

widely distributed element, forming the basis of all calcareous and cretaceous substances. Besides the forms mentioned above, Calcium occurs as a *sulphate* (gypsum), also as a *phosphate* in bones, shells and various organic tissues, and as a *silicate* and a *fluoride* in certain minerals and vegetables.

Official Salts of Calcium.

Calx, Lime, Calcium Oxide, CaO,—is Lime prepared by burning white marble, oyster-shells, or the purest varieties of native Calcium Carbonate. Occurs in hard, white masses, gradually resolving to a white powder in the air, odorless, of sharp, caustic taste and alkaline reaction, soluble in 750 of water and 1600 of boiling water, insoluble in alcohol. Not used internally except in solution.

Calcii Carbonas Præcipitatus, Precipitated Calcium Carbonate, CaCO₃,—a fine impalpable, white powder, odorless and tasteless, insoluble in water or alcohol, but soluble in mineral acids or acetic acid with effervescence. Creta (chalk) is native Calcium Carbonate. Dose, gr. v-xxx [av. gr. xv.]

Calcii Chloridum, Calcium Chloride, CaCl₂,—hard, colorless masses, deliquescent, of sharp, saline taste, soluble in 1½ of water and in 8 of alcohol. Dose, gr. iij-x [av. gr. viijss], in solution. This salt should not be confounded with Chlorinated Lime.

Calcii Sulphas Exsiccatus, Exsiccated Calcium Sulphate, (Dried Gypsum)—contains about 5 per cent. of water. A fine, white powder, without odor or taste, insoluble in alcohol, soluble in 410 of water at 59° F., in 388 of water at 100° F., and in 451 of water at 212° F. Used in the preparation of Calx Sulphurata.

Calcii Sulphidum, Calcium Sulphide, is described under SULPHUR; **Calcii Bromidum, Calcium Bromide,** under BROMUM; **Calcii Hypophosphis, Calcium Hypophosphite, Calcii Phosphas Præcipitatus, Precipitated Calcium Phosphate,** and **Calcii Lactophosphas,** under PHOSPHORUS.

Preparations of the Oxide. (Lime.)

Liquor Calcis, Solution of Calcium Hydroxide, Lime-water,—contains not less than 0.14 per cent. of Calcium Hydroxide, Ca(OH)₂. A clear, colorless liquid, of saline taste and alkaline reaction. Dose, ʒss-j [av. ʒiv.]

Syrupus Calcis, Syrup of Lime, Syrup of Calcium Hydroxide,—contains 6½ per cent. of Lime, and 40 of Sugar, the latter aiding the solvent power. Dose, ʒx-ʒj, [av. ʒxxx.] Is an antidote to poisoning by Oxalic Acid and Phenol.

Linimentum Calcis, Lime Liniment, (Carron Oil)—contains equal volumes of Lime-water and Linseed Oil, mixed by agitation. For local use.

Calx Chlorinata, Chlorinated Lime, is described under CHLORUM; and **Calx Sulphurata, Sulphurated Lime,** under SULPHUR.

Preparations of the Carbonate. (Chalk.)

Creta Præparata, Prepared Chalk, CaCO₃,—is native Calcium Carbonate, freed from most of its impurities by elutriation; a white, amorphous powder, odorless and tasteless, insoluble in water or alcohol. Dose, gr. x-xxx [av. gr. xv.] It is a constituent of Hydrargyrum cum Creta, and also of the following:

Pulvis Cretæ Compositus, Compound Chalk Powder,—has of Prepared Chalk ʒo, Acacia 20, Sugar 50 parts. Dose, gr. v-ʒj [av. gr. xxx.]

Mistura Cretæ, Chalk Mixture,—has of the preceding 20 parts, Cinnamon Water 40, Water to 100, rubbed together and made fresh as required. Dose, ʒj-ʒj [av. ʒiv.]

Testa Præparata, Prepared Oyster-shell (Unofficial),—contains animal matter intimately mixed with the Carbonate of Calcium. Dose, gr. x-xx or more.

Allied Substances.

Substances allied to Chalk, and derived from the animal kingdom, are—*Crabs'-eyes,* which are concretions obtained from the stomach of the craw-fish, *Coral, Cuttle-fish Bone, Egg-shell and Oyster-shells* (Testa, see above); all of which are mainly composed of Calcium Carbonate, but also contain the phosphate and sulphate of calcium and other metallic salts in small quantity, as well as organic material. In the past special virtues have been ascribed to these substances, and even now some authorities maintain that the animal carbonates derange the stomach less than the mineral ones, and are to be preferred for infants and delicate persons.

Incompatibles.

Incompatible with the *Carbonate* are Acids, Alum, Ammonium Chloride, Sulphates, Tartar Emetic, and other metallic salts; with the soluble *Calcium Salts* are Alkalies, Carbonates, Citrates (with heat), Oxalates, Phosphates, Tartrates.

PHYSIOLOGICAL ACTION.

Lime, in its unslaked form (quick-lime), has a great affinity for water and readily combines with sulphur, thereby decomposing and destroying organic matter. Upon the skin its action is irritant and superficially caustic, but more severe on the mucous membranes, and if inhaled or swallowed it may produce dangerous local inflammation, followed by ulceration. In weak solution it has an astringent and sedative effect both locally and internally, and acts as an absorbent and an antacid. Chalk possesses the astringent and antacid qualities of lime without its irritant properties.

Calcium Chloride is a very diffusible salt, and in small doses has remarkably alterative action, being apparently a powerful antagonist to the condition known as the strumous diathesis. Full doses produce symptoms of muscular poisoning similar to those caused by potassium salts, with lowered temperature, a slow pulse, and a tendency to cardiac paralysis. It inhibits intestinal peristalsis, and increases the coagulability of the blood, thereby acting as a hemostatic. It increases the amount of the urine, and promotes the excretion of urea. In large doses it is an irritant poison. It has a great affinity for water, and is used in pharmacy to abstract water from other substances, as in the preparation of absolute alcohol and ether. In solution it is used as a test for tartrates, citrates and oxalates.

Calcium Salts play an important part in the circulation and in most of the other functions of the body. The heart or any other muscle, deprived of calcium, will no longer contract. These salts have a remarkable influence on the nutrition of plants and animals, the Phosphate being as essential to the nourishment of the organs of locomotion (cartilage, bone, tendon and muscle) as iron is to the blood or phosphorus to the nerve tissue. They possess high coagulating power on the blood; their deficiency gives rise to lymphatic and osseous disease, and their absence results in emaciation and finally death. They are excreted almost entirely by the intestines, a very small portion being absorbed, and but little of that passes out by the kidneys. Their absence from water renders the latter flat and insipid to the taste, but if present in excess (above 20 grains of the carbonate to the gallon) the water containing them is believed to be one of the factors of goitre. The Sulphate, in even so small a proportion as 6 grains to the gallon, is unwholesome, as it is liable to irritate the bowels and produce constipation and diarrhea alternately, according as its astringent or irritant effect predominates.

THERAPEUTICS.

Lime may be used as a caustic and depilatory, but is better known as an agent for hastening decomposition, which it does by its great affinity for water, the resulting hydrate absorbing many of the products. Chlorinated Lime is an excellent antiseptic and disinfectant, but as it owes its energy entirely to its power of evolving chlorine it will be described under the title Chlorum. Lime-

water is a favorite remedy for vomiting, especially in children, and is added to milk to increase its digestibility. A mixture of milk and lime-water will be retained by the stomach when no other food can be borne. Lime-water is an efficient agent in acid dyspepsia, mucous enteritis and typhoid fever, as an astringent and antacid. Locally, it is well employed as an enema against thread-worms, as a mouth wash for aphthæ, and as a lotion for cracked nipples, eczema-worms, and many mucous and purulent discharges. For such purposes it may be mixed with oil or glycerin, and if a few drops of carbolic acid be added the efficacy of the mixture is much increased. The Liniment is best known by the name *Carron Oil*, from the foundries at Carron, where it is extensively used. It is one of the best applications for burns and scalds, and makes a good dressing for the face in smallpox, and for cases of eczema affecting a large area of the skin. The vapor of slaking lime, or lime-water in the form of spray, have been usefully employed as inhalations in diphtheria. Lime-water is a good injection into the bladder in vesical calculus, in which its benefit is probably due to its astringent and soothing effects on the inflamed vesical mucous membrane, blunting its sensibility, and preventing the further growth of the stone by neutralizing the free acid of the urine. The Syrup contains more lime in solution than lime-water does, and may be used instead of the latter when a strong preparation is indicated. It is one of the antidotes in poisoning by carbolic and oxalic acids, while lime in any form (wall-plaster, whiting, etc.) is the best antidote for any mineral acid.

Chalk is the basis of all dentifrices, and may be used as a dusting-powder on ulcers, burns and excoriations of the skin. Chalk-mixture is a common remedy for diarrhea, and is usually employed in combination with other astringents, also with opium and aromatics. It is particularly serviceable for the diarrheas of children with sour-smelling stools and other symptoms of gastrointestinal acidity.

One of the curiosities of medical history is the fact that in 1739 the British Parliament gave the sum of £5,000 to Mrs. Johanna Stephens for divulging the nature of a certain lithontriptic remedy. This, she stated, consisted of calcined egg-shells and soap, with various aromatic bitters, a combination which had previously been recommended by Barbette for the same purpose. The nauseousness of this compound suggested to Whytt the use of lime-water as a substitute, and the latter was found to be efficacious in many instances. Calcium salts are believed to prevent the formation of uric acid calculi by binding the phosphates of the food and blood, and thereby lessening the excretion of phosphoric acid, the disodium phosphate holding uric acid in solution, though the monosodium phosphate precipitates it. The carbonate is the salt preferred for this purpose, given in doses of gr. xv-xx thrice daily in plenty of water.

Calcium Chloride is used with benefit as an internal remedy in the various manifestations of the strumous diathesis. It often causes the resolution of glandular enlargements, and the calcification of tubercular deposits, aids the cicatrization of ulcerating cavities, and has proved curative in eczema and lupus. It is praised in phthisis, also in chorea, and for the colliquative diarrhea of strumous children. As it inhibits intestinal peristalsis it is a rational and useful remedy for the diarrhea of hysteria and other forms of nervous excitability.

It is used as a hemostatic in uterine hemorrhages and hemophilia. In solution as a fomentation it is said to hasten the maturation of boils.

The therapeutics of the other salts and combinations of calcium are described under the titles of their more active ingredients, Bromum, Chlorum, Phosphorus and Sulphur.

CALENDULA, Marigold,—is the florets of *Calendula officinalis*, the common Garden Marigold, a plant of the nat. ord. Compositæ, frequently cultivated for ornament. The tincture (20 per cent.) is also official, and is exclusively used as a local application to promote the healing process in wounds, ulcers, burns and other breaches of tissue. Extravagant views of its powers as a vulnerary are promulgated by the so-called "homeopathic surgeons," and serve as one of their excuses for professing an exclusive position in the art of surgery. Dose of Calendula, gr. x-xx [av. gr. xv].

CALUMBA, Calumba,—is the root of *Jateorhiza palmata*, a plant of the nat. ord. Menispermaceæ, native in southeastern Africa, but cultivated in the East Indian Islands. It contains the alkaloid *Berberine* (see under BERBERIS, page 176), a bitter principle named *Calumbin*, also Calumbic Acid and Starch, but no tannin. Dose, gr. v-xlv [av. gr. xxx.]

Preparations.

Fluidextractum Calumbæ, Fluidextract of Calumba.—Dose, ℥v-xlv [av. ℥xxx.]

Tinctura Calumbæ, Tincture of Calumba,—2 in 10. Dose, ʒss-ij, [av. ʒj.]

Incompatible with Calumba preparations are: Mineral Acids, Ammonia, Cinchona infusion, Galls infusion, Ferric salts, Lead Acetate, Lime-water, Mercuric Chloride, Silver Nitrate, Tartar Emetic.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Calumba is one of the simple bitters, a group of vegetable agents which contain no volatile oil, have no astringent property, and no effect upon the general system, but markedly affect the stomach as stimulants. This group includes also Chirata, Cornus, Gentian, and Quassia. They stimulate the nerves of taste, increase the flow of saliva, excite the gastric circulation and the flow of gastric juice, and thereby increase appetite, aid digestion, and promote the constructive metamorphosis. As they also increase the production of the gastric mucus, their long-continued use will set up gastric catarrh and impair digestion, though they are the least irritant of all the stomachic tonics.

As Calumba contains no tannin, it may be administered with the salts of iron, and is often prescribed with the sub-carbonate. It is useful in atonic dyspepsia with pain after eating, in the convalescent stage of disease to promote appetite and digestion, in diarrhea and dysentery, vomiting, sea-sickness, cholera morbus and cholera infantum. An Infusion of Calumba with Ginger and Senna is effective in flatulence, and the same preparation is a good vehicle for the administration of acids and alkalies, tonics, aromatics, and mild cathartics. Having little or no irritant quality, it is an excellent tonic in the hectic fever of phthisis.

CAMBOGIA, Gamboge,—is a gum-resin, obtained from *Garcinia Hanburii*, a Siamese tree of the nat. order Guttiferae. It contains 73 per cent of *Gambogic Acid*, a resinous sub-

stance, also 25 per cent. of gum and 2 of water. It is partly soluble in alcohol and in ether. The only official preparation is the Pil. Catharticae Co. (described under COLOCYNTHIS), each pill containing gr. $\frac{1}{4}$ of Gamboge. Its dose, as a cathartic, is gr. ij-v,—as a diuretic, gr. j at short intervals, [av. gr. ij.]

Gamboge is an irritant purgative, decidedly diuretic, and its powder is sternutatory. Its catharsis is accompanied by vomiting and colic, and the stools produced are watery, but not so much so as generally believed. It has no cholagogue action. Full doses are liable to produce violent gastro-enteritis, and incautiously used (as in Morrison's pills) it has caused death. On the other hand, large doses have been given continuously in some cases, without producing any dangerous symptoms.

Gamboge was formerly much used as a hydragogue cathartic and diuretic in dropsies, but its irritant qualities have caused it to be superseded by other agents (elaterium, digitalis, etc.). However, for dysentery, especially when in young subjects, very small doses (gr. $\frac{1}{10}$ etc.) at short intervals, up to gr. $\frac{3}{4}$ in 24 hours, have proven to be remarkably efficacious.

CAMPHORA, Camphor, $C_{10}H_{16}O$,—is officially described as the dextrogyrate modification of the saturated ketone obtained from *Cinnamomum Camphora*, a tree of the nat. ord. Laurineae, and purified by sublimation. It occurs in white, translucent, waxy masses, of penetrating odor and pungent taste, lighter than water, in which it is sparingly soluble (1 to 1300), but dissolves readily in alcohol, ether, chloroform, benzoin, and oils. The camphor-tree is indigenous to China, Japan, Formosa and other parts of Eastern Asia. Borneo-camphor has the formula $C_{10}H_{18}O$, bears the same relation to Japanese camphor as alcohol bears to aldehyde, and is heavier than water. Dose, gr. j-ij [av. gr. ij.]

Derivatives of Camphor are—*Camphor-cymol*, which is obtained by its distillation with zinc chloride; *Camphoric and Camphretic Acids*, which result respectively from its lesser or greater oxidation; and *Safrol*, also contained in Sassafras oil, but obtained in much larger quantities from Camphor oil, a waste by-product in the manufacture of crude camphor. An artificial Camphor is made by synthesis from oil of turpentine.

Official Preparations.

Aqua Camphorae, Camphor-water,—Camphor 8, Alcohol 8, Talc 15, Distilled Water to 1000. Used externally or as a vehicle internally. Dose, \mathfrak{z} j-iv, [av. \mathfrak{z} ij.]

Spiritus Camphorae, Spirit of Camphor,—10 per cent. in Alcohol. Dose, \mathfrak{m} v-xx [av. \mathfrak{m} xv.]

Linimentum Camphorae, Camphor Liniment,—Camphor 20, Cotton-seed Oil 80.

Ceratum Camphorae, Camphor Cerate,—has of the Liniment 10, White Wax 35, White Petrolatum 15, Benzoinated Lard 60. Used for itching skin-affections.

Camphora Monobromata, Monobromated Camphor, $C_{10}H_{15}BrO$,—colorless, prismatic needles or scales, of mild camphoraceous odor and taste, and neutral reaction; almost insoluble in water, slightly in glycerin, freely in alcohol, ether, oils, etc. Dose, gr. j-v [av. gr. ij] in emulsion.

Acidum Camphoricum, Camphoric Acid, $C_8H_{14}(COOH)_2$,—is a dibasic acid, obtained by the oxidizing action of nitric acid on camphor. Occurs in white, acicular, odorless crystals, of feebly acid taste; insoluble, or nearly so, in cold water, readily soluble in hot water, alcohol, ether and fatty oils. Dose, gr. x-xx [av. gr. xv], dry on the tongue.

Camphor is an ingredient of Linimentum Saponis, and Tinctura Opii Camphorata.

Unofficial Preparations.

Rubini's Tincture of Camphor,—is a saturated solution in alcohol, \mathfrak{z} j in \mathfrak{z} ij, of which the dose is from 4 to 10 drops. \mathfrak{m} vij have caused toxic symptoms in an adult.

Raspail's "Eau Sedative",—contains Aq. Ammoniae \mathfrak{z} ij, Sodii Chloridum \mathfrak{z} ij, Camphorated Spirit of Wine \mathfrak{z} ij, Water Oij. Used externally.

Camphora Carbolata is the name given to a mixture of 2½ parts of camphor with one each of carbolic acid and alcohol. This preparation, mixed with olive oil, is a good non-irritating and antiseptic dressing for wounds and breaches of surface.

Camphor-Chloral is a fluid obtained by triturating together equal parts of camphor and chloral hydrate. It dissolves morphine sulphate readily (gr. xx in \mathfrak{z} ij), also many other salts of alkaloids. It is often a serviceable application in superficial neuralgia, and is said to allay spasmodic cough if painted over the larynx.

Camphora Salicylata is obtained by heating together 11 parts of salicylic acid and 14 of camphor. An ointment prepared therefrom has been used with satisfactory results in the treatment of phagedena, spreading syphilitic sores, epithelioma and lupus.

Oleum Camphorata, Camphorated Oil,—strength 10 per cent., is used for hypodermic injection, in doses of \mathfrak{m} xv- \mathfrak{z} j.

Oxyphor,—is the trade name of an alcoholic solution, containing 50 per cent. of *Oxy-camphor*, a synthetic derivative of camphor, prepared by replacing one of the hydrogen atoms by the molecule hydroxyl, and unstable in the crystalline state. Dose, \mathfrak{z} ss-ij.

Incompatibles.

Incompatible with *Camphor* preparations are: Butyl-chloral Hydrate, Chloral Hydrate, Chromic Trioxide, Dichlor-acetic Acid, Euphorin, Hydrochloric Acid, Menthol, Monochlor-acetic Acid, Naphtol, Phenol, Potassium Permanganate, Pyrocatechin, Pyrogallol, Resorcin, Salol, Salicylic Acid, Thymol, Urethane, Water; with *Camphora Monobromata* are: Chloral Hydrate, Euphorin, Phenol, Pyrocatechin, Salol, Thymol. With *Spirit of Camphor* are Acacia, Aqueous fluids, Gelatin.

PHYSIOLOGICAL ACTION.

Camphor is antispasmodic, anodyne, antiseptic, diaphoretic, a stimulant expectorant, a cerebral excitant, a gastro-intestinal irritant, and a rubefacient. It has an acrid, hot taste, and irritates the skin and mucous membranes, in quantity exciting severe gastric inflammation with all the effects of an irritant poison. In medicinal doses it stimulates the vasomotor system and the cardiac motor ganglia, and lessens the influence of the pneumogastric,—thus increasing the circulation and raising arterial tension. It also stimulates respiration and mental activity, even producing intoxication; promotes diaphoresis, allays pain, and increases the menstrual flow and the sexual appetite, but its continued use depresses the generative function. "Camphora per nares castrat odore mares."

Large doses cause gastro-intestinal inflammation, depress the heart and lower arterial tension, diminish the reflex function of the spinal cord, produce coldness of the surface, insensibility, coma, convulsions and perhaps death. As many as 200 grains have been taken without fatal result, yet 6 or 7 grains have produced extreme drowsiness and weakness of the pulse, 20 grains laid up an Alpine guide for a day, and \mathfrak{z} ss of the spirit caused profound symptoms of poisoning, including epileptiform convulsions and severe headache. The autopsy in one fatal case showed congestion of the cerebral meninges. It is eliminated by the bronchial mucous membrane, skin and kidneys, and has often caused dysuria.

Monobromated Camphor resembles the bromides, but its action is not identical with theirs. In mammals it produces muscular weakness passing into paralysis, lowered temperature and respiration, stupor and death. In some

cases its use by man has been followed by epileptiform convulsions. It is a nervous sedative and hypnotic, and a gastric irritant.

THERAPEUTICS.

Camphor was much used by the older physicians as an antispasmodic, and is greatly valued still in China and Japan. It has a reputation for uncertainty of therapeutic action, but is usefully administered in cholera and choleraic diarrhea, summer diarrhea and that of infants, vomiting, gastralgia, cardiac depression, nervousness and nervous headache, nymphomania, capillary bronchitis, typhoid and eruptive fevers, dysmenorrhea, afterpains, chordee, strangury, and catarrhal colds. Locally it is effective in myalgia, lumbago, toothache, gangrene, and other conditions where counter-irritation or a local anodyne is required. A solution in ether is a beneficial application in erysipelas.

Subcutaneous injections of camphor in doses of gr. j dissolved in ℥xv of olive oil are employed with excellent results in pneumonia, typhoid fever, and other conditions when collapse is imminent. In fibrinous pneumonia these injections produce a depression of about one degree in the temperature, and greatly ameliorate the general condition. They are also employed with benefit in the treatment of phthisis during the period of softening, rendering the patient more comfortable and prolonging life. Camphor administered in this manner is not well borne by young children, even in minimum doses. Its power of producing sedation of the nervous system and stimulation of the heart have been utilized in the treatment of tetanus, and may be efficiently employed in many acute affections.

Monobromated Camphor is used as a nerve sedative and hypnotic, but is not particularly efficient. It has been employed with advantage in whooping-cough, neuralgia, chorea, hysteria, delirium tremens and epilepsy, but it is taken with difficulty and is liable to irritate the stomach.

Camphoric Acid, in solutions of $\frac{1}{2}$ to 6 per cent. strength, has been used with benefit as a topical agent in cystitis, also in coryza, acute bronchitis and other affections of the respiratory tract. Internally administered it gives good results as an intestinal disinfectant, and has lately come into prominence as one of the most efficient agents against sweating from various causes, especially the profuse night-sweats of pulmonary tuberculosis. For this purpose it is best administered dry on the tongue, in dose of 10 to 30 grains, not more than two hours before the time for the expected sweating to occur, as it is quickly and abundantly eliminated by the urine.

Oxycamphor is devoid of the stimulant action of camphor on the brain, medullary centres, and blood pressure, but markedly depresses the respiration by diminishing the excitability of the respiratory centre. The alcoholic solution named *Oxyphor*, (see page 197), has been used with great satisfaction in asthma, dyspnea, and whooping-cough.

CANNABIS INDICA, Indian Cannabis, (Indian Hemp),—is the dried flowering tops of the female plant of *Cannabis sativa*, grown in the East Indies; a coarse, pubescent, somewhat viscid annual of the nat. ord. Moraceæ. Its odor is peculiar and narcotic, its taste slightly acrid.

Cannabis Americana, American Cannabis, (Unofficial),—is the same plant, *Cannabis sativa*, grown in the Southern States.

The two varieties are specifically identical with each other, differing only in the degree of their action, that grown in India being the most powerful. They contain a resin named *Cannabin*, and a *Volatile Oil*, from the latter of which are obtained *Cannabene*, a light hydrocarbon, and *Cannabene Hydride*, a crystalline body. Cannabis should not be confounded with the so-called "Indian or Canadian Hemp," *APOCYNUM CANNABINUM* (see page 145).

Preparations.

Extractum Cannabis Indicæ, Extract of Indian Cannabis.—Dose, gr. $\frac{1}{4}$ – $\frac{3}{4}$ [av. gr. $\frac{1}{2}$], if active. Hering's English Extract is one of the best.

Fluidextractum Cannabis Indicæ, Fluidextract of Indian Cannabis.—is an alcoholic preparation which in mixtures must be thoroughly emulsified with Acacia, otherwise the resinous drug will separate and float to the top or adhere to the sides of the bottle. The Dose is put at ℥j–v [av. ℥j], but the author has frequently administered ℥j of a good fluid extract without untoward results. Whatever may be the reason, it is a fact which he has often verified, that if the precipitate, formed when the alcoholic preparation is added to water, be of a brownish hue, a dirty, yellow-brown, the sample will prove to be almost inert;—but if of a decided olive-green color, the preparation will be active. The activity will be found to increase almost in direct proportion to the decided green color of the precipitate. Samples from one manufacturer show this difference, often seen between two bottles in the same shipment. The active principle seems to be intimately connected with the chlorophyll or other coloring matter present, and to be destroyed therewith by whatever affects the latter.

Tinctura Cannabis Indicæ, Tincture of Indian Cannabis.—strength 10 per cent. Dose, ℥v–xxx [av. ℥xx]. The above remark on mixtures containing the fluid extract applies also to those containing the tincture of this drug.

Similar preparations of *Cannabis Americana* are made by the manufacturers and may be used in larger quantities. The dosage of all preparations of hemp is uncertain, as specimens of the plant vary greatly in activity. The best rule is to begin with a small dose, gradually testing the activity of the drug and the susceptibility of the patient by cautiously increased doses.

Cannabin Tannate (Unofficial),—is a yellowish-brown permanent powder, insoluble in water and ether, slightly soluble in alcohol, having a not unpleasant odor and a bitterish, astringent taste. No formula has been published for it, but it is claimed to be the tannate of a glucoside by Merck, of Darmstadt, who placed it on the market. Dose, as a hypnotic, gr. v–x.

Preparations used in the East.

Churrus is an impure resin, prepared by rubbing the leaves of the plant together and scraping off the adhering resin.

Gunjah is the dried leaf and tops as sold in the bazaars for smoking purposes.

Hashish, Bhang or Siddhi is a confection consisting of the leaves and small stalks coarsely broken and mixed with fruits and aromatics. It is employed in the preparation of various electuaries and beverages, and is also smoked with or without tobacco.

Incompatibles.

Caustic Alkalies are incompatible with preparations of Hemp. Water precipitates the resin from alcoholic preparations.

PHYSIOLOGICAL ACTION.

Cannabis Indica is antispasmodic, analgesic, anesthetic and narcotic, a cerebro-spinal stimulant and a powerful aphrodisiac. It increases intellectual and motor activity, stimulates the vaso-motor nerves, raising arterial tension, depresses sensation, and strengthens the energy of the uterine muscular fibre, but has no power to initiate uterine contractions. In large doses it causes a peculiar but generally pleasant form of intoxication, during which the particular traits of the individual are exaggerated, and the ideas follow each other so

rapidly as to produce a sense of great prolongation of time, minutes seeming as if hours or even days. With this occurs increased sexual desire and uterine activity, also sensations of double consciousness and enormous dimensions. The sight and hearing are exalted, pupils dilated, anesthesia sets in, the reflexes are lowered by stimulation of inhibition, and if the dose be a heavy one a cataleptic state is induced. Sleep or coma follows according to the size of the dose, but death has never been produced by this drug.

After-effects are dullness, heaviness, vertigo, headache, confused thought, anesthesia of the skin, and marked diuresis,—but no nausea, no vital depression, no constipation. Repeated use of the drug causes mental weakness and sexual impotence, the results of over-stimulation. It is much used by the natives of Egypt, and is responsible for most of the crime and insanity seen in that country. A ravenous appetite is usually one of its early effects.

THERAPEUTICS.

Cannabis Indica was formerly much employed as an anodyne and hypnotic, also as an anesthetic during surgical operations. It is now somewhat out of fashion. In migraine it is useful to prevent recurrence of the attack, and in neuralgia it is often very efficient. Uterine affections, such as chronic metritis, subinvolution, menorrhagia and dysmenorrhea, are greatly benefited by its anodyne quality and its power over the uterine muscular fibre. It is one of the best hypnotics in delirium tremens, and in traumatic tetanus and paralysis agitans large doses of this drug will lower the reflex activity. The tincture, in doses of 2 to 8 minims every 3 or 4 hours for children below ten years of age, is highly praised in chorea minor and whooping-cough. Dysuria and retention of urine are often relieved by it, while in spasm of the bladder and other painful affections of that organ it will be found a most efficient remedy. It is useful in functional impotence, especially if combined with Ergot and Nux-vomica. In gonorrhoea it lessens the discharge, relieves the inflammation, burning pain and restlessness, and allays chordee. The tincture of Cannabis Americana is the most useful in this affection, being fully as efficient as copaiba or sandal oil, and much more agreeable. It should, however, be prepared from the fresh plant, and be given in 3 to 5 drop doses 3 or 4 times daily after the subsidence of the acute symptoms. Full doses of the tincture of the Indian plant are extremely efficient in many cases of headache at the menopause, but should be used cautiously until the activity of the sample and the susceptibility of the patient are tested.

Dr. Lees has called attention to the fact that aqueous preparations of this drug, which contain but little of the resin, are much used by the natives of India for intoxicating and stimulating purposes, which indicates that the volatile oil and not the resin is the active principle. He uses a strong aqueous extract, prepared without heat, which gives all the beneficial effects of the alcoholic preparations without the extreme exhilaration bordering on intoxication so often

produced by even medium doses of the latter. He finds that, in pulmonary affections generally, this *Liquor Cannabis Indicae* acts favorably as an anodyne and hypnotic, while in phthisis pulmonalis it relieves the cough and aids the patient by its stimulant and exhilarating qualities to a degree which no other drug can accomplish. Lees has also used it with benefit in indigestion with constipation, and in many affections of children in which nervous symptoms are prominent. The adult dose is ʒss-j.

Cannabin Tannate is considered by Frommüller to be a very useful hypnotic, not in any degree dangerous and neither disturbing the secretions nor leaving unpleasant after-effects. It has been used with benefit in acute mania.

CANTHARIS, Cantharides, (Spanish Flies),—is the dried beetle, *Cantharis vesicatoria*, an insect of the nat. ord. Coleoptera, about an inch long, of a shining green color, the powder being grayish-brown with green particles, odor very disagreeable. Contains *Cantharidin*, $C_{10}H_{12}O_4$, the active principle; also a greenish volatile oil and peculiar fatty bodies. Dose, gr. $\frac{1}{4}$ -j [av. gr. ss.]

Preparations.

Tinctura Cantharidis, Tincture of Cantharides,—10 per cent. Dose, ʒj-x [av. ʒv.]
Ceratum Cantharidis, Cantharides Cerate, (Blistering Cerate),—Cantharides 32, Yellow Wax, Rosin, of each 18, Lard 17, Liquid Petrolatum 15.

Collodium Cantharidatum, Cantharidal Collodion, (Blistering Collodion),—Cantharides 60, Flexible Collodion 85, Chloroform to 100.

Emplastrum Picis Cantharidatum, Cantharidal Pitch Plaster, Warming Plaster, (Unofficial),—has of Cerate of Cantharides 8 parts, Burgundy Pitch to 100.

Incompatibles.

Incompatible with *Cantharidin* are: Copper Sulphate, Lead Acetate, Mercuric Chloride, Silver Nitrate.

PHYSIOLOGICAL ACTION.

Cantharis applied to the skin is a rubefacient and vesicant, acting more slowly than mustard but much more severely. Internally it is irritant, causing heat of stomach, gastralgia, nausea and vomiting, the circulation is stimulated, temperature elevated, the urine becomes scanty and irritating, is voided with difficulty and pain, and often contains blood and albumin. Afterwards the pulse falls, temperature and arterial tension are lowered, and depression ensues. A toxic dose produces severe gastro-enteritis, abdominal tenderness, tenesmus, mucous or bloody stools, pain in the stomach and lungs, dysphagia, ptialism, strangury, priapism, hematuria, swollen genitals, abortion, muscular tremor, convulsions, coma and insensibility. The post-mortem shows evidences of violent metritis, gastro-enteritis and general peritonitis. Cantharis is aphrodisiac by causing vascular turgescence of the genital apparatus, but only in doses which produce dangerous symptoms. It is abortive only in toxic doses. In small doses it is diuretic and emmenagogue.

Counter-irritation by rubefacients or blisters acts on disease probably through the nervous system. Its influence is explained by the theory that the periph-

eral extremities of the nerves supplying the skin of the part to which the agent is applied undergo some molecular change, which extends to the nerve centre and is thence radiated to centrifugal or trophic nerves, effecting various changes in nutrition and secretion over the areas to which they are distributed. In addition to this method of action, neighboring parts are affected by direct extension of the inflammation produced, and distant parts are also implicated by absorption through the vesicated surface of agents having special affinities for certain organs.

A blister acts primarily as a stimulant to the body generally as well as to the organs in its vicinity, but if permitted to remain long enough to produce a large bleb, the result is depression proportionate to the amount of serum abstracted, the serum of the bleb containing nearly as much albumin as the blood itself.

THERAPEUTICS.

As a counter-irritant and vesicant Cantharis is of great value in neuralgia if applied close to the emergence of the nerve from the spinal column, also in sciatica and neuritis, and in acute rheumatism around the affected joints. A blister at the nape of the neck controls many headaches, and one behind the ear will modify inflammatory affections of the eye. In pleuritic effusions a succession of small blisters (flying-blisters) will promote absorption of the pleural contents, and a blister applied to the perineum will often cure a rebellious gleet. Though valuable as a therapeutic measure in very many conditions, blistering is going out of fashion except in hospitals and among people who believe in heroic treatment. It is invaluable in subacute joint affections.

As an internal remedy Cantharis must be employed in very small doses (m_j of the tincture) in order to be efficient. When so used it is an admirable agent in acute desquamative nephritis after the active inflammation and fever have subsided, to reduce the albumin and blood in the urine. Drop-doses are particularly useful in irritable bladder with frequent desire to micturate, so often observed in women, also in the incontinence of the aged and of children; and in cystitis, gonorrhœa and gleet. The same dose thrice daily will generally abate chordee. In spermatorrhea, prostatorrhœa, scanty menstruation, and menorrhagia in subjects of lax fibre and general want of tone, it is often very serviceable. Cutaneous squamæ and vesiculæ are greatly improved by small doses frequently administered and gradually increased, and it is one of the best remedies for psoriasis. For alopecia areata it is of the utmost value as an external application, and the tincture, largely diluted, is an ingredient of all the hair renewers in common use. In pleurisy, after effusion has taken place, it will be found admirable in 1- to 2-drop doses every 2 or 3 hours, and in the after-prostration of diphtheria it proves a serviceable stimulant. One of the best applications to burns or scalds is a cloth dipped in a lotion of the tincture one part to thirty or forty of water. The same lotion is an efficient application to vesicular erysipelas and herpes zoster.

CAPSICUM, Capsicum, (Cayenne Pepper),—is the dried, ripe fruit of *Capsicum fastigiatum*, a plant of the nat. ord. Solanaceæ, native in tropical Africa and America. It contains *Capsicin*, which is a thick, red liquid, and is the active principle,—also a volatile alkaloid having the odor of Coniine. Dose of the powdered drug, gr. ss–ij [av. gr. j.]

Preparations.

Fluidextractum Capsici, Fluidextract of Capsicum. Dose, m_{ss} –ij [av. m_j .]

Tinctura Capsici, Tincture of Capsicum,—5 per cent. strength. Dose, m_{v} –xx [av. m_{viii} .]

Oleoresina Capsici, Oleoresin of Capsicum,—extracted by acetone. Dose, gr. $\frac{1}{4}$ –j [av. gr. ss.]

Emplastrum Capsici, Capsicum Plaster,—prepared by applying a thin coating of Oleoresin of Capsicum to Adhesive Plaster so that each square 6 inches may contain about gr. iv of the oleoresin. An excellent warming plaster.

Capsicum is an ingredient of the *Pilulæ Podophylli, Belladonnæ et Capsici* (see under *PODOPHYLLUM*).

Incompatibles.

Incompatible with *Capsicum* are: Alum, Ammonia, Alkaline Carbonates, Copper Sulphate, Ferrous Sulphate, Galls infusion, Lead Acetate, Mercuric Chloride, Silver Nitrate, Zinc Sulphate.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Capsicum is irritant to the skin and mucous membranes. Externally used for sufficient length of time it will produce vesication, internally in quantity it will excite gastritis. In medicinal doses it increases the saliva, excites a sensation of warmth in the stomach, promotes appetite and digestion, and produces easier and more copious alvine evacuations. It stimulates the action of the heart, is diaphoretic and diuretic, also decidedly aphrodisiac. It is a general stimulant to the nervous system, but in repeated doses produces a slight narcotic effect upon the brain. On the vascular system it acts like ergot, powerfully constricting the vessels by influencing the unstriped muscular fibre in their walls, either directly or through the vaso-motor nerves.

Capsicum is an excellent stomachic tonic in atonic dyspepsia and in that of chronic alcoholism with tremor and insomnia. In acute dipsomania and delirium tremens large doses are efficient in producing sleep and promoting appetite. It is the best substitute for alcohol and opium in attempts to cure those habits. It is well used in intermittents, chiefly as an adjuvant to more active drugs; in flatulent colic, especially when occurring in hysterical women and hypochondriacs; also in low fevers and cholera as a stimulant. It gives good results in functional impotence, in spermatorrhea from loss of tone, in chronic parenchymatous nephritis to check the waste of albumin, and is beneficial in chronic cystitis and in prostatorrhœa. The tincture internally, and a plaster externally over the loins, are efficient in cases of renal congestion with habitual pain in the back and a trace of albumin in the urine. Locally the tincture diluted (\mathfrak{z} j to \mathfrak{z} viii) or the powder with honey, forms an excellent gargle for relaxed throat and its accompanying cough, relaxed uvula, inflammatory sore throat, and the cynanche of scarlet fever, but they must be used with caution, as such applications are sometimes very irritating.