Tinctura Ailanthus. *Tincture of Ailanthus* (Unofficial),—Dose, ♏x–ʒij.

Ailanthus is a decided nauseant, and a drastic purgative, causing also vertigo, weakness, cold sweats, dull headache, pains in the back, numbness and tingling in the limbs. It paralyzes the cerebrum and spinal cord of animals, impairment of motility beginning in their hind extremities. The cardiac action, at first increased, soon slows, the pulse becoming small and weak, and the respiration depressed, death occurring from paralysis of respiration. It is a good teniafuge.

Ailanthus is used against tapeworm, a decoction of the fresh bark (ʒj to ℥iv), or the oleo-resin in drachm doses, being very efficient. It has been well employed in malignant scarlatina, with dark and partial eruption, insensibility, delirium and other cerebral symptoms.

ALBUMIN AND ALBUMINOIDS.—Albumin (albumen) is the typical member of a group of organic proximate principles which have the same general chemical composition but very different physical properties, and are called albuminoids, proteids, or nitrogenous principles. They all contain N, together with C, O, H, and Sulphur. The chief members of the group are *Albumin*, *Fibrin* and *Casein*, often termed the histogenetic bodies, because they are essential to the building up of the animal organism. They are each resolved by caustic potassa and heat into *Protein*, which may then be thrown down by acetic acid. The albuminoids are originally formed in the vegetable kingdom, occurring in all parts of plants but especially in their seeds. When eaten by animals they undergo digestion into soluble compounds (peptones), which pass into the blood and are retransformed into serum-albumin before being built into the tissues. *Albumin* is the most important member of the group, as it forms the principal portion of all animal tissues, varying from 1 part per 1000 in the cerebro-spinal fluid to 383 per 1000 in the crystalline lens. The composition of its molecule is very complex and varies widely within certain limits in different organs and conditions, but $C_{72}O_{22}H_{112}N_{18}S$ is given as its approximate formula.

Albumin is amorphous, soluble in water, coagulated by heat, and occurs in three native forms, viz.—(1) *Serum-albumin*, which is yellow, elastic, transparent, soluble in water but precipitated by alcohol and by strong acids, and coagulated by heat at 104° F. (2) *Egg-albumin*, differs from the first by precipitating when shaken with ether, and in other respects. It is soluble in water and coagulated by heat. (3) *Plant-albumin*, occurs in nearly all vegetable juices and especially in the seeds of plants. It is coagulated by heat and strongly resembles egg-albumin.

Incompatible with Albumin are: Acetic Acid (with heat), Alcohol, Alum, Ammonium Sulphate, Camphor, Coniine, Collodion, Copper Sulphate, Ether, Ferric Chloride, Heat, Hydrogen Peroxide, Lactic Acid, Mercuric Chloride, Metallic Salts, Metaphosphoric Acid, Mineral Acids, Phenol, Picric Acid, Tannic Acid, Thymol, Volatile Oils.

Gelatinum, *Gelatin*—is a derivative of the proteids *ossein* and *collagen*, and is obtained from bones, tendons, cartilage, skin, and other fibrous animal structures, by prolonged boiling in water. It swells up in cold water, is soluble in boiling water, and its aqueous solution solidifies (gelatinizes) on cooling. Its composition is similar to that of albumin but it does not yield protein. Gelatin is the basis of soup, beef-tea, and other preparations made from meat with boiling water.

Gelatinum Glycerinatum, *Glycerinated Gelatin*,—is composed of equal parts of Gelatin and Glycerin.

Ichthyocolla, *Isinglass*, (Unofficial),—the swimming-bladder of several species of sturgeon, occurs in horny, semi-transparent sheets, iridescent, soluble in 24 of boiling water, and forms on cooling a transparent jelly. It is the purest form of Gelatin known.

Emplastrum Ichthyocollæ, *Isinglass Plaster, Court Plaster*, (Unofficial),—consists of Isinglass 10, Glycerin 1, Alcohol 40, Water and Tincture of Benzoin, spread on taffeta and allowed to dry.

Incompatible with Gelatin are: Alcohol, Alumnol, Chlorine water, Ferric salts, Formaldehyde, Mercuric Chloride, Metaphosphoric Acid, Picric Acid, Platinum Chloride, Potassium Ferrocyanide, Tannic Acid, Tartar Emetic.

Chondrus, (*Irish Moss, Carragheen*)—is a sea-weed, *Chondrus crispus*, dried and bleached. It contains mucilage 55½, water 19, mineral matter 14, albuminoids 9½, and cellulose 2 per cent. A jelly may be prepared by boiling 2 oz. in a quart of water for an hour, then straining and adding 3 oz. of sugar while hot. The dose is indefinite, [av. ʒiv.]

Irish moss is horny, translucent, pale yellowish-white, of sea-weed odor, and mucilaginous saline taste. It swells in cold water but does not dissolve. On boiling with 30 parts of water for 10 minutes it yields a solution which gelatinizes on cooling. It is a demulcent and nutrient of some slight value in bronchial and catarrhal affections; but as it contains no starch it is not as valuable as Iceland Moss (Cetraria) as a food for the sick. [See under the title AMYLUM.] Another member of the Algæ is the *Fucus Vesiculosus*, which is described under its own title.

Unofficial Analogues of Albumin.

Fibrin is the proteid which causes the clotting of plasma, lymph, and the blood when shed. It does not exist in the living, circulating blood, but is formed by the mutual action of fibrinogen, fibrino-plastin and fibrin-ferment, which arise as products of the breaking up of white blood-corpuscles. In normal blood it occurs to the extent of 0.2 per cent., is increased in inflammation and diminished in hemophiles.

Fibrin has the same general composition as albumin but contains more O and S. Its special characteristic is its power of spontaneous coagulation. It is insoluble in water and in ether, and is changed into syntonin (acid-albumin) by dilute hydrochloric acid.

Casein is the proteid contained in milk. Its composition is the same as that of albumin, but it differs therefrom in not being coagulated by heat and by being thrown down by organic acids which do not precipitate albumin. It is, by some authorities, supposed to be a combination of albumin and potash.

Gluten is a nitrogenous constituent of the seeds of wheat and other cereals, the former containing it in the proportion of from 8 to 15 per cent. It is made up of a number of albuminous principles which differ but slightly from each other, the chief ones being gluten-fibrin, gluten-casein, gliadin and mucedin.

Unofficial Albuminous Preparations.

Albumen Ovi, *Egg-albumen*,—the liquid white of the egg of the domestic hen, was official in the B. P. It contains 12 per cent. of albumin, with 3 of mucus and salts, and 85 of water.

Many writers use the spelling albumen for the name of the proximate principle albumin. Others distinguish between the white of egg (albumen) and its chief constituent (albumin).

Vitellus, *Yolk of Egg*,—is the yolk (or yelk) of the hen's egg, and occurs as a viscid, reddish-yellow, opaque liquid, of bland taste and alkaline reaction,

coagulated by heat and by alcohol. It may be regarded as a dense emulsion of oil suspended in water by means of albumin. It contains, in 100 parts, vitellin 16 to 18, cholesterin 0.4, lecithin 7, fat 21 to 31, also salts, etc., and from 48 to 55 of water. *Vitellin* is described as a mixture of albumin and casein (Fowne), or as a proteid related to casein mixed with about one-fourth of albumin (Nat. Disp.).

Glyceritum Vitelli, *Glycerite of Yolk of Egg, Glyconin* (Unofficial),—consists of Vitellus 45, Glycerin 55, rubbed together until thoroughly mixed.

Beef, among meats, has the highest nutritive value. The average of many analyses shows its composition to be as follows: In 100 parts, total albuminoids 20¾, fat 2¾, extractives 1½, salts 1½, water 73½, also a minute quantity of creatin.

Extracts of Meat prepared by boiling down the flesh of animals, as Liebig's Extract, are stimulants, not nutrients, as they contain practically none of the nutritious (albuminous) constituents of meat but only the salts and flavoring matter (E. Smith).

Meat-juices, prepared by a cold process of extraction and partial digestion, are claimed to retain the fibrin, gelatin and coagulable albumin. Many such are on the market, under the trade-names Bovinine, Bovril, etc.

Chittenden, by analyses of various meat extracts, has shown that they possess very little nutritive value as compared with fresh lean beef. In most of them the fat is less than 1 per cent., and the total amount of available proteid is far below 1 per cent. Some are even less nutritious than ordinary beef-tea.

Beef Peptonoids is the trade-name of a powdered preparation which is claimed to consist of the nutritive constituents of beef with milk and wheat gluten, partially peptonized and containing 95 per cent. of nutritious material. *Liquid Peptonoids* is intended to represent the same combination in liquid form, all the constituents being entirely digested and ready for assimilation. *Panopepton* is a similar preparation.

Sanose is a food preparation which is claimed to contain 100 per cent. of albuminous material, of which 80 is casein and 20 is albumose.

Somatose is a dry powder, which is said to contain nearly 90 per cent. of albumoses, 80 grains corresponding in nutrient value to about 1½ ounces of fresh beef.

Milk contains all the elements necessary for the growth and nutrition of animal tissues in the most digestible form. Its chief albuminoid constituent is *Casein*, but it also contains fat, sugar, salts and water, which vary in proportion according to the animal and its food. *Cow's Milk*, of sp. gr. 1.030, averages, in 100 parts, of albuminoids 4, fat 4, sugar 5, salts ½, and water 86½. *Goat's Milk* is very near to that of the cow in composition, but *Asses' Milk* has much less of casein and salts, very little fat, and more sugar and water. *Woman's Milk* contains about the same proportion of casein as asses' milk, more fat than cow's milk, more sugar than the others, and less salts than any except asses' milk.

Buttermilk contains, in 100 parts, casein 4½, sugar 2½, fat ¼, salts ½, lactic acid ¼, and water 92.

Condensed Milk is prepared by adding refined sugar and an alkali to fresh cow's milk, then evaporating the mixture in vacuum pans until it has a thick, semifluid consistency. *Desiccated Milk* occurs in the form of a dry powder, and is highly esteemed in the armies of Europe.

Peptonized Milk is prepared by adding to fresh cow's milk one-third part of water, in which, after boiling and cooling, there is dissolved a pinch of Sodium Bicarbonate, and ʒj or ʒij of Liquor Pancreaticus is added to each pint. The mixture is then allowed to stand in a warm place for an hour, when it is ready for use. *Peptogenic Milk Powder*, containing the requisite proportions of the alkali and the pancreatic ferment, may be obtained in the drugstores and will prove satisfactory.

Cheese is obtained from the milk of animals, especially the cow, by coagulating the casein by means of rennet or an acid, and after separation submitting it to pressure. It contains, in 100 parts, albuminoids (casein, etc.) 28 to 45, fat 6 to 30, salts 4 to 5, and water 36 to 44; the proportions of each varying according to the quality of the milk used.

Kumyss, *Koomiss*,—is an effervescing fermented liquor originally prepared by the Tartars from mare's milk, but now imitated with cow's milk by adding sugar of milk, fermenting in open tanks, skimming off the casein and butter, then bottling during active fermentation. Its successful preparation depends on its undergoing slow fermentation for 5 to 10 days in a cold room, at 40° F. If the temperature be higher than 50° the fermentation will be of the acetous variety, and will result in sour milk with heavy curd, feeble effervescence and repulsive taste.

Wolff's Formula, for its preparation in small quantity, is as follows:—Dissolve ℥ss (a tablespoonful) of grape sugar in ℥iv of water. Dissolve gr. xx (a teaspoonful) of Fleischmann's compressed yeast or well washed and pressed out brewer's yeast in ℥ij of cow's milk. Mix the two solutions in a quart champagne bottle, and fill it within two inches of the top with good cow's milk. Cork well, secure the cork with wire, keep it in a cellar or ice chest, maintaining a temperature of 50° F. or less, and agitate twice daily. In three or four days it is ready for use, but should not be kept longer than four or five days. Draw it with a champagne tap.

Kumysgen is a powder containing the elements necessary for the preparation of Kumyss, for which a special bottle and tap are also furnished by the manufacturers. It is a very convenient manner of making this preparation, and the product tastes just as well as that made in the ordinary way. Whether it acts as well dietetically remains to be ascertained.

Kéfir is the name of a fermented drink prepared from the milk of a cow or mare by the addition of a mushroom-like ferment found near the snow-line in the Caucasian Mountains. It is used by the natives of the Asiatic plains as a remedy for struma, anemia, lung and stomach diseases. Kéfir is richer in albuminoids than Kumyss, is less alcoholic and less acid.

The following table shows the average composition of Milk, Kumyss and Kéfir:—

	Cow's milk.	Kumyss.	Kéfir.
Albuminoids (casein, etc.),	4	1	4
Butter,	4	2	2
Sugar of milk,	5	2½	2
Lactic Acid,	—	1	1
Alcohol,	—	1½	1
Water and salts,	87	92	90

Physiological Action.

The normal adult human organism, doing ordinary work, loses daily by its metabolism 4½ oz. of albuminous or proteid matter, besides 14½ oz. of carbohydrates, 3 oz. of fat, 1 oz. of salts and 2½ quarts of water, these quantities being largely increased during the performance of laborious work. A corresponding amount of these substances must be daily ingested in order to supply material for the repair of the tissues and for the production of heat and other forms of force. The albuminoids are most important alimentary principles, their chief

office being the repair of the tissues, they being the only foods containing nitrogen, an essential element in the formation of every structure which manifests any form of energy. They can replace each other in supplying nutrition to the tissues, their composition is identical with that of the same substances in the blood and other tissues, and they consist wholly of nutritive material in concentrated and digestible form. They undergo digestion in the stomach by the acid gastric juice, also in the intestine by the pancreatic juice, the respective ferments of which convert them into soluble *peptones*, the form in which they enter the blood. The digestive changes through which they pass are—(1) *proteid*, the albuminoid, as ingested; (2) *acid-albumin* or *syntonin* in the stomach, *alkali-albumin* in the intestine; (3) *propeptone* or hemialbumose; and (4) *peptone*. The chief products arising from their oxidation within the body are CO_2, H_2O and urea, the latter containing nearly all their nitrogen. They are mainly obtained by the ingestion of animal food, as flesh, milk, eggs, etc., but they are also contained in vegetable products, especially the seeds of certain plants, those of leguminous plants (peas, beans, lentils,) containing more proteid material than any kind of meat.

The increased ingestion of albuminoid food, by persons who have previously used it sparingly, improves the quality of the blood by increasing the number of the red corpuscles, and causes a rise in the sp. gr. of the urine and a greater excretion of urea and uric acid. Individuals who consume albuminoids in excess of their requirements are lean but muscular, irritable in temper and prone to excessive sexual appetite. The exclusive use of animal food develops a superabundance of muscular force, so that a nation of meat eaters is usually one of hunters possessing a warlike and savage disposition.

Disease may be produced by food of any kind through excess or deficiency in quantity, special characteristics of quality, or imperfect digestibility. Albuminoid food in excess produces congestion and enlargement of the liver and probably other organs. If exercise is not taken at the same time, the albuminoids are imperfectly oxidized, and deleterious products are retained in the system, or the eliminating organs are irritated by the passage through them of material which they are not adapted to remove. A great excess of albuminoids, without other food, produces in a few days marked febrile symptoms, malaise and diarrhea; and if persevered in albumin appears in the urine. Gout probably arises in the same way, partly from the use of alcohol, which delays metamorphosis, partly from using too much albuminoid food, and partly from want of exercise. A diet which is deficient in albuminoids causes a lessening of bodily activity and the gradual oncome of an adynamic condition which predisposes the subject to infectious diseases and modifies the course of many affections, typhoid fever running its course in such cases with less elevation of temperature than is usual and with less excretion of urea. Complete deprivation of albuminoids produces loss of muscular strength, mental debility and feverish and dyspeptic symptoms, followed by anemia and prostration.

The advantages of a meat diet are:—its large amount of nitrogenous material, the presence in it of iron and important salts, and also much fat, the latter performing to great extent the office of the carbo-hydrates in supplying fuel to the body. It is easily cooked, is very digestible whether raw or cooked, and is more readily assimilated than any vegetable food. Its great disadvantage is that it contains neither starch nor sugar, hence it cannot supply all the carbon needed by the body unless so large a quantity of it be taken ($4\frac{1}{2}$ lbs. of beef daily) as would soon impair the digestive organs.

Beef contains alimentary principles which are most important for the nutrition of the body. When of good quality, neither too old nor too young, having the fat and muscle suitably proportioned and unaltered by disease, and properly cooked, it is the best of the animal foods.

Milk is an excellent albuminous food, but its proteid, casein, is coagulated by the acids in the stomach, even by the acid of the gastric juice, and is tolerated with difficulty by many persons, especially in the large quantity which must be taken to itself maintain the nutrition of the organism. As an exclusive diet, for anyone above the infant age, it soon palls upon the appetite, and causes a sense of emptiness at the epigastrium, a coated tongue and an unpleasant taste in the mouth. The subject of an exclusive milk diet is usually constipated, the stools being hard and of ochre-yellow color, but if diarrhea is produced it shows that the milk is not digested. The urine is greatly increased in quantity and the body-weight is gradually diminished to a certain point, where it remains. The pulse is quickened at first and arterial tension is lowered, but the pulse-rate falls as soon as the body ceases to lose weight. A sense of weakness is usually experienced, but many persons are greatly debilitated and some complain of vertigo.

Kumyss has an acidulous and peculiar taste. In large quantity it can take the place of other food for a time, each quart equalling 4 oz. of solids. It is a powerful diuretic, especially in cold weather, and in warm weather it causes free perspiration. It is stimulant and tonic, increases the nutrition of the body and produces considerable somnolence. The stomach tolerates it well, even when it rejects all other food. It is easily assimilated and very nutritious.

Eggs, like milk, constitute an almost complete food, as they contain all the elements required by the blood. According to Pavy an egg weighing 2 oz. has 110 grains of albuminous material, 82 grains of fat and 11 grains of saline matter. The white, consisting chiefly of albumin dissolved in water, contains the larger proportion of nitrogenous material, and the yolk contains the greater quantity of fat.

Gelatin is undoubtedly a food, as it increases vital action in the same direction, if not in the same degree, as albumin (E. Smith). Like albumin, however, it must not be relied on alone, but should be mixed with a proper quantity of other foods. It is an efficient styptic and hemostatic.

THERAPEUTICS.

The chief affections in which nitrogenous food is required are diabetes mellitus, anemia, obesity, phthisis and other wasting diseases, and long-continued fevers. In fever there is an excessive consumption of the proteids of the body and the eliminative processes are very active, the discharge of urea being often enormous. All this increases the demand of the organism for albuminoid food, but the digestive power of the stomach is, at the same time, greatly reduced, the secretion of gastric juice being diminished. In carcinoma of the stomach and some other affections hydrochloric acid is absent from the gastric juice, and in many diseases gastric digestion is feeble or imperfectly performed. Hence it becomes important to furnish albuminoid foods in such form that they may be assimilated with the least possible expenditure of digestive energy. Peptones can be prepared outside the body and administered as food, but when artificially made they have little nutritive value, are unable to supply the need of the organism and are exceedingly disagreeable to the patient. Albumoses, the intermediate products, are readily absorbed, and being free from taste and not causing digestive troubles they are suitable foods for invalids and for subjects of weak digestion.

Raw beef, scraped to a pulp, freed from fat and seasoned with salt and pepper, is used in the treatment of chronic diarrheas, also in debilitated conditions from any cause wherein it becomes necessary to administer an easily digested nitrogenous aliment. Its chief objection is the liability of tape-worm following the use of uncooked meat. Beef-tea, when made with boiling water, contains less than one per cent. of gelatin, the only nutritive principle yielded by meat to a hot aqueous solution. The other extractives obtained by boiling (creatin and creatinin) are simply effete muscular material on the way to the formation of urea. Hence beef-tea, bouillon and similar preparations of meat contain little except stimulating salts and are almost wholly devoid of nutritive properties. Cold drawn infusions of meat have considerable food value, as they contain much albuminous material.

Blood is rich in nutritive elements and has been much employed as a food in wasting diseases, especially phthisis, the subjects of which often resort to slaughter-houses to drink the fresh blood of animals. The result is that the nutrition is improved, often to a remarkable extent, but the practice is open to the danger of the patient swallowing parasites.

Albumen Ovi (white of egg), besides being a valuable food, is used in medicine as an antidote in poisoning by corrosives and irritants, especially corrosive sublimate, copper sulphate, silver nitrate and the lead salts. Shaken with alum it coagulates and forms the so-called *Alum Curd*, which is highly esteemed as an astringent and cooling application in acute conjunctivitis, also for burns and erysipelas. White of egg, diluted with water, sweetened and flavored, forms an agreeable and nutritious drink in gastritis. It is spread on silk or

gold-beater's skin to make an adhesive plaster, which only requires moistening before application.

Yolk of Egg is more nutritious and digestible than the white, and is highly esteemed in dyspepsia. The yolk of a hard-boiled egg crumbles easily and is readily acted on by the gastric juice. It is a useful article of diet in exhausted conditions of the system, but its chief use in medicine is for emulsionizing oils and camphors. The Glycerite has the consistence of honey and forms an opaque emulsion with water. It is a good vehicle for cod-liver oil, and an excellent protective application for burns, erysipelas, fissure of the nipples, and many cutaneous disorders. It is used as a cosmetic, and may be employed as an aliment.

Gelatin is somewhat nutritious, but is usually employed as the basis of flavored jellies, which are esteemed rather as delicacies than as foods. It is highly praised as a styptic application in epistaxis and other hemorrhages. A normal saline solution containing 2 per cent. of gelatin is successfully used hypodermically or by rectal injection in hemoptysis, hematuria, and purpura hemorrhagica; while daily doses of ℥vj of a 10 per cent. solution internally have given satisfactory results in hemophilia. It has been efficiently used subcutaneously by Lancereaux and Osler in the treatment of aneurisms, 250 Cc. of a 1 per cent. solution in normal saline solution being injected every other day slowly into the thigh or abdominal wall. Isinglass has no advantage over any other form of gelatin. It is used for clarifying liquids and in solution as a test for tannic acid. The plaster, commonly called *court-plaster*, is a useful protective agent for cuts, sores, etc.

Milk is the only proper food for infants up to the age of eight months, their digestive organs being unable to manage the farinaceous aliments. For those who are deprived of their natural milk the best substitute is cow's milk diluted with about one-third part of water and sweetened with sugar, which should be given at a temperature of 100° F. and at intervals of about three hours. The addition of lime-water instead of ordinary water will make it more digestible. As an exclusive diet for older children and adults, milk is employed with great benefit in many gastric and intestinal disorders; also in albuminuria, diabetes, ascites, anasarca, eczema, gout, aneurism, and in irregular and tumultuous cardiac action due to valvular disease of the heart. Skimmed milk is better borne than unskimmed milk in many affections of the gastro-intestinal tract. Milk is the one food available in typhoid fever and may be wholly depended on as aliment in that disease. It is especially useful in scarlet fever, both as a nutrient and a diuretic. In intestinal indigestion, cholera morbus, cholera infantum, and the ileo-colitis of children, it is necessary to supply only such foods as are digested in the stomach, in order to give the intestine rest, hence milk, eggs, meat-juices and meat-broths are the suitable articles of diet in these affections.

Buttermilk contains lactic acid, which does not exist in ordinary milk, hence

it is more easily digested than the latter. It is particularly useful in gastric disorders, albuminuria and diabetes.

Kumyss is an invaluable article of diet in many wasting diseases, especially phthisis. It is of great benefit in dyspepsia, the diarrheas of children, convalescence from acute maladies, chronic affections of the kidneys, and other cachexiæ. In cases of feeble digestive power an ounce every hour is sufficient, but as its digestion and assimilation increase it may be given almost *ad libitum*, and when used with other food a half-pint may be taken after each meal. Each quart is estimated to contain four ounces of solid food, besides from 1 to 3 per cent. of alcohol.

ALCOHOL, Alcohol, *Ethyl Alcohol*, (*Ethyl Hydroxide*,) C_2H_5OH. The official alcohol is *Ethyl Alcohol*, which is represented in the pharmacopœia by the several preparations named Brandy, Whisky, and Wine, as also under the following three forms, viz.—

Alcohol Absolutum, *Absolute Alcohol*, C_2H_5OH,—is *Ethyl Alcohol*, containing not more than 1 per cent. by weight of water. A transparent, inflammable, colorless, mobile and volatile liquid, very hygroscopic, of characteristic, agreeable odor, and burning taste. Sp. gr. not higher than 0.797 at 59° F. Used in the manufacture of Chloroform.

Alcohol,—a liquid composed of about 92.3 per cent. by weight, or 94.9 per cent. by volume, of *Ethyl Alcohol*, and about 7.7 per cent., by weight, of water. It is a transparent, inflammable, colorless, mobile and volatile liquid, of agreeable odor and burning taste, sp. gr. 0.816 at 60° F. It is miscible with water in all proportions and without any trace of cloudiness; also miscible with ether or chloroform. Obtained by the distillation of fermented saccharine fluids. Used in preparing tinctures and spirits, also in some liniments, liquors and mixtures.

Alcohol Dilutum, *Diluted Alcohol*,—a liquid composed of about 41.5 per cent., by weight, or about 48.9 per cent., by volume, of *Absolute Alcohol*, and about 58.5 per cent. of water. It is prepared by mixing together equal volumes of alcohol and distilled water. Sp. gr. about 0.936 at 60° F.

An Alcohol is a volatile organic compound, which contains no N, has a great affinity for water, and reacts with acids, forming therewith H_2O and ethers. Alcohols are therefore analogous to the metallic hydroxides, as are Ethers to salts. *Methyl Alcohol* is obtained by the destructive distillation of wood, *Phenyl Alcohol* (Phenol) by that of coal-tar, and the fermented *Alcohols* (Ethyl, Amyl, etc.) from any vegetable substance containing sugar (or starch and the ferment Diastase, which converts the starch into sugar), by fermentation through the agency of the yeast-plant, which splits the sugar into Alcohol and CO_2. The product contains much water, and is then distilled in order to separate the alcohol, which passes over first, with a certain amount of water, the greater part of the latter being left behind. In this country Alcohol is so produced from grain (chiefly barley), and is termed *High Wine*, being disposed of by the distillers to certain wholesale liquor dealers, many of whom proceed to "rectify" it by mixing and blending it with water, essential oils of corn, rye, etc., ethers, burnt sugar, and occasionally small quantities of genuine whisky, brandy, etc. The product is then labeled "Old Tom Gin," "Old Crow Whisky," etc., according to the requirements of the retail dealers. True *Whisky* is distilled from the mash of fermented grain (corn, wheat, and rye, or a mixture of all three), and should be not less than four years old, to be official; *Brandy* from the fermented juice of fresh grapes, and should be not less than four years old. *Wines* are the product of the fermented juice of grapes, without distillation.

Alcohol may be produced synthetically by shaking Olefiant Gas, C_2H_4, with strong Sulphuric Acid, then diluting and distilling. Absolute Ethyl Alcohol, which is only used for chemical testing and for the manufacture of Chloroform, is obtained by shaking Alcohol with Potassium Carbonate, decanting and distilling with slaked lime.

Alcohol very slowly oxidized forms *Aldehyde*, C_2H_4O; if less slowly *Acetic Acid*, $C_2H_4O_2$; if quickly, as in burning, CO_2 and H_2O, which are in all cases the ultimate products of its continued oxidation.

An Aldehyde is obtained from an alcohol by removing therefrom two atoms of hydrogen, hence its name—*Al*cohol *dehyd*rogenatum. Aldehydes lie in chemical constitution between the alcohols and the acids, and have the power of reducing silver salts in darkness, which is shared also by living protoplasm. The principal aldehydes are—

Acetic Aldehyde, Aldehyde, Ethyl Aldehyde, Ethylidene Oxide, C_2H_4O,—a colorless, mobile liquid, antiseptic, locally irritant, anesthetic when inhaled, and a powerful depressant of the respiration, too dangerous for use.

Formic Aldehyde, Formaldehyde, CH_2O,—is a gaseous body prepared by subjecting methyl alcohol to oxidation. It is described under its own title.

Paraldehyde, $C_6H_{12}O_3$,—is a polymeric form of Aldehyde and a valuable hypnotic. It is described under its own title.

A Ketone bears the same relation to an aldehyde that an Ether does to an alcohol, being an aldehyde in which the hydrogen has been replaced by a radicle. The most important Ketones are—

Acetonum, Acetone, Dimethyl-ketone, C_3H_6O,—See page 65.

Hypnone, Phenyl-methyl-acetone, $C_6H_5(CO)(CH_3)$ (Unofficial),—a hypnotic agent of moderate energy, described under the title CHLORAL.

Principal Unofficial Alcohols.

Methyl Alcohol, *Methyl Hydroxide*, *Wood-spirit*, CH_3OH,—also called Carbinol, Methol, Hydroxymethane, is a non-fermented alcohol, obtained from the destructive distillation of wood. Ordinarily it contains many impurities, which give it a very disagreeable odor, and mixed with ethyl alcohol it renders the latter so disagreeable as to be unfit for drinking. Such a mixture is sold, under the name *Methylated Spirit*, for use as a solvent in the arts, as a combustible in lamps, etc.

Amyl Alcohol, *Amyl Hydroxide*, *Potato-spirit*, *Fusel Oil*, $C_5H_{11}OH$,—is a fermented alcohol obtained from the potato, also occurring in the crude spirit produced by the fermentation of saccharine solutions with yeast, and separated by excessive distillation, passing over after the ethyl alcohol. It is oxidized into Valerianic Acid. From it is prepared *Amyl Nitrite*, by distilling with nitric and sulphuric acids and copper wire. It is an oily liquid, of penetrating and oppressive odor and burning taste: sparingly soluble in water, but soluble in all proportions in alcohol, ether and essential oils.

Official Alcoholic Preparations.

Spiritus Frumenti, *Whisky*,—obtained from the distillation of the mash of fermented grain; rye, wheat, corn or barley, and at least four years old. It should have a specific gravity of not more than 0.945, nor less than 0.924 at 60° F., corresponding to an alcoholic strength of 37 to 47.5 per cent. by weight, or 44 to 55 per cent. by volume. It contains Ethers developed by the action of acetic and butyric acids on the alcohol, and traces of Amyl Alcohol (fusel-oil) even in the best. Dose, ʒij–℥ij.

Spiritus Vini Gallici, *Brandy*,—obtained from the distillation of the fermented juice of grapes, and at least four years old. Sp. gr. 0.925 to 0.941. Has an alcoholic strength of 39 to 47 per cent. by weight, and Œnanthic and other Ethers developed by age. Pale Brandy

is colored by the cask, the dark has caramel to color it. Is often prepared artificially by adding to high wines Acetic or Nitric Ether, Caramel, and Logwood or Catechu for astringency Dose, ʒij–℥ij.

Spiritus Rectificatus, *Rectified Spirit,* (official in the B. P.),—is Alcohol 90 per cent. obtained by the distillation of fermented saccharine fluids. Sp. gr. 0.834. Is often spoken of as "56 over proof," meaning that to reduce 100 volumes of it to the strength of proof spirit requires 56 volumes of water.

Vinum Album, *White Wine,*—should contain from 7 to 12 per cent. by weight of absolute alcohol, and is made by fermenting the unmodified juice of the grape, freed from seeds, stems and skins. California Riesling, Ohio Catawba, etc. Dose, ℥j–℥iv.

Vinum Rubrum, *Red Wine,*—should contain from 7 to 12 per cent. by weight of absolute alcohol, and is made by fermenting the juice of colored grapes in presence of their skins. Native Claret, Burgundy, etc. Dose, ℥j–℥iv.

Unofficial Alcoholic Preparations.

Rum,—is obtained by the distillation of fermented molasses, and has about 42 per cent. by weight of alcohol.

Gin,—has about the same alcoholic strength as rum, and approaches very nearly to the official Spiritus Juniperi Compositus. It is usually distilled from rye or barley, and flavored, in Holland, with juniper berries and hops; in England, often with oil of turpentine, various cheap aromatics, acetate of lead, sulphate of zinc, cayenne pepper, etc. Pure gin is slightly diuretic, from the oil of juniper contained in it.

Spiritus Odoratus, *Perfumed Spirit, Cologne-water,*—prepared by adding to 800 parts of Alcohol, Water 158, Acetic Ether 2, Oil of Bergamot 16, Oil of Lemon 8, Oil of Rosemary 8, Oil of Lavender Flowers 4, and Oil of Orange Flowers 4 parts. A perfume and ingredient of lotions.

Vinum Aromaticum, *Aromatic Wine,*—consists of Stronger White Wine 94 per cent., with Lavender, Origanum, Peppermint, Rosemary, Sage and Wormwood, of each 1 per cent. It was official in the U. S. P. 1880.

Vinum Portense, *Port Wine,*—is not a natural wine, spirit being added during the processs of manufacture, and the alcoholic strength raised to 30 or 40 per cent.

Vinum Xericum, *Sherry Wine,*—a dry, spirituous white wine, generally made to order by the dealers, and having from 20 to 35 per cent. of alcohol.

Sparkling Wines, as Champagne, Hock, Catawba,—are more or less sweet, and charged with carbonic acid, being bottled before fermentation is completed and the grape sugar all converted into alcohol. They contain 8 to 10 per cent. of absolute alcohol.

Sweet Wines, as Burgundy, Tokay, Muscatel, Malaga, Angelica, Madeira, etc.,—are of low alcoholic strength, 6 to 7 per cent. unless fortified.

Light Red Wines, as Claret, Red Rhine, Concord,—have 5 to 7 per cent. alcohol, tannic acid, grape coloring matter, etc.

Dry Acid Wines, as Rhine and Moselle, California Hock, Kelley Island Catawba,—in these fermentation is complete, and the alcoholic strength from 5 to 7 per cent.

Beer, Ale and Porter,—are fermented liquors, made from malted grain, with hops and other bitters added. Beer is made by slow fermentation, the yeast sinking; Ale by rapid fermentation, the yeast floating. Their alcoholic strength is 2 to 3 per cent. in beer, 4 to 6 per cent. in ale and porter,—and they also contain malt extract, carbonic acid, lactic acid, various aromatics, potassium and sodium salts, etc.

Kumyss,—is obtained by the fermentation of milk, that of the mare being used in Tartary, where it is employed as a food. It contains from 1 to 3 per cent. of alcohol, sugar, lactic acid, casein, fat, salts, carbonic acid and ethers. [See page 97.]

Incompatibles.

Incompatible with *Alcohol* are: Acacia, Acids (mineral), Albumin, Bromine, Chlorine, Chromic Trioxide, Mercuric Chloride, Potassium Permanganate, Salts (inorganic). Physiologically incompatible are Cocaine, Caffeine, Strychnine.

Physiological Action of Alcohol.

The Alcohols of the series to which the above-mentioned belong are all narcotic poisons when taken in sufficiently large doses; and have the general effect of paralyzing the nerve-centres in the inverse order of their development. The symptoms produced may be divided into stages,—(*a*) stimulant, (*b*) anodyne and anesthetic, (*c*) narcotic, (*d*) paralytic; therein closely following the action of the volatile anesthetics derived from them, though wanting in the profound degree of anesthesia which the latter produce. Ethyl Alcohol, the effects of which are detailed below, has the most typical action, and in poisoning by it these stages follow each other in regular order. In poisoning by Methyl Alcohol the excitement is greater, the subsequent stages succeed each other more rapidly, and if the dose be insufficient to cause death, the effects pass off more quickly, They all lower the body-temperature.

Methyl Alcohol is an active and dangerous poison, differing from ethyl alcohol in that it is only partly oxidized in the system, and forms within the organism the highly toxic formic acid. In many cases it has caused permanent blindness, even when taken in small quantities, and has frequently caused death. It is extensively used as a substitute for ethyl alcohol in the manufacture of extracts, spirits, bitters, and medicines, intended for human consumption, such as Jamaica ginger, essence of peppermint, and lemon extract.

The post-mortem appearances, after acute poisoning by the alcohols, show changes in the blood, stomach, intestines, liver, lungs and kidneys; some of which are probably due to the asphyxiation resulting from the paralysis of respiration. The Blood is dark and clotted in the heart. The Stomach and Intestines are congested and softened, especially so if the ingested alcohol has been undiluted. The Liver is very much congested, soft and friable. The Spleen is gorged with blood and softened. The Lungs are congested and show small extravasations of blood, and in the Kidneys also hemorrhages are found.

Physiological Action of Ethyl Alcohol.

Externally applied, Alcohol is refrigerant, astringent, anhidrotic, rubefacient, and slightly anesthetic. Pure alcohol is not germicidal to dry bacteria, but that of 60 to 70 per cent. alcohol strength is efficient against most forms, and is a good antiseptic and disinfectant. Applied to the skin it evaporates quickly, cooling the surface, temporarily contracting the superficial vessels, and checking perspiration. If its evaporation is prevented, as by covering with a watch-glass or a piece of rubber, or if the alcohol is rubbed in, it absorbs water from the tissue and hardens it. It coagulates the albumin of the part, but the coagulum is soon redissolved by the fluids of the tissues. It then dilates the vessels of the derma, producing a sensation of warmth and a rubefacient effect upon the skin. Upon the mucous membrane of the mouth and pharynx similar effects are produced by the same application. If the alcohol is concentrated, a burning sensation is felt immediately; also an increased flow of saliva and quickened pulse, due to reflex action. Then follows a slight local anesthesia of the part, and if the alcohol be held there for some time, the mucous membrane