

the action of diastase, ptyalin, or pancreatin, is converted into glucose. (See the article AMYLUM, page 123).

Benzosulphinidum, *Benzosulphinide*, *Saccharin*, (*Glusidum*, B. P.), the anhydride of ortho-sulphamide-benzoic acid,—occurs as a white, crystalline powder, having an intensely sweet taste, even in dilute solutions; soluble in 250 of water, and in 25 of alcohol at 77° F., in 24 of boiling water, readily soluble in ammonia water, in alkali hydroxide solutions, and in a solution of sodium bicarbonate with evolution of CO₂. Dose, gr. ss-v [av. gr. iij.]

Preparations.

Syrupus, *Syrup*,—has of Sugar 85, Distilled Water to 100.

Sugar is an ingredient of Pil. Ferri Carbonatis, Pil. Ferri Iodidi, Ferri Carbonas Saccharatus, Mistura Ferri Composita, Pulvis Cretæ Compositus, Pulvis Glycyrrhizæ Compositus, also the Troches, Syrups, Compound Syrups, etc.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Sugar is employed in pharmacy and therapeutics chiefly as a vehicle, a corrigent, a preservative and an antiseptic. Syrups protect the active ingredients against putrefaction, but not always against fermentation. They also protect certain ferruginous preparations against oxidation. As an ingredient in troches, powders and extemporaneous mixtures sugar is used to cover the taste or to make insoluble substances more easily miscible with water. It increases the solubility of lime in water. As a food it possesses well-known properties, being a nutrient to adipose tissue and a respiratory fuel, and is decidedly diuretic in its action upon healthy kidneys. Sugar and sugar-forming food constitute more than one-half of the nourishment needed by a healthy person, and when withheld or diverted as in diabetes, the patient is actually starved and undergoes progressive and rapid emaciation. Levulose is found to be more easily consumed in the system than cane-sugar, and in the treatment of diabetic patients may be used with benefit for some time. Heretofore its cost has been very great, but it is now being manufactured in large quantities and sold at a reasonable price, under the trade-name *Diabetin*.

Sugar of Milk is the least soluble of all sugars in water, but is soluble in alcohol. It enters into alcoholic fermentation with difficulty. In the presence of decomposing albuminous matter and under certain other influences, it undergoes the *lactic fermentation*, which results in the formation of lactic acid, carbon dioxide and alcohol. It readily reacts with the reduction tests.

Sugar of Milk is a powerful diuretic, especially in cardiac dropsy, in which Sée considers it "the best and most certain diuretic we possess, the excretion of urine caused by it being greater than that due to any other drug." He found that it acts similarly to Caffeine though more powerfully, while possessing none of the disadvantages of the latter. Its diuretic action is but slight in cases where extensive renal disease exists, and it has no power over dyspnea.

Sugar of Milk is used in the triturations, also in Dover's powder, as a diluent. Being much harder than sugar it is considered a valuable excipient for powders requiring the minute subdivision of their medicinal constituent. It is less sweet than sugar, and being less apt to ferment in the stomach and bowels is better than the latter for use with infants' food.

Benzosulphinide (Saccharin), when pure is about 500 times sweeter than sugar, and imparts a distinctly sweet taste to 70,000 times its weight of water; but the commercial article is standardized to about 300 times the sweetening power of sugar. It is not a food, but has no injurious action on man, and is eliminated in the urine and the saliva without change. It is used as a substitute for sugar in the food of diabetics and subjects of hepatic disease and corpulence; also to cover the taste of nauseous drugs and as an internal antiseptic in cases of cystitis with decomposing urine. A grain of Saccharin sweetens 6 to 8 fluidounces of liquid. It may be used to a maximum quantity of 30 grains per diem. It is rendered soluble by mixing with it two-thirds its quantity of sodium bicarbonate. It is an efficient antiseptic.

Dulcin, *Sucrol*, *Para-phenetol-carbamide* (Unofficial),—is a urea derivative of phenetidin and occurs in colorless crystals which are soluble in 800 of water, 55 of boiling water, 25 of alcohol, also in ether. Its sweetening power is about 200 times that of sugar. In reasonable doses it is harmless, does not cause any decomposition of the blood, or give rise to the great disgust engendered by Saccharin on prolonged use. Its great insolubility is its chief disadvantage. Dose, gr. ss-ij, up to a daily maximum of 30 grains.

Saxin,—is a similar product of English manufacture, said to be 600 times sweeter than sugar.

SALICINUM, **Salicin**, C₁₃H₁₈O₇,—is a glucoside obtained from several species of *Salix*, the Willow, and *Populus*, the Poplar, trees of the nat. ord. Salicaceæ. It is found also in *Gaultheria procumbens*, the wintergreen, nat. ord. Ericaceæ; and in *Betula lenta*, the sweet birch, nat. ord. Betulaceæ; the volatile oils of which, distilled from the leaves of the former and from the bark of the latter, consist almost entirely of methyl salicylate (see next page).

Salicin occurs in colorless or white and silky, shining crystalline needles, or a crystalline powder, odorless, of very bitter taste, permanent in the air, of neutral reaction; soluble in 28 of water and in 30 of alcohol, in 0.7 of boiling water and in 2 of boiling alcohol; almost insoluble in ether or chloroform. Dose, gr. x-xxx [av. gr. xv.]

Salix Nigra, the *Pussy Willow* (Unofficial),—grows along streams in the Southern States. A fluidextract is on the market, and may be used in doses of ʒss thrice daily, as a sexual sedative.

Acidum Salicylicum, *Salicylic Acid*, HC₇H₅O₃,—is a monobasic organic acid, existing naturally in combination in various plants, but generally prepared synthetically from phenol. It occurs in light, fine, white, prismatic needles, or a crystalline powder, odorless, of sweetish, afterwards acrid taste and acid reaction, permanent in the air; soluble in about 450 of cold water, but readily soluble in water containing 8 per cent. of Borax or 10 per cent. of Sodium Phosphate. It is soluble in 2½ of alcohol, in 14 of boiling water, in 2 of ether, in 80 of chloroform, and is very soluble in boiling alcohol. Dose, gr. v-xv [av. gr. vijss.]

Salicylic Acid is a derivative of Salicin, probably by double oxidation; but may also be considered as a substitution-derivative of Benzene, formed by replacing 2 atoms of its hydrogen, the one by hydroxyl, and the other by carboxyl. It is obtained therefore either synthetically by combining the elements of Phenol with these of Carbonic Acid, and subsequent purification,—or from natural Salicylates as the Oil of Wintergreen and Sweet-Birch,—or from Salicin, by heating with caustic potash and treating with hydrochloric acid. The acid prepared from

natural sources is purer and more efficient than that prepared artificially, and will often be tolerated by a patient who cannot bear the latter.

Official Salicylates.

Lithii Salicylas, *Lithium Salicylate*, $\text{LiC}_7\text{H}_5\text{O}_3$,—a white, or grayish-white powder, odorless, sweetish, very soluble in water and in alcohol. Dose, gr. v-xxx [av. gr. xv.]

Sodii Salicylas, *Sodium Salicylate*, $\text{NaC}_7\text{H}_5\text{O}_3$,—a white, amorphous powder, soluble in $\frac{3}{4}$ of water and in 6 of alcohol, also in glycerin. Dose, gr. v-xxx [av. gr. xv.]

Strontii Salicylas, *Strontium Salicylate*,—a white, crystalline powder, soluble in 18 of water and in 66 of alcohol. Dose, gr. v-xxx [av. gr. xv.]

Methylis Salicylas, *Methyl Salicylate*, (Artificial Oil of Wintergreen),—is an ester, produced synthetically; and is the principal constituent of Oil of Gaultheria and Oil of Betula. It is soluble in all proportions in alcohol or glacial acetic acid. Dose, mxxv -xxx [av. mxxv], suspended in sugared water.

Phenylis Salicylas, *Phenyl Salicylate*, *Salol*, $\text{C}_{13}\text{H}_{10}\text{O}_3$ —is the salicylic ester of phenyl, and occurs as a white, crystalline powder, odorless and almost tasteless, nearly insoluble in water, soluble in 10 of alcohol, and very soluble in ether, chloroform and oils. On being warmed with an alkali it splits up into Salicylic Acid 60, and Phenol 40. Dose, gr. v-xv [av. gr. vijss], frequently repeated, in compressed tablets or in cachets, or suspended by mucilage of acacia or of tragacanth.

Physostigminæ Salicylas, *Physostigmine Salicylate*,—is described under **PHYSOSTIGMA**.

Oleum Betulæ, *Oil of Betula*, (*Oil of Sweet Birch*),—is a volatile oil distilled from the bark of *Betula lenta*, the Sweet Birch. It is identical with Methyl Salicylate (see above), and nearly identical with Oil of Gaultheria. Russia leather derives its odor from this oil. Dose mxxv -xxx [av. mxxv].

Oleum Gaultheriæ, *Oil of Gaultheria*, *Oil of Wintergreen*,—consists almost entirely of Methyl Salicylate, and is nearly identical with the preceding. It is described under the title **GAULTHERIA**.

Unofficial Salicylates and Other Derivatives.

Aspirin, *Acetyl-salicylic Acid*,—occurs as a white powder, soluble in 100 of water. It is said to be more efficient than the salicylates, and to cause less gastric irritation. It has been used most efficiently in acute articular and muscular rheumatism, gout, pleurisy, polyneuritis, chorea and neuralgia. Dose, gr. v-xv, thrice daily.

Malakin, *Salicyl-para-phenetidin*,—is a condensation product of salicylic aldehyde and p-phenetidin, occurring in bright yellow needles, almost insoluble in water or alcohol, and decomposed by dilute mineral acids. Its action is that of salicylic acid, but its effects are very mild,—hence its name (from *μαλακός*, mild). It has proved valuable in acute rheumatism and other febrile affections, as an antipyretic and analgesic. As it may be given for a long time without causing any disturbance, it is of especial service in habitual headaches. Dose, gr. viij-xv, repeated about six times in 24 hours.

Mesotan,—the methyl-oxymethyl-ester of salicylic acid, is a yellow fluid, miscible in all proportions with alcohol, ether and oils. It contains 71 per cent. of salicylic acid, is readily absorbed by the skin, and is used with friction as an external remedy in rheumatism, either pure or mixed with an equal quantity of olive oil.

Rheumatin, is the trade name of a salicylate of saloquinine, and occurs in tasteless needles, sparingly soluble in water. It is used with benefit in acute articular rheumatism and trigeminal neuralgia. Dose, gr. x-xxx, up to ʒj daily.

Salipyrin, *Antipyrine Salicylate*, $\text{C}_{18}\text{H}_{18}\text{N}_2\text{O}_4$,—is produced by the combination of Salicylic Acid 57.7, and Antipyrine 42.3 parts. It is a white, crystalline, odorless powder, very soluble in alcohol, insoluble in water. Its claims to preference are based upon its comparative harmlessness (ʒijss having been taken within 3 or 4 hours without the slightest ill effect); but 2 doses of gr. xv four hours apart caused serious effects in one case. Dose, gr. x-xx every hour or 2 hours until ʒij have been taken. It is best administered in wafers, as a powder, or in mixture, rubbed up with glycerin and flavored with raspberry syrup.

Salophen, *Para-amidophenol Salicylate*,—contains the equivalent of nearly 51 per cent. of Salicylic Acid, and occurs as minute, white, crystalline scales, odorless and tasteless, insoluble in water, soluble in alcohol; decomposed by alkalies into salicylic acid and acetyl-para-amido-phenol; also decomposed by the organism as demonstrated in the urine. Dose, gr. v-xv, up to ʒj or jss in the 24 hours.

Saloquinine, *Salochinin*,—the quinine ester of salicylic acid, occurs as a tasteless, crystalline powder, insoluble in water. It is said to possess the virtues of quinine as well as those of salicylic acid, and is used efficiently as an antipyretic and anti-neuralgic. Dose, gr. x-xxx, thrice daily.

Urasol, *Acetyl-methylene Di-salicylic Acid*,—is a proprietary preparation, said to contain Salicylic Acid 75, Acetic Acid 16, and Formaldehyde 8 per cent. It occurs as an insoluble, yellowish-white powder, and is claimed to have solvent power on uric acid, to be free from toxic, irritant or depressant qualities, and to have been used with benefit in rheumatism, gout, cystitis, pyuria, typhoid fever and scarlet fever. Dose, gr. v-x every hour, or gr. xv-xx every 3 or 4 hours, to a daily average of ʒij .

Incompatibles.

Incompatible with *Salicylic Acid* and the *Salicylates* are: Acids (mineral), Exalgin, Ferric salts, Lead Acetate, Lime-water, Potassium Iodide, Quinine salts, Sodium Phosphate, Spirit of Nitrous Ether, Urethane. With *Salol* are: Alkalies with heat, Borneol, Bromine-water, Camphor, Chloral Hydrate, Euphorin, Exalgin, Ferric Chloride, Naphthalene, Phenol, Pyrocatechin, Resin, Thymol, Urethane.

PHYSIOLOGICAL ACTION.

Willow-bark is highly astringent, antiperiodic and feebly tonic, but is never employed medicinally owing to its bulk. Salicin is a bitter tonic, also antifermentive, antiseptic and highly destructive to low organisms. It has slight antiperiodic power and is feebly antipyretic. It prevents the reaction between amygdalin and emulsin, also that of ptyalin on starch. It is well borne by the stomach, seems to be devoid of toxic power on man, and is mainly excreted as salicylic, salicyluric and salicylous acids, being first changed in the bowel into saligenin and glucose.

Salicylic Acid is an energetic antipyretic, antiseptic and germicide. Locally it is anhydrotic and stimulant, its prolonged contact with the skin causes swelling and exfoliation of the epidermis, the cast-off flakes being thicker in direct proportion to the strength of the preparation employed. It is irritant to mucous membranes, and when inhaled it causes sneezing and cough. In small doses it stimulates the stomach, heart and respiration, but moderate quantities derange the stomach, causing nausea and vomiting; while large doses depress the heart's action and the respiration after a primary excitation of both, lower the arterial tension, relax the vessels, produce free perspiration, and reduce the temperature in fever. It causes symptoms resembling those of cinchonism, including a sense of fulness in the head, roaring and buzzing in the ears, disturbances of sight and hearing, excessive sweating, dilated pupils, and delirium. A toxic dose produces extreme dyspnea, a slow and laboring pulse, depression of the heart and arterial tension, and gradual failure of the respiration, until death occurs from asphyxia. Large doses continued for some time may produce bed-sores from depression of the circulation, but do not affect the peripheral nerves as to either motion or sensation. In the blood it is first changed to sodium salicylate, but a portion is again set free and uniting with glycocholic forms salicyluric acid, coloring the urine green. It is slowly excreted with the secretions generally, especially in the urine, sweat, saliva, and bile. It stimulates the kidneys, at the same time disinfecting them and increasing the acidity of the urine, but may so irritate the kidneys as to produce albuminuria and

hematuria. It largely increases the elimination of urea and uric acid. It is destructive to the torula and other low organisms, and prevents alcoholic fermentation, also that caused by the organic ferments (pepsin, ptyalin, etc.). In solutions containing bacteria it will prevent their development if present in the proportion of 1 in 1,500, and will destroy them in the strength of 1 in 250 (Bucholz).

Sodium Salicylate is remarkably antipyretic in doses of gr. xv, given 4 or 5 times in 24 hours. It is a powerful diaphoretic, and an efficient cholagogue, and is supposed to possess the curious property of increasing the fluidity of the bile, at the same time that it promotes its secretion, other cholagogues increasing the proportion of solids therein. (Brunton.) It greatly increases the elimination of uric acid and urea, and in other respects it acts like the acid, but with less energy. Its antiseptic and germicidal powers are nearly equal to those of salicylic acid.

Phenyl Salicylate (Salol) is decomposed in the small intestine, and in overdoses may produce the tinnitus aurium and other symptoms of salicylic acid, as also the smoky urine and other effects of phenol. As an antipyretic it ranks high, and acts with sufficient power to depress the temperature below the normal point. It causes profuse sweating and sometimes depression when so employed. It increases nitrogenous elimination, and though itself but feebly germicidal it is one of the most efficient intestinal disinfectants, the products of its decomposition in the intestinal canal being active germicides.

THERAPEUTICS.

The Salicin derivatives are employed chiefly in acute and subacute rheumatism, in which they possess great power to modify and overcome the severe symptoms, though exercising no permanent influence on the causative factors of the disease. They are most suitable to strong and vigorous patients, and if they do not relieve the symptoms quickly their use should be abandoned. The activity of Salicin depends probably on its conversion into salicylic acid in the organism, which being slow and imperfect, this agent is not suitable for rapid results, and is seldom employed.

Salicylic Acid is irritant to the stomach and for internal use has been largely displaced by its sodium salt, though some clinicians believe it to be more efficient in rheumatic fever than any salicylate. It is much used by dermatologists as a local application in skin diseases characterized by much thickening of the epidermis and in the parasitic skin affections. It is the active ingredient of corn remedies, and is a useful application in gangrenous wounds, eczema of the hands or feet, cancer, burns, and fetid perspirations, in the last affection being used in solution with borax.

Sodium Salicylate is more soluble than the acid and less irritant to the stomach, while in doses about 50 per cent. larger it is equally efficient. It is employed in 3- to 5-grain doses internally after meals, to arrest gastric fermentation

and to prevent acidity and flatulence. It is used instead of the acid in acute inflammatory rheumatism, muscular rheumatism, phlebitis, rheumatic neuritis and other irregular forms of rheumatism, with immediate benefit in most cases, and it sometimes gives temporary relief in chronic rheumatism. In gout and its manifestations, especially migraine and sciatica, it frequently proves highly effective; and it has been used with satisfaction in cases showing a tendency to the formation of gall-stones. It is useful in the glycosuria of gouty subjects, and in the nervous irritability of lithemic persons. It is ranked as almost specific in pneumonia by many practitioners, and is very efficient in non-syphilitic inflammations of the eye-ball, whether rheumatic or not, especially interstitial keratitis, if given in large doses, gr. j for each pound of body weight. It is highly efficient in quinsy, and has been commended as an alterative diuretic for the removal of serous pleuritic effusions. When large doses are prescribed the patient should be kept in bed, and brandy, strychnine, and digitalis should be administered to counteract its depressant action. The salicylates are contraindicated in meningeal inflammation or congestion, middle ear disease, renal insufficiency, albuminuria, and nephritis.

Lithium Salicylate is believed to be particularly applicable in lithemia, gout, rheumatic arthritis, and the various manifestations of the uric diathesis. Strontium Salicylate is not apt to derange the stomach, but is too slow in its action to be of value when a rapid and powerful influence is desired. In 5-grain doses it is one of the best intestinal antiseptics, giving better results than salol or naphthalene. In 10 to 15 grain doses it is one of the most efficient salicylates for chronic gout and lithemia with intestinal indigestion (Wood).

Phenyl Salicylate (Salol) is efficient for duodenal catarrh, catarrh of the bile-ducts and catarrhal jaundice; also in the bilious form of sick-headache, and in some forms of neuralgia. Its greatest power is manifested in acute rheumatism, in which many clinicians maintain that it has no superior, if given in 15- to 30-grain doses, up to 2 drachms in the 24 hours, and continued for some time after the acute symptoms have subsided. In large doses, it is liable to induce symptoms of phenol poisoning, which may be met by administering sodium sulphate or any other sulphate. In all affections associated with micro-organisms in the intestines, as acute diarrhea, cholera, dysentery, and typhoid fever, it has done most excellent service, even in Asiatic cholera. It is a remedy of very great value in typhoid fever, disinfecting the ulcerated intestine it promotes the healing process and hinders reinfection. It is highly praised in epidemic influenza (grippe), having proved itself remarkably efficient in recent epidemics of that affection. It proves an efficient disinfectant in catarrh of the bladder, its constituents being excreted with the urine and coming in contact with the vesical mucous membrane for a considerable length of time. It is much quicker in its action upon the urine than ammonium benzoate, as in a day or two ordinarily the urine loses its foul odor and alkalinity and becomes clear. Dissolved in Retinol, it is considered especially useful in sub-

acute cystitis, having conquered cases in which other remedies have proven ineffectual. It has been successfully employed as a remedy in diabetes and in variola. given in doses of 15 grains three or four times daily. Its therapeutic value depends chiefly upon its property of splitting up in the alkaline fluids of the intestine into Salicylic Acid and Phenol compounds, whereby it effects the thorough antiseptis of the intestinal tract and performs the work of its constituent elements upon the organism. Externally it is employed as an antiseptic and deodorant powder against impetigo, eczema, sycosis and other skin diseases; and has done good service as an insufflation in the treatment of ozena. In spirituous solutions (5 per cent.) it is used with various flavoring agents in the preparation of mouth-washes and dentifrices, and it enters into the composition of soaps, face powders, and other toilet articles. A mixture of equal parts of Camphor and Salol, heated together, has given good results in the treatment of suppuration of the middle ear, giving no pain and setting up no inflammation of the part.

Salophen is tasteless and non-toxic, while probably equal to salol in efficiency. It has been used with great satisfaction in acute rheumatism, rheumatic arthritis, typhoid fever, cholera, neuralgia, sciatica, gastro-enteritis, pyelitis and cystitis. In long-standing sciatica a 10 per cent. solution hypodermically into the gluteal muscles has given good results. It has been employed with decided benefit in intestinal dyspepsia with flatulence, also in gastrectasis for the relief of the fermentive disturbances to which the dilated stomach is liable.

Salipyrin has given excellent results in acute and chronic rheumatism, rheumatic sciatica, neuralgia and influenza; and has proved efficient in metrorrhagia from various causes, given in doses of 15 grains thrice daily up to a daily maximum of 2½ ounces in some instances. In 50 such cases treated by Orthman no unpleasant effects were observed, but Scharfe reports a case of serious poisoning by two doses of 15 grains each, taken four hours apart. As it is not obtainable in this country, by reason of a legal conflict between its patentees and those of antipyrine, its constituents may be administered in conjunction in the proportion of Salicylic Acid 3 and Antipyrine 2, in proper-dose for each case, with just as good results as are afforded by Salipyrin itself (Squibb).

SALVIA, Sage,—the leaves of *Salvia officinalis*, the common garden Sage, a perennial plant of the nat. ord. Labiatae, native in Southern Europe but cultivated in our gardens for its strong, fragrant odor. They contain tannin, resin, etc., and a volatile oil which consists of *Salviol*, $C_{10}H_{16}O$, camphor and terpenes. There are no official preparations. Dose of the powdered leaves, gr. xx-xlv [av. gr. xxx], in infusion.

Sage is aromatic, stimulant, tonic, astringent and a vulnerary. It was highly esteemed in ancient times, and even yet is popular as a domestic cure-all with many people. In infusion it may be used as a beverage in febrile conditions and to check sweating, also for the night-sweats of phthisis. Like other members of the same class it has a slight influence over enteralgia and flatulence. It makes a good astringent and stimulating gargle.

SAMBUCUS, Elder, (Unofficial),—the flowers of *Sambucus canadensis*, the common Elder, a shrub of the nat. ord. Caprifoliaceae. The plant contains a small quantity of a volatile oil, also a resin and valerianic acid. The common Elder of Europe (*S. nigra*) is more of a tree, and is official in the Br. Phar. Dose, gr. xxx-3j, in hot infusion.

Elder-flowers are stimulant and diaphoretic, also diuretic in some degree. The berries are diaphoretic and laxative, while the inner bark is a hydragogue cathartic and in large doses emetic. Formerly the inspissated juice of the berries was employed as an alterative in rheumatism and syphilis, but the flowers are now used only for flavoring purposes. Elder-flower Water (Aqua Sambuci, B. P.) is an excellent vehicle for collyria and lotions.

SANGUINARIA, Blood-root,—is the dried rhizome, collected in autumn, of *Sanguinaria canadensis*, a perennial plant of the nat. ord. Papaveraceae, which grows throughout the United States, being one of the earliest and most beautiful of the spring flowers. It has a single white flower on an erect stalk, the petals often tinged with rose or purple. It contains the alkaloids *Sanguinarine*, $C_{20}H_{15}NO_4$, *Chelerythrine*, found also in *Chelidonium*, *Protopine*, present also in *Opium*, and *Homochelidonine*; with citric and malic acids, resins, gum, etc. The salts of its alkaloids are of brilliant red and orange colors and are soluble in water. Dose of the powdered root as an expectorant, gr. j-v [av. gr. ij]; as an emetic, gr. x-xxx; best given in pill.

Preparations.

Fluidextractum Sanguinariæ, *Fluidextract of Sanguinaria*.—Dose, ℥j-v [av. ℥jss] as an expectorant and stimulant; ℥x-lx as an emetic, cautiously.

Tinctura Sanguinariæ, *Tincture of Sanguinaria*,—strength 10 per cent. Dose, as an expectorant, ℥v-xxx [av. ℥xxv]; as an emetic ʒj-ij.

Sanguinarina, *Sanguinarine*, $C_{20}H_{15}NO_4$ (Unofficial),—is the chief alkaloid and probably the active principle of the plant. Dose, as an expectorant, gr. ʒj-ʒ; as an emetic gr. ʒ repeated in 10 minutes will produce vomiting after the second or third dose. As found in commerce it is generally a mixture of the alkaloids.

Incompatibles are: Alkalies, Tannic Acid, Metallic salts, and other alkaloidal precipitants.

PHYSIOLOGICAL ACTION.

Sanguinaria is sternutatory, sialagogue, expectorant and emmenagogue, a systemic emetic, a cardiac paralyzer, a violent irritant, an acro-narcotic poison and an alterative. Its taste is bitter and acrid. It causes violent sneezing when inhaled, increases secretion by irritating the secretory organs as it is eliminated, and in full doses produces salivation, catharsis and vomiting with great depression. Overdoses are violently irritant, the heart's action being at first increased, together with the arterial tension, then markedly depressed, and finally paralyzed by stimulation of its inhibition. The reflexes are lowered by paralysis of the spinal centres, muscular contractility is impaired, the pupils are dilated, the temperature is lowered, cold sweats, great thirst and collapse supervene, and death occurs by paralysis of the cardiac and respiratory centres, often preceded by convulsions. Locally used, Sanguinaria is a feeble escharotic.

Sanguinaria is a member of the poppy family, and its alkaloids bear a close resemblance to those of opium. Sanguinarine causes tetanus and high excitement, and stands between codeine and thebaine in its action on the central nervous system. It causes violent peristalsis of the bowel, increases the saliva, and is emetic and expectorant. Chelerythrine paralyzes the central nervous system without producing any preliminary stimulation, has the same action as

protopine and cryptopine on the muscles (see page 363), and first irritates and then paralyzes the sensory nerve-endings. Homochelidonine resembles morphine in its effects on the central nervous system, but has less stimulant action.

THERAPEUTICS.

Sanguinaria is used in small doses of the tincture as a gastric tonic and an hepatic stimulant in atonic dyspepsia, duodenal catarrh and that of the biliary ducts with jaundice. Affections of the respiratory tract are often benefited by it, especially asthma, acute bronchitis and chronic nasal catarrh, in which expectorant doses (gtt. x) of the tincture should be given, and in the latter affection the powdered drug may be used as a sternutatory. A decoction forms an efficient gargle in the sore-throat of scarlet fever. Sanguinaria is a serviceable remedy in chronic bronchitis and in amenorrhea of functional character, also in functional impotence from irritability of the organs, with daily seminal losses and relaxation of the genitalia. By many practitioners it is considered a specific emetic in croup, but others look upon it with disfavor as too uncertain and harsh in its action. It has been thought to have alterative properties, and hence is frequently used with *Stillingia* and other plants in the treatment of strumous and syphilitic affections. In pneumonia of typhoid type and in pleuro-pneumonia it has undoubtedly been of great service in many cases.

Locally, the powdered root is well employed as an application to foul ulcers and fungous granulations, also by insufflation to nasal polypi, and for chronic hypertrophy of the nasal mucous membrane.

Sanguinarine has been used with good results in pneumonia, bronchitis and atonic dyspepsia. Doses of gr. $\frac{1}{12}$ to $\frac{1}{8}$ are expectorant without irritating the stomach, and still smaller doses (gr. $\frac{1}{20}$ to $\frac{1}{10}$) are stimulating to the gastric and intestinal secretions.

SANTALUM ALBUM, White Sandalwood,—the source of the official Oil of Santal, is not itself official. It is a tree of the nat. ord. Santalaceæ, having its habitat in India but now nearly exterminated there. *Santalum citrinum*, the yellow Sandalwood, from the Hawaiian and Fiji Islands, is more commonly met with in commerce.

Oleum Santali, Oil of Santal, (Oil of Sandalwood),—a volatile oil distilled from the wood of *Santalum album*; a pale-yellow liquid, soluble in alcohol, of peculiar and aromatic odor, pungent taste and acid reaction. Dose, ℥v-xv [av. ℥viiij], in emulsion or capsules.

Sandalwood is a very agreeable perfume. The Oil is astringent to mucous membranes, producing dryness of the fauces, thirst, colic, and a sense of fullness in the renal regions. In concentrated form it is a local irritant, but the effects of large doses have not been studied. It is extensively used in chronic bronchitis and in gonorrhœa, forming the contents of proprietary capsules which are sold for the cure of the latter disease in all drug stores. As found in the

shops it is extensively adulterated with oil of cedar and is a very unreliable remedy.

SANTALUM RUBRUM, Red Saunders,—is the heart-wood of *Pterocarpus santalinus*, a tree of the nat. ord. Leguminosæ, native in India. It comes in chips or as a coarse powder, nearly inodorous and tasteless, not imparting any red color to water when macerated in it, but coloring alcohol, ether and alkaline solutions a bright red. The wood has no medicinal properties and is employed solely for the purpose of coloring alcoholic preparations. It is a constituent of *Tinctura Lavandulæ Composita*.

SANTONICA, Levant Wormseed,—is the dried unexpanded flower-heads of *Artemisia pauciflora*, a small, perennial plant of the nat. ord. Compositæ, which grows in Asia Minor, and contains a volatile oil and the peculiar, crystalline principle *Santonin*. Dose, gr. x-lx.

Santoninum, Santonin, $C_{15}H_{18}O_3$ —the inner anhydride or lactone of santoninic acid, obtained from Santonica, occurs in colorless, prismatic crystals, turning yellow on exposure to light, odorless, of bitter after-taste, and neutral reaction, nearly insoluble in cold water, but soluble in 40 of alcohol, 4 of chloroform, also in solutions of the caustic alkalies. Dose, gr. $\frac{1}{4}$ – $\frac{1}{2}$ for a child, gr. $\frac{1}{2}$ –iij [av. gr. j] for an adult, not repeated soon as the action of the drug is slow.

Trochisci Santonini, Troches of Santonin,—each troche contains about $\frac{1}{2}$ grain of Santonin, with Sugar, Tragacanth, and Stronger Orange Flower Water. Dose, j-v.

Santonin and its preparation are sensitive to light and should be kept in amber-colored bottles tightly corked.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Santonin is anthelmintic to the round-worm (*ascaris lumbricoides*), also but in less degree to the thread-worm (*oxyuris vermicularis*). It is taken into the blood as Sodium Santoninate, and affects the cerebral faculties and the vision; objects appearing at first blue, green, or red, then yellow (chromatopsia), often succeeded by blindness for a week or more. Toxic doses disturb the consciousness of the patient, produce a sort of intoxication, tremors, weakness, with enfeebled respiration and slowing of the pulse, coldness of the surface, vomiting, sweating, mydriasis, convulsions, and death from failure of respiration. A dose of 2 grains is said to have proved fatal to a feeble child five years old. It is excreted by the kidneys, coloring the urine if acid a greenish-yellow, if alkaline a reddish-purple, and it produces considerable enuresis.

As an anthelmintic Santonin is the most certain agent against the round-worm, and is best administered in powder with calomel at bedtime after a day of fasting, a senna-draught or a dose of castor oil being used the following morning. It also acts fairly well in suppository against the thread-worm, but is inoperative against tape-worm. Some observers consider it more promptly efficient when given in castor oil, and that the oil lessens the risk of evil after-effects. It has also been prescribed with great benefit for nocturnal incontinence of urine, and for certain eye affections, particularly amblyopia from atrophic or

inflammatory changes in the retina and optic nerve. It should never be given to children during a fever, nor when the bowels are constipated, for fear of toxic results.

SAPO, Soap, (White Castile Soap),—is Soap prepared from sodium hydroxide and olive oil; a whitish solid, hard, yet easily cut when fresh, of faint, peculiar odor free from rancidity, a disagreeable alkaline taste and alkaline reaction; readily soluble in water and in alcohol. It is an ingredient of three of the official pills, and two plasters.

Sapo Mollis, Soft Soap, (Green Soap),—is Soap prepared from potassium hydroxide and linseed oil; a soft, unctuous mass, of a yellowish-brown color, soluble in about 5 of hot water and in 2 of hot alcohol. The name Green Soap is a misnomer, as it is not green in color.

Insoluble Soaps are combinations of the oily acids with earths and metallic oxides, as the Soap of Lime, official as Linimentum Calcis, and the Soap of Lead Monoxide, the former Lead Plaster.

Sapo Animalis, Curd Soap, official in the Br. Phar.,—is made with Soda and a purified animal fat consisting chiefly of Stearin. Used in pills and suppositories.

Sapo Medicatus, official in the French Codex,—is a Soda soap prepared from expressed Almond Oil.

Saponification is a process of double decomposition between a fat (stearate, palmitate or oleate of glyceryl) and an alkali, in which glycerin and the metallic salt of the fatty acid are formed. The glycerin, not being saponifiable, is set free, but the fatty acid (stearic, palmitic or oleic) unites with the salifiable base to form soaps, which are therefore mixed stearates, oleates and palmitates of various bases. Nearly all soaps are oleates or palmitates (or both) of sodium or potassium (or both). Hard soaps are sodium soaps, soft soaps are potassium soaps.

Preparations.

Emplastrum Saponis, Soap Plaster,—has of Soap 10, Lead Plaster 90, Water q. s.

Linimentum Saponis, Soap Liniment,—has of Soap 6, Camphor 4½, Oil of Rosemary 1, Alcohol 72½, Water to 100. **Opodeldoc** is a similar preparation. Soap Liniment is an ingredient of Chloroform Liniment.

Linimentum Saponis Mollis, Liniment of Soft Soap, (Tincture of Green Soap),—has of Soft Soap 65, Oil of Lavender 2, Alcohol to 100.

PHYSIOLOGICAL ACTION AND THERAPEUTICS

Soap is laxative, antacid and antilithic; externally it is a stimulating dis-cussant, and is used for cleansing the skin, removing fatty substances and softening the epidermis, but if too long applied it may prove decidedly irritant. It is a good antidote in poisoning by acids, and should be administered freely in such cases until more energetic alkalies can be obtained. In aqueous solution it makes a useful enema for constipation, or a plug of soap may be inserted into the rectum.

Soft Soap is a powerful detergent stimulant and is much employed in skin diseases, especially eczema rubrum, in which the tincture is rubbed on, the diseased skin well washed and then covered with a bland ointment. The tinc-

ture is the most elegant form for use, and may be diluted with three parts of alcohol for shampooing the scalp.

The Liniment is used with friction in sprains, bruises and stiff joints, being a little more stimulating than camphor-liniment. It makes a good basis for extemporaneous liniment prescriptions.

SARSAPARILLA,—is the dried root of *Smilax medica*, and other species of *Smilax*, plants of the nat. ord. Liliaceæ, growing in Mexico, Honduras and Brazil. There are six commercial varieties on the market, which are put up in differently formed bundles. It contains starch, resin, calcium oxalate, an essential oil, and an acrid neutral principle named *Parillin* or *Smilacin*, which when acted on by dilute sulphuric acid yields another principle *Parigenin*.

Preparations.

Fluidextractum Sarsaparillæ, Fluidextract of Sarsaparilla.—Dose, ℥xx-℥j [av. ℥xxx].

Fluidextractum Sarsaparillæ Compositum, Compound Fluidextract of Sarsaparilla,—has of Sarsaparilla 75, Glycyrrhiza 12, Sassafras 10, Mezereum 3, Glycerin 10, Diluted Alcohol to 100. Dose, ℥xx-℥j [av. ℥xxx].

Syrupus Sarsaparillæ Compositus, Compound Syrup of Sarsaparilla,—has of the Fluidextract 20, Fl. ext. of Glycyrrhiza 1½, Fl. ext. of Senna 1½, Sugar 65, Oils of Sassafras, Anise and Gaultheria, each 0.02, Water to 100. Dose, ℥j-℥j [av. ℥iv].

Syrup of Sarsaparilla (Unofficial),—much used to flavor soda-water, is a mixture of the oils of sassafras and gaultheria in syrup.

Incompatibles.

Incompatible with *Sarsaparilla* preparations are Galls in infusion, Lead Acetate, Lime-water. With the *Compound Syrup of Sarsaparilla*, Mercuric Chloride.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Those who believe that Sarsaparilla has any action ascribe to it diuretic diaphoretic, tonic and alterative properties. Careful physiological experiments with the drug and its principle have so far given negative results. It has been used as a so-called "blood-purifier" in scrofula, chronic abscesses, necrosis, old ulcers, and many cutaneous diseases, but is generally combined with other agents of undoubted activity. The compound decoction is considered a good agent in tertiary syphilis, especially in debilitated subjects; while the other preparations are commonly employed as vehicles for potassium iodide and mercuric chloride in syphilis of any form.

SASSAFRAS, Sassafras,—is the dried bark of the root of *Sassafras variifolium*, an indigenous tree of the order Lauraceæ, collected in early spring or autumn, and deprived of the periderm. It contains a volatile oil, the principal constituent of which is *Safrol* (see next page). Dose, ℥j-iv [av. ℥ij].

Sassafras Medulla, Sassafras Pith,—is the dried pith of the same tree. When macerated in water it yields a mucilage which is not precipitated upon the addition of alcohol.