of scrofulous ulceration. Squamous skin diseases, the "dartres" of the older writers, are, next to syphilis, the most successful field for the action of gold. In cutaneous diseases it is used locally as well as internally. Dropsy is one of the affections in which it was anciently recommended, and in which modern therapeutists have found it efficient, especially ascites due to chronic hepatic disease or to induration of the abdominal organs, also post-scarlatinal dropsy and ovarian dropsy.

Many disorders of the female generative organs have proved amenable to gold when persistently employed. Amenorrhea due to ovarian torpor and chronic metritis with scanty menstruation are often benefited thereby, while sterility dependent on these states or due to coldness, is more certainly cured by the auric preparations than by any other merely medicinal means. The tendency to habitual abortion may be averted by the use of the Chloride, which is also beneficial for mental symptoms of hysterical character, especially when connected with uterine disease. Many competent clinicians have highly commended gold in suicidal melancholia, in hypochondriasis accompanying hepatic or testicular disease, in decline of the sexual power in men, and as a tonic for low-spirited, pining boys with undeveloped testes.

Sclerosis of the internal organs, especially the liver and kidneys, may be retarded by the persistent use of the Gold and Sodium Chloride in doses of gr. $\frac{1}{30}$–$\frac{1}{20}$ thrice daily. Nervous dyspepsia, characterized by a red and glazed tongue, epigastric pain increased by food, and relaxation of the bowels after eating, is greatly benefited by the same salt in equally small doses. Catarrh of the duodenum and bile-ducts, and jaundice therefrom, also vertigo and vertiginous sensations connected with gastric disorders or due to cerebral anemia, are often removed by a course of treatment with the salts of gold. The Bromide has been employed in doses of from gr. $\frac{1}{4}$ to gr. $\frac{1}{2}$ with decided benefit in obstinate cases of hysteria and epilepsy. Goubert used it successfully for migraine, epilepsy, chorea and exophthalmic goitre, in daily doses of gr. $\frac{1}{8}$ to $\frac{1}{6}$, continued until its characteristic headache was produced. He claimed for it greater efficacy in epilepsy than is possessed by the other bromides, and said that, as compared with them, it is better tolerated and does not induce depression and emaciation or the other pronounced symptoms of bromism.

A combination of Gold and Arsenic (*Auri Arsenas*) was introduced by Chrestien and extensively employed by Massart in cancer and phthisis, with sufficient success to merit the approval of the medical societies of Lyons and Toulouse. It is said to be particularly serviceable in scrofulous affections, especially lupus, and to exercise a highly beneficial influence on anemia and chlorosis. A solution of the Bromides of Gold and Arsenic has been successfully employed for several years by Dr. Barclay and others in the various diseases of which sclerosis is the chief factor, such as cirrhosis of the liver and lungs, interstitial nephritis, atheroma and calcareous degeneration of the arteries, senile degenerative changes and neurotic disease, fibroid phthisis, and locomotor ataxia; also in cervical adenitis, arthritis deformans, syphilitic neuralgia and iritis, miliary tuberculosis, epilepsy, chronic neuritis, sciatica, chronic muscular rheumatism and neurasthenia. *Arsenauro* is the trade-name of this solution, which has been the subject of extended reports from many competent observers, some of whom claim to have obtained from the use of this combination results which neither of its constituents are capable of when administered alone. It is held to have marked alterative power upon the glandular system and upon all non-malignant scleroses; to be not only a blood-maker but a blood-builder, increasing the number of the corpuscles and improving their quality, and also increasing the amount of hemoglobin therein. It is eliminated by the kidneys and produces no irritation when administered either by the mouth or hypodermically. A similar solution of the Bromides of Gold, Arsenic, and Mercury, named *Mercauro*, is on the market, and is highly praised in the treatment of the late manifestations of syphilis, particularly those affecting the nervous system.

A so-called *Bichloride-of-Gold Cure* for inebriety has become highly notorious through extensive advertising and other commercial methods, but from the most reliable information obtainable it is reasonably certain that the only preparation of gold which plays a prominent part therein is the gold coin which passes from the patient's pocket to that of the manager of the "institute." The physiological symptoms produced by the remedy employed are those of strychnine and atropine, the administration of which hypodermically several times daily for three or more weeks is decidedly dangerous. In many cases cardiac failure has occurred soon after the completion of the treatment, and in a large number of instances insanity or other serious psychoses have developed immediately after the subjects had been through one of these so-called "cures."

BALSAMUM PERUVIANUM, Balsam of Peru,—is a balsam obtained from *Toluifera Pereiræ*, a Central American tree, of the nat. ord. Leguminosæ. It occurs as a thick, brown-black liquid, its odor reminding of benzoin and vanilla, soluble in 5 of alcohol, almost insoluble in water, which extracts from it only some cinnamic acid and cinnamein. It is not a true balsam, as it contains no volatile oil. Its composition is: *Cinnamein* (benzyl cinnamate, $C_{16}H_{14}O_2$) 60 per cent., *Cinnamic Acid* 6 per cent., *Resins* 30 per cent.; also benzoic acid and other bodies. Dose gr. x–xxv [av. gr. xv.] in emulsion. There are no official preparations.

Incompatible with Balsam of Peru are: Ferric salts, Iodoform, and Hydrogen Peroxide.

The action of Balsam of Peru is that of its several constituents, namely, antiseptic, stimulant to the circulation, and sedative to the nervous system; acting chiefly on the mucous membrane, it is tonic and expectorant, diuretic and diaphoretic. In large doses, it causes gastralgia, nausea and vomiting, colic and diarrhea. It closely resembles in physiological action its congeners, Styrax and Benzoin.

Balsam of Peru is used locally in chronic skin diseases of inflammatory type and sore nipples, to relieve itching, cleanse bed-sores, promote the healing of wounds and ulcers, and to kill the acarus scabiei, being considered by some authorities the best of all applications in itch. Internally, it is used as a stimulant and disinfectant expectorant in chronic bronchitis and asthma, as well as in gonorrhea, gleet, leucorrhea, and other discharges from mucous membranes.

BALSAMUM TOLUTANUM, Balsam of Tolu,—is a balsam obtained from *Toluifera Balsamum*, a tree of the nat. ord. Leguminosæ, a native of Venezuela and New Granada. Its composition and properties are similar to those of Balsamum Peruvianum, except that it is of lighter color, more agreeable odor, and contains a volatile oil, *Tolene*, in the proportion of about 1 per cent. Dose, gr. x–xx [av. gr. xv.]

Tinctura Tolutana, *Tincture of Tolu,*—contains 20 per cent. of the Balsam dissolved in alcohol. Dose, ♏ xx–xl (av. ♏xxx.]

Syrupus Tolutanus, *Syrup of Tolu,*—has of the Tincture 5 per cent., with Sugar 82, and Water to 100. It is much used in cough mixtures, and covers the taste of Chloral Hydrate well. Dose, ʒj–vj (av. ʒiv.]

Balsam of Tolu has similar action to that of Balsam of Peru, but being more agreeable in flavor it is more used internally than the latter. It is chiefly employed as a pleasant excipient in cough mixtures, and is a constituent of the Compound Tincture of Benzoin.

BAPTISIA, Wild Indigo (Unofficial),—is the root bark of *Baptisia tinctoria*, a plant of the nat. ord. Leguminosæ, native in North America. It contains an alkaloid and a resin, neither of which have been examined critically. The so-called *Baptisin* is an impure resinoid, obtained by precipitation from the alcoholic extract with water.

Unofficial Preparations.

Extractum Baptisiæ, *Extract of Baptisia,*—Dose, gr. j–x.
Fluidextractum Baptisiæ, *Fluidextract of Baptisia,*—Dose, ♏ij–xx.
Tinctura Baptisiæ, *Tincture of Baptisia,*—Dose, ♏v-xxx.
Baptisin,—the resinoid. Dose, gr. j–v.

Baptisia has a bitter and acrid taste; in small doses it is laxative, in large ones violently emeto-cathartic, and may excite severe gastro-intestinal inflammation. It is a decided stimulant of the liver, and increases the secretions of the glandular appendages of the gastro-intestinal mucous membrane. It has considerable power as an antiseptic.

Baptisia has been used locally in decoction or cataplasm to obstinate and painful ulcers, for threatening or existing gangrene and gangrenous sores. Internally, it is a useful remedy in amenorrhea, typhoid and typhus fevers, variola, scarlatina, and epidemic dysentery. In the common continued fever, or in the first stage of typhoid, it will be found of service in drop-doses of a fresh tincture, repeated hourly.

BARIUM, Ba.,—is one of the alkaline metals, and is characterized by its strong affinity for oxygen. Several of its salts are official only as test-solutions, but the Chloride has important physiological actions which may obtain for it a permanent place in practical medicine.

Barii Chloridum, *Barium Chloride,* $BaCl_2 + 2H_2O$, (Unofficial),—occurs in colorless, translucent tables or lamellæ, soluble in 3 of water, insoluble in absolute alcohol. Dose, gr. ss–ij, in water, thrice daily after meals.

Incompatibles.

Incompatible with *Barium salts* are: Carbonates, Chlorates, Oxalic Acid, Oxalates, Phosphoric Acid, Phosphates, Sulphuric Acid, Sulphates, Tannic Acid, Tartaric Acid, Tartrates.

Physiological Action and Therapeutics.

Barium salts in overdoses act as irritant poisons, causing salivation, thirst, vomiting, purging, dyspnea, and a slow pulse. Toxic doses paralyze the central nervous system and the heart, which is arrested in systole. In medicinal doses the Chloride stimulates the cardiac muscle, like Digitalis causing the contractions of the ventricles to become slower and more forcible. It constricts the arterioles by action on their muscular coat, raising the blood-pressure, stimulates the intestinal muscular fibres, and increases peristalsis, in these respects acting like Ergot. Applied locally to voluntary muscles it prolongs their contraction, like Veratrine. It was formerly used as a remedy in glandular affections and nervous diseases, and has been found efficient in mitral insufficiency, irregular heart, hemorrhages, and atony of the bladder and of the intestine. The Sulphide is occasionally used as a depilatory.

BELLADONNA, Deadly Nightshade.—The *Atropa Belladonna* is an herbaceous, perennial plant, of the nat. ord. Solanaceæ, having dark-purple, bell-shaped flowers, and glossy, purplish-black berries about the size of cherries. It is indigenous in the mountainous districts of central and southern Europe and Asia, and is cultivated in Europe and the United States. It contains the official alkaloid *Atropine*, $C_{17}H_{23}NO_3$, which may be decomposed into Tropine and Tropic Acid,—also the alkaloids *Belladonnine*, *Hyoscyamine*, *Hyoscine*, and *Atropamine*, in varying quantity, all existing as malates in the plant. It also contains the usual vegetable constituents, as albumin, gums, etc., and a coloring principle named *Atrosin*. The official titles are as follows:—

Belladonnæ Folia, *Belladonna Leaves,*—ovate and tapering, brownish-green above, grayish-green below, of slight odor and bitter, disagreeable taste. Stramonium leaves are more wrinkled, Hyoscyamus leaves are more hairy. Dose, gr. ss–jss [av. gr. j], gradually increased.

Belladonnæ Radix, *Belladonna Root,*—occurs in cylindrical, tapering, wrinkled pieces, ½ to 1 inch thick, nearly odorless, taste bitter and acrid. Dose, gr. ss–j [av. gr. ¾], cautiously increased.

Allied Plants are Hyoscyamus, Stramonium, Duboisia, and Scopola, containing alkaloids which are closely allied to Atropine, both chemically and physiologically.

Preparations of the Leaves.

Extractum Belladonnæ Foliorum, *Extract of Belladonna Leaves.*—Dose gr. $\frac{1}{10}$ to ½, [av. gr. ⅓].

Tinctura Belladonnæ Foliorum, *Tincture of Belladonna Leaves,*—10 per cent. Dose, ♏j–xv [av. ♏viij.]

Emplastrum Belladonnæ, *Belladonna Plaster,*—has of the above extract 30 per cent., mixed with Adhesive Plaster. It may produce the physiological action of the drug.

Unguentum Belladonnæ, *Belladonna Ointment,*—has of the above extract 10, Diluted Alcohol 5, Benzoinated Lard 65, Hydrous Wool-fat, 20.

The Extract is a constituent of Pil. Laxativæ Comp., and Pil. Podophylli, Belladonnæ et Capsici.

Preparations of the Root.

Fluidextractum Belladonnæ Radicis, *Fluidextract of Belladonna Root.*—Dose, ♏ss–ij [av. ♏j.]

Linimentum Belladonnæ, *Belladonna Liniment,*—has of Camphor 5, dissolved in Fluidextract of Belladonna Root to 100.

Atropine and its Derivatives.

Atropina, *Atropine,* $C_{17}H_{23}NO_3$,—white, acicular crystals, odorless, of bitter taste and alkaline reaction; very soluble in alcohol and in chloroform, also in 130 of water at 59° F. Is decomposed by prolonged contact with caustic alkalies and is resolvable into *Tropine* and *Tropic Acid.* [Av. dose, gr. $\frac{1}{160}$.]

Atropinæ Sulphas, *Atropine Sulphate,* $(C_{17}H_{23}NO_3)_2H_2SO_4$,—a white powder of bitter taste and neutral reaction, soluble in 0.4 of water and in 6.2 of alcohol at 59° F. Dose gr $\frac{1}{200}$–$\frac{1}{100}$ [av. gr. $\frac{1}{160}$].

Oleatum Atropinæ, *Oleate of Atropine,*—a 2 per cent. solution of the alkaloid in Alcohol 2, Oleic Acid 50, and Olive Oil to 100.

Homatropinæ Hydrobromidum, *Homatropine Hydrobromide,* $C_{16}H_{21}NO_3HBr$,—is the hydrobromide of an alkaloid obtained by the condensation of tropine and mandelic acid. It is soluble in 6 of water, 33 of alcohol, insoluble in ether, Dose, gr. $\frac{1}{150}$–$\frac{1}{100}$ [av. gr. $\frac{1}{128}$.] It is used by ophthalmologists as a mydriatic, its effects passing off much sooner than those of Atropine. Homatropine slows the heart, Atropine quickening it.

Incompatibles.

Incompatible with *Belladonna* or *Atropine* are: Alkaloidal precipitants, Alkali Hydrates or Acids with heat, Tannic Acid, Vegetable decoctions or infusions. Physiologically incompatible are: Aconitine, Bromal Hydrate, Chloral Hydrate, Hydrocyanic Acid, Jaborandi, Morphine, Muscarine, Physostigmine, Phytolacca, Pilocarpine, Quinine.

Physiological Action.

The effects of Belladonna are those of its alkaloid Atropine, the dominant actions of which are stimulant to the vaso-motor centre and the cerebral cortex, and paralyzant to the terminal nerve-organs. It stimulates the central nervous system, especially its higher divisions, including the respiratory and vaso-motor centres [Strychnine affects the lower divisions], and paralyzes the terminal nerve-organs of the involuntary muscles, the intestines, the secretory glands, and the inhibitory apparatus of the heart. By stimulating the vaso-motor centre it greatly raises the arterial pressure; by depressing the vagus cardiac terminations it increases the rate but not the force of the heart, [Digitalis slows the rate and increases the force], and at the same time it raises the body temperature. If the dose be sufficient the blood pressure becomes progressively lowered by depression of the cardiac muscle and the muscles in the capillary walls, the temperature falls, but the rapid pulse continues to the last. The respiration is stimulated by small doses but is depressed by large ones, which paralyze the respiratory centre and the motor nerves of the respiratory mucles. Death occurs by asphyxia combined with cardiac failure. Excepting the vaso-motor and respiratory spinal centres the spinal cord is affected but slightly, though very large doses may produce convulsions and paralysis. The motor nerves are directly depressed without any apparent stimulation, the sensory nerves are but slightly affected, though they are depressed by its local application. The voluntary muscles are unaffected, the involuntary are paralyzed by the action of the drug on their nerve terminations. All the secretions of the body are checked by the paralysis of the nerve-endings in the secretory glands, except the urine, which is sometimes increased.

A small dose of Belladonna or Atropine causes dryness of the mouth and throat and some slight disorder of vision. Under larger doses the dryness is more intense, the fauces reddened, the pupils are dilated, the vision disordered, the pulse becomes very rapid, and a bright red flush, resembling that of scarlet fever, appears on the face and neck and may spread over the whole body. The intellect is not affected, but some giddiness and confusion of thought may be experienced, and sometimes spectral illusions occur. Large doses produce a talkative, wakeful delirium, which is often wild, the patient being violent and uncontrollable; a very large dose may cause a fatal stupor with complete muscular relaxation, or severe convulsions ending in coma and paralysis. Congestion of the lungs, the membranes and substance of the brain and cord, and the retina, are usually found after death. There is suppression of urine after a toxic dose, though medicinal doses sometimes increase its flow.

The pupils are dilated by either the local or systemic use of the drug, which stimulates the end-organs of the sympathetic and paralyzes those of the motor oculi, thus increasing the power of the radiating iris fibers and lessening the action of its circular ones. Atropine applied locally also paralyzes accommodation and increases the intraocular pressure. The least quantity of atropine which will affect the pupil is variously stated at from the one-two thousandth to the one-seven hundred thousandth of a grain, the latter amount being that given by Donders.

Atropine is rapidly absorbed and quickly eliminated, the latter process being complete within two hours. Its excretion is performed by the kidneys, and the urine of an atropinized animal will dilate the pupil of another animal. Birds and herbivorous animals are affected very slightly, and pigeons seem to be entirely unaffected by it. Children bear proportionately larger doses than adults.

Therapeutics.

Belladonna is one of the most valuable agents in the materia medica, ranking high in its efficacy and its wide range of usefulness. It is employed in direct conformity with its physiological action, to relieve pain, relax spasm, stimulate the circulation, decrease secretion, and check local inflammation. Atropine is used for the same purposes, also to antagonize the effects of certain poisons, to dilate the pupils, and to paralyze the accommodation of the eye. These agents are efficiently administered in rheumatic torticollis, lead colic, spasmodic

colic, spasmodic dysmenorrhea, laryngismus stridulus, whooping cough, asthma, constipation, irritability of the bladder, and many other spasmodic affections. They are of little value in relieving pain unconnected with spasm, though they have been used with benefit in the pain of inflammation, particularly that of rheumatism, gout, neuralgia due to peripheral disturbance, sciatica, cancer, and pelvic affections. The sedative action of Atropine on the vagus has been successfully utilized in cholera infantum and other forms of cholera, on the theory that the gastro-enteric branches of the nerve are powerfully excited by the toxin of the disease. It is of great value in sudden collapse occurring in acute disease, and characterized by failure of arterial tension, subnormal temperature and excessive sweating; also in shock when the loss of temperature is chiefly due to vaso-motor paralysis. As a vaso-motor contractor it has been highly commended in pneumonia, congestion of the lungs, cerebral and spinal hyperemia, congestive headaches, encephalitis, meningitis, and myelitis. Belladonna is often a valuable remedy in recent cystitis from chill, incontinence of urine in children, acute coryza, sore throat with fever, acute tonsillitis, epileptic and puerperal convulsions, spermatorrhea, and involuntary seminal emissions. In scarlet fever it is indicated when the rash is imperfectly developed, the pulse feeble, and the general condition adynamic, also in typhus fever when the pupils are contracted, and in erysipelas of superficial and non-vesicular character. The prophylactic power of Belladonna against scarlet fever was at one time believed in by many practitioners, strenuously denied by others, and is now generally discredited. The Ointment is an efficient application in mastitis, rectal ulcer, anal fissure, boils, carbuncle, and other superficial inflammations.

Beside the affections already mentioned, Atropine is used internally or hypodermically as a hemostatic remedy in metrorrhagia and phthisical hemoptysis; also in ptyalism due to mercury and pregnancy, for the night-sweats of phthisis, in colliquative diarrhea, and as an antagonist to all the effects of Muscarine, and to some of the effects of Morphine, Physostigmine, Hydrocyanic Acid, Ether, and Chloroform. It is synergistic to many of the effects of Morphine, and in poisoning thereby it should be used in very small doses, chiefly as a respiratory stimulant. Most of the unsuccessful cases treated by it were instances of overdosing with the antagonist, thereby superinducing atropine-narcosis upon the morphine-narcosis. In many cases of apparent death from ether or chloroform, the hypodermic injection of Atropine has saved life when other methods had failed. A solution of gr. iv to the ℥ is used locally by ophthalmologists to dilate the pupils, paralyze accommodation, and contract the vessels of the eye, as in iritis, phlyctenular keratitis, and perforating ulcer of the cornea. It is contraindicated whenever there is increased intraocular tension, and should not be used in persons over 40 years of age, or in gouty or rheumatic subjects, in whom its instillation may light up a latent or incipient glaucoma.

BENZOINUM, Benzoin,—is a balsamic resin obtained from *Styrax Benzoin*, a tree of the nat. ord. Styraceæ, native in Sumatra and Siam, by incision of its bark. It occurs in agglutinated tears or a brown, mottled mass, is soluble in alcohol and solution of potassa, and is composed of *Resins* 80 per cent., *Benzoic Acid* 10 to 20 per cent., and a trace of *Volatile Oil*. Some varieties yield also *Cinnamic Acid*. Dose, gr. v–xx, [av. gr. xv.]. Benzoin is an ingredient of Adeps Benzoinatus, Benzoinated Lard.

Preparations.

Tinctura Benzoini, *Tincture of Benzoin,*—has of Benzoin 20 parts, Alcohol 100. Dose, ♏x–xx, [av. ♏xv.]

Tinctura Benzoini Composita, *Compound Tincture of Benzoin* (*Friar's Balsam*),—has of Benzoin 10, Aloes 2, Storax 8, Balsam of Tolu 4, Alcohol to 100. Dose, ♏x–xl, [av. ♏xxx.]

Benzoic Acid and its Salts.

Acidum Benzoicum, *Benzoic Acid,* $HC_7H_5O_2$,—occurs in light, feathery plates and needles, and is obtained from Benzoin by sublimation, or prepared artificially, chiefly from Toluol. It is soluble in 500 of water, and in 2 of alcohol at 59° F., but its solubility in water is aided by Borax, one part of each being soluble in 100 parts. It is a constituent of Tinctura Opii Camphorata. Dose, gr. v–x [av. gr. vijss] in wafers.

Ammonii Benzoas, *Ammonium Benzoate,*—is soluble in 5 parts of water and in 28 of alcohol. Dose, gr. v–xxx, [av. gr. xv.]

Lithii Benzoas, *Lithium Benzoate,*—soluble in 4 parts of water and in 12 of alcohol. Dose, gr. v–xxx, [av. gr. xv.]

Sodii Benzoas, *Sodium Benzoate,*—is efflorescent on exposure to air, soluble in about 2 parts of water and in 45 of alcohol. Dose, gr. v–xxx [av. gr. xv.]

Unofficial Derivatives.

Acidum Cinnamicum, *Cinnamic Acid,* $C_9H_8O_2$,—occurs in the balsams, in styrax, and in some benzoin resins. It occurs in fine needles or thick prisms, which are soluble in hot water and in alcohol. Dose, gr. j–x, hypodermically.

Sodii Cinnamas, *Sodium Cinnamate,*—occurs as a white, crystalline powder, soluble in water. Dose, gr. j–x, in 5 per cent. sterilized solution, internally or hypodermically.

Incompatibles.

Incompatible with *Benzoin* are Alkalies, Acids, Water; with the *Benzoates* are Acids Ferric salts.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

The action of Benzoin is that of Benzoic Acid, which is antiseptic, antipyretic, analgesic, diaphoretic, and diuretic. A solution of 1 in 1000 prevents the development of bacteria, and one of 4 in 1000 is fatal to most of them. Taken internally it causes slight epigastric heat, increases the pulse-rate, and stimulates the action of the skin and kidneys, the salivary glands, and the bronchial mucous membrane. It is principally excreted by the kidneys, partly as hippuric acid by combination with glycocoll, and in part unchanged. Benzoin is irritant to the fauces, and the powder excites sneezing and coughing when inhaled.

Benzoin is principally used as a stimulating expectorant, especially in the chronic bronchitis of the aged, and by atomization in laryngeal affections. The compound tincture, ʒj to ℥j in a pint of boiling water, is a useful sedative inhalation for the irritation and cough of subacute laryngitis and tracheitis.

It has been used beneficially in chlorosis and some uterine disorders. The compound tincture is a good local application (1 part to 4 of glycerin and water) for sore nipples and chaps of the hands and lips. For use as a cosmetic, either tincture is mixed with 20 parts of water, and employed to remove freckles, and for other skin affections, especially urticaria. The tinctures are excellent applications to foul-smelling wounds, and form the basis of all the proprietary preparations sold for that purpose.

Benzoic Acid and its salts are generally considered to be efficient agents for rendering an alkaline urine acid. They are valuable remedies in chronic cystitis, not only neutralizing the alkalinity of the urine, but also stimulating and disinfecting the vesical mucous membrane. Phosphatic calculi are said to have been dissolved by the long-continued use of Ammonium Benzoate.

Sodium Benzoate has been largely used as a substitute for the salicylates in the septic diseases, being equally antiseptic and antipyretic. Though slower in action, its effects are more permanent, and it is capable of being used in larger doses (ʒij–iij daily). In diphtheria and scarlet fever it has been highly efficient, and in acute rheumatism, typhoid and the malarial fevers it has rendered good service. In phthisis, its use by inhalation to the extent of $\frac{1}{1000}$ of the body-weight daily has seemed to be of value. It has proved very efficient in whooping-cough.

Lithium Benzoate is used in gout and the uric acid diathesis, with the object of forming the very soluble urate of lithium in the system, also on the theory that, as benzoic acid is converted into hippuric acid at the expense of nitrogenous material which would otherwise become uric acid, the latter product will be lessened.

Cinnamic Acid resembles benzoic acid in its action. It increases leucocytosis, and promotes the excretion of uric acid in a marked degree. Sodium Cinnamate has been used internally and by intravenous injection in pulmonary tuberculosis with excellent results.

BERBERIS, Berberis, (*Barberry*),—is the root of several species of the nat. ord. Berberidaceæ, the one generally used being the *Berberis aquifolium*, or Oregon grape, which grows on the Pacific slope of the United States. Its value is probably due to its alkaloid, *Berberine*, $C_{20}H_{17}NO_4$, a yellow, crystalline body, soluble in hot water and alcohol, but not in ether, which is found also in several other plants, as Hydrastis, Coptis, Podophyllum, Menispermum, Calumba, Xanthoxylum, etc. Dose, gr. x–xl [av. gr. xxx.]

Fluidextractum Berberidis, *Fluidextract of Berberis*,—Dose, ♏x–xl [av. ♏xxx.]

Berberina, *Berberine* (Unofficial),—Dose, gr. j–x. It usually occurs in commerce as *Hydrastin*, which is a Berberine Hydrochlorate prepared from Hydrastis.

Berberis is an astringent bitter, a tonic and stomachic in small doses, but in large doses it is cathartic, producing watery diarrhea with abdominal pain. It is believed to possess considerable alterative powers. It has been successfully used as a local application in conjunctivitis, and internally as a remedy for intermittent, remittent and typhoid fevers, diarrhea and dyspepsia. As an alterative and tonic it is useful in syphilitic and strumous affections, and in pain, soreness and burning sensations along the biliary or urinary tracts with a tendency to gravel or gall-stones it will be found a useful remedy.

Berberine has some antiseptic and antiperiodic value, but in large doses it is a gastro-intestinal irritant. The Hydrochlorate is a useful injection in gonorrhea, in which it acts by virtue of its antiseptic and astringent powers. Alkaloidal precipitants and soluble Tartrates are incompatible with Berberine salts.

BISMUTHUM, Bismuth, Bi.—This metal is represented in medicine by six official salts and several unofficial ones, the most important of which are the following:—

Official Salts of Bismuth.

Bismuthi Citras, *Bismuth Citrate,* $BiC_6H_5O_7$,—a white, amorphous powder, odorless and tasteless, insoluble in water or alcohol, soluble in Water of Ammonia. Used only for pharmaceutical purposes. Dose, gr. j–iij [av. gr. ij.]

Bismuthi et Ammonii Citras, *Bismuth and Ammonium Citrate,*—is a combination of the citrate with aqua ammoniæ, and has no definite chemical composition. Small, pearly scales, very soluble in water, sparingly in alcohol. Dose, gr. j–v, [av. gr. ij.]

Bismuthi Subcarbonas, *Bismuth Subcarbonate,*—a white or yellowish-white powder, of somewhat varying chemical composition, tasteless and odorless, insoluble in water or alcohol. Dose, gr. v–xx [av. gr. vijss], in powder or emulsion.

Bismuthi Subnitras, *Bismuth Subnitrate,*—a heavy, white powder, of somewhat varying chemical composition, odorless and almost tasteless, of slightly acid reaction; insoluble in alcohol, almost insoluble in water. Dose, gr v–xx, [av. gr. vijss.] several times a day, in powder, pill, or milk; often combined with opium, morphine or belladonna.

Bismuthi Subgallas, *Bismuth Subgallate* (*Dermatol*),—fine, odorless, saffron-yellow powder, insoluble in all ordinary solvents. Dose, gr. v–xx [av. gr. iv.]

Bismuthi Subsalicylas, *Bismuth Subsalicylate,*—should yield not less than 80 per cent. of pure bismuth oxide; almost insoluble in water, insoluble in alcohol. Dose, gr. v–xv [av. gr. vijss.]

Unofficial Bismuth Salts.

Bismuthi Subiodidum (Oxyiodidum), *Bismuth Subiodide,*—a brick-red, heavy, amorphous powder, insoluble in water, insoluble in any reagent without decomposition. Used locally as an antiseptic dusting powder, and internally in doses of gr. jss–iij.

Bismuthi Oleas, *Bismuth Oleate,*—a pearly-gray, soft, bland substance. [See under Acidum Oleicum].

Airol, *Bismuth Oxy-iodo-gallate,*—is a patented combination of Bismuth Subgallate and Iodine, occurring as a bulky, gray powder, odorless and tasteless, insoluble in water or alcohol. It is used as a dusting powder for ulcers and wounds, or mixed with Vaselin or Lanolin as an ointment. Calomel is incompatible with it.

Eudoxin, *Bismuth Tetra-iodo-phenol-phtalein,*—is a bismuth salt of Nosophen and contains about 53 per cent. of Iodine and 14 per cent. of Bismuth. It occurs as a reddish-brown, odorless and tasteless powder, insoluble in water. It is said to be an efficient internal antiseptic for gastric and intestinal affections. Dose, for children, gr. j–iij; for adults, gr. iij–viij.

Orphol, *Bismuth Beta-naphtholate,*—contains from 50 to 70 per cent. of Bi_2O_3 also Beta-naphthol; is a reddish-brown powder, insoluble in water, and recommended as an intestinal antiseptic and astringent. Dose, gr. v–xx, up to a daily quantity of gr. xv for children and gr. xlv for adults, given with honey or milk.

Xeroform, *Bismuth Tri-brom-phenol,*—is a patented preparation which contains about 50 per cent. of Bi_2O_3 and occurs as a yellow, insoluble powder, having a faint odor of carbolic acid. It is almost non-toxic and unirritating to mucous surfaces. It is an excellent surgical and intestinal antiseptic, and has been used locally with benefit in chancroids, buboes, foul ulcers, infected wounds, burns, eczema and other skin diseases. It has been given internally with satisfactory results in cholera, intestinal catarrh and the summer diarrhea of children, also for chronic urticaria and certain forms of infantile eczema. Dose, gr. vij–xv, three times a day.

Incompatibles.

Incompatible with *Bismuth and Ammonium Citrate* are Acids; with *Bismuth Subnitrate* are Alkali Carbonates and Hydrates, Calomel, Hypophosphites, Gallic Acid, Iodides, Salicylic Acid, Sulphur, Tannic Acid; with the *Subcarbonate* as with the carbonates (see under Carbo); with the *Subgallate*, Acids.

Physiological Action.

The action of the insoluble Bismuth salts is chiefly a local one, they being sedative to the end-organs of the nerves, though a minute quantity passes into

the blood and acts as a tonic, promoting constructive metamorphosis by increasing the appetite and digestion. They are also feebly astringent, and produce constipation after a time, coloring the stools and tongue a dark clay color, from their conversion in part into the sulphide. Toxic effects when occurring are ascribed to Arsenic, with which the commercial preparations were formerly contaminated; but it has been shown that the Bismuth salts possess toxic powers of their own, and that the symptoms of bismuth-poisoning may develop when these preparations are applied as a dressing to a large, denuded surface, or taken internally in large doses for a long period of time. A black line along the margins of the gums, headache, nausea, vomiting, pale face, elevated temperature, rapid pulse, edema of the lower extremities, diarrhea, and an odor of urine on the breath, are some of the symptoms observed in such cases. Black and gangrenous sloughs may occur in the intestines, and the urine may contain albumin.

The insoluble Bismuth salts are used internally in many forms of disordered digestion, gastralgia, vomiting and diarrhea, especially in children, but large doses are necessary for efficiency. The best vehicle for them is milk. Locally they are used with advantage in acne rosacea, stomatitis, nursing sore mouth, eczema, intertrigo, ulcers, conjunctivitis, coryza, gonorrhea, gleet and leucorrhea. The Subnitrate is regarded by many practitioners as almost a specific in cholera infantum, given in hourly doses of 3 to 6 grains: also in the diarrhea of phthisis, in dysentery and intestinal ulceration, it is highly efficient, in doses of 15 grains every hour or two. Externally, it is employed as a dusting powder, either pure or mixed with starch (1 to 5); as a drying application for the nasal, pharyngeal and laryngeal mucous membranes; in suspension as an injection in gonorrhea (4 to 10 per cent.); and with vaselin (10 to 15 per cent.) as an ointment in eczema, also for burns and wounds.

The Bismuth and Ammonium Citrate being soluble, is more rapid in action, but also more astringent and irritant than the other salts, though it is probably precipitated in the stomach by the hydrochloric acid of the gastric juice. It is serviceable in diarrhea without irritation of the intestinal mucous membrane, but rather with relaxation thereof. The Subsalicylate when pure is well borne by the stomach, and can be used for longer periods than the subnitrate. It has been especially serviceable in the diarrhea of phthisis, in that of typhoid fever, and in chronic gastric and intestinal disorders, also as an internal antiseptic in dilatation of the stomach.

The Subgallate, also known as *Dermatol*, is one of the many substitutes for Iodoform. It has great stability, as well as valuable drying and bactericidal qualities, and is an excellent vulnerary for wounds and burns. It has proven useful in the treatment of moist cezema, ulcers, and other affections of the eye, diseases of the middle ear and dental caries. It occasionally produces dermatitis, and Dr. Cantrell holds that it is decidedly irritating, is a stimulant rather than an astringent, does not check but rather increases discharge, and does not

fulfil the claims made for it. Efforts are made to show value for it as an internal remedy in fermentative dyspepsia and gastric catarrh. It is efficiently employed internally for diarrhea in doses of 10 or 20 grains every two or three hours.

The Oleate is credited with mildly astringent and emollient properties, and has been used with benefit in pustular affections of the skin and in acne. The Subiodide is an exceedingly valuable agent in the treatment of burns, wounds, ulcers, and similar affections as a substitute for Iodoform. It is remarkably efficient as a stimulant of granulation in wounds, and is odorless, non-irritant, and highly antiseptic.

BROMUM, Bromine, Br,—is a non-metallic element found in sea-water and in the mother-liquid of certain salt-works, usually in combination with other substances. It occurs as a dark, brownish-red, volatile liquid, evolving an irritant vapor of peculiar and suffocating odor. It is soluble in 30 of water at 59° F., very soluble in alcohol, ether, chloroform and carbon disulphide. On exposure to air or heat it is completely volatilized. It destroys the color of solutions of litmus and indigo, and imparts a yellow color to solution of starch. It is used only by inhalation and locally as an escharotic.

Acidum Hydrobromicum Dilutum, *Diluted Hydrobromic Acid,*—is composed of absolute Hydrobromic Acid, HBr, 10 per cent., and Water, 90 per cent., and occurs as a clear, colorless and odorless liquid, of pungent and acid taste. It is produced by decomposing Potassium Bromide with Sulphuric acid and distilling. Dose, ♏xx–℥ij [av. ʒj.] well diluted.

Bromides and their Preparations.

Potassii Bromidum, *Potassium Bromide,* KBr,—colorless, cubical crystals, soluble in 1.6 of water and in 200 of alcohol. Dose, gr. ij–ʒj, [av. gr. xv], well diluted.

Sodii Bromidum, *Sodium Bromide,* NaBr,—colorless, monoclinic crystals, soluble in 1.2 of water and in 13 of alcohol. Dose, gr. ij–ʒj, [av. gr. xv], well diluted.

Lithii Bromidum, *Lithium Bromide,* LiBr,—a white, granular, deliquescent salt, very soluble in water and in alcohol. Dose, gr. ij–xl, [av. gr. xv], well diluted.

Ammonii Bromidum, *Ammonium Bromide,* NH_4Br,—colorless, prismatic crystals, soluble in 1.5 of water and in 30 of alcohol. Dose, gr. ij–xl [av. gr. xv], well diluted. This Bromide is well borne by children in comparatively large doses if epileptic from reflex causes. A child one year old can tolerate gr. v every 4 hours (Barton).

Calcii Bromidum, *Calcium Bromide,* $CaBr_2$,—a white, granular, deliquescent salt, very soluble in water and in alcohol. Dose, gr. ij–ʒj, [av. gr. xv], well diluted.

Strontii Bromidum, *Strontium Bromide,* $SrBr_2(H_2O)_6$,—colorless, hexagonal crystals, very deliquescent, very soluble in water and in alcohol; insoluble in ether. Dose, gr. ij–xxx [av. gr. xv], well diluted.

Zinci Bromidum, *Zinc Bromide,* $ZnBr_2$,—a white, granular, deliquescent powder, very soluble in water and in alcohol. Dose, gr. ½–iij [av. gr. ij], well diluted.

Syrupus Ferri Bromidi, *Syrup of Iron Bromide* (Unofficial),—is a syrupy liquid containing 10 per cent. of Ferrous Bromide, $FeBr_2$, prepared by acting on Iron Wire 35 parts with Bromine 75, adding Sugar 600 and Water up to 1000 parts. A translucent, pale-green, odorless liquid of sweet, ferruginous taste and neutral reaction. Dose, ʒss–j.

Arsenic Bromide is described on page 159, **Aurum Bromide** on page 165, **Ethyl Bromide** on pages 87 and 90, and **Camphora Monobromata** under CAMPHORA.

Derivatives of Bromine.

Bromoformum, *Bromoform,* (*Tri-bromo-methane*), $CHBr_3$—is prepared by the action of sodium hypobromite on acetone, or by the action of bromine upon a solution of equal