

tion into the colon has given satisfactory results in many cases, and is considered one of the most valuable methods for the treatment of that affection. As an internal remedy it has rendered good service in cholera infantum after the acute symptoms abated, and has given marked relief to the pain in catarrh of the biliary ducts. Its employment in spinal sclerosis, glosso-labio-laryngeal paralysis and similar affections has not proved very successful, but it is said to be one of the few remedies which are of any service in locomotor ataxia. It was formerly used as a nerve tonic in epilepsy, but has been superseded by other agents which are less objectionable and more efficient. It has cured epilepsy where the bromides have failed, and it is an established fact that patients who have been subjected to a course of silver medication which has produced a deposit of the metal in the tissues possess a remarkable degree of immunity from various minor nervous ailments. It may be inferred that a remedy which is deposited in the tissues may interfere by its presence with the chemical activity of adjacent atoms, preventing their explosive union (Murray).

Several silver compounds have been introduced as substitutes for the Nitrate, with the view of obtaining greater penetrative local action, as the latter salt is decomposed by the proteids and chlorides of the tissues and possesses only limited powers as an antiseptic and astringent. These compounds are marketed under various trade-names (see pages 151 and 152), and are used with satisfaction as local applications in gonorrhœa, conjunctivitis, otitis media, laryngitis, pharyngitis, dysentery, erysipelas, empyema of the antrum, cystitis, and other inflammatory and suppurative affections. Protargol has probably been the most popular, though Neissen states that the results of 870 cases of gonorrhœa treated therewith show that the average duration of the disease is not lessened by this agent more than by other recognized methods of treatment. Collargol has been used internally, by inunction, and by intravenous injection. It is said to cause marked and rapid leucocytosis, to be completely excreted within a month, to be incapable of producing argyria, and to have inhibitory action in the blood on bacteria. It has been used with benefit in skin and venereal diseases, local suppurations, and septic disorders; also in diphtheria, scarlet fever, pneumonia, pericarditis, and typhoid fever.

The Oxide is the least irritant of the silver salts and does not discolor the skin so quickly as the nitrate, but eventually the same result follows its continued administration. It has been employed with more or less success in gastric neuralgia, irritable dyspepsia, pyrosis, gastric and pulmonary hemorrhages, dysmenorrhœa, menorrhagia and other uterine affections, also to check profuse sweating, to relieve vomiting even in severe gastritis, and to control diarrhea depending on reflex nervous irritation. As an ointment, 5 to 10 grains to the drachm of lard, it is employed for application to venereal sores and to the urethra in gonorrhœa.

A course of silver medication should be regulated by suspending the remedy after 5 or 6 weeks' use, then promoting elimination by purgatives, diuretics and baths. To prevent the general discoloration Potassium Iodide may be given conjointly with the silver, and

baths of Sodium Hyposulphite used frequently. The dark line at the margin of the gums is removable by a course of the Acid Tartrate of Potassium. Argyria has been produced in three months and after the use of ʒss-j of the nitrate.

**ARNICA, Arnica**,—is the dried flower-heads of *Arnica montana*, Leopard's Bane, a perennial of the nat. ord. Compositæ, indigenous to the mountains of Northern Europe and Siberia, and said to have been found in the mountains about the headwaters of the Missouri and Columbia rivers. It has large orange-yellow flowers and a small, curved rhizome with several rootlets. It contains two alkaloids, *Arnicine* and *Cytisine*, the latter being probably identical with the active principle of *Cytisus laburnum*, the Laburnum; also *Trimethylamine* ( $\text{CH}_3)_3\text{N}$ , an ammoniacal alkaloidal principle, which has been looked upon as the active ingredient. Arnica also contains *Inulin*, *Capronic* and *Caprylic Acids*, tannin, mucilage, resins, and two essential oils, one in the flowers, the other in the root. Dose, gr. v-xx, [av. gr. xv.]

*Preparations.*

**Tinctura Arnicæ, Tincture of Arnica**,—strength 20 per cent. Dose, ʒv-xxx, [av. ʒxxv.]

**Infusum Arnicæ, Infusion of Arnica** (Unofficial),—Arnica flowers 20, to 100 parts of water, is thought by many observers to be the best form for local use, as it does not excite dermatitis, probably from containing none of the Volatile Oil.

**Trimethylamina, Trimethylamine**,  $\text{C}_3\text{H}_9\text{N}$  (Unofficial),—is a thin, colorless, strongly alkaline liquid, boiling at 49° F., and at ordinary temperatures a colorless, inflammable gas. The Hydrochloride is the most stable salt, crystallizing in white or colorless prisms, nearly odorless, of pungent taste, very deliquescent, freely soluble in water and in alcohol. Dose, gr. ij-ijj in syrup every 2 hours.

Trimethylamine has been obtained from Arnica flowers and those of several other plants, from Ergot, Hops, Codeine, Cod-liver Oil, and decomposing albuminous substances, such as human urine, herring-pickle, and the residue left in making sugar from beets. It is sometimes incorrectly named *Propylamine*, a term also applied to an impure trimethylamine, but in reality an allied and isomeric compound.

*Incompatibles.*

Incompatible with *Arnica* preparations are: Acids (mineral), Ferrous Sulphate, Lead Acetate, Zinc Sulphate.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Arnica is irritant, stimulant, depressant, antipyretic, diuretic and vulnerary. It irritates the gastro-intestinal tract, and in some persons the local use of alcoholic preparations of the flowers will excite erysipelatous inflammation of the skin, though those of the root have not been observed to do so. In small doses internally it increases the action of the heart, raises the arterial tension and stimulates the action of the skin and the kidneys. Large doses produce a transient excitement, followed by depression of the circulation, respiration, and nerve-centres; headache, unconsciousness, and even convulsions being induced, the body-temperature lowered, the pupils dilated, and muscular paralysis produced. A toxic dose paralyzes the nervous systems of animal and organic life, causing collapse and death. Cytisine is a powerful central emetic, and in large doses paralyzes the motor nerves. Its direct action on the circu-

lation is slight; toxic doses cause a gradual lowering of arterial pressure, and death by respiratory paralysis.

Arnica is a popular remedy with those who patronize the so-called homeopathic school of practice, but like many other agents which the homeopaths claim to have given to medicine, it is a remedy much older than homeopathy, and was investigated originally by regular physicians, notably by Van der Kolk in the sphere of mental affections. Externally, the tincture in water has a popular reputation in sprains and bruises, though an infusion is better for local use. Ecchymoses are rapidly dispersed by its administration internally as well as externally; and for internal bruises from shock or concussion its internal use has proven very efficacious. The aqueous preparation applied locally promotes the rapid union of cut surfaces.

Internally, besides its value as previously noted, Arnica is employed effectively in typhus and typhoid fevers as a stimulant and antipyretic; also in delirium tremens, rheumatism and rheumatic gout, hemorrhages, epistaxis, hemoptysis, amaurosis, concussion of the brain, chronic dysentery and paralysis of the bladder, it has rendered good service. In idiopathic mania, after the first excitement has diminished. Arnica, in aqueous preparation internally, has given great satisfaction. It has often checked an exhausting diarrhea after many other remedies have failed.

**Trimethylamine** is an active escharotic and a gastro-intestinal irritant. It lowers the rate and force of the heart, decreases the body-temperature, and diminishes (though sometimes increases) the excretion of urea. The Hydrochloride is a powerful antipyretic in doses of gr. ij every 3 hours. It has been found useful in acute rheumatism and gout, relieving pain, reducing temperature, and diminishing the frequency of the pulse. In chronic rheumatism, as a liniment (1 part to 3 of Glycerin), it is said to give relief equal to that produced by any anodyne. It has been used with benefit in chorea, moderating the spasmodic movements when not suspending them entirely.

**ARSENUM, Arsenic, As.**—The metal Arsenum exists in many minerals, and occurs in the free state as a sulphide, and in combination, especially with iron, nickel, and cobalt. It is represented in medicine by its Trioxide and Iodide, Sodium Arsenate, and Potassium Arsenite, which are official; also by several unofficial compounds. The Trioxide (arsenous acid) is obtained by roasting native arsenides and condensing the fumes in a horizontal chimney.

*Official Compounds and their Preparations.*

**Arseni Trioxidum, Arsenic Trioxide, (Arsenous Acid),  $As_2O_3$** —is a heavy, white solid, occurring as an opaque powder, or in semi-transparent masses having usually a striated appearance, soluble in 30 to 80 of water at 59° F., the solubility varying with its physical condition, also soluble in 15 of boiling water, in alkalies and their carbonates, in hydrochloric acid and in glycerin. It is volatilized at 424.4° F. without melting, and when thrown on ignited charcoal it emits an alliaceous odor. It floats when sprinkled on water, though its weight is about  $3\frac{1}{2}$  times that of the corresponding bulk of the fluid on which it rests. Dose, gr.  $\frac{1}{30}$ — $\frac{1}{10}$ , [av. gr.  $\frac{1}{30}$ .]

**Liquor Acidi Arsenosi, Solution of Arsenous Acid**,—is a 1 per cent. solution in HCl and Distilled Water. Dose, ℥ij—vj, thrice daily in water after meals, [av. ℥ij.]

**Liquor Potassii Arsenitis, Solution of Potassium Arsenite (Fowler's Solution)**,—is a 1 per cent. solution, prepared by boiling together Arsenous Acid, 1, Potassium Bicarbonate

2, Comp. Tincture of Lavender 3, and Distilled Water to 100. Dose, ℥ij—vj, [av. ℥ij.] in water thrice daily after meals.

**Sodii Arsenas, Sodium Arsenate,  $Na_2HAsO_4 + 7H_2O$** ,—is a salt of the second oxide, Arsenic Acid,  $As_2O_3$ . Occurs in colorless prismatic crystals, of feebly alkaline taste and reaction, soluble in 4 of water at 59° F., very soluble in boiling water, hardly soluble in alcohol. Dose, gr.  $\frac{1}{8}$ — $\frac{1}{4}$ , [av. gr.  $\frac{1}{10}$ .]

**Sodii Arsenas Exsiccatus, Exsiccated Sodium Arsenate**,—an amorphous, odorless, white powder, very poisonous. [Dose, gr.  $\frac{1}{30}$ — $\frac{1}{15}$ , [av. gr.  $\frac{1}{30}$ .]

**Liquor Sodii Arsenatis, Solution of Sodium Arsenate, (Pearson's Solution)**,—is a 1 per cent. solution of the dried Arsenate in Distilled Water. Dose, ℥ij—vj, [av. ℥ij.] in water after meals.

**Arseni Iodidum, Arsenic Iodide,  $AsI_3$** ,—occurs in glossy, orange-red crystalline masses or scales, gradually losing iodine by exposure to the air, soluble in 7 of water and in 30 of alcohol at 59° F.; is gradually decomposed by boiling water and by boiling alcohol, and is completely volatilized by heat. Dose, gr.  $\frac{1}{30}$ — $\frac{1}{15}$ , [av. gr.  $\frac{1}{30}$ .]

**Liquor Arseni et Hydrargyri Iodidi, Solution of Arsenic and Mercuric Iodide, (Donovan's Solution)**,—has Arsenic Iodide and Mercuric Iodide, of each 1 part in 100 of Distilled Water. Dose, ℥j—v [av. ℥jss], in water after meals.

*Unofficial Arsenum Compounds.*

**Cupri Arsenis, Cupric Arsenite**,—occurs in the various cupro-arsenical pigments used for wall-paper coloring and as insect-poison, viz.—Scheele's green, Mineral green, Paris green, etc. Is highly poisonous. Dose, gr.  $\frac{1}{100}$  daily, in divided doses.

**Liquor Arseni Bromidi, Solution of Arsenic Bromide, Clemens' Solution**,—is properly a Liquor Potassii Arsenatis et Bromidi, and contains 1 per cent. of the arsenic salt. It is prepared by boiling together Potassium Carbonate and Arsenous Acid, ℥j of each in ℥x of distilled water, until a clear solution is formed; when cold ℥ij of Bromine and ℥xij of water are added, and the mixture is allowed to stand until all color disappears, when it is ready for use. Dose, ℥j—v, thrice daily in water after meals.

**Solutions of the Bromides of Arsenic and Gold (Arsenauro), of Arsenic, Gold and Mercury (Mercauro), of Arsenic, Gold and Calcium (Calcauro), and of Arsenic, Gold and Manganese (Manganauro)**, are described under the title AURUM.

**Atoxyl**,—is the trade-name of an Amido-benzene compound of Arsenum, containing 38 per cent. of arsenic oxide, and occurs as a colorless, odorless, and almost tasteless powder, soluble in  $\frac{1}{4}$ th its weight of warm water. Dose, hypodermically, gr.  $\frac{1}{10}$ — $\frac{1}{2}$  at first, gradually increased up to gr. iij.

**Cacodylic Acid, Dimethyl-arsenine Hydroxide**,—is an organic arsenical compound containing the equivalent of 71 per cent. of arsenic oxide. Its Sodium, Magnesium, and Ferric salts have been used internally and intravenously. Dose, of Sodium Cacodylate, gr.  $\frac{1}{3}$ —j; twice daily after meals.

**Arrhenal, Disodic-methyl Arsenate**,—is soluble in  $\frac{1}{2}$  its weight of water, insoluble in alcohol, and is said to act with greater therapeutical effect than the cacodylates, especially in chronic malaria. Dose, gr.  $\frac{1}{3}$ —j, thrice daily.

*Incompatibles.*

Incompatible with *Arsenic Trioxide* and the *Arsenites* are: Hypophosphorous Acid and the Hypophosphites in acid solution, Dialyzed Iron, Iron salts and salts of the other heavy metals, Lime-water, Magnesia, Potassium Iodide, Silver Nitrate, Sulphides, Tannic Acid and Vegetable astringent decoctions and infusions. With the *Iodide* as for other iodides (see under IODUM).

*Tests for Arsenic.*

The principal tests are simple and should be known by every physician. (1) *Reinsch's Test*,—Hydrochloric Acid and a clean strip of Copper are boiled with the suspected fluid; a dull steel-colored deposit of copper arsenide will appear on the copper if arsenic is present. (2) *Marsh's Test*,—Zinc and diluted Sulphuric Acid are placed in a flask with the suspected liquid to produce nascent hydrogen, and the gas issuing from the tube is ignited, and a clean porcelain plate is brought into contact with the flame. If arsenic is present the gas will contain hydrogen arsenide (arsin) and on the plate will be formed a steel-blue mirror of arsenum, which is distinguished from that formed by antimony by being soluble in a solution of potassium hypochlorite (bleaching-powder).

## PHYSIOLOGICAL ACTION.

Arsenic Trioxide, applied to the skin denuded of its epidermis, acts as a painful escharotic, producing violent inflammation and resulting in a slough which forms a barrier to its absorption. If applied in dilute solution over a large surface, it will be absorbed, and may produce the systemic effects described below.

In small doses it is a stomachic and general tonic, promoting the appetite and digestion, increasing the cardiac action, the respiratory power, and the intestinal secretions; stimulating peristalsis, exalting mental activity and the sexual appetite, and producing a fair skin and a rotund form. When tolerance of the drug is established, large doses are used with impunity, as by the arsenic eaters of Styria, who can swallow at once as much as 5 grains with safety. They are careful, however, not to take any water into the stomach at the same time, so that the dose is slowly absorbed, and probably eliminated rapidly. Not all those who begin its use can acquire tolerance of it, but those who do so seem to continue it without injury, and live to an old age, undergoing great exertion without exhaustion, and being enabled to ascend steep mountains without difficulty of respiration.

In full medicinal doses, continued for some time, it causes itching and edema of the eyelids, ptyalism, nausea and vomiting, diarrhea or dysentery, epigastric pain and soreness, feeble and irritable heart, dyspnea, disordered sensibility, herpes zoster, urticaria, eczema and other skin eruptions, jaundice and albuminuria. In large doses it is a powerful irritant to the gastro-intestinal and bronchial mucous membranes. Toxic doses may produce either symptoms of gastro-enteritis, or those of profoundly narcotic character. In the first and most usual form of acute arsenical poisoning, there is burning pain in the throat and stomach extending over the abdomen, vomiting, thirst, bloody stools, strangury, suppressed, albuminous or bloody urine, rapid and feeble heart, great anxiety, cold breath, finally exhaustion and collapse,—a group of symptoms much resembling cholera. The autopsy shows erosions, ecchymoses, and softening of the gastro-intestinal mucous membrane, congestion of the lungs and bronchi, and fatty degeneration of the liver, kidneys and cardiac muscle. The poison is found in the urine, saliva, tears, sweat, etc., and may be detected even in the parenchymatous tissues. In the nervous form of poisoning by arsenic, profound coma and insensibility come on suddenly without any gastro-intestinal symptoms.

Arsenical preparations are generally classed as alteratives, but they are valuable tonics and antiseptics, and possess antiperiodic powers second only to those of quinine.

*Chronic Arsenical Poisoning* may occur from the inhalation of arsenical vapors or dust arising from wall-papers or other substances containing the poison. The quantity necessary to produce symptoms of poisoning when inhaled seems to be very small. The most prominent symptoms are, at first in-

creased appetite, next colicky pains, mucous or dysenteric stools, irritation of the eyes, coryza, a short, dry cough, and a white and silvery tongue, all accompanied by great bodily prostration.

The long-continued use of arsenic may induce peripheral neuritis, the chief symptoms of which when so caused are—severe darting pains in the limbs, paralysis of the muscles of the extremities, especially the extensors of the hands and feet, ataxic gait, herpes zoster, and rapid muscular atrophy. In several cases it has caused general brown pigmentation of the skin, and may give rise to the same pigmentation of psoriasis patches. After death from chronic poisoning, in addition to the gastro-intestinal and nervous lesions, there is found widespread fatty degeneration, affecting most of the organs, but particularly the liver, kidneys, stomach and muscles, including the heart.

To avoid arsenical poisoning during a course of the drug full doses (℥vj of Fowler's solution) should be used at the commencement, and always taken on a full stomach. The dose should then be steadily reduced. Susceptible persons often tolerate it better if a few drops of laudanum are administered with each dose. It is quickly absorbed, and slowly eliminated, chiefly by the kidneys and the skin, its excretion continuing for about 60 hours, hence it should be administered at infrequent intervals of time.

## THERAPEUTICS.

Externally, Arsenic has been employed in the form of paste as a depilatory, and as an escharotic in cancers, but is excessively painful. Most of the secret "cancer cures" have arsenous acid for their basis. Internally, it is used as a tonic and astringent to the intestinal canal, as a tonic and antispasmodic in nervous diseases, and for its action on tissue change. It is of especial value in irritative dyspepsia, gastralgia, pyrosis, gastric ulcer or cancer, regurgitation of food without nausea, diarrhea coming on immediately after taking food, vomiting of drunkards and chronic alcoholism. It has proven of signal service in the commencement of phthisis, also in catarrhal pneumonia, probably by causing fatty degeneration of the exudation in the alveolar cavities, thus breaking it up and quickening its absorption. It is often very serviceable in chronic bronchitis with copious expectoration, in acute catarrh, hay fever, whooping-cough, asthma, chorea, epilepsy, angina pectoris and other spasmodic nervous disorders. In many forms of neuralgia it frequently gives prompt and permanent relief, especially in cases due to malarial poisoning. As an antiperiodic, it has high rank, being, however, of particular value in chronic malarial poisoning, and as an adjunct to quinine in the intervals between the paroxysms of intermittents. Anemia and chlorosis are remarkably benefited by it, and in rheumatic arthritis and chronic rheumatism it is sometimes of great service. In chronic scaly and papular skin diseases its value is very great, but it is not serviceable in acute forms, and the more chronic the cutaneous affection the more likely it is to be amenable to Arsenic. Epithelioma may

be retarded by small doses long continued, and it has certainly been useful in delaying the progress of other cancers, particularly scirrhus of the stomach and uterine carcinoma. Hypodermically its solutions have been extremely efficient in histrionic spasm, local chorea of the head and neck, obstinate cases of general chorea, and in lymphadenoma.

The so-called Bromide of Arsenic, in the form of Clemens' solution, has rendered good service as a remedy for diabetes mellitus of hepatic origin. Cupric Arsenite has been highly praised as a remedy for typhoid fever, in which it is given for its qualities as an intestinal antiseptic and a general stimulant. The Cacodylates have been used with benefit in anemia, chlorosis, chorea, chronic bronchitis, pulmonary tuberculosis, inoperable carcinoma, and other affections for which arsenic is indicated. The Sodium Cacodylate is considered by Murrell more toxic than the ordinary arsenical preparations, and only to be used with the greatest caution. It is said to increase the menstrual flow, and to promote the growth of the hair. The amido-benzene compound of arsenic named Atoxyl is claimed to be 40 times less toxic than Fowler's solution, and to afford the means of giving a large dose of arsenic without ill-effects. It has been used with satisfaction in dermatological practice, preferably by hypodermic administration, and in small doses at first, gradually increased up to 3 grains.

**ASAFETIDA, Asafetida**,—is a gum-resin obtained by incision from the living root of *Ferula fetida*, a perennial herb of the nat. ord. Umbelliferae, native of Persia and Afghanistan. It occurs in whitish tears embedded in a grayish sticky mass, of alliaceous odor and taste, soluble in alcohol to at least 60 per cent., and when triturated with water it yields a milk-white emulsion. Its principal constituent is a *Sulphuretted Volatile Oil*, consisting chiefly of Allyl Sulphide,  $C_6H_{10}S$ ; it also contains a gum and a resin, with ferulaic, malic, acetic, formic and valerianic acids. Dose, gr. ij-viiij, [av. gr. iv.]

*Preparations.*

**Tinctura Asafetidae**, *Tincture of Asafetida*,—strength 20 per cent. Dose, ℥xx-xxx [av. ℥xv.]

**Emulsum Asafetidae**, *Emulsion of Asafetida*, (*Milk of Asafetida*),—strength 4 per cent. in water. Dose, ℥ij-℥j, [av. ℥iv.]

**Pilulae Asafetidae**, *Pills of Asafetida*,—each pill has gr. iij of Asafetida with gr. j of Soap. Dose, j-iv pills, [av. ij.]

**Mistura Magnesia et Asafetidae**, *Mixture of Magnesia and Asafetida*, *Dewees' Carminative* (Unofficial), has of Magnesium Carbonate 5, Tinct. Asafetidae 7, Tinct. Opii 1, Sugar 10, Aqua Dest. q. s. ad 100 parts. Dose, ℥ss-℥ss.

**Spiritus Ammoniae Foetidus** (Unofficial),—Asafetida 1½, Liquor Ammoniae Fortior 2, Alcohol 20 parts. Dose, ℥ss-j.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Asafetida is a powerful antispasmodic, a stimulant to the brain and nervous system, a stimulating expectorant, also tonic, laxative, diuretic, diaphoretic, emmenagogue, aphrodisiac and anthelmintic in action. Its odor and taste are

extremely nauseous and persistent. In small doses continued it causes impaired digestion, alliaceous eructations, acrid sensation in the fauces, gastralgia, flatulent distention, fetid flatulence, burning urination, diarrhea and tenesmus. Full doses produce various nervous or hysterical phenomena, with nausea, vomiting and purging. The Volatile Oil diffuses into the blood and tissues, and is excreted in the urine, sweat, and breath. By its action the circulation is stimulated, the arterial tension raised, the power of the cardiac motor ganglia is increased and the cardiac inhibition relaxed. Asafetida also stimulates the brain even to pleasant intoxication, and produces a subjective sensation of warmth without any rise of body-temperature. It stimulates the nervous system, the secretions and excretions, the menstrual flow and the sexual appetite. In Asia it is used as a condiment with food, and though at first it is nauseous to most people, a taste for it may be readily acquired.

The disgust which is generally felt for Asafetida makes its use very restricted, though a valuable medicine. The Emulsion is extremely serviceable in the flatulent colic of infants, and as an enema in infantile convulsions. There is no better remedy in hysteria and hypochondriasis with indigestion and flatulence; in constipation with amenorrhea of anemic subjects, due to ovarian and intestinal torpor; in bronchial affections, cough of habit, chronic catarrhs, and flatulent indigestion. It has been highly praised in the treatment of habitual abortion.

**ASCLEPIAS, Pleurisy Root** (Unofficial),—is the root of *Asclepias tuberosa*, a plant of the nat. ord. Asclepiadaceae and a native of the Eastern and Southern States. Two other species of *Asclepias* are used in medicine and were formerly official.

An Infusion or Decoction may be made in the proportion of ℥j of the powdered root to a quart of water, and given in teacupful doses every 2 or 3 hours.

*Asclepias* contains two resins, a peculiar principle, tannic and gallic acids, albumin, pectin, gum, various salts and a volatile, odorous, fatty matter. It is emetic and cathartic in full doses, also diaphoretic and expectorant, as well as depressant to the action of the heart, and probably slightly sedative and astringent. It is a popular remedy in the Southern States for pleurisy (hence its common name), and has been used in medicine for catarrh, pneumonia, phthisis, diarrhea, dysentery, rheumatism, gastralgia, and to promote the eruption in exanthematous fevers. It is undoubtedly a powerful diaphoretic.

**ASPIDIUM**,—is the rhizome of *Dryopteris Filix-mas*, Male Fern, and of *Dryopteris marginalis*, Marginal Shield Fern, plants of the nat. ord. Filices, the former found in most parts of the world, the latter indigenous to N. America. The active principles are *Filmaron*, *Albaspidin*, and *Filicic Acid*, named in the order of their value as anthelmintics. It also contains several other principles, a green, fatty oil, a volatile oil, resin, tannin, etc. Dose, ℥ss-℥jss [av. ℥j.] in a single dose fasting, or in divided doses at short intervals, followed by a purgative.

**Oleoresina Aspidii**, *Oleoresin of Aspidium*,—is an acetone extract and deposits Filicic Acid on standing. It should be well shaken before being used. Dose, gr. xx-℥j, [av. gr. xxx.] in capsules, repeated every 3 hours for 2 or 3 doses.

Aspidium is an efficient vermicide against tapeworm, particularly the unarmed variety (*bothriocephalus latus*). The Oleoresin is the best form the

patient having fasted for the previous day, or used only a milk diet, ʒj may then be given in 4 doses  $\frac{1}{4}$  hour apart. This may be repeated the next morning and followed by three drops of croton oil in emulsion. This is one of many methods. Cusso may be combined with it advantageously. A formula for a mixed treatment by Aspidium, Pomegranate and Pumpkin-seed is given under the title GRANATUM.

Filmaron is said by Jacquet to be equally effective as an anthelmintic, and much easier to take than aspidium. In no case were unpleasant concomitant symptoms noted. Animals injected with poisonous doses of filmaron intraspinally and intravenously soon developed convulsions, and shortly after paralysis. Death took place with the heart in diastole. Animals given the drug by the mouth developed hemorrhagic gastroenteritis and died without convulsions. Dose, gr. xv-xxx, dissolved in chloroform, mixed with Castor Oil ʒvj-ʒj, and diluted in beer foam, followed an hour later by more castor oil in beer foam.

**AURANTIUM, Orange**,—occurs in two official varieties of fruit and preparations of their flowers, *Citrus vulgaris*, the Bitter Orange, and *Citrus Aurantium*, the Sweet or Portugal Orange, both trees of the nat. ord. Rutaceæ, cultivated in almost all warm countries. Other varieties are described under LIMON. The official titles are—

**Aurantii Amari Cortex, Bitter Orange Peel**,—the dried rind of the unripe fruit of *Citrus vulgaris*, characteristics well known. It contains a Volatile Oil isomeric with oil of turpentine,  $C_{10}H_{16}$ , and a bitter crystalline principle, named *Hesperidin* or *Aurantiin*.

**Aurantii Dulcis Cortex, Sweet Orange Peel**,—is the fresh outer rind of the ripe fruit of *Citrus Aurantium*. It contains a Volatile Oil differing from that of the bitter orange, and less of the bitter principle.

*Official Preparations.*

**Fluidextractum Aurantii Amari, Fluidextract of Bitter Orange Peel**.—Used as flavoring. Dose, ʒxx-ʒj, [av. ʒxxv.]

**Tinctura Aurantii Amari, Tincture of Bitter Orange Peel**,—strength 20 per cent. Dose, ʒj-ij, [av. ʒj.] A flavoring preparation.

**Tinctura Aurantii Dulcis, Tincture of Sweet Orange Peel**,—strength 20 per cent. Dose, ʒj-ij, [av. ʒj.] A flavoring preparation.

**Syrupus Aurantii, Syrup of Orange**,—Tincture of Sweet Orange Peel 5, Magnesium Carbonate 1, Citric Acid 5, Sugar 82, Water to 100. Dose, ʒj-ij. Used for flavoring.

**Syrupus Aurantii Florum, Syrup of Orange Flowers**,—Sugar 85, Orange-flower Water to 100. Dose, ʒj-ij. A delicate flavoring agent, but having to some persons an extremely sickish taste.

**Spiritus Aurantii Compositus, Compound Spirit of Orange**,—Oil of Orange Peel 20, Oil of Lemon 5, Oil of Coriander 2, Oil of Anise  $\frac{1}{2}$ , Alcohol to 100. Dose, as for alcohol.

**Aqua Aurantii Florum Fortior, Stronger Orange-flower Water**,—is water saturated with the volatile oil of fresh orange flowers. Dose, indefinite [av. ʒij.] for flavoring. Used to prepare—

**Aqua Aurantii Florum, Orange-flower Water**,—consists of equal volumes of the preceding and Distilled Water, mixed immediately before use. Dose, indefinite, [av. ʒiv.]

**Oleum Aurantii Corticis, Oil of Orange Peel**,—a volatile oil, obtained by expression from the fresh peel of either orange. Is soluble in about 4 times its volume of alcohol, and is an ingredient of the official Spirit of Orange and also of Spiritus Myrciæ (Bay Rum). Dose, gtt. j-v, [av. ʒiij.]

**Elixir Aromaticum, Aromatic Elixir, (Simple Elixir)**,—has of the Comp. Spt. of Orange 1.2, Purified Talc 3, Syrup 37 $\frac{1}{2}$ , Alcohol and Distilled Water to 100. A flavoring vehicle. Dose, ʒj-ʒj, or more.

Orange is aromatic and tonic, also more or less bitter, but has little action except a mild stimulant influence on the nervous system due to its volatile oil. Persons much exposed to its fumes are liable to cutaneous eruptions and various nervous disorders. The oil may produce violent colic and convulsions in children, one case being reported in which death resulted from eating the rind. Its use in medicine is confined to flavoring purposes, though the preparations of the bitter orange may be used as gentle tonics and stimulants to the digestion, but they are usually combined with more energetic agents.

**AURUM, Gold, Au**,—is represented by only one official salt, the Gold and Sodium Chloride, but triturations of the metal itself may be prepared, according to the general pharmacopœial formula for such preparations. The unofficial solution of Gold and Arsenic Bromide is a very efficient preparation.

**Auri et Sodii Chloridum, Gold and Sodium Chloride**,—is a mixture composed of equal parts of dry Gold Chloride,  $AuCl_3$ , and Sodium Chloride,  $NaCl$ ; and occurs as an orange-yellow powder, of saline and metallic taste, slightly deliquescent in damp air, very soluble in water, partly soluble in alcohol, and contains not less than 30 per cent. of pure gold. Dose, gr.  $\frac{1}{10}$ - $\frac{1}{5}$  [av. gr.  $\frac{1}{10}$ ] once or twice a day. The Ph. Ger. gives the maximum single dose as gr.  $\frac{1}{2}$ , and the maximum daily dose as gr. iij, but these doses are too high.

*Incompatible* with this salt are: Alkalies, Alkaloids, Arsenites, Hypophosphorous Acid, Ferrous and Mercurous salts, Organic substances, Oxalic Acid, Potassium Iodide, Sulphurous Acid, Thymol, Vegetable infusions.

*Unofficial Preparations.*

**Auri Pulvis, Powdered Gold**,—may be obtained by triturating gold leaf with ten times its weight of sugar of milk or potassium sulphate until brilliant particles are no longer visible in it, and then washing the diluent away with boiling water. A *Trituration of Gold* may be prepared in the same manner, retaining the sugar of milk, as directed by the pharmacopœia under the title TRITURATIONES. Dose of powdered gold is gr.  $\frac{1}{8}$ -gr. j, or a little of it may be applied by friction to the sides of the tongue.

**Auri Chloridum, Gold Chloride**,—also called the perchloride or terchloride of gold,  $AuCl_3$ , the "potable gold" of the alchemists,—occurs in needle-shaped prisms of a deep orange color, very deliquescent and freely soluble in water, in alcohol and in ether. Dose, gr.  $\frac{1}{10}$ - $\frac{1}{5}$ , in pill or solution, preferably the latter. The commercial salt so named, and much used by photographers, is not the pure chloride but a crystallized double salt of gold and sodium, containing 50 per cent. of metallic gold.

**Auri Bromidum, Gold Bromide**,  $AuBr_3$ ,—occurs as a yellowish-gray, friable mass, which is insoluble in water but soluble in ether, and contains 55 per cent. of Bromine. Dose, gr.  $\frac{1}{10}$ - $\frac{1}{5}$ , but against migraine the minimum quantity should be used twice daily an hour before meals.

**Auri et Sodii Bromidum, Gold and Sodium Bromide**,  $AuBr_3 \cdot NaBr \cdot 2H_2O$ ,—may be used hypodermically in solution, 2 parts to 100 of distilled water, the dose of which is ʒviiij increased to ʒxxxij, respectively representing  $\frac{1}{4}$  and  $\frac{3}{4}$  of a grain.

**Liquor Auri et Arseni Bromidi, Solution of Gold and Arsenic Bromide** (Barclay),—is marketed under the trade-name "Arsenauro," and contains gr.  $\frac{1}{2}$  of each salt in ʒxx. Dose, ʒv-xv in water, thrice daily after meals, or hypodermically.

This solution may be prepared as follows: (1) Take of Nitric Acid ʒj and of Hydro-

chloric Acid  $\mathfrak{z}\text{ij}$ , mix them and dissolve in the mixture 21 grains of pure Gold, then evaporate to dryness in a water-bath. Dissolve the resulting Chloride of Gold in distilled water  $\mathfrak{z}\text{j}$ , and add slowly a solution of 35 grains of Ammonium Bromide in  $\mathfrak{z}\text{iv}$  of water. Shake with Squibb's ether until all the gold is taken out, separate in a separating funnel, and treat the ether solution with fused calcium chloride to remove all water. Distil off the ether, and the ether solution with fused calcium chloride to make *Solution No. 1*. (2) Dissolve the remaining Gold Bromide in  $\mathfrak{z}\text{iv}$  of water to make *Solution No. 1*. (2) Dissolve 48 $\frac{1}{2}$  grains of Arsenous Acid in  $\mathfrak{z}\text{iv}$  of distilled water by the aid of heat, and when cold add  $\mathfrak{z}\text{j}$  of Bromine and let the mixture stand for 24 hours. Then drive off the excess of bromine by boiling in a sand-bath until the solution is colorless, which gives *Solution No. 2*. (3) Mix the two solutions and add sufficient water to make 1 quart.

**Liquor Auri, Arseni et Hydrargyri Bromidi**, *Solution of Gold, Arsenic and Mercury Bromide* (Barclay),—is marketed under the trade-name "*Mercauro*," and contains gr.  $\frac{1}{32}$  of each bromide in  $\mathfrak{xx}$ . Dose,  $\mathfrak{v}$ – $\mathfrak{xv}$  in water, thrice daily after meals, or hypodermically.

Similar solutions of the bromides of gold, arsenic and calcium ("*Calcauro*") and of the bromides of gold, arsenic and manganese ("*Manganauro*"), are on the market and may be used in like doses.

#### PHYSIOLOGICAL ACTION.

The action of the salts of gold upon the human organism is analogous in many respects to that of mercury, causing local irritation and escharotic effects when applied in substance or in strong solution. In continued medicinal doses given internally they produce a condition of general erethism which closely resembles the mercurial fever, and is accompanied by salivation but without tenderness or ulceration of the gums. The Chloride is one of the most active salts, being, according to Chrestien, even more toxic than corrosive sublimate. Locally, it produces irritant and caustic effects, and imparts a yellow stain to the skin, which later on turns violet and even black, from reduction of the metal therein. In overdoses it causes gastric pain and inflammation, also ulceration of the gastro-intestinal mucous membrane, and otherwise acts as a corrosive poison; toxic doses produce a violent gastro-enteritis with such nervous phenomena as convulsive tremor, cramps, priapism, insomnia and insensibility (Magendie).

The salts of gold, administered in small medicinal doses, increase the appetite and the digestive power and stimulate the functional activity of the secreting organs, especially the skin and the kidneys. They also stimulate the generative apparatus, causing diaphoresis, and diuresis, exciting the menstrual flow in women and the sexual appetite in men. The observations of several competent physicians have established the power of these salts to excite the vascular and muscular systems and to produce fever, to increase the urine and the sweat, to cause salivation without stomatitis, a sense of heat in the stomach, headache and diarrhea, to promote menstruation, excite the genitalia, and profoundly affect the nervous system. In large or continued doses they cause dryness of the tongue, redness of the pharynx, gastric and intestinal colic, nausea and vomiting, and even erosion of the gastric mucous membrane. The Bromide, though containing only 55 per cent. of bromine, is found to be many times more active, weight for weight, than the ordinary bromides. Administered in doses of from  $\frac{1}{2}$  grain to 3 grains per kilogramme of body-weight, it depressed the cortical motor centres to such a degree that the strongest electrical stimulation thereof failed to produce an epileptic seizure (Shtcherbak).

#### THERAPEUTICS.

The literature of gold shows that it is one of the most ancient medicines. Pliny, in the first century, recorded its use as a recognized remedy for several conditions for which it is still employed, including lichenoid eruptions, fistula, hemorrhoids, warts, putrid ulcers, and sores emitting an offensive smell. In the finely divided metallic state it was employed as a panacea by the Arabian physicians and by the alchemists. During the 17th and 18th centuries it was highly esteemed as an antisyphilitic, also for leprosy, dropsies, epilepsy, the pest, fevers, amenorrhea, sterility and uterine diseases. During the first quarter of the present century it was in high repute among the European physicians as a remedy for syphilis and for scrofula.

Mitchill (1818) administered gold salts for syphilis in the New York Hospital, with excellent results. In his opinion "the muriate of gold will effect all that is achieved by the muriate of quicksilver, with incomparably less inconvenience to the patient, who gets well under the former without the hazard of a sore mouth or a salivation, and with very little wear and tear of constitution." Trousseau (1851) said that the happy results of gold in the treatment of venereal diseases are incontestable; and von Schroff of Vienna (1868) gave it great praise for the restoration of a case of syphilis in which the strongest mercurials had failed to avert destruction of the nasal bones or the deep, spreading ulcers of the skin. Phillips (1894) said that its efficacy is best seen in the later developments of syphilis, such as ulceration of the nose and larynx, cutaneous syphilides, hard nodes, etc., also that it may especially be employed in long-standing cases with chronic periostitis and when mercury has already been given to saturation. Still it has never obtained general professional favor in the United States or in England until recently. Professor Barton, of Jefferson Medical College, Philadelphia (1827), pronounced the following judgment upon it in his lectures on materia medica. "On the whole view of what has been said in favor of gold, I am not inclined to attach great importance to it as a remedy. It is well enough in its proper place and for its proper purposes, for which it is more useful than as a medicine. Plenty of it would doubtless cure many diseases of mind and body." Such has been the general opinion since the above words were printed, but of late years a number of compounds of gold with other elements (chlorine, bromine, iodine, arsenic and mercury) have been employed as medicines with considerable satisfaction.

Dr. Piffard of New York found that Gold is unquestionably useful in the later stages of syphilis, and said that its best effects are obtained with very small doses, gr.  $\frac{1}{15}$  or less, continued for not more than one or two weeks at a time. Several other observers have given it great praise as a remedy in constitutions which are broken down by the combined influence of syphilis and mercury, for syphilis in strumous subjects, and for the various manifestations of scrofula. Under its use the auric fever may develop, and the local affections for which it is administered may assume an aggravated intensity, and even new ones appear; but these phenomena do not call for suspension of the remedy, for the disease retrogrades rapidly in a few days after they appear (Trousseau); and on lessening the dose pyrexia subsides and good effects are more conspicuous (Phillips).

Strumous affections have been frequently reported cured by the internal and local use of auric preparations, including scrofulous ulcers, lupus, ozena, enlarged and indurated cervical glands, and hypertrophy of the tongue with induration thereof. Gold has been credited with many cures of cancer of the uterus, mammae and tongue, but it is probable that such have really been cases