

Preparations.

Aloe Purificata, *Purified Aloe*,—prepared from Aloes by melting and mixing with $\frac{1}{4}$ th its weight of Alcohol, straining and evaporating. The product is in irregular dull-brown, brittle pieces, almost entirely soluble in alcohol. From it are prepared the following preparations. Dose, gr. j-v, [av. gr. iv.]

Extractum Aloes, *Extract of Aloes*,—prepared by mixing 1 part of Aloes with 10 parts of Boiling Water, standing 12 hours, decanting, straining, and evaporating. Dose, gr. ss-v, [av. gr. ij.]

Tinctura Aloes, *Tincture of Aloes*,—has of Aloes 10, Glycyrrhiza 20, Diluted Alcohol to 100 parts. Dose, ℞x-℥j, [av. ℞xxx.]

Tinctura Aloes et Myrrhæ, *Tincture of Aloes and Myrrh*,—Aloes 10, Myrrh 10, Glycyrrhiza 10, Alcohol and Water to 100 parts. Dose, ℞x-℥j, [av. ℞xxx.]

Pilulæ Aloes, *Pills of Aloes*,—each has Aloes and Soap, 2 grains of each. Dose, ij.

Pilulæ Aloes et Ferri, *Pills of Aloes and Iron*,—each pill contains gr. j each of Aloes, Sulphate of Iron and Aromatic Powder, with Confection of Rose. Dose, ij.

Pilulæ Aloe et Mastiches, *Pills of Aloe and Mastic*, (*Lady Webster's Pill*),—each pill has of Aloes gr. ij, Mastic gr. ss, Red Rose, gr. ss. Dose, ij.

Pilulæ Aloes et Myrrhæ, *Pills of Aloes and Myrrh*,—each pill contains of Aloes gr. ij, Myrrh gr. j, Aromatic Powder gr. ss, mixed with Syrup. Dose, ij.

Pilulæ Laxativæ Compositæ, *Compound Laxative Pills*,—each pill contains of Aloin gr. $\frac{1}{4}$, Strychnine gr. $\frac{1}{128}$, Belladonna Extract, gr. $\frac{1}{8}$, Ipecac, gr. $\frac{1}{8}$, with Glycyrrhiza and Syrup. Dose, ij.

Pilulæ Lapacticæ, *Lapactic Pills* (Unofficial)—each pill contains of Aloin gr. $\frac{1}{4}$, Strychnine gr. $\frac{1}{80}$, Extr. Belladonnæ gr. $\frac{1}{8}$, Ipecac gr. $\frac{1}{8}$. Dose, ij-viii.

Aloes is a constituent of *Pilulæ Rhei Compositæ* and *Tinctura Benzoini Composita* (which see, under RHEUM and BENZOINUM respectively).

Incompatibles.

Incompatible with Aloes are Mercury Nitrate, Silver Nitrate; with Aloin are Alkaline Hydrates, Bromine-water, Ferric Chloride, Lead Acetate (basic), Tannic Acid.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Aloes is a tonic-astringent and resin-bearing purgative, an emmenagogue and an anthelmintic against the thread-worm. As a cathartic it acts chiefly on the lower half of the large intestine, doses of 1 to 4 grains producing in about 10 hours copious soft evacuations with some griping pain. This effect is produced whether the drug be taken internally or absorbed from an exposed surface, so that it probably diffuses into the blood and is eliminated by the mucous membrane of the colon. It is a stomachic tonic in small doses, a stimulant of the hepatic functions, and an excitant of the pelvic circulation. It may cause abortion in the female and priapism in the male, and is said to have frequently produced hemorrhoids, which if existing it will aggravate. Given to nursing mothers it imparts a purgative quality to their milk.

Aloes is chiefly used in combination with iron, myrrh, and nux-vomica, for amenorrhœa and chronic constipation with atonic dyspepsia and hypochondriasis. It is curative in certain forms of hemorrhoids especially those occurring after delivery and where the condition is not one of active pelvic congestion. It is also used internally and as an injection in gonorrhœa, and for simple atonic jaundice. It must be avoided in irritable rectum, hemorrhoids of active form, menorrhagia and pregnancy, unless given in small doses and with care. The Pil. Aloes et

Ferri is perhaps the most generally used agent in the anemia, amenorrhœa and constipation of girls at the period of puberty.

ALTHÆA, *Marsh-Mallow*,—is the root of *Althæa officinalis*, a European plant of the nat. ord. Malvaceæ. It contains about 35 per cent. each of vegetable mucus and starch, with 2 per cent. of *Asparagin*, also pectous matter, sugar, fixed oil, but no tannin. It is a constituent of *Massa Hydrargyri* and *Pilulæ Phosphori*, and is much used as an excipient in extemporaneous pharmacy. Dose, indefinite.

Althæa is one of the best mucilaginous drugs, but has no active medicinal properties. It is used in Europe to make pectoral teas and syrups, and is extensively employed as a mucilaginous demulcent. The powdered root makes a good emollient poultice. In the *Phar. Ger.* a Compound Althæa Tea is official, which under the common name, "German Breast Tea," is a popular demulcent drink in bronchial affections, coughs, etc.

Asparagin (Unofficial),—is an organic principle, occurring in large rhombic crystals, and found in many other plants, as in the shoots of asparagus, vetches, potatoes, licorice, the sweet almond, the root of the locust, etc. It is considered a derivative of *Succinic Acid*, and has diuretic properties, besides being sedative to the circulation. It may be used in ascites, especially in children, in the anasarca of Bright's disease, and in gout. Dose, gr. ij-iiij, in water.

ALUMINUM, Al.—This metal is widely distributed in nature, chiefly in the form of the silicate, constituting clay, kaolin, and many common rocks. Its official salts are the following-named:—

Alumen, *Alum*, (*Potassium Alum*, *Aluminum and Potassium Sulphate*), $\text{AlK}(\text{SO}_4)_2 + 12\text{H}_2\text{O}$,—occurs in large, octahedral crystals, or cubes, of sweetish astringent taste and acid reaction, soluble in 9 parts of water and in 0.3 of boiling water, insoluble in alcohol. The Ammonia-alum (*Alumini et Ammonii Sulphas*) was formerly official, and is still sold and dispensed as Alum. Dose, gr. v-x, [av. gr. vijss.]—as an emetic ℥j for a child.

Alumen Exsiccatum, *Exsiccated Alum*,—is a white, granular powder, slowly soluble in 20 parts of water at 59° F., and quickly soluble in 1.4 of boiling water. Dose, gr. j-v.

Alumini Hydroxidum, *Aluminum Hydroxide* (*Hydrated Alumina*), $\text{Al}_2(\text{OH})_6$,—is a white, light, amorphous, tasteless powder, insoluble in water or alcohol, but soluble in strong alkaline or acid solutions. Dose, gr. iiij-xx in powder or mixture.

Alumini Sulphas, *Aluminum Sulphate*, $\text{Al}_2(\text{SO}_4)_3 + 16\text{H}_2\text{O}$,—is a white crystalline powder, soluble in 1.2 of water at 59° F., almost insoluble in alcohol. Used locally.

Kaolinum, *Kaolin*,—is a native Aluminum Silicate, powdered and freed from gritty particles by elutriation. It is a fine white clay, derived from the decomposition of the felspar of granitic rocks. It is used as an excipient for the easily reduced metallic salts, and as an ingredient of—

Cataplasma Kaolini, *Cataplasm of Kaolin*,—contains Kaolin, Glycerin, Boric Acid, Thymol, Methyl Salicylate, Oil of Peppermint. It is identical with the trade preparation known as *Antiphlogistine*, (see under GLYCERINUM).

Incompatibles.

Incompatible with Alum are: Alkaline Hydrates, Borax, Carbonates, Galls, Kino, Lead Acetate, Lime-water, Magnesia, Magnesium Carbonate, Mercury salts, Phosphates, Tartaric Acid, Potassium Chlorate.

Unofficial Compounds.

Alumol,—is the trade name of an aluminum salt of naphthol-sulphonic acid, and is readily soluble in cold water. It is markedly antiseptic and astringent, and though precipitating gelatin and albumin, the precipitate is soluble in an excess of either, so that when it is used on purulent discharges they do not clog up cavities, and desirable penetration below the surface is accomplished. Incompatible with it are Albumin, Alkalies, Gelatin, and Silver Nitrate.

Zinol,—is a mixture of Alumol 4, Zinc Acetate 1, and occurs as a colorless and odorless

powder, freely soluble in water. It is astringent and bactericidal, and is used in 1½ to 3 per 1000 solutions in vaginal catarrh of gonorrhoeic origin, and as a dressing for bed-sores and suppurating wounds.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

Alum is an astringent, coagulating albumin and stimulating muscular contraction. At first it excites the flow of saliva and then markedly diminishes it. It coagulates pepsin and arrests digestion, stops peristalsis, and usually causes constipation, though sometimes inducing diarrhea. Although coagulating albumin, even in weak solution, it enters the blood, constricts the capillaries, arrests secretions, especially those of mucous surfaces, and stops capillary hemorrhage. In teaspoonful doses it is an efficient and non-depressant emetic. In large doses it is a gastro-intestinal irritant, one ounce and five-eighths of dried Alum having caused the death of an adult in eight hours.

Alum is used locally as an astringent in chronic catarrhs, leucorrhoea, gonorrhoea, hemorrhoids, bed-sores, ulcers, relaxed throat, colliquative sweats, catarrhal ophthalmia and granular lids. The dried powder is escharotic, destroying granulations and warty growths, and is used by insufflation in chronic nasal catarrh. Internally it is beneficial in gastric catarrh, gastralgia, enteralgia, passive hemorrhages, lead colic and constipation. As an emetic it is employed in croup, and it is a good antidote in lead-poisoning. Alum is best administered alone, as it forms precipitates with a large number of drugs.

Aluminum Hydroxide is a feeble astringent and dessicant, occasionally used as a local application in inflammatory skin affections, and internally in diarrhea. The Sulphate is antiseptic and astringent, and is chiefly employed in 5 per cent. solution locally for ulcers, and in 8 to 10 per cent. solution for foul mucous discharges. A saturated solution is mildly escharotic, and may be used as a daily application for enlarged tonsils, nasal polypi, ulceration of the os uteri, and various chronic enlargements.

Alumol does not irritate or cause pain, and is employed dry and in solution as a dressing for wounds and ulcers, acute inflammatory diseases of the skin, and acute and chronic inflammations of mucous membranes. In 1 to 3 per cent. solution it makes a good injection for gonorrhoea, and a 4 per cent. solution is used to check the lachrymal discharge during an examination of the eye.

Earth, in the form of clean, yellow clay, was used by Dr. Hewson as a surgical dressing for wounds, and as an application for erysipelas, but has been abandoned since the introduction of antiseptics and the discovery of soil infection by pathogenic organisms.

AMMONIUM, NH_4 ,—is a hypothetical compound radicle, which does not exist in the free state, but in combination with acids forms salts which closely resemble those of the elements Potassium and Sodium. Many of its salts are official, as well as the aqueous solutions of the gas **Ammonia**, NH_3 , which is produced during the putrefaction of all organisms and many organic nitrogen-

ous compounds. Ammonia exists free in the air and the soil, and is contained in the products of the dry distillation of many nitrogenated compounds. The so-called "gas-liquor," a by-product in the manufacture of illuminating gas, when neutralized by hydrochloric acid, yields Ammonium Chloride, NH_4Cl , and from this salt are derived all the other ammonium compounds employed in medicine.

Ammonium Salts and their Preparation.

Liquor Ammonii Acetatis, *Solution of Ammonium Acetate*, (*Spirit of Mindererus*), is prepared by neutralizing dilute acetic acid with ammonium carbonate. It contains about 7 per cent. of the acetate and is an ingredient of **Liquor Ferri et Ammonii Acetatis**. It should be freshly made as it soon deteriorates. Dose, $\mathfrak{z}\text{j}-\mathfrak{z}\text{j}$, [av. $\mathfrak{z}\text{iv}$.]

Ammonii Benzoas, *Ammonium Benzoate*, $\text{NH}_4\text{C}_7\text{H}_5\text{O}_2$,—minute four-sided laminar crystals, soluble in 5 of water and 28 of alcohol at 59° F. Dose, gr. v-xx, [av. gr. xv.]

Ammonii Bromidum, *Ammonium Bromide*, NH_4Br ,—prismatic crystals or a granular salt, soluble in 1½ of water and 30 of alcohol at 59° F. Dose, gr. ij-xx, [av. gr. xv.] well diluted. Children bear it well if epileptic from reflex causes; a child 1 year old will tolerate gr. v every 4 hours (Barton).

Ammonii Carbonas, *Ammonium Carbonate*, $\text{C}_2\text{H}_{11}\text{N}_3\text{O}_5$,—occurs in white masses consisting of both the acid carbonate and carbamate, which on exposure to air become a white powder. Soluble in 5 parts of water. Dose, gr. ij-x, [av. gr. iv.] For children small doses, gr. ¼-ij, frequently repeated.

Ammonii Chloridum, *Ammonium Chloride*, (*Sal-ammoniac*), NH_4Cl ,—a white, crystalline powder, of saline taste, and slightly acid reaction; soluble in 3 of water and very sparingly in alcohol. Dose, gr. j-xx, [av. gr. vijss.]

Trochisci Ammonii Chloridi, *Troches of Ammonium Chloride*,—each contains 1½ grains of the Chloride. Dose, j-x troches.

Ammonii Iodidum, *Ammonium Iodide*, NH_4I ,—a deliquescent, granular, white salt, soluble in 1 of water and in 9 of alcohol at 59° F. Dose, gr. ij-x, [av. gr. iv.]

Ammonii Salicylas, *Ammonium Salicylate*, $\text{NH}_4\text{C}_7\text{H}_5\text{O}_3$,—colorless prisms or plates, or a white powder, soluble in 0.9 of water, and in 2.3 of alcohol at 77° F. Dose, gr. j-x, [av. gr. iv.]

Ammonii Valeras, *Ammonium Valerate* (Valerianate), $\text{NH}_4\text{C}_8\text{H}_9\text{O}_2$,—white, quadrangular plates, deliquescent, very soluble in water and in alcohol. Dose, gr. j-x, [av. gr. vijss.]

Preparations of Ammonia.

Aqua Ammonia, *Ammonia Water*,—is an aqueous solution of Ammonia, containing 10 per cent. by weight of the gas. It is a colorless liquid of pungent odor, acrid taste and strongly alkaline reaction. Dose, $\mathfrak{m}\text{v}-\mathfrak{z}\text{ss}$, [av. $\mathfrak{m}\text{xv}$.] well diluted.

Aqua Ammonia Fortior, *Stronger Ammonia Water*,—contains 28 per cent. by weight of the gas. Sp. gr. 0.901 at 59° F.

Spiritus Ammonia, *Spirit of Ammonia*,—is a 10 per cent. solution of the gas in alcohol. Sp. gr. about 0.810. Dose, $\mathfrak{m}\text{x}-\mathfrak{z}\text{j}$, diluted, [av. $\mathfrak{m}\text{xv}$.]

Spiritus Ammonia Aromaticus, *Aromatic Spirit of Ammonia*,—contains Ammonium Carbonate, Aqua Ammonia, Oils of Lemon, Lavender, and Nutmeg, Alcohol and Water. Used in the Tinct. Guaiaci Ammoniata and the Tinct. Valerianae Ammoniata. Dose, $\mathfrak{m}\text{xv}-\mathfrak{z}\text{j}$, [av. $\mathfrak{m}\text{xxx}$.]

Linimentum Ammonia, *Ammonia Liniment*,—has of Aqua Ammonia 35 parts, Cotton-seed Oil 57, Alcohol 5, Oleic Acid 3.

Raspail's Eau Sedative (Unofficial),—consists of Aqua Ammonia $\mathfrak{z}\text{ij}$, Sodii Chloridum $\mathfrak{z}\text{ij}$, Spiritus Vini Camphorat. $\mathfrak{z}\text{ij}$, Aqua $\mathfrak{z}\text{xxxij}$. For local use.

Incompatibles.

Incompatible with *Ammonia* preparations are Acids, Acid salts; with the *Aromatic Spirit* are Acids, Acid salts, Lime-water, Aqueous fluids; with the *Acetate* are Alkaline Carbonates

Potassium and Sodium Hydroxides; with the *Benzoate* are Acids, Liquor Potassæ, Ferric salts; with the *Carbonate* are Acid salts, Alkaloids, Alum, Salts of Copper, Iron, Lead and Silver, Magnesia, Magnesium Sulphate, Mercurous and Mercuric Chlorides, Potassium Bitartrate and Bisulphate, Tartar Emetic, Zinc Sulphate; with the *Chloride* are Alkalies and their Carbonates, Alkaline earths, Lead and Silver salts.

PHYSIOLOGICAL ACTION.

The gas Ammonia is intensely alkaline and irritant to mucous membranes; inhaled it causes spasmodic cough and a sense of suffocation. Its prolonged inhalation will produce violent inflammation of the air-passages and edema of the glottis. It stimulates the nasal branch of the fifth nerve, exciting the vaso-motor centre by reflex action, and thus raising the arterial tension. Applied to the skin and allowed to evaporate, it has a slight rubefacient effect, but if evaporation be prevented it penetrates the epidermis, and has a powerfully vesicant action. The Aqua, swallowed undiluted, may cause death quickly by suffocation from the action of its vapor upon the air-passages; if not, it may excite gastro-enteritis accompanied by coma, differing in the latter respect from potassium or sodium poisoning. After absorption it stimulates both the respiration and the circulation by direct action on their respective nerve-centres. Ammonia exists normally in the circulation, where it keeps the fibrin in solution and thus maintains the fluidity of the blood. It increases the glycogenic function of the liver, and is converted finally into urea. It is a powerful irritant to muscular tissue, causing tetanic contraction and subsequent rigor mortis when directly applied.

All Ammonium Salts stimulate and finally paralyze the spinal cord, motor nerves and muscles in animals, but the order and intensity of the action vary with the salts employed, some having a predominating influence on the cord, others on the motor nerves. In general they may be said to form a series, of which the members at one end stimulate the cord, and those at the other paralyze both the cord and the motor nerves. At the stimulant end are Ammonia and the Chloride; at the paralyzant end the Iodide; the Bromide, Phosphate and Sulphate lying between (Brunton). In medicinal doses they act on man as stimulating expectorants, in large quantity they injure the structure of the red blood-corpuscles, and if long continued they produce rapid emaciation by impairing digestion and increasing tissue-waste.

The Chloride has decided cholagogue powers, increases the excretion of urea, in 20-grain doses is purgative, and is considered to have a selective action upon the gastric mucous membrane. The Carbonate is a powerful and very diffusible stimulant; when administered internally in moderate doses it is probably decomposed by the HCl of the gastric juice, nascent ammonia being set free and absorbed. It stimulates the respiratory centre, acts as a stimulating expectorant, and in very small doses stimulates the secretion of the gastric juice. It is also emetic, and has been supposed to prevent iodism when administered conjointly with potassium iodide. The Solution of the Acetate is an active diaphoretic if the body be warm, or a diuretic if it be cool. In wineglassful doses

it will counteract many of the immediate effects of alcohol. The Phosphate is diuretic, and is believed to decompose the insoluble sodium urate in the blood, converting it into the soluble salts ammonium urate and sodium phosphate, and thus promoting its elimination. The Benzoate is also diuretic, and like benzoic acid it passes out of the system in the urine as hippuric acid. It stimulates the liver, and acidifies the urine where there is a phosphatic tendency thereof. The Nitrate and Sulphate are only used for the preparation of other salts, while the Iodide, Bromide and Valerate correspond in action to that of their bases, and are described under the respective titles, IODUM, BROMUM and VALERIANA.

THERAPEUTICS.

The stronger Water of Ammonia may be used as a rubefacient and vesicant, and its vapor, by cautious inhalation, in syncope and the results of shock. Locally, it is a good application to bites of the less venomous reptiles and to the stings of insects. The Carbonate is used internally in the eruptive fevers, delirium tremens, continued fevers, and pneumonia, when much depression exists; as a stimulating expectorant in chronic bronchitis, in the broncho-pneumonia of children, and in cardiac asthma. It is highly recommended in scarlet fever in doses of 3 to 5 grains every one, two, or three hours, all acid drinks or fruits being prohibited while it is being administered. With ten-minim doses of tincture of capsicum in an ounce of some bitter infusion it is exceedingly efficient, in 5- to 10-grain doses, for the sinking sensations and craving for stimulants experienced by subjects of alcoholism. It may be used as an emetic in bronchitis, when the tubes are choked with mucus and the circulation of the patient is weak. It may also be employed by inhalation, and administered internally, for similar purposes as Aqua Ammonia. In doses of 5 grains, administered hypodermically in the vicinity of wounds caused by poisoned arrows, it was employed by Parke in Africa, with entire success in saving life when used immediately after injury, though those so wounded at too great a distance for treatment invariably died within a short time.

The Chloride has high repute in catarrh of the stomach, with anorexia, bad taste in the mouth, flatulence, coated tongue, etc., in short, the symptoms of so-called "biliousness"; also, in chronic congestion of the liver, jaundice from catarrh of the bile-ducts, nervous and sick headaches, myalgia, amenorrhea, muscular rheumatism and neuralgia. In the latter affection it should be given in 30-grain doses several times a day. It is also efficient in bronchial catarrh without fever, and in chronic bronchitis when the secretion is scanty and tough. It is remarkably efficient in straightening up a victim of acute alcoholism; administered to one on the verge of delirium tremens, in dose of $\frac{1}{2}$ drachm in half a pint of water, swallowed at one draught, it is said to restore the patient's faculties so quickly as to astonish those who have never seen it so employed. Locally, in solution, it has been well employed as a lotion for inflammatory swellings, as sprains, inflamed joints, orchitis; also to allay itching in prurigo, to remove

ecchymoses and glandular enlargements. *Eau Sedative* is often a good local application for headaches.

The Solution of the Acetate is especially beneficial in the exanthemata, influenza, coryza, anomalous febrile conditions of children, acidity and vomiting; also in acute alcoholism and in erysipelas when there is feeble circulation, cyanosis and delirium. It is frequently combined with spirit of nitrous ether, as a diuretic and diaphoretic in febrile affections. The Phosphate is particularly applicable to gout and lithemia, and is a very efficient cholagogue. The Benzoate is useful in cystitis with alkaline urine and phosphatic deposits, as it acidulates the urine, at the same time stimulating and disinfecting the mucous coat of the bladder.

Aqua Ammoniac has been administered by intra-venous injection, with efficacy and safety, in sudden or threatened thrombosis, impending cardiac paralysis during chloroform anesthesia, and in poisoning by hydrocyanic acid and other cardiac depressants. In the same manner, it has been employed, but unsuccessfully, in poisoning by the bite of venomous reptiles. Ten drops of the stronger *Aqua* are diluted with three parts of water, and carefully injected into a vein, all air being rigorously excluded from entrance into the circulation.

The therapeutics of the Iodide, Bromide and Valerate are stated under the titles IODUM, BROMUM and VALERIANA respectively.

AMYGDALA, Almond.—The seeds of two varieties of *Prunus Amygdalus* nat. ord. Rosaceae, namely *Amygdala amara* and *Amygdala dulcis*, are official, together with several preparations, some prepared from one variety, some from another, while one is from either and one from both. *Amygdalin*, $C_{20}H_{27}NO_{11}$, is a crystalline glucoside, existing in *Amygdala amara* but not in *Amygdala dulcis*; while the ferment *Emulsin* is common to both varieties. The reaction which occurs between these two substances in the presence of water produces Hydrocyanic Acid. (See ante, page 74.)

Amygdala Amara, Bitter Almond,—is the ripe seed of *Prunus Amygdalus*, var. *amara*, a tree of the nat. ord. Rosaceae, indigenous to Asia, but cultivated in many other parts of the world, especially in Spain and the Balearic Islands. The seed has an embryo of bitter taste, which, when triturated with water, emits the odor of hydrocyanic acid.

Amygdala Dulcis, Sweet Almond,—is the ripe seed of *Prunus Amygdalus*, var. *dulcis*, a tree of the nat. ord. Rosaceae. The bitter and sweet almond trees are identical botanically, and the fruits and seeds of the two varieties resemble each other closely, only differing in taste and the presence or absence of amygdalin (see above). The sweet almond is largely cultivated about Malaga and in California.

Preparations.

Oleum Amygdalæ Amaræ, Oil of Bitter Almond,—is a volatile oil, of peculiar and aromatic odor, bitter, burning taste, and neutral reaction; soluble in 300 of water, but freely in alcohol and ether. Dose, m^{ss} – j , in mixture, [av. m^{ss} .]
This essential oil should yield not less than 85 per cent. of Benzaldehyde, and not less

than 2 per cent. and not more than 4 per cent. of Hydrocyanic Acid which may be removed by distillation with caustic potash. *Nitrobenzol*, Oil of Mirbane, closely resembles the oil of bitter almond, and like it is used for flavoring. It contains no Hydrocyanic Acid, but is a dangerous poison, producing toxic effects when inhaled, even in small doses.

Oleum Amygdalæ Expressum, Expressed Oil of Almond,—is the fixed oil expressed from Bitter or Sweet Almond. Used in Unguentum Aquæ Rosæ, and as a bland local application in skin affections. Dose, ʒj – ʒjss , [av. ʒj .]

Aqua Amygdalæ Amaræ, Bitter Almond Water,—is a weak solution of the Oil in Distilled Water (1 to 1000). Is only a flavored water. Dose indefinite, [av. ʒj .]

Spiritus Amygdalæ Amaræ, Spirit of Bitter Almond, (Essence of Bitter Almond), has of the Oil 1, dissolved in Alcohol 80, and Water added to 100 volumes. Dose, ʒv – x , [av. ʒviiij .]

Syrupus Amygdalæ, Syrup of Almond,—has of the Spirit of Bitter Almond 1 per cent., with Orange-flower Water 10, and Syrup to 100. Dose, ʒss – jss , [av. ʒj .]

Emulum Amygdalæ, Emulsion of Almond,—has of Sweet Almond 6 per cent., with Acacia, Sugar and Water. A demulcent drink, much used as a vehicle for cough mixtures. Dose, ʒj – ʒj , [av. ʒiv .]

Benzaldehydum, Benzaldehyde, C_6H_5O ,—an aldehyde, produced artificially or obtained from natural oil of Bitter Almond or other oils; soluble in alcohol, ether, and oils, and in 300 of water. Dose, ʒj – j , [av. ʒss .]

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

The bitter and sweet varieties of the species *Prunus Amygdalus* differ in action only through the agency of the principle Amygdalin contained in the former. The Sweet Almond is demulcent and nutritive, while the fixed oil expressed from either variety is a bland application, having the same action as olive oil. The action of the Bitter Almond and its oil is due to the hydrocyanic acid contained in them.

The Oil of Bitter Almond is used as a flavoring agent, and may be employed locally or internally in lieu of hydrocyanic acid. The Syrup is somewhat sedative, but is generally used as a demulcent or for flavoring purposes. The Emulsion is used in catarrhal affections and as a vehicle for cough-mixtures. The poisonous character of the Bitter Almond and its essential oil should be kept in mind when prescribing them. Of 39 cases of poisoning by bitter almond preparations, the oil caused 28, the spirit 4, the almonds themselves 4, the water 2, and the emulsion 1.

The Expressed Oil of Almond is a good demulcent, also laxative in doses of ʒj to ʒij . It is used externally for excoriations, chapped hands and inflammatory affections of the skin, and may be applied in the external auditory canal for earache. *Almond Bread* is made from the cake remaining after the fixed oil is expressed from the sweet almond. The cake is ground into a meal or flour, and is an excellent substitute for wheat bread in the diet of diabetics, as it contains no starch.

AMYLIS NITRIS, Amyl Nitrite,—is a liquid containing about 80 per cent. of *Amyl Nitrite*, $C_5H_{11}NO_2$, together with variable quantities of undetermined compounds. It occurs as a clear, yellowish liquid, of ethereal and fruity odor, aromatic taste, and neutral or slightly acid reaction, extremely volatile,

insoluble in water but freely soluble in alcohol, ether, chloroform and benzin. It is produced by the action of nitric acid upon amylic alcohol, and when impure may contain nitric or hydrochloric acid. Dose,—internally $\mathfrak{m}\frac{1}{4}$ -j dissolved in alcohol,—by inhalation $\mathfrak{m}\text{ij}$ -v; but larger doses are probably safe, [av. $\mathfrak{m}\text{ij}$.]

Analogous Compounds.

Spiritus Glycerylis Nitratis, *Spirit of Glycerl Trinitrate*, *Spirit of Nitroglycerin* (*Spirit of Glonoin*),—is an alcoholic solution, containing 1 per cent. by weight of Glyceryl Trinitrate. Dose, $\mathfrak{m}\text{ss}$ -ij, [av. $\mathfrak{m}\text{j}$.]

Tabellæ Trinitrini, (B. P.), *Tablets of Nitroglycerin*,—are tablets of chocolate, each containing gr. $\frac{1}{100}$ of pure Nitroglycerin. Dose, j-ij.

Sodii Nitris, *Sodium Nitrite*, NaNO_2 , and **Potassii Nitris**, *Potassium Nitrite* (the latter unofficial),—are used as substitutes for Amyl Nitrite and Nitroglycerin. The former is a white, crystalline powder, deliquescent in the air, in which it gradually oxidizes to sodium nitrate; has a mild, saline taste, but no odor; very soluble in water, slightly in alcohol. Dose, gr. ss-ij, [av. gr. j.] according to individual susceptibility.

Æthylis Nitris, *Ethyl Nitrite*, $\text{C}_2\text{H}_5\text{NO}_2$,—constitutes about 4 per cent. of Spirit of Nitrous Ether (See page 88).

Tetranitrin, *Erythrol Tetranitrate* (Unofficial),—occurs in large scales, which are soluble in alcohol, insoluble in water, and explode on percussion. Dose, gr. ss-j.

Incompatibles.

Incompatible with *Amyl Nitrite* are Alcohol, Antipyrine, Potassa; with the *Nitrites* are Acetanilide, Antipyrine, Chlorates, Chromates, Gold Chloride, Hypophosphites, Iodates, Iodides, Mercurous and Mercuric salts, Permanganates, Sulphites, Tannic Acid, and vegetable astringent preparations; with *Nitroglycerin* are Alkalies, Carbonates, Hydrochloric Acid, Hydriodic Acid. Physiologically incompatible are Chloroform, Cocaine, Morphine, Strychnine, Ergot, Digitalis, Atropine, Picrotoxin, and all other agents which increase the functional activity of the spinal cord and sympathetic, though by reason of their slower rate of diffusion this antagonism may not be always available.

PHYSIOLOGICAL ACTION.

Amyl Nitrite and the other Nitrites agree closely in their general action, producing great vascular dilatation by paralyzing either the sympathetic system, the vaso-motor centre or the muscular coat of the arterioles,—which, is yet undecided. They cause tumultuous action of the heart by relaxing its inhibition; lowered respiration, from paralysis of the respiratory muscles and impairment of the oxygenizing function of the blood; diminution of sensation, motility, and reflexes; a sense of heat, but lowered body-temperature; also throbbing pain in the head, beating carotids, quickened pulse, flushed face and vertigo. The effect of an ordinary inhalation of Amyl Nitrite on man is very transitory, excepting the headache, which may last several hours. Of all the nitrites it is the most prompt but least enduring in action, and is best administered by inhalation. It causes sugar to appear in the urine and increases the quantity of urine voided. Mixed with blood it forms methemoglobin, which is not so readily deoxidized as hemoglobin, and under its influence the blood in the body becomes of a dark chocolate color both in the arteries and in the veins.

Nitroglycerin acts similarly, but less promptly, and its action is more enduring. Its headache is of intensely frontal character, and persists for hours after the other effects have passed off. It is more suitable than amylic nitrite

for internal administration. Sodium Nitrite is also slower in action than amylic nitrite, and does not cause so much throbbing headache as nitroglycerin. It may be given in solution with water. The action of all these agents is probably due to the nitrous acid contained in them. Tetranitrin is a vasodilator, acting as such by reason of its nitrate constituents.

THERAPEUTICS.

The inhalation of Amyl Nitrite is a useful palliative in angina pectoris, epilepsy, tetanus, and many of the respiratory neuroses, as spasmodic asthma, whooping-cough, laryngismus stridulus, etc. It is indicated in migraine of the pale-face form, and in the cold stage of intermittents and pernicious remittents, to prevent internal congestion,—also in convulsions of various kinds, including the puerperal form. It has been sometimes used in threatened death from chloroform anesthesia, and in poisoning by strychnine.

Nitroglycerin is employed with benefit in neuralgic dysmenorrhea and seasickness; also in chronic interstitial nephritis, by redistributing to the kidneys their blood-supply cut off by degeneration of the renal ganglionic centres. It promptly relieves hiccough, also migraine of spasmodic character, and has afforded immediate relief in neuralgia of the fifth and in sciatica. Its administration in angina pectoris, though not producing such prompt results as that of Amyl Nitrite, gives excellent and much more lasting effects. It is useful in the weak heart of the aged, or that from fatty degeneration, or when, as in Bright's disease, the arterial tension is above normal; also in irritable and overacting heart, which it relieves by rapidly dilating the arterioles and thereby lowering arterial tension. It is employed with benefit in epilepsy, in alternation with bromide treatment.

Sodium Nitrite has been successfully used in angina pectoris, in hemicrania, and in asthma of purely bronchial and neurotic origin. It has proved decidedly beneficial in the abnormally high arterial tension of chronic desquamative nephritis, especially when complicated with a weakened and dilated heart. Disagreeable symptoms caused by it may be prevented by prescribing it with spirit of chloroform or ammonia water and small doses of morphine.

Tetranitrin is highly recommended in asthma, angina pectoris, arteriosclerosis, interstitial nephritis, gout, and lead-poisoning, for the purpose of reducing high arterial tension. Brunton prefers a mixture of Potassium Nitrite gr. ss, with Potassium Nitrate, gr. xvij, and Potassium Bicarbonate gr. xxv, once daily in a glassful of water. It acts less promptly and less intensely than Tetranitrin, but its effects are more enduring.

AMYLUM, **Starch**, $\text{C}_6\text{H}_{10}\text{O}_5$,—is the fecula of the seed of *Zea Mays*, the Maize or Indian Corn, a plant of the nat. ord. Gramineæ. Though corn-starch is the only official kind, any other might be properly used, as the starch occurring in wheat, barley, oats, arrow-root, sago and tapioca, all of which were official in the U. S. P. of 1870. The last three are almost entirely composed of

starch; wheat contains about 70 per cent., and rice nearly 90 per cent. The B. P. recognizes the starches from Maize (*Zea Mays*), Wheat (*Triticum sativum*) and Rice (*Oryza sativa*); the Ph. Ger. recognizes that from wheat alone.

Starch occurs in distinct grains (granules) which form irregular, angular masses, white, odorless and tasteless, of neutral reaction, easily pulverized and insoluble in alcohol, in ether and in cold water. In boiling water they swell, burst and form a mucilage which gelatinizes on cooling and gives a deep blue color on the addition of Iodine, the color disappearing on warming and returning on cooling. Under the microscope the granules are seen to be lenticular in form and differing somewhat in size and shape according to the plant from which they are derived. Those from wheat are large and small mixed and show concentrated striæ formed around a nearly central spot (hilum). Those from maize are smaller, have a hilum but no striæ. Those from rice are very minute, polygonal in shape, with a small hilum but no striæ.

Starch is converted into grape-sugar (glucose) by the action of diastase, ptyalin and pancreatin, also by boiling it with a dilute mineral acid, Dextrin being formed as an intermediate product. [See the article entitled PEPsinum.] By hot, concentrated nitric acid it is converted into oxalic acid, but cold, fuming nitric acid dissolves it, forming an explosive compound. By the action of ferments it is finally converted into alcohol and carbon dioxide. $C_6H_{10}O_5 = 2C_2H_5OH + 2CO_2$.

Glyceritum Amyli, *Glycerite of Starch*,—has of Starch 10 parts, Water 10, Glycerin 80, triturated and heated to a jelly. A vehicle for external applications.

Maltum, *Malt*,—is the seed of *Hordeum distichum*, Barley (nat. ord. Gramineæ), caused to enter the incipient stage of germination by artificial means and dried. The germination is allowed to go far enough to develop the maximum amount of *Diastase*, the peculiar ferment by which the starch of the grain is converted into glucose. Malt is the source of beer, ale and whisky, and is composed of the germinated, dead grains with their acrospires and radicles. It should be fresh, not darker in color than a pale amber, and of agreeable odor and sweet taste.

Extractum Malti, *Extract of Malt*,—is a liquid of the consistence of thick honey, containing all the soluble principles of malt in permanent form. It consists chiefly of diastase and glucose. Dose, ʒj-ʒj, [av. ʒiv.]

Unofficial Derivatives and Analogues.

Dextrin,—is produced by the action of dilute acids on starch, and is an intermediate product in the conversion of starch into glucose. It is a transparent, brittle solid, soluble in water and in dilute alcohol, is not fermentable, and is not colored by Iodine.

Cetraria, *Iceland Moss*,—is the lichen *Cetraria islandica* found in northern latitudes. It contains *Lichenin* or lichen starch, which forms as a jelly when the plant is boiled in water; also *Cetraric Acid*.

Decoction Cetrariæ, *Decoction of Cetraria*,—5 per cent. strength. Dose, ʒij-iv.

Horlick's Food,—is, like Mellin's and many other foods for children, a granulated extract of malt. *Hoff's Malt Extract* is another such preparation in fluid form, containing alcohol, and corresponding to a concentrated beer.

Cellulose, $C_6H_{10}O_5$,—forms the basis of all vegetable fibre, and is isomeric with starch. It exists almost pure in cotton and in Swedish filter paper. *Pyroxylin*, Gun-cotton, is dinitro-cellulose.

Glycogen, *Animal Starch*,—closely resembles starch in its properties, being converted into glucose by the same agents which so act on starch. It exists in the liver of all animals.

Incompatibles.

Incompatible with *Starch* in solution are: Acids, Alkalies, Alcohol, Diastase, Iodine, Lead Subacetate, Lime-water, Tannic Acid.

PHYSIOLOGICAL ACTION.

Starch and its derivative grape-sugar are the chief members of the non-nitrogenous group of alimentary principles designated *hydrates of carbon* or *carbo-hydrates*, so called because in them the constituent elements H and O exist in multiples of the same proportions as in water. Starch is met with only in the vegetable kingdom, occurring in the form of granules in many seeds, roots, stems, and in some fruits. It is formed by plants from inorganic material under the influence of light, and is stored up in their seeds as food for the young seedlings. In order to be absorbed by the animal organism starch must undergo digestion by the action of the secretions of the pancreas and intestinal glands, which convert it first into soluble dextrine and then into grape-sugar, in which form it passes into the blood.

Food is required by the animal organism for two purposes, (1) to generate heat and other forms of force, (2) to repair the waste of the tissues. Both are essential to continued life, but the first is even more important than the second, for though the body may live a long time while wasting, it dies rapidly when the source of heat is removed or greatly lessened. The doctrine taught by Liebig—that the nitrogenous principles (albuminoids) are exclusively concerned in tissue repair, and the non-nitrogenous (starches, sugars and fats) in heat-production,—though not strictly accurate, still holds good as describing the leading office of each group.

The carbo-hydrates (starches, sugars, etc.) represent in vegetable food the same office which the hydrocarbons (fats) represent in animal food, namely—the maintenance of heat-production and other forms of force. The glycogen in the liver and in the muscles is a store of insoluble fuel for emergencies, and is given up in the form of soluble grape-sugar as required. Any surplusage of carbo-hydrates goes to form fat, the adipose tissue of the body, another reserve of body-fuel. Being devoid of nitrogen the carbo-hydrates cannot enter into the actual structure of the tissues, the instruments of energy, but their oxidation supplies the motive power, they being the fuel of the body. When they are entirely burnt up and no more supplied the organism perishes of exhaustion. The adult human body of average size and weight requires according to its activity from 12 to 18 ounces of water-free carbo-hydrate material daily in some form of food.

Starch and sugar occur in vegetable foods in from three to five times greater amount than proteid material. The latter exists in greater proportion in the leguminous vegetables (peas, beans, lentils) than in meat, but in other vegetables the proteid is much less. Cereal grains are by far the most important vegetable foods, and among them *Wheat* is the one most generally used. Its constituents correspond with the requirements of the human organism more closely than those of any other grain; in fact both life and health can be maintained on wheat alone for a very long period. As ordinarily used, however, it is deprived of much of its nutritive value, white bread being made from wheaten flour from