can be used in the form of a spray mixed with equal parts of ether.

CREASOTUM.

CREASOTE.

Formula.—Compound of guaiacol, $C_7H_8O_2$, and creasol, $C_8H_{10}O_2$.

Characters.—A colourless transparent liquid, of peculiarly strong odour and burning taste. Sp. gr. 1·071. Much of that found in commerce is carbolic acid; but creasote, unlike carbolic acid, does not solidify on cooling. Slightly soluble in water and freely in all proportions of rectified spirit, alcohol, and ether.

Preparation.—Made by the distillation of wood tar.

Physiological Effects and Therapeutics.—Carbolic acid has now generally taken the place of this agent; although very nearly identical in their action, some advantages are claimed for the carbolic acid. (See *Acidum carbolicum.*)

It has been used in the same manner as tannic acid for hardening the pulp previous to extraction. Its nauseous taste and unpleasant odour, however, are objections to its use for this purpose. It is also a favourite ingredient in devitalising pastes.

Dose.—1 to 3 minims.

Antidotes.—See *Acidum carbolicum.*

CUPRI SULPHAS.

SULPHATE OF COPPER.

Synonyms.—Blue vitriol; blue stone.

Formula.—$CuSO_4$, $5H_2O$.

Characters.—A blue crystalline salt in oblique rhombic prisms, soluble in water, yielding a pale blue solution which strongly reddens litmus. It has a styptic taste.

Preparation.—Prepared by heating sulphuric acid and copper scales to dryness, re-dissolving the mass, filtering and crystallizing.

Physiological Effects and Therapeutics.—Its topical action is stimulant, astringent, styptic, and caustic when applied to raw surfaces. In-

ternally it is astringent and tonic, and in large doses an emetic.

M. Féréol has given the ammoniacal solution of sulphate of copper in neuralgia (in six cases only). The neuralgia which, in nearly every case was of long standing, had resisted all other therapeutic means, and presented the characters of facial tic-douloureux. The disappearance of the pain was almost instantaneous, and although the painful phenomena might not have entirely vanished, still the improvement was very marked. The medicine should be continued for twelve or fifteen days at least, to prevent any relapse.

Applied to ulcers, either for the purpose of repressing excessively soft and spongy granulations, or hastening the process of cicatrization, it is one of the best agents we can employ. In superficial ulcerations of the mucous membrane, especially of the mouth, one or two applications are sufficient.

Sulphate of copper is an invaluable remedy in pyorrhœa alveolaris; it should be applied after the removal of the tartar in the form of powdered crystals, which should be packed into the pockets beneath the free edge of the gum by means of non-metallic instruments.

Dose.—$\frac{1}{4}$ grain to 2 grains. As an emetic, 5 to 10 grains.

Antidotes.—Stomach pump, milk, white of egg, stimulants, arrowroot, flour.

ERGOTA.

ERGOT.

Synonym.—*Secale cornutum.*

Characters.—The sclerotium of the *Claviceps purpurea* replacing the grain of rye; is about an

inch long, tapering, furrowed on each side, has a mawkish taste. Contains sphacelinic and ergotinic acids, an alkaloid called cornutine, a fixed oil, etc.

Physiological Effects and Therapeutics.—Ergot contracts the arteries and inhibits the action of the heart, and markedly affects the spinal cord, more especially the posterior columns, and contracts the uterus.

It is a powerful general hæmostatic for passive hæmorrhage, and has been used with some success for hæmorrhage following the extraction of teeth.

It is much used in the third and sometimes the second stage of labour for its ecbolic properties.

Dose.—Liquid extract ... 15 to 30 minims.
Ergotin ... ... 2 to 5 grains.
Hypodermic injection 3 to 10 minims.

Antidotes.—Tannin and stimulants.

ETHIDENI DICHLORIDUM.

DICHLORIDE OF ETHIDENE.

Synonym.—Ethidene chloride.

Formula.—$C_2H_4Cl_2$.

Characters.—It resembles chloroform in appearance, taste, and smell, and is less inflammable than alcohol. The sp. gr. is 1·225. It mixes freely with alcohol, only slightly with water, and less so with chloroform.

Preparation.—Prepared from bye products in the manufacture of chloral.

Physiological Effects and Therapeutics.—Ethidene appears to occupy an intermediate position between chloroform and ether. It reduces the blood pressure to a considerable extent, and probably depresses the heart's action more than chloroform. It produces less excitement than chloroform, but in other respects is very similar

in its action to that drug, while the period of anæsthesia is more prolonged. It is administered like ether from an ether inhaler.

As a LOCAL ANÆSTHETIC it may be applied to the seat of pain, as in neuralgia, etc.

Antidotes.—See *Chloroformum*.

FICUS.

FIG.

The dried fruit of *Ficus carica* imported from Smyrna. Taken internally they are nutritious and mildly laxative. Heated in boiling water, or roasted, they form a convenient poultice, and one especially applicable for use in the mouth.

GELSEMIUM.

YELLOW JASMINE.

The dried rhizome and rootlets of *Gelsemium nitidum*. Indigenous in the Southern States of North America.

Characters.—The rhizomes are light brown in colour with dark purple longitudinal lines ¼ to 6 inches long, and ¼ to ¾ inch in diameter. The small rootlets are attached to or mixed with these. It has a narcotic and aromatic odour and bitter taste.

It contains several constituents, of which the alkaloid gelsemina is the chief.

Physiological Effects and Therapeutics.—It is readily absorbed into the blood, and exercises a sedative action on the nervous system; like conium it is a paralyzer; but, unlike it in its mode of action, the paralysis does not commence at the periphery. Gelsemium destroys muscular

irritability, and impairs the sensibility of the sensory nerves.

The symptoms from large doses of gelsemium come on quickly and soon subside; these are pain in the head and eyes, giddiness, affection of the sight, and numbness of upper extremities.

In large doses it is poisonous, causing great prostration, nausea, vomiting, dilatation of the pupils (diplopia), and more or less loss of sight; inability to speak or move, coldness of the surface, and death by apnœa—paralysis of the muscles of respiration.

Gelsemium has often very decided effect upon neuralgia of the fifth nerve; and in neuralgic and rheumatic affections generally it has been used with the most beneficial results, in doses of 10 to 20 minims of the tincture. In many cases the necessary dose to relieve pain produces the toxic symptoms mentioned above, but unfortunately it is a most uncertain drug in its action.

Dr. Miller has used it with success as an external application in neuralgia.

Dose.—5 to 20 minims of the tincture.

Antidotes.—Ammonia, brandy, quinine.

GLYCERINUM.

GLYCERINE.

Formula.—$C_3H_5(HO)_3$.

Characters.—A clear colourless fluid, oily to the touch, without odour, of a sweet taste, freely soluble in water and in alcohol. Should leave no residue when strongly heated in a capsule.

Preparation.—Produced in the saponification of fats and fixed oils.

Uses.—A valuable application to some diseases of the skin and mucous membranes, either alone or in conjunction with other substances. When

used alone, it probably owes its efficacy to its physical properties, that of excluding air, and not drying at ordinary temperatures. It is a good solvent of many substances, such as borax, tannic acid, carbolic acid, gallic acid, arsenious oxide, etc., some of which are but slightly soluble in water.

Dose.—1 to 2 fluid drachms.

GLUSIDUM.

GLUSIDE.

Synonyms. — Saccharin, benzoyl-sulphonic-imide.

Formula.—C_6H_4, CO, SO_2, NH.

Characters.—A light, white powder, without odour and with an intensely sweet taste. Slightly soluble in water, more easily soluble in spirit and boiling water.

Preparation.—Obtained from toluene, a coal-tar derivative.

Physiological Effects and Therapeutics.—It is chiefly used internally as a sweetening agent when sugar is contraindicated.

As an antiseptic Dr. Miller strongly recommends it as an ingredient in mouth washes intended for daily use, and says: "It appears also to be one of the least poisonous of the substances recommended for the treatment of the oral cavity, and has no deleterious action upon the teeth."

Dose.—$\frac{1}{2}$ to 2 grains.

GUTTA PERCHA.

GUTTA PERCHA.

The concrete juice of *Dichopsis gutta* and other species of the same order *Sapotaceæ*.

Characters.—In tough flexible pieces, of a

light brown or chocolate colour; soluble, or nearly so, in chloroform, yielding a more or less turbid solution.

Entirely soluble in oil of turpentine, carbon bisulphide, or benzol.

Preparation.—It may be obtained pure by dissolving the commercial gutta percha in methylated chloroform, and filtering the solution, to which is added methylated spirits of wine; the pure gutta percha being precipitated, is collected, dried, and rolled into sticks.

Uses.—In conjunction with silica it forms a most useful stopping. A solution of it (in chloroform) may be employed to protect the surface of stoppings from the action of the fluids of the mouth until they are sufficiently hard not to be injuriously affected by them. In this form it is also useful to secure applications to sensitive surfaces or in cavities; the surface of the tooth should be carefully dried, the medicine placed in position, then covered with a strip of muslin dipped in the solution, and protected until the chloroform has entirely evaporated.

It is used for lining artificial dentures; for taking impressions of the mouth, for making splints, and as a root filling.

HAMAMELIS.

Synonyms.—Witch hazel, winter bloom.

The bark and leaves are used.

Characters.—The bark is $\frac{1}{10}$ inch thick and is in quills or curved pieces; colour, grey externally, dull red internally; tough, with astringent taste.

The leaves, oval or obovate, wavy, toothed on the margin, astringent and bitter.

It contains tannin and a bitter principle.

Hamamelis is a powerful astringent and hæmostatic. It is used both externally and internally, and is especially useful in passive hæmorrhage.

Dose.—Of the tincture, 5 to 60 minims; of the fluid extract, 2 to 5 minims; as lotion, 1 part of the tincture to 10 of water.

HIRUDO.

THE LEECH.

There are two kinds: *Sanguisuga Medicinalis*, speckled leech; *Sanguisuga officinalis*, green leech.

The speckled leech has a greenish yellow belly spotted with black, and the green leech has an olive green belly, not spotted. They are usually about two inches long, tapering at each end.

They are used for the purpose of extracting blood from congested parts, removing on an average from a quarter to a half an ounce of blood.

HYDRARGYRI PERCHLORIDUM.

PERCHLORIDE OF MERCURY.

Synonyms.—Bichloride of mercury, corrosive sublimate, mercuric chloride.

Formula.—$HgCl_2$.

Characters.—It occurs in heavy colourless masses of prismatic crystals, having a highly acrid metallic taste. It is very slightly soluble in water, but more soluble in alcohol, and still more readily in ether. When heated, it sublimes without decomposing or leaving any residue.

Preparation.—By subjecting a mixture of persulphate of mercury and chloride of sodium with a little black oxide of manganese to sublimation in a suitable apparatus.

Physiological Effects and Therapeutics.—It is an irritant, and a most powerful antiseptic and germicide.

Externally it may be used as an ointment, gargle, or lotion, in chronic skin diseases, ulcerated throat, and chronic discharges from mucous membranes.

In dental practice it has proved invaluable for sterilizing cavities and root canals, and in weak solution for treating abscesses or sinuses. Dr. Miller, as a result of his investigations on the relative powers of different antiseptics, states that weak solutions are not so powerful as germicides as pure carbolic acid, and recommends a solution of 1 in 100 of the perchloride for the treatment of pulp canals, and 1 in 50 for sterilising cavities previous to filling.

The rubber dam should in every case be used when applying these strong solutions.

On account of its corrosive action the use of perchloride of mercury in mouth washes is limited, first from the fact that it is unsafe to prescribe it in a sufficiently strong solution to obtain complete sterilization in a limited time; and secondly, if more rapid result is desired, a stronger solution becomes a dangerous one for frequent use. If constantly used there is some danger of staining the teeth.

Perchloride of mercury coagulates albumen, but this action can be prevented by the addition of 5 parts of hydrochloric acid or tartaric acid to 1 part of hyd. perchlor.

The general internal action of perchloride of mercury is similar to the other preparations of mercury. Mercury is administered internally chiefly for its antisyphilitic, alterative and purgative properties. In the primary and secondary stages of syphilis, the carefully and sufficiently

prolonged administration of mercury, carried to a degree short of ptyalism, is usually followed by the best results. In syphilitic ulcerations of the mouth and fauces the application of a mixture of blue pill (mercury 2, confection of roses 3, liquorice root 1) and glycerine is frequently very beneficial.

As alteratives, mercurials are given in small doses. Calomel is said to be less beneficial as an alterative than blue pill or grey powder. As a purgative it is given in larger doses.

In small and repeated doses, the first obvious effect of mercurials is an increased activity in the secreting and excreting organs. The absorbent or lymphatic system seems also to be stimulated to increased activity; at the same time, glandular swellings, enlargements, and indurations of various kinds are dispersed. When it is desired to obtain the sialogogue effects of mercury, somewhat larger or more frequent doses are given. Of all the secretions, none are so uniformly and remarkably augmented as those of the mucous follicles of the mouth and salivary glands; and the increased secretion is accompanied by more or less tenderness and inflammation of those parts, the whole constituting what is termed salivation or ptyalism.

The first symptoms are slight tenderness and tumefaction of the gums, which acquire a pale rose colour, except at the edges surrounding the teeth, where they are a deep red. Gradually the mouth becomes very sore, and the tongue much swollen, coppery taste is perceived, the teeth are slightly loosened, and the breath acquires a remarkably fœtid odour, the salivary glands soon become tender and swollen, the saliva and mucus of the mouth flowing abundantly. In aggravated cases the teeth fall out, and periostitis and necrosis ensue.

The action of mercury must be always carefully watched, especially in cases of anæmia and debility, even when these are due to syphilis; in tuberculosis and renal disease its use is contra-indicated.

Doses.—Liquor hydrarg. perchloridi, 30 to 120 minims; hydrarg. c. creta, 3 to 8 grains; pilula hydrargyri, 3 to 8 grains; hydrarg. subchlor. (calomel), ½ to 5 grains.

Antidotes.—Emetics, white of egg, flour, milk.

HYDROGENII PEROXIDUM.

PEROXIDE OF HYDROGEN.

Synonym.—Hydroxyl.

Formula.—H_2O_2.

Characters.—A colourless oily liquid. It is a very unstable solution, easily decomposing, and should be kept in dark well-stoppered bottles. It is odourless, with a bitter taste.

Preparation.—By treating barium peroxide with dilute sulphuric acid and filtering.

Physiological Effects and Therapeutics.—It is a powerful antiseptic, and readily destroys bacteria. It has been given internally for diabetes, rheumatism, and cardiac disease.

It is also a powerful bleaching and oxydizing agent, and stains on teeth can be removed by it where more dangerous substances cannot be safely applied. As a bleaching agent it is more generally recommended to be used mixed with chloride of aluminium, the chlorine of which it liberates, in a similar manner to the method employed when using chlorinated lime.

For cleansing the septic pulp canals of teeth it is much used, its activity being shown by the energetic bubbling which occurs directly it comes in contact with the putrescent matter; by alter-

nately drying the canals and reapplying the solution all action rapidly ceases. Care must be taken to see that it has free access to the remoter parts by a gentle pumping action.

Pyorrhœa alveolaris, especially when accompanied by free suppuration, can be advantageously treated with peroxide of hydrogen as a first application, in consequence of the absence of any deleterious effect of the drug on the surrounding tissues; it can be freely applied to the diseased alveolar margins.

An ethereal solution of peroxide of hydrogen 30 volume strength (with a little alcohol) is prepared, which does not readily decompose, and is more powerful in its action. Care must be taken in using this solution in the mouth, as it produces considerable pain when in contact with healthy soft tissues. It is known as ozonic ether.

The use of peroxide of hydrogen as an ingredient of mouth washes is deprecated by Dr. Miller on account of its deleterious acid reaction on the teeth.

Hydrogen peroxide is the chief constituent of "Sanitas."

Dose.—Of the aqueous solution, ½ to 2 drachms; of the ethereal solution, ½ to 1 drachm.

IODOFORMUM.

IODOFORM.

Formula.—CHI_3.

Characters.—A crystalline body of the colour of saffron, of a sweet, pungent taste, and a persistent unpleasant odour; nearly insoluble in water, but soluble in alcohol, ether, chloroform, glycerine, and the essential oils.

Preparation.—It may be obtained by heating iodine with carbonate of potassium, alcohol, and water.

Physiological Action and Therapeutics.—Iodoform is an antiseptic and disinfectant, and has slight local anæsthetic properties. It is seldom, if ever, given internally. It has been highly recommended as an antiseptic. For this purpose it may be dissolved in any of the essential oils. Eucalyptus oil and iodoform are antiseptic agents of a powerful and permanent kind, and they cause no irritation or destruction whatever of the tissues, as does strong carbolic acid. They may be used either alone, or together in any proportion.

Directly, it but slightly retards the development of bacteria, and in no case exerts a devitalizing action, but probably acts by depriving them of the nourishment necessary for their activity; notwithstanding these conclusions it has been proved of great value as a soothing and healing application in the form of ointment, powder, etc. Care is necessary in its use, as several cases of poisoning have occurred from the absorption of iodoform used as an antiseptic dressing to broken or suppurating surfaces.

Dose.—1 to 3 grains.

IODOL.

Synonym.—Tetra-iodo-pyrrol.

Characters.—A light brown crystalline powder, tasteless, with a faint odour. It contains 90 per cent. of iodine.

Preparation.—By precipitating pyrrol (obtained from animal oil) with iodo-iodide of potassium.

Physiological Effects and Therapeutics.—Similar to those of iodoform; but it is said to be not so poisonous, and has no unpleasant odour.

Dose.—1 to 3 grains.

IODUM.

IODINE.

Symbol.—I.

Characters.—It occurs in crystalline plates or scales, having a peculiar odour, dark colour, and metallic lustre. When heated, it sublimes, yielding a beautiful violet vapour, without leaving any residue. An aqueous solution strikes a deep blue colour with a cold solution of starch, even when very dilute. It is very sparingly soluble in water, but freely so in alcohol, ether, and solution of iodide of potassium, or chloride of sodium.

Preparation. — Obtained from the ashes of seaweed, and from mineral iodides and iodates.

Physiological Effects and Therapeutics.—Externally it is an irritant antiseptic, disinfectant, and deodorizer. It produces intense local action, and often causes a prolonged sensation of pricking and smarting. When injected into abscesses, etc., it is supposed to produce a protective film upon the diseased surface, it stimulates reparative action, and, by its antiseptic properties, corrects the fœtor of the secretions.

In acute and chronic periodontitis a strong tincture, either alone or in conjunction with tincture of aconite, painted upon the gum and around the neck of the affected tooth, or upon the surface of the part affected, is most beneficial.

The tincture and liniment are also used to paint over glandular swellings, etc., in order to produce absorption. On account of its affinity for iron it is used to loosen or remove the fragment of an instrument when broken in a root canal.

The stain on the skin caused by the application of iodine can be removed by spirit of ammonia.

It is usually administered internally in combination as iodide of potassium (which see, p. 107).

Antidotes.—Stomach pump, emetic, starch, arrowroot, gruel, white of egg, nitrite of amyl.

IRIDIS RHIZOMA.

ORRIS RHIZOME.

Synonym.—Orris root. The so-called orris root of commerce consists usually of the rhizomes of three species of iris.—*Iris florentina*, *I. pallida*, and *I. germanica* (nat. order *Iridaceæ*), imported from Leghorn and Trieste.

Characters. — Occurs in pieces, simple or branched, more or less knotty, about the thickness of the thumb, of a whitish colour, bitterish acrid taste, and a violet odour. This odour is increased in the process of powdering.

Uses.—Used in tooth powders on account of its violet odour. During teething, infants are sometimes permitted to rub their gums and bite it, but the practice is objectionable, as it contains an acrid substance which often causes derangement of the bowels.

KRAMERIÆ RADIX.

RHATANY ROOT.

The dried root of Peruvian rhatany, *krameria triandra*, or of Savanilla rhatany, *krameria ixina*.

Characters.—The bark of both kinds has an astringent taste, and tinges the saliva red. Very little taste or odour in the wood itself.

Physiological Effects and Therapeutics.—A powerful and valuable astringent; which property chiefly depends upon the presence of tannin, good specimens containing about 40 per cent. In

passive hæmorrhages, rhatany, either in the form of infusion or extract, has been found signally beneficial. It is doubtful whether it possesses any advantage over tannin.

In spongy and bleeding gums, the powder has been employed as a dentifrice; the tincture is also a good application. The infusion, or a solution of the tincture, forms a useful gargle in some varieties of relaxed sore throat and inflammation of the mouth.

LIQUOR AMMONIÆ FORTIOR.

STRONG SOLUTION OF AMMONIA.

Characters.—Ammoniacal gas, NH_3, dissolved in water. A colourless liquid, with a characteristic and very pungent odour, and strong alkaline reaction. Sp. gr., 0·891.

Preparation. — By heating a mixture of powdered chloride of ammonium (hydrochlorate of ammonia) and slaked lime, and collecting the gas in distilled water until required strength is attained.

Physiological Effects and Therapeutics.—Its local action is at first rubefacient, then vesicant, and lastly caustic or corrosive. Its emanations are irritant. In syncope its effects are of an immediately restorative character; but it should be used cautiously. Internally, in small doses it acts as a diffusible stimulant or calefacient. More especially is this remedy indicated when the object is at the same time to promote the action of the skin.

Dose.—Given internally as liq. ammoniæ (liq. am. fort., 1; aquæ distil, 2), 10 to 20 minims.

Antidotes.—Stomach pump, emetic, vinegar, lemon juice, olive oil, milk.

LIQUOR FERRI PERCHLORIDI FORTIOR.

STRONGER SOLUTION OF PERCHLORIDE OF IRON.

Characters.—Perchloride of iron (Fe_2Cl_6) in water. An orange brown liquid, miscible in water or alcohol in all proportions.

Preparation.—Made by dissolving iron wire in hydrochloric acid and water, adding nitric acid, evaporating and diluting.

Physiological Effects and Therapeutics.—This solution is a most valuable local styptic and astringent, and is frequently of great service in arresting hæmorrhage after tooth extraction.

It is administered internally in the form of the liquor ferri perchloridi (strong solution 1, water 3); and the tincture ferri perchloridi (strong solution 1, rectified spirit 1, water 2); chiefly on account of its hæmatinic, astringent, and tonic properties. It is also given in epilepsy and some skin diseases.

In cases of *neuralgia* with *anæmia*, when no organic cause can be discovered, the salts of iron are especially recommended. The long continued use of iron is highly beneficial in scrofula and rickets.

Dose.—Of the dilute solution and tincture 10 to 30 minims.

LIQUOR SODÆ CHLORINATÆ.

SOLUTION OF CHLORINATED SODA.

Synonym.—Labarraque's disinfecting solution.

Formula.—NaCl, NaClO.

Characters. — A colourless alkaline liquid, with an astringent taste and feeble odour of chlorine.

Preparation. — By slowly passing washed chlorine into a solution of carbonate of soda. It should be preserved in a coloured stoppered bottle, in a cool dark place.

Physiological Effects and Therapeutics.— Externally, it is a stimulant, astringent, antiseptic, and deodorizer. It is best applied in the form of lotion (1 part to 10 or 15 parts of water). It forms an efficacious remedy in aphtha, stomatitis, and cancrum oris. In all affections of the mouth attended with a fœtid discharge—as mercurial salivation, the ulcerated gums of scurvy and carious teeth—it proves highly serviceable, correcting the fœtor and by its stimulating property inducing a healthy reaction.

It is also a valuable agent for bleaching discoloured teeth.

LIQUOR SODII ETHYLATIS.

SOLUTION OF ETHYLATE OF SODIUM.

Characters.—A clear syrupy liquid, becoming brown when kept.

Preparation.—By dissolving 1 part of metallic sodium in 20 parts of ethylic alcohol.

Physiological Effects and Therapeutics.— It is a powerful caustic and can be conveniently used for removing small tumours, such as polypi of the gum; and may be applied on a camel's-hair brush or glass rod.

LIQUOR FERRI PERSULPHATIS.

SOLUTION OF PERSULPHATE OF IRON.

Characters.—$Fe_2 3SO_4$ (ferri persulphas) in water. A dense solution of dark-red colour,

inodorous, and having a strong styptic taste; miscible with water and alcohol in all proportions. Sp. gr. 1·441.

Preparation.—Make a hot solution of sulphate of iron in sulphuric acid and water, and boil it with nitric acid and water until the nitrous fumes cease to be given off; concentrate by boiling.

Physiological Effects and Therapeutics.—Highly astringent without causticity. It is a very efficacious local styptic, and therefore well adapted to check hæmorrhage from parts not readily subjected to pressure, such as the sockets from which teeth have been extracted.

LIQUOR MORPHINÆ BIMECONATIS.

SOLUTION OF BIMECONATE OF MORPHINE.

Characters.—A nearly colourless fluid.

Preparation. — Made by precipitating the morphine from a solution of the hydrochlorate by ammonia, and dissolving the precipitate in water, spirit, and meconic acid.

Physiological Effects and Therapeutics.—*See* Opium.

Dose.—5 to 40 minims.

Antidotes.—*See* Opium.

MAGNESII CARBONAS PONDEROSA.

HEAVY CARBONATE OF MAGNESIA.

Formula.—$(MgCO_3)_3, Mg(HO)_2, 4H_2O$.

Characters. — A white granular powder, slightly soluble in water.

Preparation. — Prepared from concentrated boiling solutions of sulphate of magnesium and

carbonate of sodium. Purifying and drying at a temperature below the boiling point of water.

Physiological Effects and Therapeutics.—Similar to those of magnesia ponderosa, but preferable to it as an antacid ingredient of tooth powders.

MAGNESIA PONDEROSA.

HEAVY MAGNESIA.

Synonym.—Heavy calcined magnesia, oxide of magnesium.

Formula.—MgO.

Characters.—A white powder, almost insoluble in water.

Preparation.—Prepared by calcining heavy carbonate of magnesia at a red heat to expel the CO_2.

Physiological Effects and Therapeutics.—An antacid and laxative. As an antacid it is preferable to the carbonate, as the latter, when brought in contact with the acid of the stomach, gives rise to much flatus.

It is serviceable in pyrosis and aphthous ulcerations, and is also a useful adjunct to tooth powders.

Dose.—10 to 60 grains.

MAGNESII SULPHAS.

SULPHATE OF MAGNESIA.

Synonym.—Epsom Salts.

Formula.—$MgSO_4, 7H_2O$.

Characters.—Minute colourless prisms with a bitter taste.

Preparation.—Prepared by the action of dilute

sulphuric acid upon dolomite or magnesian limestone; filtering and crystallizing.

Physiological Effects and Therapeutics.—A refrigerant and saline purgative. In dyspepsia, accompanied by costiveness, the sulphate of magnesia, in small doses, has been found very effectual.

Dose.—Refrigerant, 10 to 60 grains; purgative, $\frac{1}{4}$ to $\frac{1}{2}$ ounce, or more.

MASTICHE.

MASTICH.

A concrete resinous exudation, obtained by incisions in the bark of *Pistasia lentisens*.

Characters.—Small yellowish tears, brittle and transparent. Insoluble in water. Soluble in ether and chloroform.

Wool saturated with a solution of it in ether or chloroform makes a convenient and impervious temporary filling for the retention of dressings, etc.

MATICÆ FOLIA.

MATICO LEAVES.

The dried leaves of *Piper angustifolium* (*Artanthe elongata*), belonging to the natural order *Piperaceæ*, imported from Peru.

Characters.—Oblong leaves, with a downy under-surface. Aromatic bitter taste.

Physiological Effects and Therapeutics.—Externally it is a reliable hæmostatic. The effect is probably due rather to the mechanical action of the leaf than to astringency. Hæmorrhage from leech-bites, from superficial wounds, and

that following the extraction of teeth, etc., may be readily arrested by the local application of the *underside* of the leaf.

MENTHOL.

Synonyms.—Japanese camphor, peppermint camphor.

Formula.—$C_{10}H_{20}O$.

Characters.—Small, white, acicular crystals, or in crystalline masses, or moulded into cones; having a strong peppermint odour. It is slightly soluble in water, readily in alcohol, ether, and in oils both fixed and volatile; melts at the temperature of the body, and, when further heated, volatilizes without decomposition. Its specific gravity is less than that of water.

Preparation.—It is a stearoptene, and is obtained by cooling the oil distilled from the fresh herb of *Mentha piperita* and *Mentha arvensis*.

Physiological Effects and Therapeutics.—Anodyne, antiseptic, and local anæsthetic. Its local application for the relief of neuralgia is due to its anodyne properties, and in these cases it is usually applied to the affected part in the form of a pencil.

MORPHINÆ ACETAS.

ACETATE OF MORPHINE.

Formula.—$C_{17}H_{19}NO_3$, $HC_2H_3O_2$, $3H_2O$.

Characters.—A white powder, soluble in water and in spirit.

Preparation.—Prepared by precipitating the morphine from hydrochlorate of morphia by means of ammonia, dissolving the precipitate in acetic acid, and evaporating to dryness.

Physiological Effects and Therapeutics.—*See* Opium.

Dose.—$\frac{1}{8}$ to $\frac{1}{2}$ grain.

From this preparation is made — injectio morphinæ hypodermica (hypodermic injection of morphia).

Dose.—1 to 3 minims.

Antidotes.—*See* Opium.

MORPHINÆ HYDROCHLORAS.

HYDROCHLORATE OF MORPHINE.

Formula.—$C_{17}H_{19}NO_3$, HCl, $3H_2O$.

Characters.—In white, flexible, acicular prisms of a silky lusture, unaltered by exposure to the air. Solubility, 1 in 24 of water, 1 in 50 of rectified spirit.

Preparation.—It is prepared by thoroughly exhausting opium with distilled water, and evaporating the solution to small bulk. Solution of chloride of calcium is then added, and the whole concentrated until it becomes solid on cooling. This is submitted to strong pressure, which removes the mother liquor; the cake is then triturated with boiling distilled water, which removes the last trace, thrown on a filter, and washed with water. These washings and the mother liquor are now evaporated, cooled, solidified, and again pressed. The pressed cake is now dissolved in distilled water, treated with animal charcoal to remove the last trace of colouring matter; and then, after filtering, solution of ammonia is added in slight excess, which precipitates the morphine, leaving the codeia in solution. Morphine crystallizes out, is collected and dried. This is dissolved in hydrochloric acid, and the hydrochlorate of morphia allowed to crystallize.

Physiological Effects and Therapeutics.—*See* Opium.

Dose.—$\frac{1}{8}$ to $\frac{1}{2}$ grain.

Antidotes.—*See* Opium.

MYRRHA.

MYRRH.

A gum-resinous exudation from the stem of *Balsamodendron myrrha*, belonging to the natural order *Burseraceæ*. Collected in Arabia and Abyssinia.

Physiological Effects and Therapeutics.—Internally, it is a carminative and expectorant; and is useful in amenorrhœa. Externally, myrrh is an astringent and stimulant, and mild antiseptic. The tincture undiluted is serviceable when applied to foul and indolent ulcers of the mouth. Diluted, especially with eau de cologne, it is useful as a stimulating mouth-wash in sponginess and ulceration of the gums, and also in other affections of the mouth and throat.

It is used as a dentifrice; sometimes alone, but usually with other substances.

Dose.—Of myrrh, 10 to 30 grains. Of the tincture, $\frac{1}{2}$ to 1 fluid drachm.

NITROSUM OXIDUM.

NITROUS OXIDE.

Synonyms.—Protoxide of nitrogen, laughing gas.

Formula.—N_2O.

Characters.—A colourless, transparent, and almost inodorous gas, having a sweet taste. Sp.

gr., 1·525. It liquefies at a pressure of 50 atmospheres at 45° F.

Preparation.—By subjecting pure nitrate of ammonia to a temperature of about 400° F. in a retort or flask (taking care that the temperature does not exceed 480° F.). Nitrous oxide gas is evolved; wash, and collect it over tepid water, as cold water dissolves nearly its own weight of this gas. If a higher temperature than 480° F. be applied, nitric oxide will be given off. This may be separated by passing the gas through a solution of sulphate of iron (green vitriol). Sometimes the nitrate of ammonia contains chloride of ammonium; if so, the nitrous oxide gas will be impregnated with chlorine. To ensure the absence of this, the gas should be passed through a solution of caustic potash, and finally through tepid water.

For ascertaining the purity of nitrate of ammonia, the following simple tests may be employed:—(1) Take two grains of the salt and dissolve it in half a drachm of distilled water in a test tube; to this solution add, drop by drop, a small quantity of one containing 4 grs. of nitrate of silver in a drachm of distilled water. A light cloud and curdy deposit will indicate the presence of chlorides. (2) To a similar solution of the nitrate of ammonia, as above described, add a small quantity of one composed of 6 grs. of chloride of barium in a drachm of distilled water. A white cloud will indicate the presence of carbonates or sulphates. These test solutions may be preserved for future use.

History.—Discovered by Dr. Priestley in 1776, who termed it "Dephlogisticated nitrous air"; but it does not appear that this gas was experimented upon to any practical purpose until Sir Humphry (then Mr.) Davy's investigations proved it to be

respirable. The result of his experiments were published in the year 1801, under the title of "Researches Concerning Nitrous Oxide," and here we find the expression of his faith in its applicability towards the production of transient insensibility. From this time to the year 1844, it would seem that no effort was made to utilize the agent; but on December 10th of the last-mentioned year, Mr. Horace Wells, a dentist in Hartford, Connecticut, attended at Hartford a scientific lecture by Mr. G. Q. Colton. The gas was inhaled by a Mr. Cooley; he became excited and performed sundry evolutions, during which he contused and abraded both his shins rather extensively. The man on recovering was questioned by Mr. Horace Wells, who ascertained that he was altogether unconscious of having sustained any injury. Reflection led Mr. Wells to the belief that a man could, by inhaling the gas, render himself so insensible that he could have a tooth extracted without pain; this he resolved to test in his own person. The next morning Colton administered the gas to him, and Dr. Riggs, a dentist, extracted a carious tooth, and without the slightest pain. Shortly afterwards Wells went to Boston, U.S., and his endeavours were for a time concentrated upon the effort to bring it into use, but he failed to impress the profession at Boston with the importance of the discovery. In March, 1847, Wells wrote a pamphlet dealing with the subject, and the same year he visited Europe. He died in New York on January 24th, 1848, aged thirty-three, without having succeeded in awaking interest in his discovery.

At a meeting of the Medico-Chirurgical Society of Edinburgh, held November 10th, 1847, Sir J. Y. Simpson (then Mr. Simpson) read his well-known paper on chloroform, in which he alluded

to the use of nitrous oxide in surgical operations, and made mention of its use by several American practitioners.

After Wells' decease, Colton tried for years to induce dentists to adopt it, but without success; yet, in 1863, Smith, of New Haven, Connecticut, operated, while Colton gave the gas. From that time its use in America became general.

Dr. Colton visited Paris in 1867, and induced Dr. Evans to adopt it. The same year Dr. Evans came to England, with a view to its introduction here. The following year Dr. Colton visited England, and, at the house of Mr. C. J. Fox, administered the gas to several persons, in the presence of a number of professional gentlemen.

Physiological Effects and Therapeutics.—Nitrous oxide is a safe and convenient anæsthetic for operations; occupying only a short time, narcosis being quickly produced, and rarely leaving any unpleasant after-effects. The heart's action is slightly accelerated, and the pulse is seldom depressed, even when anæsthesia is complete. The rhythm of the respiration is at first slightly accelerated, becoming slow and regular as anæsthesia approaches; if the administration be pushed, death occurs from failure of the respiration, the heart continuing to beat for some seconds longer. It is evident that nitrous oxide has a strong affinity for the blood corpuscles, the oxygen in them being quickly displaced by it; this combination is, however, only a weak one, and is readily destroyed or broken up in the presence of a free supply of oxygen or atmospheric air. The gas eliminated from the lungs is apparently in the same condition as when it entered.

It has been asserted that the anæsthesia produced by nitrous oxide is practically a condition of asphyxia. This has been amply proved to be

erroneous by the fact, among others, that a mixture of nitrous oxide and oxygen will produce an anæsthesia as complete and almost as rapidly as when nitrous oxide alone is used; at the same time, it is true that nitrous oxide poisons by failure of the respiration when the administration is pushed so far, but this does not occur until some time after deep anæsthesia has been produced. Usually, under the influence of this gas, the patient first experiences a sensation of numbness, and perhaps tingling, and an inclination to breathe more rapidly, with a singing in the ears and a sense of fulness in the head; this is quickly followed by loss of consciousness. A peculiar duskiness or "blueness" of the face then appears, succeeded by jactitations or, sometimes, stiffening of the muscles, with a deep stertorous breathing or snoring; the pupil is generally widely dilated at this stage. This is the time to operate.

It must, however, be borne in mind that nervousness and hysteria, or idiosyncrasy, may considerably modify these symptoms, especially as regards the pulse and respiration.

The time required to produce anæsthesia is from 25 to 120 seconds, by from 10 to 60 inhalations, and a consumption of from 2 to 8 gallons of gas. The average duration of anæsthesia is 30 seconds.

Administration.—Nitrous oxide gas may be either stored in a gasometer, or more conveniently compressed into a fluid form in iron or steel bottles; and when used in the latter form, it is passed into a rubber bag or gasometer, and thence by a tube (of a diameter larger than that of the trachea) to a suitable mask or face-piece, made so that it easily adapts itself to the contour of the face, in order to prevent the ingress of air. The

escape of the gas is controlled by a stop-cock, the expired gas escaping by a one-way valve in the face-piece.

During recent years nitrous oxide gas has, by some administrators, been given mixed with from 10 to 15 per cent. of oxygen, and it is claimed that many of the objectionable symptoms are by this means altogether avoided, while at the same time the anæsthesia is prolonged; by others the patient is allowed to inhale a certain percentage of air, by which means it is said that a similar result is attained. For full information on this subject, the authors refer the student to special works on anæsthetics.

The advantages of nitrous oxide over other anæsthetics for minor operations are:—

Its safety.

The shorter time in which anæsthesia can be induced, viz., 25 to 120 seconds.

Its effects pass off quickly.

No danger of ignition.

Being pleasant to inhale, and not irritating (if pure) to the air-passages, fright and mental distress are avoided, thus diminishing the danger of death by syncope.

Because sickness and other unpleasant after-effects are very rare.

It may be safely administered to a patient in a sitting posture. At the same time, its exhibition needs extreme care and skill in advanced visceral diseases, and where there is known to exist fatty degeneration or atheroma of the blood vessels. In the latter case, for instance, the increased tension may cause rupture of a cerebral vessel and apoplexy.

Antidotes.—*See* Chloroformum.

NUX VOMICA.

Synonym.—Koochla, or poison nut tree. The seeds of *Strychnos Nux Vomica*, belonging to the natural order *Loganiaceæ*, imported from the East Indies.

Characters.—The seeds are nearly circular, about an inch in diameter, flat, or very slightly convex on the dorsal surface, and are usually surrounded by a filiform annular stria. In the centre of the ventral surface is the rounded hilum or umbilicus. Odourless, and a very bitter taste.

Physiological Effects and Therapeutics.—The seeds and the bark are powerful stimulants of the nervous system and spinal cord. Their activity resides in the alkaloids strychnia and brucia. In large doses it causes twitching of the muscles, followed by tetanic rigidity and death from apnœa; paralysed parts are more readily affected than those which are sound. It is much used in the treatment of paralysis, especially when depending on *lead* poisoning: also in mercurial paralysis, and in that resulting from rheumatism. It has been used in neuralgia with good effect.

Some constitutions are peculiarly susceptible to its action; hence its administration should always be commenced with the smallest doses, and gradually and cautiously increased, its effects being carefully watched.

Muscular stiffness or convulsive twitchings in the extremities, is a certain indication that the remedy has been carried far enough, and should at once be discontinued. During its exhibition the use of tobacco should be abandoned, its action on the system being antagonistic.

In small doses it is a good tonic and laxative, stimulating the muscular coat of the bowel.

Dose.—Tincture of nux vomica, 5 to 20 minims; Strychnine, $\frac{1}{30}$ grain.

Antidotes. — Stomach pump, emetics, anæsthetics (chloroform, ether), artificial respiration, nitrite of amyl (inhaled), bromide of potassium, and chloral hydrate (large doses).

OLEUM CAJUPUTI.

OIL OF CAJUPUT.

The oil distilled from the leaves of *Melaleuca minor*, belonging to the natural order *Myrtaceæ*. Imported from Batavia and Singapore.

Characters.—Transparent, limpid, of a pale-bluish or myrtle-green colour, having a strong, penetrating, and agreeable odour, resembling that of camphor, rosemary and cardamoms combined, and of a warm camphoraceous taste. Sp. gr. 0·914 to 0·930. Soluble in alcohol.

Physiological Effects and Therapeutics.—It is a carminative, diffusible stimulant, antispasmodic and diaphoretic. It is a medicine of much power and value.

In neuralgic affections it may be beneficially employed externally and internally, but its use is interdicted when the neuralgia is connected with an inflammatory condition.

In toothache, a small piece of cotton saturated with the oil, and introduced into a carious tooth, is stated to be an efficacious remedy.

It is a solvent of gutta percha.

Dose.—1 to 5 minims.

OLEUM CARYOPHYLLI.

OIL OF CLOVE.

A volatile oil distilled from the dried unexpanded flower buds of the *Eugenia caryophyllata* (cloves). Cultivated in the East and West Indies, Mauritius, etc.

Characters.—Colourless when new, changing gradually to a yellowish-brown colour when kept, with a strong odour and taste of cloves.

Soluble in rectified spirit and ether.

Physiological Effects and Therapeutics.—Internally it is a stomachic and carminative; locally, an anodyne disinfectant, stimulant, and counter-irritant.

On account of these properties it has been used locally for neuralgia.

In toothache a drop or two upon cotton, introduced into a carious tooth, is a popular remedy which frequently affords relief.

Mixed with oxide of zinc (the powder of the oxy-sulphate or oxy-phosphate element) it is applied in the form of a paste over an exposed, or nearly exposed, pulp; with powdered tannin it forms a very reliable dressing for sensitive dentine.

The chief constituent of oil of cloves is eugenol, a colourless, oily liquid, which is a powerful antiseptic and local anodyne.

Dose.—Of oil of cloves, 1 to 4 minims.

OLEUM EUCALYPTI.

EUCALYPTUS OIL.

The oil distilled from the leaves of the *Eucalyptus globulus*, *E. amygdalina*, or other species (natural order *Myrtaceæ*). The plant is in-

digenous to Australia. It has a pale yellow colour which darkens with age, with a pungent aromatic odour and taste. Soluble in alcohol and paraffin.

Physiological Effects and Therapeutics.—Internally it is administered for its antiperiodic and remote local antiseptic properties. Though a powerful antiseptic and deodorant it has no irritant or caustic effect, which gives it a marked advantage over many other antiseptics; it is also valuable in the treatment of pulpless or abscessed teeth, especially when mixed with iodoform.

It also possesses astringent properties, and an aqueous solution of the tincture is useful in cases of slight hæmorrhage, mucous discharges, ulcerated and spongy gums.

Dose.—1 to 4 minims.

OLEUM GAULTHERIÆ.

OIL OF GAULTHERIA.

Synonym.—Oil of wintergreen.

Characters.—Colourless, or reddish, with a strong aromatic odour and taste. Soluble in alcohol, ether, and chloroform.

It consists principally of salicylate of methyl.

Physiological Effects and Therapeutics.—Internally it is given for acute rheumatism as an antipyretic. Locally it is an antiseptic, and is used as a flavouring agent in tooth powders.

Dose.—10 to 15 minims.

OPIUM.

OPIUM.

Obtained from the *Papaver somniferum* (natural order *Papaveraceæ*).

General Characters. — Irregular lumps, weighing from two ounces to four pounds; enveloped in the remains of poppy leaves; when fresh it is plastic, tearing with an irregular, slightly moist, dark brown surface; having a peculiar narcotic odour and nauseous taste.

Preparation.—Towards evening, incisions are made into the half-ripe capsules of the poppy, care being taken not to penetrate the interior. A milky juice exudes, and concretes upon the capsule in little tears; these are worked up into the characteristic lumps.

Opium contains many alkaloids; the chief of which are, morphine, codeine, and thebaine, generally in combination with meconic or sulphuric acid, some being free.

Physiological Effects and Therapeutics.—Opium is a powerful anodyne, astringent, sedative, antispasmodic, and diaphoretic; also a narcotic and hypnotic.

It acts primarily and more intensely on the sensory and perceptive, than the vital, centres; the respiratory is more affected than the cardiac. In small doses it excites and stimulates the vascular and nervous systems, increasing the rapidity and volume of the pulse; it is apt to produce nausea, constipation, and impaired appetite and digestion. In toxic doses death occurs from paralysis of the respiratory centre.

It is administered for sleeplessness and to relieve pain, and is especially indicated when the sleeplessness is due to pain; its hypnotic effect is preceded by temporary excitement; it checks the secretions generally, excepting those of the mammary gland and the skin, and hence is given in diarrhœa and a "cold."

Opium is an invaluable drug in diabetes, its

action in this disease being due to the codeine it contains.

In sciatica, tic-douloureux, and other neuralgic affections, opium, either internally administered or locally applied, is occasionally of great service; but both these modes of use are far inferior to morphine hypodermically administered.

In toothache, a piece of solid opium, or cotton saturated with the tincture, or the wine of opium, introduced into a carious tooth frequently affords relief.

In ptyalism, opium has been given internally with a view of arresting the excessive discharge. A case is recorded where a patient was profusely salivated, and every means had failed to diminish the flow of saliva, until opium (gr. i. every 4 hours) was given, when almost immediately a cessation of the excessive secretion ensued.

Great caution should be observed in the administration of opium. It is interdicted in some diseases of the respiratory organs, etc.

Some persons are peculiarly susceptible to its action, and are unable to take even the smallest dose. Infants and children bear its exhibition badly; even two or three drops of the tincture have been known to produce a fatal result.

As a benumber or topical anodyne, it is much inferior to aconite; hence in neuralgia the latter is greatly to be preferred.

The action of opium depends chiefly on the morphine which it contains, and when the rapid effects of the drug are desired, it is usually given in the form of a preparation of morphine, which is more readily absorbed (*see page* 83).

Dose.—Of opium, ½ to 3 grains; of the tincture (laudanum), 5 to 40 minims.

Antidotes.—Stomach pump, emetics, strong coffee, ether (hypodermically), faradism, sulphate

of atropine $\frac{3}{100}$ grain (hypodermically), nitrite of amyl (inhaled), artificial respiration. Keep patient moving.

PAPAVERIS CAPSULÆ.

POPPY CAPSULES.

The nearly ripe dried capsules of the white poppy, *Papaver somniferum*, belonging to the natural order *Papaveraceæ*.

Characters.—Globular, varying from 2 to 3 inches in diameter, with stellately arranged stigmas on the top. Light brown colour, inodorous, and slightly bitter taste.

Physiological Effects and Therapeutics.—Sedative, anodyne, possessing the properties of opium in a milder and varying degree. For fomentations, two ounces to a pint and a-half of water boiled to one pint. This is frequently recommended, to be used hot, in cases of pain after tooth extraction.

Antidotes.—*See* Opium.

PARAFFINUM MOLLE.

SOFT PARAFFIN.

Synonyms. — Petroleum, *Ung. Paraffinum* (vaseline, etc., in commerce).

Characters.—A semi-solid residuum from the distillation of petroleum, or rock oil, of a yellow colour; when treated with animal charcoal it is decolourised; freely soluble in ether, slightly in alcohol, insoluble in water. It does not form a soap with alkalies. It seems indifferent to reagents,

and is not changed or made rancid by exposure to air.

Uses.—It is an admirable medium for ointments, for it does not change iodides of the metals nor the oxides of mercury, nor subacetate of lead. Citrine or nitrate of mercury ointment made with it keeps without the beautiful lemon colour being affected, even when largely diluted with it.

It may be made of any consistence by the addition of paraffin wax, and so be employed for cerates and ointments.

PHENACETINUM.

PHENACETIN.

Synonym.—Para-acet-phenetidin.

Formula.—$C_{10}H_{13}NO_2$.

Characters.—White shining crystals, without taste or odour. Sparingly soluble in cold water. Moderately soluble in spirit.

Preparation.—From para-phenetidin by the action of glacial acetic acid.

Physiological Effects and Therapeutics.—A valuable antipyretic and anodyne having a similar action to phenazone, but differing from it in having very little depressant action on the heart; and though its effects are not so rapid they are more lasting. It has been given in neuralgia and migraine, and is to be recommended for its soothing action.

It is an invaluable drug, given internally for the relief of toothache, especially when there are inflammatory conditions present.

Dose.—5 to 10 grains.

PHENAZONUM.

PHENAZONE.

Synonyms. — Antipyrine, phenyl - dimethyl-pyrazolone.

Characters. — White crystals or powder; odourless, with a bitter taste.

Soluble in water, alcohol, chloroform, and less easily in ether.

Preparation.—Is obtained from coal tar by a complicated chemical process.

Physiological Effects and Therapeutics.—Antipyrine has a depressant action on the heart, and in large doses has produced collapse, but has no direct action on the respiration.

It is a nerve sedative, anodyne, and antipyretic.

In facial neuralgia, odontalgia, and migraine, its anodyne and sedative properties have been made use of, and when given in small (10 grain) doses every three or four hours, its action is often very marked.

It has also been administered for lumbago, sciatica, epilepsy, and in acute febrile diseases.

As toxic results are occasionally met with, phenacetin has, to a great extent, superseded it as a nerve sedative.

Dose.—5 to 20 grains.

PLUMBI ACETAS.

ACETATE OF LEAD.

Synonym.—Sugar of lead.

Formula.—Pb. $(C_2H_3O_2)_2 3H_2O$.

Characters.—It occurs in white crystalline masses, which are slightly efflorescent, have an acetous odour, and a sweet astringent taste.

Preparation.—By digesting finely powdered litharge in dilute acetic acid by the aid of heat, filtering and crystallizing.

Physiological Effects and Therapeutics.—In small doses it is sedative and astringent, lessening morbid mucous discharges and even diminishing natural secretions; whence it is useful in chronic diarrhœa and dysentery. In hæmorrhage, active or passive, whether proceeding from the lungs, the stomach, the nose, or other parts, acetate of lead proves signally useful.

Dose.—1 to 4 grains.

POTASSII BICARBONAS.

BICARBONATE OF POTASSIUM.

Synonym.—Acid carbonate of potassium.

Formula.—$KHCO_3$.

Characters. — Occurs in colourless right-rhombic prisms, which are not deliquescent, and have a saline, feebly alkaline taste.

Preparation.—By passing carbonic acid gas through an aqueous solution of carbonate of potasium until crystals of the bicarbonate are formed, and recrystallizing.

Physiological Effects and Therapeutics.—An antacid antilithic, diuretic, and alterative, and is used in gout and rheumatism.

A dilute solution of this salt is very serviceable as a mouth-wash when acid medicines are being taken, and also to women during the period of pregnancy, when the secretions of the mouth are frequently found to be unusually acid.

It is a valuable agent, either alone or in conjunction with the iodide of potassium, in rheumatic toothache.

Dose.—10 to 40 grains.

POTASSII BROMIDUM.

BROMIDE OF POTASSIUM.

Formula.—KBr.

Characters. — Colourless, cubical crystals, without odour, having a pungent saline taste; readily soluble in water, less so in spirit.

Preparation.—By adding bromide gradually, and in slight excess, to solution of potash; evaporating to dryness; reducing the residue to a fine powder, mixing with wood charcoal, and fusing.

Physiological Effects and Therapeutics.—Hypnotic and sedative. It is given in epilepsy, various forms of convulsions, whooping cough, and asthma; and as a sedative to the generative organs.

Some forms of neuralgia are effectually relieved by full doses of the bromide when other remedies have failed. It averts and obviates irritability in teething, often preventing convulsions. In small doses, or locally applied, it rapidly and completely diminishes for a time the sensitiveness of the pharynx and velum palati to such an extent that those parts may be tickled without exciting the least effort at deglutition. This circumstance has been taken advantage of in preparing patients for laryngoscopic examinations and operations, and also in lessening the difficulty of taking large plaster casts of the mouth in cases of cleft palate, etc. But as a local anæsthetic cocaine has now almost entirely superseded it.

Dose.—5 to 15 grains and upwards.

POTASSA CAUSTICA.

CAUSTIC POTASH.

Synonyms.—Potash, hydrate of potash.

Formula.—KHO.

Characters.—Caustic potash is usually moulded for medicinal purposes into small sticks about the size of a pencil, which should be white and hard; it deliquesces when exposed to air, and if pure dissolves in rectified spirit. It is strongly alkaline.

Preparation.—The solution of potash is evaporated in a silver or clean iron vessel until, the ebullition being finished, the hydrate of potash liquefies; this is poured into proper moulds.

Physiological Effects and Therapeutics.—Powerfully corrosive. The hydrate of potash, and also a mixture with an equal part of lime (*potassa cum calce*), are used externally as caustics, for the formation of sloughs, for touching ulcers, etc.; the advantage of the mixture being that it is much less deliquescent than the hydrate alone; it is applied as a paste made with spirit. It dissolves animal tissues, forming a kind of soap with them. It is very difficult to circumscribe its action, and, therefore, requires to be applied with great caution.

It is a useful and convenient application to polypi of the pulp, especially in the form of potassa cum calce.

Equal parts of liquor potassæ (solution of potash) and liquefied carbolic acid make a successful application to the sockets of teeth for pain following extraction.

Antidotes.—Stomach pump, emetics, vinegar, lemon juice, olive oil, white of egg, gruel.

POTASSII CHLORAS.

CHLORATE OF POTASSIUM.

Formula.—$KClO_3$.

Characters.—Colourless, rhomboidal, crystalline plates, having a cool saline taste; sparingly soluble in cold water.

Preparation.—Obtained by passing a stream of chlorine gas through a solution of carbonate of potassium and slaked lime; subsequently boiling, filtering, and evaporating to crystallization.

Physiological Effects and Therapeutics.—Diuretic and stimulant. It becomes absorbed into the blood, and is eliminated by the kidneys. It appears to act as a diuretic and refrigerant, like nitrate of potash.

The supposition that it yields oxygen to the system is an error, for it has been found in the urine in an unchanged condition.

It is one of the most reliable remedies, indeed almost a specific, in ulceration of the mouth, particularly in stomatitis, and may be conveniently given to children mixed with honey. 3 to 5 grains of the chlorate every four hours. The bowels require to be regulated, and the constitution supported.

In ulcerative and gangrenous stomatitis (cancrum oris) no internal remedy is generally so effectual as chlorate of potash, but as a local remedy its efficiency is doubtful. To cachectic ulcerations, abraded surfaces, and in tonsilitis, the chlorate, finely powdered and locally applied, or in the form of a gargle, has proved very serviceable. In ptyalism it exercises a most beneficial influence.

Dose.—10 to 30 grains.

POTASSII IODIDUM.

IODIDE OF POTASSIUM.

Formula.—KI.

Characters. — Colourless, cubical crystals, which are generally semi-opaque. They are readily soluble in water, less so in spirit.

Preparation.—Prepared in a similar manner to bromide of potassium, with solution of potash, iodine, and wood charcoal.

Physiological Effects and Therapeutics.—Its properties are closely analogous to those of iodine. Like it, it occasionally produces headache, flushing of the face, and gastric irritation; and when taken in too large doses, produces coryza, and in some cases salivation.

In the tertiary stage of syphilis the value of the iodide is universally recognised, and it is occasionally used in the secondary stage.

It often proves most serviceable in scrofulous affections, in chronic rheumatoid arthritis, and for rheumatic nodes, which are often seen in the mouth.

It proves of service in painful neuralgic affections, dependent upon an inflammatory state of the nerve coverings; it is more especially useful when the pains are increased at night and by the heat of bed.

In faceache, partaking more of a rheumatic than a neuralgic character, Sir T. Watson found the iodide, in doses of 5 to 6 grains, produce a speedy and permanent cure.

Looseness of teeth, depending upon periostitis of the alveolar process, known by the great pain, swelling, and sponginess of the gums, is often effectually cured by the iodide.

Dose.—2 to 20 grains, or more.

Antidotes.—Stomach pump, emetics, starch.

POTASSII PERMANGANAS.

PERMANGANATE OF POTASSIUM.

Formula.—$KMNO_4$.

Characters.—It occurs in the form of dark purple, slender, prismatic crystals, inodorous, with a sweet, astringent taste, soluble in water.

Preparation.—Prepared by fusing and pulverizing black oxide of manganese, chlorate of potassium, and caustic potash, and boiling in water, and neutralizing with carbonic acid gas.

Physiological Effects and Therapeutics.—It is disinfectant, deodorant, and antiseptic. Locally applied, in substance or strong solution, it acts as a stimulant and mild escharotic. It readily yields its oxygen to bodies having an affinity for that element; hence its great value as a deodorizer; yet while it destroys the odour of putrefactive substances, bacteria not only retain their activity, but appear to grow and flourish. It has been used with success in the treatment of fœtid and gangrenous ulcers, abscesses, and wounds of all kinds; and it removes the fœtor of breath arising from local causes. It forms a useful gargle in ulcerated sore throat.

Strong solutions should not be used in the mouth because they stain the tissues a dark brown colour.

The stains of permanganate of potash are removed by dilute muriatic acid.

It is the chief ingredient of "Condy's Fluid."

PYRETHRI RADIX.

PELLITORY ROOT.

The dried root *Anacyclus pyrethrum*, belonging to the natural order *Compositæ*. Imported from the Levant.

Characters.—A fusiform root, about the length and thickness of the little finger, having a thick brown bark, studded with black shining points; breaks with resinous fracture, and presents internally a radiated structure. Inodorous.

Physiological Effects and Therapeutics.—An energetic local irritant and sialogogue. Chewed, it causes pricking in the mouth, a flow of saliva and buccal mucus, and is said to relieve some rheumatic and neuralgic affections of the head and face, and also paralysis of the tongue and muscles of the throat. In relaxation of the throat and uvula it is employed in the form of a gargle. Pellitory is not given internally.

The tincture is used to relieve periodontitis and toothache.

QUILLAIA SAPONARIA.

QUILLAIA BARK.

Synonym.—Soap bark.

A tree belonging to the natural order *Rosaceæ*. It is a native of Chili and Peru. The bark is imported in flat pieces, two or three feet in length and several inches wide, being hard and tough, with a whitish inner surface.

Properties and Uses.—The bark contains a principle, saponin, possessing the power of emulsifying gum-resins and oils, and forming with them, after being mixed with water, permanent

emulsions. The powdered bark acts as a sternutatory. Sometimes used in tooth washes, on account of its power of causing aqueous solutions to froth.

As a therapeutic agent this natural soap can be used in the form of infusion, tincture (1 of bark to 5 of proof spirit), or fluid extract.

It has slight local anæsthetic properties.

Dose.—Of the tincture, 20 to 60 minims.

QUININÆ SULPHAS.

SULPHATE OF QUININE.

Formula.—$(C_{20}H_{24}N_2O_2)_2$, H_2SO_4, $15H_2O$.

Characters. — Filiform, silky, snow-white crystals, of a pure, intensely bitter taste; sparingly soluble in water, yet imparting to it a peculiar bluish tint as seen by reflected light; dissolves readily in dilute acids.

Preparation. — Prepared from cinchona or remijia bark, which is exhausted by maceration and percolation with dilute hydrochloric acid. The solution so obtained is treated with a slight excess of solution of soda; the precipitated quinia is washed, and then very nearly dissolved in dilute sulphuric acid; a neutral liquid is thus obtained, which is filtered, concentrated, and crystallized.

It may also be obtained from the same barks by extraction with spirit after the addition of lime.

Physiological Effects and Therapeutics.—It is a valuable antiseptic and disinfectant, tonic and anti-periodic, possessing in an eminent degree the properties for which cinchona has been justly celebrated.

In tic-douloureux and other neuralgic affections

it holds a foremost place in our list of remedies. In neuralgia of malarial origin, there can be no doubt of the value of quinine. It may be given in full doses (grs. 5 to 20) shortly before the time at which the attack of pain is expected; but if after three or four doses a decided improvement is not effected, the probability is great that the neuralgia is not malarial. In a certain number of non-malarial cases, also, quinine produces a good effect, 2 to 3 grs. thrice daily being the largest quantity which is likely to be of any use.

In cancrum oris, when the constitution requires tonics and stimulants in order to support the strength, Dr. Graver strongly recommends quinine.

In aphthous ulcerations and scurvy, where the constitution is much debilitated, it is highly serviceable.

The hydrochlorate, being more soluble, is sometimes given instead; it has the same action as the sulphate.

Dose.—As a tonic, 1 to 5 grains; as an antipyretic and antiperiodic, 5 to 20 grains.

RESORCINUM

RESORCIN.

Formula.—$C_6H_4(HO)_2$.

Characters. — White, lustrous, crystalline plates, with an odour of carbolic acid; soluble in water, alcohol, and ether. It has a strong, peculiar, sweet, and somewhat unpleasant, irritating taste.

Preparation.—Made by passing the vapour of benzol through sulphuric acid.

Physiological Effects and Therapeutics.—Resorcin is little used internally; it is an anti-

pyretic, antiseptic, antiferment, and caustic. It exerts a powerful action on the nerve centres, producing epileptiform convulsions.

Ulcers of the gums and mucous membrane of the mouth which are invaded with micro-organisms, heal quickly after cauterisation with crystals of resorcin. It is also recommended as a caustic for cancerous and syphilitic ulcers, and is said to destroy the diseased tissue thoroughly. It is reputed not to affect the substance of the teeth.

A one per cent. solution arrests almost all forms of fermentation.

Dose.—1 to 30 grains in solution.

SANDARACH.

SANDARACH.

Synonym.—Juniper resin.

A resin obtained from the *Callitris quadrivalvis*, a plant belonging to the natural order *Pinaceæ* or *Coniferæ*. French sandarach is the commercial name of the resin of the *Pinus Dammara*.

Uses.—It is used as a substitute for mastic. Dissolved in spirits of wine (methylated), it is useful as a varnish for plaster models.

SAPO DURUS.

HARD SOAP.

Prepared by boiling olive oil with a solution of soda till the whole forms a thick viscid solution.

It is an antacid, and on that account is often introduced into tooth powders.

Dissolved in methylated spirit, it forms an

excellent varnish for plaster models in casting bites.

SEPIA OFFICINALIS.

COMMON CUTTLE FISH.

Natural History. — Belonging to the Class *Cephalopoda* (Cephalopods), a class of molluscs which have the body enclosed in a bag (mantle). Head protruding from the bag. The substance called *os sepiæ*, or cuttle-fish bone, is an oval or oblong calcareous bone (sometimes termed shell) deposited in the mantle of the animal.

Characters and Uses.—Os sepiæ has a cellular texture, and is so light as to float on water; when dried and ground into powder, it constitutes *pounce*. It enters into the composition of tooth powders. It is employed for several purposes in the arts, as for polishing, forming moulds for small silver castings, etc.

SINAPIS.

MUSTARD.

The seeds of *Sinapis alba* and *Sinapis nigra*, belonging to the natural order *Cruciferæ*.

Characters.—Small round seeds, yellow inside. Those of *Sinapis alba* are yellow outside, those of *Sinapis nigra* are black and somewhat smaller. Its activity is chiefly due to the essential oil, produced from the black mustard by the mutual action of sinigrin and myrosin in the presence of cold water.

Physiological Effects and Therapeutics.—In small doses it is a stimulant. In doses of from one to three teaspoonfuls it is an efficacious

emetic, effectually clearing out the stomach without producing any great amount of subsequent depression. Externally applied, in the form of poultice, it is irritant, and if left in contact with the skin for a long period, causes vesication. It should always be made with cold water.

In inflammation of the tonsils, sinapisms to the throat are very useful.

In toothache, faceache, and neuralgic affections of the head and face, a sinapism over the seat of pain often affords great relief.

Mustard leaves are an excellent substitute for the ordinary mustard poultice, being cleanly and more convenient.

SODA CAUSTICA.

CAUSTIC SODA.

Synonym.—Hydrate of sodium.

Formula.—NaHO.

Characters.—Greyish-white, hard, very alkaline and corrosive, but less caustic and deliquescent than the hydrate of potash.

Preparation. — Similar to that adopted for caustic potash, substituting sodium for potassium.

Physiological Effects and Therapeutics.—Similar to those of caustic potash.

Antidotes.—*See* Potassa caustica.

SODII BIBORAS.

BIBORATE OF SODA.

Synonym.—Borax.

Formula.—$Na_2B_4O_7$, $10H_2O$.

Characters.—In transparent, colourless crystals, soluble in water, still more so in glycerine:

insoluble in spirit. It has an alkaline reaction; dissolves fibrine, albumen, casein, and uric acid.

Preparation.—It is made artificially in Tuscany by boiling together in proper proportions boracic acid and carbonate of soda.

It occurs in a native state, and is exported from the East Indies under the name of Tincal.

Physiological Effects and Therapeutics.—It is an antiseptic and mild astringent, and is very useful as a mouth wash in apthous ulceration, generally prescribed for this purpose with honey or glycerine.

Borax is also used in skin diseases and uterine disorders.

Plaster casts may be rendered extremely hard by its use, thus: thoroughly dry the cast, then immerse it for a few minutes in a boiling solution of borax and water, and set aside to cool. It is also employed as a flux in fusing and soldering metals.

SODII BICARBONAS.

BICARBONATE OF SODA.

Formula.—$NaHCO_3$.

Characters.—A white powder; taste, alkaline with an alkaline reaction.

Preparation.—By passing carbonic acid gas into a mixture of carbonate and dried carbonate of soda until it is no longer absorbed.

Physiological Effects and Therapeutics.—It is a powerful antacid and gastric sedative. Neuralgic headache, connected with acidity of the stomach, is often relieved by a full dose of the bicarbonate of sodium.

One or two grains with a little rhubarb are

frequently given to children as a stomachic, or for aphtha. It is sometimes used as a wash or lotion in skin diseases.

A small portion put into a carious tooth often relieves toothache.

It is very useful in neutralizing the acid secretion of the mouth, whether arising from pregnancy or other causes. It is also a desirable adjunct to tooth powders.

Dose.—10 to 60 grains.

SODII HYPOPHOSPHIS.

HYPOPHOSPHITE OF SODA.

Formula.—$NaPH_2O_2$.

Characters.—White crystals, with a nauseous taste, very soluble both in alcohol and water.

Preparation.—This salt is prepared by adding carbonate of soda in solution to a solution of hypophosphite of lime as long as a precipitate is formed, separating the soluble hypophosphite of soda from the precipitate, and evaporating the solution to dryness and crystallizing.

Physiological Effects and Therapeutics.—Its medicinal properties are similar to those of hypophosphite of calcium.

SODII PHENAS.

PHENATE OR CARBOLATE OF SODA.

Formula.—NaC_6H_5O.

Characters.—A soapy mass of indistinct crystals, or in tufts of acicular crystals, more or less of a pinkish white colour, resolved by heat into an oily liquid. Readily decomposed; soluble in water, also in creosote, forming a thick mass.

Preparation. — May be obtained by mixing caustic soda with carbolic acid and a little water, and evaporating. It is met with in commerce in solution of a definite strength, and in this form it is generally used.

Physiological Effects and Therapeutics.— Hæmostatic, antiseptic, and disinfectant; it is highly recommended as an astringent and styptic application to check excessive bleeding after tooth extraction, and prevent subsequent soreness of the gum. It causes rapid absorption of the extravasated blood, thereby preventing fœtor of the breath, and facilitating the speedy closing, healing and hardening of the gum.

It is said to relieve almost magically the *after-pains* of extraction. It may be applied upon cotton, over and around the alveolus.

SODII SULPHIS.

SULPHITE OF SODIUM.

Formula.—Na_2SO_3, $7H_2O$.

Characters.—Colourless, inodourless prisms, with a saline taste. Soluble in water and spirit.

Preparation.—Made by passing sulphurous acid gas into a solution of carbonate of sodium or caustic soda.

Uses.—A mixture of 10 parts of sodium sulphite and 7 parts of boric acid is strongly recommended by Dr. Kirk for bleaching discoloured teeth; it is inserted into the tooth and a drop of water is added, and sulphurous acid gas, a powerful bleaching agent, is then liberated. The same precautions must be taken as when using chlorinated lime; it should remain in the tooth two or three days, two, or at the most three, applications being, according to Dr. Kirk, sufficient.

SPIRITUS AMMONIÆ AROMATICUS.

AROMATIC SPIRIT OF AMMONIA.

Synonym.—Sal volatile.

Preparation.—Made by mixing and distilling carbonate of ammonia, ℥iv.; strong solution of ammonia, ℥viii.; volatile oil of nutmeg, ℥ivss; oil of lemon, ℥viss; rectified spirit, Ovi; water, Oiii.

Physiological Effects and Therapeutics.—General stimulant, antacid and carminative, is a safer restorative than alcohol.

Dose.—20 to 60 minims.

THYMOL.

THYMOL.

Formula.—$C_{10}H_{13}HO$.

A stearoptene obtained from the volatile oil of *Thymus vulgaris*, *Monarda punctata* or *Carum ajowan*.

Characters.—In transparent prismatic crystals, having the odour of thyme, slightly deliquescent, and with a peppery taste, soluble in alcohol and ether, sparingly soluble in water.

Preparation.—Sometimes it crystallizes out spontaneously from the oil. It may be separated by agitating the oil with solution of caustic soda, and supersaturating the alkaline liquid with hydrochloric acid.

Physiological Effects and Therapeutics.—It is a non-irritant disinfectant, deodorant and local anodyne, and is a useful drug in the treatment of peripheral neuralgia and flatulence. Its powerful antiseptic properties render it a useful agent in the treatment of pulpless teeth and alveolar

abscess. Thymol may be with advantage added to devitalizing pastes.

VERATRINA.

VERATRINE.

Characters.—An alkaloid, not quite pure, obtained from the dried fruit (cevadilla) of *Asagræa officinalis*. It is a pale grey amorphous powder, odourless, but the minutest quantity produces intense irritation of the nostrils; strongly and persistently bitter, and highly acrid; feebly soluble in water; soluble in spirit, ether, and dilute acids.

Preparation. — The seeds are ground and thoroughly exhausted by rectified spirit. The alcoholic solution is concentrated, and, while hot, poured into cold distilled water to precipitate the resin, which is separated by filtration.

To the filtered liquid ammonia is added in slight excess, which combines with the gallic acid, setting the insoluble veratrine free. It is subsequently decolourized by animal charcoal, precipitated and dried.

Physiological Effects and Therapeutics.—Veratrine is an irritant, and excites sneezing, vomiting, purging, violent twitchings, and convulsions, and afterwards great muscular weakness, with loss of electric irritability. The pulse is at first quickened and strengthened, then slowed, and afterwards becomes quick, weak, and irregular. The twitchings and convulsions are probably in part due to the effects on the muscles and partly on the spinal cord.

Applied to the skin it causes numbness, and therefore paralyses the sensory nerves.

The susceptibility to its action varies, it in

some persons readily producing numbness and a sensation of coldness, which may last several days.

Like aconite, it has a beneficial influence upon neuralgia of the fifth nerve.

The ointment (the only form in which it is used) of the British Pharmacopœia (1 in 60) is not strong enough in facial neuralgia, and it is generally necessary to use it at least double that strength, 1 in 13 is recommended (*see p.* 130).

The ointment of the United States Pharmacopœia is 1 in 25.

Care must be taken not to apply veratrine to a denuded surface, as it will excite much pain and inflammation.

Antidotes.—Stomach pump, emetic, tannic acid, stimulants, recumbent position.

ZINCI CHLORIDUM.

CHLORIDE OF ZINC.

Formula.—$ZnCl_2$.

Characters.—A white, crystalline, semi-transparent mass, rapidly absorbing water if exposed to the air; soluble in rectified spirit, ether, and water.

Preparation. — Obtained by the action of hydrochloric acid on granulated zinc, purifying the solution by adding solution of chlorine and carbonate of zinc, evaporating to a proper consistence, and pouring into moulds to solidify.

Physiological Effects and Therapeutics.—It is a valuable escharotic to sensitive dentine, but, except in cases where rapidity of action is needed, carbolic acid is preferable in consequence of the severe dull pain caused by its application.

It is an excellent agent applied to teeth denuded of their enamel. Properly diluted, it is a valuable disinfectant and astringent.

It is an ingredient of some of the cement fillings, but on account of its strong escharotic action should not be applied to exposed or nearly exposed pulps.

Antidotes.—Stomach pump, emetics, bicarbonate of potassium or sodium, milk, strong tea, morphine.

ZINCI SULPHAS.

SULPHATE OF ZINC.

Formula.—$ZnSO_4$, $7H_2O$.

Characters.—In colourless, transparent, prismatic crystals, with a strong metallic styptic taste; insoluble in alcohol, freely soluble in water.

Preparation.—Obtained by dissolving granulated zinc in dilute sulphuric acid, purifying the solution by means of chlorine and carbonate of zinc, evaporating and crystallizing.

Physiological Effects and Therapeutics.—Tonic, astringent, and anti-spasmodic, in doses of 1 grain, gradually increased. In doses of 10 to 20 grains it proves emetic, acting promptly and effectually, leaving little subsequent depression.

Externally and locally its virtues are those of a stimulant astringent; it is commonly applied to quicken vital action as well as to check secretion. In gangrene of the mouth in children this agent (20 grains), well incorporated with honey (1 ounce), forms a very useful topical application.

This salt is an ingredient of the oxy-sulphate cement filling, and on account of its non-irritating

effect on living tissue its use is to be preferred to that containing the chloride of zinc over an exposed pulp.

Dose.—As a tonic or an astringent, 1 to 2 grains; emetic, 10 to 30 grains.

Antidotes.—*See* Zinci chloridum.

THERAPEUTIC INDEX OF DISEASES, DRUGS, PRESCRIPTIONS, ETC.

(For utility and convenience of reference some special groups of formulæ are included in this list).

Abrasion, *see* Erosion.

Abscess (Alveolar).

Aconite, Boracic Acid, Carbolic Acid, Eucalyptus Oil, Iodine, Iodoform, Perchloride of Mercury, Permanganate of Potassium, Peroxide of Hydrogen, Salicylic Acid, Sulphide of Calcium.

℞ Magnesii Sulphatis ... ... ℥ i.
Sodii Sulphatis ... ... gr. xx.
Aquæ Menth. pip. ... ad ℥ i.

Fiat haustus.

(Cooling, saline, and febrifuge.)

℞ Ferri Sulphatis ... ... gr. vi.
Acidi Sulphurici dil. ... ... ♏ xii.
Magnesii Sulphatis ... ... ℥ ii.
Infusi Quassiæ ... ... ad ℥ vi.

Ft. mistura.

(Saline, chalybeate, tonic.)

Take a sixth part.

Acidity.

Bismuth, Carbonate of Ammonia, Carbonate of Magnesia, Carbonate of Soda, Hydrochloric Acid, Nitric Acid.

℞ Sodii Bicarb. ... ... ʒi.
Mellis Boracis ... ... ʒvi.
Aquæ Chloroformi ... ad ℥viii.
Misce fiat lotio.

To be used frequently as a Mouth Wash.

℞ Sodii Bicarb. ... ... ʒii.
Tinct. Nucis Vomicæ ... ... ʒi.
Sp. Chloroformi ... ... ♏80.
Aquæ ... ... ad ℥viii.
(℥i. ter die sumend. ant. cibos.)

℞ Acidi Nitrohydrochlorici dil. ... ♏80.
Tinct. Nucis Vomicæ ... ... ʒi.
Syr. Aurantii ... ... ʒiss.
Aquæ ... ... ad ℥viii.
(℥i. t. d. s. post cibos.)

Antrum (Inflammation of).

Boracic Acid, Carbolic Acid, Chloride of Zinc, Eucalyptus Oil, Iodoform, Iodine, Perchloride of Mercury, Permanganate of Potash, Silver Nitrate, Tannic Acid, Zinc Sulphate, Zinc Chloride.

℞ Zinci Sulphatis ... ... gr. xv.
Acidi Carbolici ... ... ʒi.
Aquæ Chloroformi ... ... ad ℥viii.
Misce fiat lotio.

Apthæ.

Alum, Bicarbonate of Soda, Boracic Acid, Borax, Chlorate of Potassium, Glycerine of Borax, Iodoform, Magnesia, Nitrate of Silver, Permanganate of Potassium, Salicylic Acid, Solution of Chlorinated Soda, Tannin.

Apnœa.

Artificial Respiration, Ether, Nitrite of Amyl.

Bleaching Agents.

Chlorinated Lime (*see* page 51), Iodide of Potassium (*see* page 107), Oxalic Acid (*see* page 25), Peroxide of Hydrogen (*see* page 75).

Breath (Fetid).

Benzoic Acid, Carbolic Acid, Chloride of Zinc, Creosote, Permanganate of Potassium, Salicylic Acid, Sanitas, Solution of Chlorinated Soda, Tincture of Myrrh.

℞ Zinci Chloridi ... gr. iv. to xx.
Mellis ... ... ℥ iv.
Aquæ ... ... ad ℥ iv.

Misce fiat gargarisma.

℞ Liquoris Sodæ Chlorinatæ... ... ℥ iv.
Mellis... ... ... ℥ iv.
Aquæ ... ... ad ℥ viii.

Misce fiat gargarisma.

Cancrum Oris.

Ammonia, Chlorate of Potash, Chlorinated Lime, Hydrochloric Acid, Nitric Acid, Sulphate of Quinine, Sulphate of Zinc.

℞ Potassii Chloratis ... ... ℥ ss.
Acidi Hydrochlor. dil. ... ... ℥ ii.
Aquæ ... ... ad ℥ viii.

Fiat gargarisma.

Caries (Dental). *See* Sensitive Dentine and Toothache.

Convulsions (Teething).

Belladonna, Bromide of Potassium, Calomel, Chloral-hydrate, Chloroform (inhalation), Iodide of Potassium, Opium.

℞ Potassii Bromidi ... ... gr. iii.
Chloral hydratis ... ... gr. i.
Syrupi... ... ... ℥ ss.
Aquæ ... ... ad ℥ i.

(Every four hours for a child twelve months old.)

Cyst (Dental).

Carbolic Acid, Iodine, etc. (*see* Abscess).

Devitalizing Agents.

Arsenious Acid, Carbolic Acid, Nitric Acid.

℞ Thymoli
Ac. Arseniosi ... ... āā gr. x.
Ol. Caryophylli. q. s. ut fiat pasta.
MILLER.

℞ Ac. Arseniosi... ... ... ʒ i.
Cocainæ Hydroch. ... ... ʒ ii.
"Lanolin" q. s. to make a stiff paste.
HORLAN.

℞ Ac. Arseniosi... ... ... 4 parts.
Cocainæ Hydrochlor. ... 4 „
Mentholis ... ... 1 part.
Glycerini q. s. to make a stiff paste.
Dr. McINTOSH.

℞ Acidi Arseniosi ... ... gr. xx.
Morphinæ Acetatis... ... gr. xx.
Creasoti, vel Acidi Carbolici q. s. ut fiat pasta

℞ Acidi Arseniosi ... ... gr. xii.
Morphinæ Acetatis ... gr. ii.
Olei Caryophylli ... ... ♏ iv.
Creasoti q. s. ut fiat pasta.

Epulis.

Chromic Acid, Ethylate of Sodium, Nitrate of Silver, Nitric Acid.

Erosion.

Alcohol, Chloride of Zinc, Mastic, Nitrate of Silver, Oxide of Zinc, Phosphoric Acid, Tannic Acid.

℞ Gummi Mastichi ... ... ʒ i.
Chloroformi ... ... ʒ iv.
Zinci Chlor. ... ... ♏ x.

Misce. To be painted on the Erosion.

Exostosis.

℞ Acidi Carbolici ... ... ♏ xx.
Tinct. Aconiti (Fleming) ... ♏ xxx.
Lin: Iodi. ... ... ʒ i.

Misce. To be painted on Gum.

℞ Pot. Iodidi ... ... ʒ ss.
Sp. Ammon. Aromat. ... ... ʒ ii.
Infusi Gentian. Co. ... ... ℥ vi.

Misce fiat mistura.

(A sixth part three times a day.)

Fainting (*see* Syncope).

Gum (Chronic Inflammation of).

Aconite, Alcohol, Alum, Borax, Carbolic Acid, Catechu, Chlorate of Potassium, Chloride of Zinc, Iodine, Myrrh, Phenate of Soda, Pellitory, Tannin, Tincture of Krameria.

℞ Pulv. Aluminis ... ... ʒ ss.
Aquæ Cologniensis ... ... ʒ ii.
Acidi Tannici ... ... ʒ ss.
Aquæ Rosacæ ... ... ad ℥ viii.

Misce fiat gargarisma.

℞ Potassii Chloratis ... ... ʒ ii.
Sodii Biboratis ... ... ʒ i.
Aquæ Rosæ ... ... ad ℥ viii.

Misce fiat gargarisma.

℞ Tinct. Myrrhæ ... ... ʒ i.
Aquæ Cologniensis ... ... ʒ ii.
Borax ... ... ʒ i.
Aquæ ... ... ad ℥ viii.

Gum (Recession of).

Alum, Chloride of Zinc, Iodine, Sulphate of Copper, Tannin.

Gum (Ulceration of).

Carbolic Acid, Catechu, Chloride of Zinc, Hamamelis, Hydrochloric Acid, Iodine, Magnesia, Myrrh,

Nitrate of Silver, Perchloride of Mercury, Phenate of Soda, Salicylic Acid, Sulphate of Copper, Tannin.

Hæmorrhage.

Acetate of Lead, Alcohol, Alum, Chloride of Zinc Collodions, Dilute Sulphuric Acid, Ergot, Hamamelis, Matico Leaf, Nitrate of Silver, Solution of Perchloride of Iron, Solution of Persulphate of Iron, Tannin.

℞ Ferri Perchloridi ... ... ℥ ss.
Collodii ... ... ℥ iii.
Solve.

Local Anæsthetics.

Camphor, Carbolic Acid, Chloride of Ethyl, Chloroform, Cocaine, Ether, Iodoform, Menthol, Morphia.

Mouth Washes.

℞ Sodii Bicarbonatis ... ... ℥ i.
Tinct. Myrrhæ ... ... ℥ ii.
Aquæ Cologniensis ... ... ℥ iv
Aquæ ... ... ad ℥ viii.

(Alkaline.)

℞ Pulveris Aluminis ... ... ℥ ii.
Potassii Chloratis ... ... ℥ ii.
Aquæ ... ... ad ℥ x.

(Astringent.)

℞ Acidi Tannici ... ... gr. xx.
Tinct. Pyrethri ... ... ℥ iii.
Aquæ Rosæ ... ... ad ℥ vi.

(Astringent.)

℞ Sodii Biboratis ... ... ℥ iv.
Aquæ Cologniensis ... ... ℥ v.
Tinct. Myrrhæ ... ... ℥ ss.
Aquæ ... ... ad ℥ x.

(Alkaline and Astringent.)

℞ Potassii Chloratis ... ...ʒ vi.
Aquæ ... ... ad ℥ viii.
(Antiseptic and Astringent.)

℞ Glusidi ... ... gr. v.
Acidi Benzoici ... ... gr. vi.
Tinct. Krameriæ ... ...ʒ ss.
Alcoholis Ethylici ... ... ʒ iiiss.
Olei Menth. pip. ... ... ♏ i.
Olei Cinnamoni ... ... ♏ i.
(Antiseptic.) MILLER.

℞ Zinci Chloridi ... ...gr. i. ad v.
Mellis... ... ... ʒ i.
Aquæ ... ... ℥ i.
(Antiseptic and Astringent.)

℞ Acidi Borici ... ...ʒ iii.
Thymolis ... ... gr. v.
Glycerini ... ...ʒ iv.
Spiritûs vini rectificati ... ... ʒ ii.
Aquæ ... ... ad ℥ xii.
(Antiseptic.)

℞ Liquoris Chlori ... ...ʒ iv.
Mellis ... ...ʒ iv.
Aquæ ... ... ad ℥x.
(Deodorant.)

Neuralgia.

Locally.

Aconite, Atropine, Belladonna, Camphor, Capsicum, Chloral-Hydrate, Chloroform, Cocaine, Menthol, Morphia, Mustard, Pellitory, Thymol, Veratrine.

Internally.

Aconite, Alcohol, Arsenious Acid, Belladonna, Butyl-Chloral-Hydrate, Chloral-Hydrate, Chloroform, Gelsemium, Hypophosphite of Calcium, Iron, Morphia, Nitrite of Amyl, Nux Vomica, Opium, Phosphorus,

Potassium (Iod. and Brom.), Phenacetin, Phenazone, Salicylic Acid, Sulphate of Copper, Sulphate of Quinine.

Locally.

℞ Veratrinæ ... ... ʒ i.
Olei Olivæ ... ... ʒ i.
Adipis ... ... ℥ iss.
Misce.

(This is 1 in 13, whereas the B.P. preparation is 1 in 60: it must therefore be lightly smeared, and not rubbed, upon the seat of pain.)

℞ Linimenti Aconiti
Linimenti Belladonnæ ... āā ʒ vii.
Chloroformi ... ... ʒii.
Misce.

Anodyne in acute neuralgia. Saturate a piece of lint with this Liniment and apply to the part affected, cover it with a piece of spongio-piline previously soaked in hot water.

℞ Chloral Hydratis ... ... 3 parts.
Camphoræ ... ... 1 part.
Misce. To be rubbed on part affected.

Internally.

℞ Ammonii Chloridi ... ... ʒii.
Tincturæ Gelsemii ... ... ʒi.
Tincturæ Aconiti ... ... ♏ xx.
Aquæ ... ... ad ℥ vi.
Misce.

℥i. three times a day.

℞ Phenacetini ... ... gr. xv.

Every hour.

℞ Quininæ Sulphatis ... ... gr. xvi.
Acidi Hydrobrom. dil. ... ... ʒi.
Liq. Morphinæ Bimecon. ... ♏ lxxx.
Liq. Arsenicalis ... ... ♏ lx.
Syr. Aurantii ... ... ʒ iss.
Aquæ ... ... ad ℥ viii.

(℥i. t. d. s.)

℞ Liq. Arsen. Hydro. ... ...m v.
Tr. Ferri Perchlor. ... ...m v.
Sp. Chlorof. ... ...m x.
Aq. ... ... ad ʒ i.

Thrice daily, after meals.

CARTER.

℞ Butyl. Chloral Hyd. ... gr. v.
Syr. Aurantii ... ... ʒss.
Aq. ... ... ad ʒ ss.

Occasionally, as required.

CARTER.

℞ Quininæ Sulph. ... ... gr. i.
Ferri Sulphat. ... ... gr. ii.
Morphinæ Acet. ... ... gr. $\frac{1}{12}$.
Confect. Rosæ, q.s.

(Fiat pilula, ter die sumend.)

Pain, after Extraction.

Chloride of Zinc, Cocaine, Opium, Phenacetin, Phenate of Soda.

℞ Acidi Carbol. Glacial ... ... ʒ i.
Liq. Pot. ... ... ʒ i.
Aquæ ... ... ad ʒ viii.

Use as mouth lotion.

SIR J. TOMES.

Periodontitis.

Aconite, Capsicum, Carbolic Acid, Iodide of Potassium, Iodine, Morphia, Phenacetin, Sulphate of Magnesia, Sulphate of Soda, Sulphide of Calcium.

℞ Tinc Aconiti (Fleming).
Tinc Iodi ... ... āā ʒ i.

Misce. To be painted on the dry gum.

℞ Tinc. Aconiti (Fleming) ... ... ʒ ss.
Acidi Carbolici ... ... ♏ xv.
Lin. Iodi ... ... ad ʒ ii.

Misce. To be painted on the gum twice daily.

℞ Calcii Sulphidi ... ... gr. ⅛ ad 1
Sacch. Lactis ... ... gr. i.
Syrupi ... ... q. s.

Misce. Fiat pilula.

Take one every two to four hours.

℞ Mag. Sulph. ... ... ʒ iv.
Mag. Carb. ... ... gr. xl
Aq : Menth. pip. ... ... ℥ iv

Misce fiat mist. ¼ part three times a day.

Pulp (Exposed and Inflamed).

Arsenic, Carbolic Acid, Cocaine, Creosote, Iodoform, Menthol, Morphia, Oil of Cajuput, Oil of Cloves, Oil of Eucalyptus, Tannic Acid, Thymol.

℞ Morphinæ Acetatis ... gr. xxx.
Acidi Tannici ... ... gr. xl.
Gummi Mastichi ... ... ʒ ii.
Sp. V. Rect. ... ... ℥ i.

Misce. Apply on cotton.

Pyorrhœa Alveolaris (Riggs' Disease).

Aromatic Sulphuric Acid, Carbolic Acid, Iodine, Nitric Acid (2 to 4 per cent.), Perchloride of Mercury, Peroxide of Hydrogen, Sulphate of Copper, Sulphate of Quinine.

Sensitive Dentine.

Alcohol, Bicarbonate of Soda, Carbolic Acid, Chloroform, Cocaine, Menthol, Nitrate of Silver, Oil of Cajuput, Oil of Cloves, Phosphoric Acid, Tannin, Thymol.

℞ Acidi Tannici ... ... gr. xxiv.
Olei Caryophylli ... ... ℥ i.

Misce.

To be applied to the cavity for one or two days.

℞ Cocainæ Hydrochloratis ... gr. ix.
Olei Caryophylli ... ... ℥ i.

Misce.

Sleeplessness (due to Pain).

Bromide of Potassium, Chloral Hydrate, Opium.

℞ Tinc. Opii ... ... ♏ xv.
Vini Antimon. ... ... ♏ xv.
Aquæ Camphoræ ... ... ad ℨ i.

Misce. Every four or six hours.

CARTER.

℞ Chloral Hydratis ... ... ℥ ii.
Syrupi Aurantii Floris ... ... ℥ iv.
Syrupi Tolutani ... ... ℥ iv.
Aquæ... ... ... ad ℨ vi.

Misce.

DOSE.—$\frac{1}{6}$th part; to be given largely diluted.

Stomatitis.

Alum, Boracic Acid, Borax, Carbolic Acid, Catechu, Caustic Potash, Chlorate of Potash, Chlorinated Lime, Chlorinated Soda, Hydrochloric Acid, Lime, Magnesia, Menthol, Myrrh, Nitrate of Silver, Oil of Eucalyptus, Salicylic Acid, Sulphate of Copper, Sulphate of Quinine, Tannin, Thymol.

℞ Sodii Biboratis ... ... ℥ i.
Mellis... ... ... ℨ i.

Misce.

℞ Thymolis ... ... ℥ ss.
Glycerini ... ... ℨ vi.

Misce. Astringent. Useful in superficial Stomatitis.

℞ Pot. Chloratis ... ... gr. x.
Tinc. Ferri Perchlor. ... ... ♏ v.
Acidi Hydrochlor. dil. ... ... ♏ xv.
Aquæ ... ... ad ʒ i.

Misce. Three or more times a day. CARTER.

(ʒ i. to ʒ ii.) for children in all forms of Stomatitis.

Syncope.

Alcohol, Aromatic Spirits of Ammonia, Carbonate of Ammonia, Ether, Nitrite of Amyl.

Tartar.

Aromatic Sulphuric Acid, Dilute Hydrochloric Acid.

Teething (*see also* Convulsions).

Bromide of Potassium, Phenacetin.

℞ Potassii Bromidi ... ... gr. i.
Sodii Bicarbonatis ... ... gr. i.
Chloral Hydratis ... ... gr. i.

Misce.

To be given to very young children (under four months) in warm sweetened water.

Tooth Powders.

℞ Cretæ Præcipitatæ ... ... ℥ iv.
Pulveris Saponis Albi ... ... ʒ ii.
Ott. Rosæ ... ... gtt. iv.

Misce.

℞ Cretæ Præcipitatæ ... ... ℥ iv.
Pulveris Saponis Albi ... ... ʒ ii.
" Ossis Sepiæ ... ... ʒ iv.
Ott. Rosæ ... ... gtt. iv.

Misce.

℞ Sodii Bicarb. ... ... ʒ i.
Pulveris Ossis Sepiæ ... ... ʒ iv.
Cretæ Precipitatæ ... ... ℥ iv.
Ott. Rosæ ... ... gtt. iv.

Misce.

(Alkaline.)

℞ Pulveris Saponis Albi ... ... ℥ ij.
„ Iridis ... ... ℥ ii.
Sodiæ Bicarb. ... ... ℥ ii.
Cretæ Precipitatæ ... ... ℥ iv.
Ol. Gaultheriæ ... ... ♏ iv.
Ott. Rosæ ... ... ♏ v.

(Alkaline.)

℞ Acidi Borici ... ... ℥ ii.
Pulveris Ossis Sepiæ ... ... ℥ ij.
„ Radicis Iridis ... ... ℥ i.
Cretæ Precipitatæ ... ... ℥ iii.
Ol. Caryophylli ... ... gtt. iii.

Misce.

(Antiseptic.)

℞ Cretæ Precipitatæ ... ... ℥ x.
Ac. Benzoici ... ... ℥ iv.
Glusidi ... ... ℥ i.
Pulv. Ossis Sepiæ ... ... ℥ i.
Ott. Rosæ ... ... ♏ x.

Misce.

(Antiseptic.)

℞ Sodii Carbonatis Exsiccatæ gr. xx.
Cretæ Præcipitatæ... ... ... ℥ ii.
Pulveris Ossis Sepiæ ... ... ℥ ii.
Acidi Tannici ... ... gr. xxx.
Olei Caryophylli ... ... gtt. iii.

Misce.

(Astringent.)

℞ Pulv. Myrrhæ ... ... ℥ iv.
„ Iridis Rad. ... ... ℥ iv.
„ Cinchonæ Flavæ ... ... ℥ iv.
Cretæ Precipitatæ ... ... ℥ xi.
Pulvis Ossis Sepiæ ... ... ℥ i.
Ott. Rosæ ... ...♏ viii.
Olei Caryophylli ... ... ♏ vi.

Misce.

(Astringent.)

℞	Sodii Bicarb.	ʒ i.
	Ac. Borici	ʒ i.
	Cretæ Precipitatæ	℥ v.
	Pulv. Ossis Sepiæ	℥ i.
	Terræ Rosæ	ʒ i.
	Ott. Rosæ	♏ x.

Misce.

(Alkaline and Antiseptic.)

ARTIFICIAL RESPIRATION.

WHEN apnœa results from the administration of anæsthetic agents, such efforts should be made for resuscitation as the following:—The main reliance is on artificial respiration; this should be resorted to without a moment being lost. The action of the heart usually continues for three or four minutes after respiration has ceased; these are the precious minutes. The three principal methods whereby to effect artificial respiration are the Marshall Hall, the Silvester, and the Howard.

The MARSHALL HALL method:—Having, either with forceps or a tenaculum, drawn the patient's tongue forcibly forwards, so as to cause retraction of the arytenoid cartilages, lay the patient on the face, with the right arm doubled under the forehead so as to prevent obstruction to the mouth, then turn the body gently, and completely, on the side and a little beyond; alternately repeating these movements deliberately, efficiently, and perseveringly, fifteen or twenty times in a minute. When the patient reposes on the thorax, this cavity is compressed by the weight of the body, and expiration takes place; when he is turned on the side, this pressure is removed, and inspiration occurs. When the prone position is resumed,

make equable but efficient pressure along the spine, removing it immediately before rotation on the side (the first measure augments the expiration, the second commences inspiration).

Dr. H. R. SILVESTER'S method of restoring natural breathing is the one adopted by the Royal Humane Society, and is practised according to the following rules :—

RULE 1.—*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.

RULE 2.—*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 this purpose.

RULE 3. — *To Imitate the Movements of Breathing.*

First.—INDUCE INSPIRATION. — Place yourself at the head of the patient, grasp his arms, raise them upwards by the sides of his head, stretch them steadily but gently upwards and backwards for two seconds. By this means fresh air is drawn into the lungs by raising the ribs. (*See* Fig. 1.)

Secondly.—INDUCE EXPIRATION.—Immediately turn down the patient's arms, and press them firmly but gently downwards against the sides of his chest for two seconds. By this means foul air is expelled from the lungs by depressing the ribs. (*See* Fig. 2.)

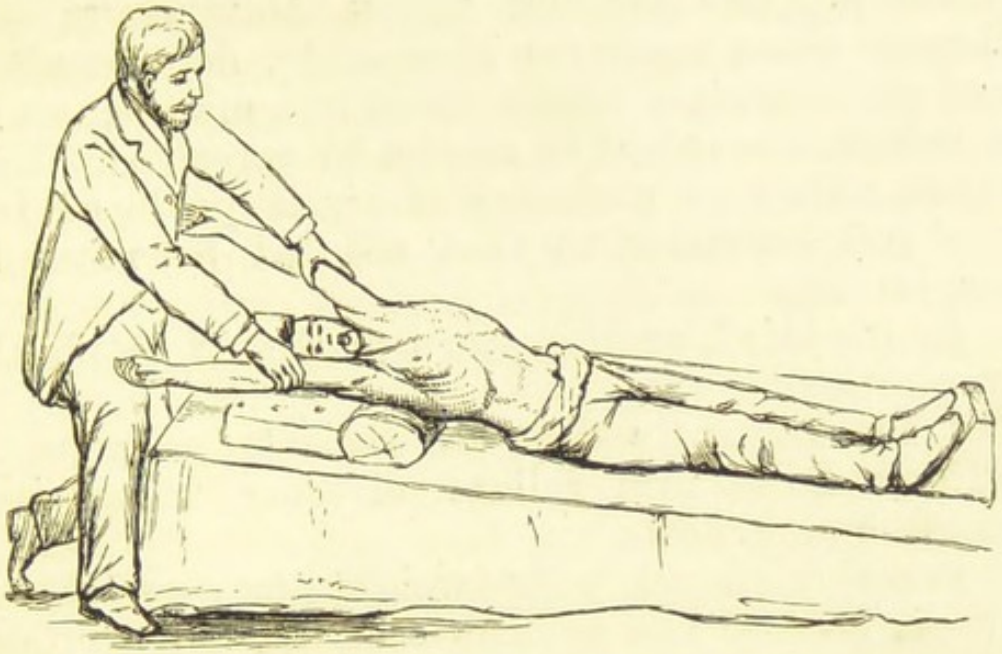


FIG. 1.—INSPIRATION.

The Position of the Body during the Employment of Dr. H. R. SILVESTER's Method of Inducing Inspiration.

FIG. 2.—EXPIRATION.

The Position of the Body during the Employment of Dr. H. R. SILVESTER's Method of Inducing Expiration.

Thirdly. — CONTINUE THESE MOVEMENTS. — Repeat these measures 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.

In the third, or HOWARD'S method of artificial respiration :—

* 1st. Instantly turn the patient downwards, with a large firm roll of clothing under the stomach and chest.

Press with all your weight two or three times, four or five seconds each time, upon the patient's back, so that the water is pressed out of the lungs and stomach, and drains freely downward out of the mouth. Then—

2nd. Quickly turn the patient face upwards, the roll of clothing put under his back just below the shoulder blades, the head hanging back as low as possible.

Place the patient's hands together above his head; kneel with patient's hips between your knees; fix your elbows against your hips. Now, grasping the lower part of the patient's chest, squeeze the two sides together, pressing gradually forward with all your weight for about three seconds, until your mouth is nearly over the mouth of the patient; then, with a push, suddenly jerk yourself back. Rest about three seconds, then begin again. Repeat these bellows-blowing movements, so that air may be drawn into the lungs, about eight or ten times a minute.

Do not stop these movements under an hour,

* This and the next paragraph specially refer to cases of drowning. They have been inserted here in order to give all the principles of the method.

unless patient breathes. Be careful not to interrupt the first short natural breaths. If they be long apart, carefully continue between them the bellows-blowing movements as before.

Though the main reliance is on artificial respiration, fresh air should be admitted by the door, window, or fan; stimulating applications applied to the surface, and cold water to the face and head. The patient should be everted, so as to facilitate the flow of blood from the abdominal vessels to the heart. If a galvanic battery be at hand, it should be resorted to among other possible means of restoring animation: one pole of the battery is applied to the phrenic nerve in the neck (on the outer edge of the lower part of the sterno-mastoid muscle), and the other pole to the sixth right intercostal space close to the sternum, alternately making and breaking the current every two seconds. Artificial respiration should be continued during the use of the battery, the current being made and continued during the inspiratory movement, *i.e.*, while the arms are being extended.

As soon as the patient can swallow, give brandy and ammonia. Efforts at resuscitation should not cease until death is evidently beyond all question.

Mention should be made of the great utility of lowering the head, so as to stimulate the brain by means of a fresh access of blood. This should always be the first thing to do, and is often sufficient of itself.

THE CLASSIFICATION OF MEDICINES.

Absorbents (*see* Desiccants).

Alteratives (Deobstruents, Liquefacients). Medicines which, acting obscurely or specifically, alter morbid conditions of the system, causing changes in the glandular, capillary, and other systems.

Anæsthetics.—These are general or local.

General anæsthetics are those which produce unconsciousness and consequent insensibility to pain.

Local anæsthetics produce loss of sensation by direct action on the sensory nerves of the part to which they are applied.

Anodynes.—Medicines which alleviate pain.

Antacids.—Agents which correct acidity by combining chemically with any free acid existing in the stomach, intestines, or elsewhere.

Antemetics.—Medicines which arrest vomiting.

Anthidrotics.—Medicines which check perspiration.

Antidotes. — Medicines which counteract the poisonous effects of other drugs.

Antilithics.—Medicines which tend to check or prevent the formation of calculi.

Antiperiodics. — Medicines which have the property of interrupting periodical attacks of disease.

Antipyretics.—Medicines which are given to reduce high temperatures.

Antiseptics.—Agents which prevent the decomposition of organic substances.

Antispasmodics.—Medicines which allay irregular and inordinate muscular contraction, and prevent the recurrence of spasms.

Aperients (*see* Cathartics).

Astringents (Styptics, Constringents). — Medicines which produce contraction of the tissues, and coagulation of the albuminous fluids; they are given to improve digestion and check increased secretions and mucous discharges, and to stop hæmorrhage (hæmostatics), or applied topically to obviate relaxation, and to stop bleeding.

Carminatives.—Remedies which dispel flatulence, and allay pain of the stomach and bowels.

Cathartics (Purgatives, Evacuants, Laxatives). —Medicines which promote alvine evacuations. These are termed *laxative*, when mild; *purgative*, when active; and *drastic*, when very violent. They vary in their mode of action; some rouse and increase the peristaltic action, others merely stimulate the mucous glands, producing watery evacuations. Further, these medicines select certain parts of the bowels on which to operate.

Caustics (Escharotics).—Substances possessing the power of destroying living tissue. When they act powerfully, they produce an eschar, hence escharotics.

Counter-Irritants (Revulsions). — An irritant applied to one part to relieve diseased action in another part (*see* Irritants).

Demulcents.—Internal emollients which soothe and soften mucous membranes.

Deodorisers. — Agents which destroy fœtid odours.

Desiccants (Absorbents).—Agents which check secretion, and dry up discharges from ulcers and wounds.

Diaphoretics (Sudorifics). — Medicines which increase the exhalation of the skin and produce sweating.

Disinfectants.—Agents which are used to destroy or counteract the specific poison of infectious diseases.

Emetics.—Medicines which excite vomiting.

Emollients.—Substances which relax the tissues, protect sensitive surfaces, and allay irritation.

Escharotics (*see* Caustics).

Expectorants.—Medicines which promote the secretion of bronchial mucus.

Febrifuges (*see* Antipyretics).

Hæmatinics (Anti-anæmics).—Medicines which increase the number and quality of the red blood corpuscles.

Hæmostatics (*see* Astringents). — Substances which arrest hæmorrhage.

Hypnotics (*see* Narcotics). — Medicines which cause sleep.

Irritants.—Substances that stimulate and cause irritation or inflammation of the parts to which they are applied.

Laxatives (*see* Cathartics).

Narcotics (Hypnotics, Soporifics). — Medicines which cause stupor or sleep, allay pain, arrest inordinate secretions, and subdue irritation.

Nutritives.—Substances which quicken assimilation, and improve the composition of living tissues.

Purgatives (*see* Cathartics).

Refrigerants (Febrifuges). — Medicines which diminish heat and quench thirst.

Rubefacients (*see* Irritants). — Agents which, when applied to the skin, irritate and redden it.

Sedatives.—Medicines which have a soothing and quieting effect on the system.

Sialogogues. — Substances which excite the secretion of saliva.

Soporifics (*see* Narcotics).

Stimulants.—Remedies which excite the vital functions.

Stomachics.—Medicines which improve the tone and functions of the stomach.

Styptics (*see* Astringents).

Sudorifics (*see* Diaphoretics).

Tonics (Restoratives).—Medicines which impart firmness, vigour, and tone to the body when it is relaxed and debilitated.

Vesicants. — Topical agents which cause the exudation of a thin serous fluid under the cuticle.

PRESCRIBING.

WHEN writing a prescription care should be taken to write clearly and distinctly, and no abbreviations should be used, if thereby the possibility of mistaking one drug for another can arise. It is usual to write all the directions to the pharmacist in Latin. An ordinary prescription consists of—

i. The Basis,
ii. The Adjuvant,
iii. The Corrective (if any),
iv. The vehicle or excipient,

the quantities being placed to the right, in Roman figures and apothecary's signs; then follows the patient's name and the initials or name of the prescriber and the date.

The following is a typical example :—

Recipe (or ℞)

Potassii Chloratis	gr. x.
Tincturæ Ferri Perchloridi	♏ x.
Spiritûs Chloriformi ...	♏ x.
Aquæ	ad ℥ i.

Misce.

Omni quarta horâ.

Prescriber's name or initials.

Patient's name.

Date.

LIST OF ABBREVIATIONS.

THE following is a List of Abbreviations, Contractions, and words more or less frequently met with in prescriptions :—

A, *aa*, *ana* (ανα). Of each ingredient.
Ad. To, or up to.
Add. *Adde*, or *addantur.* Add, *or* let be added.
Altern. horis. *Alternis horis.* Every other hour.
Bis. ind. *Bis indies.* Twice a day.
Bib. *Bibe.* Drink (thou).
C. *Cum.* With.
Cap. *Capiat.* Let the patient take.
Coch. *Cochleare.* A spoonful; a table spoonful.
Coch. ampl. *Cochleare amplum.* A large (or table) spoonful. Half a fluid ounce.
Coch. magn. *Cochleare magnum.* A large spoonful.
Coch. med. *Cochleare medium.* } A middling
Coch. mod. *Cochleare modicum.* } or moderate spoonful; that is, a dessert spoonful. Two fluid drachms.
Coch. parv. *Cochleare parvum.* A small (or tea) spoonful. One fluid drachm.
Cong. *Congius.* A gallon.

Cont. rem. *Continuenter remedia.* Let the medicines be continued.
De d. in d. *De die in diem.* From day to day.
Deglut. *Déglutiatur.* May be (*or* let be) swallowed.
Dieb. alt. *Diebus alternis.* Every other day.
Dieb. tert. *Diebus tertiis.* Every third day.
Dil. *Dilus*, *Dilutus*, *Dilute.* Dilute (thou); diluted.
Dim. *Dimidius.* One half.
F. Fac. Make. *Fiat, fiant.* Let be made.
F.H. *Fiat haustus.* Let a draught be made.
F.M. *Fiat mistura.* Let a mixture be made.
Gr. *Granum.* Grain. *Grana.* Grains.
Gtt. *Gutta.* A drop. *Guttæ.* Drops.
Gutt. quibusd. *Guttis quibusdam.* With a few drops.
Guttat. *Guttatim.* By drops.
H. D. or *Hor. decub.* *Hora decubitûs.* At the hour of going to bed.
H. S. or *Hor. som.* *Hora somni.* Just before going to sleep; *or*, on retiring to rest.
Hor. 11mâ. mat. *Horâ undecimâ matutinâ.* At the eleventh hour in the morning.
Ind. *Indies.* From day to day; *or*, daily.
M. *Misce.* Mix.
Min. *Minimum.* The 60th part of a drachm measure. *Minutum.* A minute.
Mitt. *Mitte.* Send. *Mittatur*, or *Mittantur.* Let be sent.
Mor. sol. *More solito.* In the usual manner.
O. *Octarius.* A pint.
Omn. hor. *Omni horâ.* Every hour.
Omn. bid. *Omni biduo.* Every two days.
Omn. bih. *Omni bihorio.* Every two hours.
O.M., or *Omn. man.* *Omni manc.* Every morning.
O.N., or *Omn. noct.* *Omni nocte.* Every night.

Omn. quadr. hor. *Omni quadrante horæ.* Every quarter of an hour.

P. æ Part. æqual. *Partes æquales.* Equal parts.

P. *Pendere.* By weight.

Ppt. *Præparatus.* Prepared.

P.r.n. *Pro re nata.* According as circumstances arise; that is, occasionally.

P. rat. æt. *Pro ratione ætatis.* According to the age of the patient.

Pulv. *Pulvis;* *pulverizatus.* A powder; powdered.

Q. s. *Quantum sufficiat*, or *quantum satis.* As much as is sufficient.

Repet. *Repetatur*, *repetantur.* Let be repeated.

Semidr. *Semidrachma.* Half a drachm.

Semih. *Semihora.* Half an hour.

Sesunc. *Sesuncia.* An ounce and a half.

Sesquih. *Sesquihora.* An hour and a half.

Si op. sit. *Si opus sit.* If there be occasion.

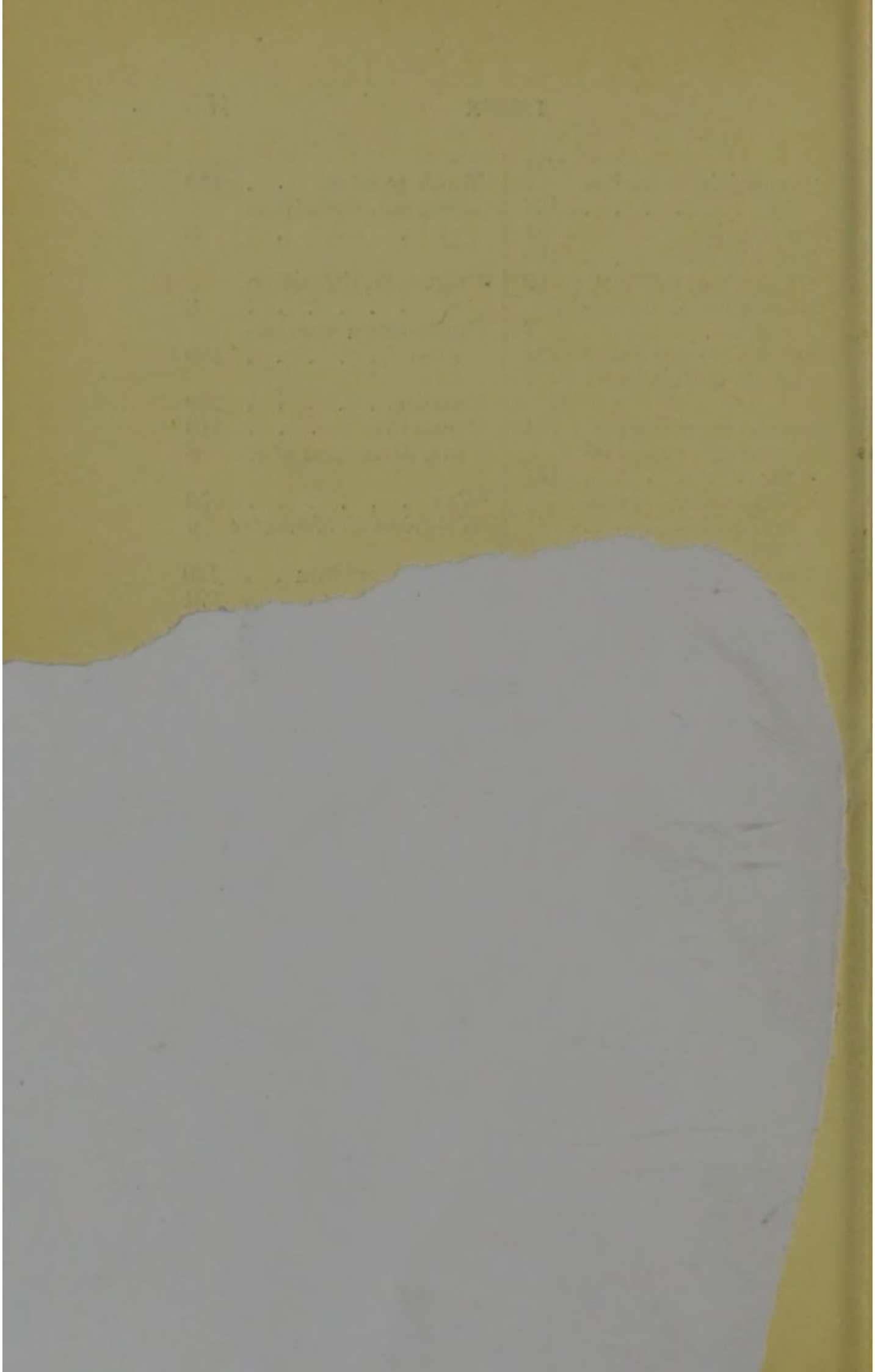
Sig. *Signatura.* A label.

Ss. *Semi.* A half.

St. *Stet.* Let it stand. *Stent.* Let them stand.

Sum. *Sume; sumat; sumatur; sumantur; sumendus.* Take thou; let them take; let be taken; to be taken.

INDEX.



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