OSMIC ACID. *Tetroxide of Osmium.* (OsO_4.) A volatile, very odorous, crystalline compound, produced by the action of nitrohydrochloric acid on osmium or either of its lower oxides. Its vapor is very pungent and poisonous. Claus recommends as an antidote to its action cautious inhalation of sulphuretted hydrogen. Osmic acid melts to a colorless liquid at 90° C. (194° F.), softening at a temperature of 35° C. (95° F.). It is slowly soluble in water; soluble in alcohol and ether; but these solutions are unstable, depositing black osmic hydrate, $Os(OH)_4$.

OXALIS ACETOSELLA. *Wood-sorrel. Acetosella.* The wood-sorrel is a small, perennial, herbaceous, stemless plant, with numerous radical leaves, which are all ternate, and supported upon slender hairy petioles. The leaflets are obcordate, entire, hairy, of a yellowish green color, but frequently purplish on their under surface. The scape or flower-stalk, which usually exceeds the petioles in length, is furnished with two scaly bracts near the middle, and terminates in a large white or flesh-colored flower, marked with red streaks. The styles are of the same length as the inner stamens. This plant is a native both of Europe and North America. It selects shady places, such as woods, groves, and hedges, and flowers in May. Other indigenous species of Oxalis possess similar properties to *O. Acetosella.* They all have ternate leaves with obcordate leaflets, and, with the single exception of *O. violacea*, bear yellow flowers. The whole herbaceous portion may be used.

Wood-sorrel is without smell, and has an agreeable sour taste. It owes its acidity to *acid-potassium oxalate* or *binoxalate of potassium* (C_2HKO_4), which is sometimes separated for use, and sold under the name of *salt of sorrel.* This is prepared in Switzerland and Germany, from different species of Oxalis and Rumex, by the following process. The plants, previously bruised, are macerated for some days in water, and then submitted to pressure. The liquid thus obtained is mixed with clay, and occasionally agitated for two days. At the end of this time, the clear liquor is decanted, and evaporated so that crystals may form when it cools. These are purified by solution and a new crystallization. Five hundred parts of the plant afford four parts of the acidulous salt. The same salt may be prepared by exactly neutralizing with potassa one part of oxalic acid in solution, then adding one part more of the acid, and evaporating the solution so that it may crystallize upon cooling. Acid potassium oxalate is in rhomboidal crystals, of a sour, pungent, bitterish taste, soluble in forty parts of cold and six parts of boiling water (*Kane*), and unalterable in the air. *Tetroxalate* or *quadroxalate of potassium* is often substituted for the binoxalate. It is prepared in the same manner, except that, instead of one part, three parts of the acid are added to the original proportion neutralized by potassa. Both salts are kept in the shops under the names of *salt of sorrel* and *essential salt of lemons*, and are employed for removing iron mould and ink stains from linen, and sometimes as a test for lime. Both are poisonous, though in a less degree than uncombined oxalic acid.

This and other species of sorrel are refrigerant; and their infusion, or a whey made by boiling them in milk, may be used as a pleasant drink in febrile and inflammatory affections. A solution of the binoxalate of potassium is used on the continent of Europe as a substitute for lemonade. It has recently been recommended by W. H. Taylor as extraordinarily efficacious in scurvy, having effected cures in that complaint after lemon-juice had failed. The salt used contained an excess of oxalic acid. It was probably the quadroxalate. Four grains were given three times a day. (*Lancet*, 1869, p. 777.) The fresh plant, eaten raw, is said to be useful in scurvy. *Oxalis crassicaulis*, a Peruvian species, yields an edible root, and, by expression from its leaves, a very sour and astringent juice, which is employed, in the form of syrup, in hemorrhages, chronic catarrh, bowel affections, and gonorrhœa, with asserted advantage.

OZOKERITE. This substance, which is brought from Austria and Turkey, and near the Caspian Sea, in its crude state, is a dirty, greenish solid. When purified by treatment with sulphuric acid and alkali and subsequent filtration while melted through bone-black or other filtering medium, it is a hard, white, spermaceti-like substance. (See *Ceresin.*) It is a mixture of natural paraffins. It is said to resemble tar in its therapeutic properties, and, mixed with glycerin or linseed oil, has been employed in skin diseases by Dr. Purdon as a substitute for that remedy. (*Brit. and For. Med.-Chir. Rev.*, 1872, p. 535. See also *Arch. Gén.*, Avril, 1873.)

PÆONIA OFFICINALIS. *Peony.* The *root* of the Garden Peony consists of a caudex about as thick as the thumb, which descends several inches into the ground, and sends off in all directions spindle-shaped tubers, which gradually taper into thread-like fibres, by which they hang together. It has a strong, peculiar, disagreeable odor, and a nauseous taste, which is at first sweetish, and afterwards bitter and somewhat acrid. The odor is lost, or much diminished, by drying. Peony root was in very great repute among the ancients, who used it both as a charm and as a medicine in numerous complaints, particularly epilepsy. Dr. A. Livezey, of Lumberville, Pa., states that in his neighborhood it is much used in the convulsions of children, and bears testimony to its possession of decided nervine powers. (*Bost. Med. and Surg. Journ.*, lv. 467.) The dose of the fresh root is from two drachms to an ounce, boiled in a pint of water down

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to half a pint, which should be taken daily. It is said to be less active when dried. The expressed juice of the recent root is recommended in the dose of an ounce. It is milky, of a strong odor and very disagreeable taste. The *seeds* are roundish-oval, about as large as a pea, externally smooth, shining, and nearly black, internally whitish, inodorous when dry, and of a mild, oleaginous taste. By some authors they are said to be emetic and purgative, by others antispasmodic. They may be given in the same dose as the root, but are not used in regular practice.

PALM OIL. This highly valuable fixed oil is the product of *Elais Guiniensis*, a palm growing on the western coast of Africa, and cultivated in the West Indies and South America. It is among the handsomest trees of its graceful family which flourish in the tropical regions of Africa. The oil is obtained by expression from the fruit. It is brought to this country chiefly from Liberia and other places on the African coast, though prepared also in the West Indies, Cayenne, and Brazil. It is not improbable that various species of Palmaceæ contribute to the supply of this article of commerce.

Palm oil has the consistence of butter, a rich, orange-yellow color, a sweetish taste, and an agreeable odor, compared by some to that of violets, by others to that of the Florentine orris. By age and exposure it becomes rancid and of a whitish color. It melts with the heat of the hand, and when perfectly fluid passes readily through blotting-paper. Highly rectified alcohol dissolves it at common temperatures, and in ether it is soluble in all proportions. Its constituents are tripalmitin and triolein, $C_3H_5(C_{16}H_{31}O_2)_3$ and $C_3H_5(C_{18}H_{33}O_2)_3$. The palmitin is converted into *palmitic acid* by saponification, with liberation of glycerin. It appears also that a considerable proportion of this acid, together with some glycerin, exists uncombined in the oil, as ascertained by MM. Pelouze and Boudet; so that the changes which are effected in oils, through the agency of alkalies, in the process of saponification, take place, to a certain extent, spontaneously in palm oil. (*Journ. de Pharm.*, xxiv. 389.) Hence it is more easily saponified than any other fixed oil. Preparatory to saponification, it may be bleached rapidly, according to J. J. Pohl, by heating it quickly to 240° C. (464° F.) and keeping it for ten minutes at that temperature. It loses for a time its peculiar odor by the process, acquiring an empyreumatic smell; but this after a while ceases to be perceived, and the characteristic odor returns. (See *A. J. P.*, xxvii. 346.) Englehart bleaches it in the following manner. One thousand pounds of the oil are heated in a boiler to 62·2° C. (144° F.) and kept at that temperature until the next day, when it is decanted into a clean vessel, and cooled to a point between 36·6° C. (98° F.) and 40° C. (104° F.). In another vessel 15 lbs. of bichromate of potassium are dissolved in 45 lbs. of boiling water; and, when the solution is partially cooled, 60 lbs. of hydrochloric acid are added. This solution is then mixed with the oil, and briskly agitated. In five minutes the color changes to green, through the reduction of the chromic acid; and, with a continuation of the agitation, the oxide of chromium separates, and nothing more is necessary than washing with water to get the oil colorless. (*A. J. P.*, 1868, p. 333.) Palm oil is said to be frequently imitated by a mixture of lard and suet, colored with turmeric and scented with Florentine orris. It is much employed in the manufacture of a toilet soap, which retains its pleasant odor. Palm oil is emollient, and has sometimes been employed in friction or embrocation, though not superior for this purpose to many other oleaginous substances.

PANAX QUINQUEFOLIUM. Willd. (*Panax, U. S.* 1870; *Ginseng*, Fr., G., Sp.; *Ginsen*, It.) The *ginseng* has a perennial root, which sends up annually a smooth round stem, about a foot high, and divided at the summit into three leaf-stalks, each of which supports a compound leaf, consisting of five or more rarely of three or seven petiolate, oblong-obovate, acuminate, serrate leaflets. The flowers are small, greenish, and disposed in a simple umbel, supported by a peduncle which rises from the top of the stem in the centre of the petioles. The fruit is a kidney-shaped, scarlet berry, crowned with the styles and calyx, with two and sometimes three seeds. The plant is indigenous, growing in the hilly regions of the Northern, Middle, and Western States, and preferring the shelter of thick, shady woods. The root is the part employed. This is collected in considerable quantities in Ohio and Western Virginia, Minnesota, etc., for the purpose of exportation to China, where it is highly valued. Some suppose the ginseng plant of Chinese Tartary to be the same as ours; others believe it to be the *Panax Schinseng* of Nees von Esenbeck; while by others, again, though acknowledged to be a Panax, it is thought to be a different species from either of those mentioned. While supplied with this drug exclusively from their own country, which furnished the root only in small quantities, the Chinese entertained the most extravagant notions of its virtues, considering it as a remedy for all diseases, and as possessing almost miraculous powers in preserving health, invigorating the system, and prolonging life. It is said to have been worth its weight in gold at Pekin; and the first shipment from North America to Canton yielded enormous profits. For a very interesting account of the Chinese methods of using it, see *P. J. Tr.*, vi. 86. The Chinese ginseng is said to maintain its price, although the American article is but little esteemed.

The root is fleshy, somewhat spindle-shaped, from one to three inches long, about as thick as the little finger, and terminated by several slender fibres. Frequently there are

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two portions, sometimes three or more, connected at their upper extremity, and bearing a supposed, though very remote, resemblance to the human figure, from which circumstance it is said that the Chinese name *ginseng* originated. When dried, the root is yellowish white and wrinkled externally, and within consists usually of a hard central portion, surrounded by a soft whitish bark. It has a feeble odor, and a sweet, slightly aromatic taste, somewhat analogous to that of liquorice root. It has not been accurately analyzed, but is said to be rich in gum and starch, and contains albumen. Mr. S. S. Garrigues, of Philadelphia, obtained from it a peculiar substance, which he proposes to call *panaquilon*, and gives the formula, $C_{12}H_{25}O_9$. To prepare it he heats a cold infusion so as to separate the albumen, filters, concentrates to a syrupy consistence, precipitates by a concentrated solution of sulphate of sodium, washes the precipitate thoroughly with the saline solution, and then treats it with alcohol, which dissolves the principle in question, and yields it on evaporation. To purify it, he dissolves it in water, treats the solution with animal charcoal, again evaporates, and dissolves the residue in absolute alcohol, which is finally distilled off. Panaquilon is an amorphous yellow powder, soluble in water and alcohol, but not in ether, of a sweet bitterish taste, and has the characteristic property that, when treated with strong acids, it is converted into a white substance, insoluble in water, with the escape of carbonic acid and water. Mr. Garrigues proposes for this white substance the name of *panacon*, $C_{11}H_{19}O_4$. (*A. J. P.*, xxvi. 511.) The root is sometimes submitted, before being dried, to a process of clarification, which renders it translucent and horny, and enhances its value as an article of export. The extraordinary medical virtues formerly ascribed to ginseng had no other existence than in the imagination of the Chinese. It is little more than a demulcent, and in this country is not employed as a medicine. Some persons, however, are in the habit of chewing it, having acquired a relish for its taste; and it is chiefly to supply the wants of these that it is kept in the shops.

PANCREATIC EMULSION. As it is generally admitted that among the offices of the pancreatic juice is that of emulsionizing fatty matters that may pass through the stomach undigested, so as to facilitate their absorption, it would appear highly probable that this secretion might prove useful in cases in which fats are digested with difficulty if at all. Dr. Horace Dobell, physician to the "Royal Infirmary for Diseases of the Chest," having noticed that consumptive patients are very apt to have a dislike for fat, and thinking that this dislike might result from an inability to digest this kind of food, reasonably inferred that the pancreatic secretion might prove useful in these cases by supplying the wanted power. He was, therefore, induced to treat a series of consumptive cases of this kind with the pancreatic juice of the pig, which he gave in the form of emulsion with the fat of beef stirred in milk. His expectations were confirmed by the results. The great majority of cases were improved by the remedy, which he now confidently recommends. The preparations which he prefers are pancreatic emulsions of cod-liver and lard oils. In this connection, the pancreatic juice remains sound for a long time; though, unmixed with fat, the juice speedily undergoes decomposition. The emulsion with cod-liver oil, as prepared by Messrs. Savory and Moore, of London, has the appearance of a white paste, and the consistence of thick clotted cream. The dose is from one to three teaspoonfuls, once or twice daily, in a cup of milk, to which a little brandy may be added. (See *A. J. P.*, 1866, p. 143; from *The Chemist and Druggist*, Jan. 15, 1866.) The name of *pancreatine* has been conferred on the pancreatic juice itself, which was brought to the notice of medical men, by Dr. G. Harley, so early as 1858, "as uniting in itself the properties of all the digestive fluids." Mr. R. V. Mattison prepares a "*Saccharated pancreatine*" as follows. Macerate the cut-up pancreas in water acidulated with hydrochloric acid for 48 hours; filter till clear. Add a saturated solution of chloride of sodium, and allow to stand until pancreatine rises to the top; skim this, drain on a muslin filter, wash with a less concentrated solution of salt, and press until nearly dry; then rub up with sugar of milk, dry thoroughly, without heat, and dilute with sugar of milk until 10 grains just emulsify two drachms of cod-liver oil. Saccharated pancreatine is a white powder soluble in between five and six parts of water. Mr. Mattison also proposes an *elixir of pancreatine* prepared directly from the glands, by macerating in acidulated water, straining, adding glycerin, and flavoring with oil of orange. (*A. J. P.*, iii., iv.) Defresne claims to prepare a pancreatine composed of three very active ferments, *myopsine*, capable of digesting 104 times its weight of dry albumen, but not acting upon fat or starch; *steapsine*, able to break up 24 times its weight of fat, but not influencing starch or albumen; and *amylopsine*, which will convert into sugar 25 times its weight of starch. (*P. J. Tr.*, ix. 223.) Pancreatine has been used to a considerable extent as a substitute for pepsin, and in the same dose. It does not, however, rapidly advance in professional favor.

PAO-PEREIRA BARK. Under this name a bark is employed in Brazil as a febrifuge. It is supposed to be the product of *Geissospermum lævе*, or of *G. Vellosii*. O. Hesse has found an alkaloid, *geissospermine*, in it (see *P. J. Tr.*, viii. 648), but he seems to have been preceded in this discovery by Santos. (*A. J. P.*, 1878, p. 184.)

PAPAYA. The *Carica papaya* (*Nat. Ord.* Passifloreæ) is an herbaceous tree, every-

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where cultivated in tropical countries for the sake of its fruit, which ranks next to the banana in importance. The tree is both dicœcious and hermaphrodite, reaches a height of about 20 feet, with a cylindrical stem 12 to 20 inches in diameter, a smooth gray bark, and a shield-like crown of leaves. The fruit in the best varieties attains a size larger than that of a man's head. According to M. Peckolt (*P. J. Tr.*, Nov. 1879), the milky juice is contained in all parts of the tree, but in such small quantity, save in the unripe fruit, that it is always procured from the latter. One fruit will yield about 33 Gm., which is obtained by scratching through the skin in various places; the process does not interfere with the ripening of the fruit, but it is said that the seeds will not germinate. The milk has an acid reaction, an astringent bitterish taste, a sp. gr. of 1·023. Upon standing for a few minutes it separates into two parts, a watery liquid, and a white, as it were coagulated, pulpy mass. In the watery portion is an albuminous substance, to which the name of *papäin* has been given. It is precipitated by alcohol, and, according to M. Wurtz, has not a definite constitution (*Comptes-Rendus*, Aug. 1879), but contains as much as 10·6 per cent. of nitrogen. In Dr. T. Peckolt's analysis, 100 parts of juice yielded 5·303 parts of papäin, 4·5 parts of caoutchouc-like substance, besides two resins, fatty materials, malic acid, extractive matter, etc. Various carnivorous plants, such as our ordinary Sarracenia, have the power of dissolving animal flesh, by virtue, apparently, of their secreting a pepsin-like ferment. Papäin is undoubtedly of this nature. M. Wurtz found that, purified by repeated precipitation from its watery solution, 0·1 Gm. of papäin in alkaline solution at a temperature of 40° C. dissolved in twenty-four hours 17·5 Gm. of moist fibrin. By further study M. Wurtz proved that the fibrin was formed into a peptone. It is noteworthy that the fibrin is dissolved, whether the solvent solution be of an alkaline or an acid reaction.

Papaya juice has a tendency to spoil by undergoing a butyric fermentation, but M. Wurtz found that the addition of glycerin to it preserved it without interfering with its digestive power. Imported in this form, it was a thick milky liquid, which first coagulated milk and then dissolved the casein, and attacked rapidly meat, false membranes, ascarides, etc. M. Peckolt affirms that juice to which glycerin has been added yields a pure and more abundant precipitate of the ferment. It is stated that from time immemorial the fresh leaves of the plant have been used by the Indians to wrap meat in to make it tender, and as a dressing to foul wounds. M. Peckolt says that, taken internally, the juice is reputed to cause intestinal inflammation, so that it is yet doubtful whether the ferment is capable of being used in practical medicine as a substitute for pepsin, since it is possible that its digestive powers may be exerted upon the mucous membrane as well as upon the contents of the gastro-intestinal tract.

PARIETARIA OFFICINALIS. *Wall Pellitory.* A perennial European herb, growing on old walls and heaps of rubbish. It is inodorous, has an herbaceous, somewhat rough and saline taste, and contains nitre derived from the walls where it flourishes. It is diuretic and refrigerant, and is said also, but without good reason, to be demulcent and emollient. The ancients employed it in various complaints, and it is still considerably used on the Continent of Europe, especially in domestic practice. It is given in complaints of the urinary passages, dropsy, and febrile affections, usually in the form of decoction. The expressed juice is also used, and the fresh plant is applied in the shape of a cataplasm to painful tumors.

PARTHENIUM INTEGRIFOLIUM. *Prairie Dock.* This is an herbaceous perennial, growing abundantly in the prairies of our Southwestern States. Two ounces of the intensely bitter flowering tops, given in the form of infusion, are thought by Dr. M. Houlton to be equivalent to twenty grains of sulphate of quinine as an antiperiodic.

PATENT YELLOW. *Mineral Yellow.* A pigment, consisting of chloride combined with monoxide of lead. It is prepared by mixing common salt and litharge with a sufficient quantity of water, allowing the mixture to stand for some time, then washing out the liberated soda, and exposing the white residue to heat.

PEACH LEAVES. *Leaves of Amygdalus Persica.* (Willd. *Sp. Plant.* ii. 982. *Persica vulgaris.* Miller, Lamarck.) The peach-tree is supposed to have been originally brought from Persia, but flourishes everywhere in the warm temperate zone. Peaches are among the most grateful and wholesome of our summer fruits. They abound in saccharine matter, which renders their juices susceptible of the vinous fermentation, and a distilled liquor prepared from them has been much used, in some parts of the country, under the name of *peach brandy.* The kernels of the fruit resemble, physically and chemically, bitter almonds, for which they are frequently, and without inconvenience, substituted in our shops. The flowers, leaves, and bark also have the peculiar odor and taste of bitter almonds, and yield hydrocyanic acid. The leaves afford a volatile oil by distillation. The distilled water prepared from them was found in one instance to contain 1·407 parts of hydrocyanic acid in 1000, and in another only 0·437 parts in the same quantity. From some experiments it is inferred that the proportion of acid is greatest where there is least fruit. (*A. J. P.*, xxiv. 172.)

Medical Properties. Peach leaves are said to be laxative; and they probably exert, to a moderate extent, a sedative influence over the nervous system. They have been used

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as an anthelmintic with great reported success. More recently their infusion has been recommended in irritability of the bladder, in sick stomach, and in hooping-cough. Half an ounce of the dried leaves may be infused in a pint of boiling water, and half a fluid-ounce given for a dose three times a day, or more frequently. Dr. Dougos gives, in hooping-cough, a pint of the strong infusion, in small doses, in the course of the day. (*Journ. de Pharm.*, xxiii. 356.) The flowers are also laxative; and a syrup prepared from them is considerably used, in infantile cases, upon the Continent of Europe. Woodville states that a drachm of the dried flowers, or half an ounce in their recent state, given in infusion, is the dose as a vermifuge. Cases of fatal poisoning from their use in children are on record. The kernels have more of the peculiar powers of hydrocyanic acid, and therefore require to be used with some caution. Blanched, and rubbed up with cold water, they form an emulsion well adapted to coughs depending on or associated with nervous irritation. The bruised leaves, flowers, or kernels are sometimes used by pharmacists for cleansing vessels from disagreeable odors. The dried fruit, stewed with sugar, is an excellent laxative article of diet, suitable to cases of convalescence attended with torpid bowels.

PEARL WHITE. *Pearl Powder.* This is subnitrate of bismuth, prepared for cosmetic use.

PELARGONIUM ODORATISSIMUM. *Rose Geranium.* This well-known plant, so much a favorite for its odor in our dwellings and conservatories, is a native of the Cape of Good Hope, but is said to be cultivated extensively in the south of France and in Turkey for the sake of its volatile oil, which is much employed for the adulteration of the oil of roses. According to Guibourt, three species of Pelargonium yield a volatile oil by distillation, closely analogous in smell to that of the rose; the species above named, and *P. capitatum* and *P. roseum*. (*Hist. Nat. des Drogues*, 4e ed., iii. 52.) The oil is obtained from the leaves. M. Recluz obtained from 35 ounces of *P. odoratissimum* two drachms of a volatile, crystallizable oil. (Méret and De Lens, *Dict. de Mat. Méd.*, iii. 368.) According to Septimus Piesse, 1 cwt. yields about two ounces. (See *A. J. P.*, xxvi. 368.) The oil which occurs in commerce, purporting to be the oil of *P. odoratissimum*, is perfectly fluid at ordinary temperatures, of a pale brownish yellow color, and the characteristic smell of the plant, recalling merely that of the rose. Pelargonic acid, $C_9H_{18}O_2$, was first obtained from the oil of *P. roseum*, which is probably the same as that under consideration, by Pless (*Ann. Ch. und Phar.*, 5, 54). This oil is now much used in perfumery, and, dissolved in alcohol in the proportion of three ounces to the gallon, forms the preparation called "*extract of rose-leaf geranium.*" Mr. Piesse states that, as this oil is used to adulterate that of roses, so is it in its turn adulterated with the cheaper oil of *Andropagon nardus*, cultivated in the Moluccas. (*A. J. P.*, xxvi. 368.) Jaillard states that the true oil of rose geranium from *P. roseum* is freely soluble in 70 per cent. alcohol. The oils likely to be used to adulterate it are insoluble in this liquid. If, therefore, six drops of the suspected oil is mixed with five C.c. of 70 per cent. alcohol, there should be no separation. (*A. J. P.*, 1878, p. 260; from *Journ. de Pharm. et de Chim.*)

PERCHLORATE OF POTASSIUM. *Hyperchlorate of Potassium.* ($KClO_4$.) This salt is prepared by fusing chlorate of potassium until it begins to assume a pasty condition. The cooled mass consists of perchlorate and chloride of potassium. The absence of undecomposed chlorate may be known by a sample failing to communicate a yellow color to hydrochloric acid. The mass must be dissolved in the smallest possible quantity of boiling water, when perchlorate crystallizes out. It is sparingly soluble in water, and insoluble in alcohol. It has been examined remedially by M. Rabuteau. The following are his conclusions. 1. Introduced into the system in the quantity of five grammes (77 grains), it is eliminated in 36 or 48 hours, without having undergone any change of composition. Its effects are wholly different from those of the chlorate of potassium. 2. It appears to be useful in intermittents, and, if it prove in fact to have antiperiodic powers, it will be preferable to quinine in pernicious fever, from the rapidity of its action. 3. Arsenic diminishes the urea discharged much more than has been supposed; neither sulphate of quinine nor perchlorate of potassium has this effect unless long administered. 4. From the properties it possesses, M. Rabuteau thinks it applicable to all diseases in which quinine and nitre are used for their sedative or diuretic properties. (*Ann. de Thérap.*, 1869, p. 141.)

PEROXIDE OF HYDROGEN. *Oxygenized Water.* (H_2O_2.) This substance, though long known to chemists, has but recently been brought into notice as a remedy. It consists of water in which, by the presenting to it of oxygen in a nascent state, an additional atom of this element has combined with the hydrogen, forming the dioxide, $(HO)_2$ or H_2O_2. It was discovered by Thenard in 1818. To prepare it, peroxide of barium, BaO_2, is rubbed with distilled water so as to form a liquid paste, which is added gradually, with constant stirring, to distilled water acidulated with one-third of its weight of hydrochloric acid, contained in a vessel immersed in a freezing mixture, when the following reaction takes place: $BaO_2 + 2HCl = BaCl_2 + H_2O_2$. When the hydrochloric acid is saturated, a fresh quantity of the acid in a concentrated state is added, and then

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more of the peroxide of barium; and the operation is repeated till the solution will hold no more chloride of barium. It is then immersed in a mixture of ice and salt, and the greater part of the chloride of barium is deposited. The portion remaining in solution may be got rid of by the cautious addition of sulphate of silver, which precipitates sulphate of barium and chloride of silver. The liquid, being now filtered, is concentrated by exposing it in vacuo in a shallow vessel placed over another containing sulphuric acid. The water rises in vapor which is absorbed by the acid, and at last the peroxide of hydrogen is left nearly pure. (*Regnault.*) Thus procured, it is a colorless liquid of a fluid consistence, of the sp. gr. 1·452, remaining liquid at zero, beginning to give out oxygen when heated above 15·5° C. (60° F.), and at a higher heat rapidly and sometimes explosively resolved into water and oxygen. But when diluted with water, with which it unites in all proportions, it is not decomposed under 37·7° C. (100° F.). The great facility with which it parts with oxygen renders it a powerful oxidizer; and the simple contact with various substances, as platinum, gold, and silver, causes it to be resolved into oxygen and water. On the contrary, certain other substances, even though ordinarily evincing a strong affinity for oxygen, as phosphorus, for example, are unaffected by it, and there are a large number of bodies, as ammonia, hydrocyanic acid, tobacco, aconite, and most other narcotic substances, which have the property not only of being unaffected by it, but of restraining its oxidizing influence on other bodies. Its relations to ozone are peculiar; and at one time it was conjectured that ozone was nothing else than peroxide of hydrogen. At present the oxygen in it is considered by some as in the positive state and called *antozone*, while *ozone* itself is oxygen in the negative state, and the two mixing produce oxygen in its ordinary state, or neutral oxygen. When this neutral condition of oxygen is disturbed, giving rise to the phenomena of ozone, antozone is also liberated. Hence, according to Schönbein, whenever, upon the contact of phosphorus with water, ozone appears, the water is found to contain peroxide of hydrogen. These facts may at some future time prove to have an important bearing on peroxide of oxygen as a physiological or remedial agent; but at present they may be left out of view in treating of it medicinally. It has been detected by M. Struvé, of St. Petersburg, in minute proportion, in the air of the atmosphere in Southern Russia. (*Chem. News*, July 2, 1869, p. 23.) Schönbein has made the same discovery in the vicinity of Basel, in Switzerland. In both instances it was found in the rain-water. (*Neues Repertorium*, 1869, xviii. 364.)

The profession is indebted to Dr. B. W. Richardson, of London, for most of what is known of the physiological operation and therapeutical effects of peroxide of hydrogen. In relation to its influence on organic bodies, Dr. Richardson found that to venous blood, deprived of its fibrin, it imparts oxygen, with an increase of heat, and a change of the color to red. Fibrin and cellular tissues cause it to evolve oxygen. Sugar and starch are decomposed by it, giving out carbonic acid. Albumen, gelatin, urea, and cutaneous tissue have no effect on it. Injected into the left cavities of the heart of an animal, it restores the irritability of that organ, but has an opposite effect in the right cavities. Thrown into the arteries, immediately after death, it restores for a time the contractile power of the muscles, and suspends cadaveric rigidity, while it counteracts the influence of various medicinal substances that cause muscular spasm. Dr. Richardson inferred from his experiments that the peroxide might be found useful as an antidote to the narcotic poisons, as a local application to gangrenous ulcers, and as an internal remedy in low forms of fever. Subsequently, from numerous therapeutical trials of the remedy, he came to the conclusion that it is of great value in chronic and subacute rheumatism; acts in the removal of scrofulous tumors like iodine; relieves the paroxysms of hooping-cough, and cuts short the disease more effectually than any other medicine; affords great relief in chronic bronchitis with dyspnœa; and, in phthisis, operates favorably in the early stage by improving digestion and giving increased activity to chalybeate remedies, while in the advanced stages it afforded great relief to the dyspnœa and oppression, acting, indeed, in this respect like opium, without its narcotic effects. In general, it seemed to him to improve digestion, and therefore to be useful in cases complicated with dyspepsia. Sometimes, when freely employed, it produced profuse salivation, suggesting the idea that it might in other respects resemble mercury, and possibly be found capable of replacing this remedy to a certain extent in the treatment of disease. Dr. Richardson recommends that a solution of the peroxide should be used charged with ten volumes of oxygen, the dose of which may be from one to four fluidrachms, freely diluted with water. There are so many substances which decompose the peroxide, that, as a general rule, it is best given without addition; at least nothing should be allowed to remain long in contact with it. There can be no difficulty in obtaining the desired strength of ten volumes of oxygen to one of the solution, by estimating the quantity of oxygen contained in the peroxide of barium employed in the process. (See *Lancet*, Oct. 20, 1860, and April 12, 1862.)

Ozonic ether is a name proposed for a solution of peroxide of hydrogen in ether, which was first noticed by Dr. Richardson. Ether will take a portion of the peroxide from its watery solution, forming a compound of considerable stability, as it has borne a voyage to Australia without change. Dr. Richardson recommends it for diffusion in the state

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of spray in the sick chamber, as it has great purifying power. Care, however, must be taken to guard against the consequences of its extreme inflammability. (See *A. J. P.*, 1869, p. 156.) But ozonic ether owes the reputation which it has so suddenly acquired to its supposed efficacy in the treatment of diabetes. In a letter by Dr. John Day, dated Australia, August, 1867, and published in the *Lancet* (Jan. 11, 1868), an account is given of an apparently quite desperate case of that disease, in which he was induced to give the ethereal solution of the peroxide of hydrogen, by the hope of oxidizing the sugar in the circulation, and thus causing its elimination through the lungs instead of the kidneys. He gave half a drachm of the solution, mixed with an ounce of distilled water, three times a day. The effect was most striking. The quantity of urine discharged rapidly decreased to the normal standard, its sp. gr. diminished at the same time, the thirst disappeared, and the patient, who was a woman, appeared to have been snatched from the brink of the grave. In less than a month, she had so far improved that she considered herself quite well, though there was probably still sugar in the urine. The case of a man was afterwards described, in a letter from Mr. S. J. Bayfield of London, to the *Med. Times and Gaz.* (1868, p. 404), in which a cure was effected under the use of the medicine as employed in the case of Dr. Day. Experience thus far would seem to be greatly in favor of the remedy; but among the first therapeutic experiments of Dr. Richardson with peroxide of hydrogen had been its use in diabetes, in which, though it appeared to have considerable effect in diminishing the discharge of urine and the secretion of sugar, it had shown no power of arresting the course of the disease, which, so far as traced to its results, had proved uniformly fatal. (*Med. Times and Gaz.*, 1868, p. 662.) Dr. Pavy, also, who tried it in a few cases, failed to get any advantage from its use. (*On Diabetes*, 2d ed., p. 268.) Dr. John Day believes that the efficacy of iodide of potassium in chronic syphilis is much increased by the exhibition of peroxide of hydrogen shortly after each dose of the iodide. He thinks that the iodide is in this way liberated in the blood. (*Med. Times and Gaz.*, 1871, p. 569.)

Locally employed, peroxide of hydrogen sometimes acts very beneficially, especially in feeble, flabby, or ill-conditioned ulcers, in chancre and diphtheritic sores, in all of which it operates, not as a corrosive substance, but probably by imparting oxygen to the diseased tissues, and thus destroying them.

PETROLEUM. *Rock Oil.* This was recognized by the late London and Edinburgh Colleges, but has been omitted in the British Pharmacopœia, and, as it holds no place in that of the United States, takes rank among the extra-officinal medicines. Petroleum is a native mixture of hydrocarbons with very small amounts of oxidation or alteration products admixed. The hydrocarbons may be gaseous, liquid, or solid, and in crude oil, fresh from the wells, all three classes are present. The hydrocarbons belong to several of the homologous series known to organic chemistry. The researches of Pelouze and Cahours, of Warren, and more especially of Schorlemmer, have established the presence of the paraffin series, C_nH_{2n+2}, beginning at marsh-gas and continuing through the liquid members, which constitute the bulk of the oil, to the solid hydrocarbons known commercially as "paraffin"; of the olefine series, C_nH_{2n}; and of the benzol series, C_nH_{2n-6}. After the oil has been heated, as in distillation, pyrogenic products form, so that in the residues of petroleum distillation naphthalene, anthracene, and other higher hydrocarbons have been detected. In Caucasian petroleum, Beilstein and Kurbatow (*A. J. P.*, 1880, p. 612) have also found another homologous series of hydrocarbons, *hexahydrobenzol*, C_6H_{12}, and its homologues.

Pennsylvania petroleum consists, however, chiefly of paraffins, and the individual hydrocarbon making the bulk of illuminating oil is *heptane*, C_7H_{16}. The oxidation products accompanying petroleum constitute only a small fraction of one per cent. usually, and have not been studied chemically. Prolonged atmospheric exposure may, however, cause a petroleum to thicken, at least superficially. In this way the semi-solid deposits of California are explained, as well as Rangoon tar and Trinidad pitch or bitumen. When the bitumen is in the solid state it is called *asphaltum*. This is black, dry, friable, and soluble in water or alcohol. Not unfrequently asphaltum exists in nature mixed with more or less of the liquid substance; and this semi-solid mixture is distinguished by the name of *maltha* or *mineral tar*.

Petroleum has been known from the earliest historical period. Herodotus refers to wells of it existing in Zante, and from time immemorial it has been known in Persia, where it was probably connected with the origin and ceremonies of fire-worship. Until the discoveries of Pennsylvania petroleum, the best-known sources of it were the borders of the Caspian Sea in Persia, at Amiano in Italy, at Gabian in France, the island of Trinidad in the West Indies, and in the Burman Empire near Rangoon, where vast quantities have been annually raised for many centuries, without any apparent exhaustion of the wells from which it is drawn. Within the limits of the United States it has long been known to exist in a few localities. On the borders of Seneca Lake in the State of New York, small quantities of it were collected, and to some extent used in medicine under the name of Seneca oil. In Western Pennsylvania, on Duck Creek in Ohio, near Scottsville in Kentucky, and on the Kanawha in Virginia, it attracted local attention; and a certain locality in Western Canada had acquired some notoriety by its

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burning spring. But little attention was paid to it until about twenty-three years since; when, the preparation of oil for burning, distilled from bituminous shales, having proved very profitable, and a strong resemblance having been proved to exist between this and petroleum, enterprise was directed towards some of the known sources of the latter liquid, and, being greatly stimulated by success, soon led to further and astonishing discoveries. Hitherto the most productive locality of petroleum has been in Western Pennsylvania; but it has been found to exist in great quantities elsewhere, and in fact occupies large portions of a region commencing in Western Canada, and extending, through New York and Pennsylvania, westward into Ohio and Kentucky, and far southward into Western Virginia. From later accounts it appears that petroleum exists also abundantly in California, although, as before stated, of a thicker quality.

In the early days of the petroleum discovery the oil was gathered as it floated on the surface of the water in springs or small streams. In 1859 the first oil well, the *Drake* well, was sunk near Titusville, Pa., and the oil-bearing strata were reached at a depth of 71 feet, with the result of some 8 barrels per day. In 1861 and 1862 the first large flowing wells were struck in drilling for oil. The explanation of these flowing wells is simply that in new territory the gaseous hydrocarbons have accumulated with the liquid oil in such amount that they exert an enormous pressure, causing a flow of oil at the rate of two, three, and in one case as high as five thousand barrels per day. At the present time, a fresh district has been opened in Warren Co., Pa., and four large flowing wells are together pouring forth some 6000 to 7000 barrels of oil daily. Often, however, the pent-up gas escapes with enormous force without any accompanying oil. These "gas wells," as they are termed, are well known throughout the oil regions. Prof Sadtler has analyzed numerous samples of this natural gas, and finds it to consist chiefly of methane and its homologues, with traces of the olefines and of carbon monoxide. In one case free hydrogen was present. (*Proc. Amer. Philos. Soc.*, xvi. 585, 1877.) After a well has flowed oil for a time, it will continue to yield, on pumping. Indeed, many smaller wells never have flowed, and have to be pumped from the start. In some districts "torpedoing" with nitroglycerin has been largely resorted to after a well has begun to decline in power, in order to increase the flow. The explosion effects this by shattering the sandstone and pebble conglomerate which holds the oil, so that new channels are opened.

Oil wells are of various depths. The first or Drake well, as stated, was only 71 feet deep, while in Butler County the fourth sand-rock was reached only at a depth of from 1500 to 1800 feet.

There are two theories as to the origin of petroleum. According to one, it is simply a product of distillation from the bituminous shales which underlie almost the whole of this oil-producing country. The gas and the liquid oil are equally products of this distillation. According to the other it represents the decomposition of marine plants and possibly animal life which accumulated in these sand-rock formations. These decomposition products may have also been in part subjected to distillation.

Crude petroleum is occasionally of a clear color when taken from the earth, but is generally of a greenish color, appearing claret-red by transmitted light. The green color may, however, become so dark as to be almost black. In gravity it varies from 0·865 to 0·777, or from 32·5° to 52° Baumé.

The enormous production of crude petroleum in the last twenty-five years has had the effect of developing a variety of new industries connected with the working or shipping of it. The whole producing area of Western Pennsylvania is now covered with a network of wrought-iron pipes, for the conveyance of the oil; and these "pipe lines" have even extended to the sea-board in two cases, so that crude oil is pumped from the vicinity of the wells to the sea-board cities to be refined there or to be exported in bulk. The refining of crude oil, and the working up of the several liquid and solid products that are known commercially, are also immense industries. The following figures show the quantities of petroleum and petroleum products exported during the year 1881. This is, of course, independent of the amount used in home consumption. Crude oil exported, 40,430,108 gal.; value, $3,089,297; naphthas exported, 20,655,116 gal.; value, $1,981,197; illuminating oil exported, 444,655,615 gal.; value, $42,122,683; lubricating oils exported, 5,053,862 gal.; value, $1,165,605; residuum exported, 3,756,018 gal.; value, $197,321; total exported, 514,550,719 gal.; value, $48,556,103.

Barbadoes petroleum is a black, nearly opaque, inflammable liquid, of the consistence of molasses, unctuous to the touch, and possessing a bituminous taste, and a strong and tenacious odor. Its sp. gr. varies from 0·730 to 0·878. When subjected to distillation it yields naphtha, and leaves a solid residue of asphaltum. It is little affected by alcohol, acids, or alkalies, but dissolves in ether and in the fixed and volatile oils. It consists chiefly of carbon and hydrogen, associated with a little nitrogen and oxygen. *Rangoon petroleum*, also called *Rangoon tar* and *Burmese naphtha*, has a greenish brown color, a peculiar, rather fragrant odor, and the consistence of goose-fat. It is lighter than water. Heated to 32·2° C. (90° F.) it becomes a very mobile liquid. By distilling it in a current of steam, first at 100° C. (212° F.), and afterwards super-heated, Drs. W. de la Rue and H. Müller obtained 96 per cent. of volatile products, solid and liquid.

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The solid product (*paraffin*) amounted to from 10 to 11 per cent. The liquid product, usually called naphtha, is separable by sulphuric and nitric acids into two series of hydrocarbons; one series removable by these acids, the other resisting their action. The former series contain fewer atoms of hydrogen than of carbon, and embrace, among other hydrocarbons, benzol and toluol. The latter, which form by far the larger portion of the liquid produc , are perfectly colorless, almost inodorous, very mobile liquids, not congealable by intense cold. They belong to the paraffin series, and have the general formula $CnH_{2}n + _{2}$.

The method of purifying petroleum is analogous to that already described for purifying coal tar. The crude oil is put into large retorts of wrought iron and exposed to a heat rising gradually to between 315·5° C. (600° F.) and 426·6° C. (800° F.), by which all the volatile ingredients are distilled, leaving 10 or 12 per cent. of solid residue, constituting a sort of coke. The liquids thus obtained are comparatively colorless, though still retaining the strong odor of the crude oil. The several fractions are caught separately, and are of very different gravities and volatility, adapting them for different uses. An average result of distillation may be stated as follows: Gasoline 1½ per cent., refined naphtha 10 per cent., benzin 4 per cent., refined petroleum or kerosene 55 per cent., lubricating oil 17½ per cent., paraffin 2 per cent., loss, gas, and coke 10 per cent. A crude distillate, however, would not be adapted for the purposes of an illuminating oil, so the distillate must be treated with acid. It is placed in the treating tank or "agitator" and one or two per cent. of strong sulphuric acid is added, when by the aid of an air-blast introduced below the whole is violently agitated. The acid combines with the impurities of the oil and forms a tarry substance, called the "sludge acid," which settles to the bottom, and after the whole has subsided is removed. The oil is then washed with water and again agitated, the process being repeated once or twice. It is then treated with caustic soda solution and again washed. The oil is now clear and almost colorless. It is then placed in large tanks covered with glass frames, where it is "bleached" by the aid of sunlight. It is sometimes atomized or sprayed in these tanks, and is thus brought to the desired fire-test. In most States of the Union the legal fire-test for illuminating oils is 110° F.; that is, it must not evolve inflammable vapors under this temperature of 110° F. Many special brands of illuminating oil have a much higher fire-test, as high even as 300° F.

Lubricating oils, on the other hand, are valued according to their "cold-test;" that is, they must not congeal except at very low temperatures. A lubricating oil, therefore, consists of the heavy liquid hydrocarbons of the paraffin and olefine series, but is free from the solid paraffin.

Medical Properties and Uses. Petroleum is accounted a stimulating antispasmodic, expectorant, and diaphoretic. In large quantities it may prove poisonous, as shown by a case recorded in the *Journ. de Pharm.* (Mars, 1869, p. 227), in which, after swallowing by mistake a quantity of rectified petroleum, a workman was seized almost immediately with violent inflammation of the throat, with colicky pain, and a desire to vomit, followed in an instant by a fearful tetanic seizure, and a general rigidity, attended with the most frightful cries. After a relaxation of ten minutes the symptoms returned with still greater violence; and life was probably saved only through the prompt action of the powerful emeto-cathartic medicines administered. It is occasionally given in disorders of the chest, when not attended with inflammation. In Germany it has been extolled as a remedy for tape-worm. Schwartz's formula in such cases was a mixture of one part of petroleum with one and a half parts of tincture of assafetida, of which forty drops were given three times a day. Externally, petroleum is employed in chilblains, chronic rheumatism, affections of the joints, paralysis, and diseases of the skin, and is said to be very effectual in psora and prurigo. (See *Petrolatum*, Part I.) It also affords a good antiseptic dressing for wounds. (*Med. Times and Gaz.*, 1870, p. 101.) It is an ingredient in the popular remedy called *British oil.* (See *note*, p. 1048.) The dose of Barbadoes petroleum is from thirty drops to a small teaspoonful, given in any convenient vehicle. Rangoon petroleum is probably more active, and should be given in a smaller dose. Crude petroleum is used to a considerable extent as an external application in domestic practice. It is light-colored, thinner in consistence, and less sapid and odorous than the Barbadoes petroleum, and probably contains more naphtha. The finer kinds of petroleum, called naphtha, have been used with advantage in epidemic cholera by Dr. Andreosky, of the Russian army, by M. Cloquet, physician to the Shah of Persia, and by M. Moretin, of France. They gave from ten to twenty drops in half a glass of white wine or mint-water. It is affirmed that many cases of asthma are much benefited by inhaling petroleum vapors.

PHLORIZIN. *Phloridzin. Phlorrhizin.* ($C_{21}H_{24}O_{10}$.) This is a bitter principle, discovered by Dr. Konink, of Germany, in the bark of the apple, pear, cherry, and plum trees. It is most abundant in the bark of the root, and derived its name from this circumstance (from two Greek words *θλοιός*, bark, and *ῥίζα*, a root). It is light, white, crystallizable in silky needles, of a bitter taste, soluble in about 1000 parts of cold and in all proportions in boiling water, very soluble in alcohol and methylic alcohol, scarcely soluble in ether cold or hot, dissolved without change by solutions of the alkalies, de-

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prived of its water of crystallization at 100° C. (212° F.), and fusible at a somewhat higher temperature. The ammoniacal solution becomes red on exposure to the air on account of the formation of phloridzëin, $C_{21}H_{30}N_2O_{13}$. It is without acid or alkaline reaction, and belongs to the class of glucosides. When heated with dilute hydrochloric or sulphuric acid, it is converted into sugar and a peculiar substance called *phloretin*, $C_{15}H_{14}O_5$. (See *Chem. Gaz.*, viii. 392.) To obtain it, the fresh bark of the root of the apple-tree should be selected, as the dried bark is said to contain it in much smaller proportion. The bark is to be boiled for an hour or two successively in two separate portions of water, each sufficient to cover it, and the decoction set aside. At the end of thirty hours they will have deposited a considerable quantity of colored phlorizin, which may be purified by boiling for a few minutes with distilled water and animal charcoal, filtering, repeating this process two or three times, and then allowing the solution to cool slowly. The phlorizin is deposited in the crystalline state. An additional quantity may be obtained by evaporating the decoction to one-fifth of its bulk, allowing it to cool, and purifying the substance deposited in the same manner as before. Rochleder states that the leaves contain a principle, *isophlorizin*, isomeric with phlorizin.

Phlorizin is said to possess the anti-intermittent property in a high degree, and to have proved successful where quinine had failed. It was employed by Dr. Konink in the dose of 10 or 15 grains, and effected cures in several cases of intermittent fever. Dr. De Ricci recommends it very strongly as a tonic in the dyspepsia of delicate females, in the debility of children requiring a supporting treatment, and in all cases in which quinine is indicated but is not well borne. He has never known it to disagree with patients in the dose of 10 grains three or four times a day. As a tonic, 5 grains of it may be given at a dose. Though nearly insoluble in water alone, it may be readily exhibited in solution by adding to the water a few drops of spirit of ammonia. (*Dub. Quart. Journ.*, Aug. 1862.)

PHOSPHATE OF POTASSIUM. *Potassii Phosphas.* (K_2HPO_4.) The phosphate of potassium, which has of late come into use as a medicine, is the dipotassic orthophosphate, having a composition precisely analogous to that of the medicinal phosphates of sodium and ammonium. It may be formed precisely as phosphate of sodium is prepared; or by saturating, by means of carbonate of potassium, common or orthophosphoric acid, H_3PO_4. The medicinal phosphate of potassium is a white, amorphous, deliquescent salt, crystallizing with difficulty. It has been given as an alterative in scrofula and phthisis, and in some other diseases, with supposed advantage. The dose is from ten to thirty grains three times a day, dissolved in a tablespoonful of water.

PHOSPHATE OF ZINC. *Zinci Phosphas.* ($Zn_3P_2O_8,2H_2O$.) Dr. Barnes, of London, has brought forward this salt of zinc as having special advantages over other salts of the same metal in the treatment of nervous diseases. The theoretical ground of preference is that in diseases of the brain there is apt to be a waste of phosphorus in the cerebral substance, and the phosphoric acid offers the means of supplying the deficiency. Phosphate of zinc, or trizincic orthophosphate, may be prepared by the mutual reaction of sulphate of zinc and an alkaline phosphate. It is a white powder, insoluble in water but soluble in acids. Dr. Barnes has found it peculiarly useful in the insanity occurring in the convalescence from fevers, in which he associates it with quinine, and in epilepsy attended with disorder of the uterine functions. He also uses it preferably to the sulphate of zinc in the sweats of phthisis. He finds it less liable to disturb the stomach than the sulphate. It may be given in pill. or dissolved in water acidulated with phosphoric acid, in the dose of from one to three grains.

PHYSALIS ALKEKENGI. *Alkekengi. Common Winter Cherry.* A perennial herbaceous plant, belonging to the Solanaceæ, growing wild in the south of Europe, and cultivated in our gardens. The fruit is a round red berry, about as large as a cherry, enclosed in the calyx, and containing numerous flat kidney-shaped seeds. All parts of the plant are bitter, especially the leaves and the capsules enveloping the fruit. The berries are very juicy, and have an acidulous, bitterish taste. By drying they shrink, and become of a brownish red color. The bitter principle has been isolated by MM. Dessaignes and Chautard, and named by them *physalin*. It is obtained by agitating an infusion of the plant with chloroform, which extracts the bitter principle, and yields it by evaporation. To purify it, dissolve it in hot alcohol, add a little animal charcoal, filter, precipitate by water, and wash the precipitate with the same liquid. It is a light powder, white with a shade of yellow, of a taste slight at first, but in the end permanently bitter, very slightly soluble in cold water, somewhat more soluble in boiling water, and very soluble in alcohol and chloroform, especially with the aid of heat. Its composition is $C_{14}H_{16}O_5$. (*Journ. de Pharm.*, 3e sér., xxi. 24.) The berries are said to be aperient and diuretic, and have been recommended in suppression of urine, gravel, and other complaints of the urinary passages. M. Gendron recommends them very highly as a febrifuge. He thinks they are most effective when allowed to ripen and begin to dry on the stem. He usually administers about three drachms daily in two doses. (*Arch. Gén.*, xxiii. 536.) A French physician has published a pamphlet on gout, in which he strongly recommends alkekengi as more efficacious even than colchicum.

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He takes the flowers and unripe fruit, dries and powders them, makes the powder into a paste with water and a little slaked lime, treats the mixture with boiling alcohol, and finally filters and evaporates the alcoholic liquid. The residue is given in the form of pill, made with solution of silicate of sodium and powdered *Teucrium Chamædrys*. Five or six of the pills are taken daily. (*Braithwaite's Retrospect*, Am. ed., No. 46, p. 214.) From six to twelve berries, or an ounce of the expressed juice, may be taken for a dose; and much larger quantities are not injurious. They are consumed to a considerable extent in some parts of Europe as food. The berries of the *Physalis viscosa*, of this country, are said by Clayton to be remarkably diuretic.

PICHURIM BEANS. *Sassafras Nuts.* The seeds of an uncertain tree growing in Brazil, Guiana, Venezuela, and other parts of South America. The tree has been supposed to be the *Ocotea Pichurim* of Kunth (*Laurus Pichurim*, Richard, *Aydendron Laurel*, Nees); but its position in either of these genera is denied by F. Nees von Esenbeck; and the plant is now referred to the genus Nectandra with the specific name *Puchury*. There appear to be two varieties of *Nectandra Puchury*, one bearing larger and the other smaller fruit, and distinguished as the *major* and *minor*. Professor Carson, of the University of Pennsylvania, had specimens of the fruit and other parts of the tree sent him, sufficient to verify the ascription of the pichurim beans to this source. (*A. J. P.*, xxvii. 385.) The beans are the kernels of the fruit separated into halves. They are ovate-oblong or elliptical, flat on one side, convex on the other, of a grayish brown color externally, chocolate-colored within, of an aromatic odor between that of nutmegs and sassafras, and of a spicy pungent taste. There are two kinds, one about an inch and a half long by half an inch in breadth, the other little more than half as large, rounder, and of a dark brown color. The former were said by Dr. Carson to come from Brazil, the latter from Venezuela, and may be severally the product of the varieties of the tree above referred to. (*Ibid.*, p. 387.) Bonastre has found them to contain a concrete volatile oil, a fatty matter of the consistence of butter, stearin, resin, brown coloring matter, fecula, gum, sugar, and lignin. Their virtues depend on the volatile oil. The buttery portion, known as "pichurim fat," contains *laurostearin*, $C_3H_5(C_{12}H_{23}O_2)_3$, and *pichurim camphor*, which, according to Gerhardt, is identical with laurel camphor. In *A. J. P.*, 1851, p. 1, Prof. Procter describes a liquid product brought from South America, known as "*the native oil of laurel* or *sassafras*," or "*aceyte de sassafras*," said to be obtained by making incisions in the trunk of a tree growing on the Orinoco. As described by Prof. Procter, it is an oleoresin, of the sp. gr. 0·898, of a light auburn color, a peculiar penetrating odor, and an aromatic, bitterish, pungent, and somewhat camphorous taste. On distillation, almost the whole passes over in the shape of a colorless volatile oil; a small proportion only of resinous matter being left behind. This oleoresin is conjectured to be the same as that employed for adulterating the copaiba exported from Maracaibo. It may be distinguished from copaiba by its ready solubility in alcohol of 0·838, and by the fact that its volatile oil is acted on by potassium. It is believed to be the same product as the "native oil of laurel" described by Pereira, which was obtained from Demerara, and by incisions in a large tree. Prof. Carson, on comparing it with a specimen of oil presented to him as obtained from the same tree with the fruit above mentioned, had no hesitation in considering them as identical, and, therefore, in referring the so-called native oil of laurel to *Nectandra Puchury*. Müller, by distilling the oil in contact with sulphuric acid, obtained a greenish yellow oil possessing the peculiar odor of the beans. By fractional distillation he separated—1, a colorless oil, boiling at 150° C. (302° F.); 2, a colorless oil, boiling between 165° C. (329° F.) and 170° C. (338° F.); both of these oils consist principally of a hydrocarbon, $C_{10}H_{16}$; 3, a greenish yellow viscid oil, boiling between 235° C. (455° F.) and 240° C. (464° F.), and having the composition $C_{38}H_{58}O_2$; 4, a deep blue oil, having a faint odor, boiling between 260° C. (500° F.) and 265° C. (509° F.). In medical properties the pichurim beans resemble the common aromatics, and may be employed for the same purposes. In South America they are said to be used as a substitute for nutmeg, and have even been called by that name. They are rare in this country. The oil obtained from the tree is said to impart its odor to the perspiration and urine, and to be useful in rheumatism, gout, etc. The bark is sometimes employed as a tonic and febrifuge.

PICRIC ACID. *Carbazotic Acid. Trinitrophenic Acid. Trinitrophenol.* ($C_6H_3(NO_2)_3O$.) This acid is obtained by the action of nitric acid on indigo, silk, salicin, aloes, benzoin, phlorizin, Australian gum, and other substances, or, as the name indicates, from phenol (carbolic acid). It may be cheaply prepared by adding coal-tar creasote (impure carbolic acid) gradually to strong nitric acid and heating, when, on standing, the picric acid will crystallize out; but in practice it is now almost always made by dissolving crystallized carbolic acid in strong sulphuric acid, and adding either nitric acid or sodium nitrate to the resultant sulphophenic acid. (Allen, *Commerc. Org. Anal.*, p. 327.) It is in pale yellow shining scales, soluble in water, to which it gives a strong yellow color and very bitter taste. Its salts crystallize readily, and explode when heated. The potassa salt is so sparingly soluble, that an alcoholic solution of the acid may be used

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as a test for this alkali. It is largely used in dyeing, producing magnificent yellow colors, and, in connection with indigo or Prussian blue, different shades of green. The salts which picric acid forms with potassa and soda are yellow and bitter; and it is in this state that the acid is often used in dyeing. It should be understood, however, that these salts are capable of exploding violently, at elevated temperatures or from a severe blow; and very fatal consequences occurred from such an explosion of a large quantity of picrate of potassium, in one of the magazines of Paris, in March, 1869. (*Journ. de Pharm.*, 1869, p. 247.) According to Mr. Galippe, picric acid affords one of the most sensitive known tests for albumen. He uses a saturated aqueous solution, putting it first into a test tube and dropping in the suspected urine. If albumen be present, a white line forms at the junction. (*Edinb. Med. Journ.*, 1873, p. 178.)

In large doses picric acid is poisonous; 10 grains of it having been sufficient to kill a dog in less than two hours. (*Taylor on Poisons*, p. 793.) It was first used in intermittent fever by Dr Bell, of Manchester, and several practitioners have since claimed for it decided antiperiodic properties. More recent studies have, however, shown that the remedy is entirely unreliable. Anthelmintic powers have also been assigned to it, but Erb has proven that it is of no value in cases of tape-worm or in trichiniasis. (*Das Pikrinsäure*, Würzburg, 1865.) The most eligible form for administration is the salt of ammonia (picrate of ammonia), given in pill, in doses of a quarter to half a grain, three times a day. Mr. Aspland began with a grain three times a day, and increased to 4 grains for a dose. A curious effect of these salts, first observed by Dr. Moffat, is to produce, in many cases, a temporary yellowness of the skin and conjunctiva, as in jaundice. The effect is generally induced when about 15 grains of the acid have been taken. The urine also becomes orange-colored. The color disappears in two or three weeks after ceasing to use the medicine.

Picrate of iron may be prepared by digesting pure crystallized picric acid with an excess of recently precipitated ferric oxide and water at a gentle heat, till the acid has disappeared, filtering, and evaporating the filtrate at a temperature not exceeding 100° C. (212° F.). Thus prepared it is amorphous, reddish brown in mass, lighter colored in powder, of an astringent and intensely bitter and persistent taste, and readily soluble in water. On account of its bitterness, it is best given in pill. (See *A. J. P.*, 1863, p. 169.)

PICRORHIZA KUERVA. Under the name of *kali-kutki* a root has long been in use in India, which is stated to be the product of *Picrorhiza kuerva*. It is said to be a very valuable tonic, but has not yet found its way into European commerce. For an account of its physical properties, see *P. J. Tr.*, Dec. 1870, p. 502.

PIMPINELLA SAXIFRAGA. *Small Burnet Saxifrage. Saxifraga.* A perennial umbelliferous European plant, growing on sunny hills, and in dry meadows and pastures. The root has a strong, aromatic, yet unpleasant odor, and a sweetish, pungent, biting, aromatic, bitterish taste. Its active constituents are volatile oil and an acrid resin. It is considered diaphoretic, diuretic, and stomachic, and has been used in chronic catarrh, asthma, dropsy, amenorrhœa, etc. The dose in substance is about half a drachm, and in infusion two drachms. The root is used also as a local stimulant in toothache, etc.

PINCKNEYA PUBENS. Michaux. A large shrub or small tree, growing in South Carolina, Georgia, and Florida, in low and moist places along the sea-coast. It is closely allied, in botanical characters, to the Cinchonas, with which it was formerly ranked by some botanists. The bark is bitter, and has been used with advantage in intermittent fever.

PISCIDIA ERYTHRINA. *Jamaica Dogwood.* This is a leguminous tree growing throughout the West Indies, and yielding to commerce a very valuable wood. From time immemorial the bark has been used for catching fish. The leaves, twigs, and root-bark are collected, macerated with the residue from the distillation of rum or with lime-water, then transferred into baskets, and the latter dragged up and down the water until the active principle has been extracted and the fish are stupefied.

In 1844, Dr. William Hamilton called the attention of the profession to the plant (*P. J. Tr.*, Aug. 1844) as a powerful narcotic, capable of producing sleep and relieving pain in an extraordinary manner, and stated that in toothache a saturated tincture is exceedingly efficacious, not only affording relief when taken internally, but uniformly curing the pain when introduced upon a dossil of cotton into the carious tooth. Notwithstanding these statements, no attention was given to the subject until the enterprise of Parke, Davis & Co. recently brought it before the notice of the profession. The bark of the root as it appears in commerce is described as follows.

"The bark of commerce appears in pieces of two to four inches in length, and from one to two inches wide, and about one-eighth of an inch in thickness. The outer surface of some of the pieces is of a dark gray brown, while others are of a yellow brown, with no shade of gray present. The bark is frequently studded with flattened protuberances of a lighter color than the surrounding cork. The central part of the bark is much lighter colored, and, when wet or freshly broken, is of a peculiar blue-green color. The inner part of the bark is of a dark brown color, and very fibrous. It has a strong dis-

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agreeable odor of opium when broken into pieces. It is strongly acrimonious, and produces a burning sensation in the mouth and pharynx."

In all probability the active principle is an alkaloid, but we are not aware that this has as yet been obtained in a pure state. A resinoid, yellowish powder, separated by Mr. Nagle, has received the name of *piscedin*.

The action of the drug upon the lower animals has been studied by Drs. J. Ott and A. C. Nagle with similar results. (*Jamaica Dogwood*, Parke, Davis & Co., 1881.) The conclusions reached are—1. It is narcotic to frogs, rabbits, and men. 2. It does not affect the irritability of the motor nerves. 3. It does not attack the peripheral ends of the sensory nerves. 4. It reduces reflex action by a stimulant action on the centres of Setschenow. 5. It produces a tetanoid state by a stimulant action on the spinal cord, and not by a paralysis of Setschenow's centres. 6. It dilates the pupil, which dilatation passes into a state of contraction upon the supervention of asphyxia. 7. It is a salivator. 8. It increases the secretion of the skin. 9. It reduces the frequency of the pulse. 10. It increases arterial tension by stimulation of the vaso-motor centre. 11. This increase of pressure is soon succeeded by a fall, due to a weakening of the heart itself.

The exact practical value of the drug has not been determined, nor are the results produced in man by doses approaching toxic, known. Dr. Hamilton took a drachm, when laboring under severe toothache, on going to bed. He first felt a violent sensation of heat internally, which gradually extended to the surface, and was followed by profuse perspiration, with profound sleep for twelve hours. On awaking, he was quite free from pain, and without the unpleasant sensations which follow a dose of opium.

Various practitioners have reported good results from its use as an anodyne in neuralgia, nervous insomnia, hooping-cough, etc., but in other hands it has failed to do good. Dr. H. C. Wood has found it in one case of neuralgia to produce great nausea and gastric distress without evincing the slightest narcotic effect. The dose of the fluid extract is a drachm, to be carefully increased.

PLANTAGO MAJOR. *Plantain.* The leaves are saline, bitterish, and austere to the taste; the root saline and sweetish. The common plantain weed was formerly considered refrigerant, diuretic, deobstruent, and somewhat astringent. The ancients esteemed it highly in hemorrhages, particularly from the lungs, consumption, dysentery, etc., but it is at present never used, except it be externally in domestic practice as a stimulant application to sores. The leaves are put on whole or bruised in the form of a poultice. *Plantago media* and *P. lancifolia*, or *rib-grass*, which are also indigenous, possess properties similar to those of *P. major*, and may be used for the same purposes.

Semen psyllii are the seeds of several species of European Plantago. The best are those of *Plantago Psyllium*, or *fleawort*, which grows in the south of Europe and in Barbary. They are small, about a line long by half a line in breadth, convex on one side, concave on the other, flea-colored, shining, inodorous, and nearly tasteless, but mucilaginous when chewed. They are demulcent and emollient, and may be used internally and externally in the same manner as flaxseed, which they closely resemble in medical properties.

PLATINUM. The most useful salt of Platinum is the chloride, $PtCl_4 5H_2O$, which may be obtained by mixing an aqueous solution of chloroplatinic acid, H_2PtCl_6, with a solution of nitrate of silver: a precipitate containing the silver, combined with some platinum and chlorine, separates, and the yellowish red solution yields on evaporation fine large red crystals of chloride of platinum. The compound usually called platinum chloride is said by Roscoe and Schorlemmer to be chloroplatinic acid, $H_2PtCl_6.6H_2O$, and is made by dissolving the metal in nitro-hydrochloric acid, and evaporating with hydrochloric acid until all of the nitric acid is removed. In 1826, Prof. Gmelin, of Tübingen, made experiments to determine the action of this metal on the economy. In 1841, Dr. Ferdinand Hoefer published some observations on the same subject. The latter experimented chiefly with the chloride, formerly called bichloride, and the double chloride of platinum and sodium. They are both poisonous; the chloride in the dose of 15 grains, the double chloride in that of 30 grains. When a concentrated solution of the chloride is applied to the skin, it produces violent itching, followed by an eruption. Administered internally it irritates the mucous membrane of the stomach and occasions headache. The double chloride has no action when externally applied, and, when given internally, operates on the system in a less sensible manner than the chloride. It possesses the power of augmenting the urine. Dr. Hoefer ranks the preparations of platinum with the alteratives, by the side of those of iodine, arsenic, and gold. He considers them particularly suited to the treatment of syphilitic diseases; the chloride to cases of long standing and inveterate, the double chloride to those which are recent. The dose of the chloride is from half a grain to two grains twice a day, given in pill. Eight grains may be made into sixteen pills, with a drachm of the extract of guaiacum wood of the French Codex, and sufficient powdered liquorice root. Of these, one, two, or three may be taken morning and evening. The double chloride may be prepared by dissolving five grains of the chloride and eight of pure chloride of sodium in seven fluidounces of gum-water; and the whole may be taken by tablespoonfuls in the course

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of twenty-four hours. For frictions on indolent ulcers, Dr. Hoefer used an ointment composed of sixteen grains of the chloride, thirty-two grains of extract of belladonna, and an ounce of lard. (*Journ. de Pharm.*, xxvii. 213.)

PLUMBAGO EUROPÆA. *Leadwort. Dentellaria.* A perennial, herbaceous plant, growing in the south of Europe. It has an acrid taste, and, when chewed, excites a flow of saliva. This is particularly the case with the root, which has been long used to relieve toothache. Hence the plant derived the name of *dentelaire* by which it is known in France. A decoction of the root in olive oil has been highly recommended for the cure of the itch. Writers differ much in their statements in relation to the activity of the plant, some speaking of it as a rubefacient, vesicatory, and caustic, and, when swallowed, as violently emetic, and liable to produce dangerous irritation of the alimentary canal; while others consider it nearly inert. Perhaps the difference may be ascribed in part to the use of the plant in the recent state in one case, and dried or long kept in the other. A crystallizable, acrid principle, called *plumbagin*, has been extracted from the root by Dulong. (*Journ. de Phar.*, (2) xiv. 441.)

POLYGALA RUBELLA. Willd. (*P. polygama.* Walter.) Bitter polygala is an indigenous, perennial plant, with a branching, somewhat fusiform root, which sends up annually numerous simple, smooth, and angular stems, from four to eight inches in height. The leaves are scattered, sessile, obovate or linear lanceolate, attenuated towards the base, obtuse, and mucronate. The flowers are purple, and in elongated terminal racemes. From the base of the stem proceed other racemes, which lie upon the ground, or are partially buried under it, and bear incomplete but fertile flowers, the calyx of which is without wings. This plant is found in many parts of the United States, preferring a dry sandy or gravelly soil, and flowering in June and July. The whole plant was formerly officinal. It has a strong and permanent bitter taste, which it yields to water and alcohol. In small doses bitter polygala is tonic, in larger, laxative and diaphoretic. The infusion of the dried plant has been usually employed to impart tone to the digestive organs. (*Bigelow.*) It appears to be closely analogous in medical virtues to *Polygala amara* of Europe, which is used for a similar purpose.

POLYPODIUM VULGARE. *Common Polypody.* A fern belonging both to the old and new continents, and growing in the clefts of old walls, rocks, and decayed trunks of trees. The root, which is the part considered medicinal, is rather long, about as thick as a goose-quill, somewhat contorted, covered with brown, easily separable scales, furnished with slender radicles, and marked by numerous small tubercles. As found in the shops, it is sometimes destitute of the scales and radicles. Its color is reddish brown with a tinge of yellow, its odor disagreeably oleaginous, its taste peculiar, sweetish, somewhat bitter, and nauseous. The root of the variety growing upon the oak has been preferred, though without good reason. It was deemed purgative by the ancients, who employed it for the evacuation of bile and pituitous humors in melancholic and maniacal cases. Modern physicians have used it in similar complaints, and as a pectoral in chronic catarrh and asthma. At present, however, it is scarcely ever employed, being considered nearly inert. It was given in doses varying from a drachm to an ounce, usually in connection with cathartics.

POLYTRICHUM JUNIPERINUM. *Hair-cap Moss. Robin's Rye.* This indigenous moss is stated by Dr. Wm. Wood to be a powerful diuretic, and very useful in dropsy. (*Am. Journ. Med. Sci.*, N. S. xxvii. 267.) He infuses a large handful of the whole plant in water, and allows the patient to drink freely of the tea, "the more the better." Dr. Ariel Hunter confirms these statements. (*N. J. Med. and Surg. Reporter*, ix. 417.)

POPULUS. *Poplar.* Several trees belonging to this genus have attracted some attention in a medical point of view. In most of them the leaf-buds are covered with a resinous exudation, which has a peculiar, agreeable, balsamic odor, and a bitterish, balsamic, somewhat pungent taste. This is abundant in the buds of *Populus nigra* or the *black poplar* of Europe, which are officinal in some parts of that continent. They contain resin and a peculiar volatile oil. The buds of *P. balsamifera*, growing in the northern parts of North America and Siberia, are also highly balsamic; and a resin is said to be furnished by the tree, which is sometimes, though erroneously, called *tacamahac*. The virtues of the *poplar buds* are probably analogous to those of the turpentines and balsams. They have been used in pectoral, nephritic, and rheumatic complaints, in the form of tincture; and a liniment, made by macerating them in oil, has been applied externally in local rheumatism. The *unguentum populeum* of European pharmacy is made, according to the directions of the French Codex, by bruising in a marble mortar, and boiling in 2000 parts of lard, with a gentle fire, till the moisture is dissipated, 250 parts, each, of the fresh leaves of the black poppy, deadly nightshade, henbane, and black nightshade; then adding of the dried buds of the black poplar, bruised, 400 parts; digesting for 24 hours; straining with strong expression; and finally allowing the ointment to cool after defecation. This is an anodyne ointment, occasionally employed in Europe in painful local affections. It has been ascertained that poplar buds

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are capable of imparting a principle to ointments which in a powerful degree obviates their tendency to rancidity.

The bark of certain species of poplar is possessed of tonic properties, and has been used in intermittent fever with advantage. Such is the case with that of *P. tremuloides* or *American aspen*, and of *P. tremula* or *European aspen*. In the bark of the latter Braconnot found *salicin*, $C_{13}H_{18}O_7$, and another crystallizable principle which he named *populin*, $C_{20}H_{22}O_8$. It is in these, probably, that the febrifuge properties of the bark reside. They may be obtained by precipitating a saturated decoction of the bark with solution of subacetate of lead, filtering, precipitating the excess of lead by sulphuric acid, again filtering, evaporating, adding animal charcoal towards the end of the evaporation, and filtering the liquor while hot. Salicin gradually separates, upon the cooling of the liquor, in the form of crystals. If, when this principle has ceased to crystallize, the excess of sulphuric acid in the liquid be saturated by a concentrated solution of carbonate of potassium, the populin will be precipitated. If this be pressed between folds of blotting-paper, and redissolved in boiling water, it will be deposited, upon the cooling of the liquid, in the crystalline state. The leaves also of *P. tremula* afford populin, and more largely even than the bark. It is probable that both principles exist in the bark of *P. tremuloides* and other species. Salicin is described under *Salix*. *Populin* is very light, purely white, and of a bitter, sweetish taste, analogous to that of liquorice. When heated it melts into a colorless and transparent liquid. It is soluble in 2000 parts of cold, and about 70 parts of boiling water; and is more soluble in boiling alcohol. Acetic acid and the diluted mineral acids dissolve it, and, upon the addition of an alkali, let it fall unchanged. Piria regards it as a complex body, consisting of benzoic acid, *saligenin*, $C_7H_8O_2$, and glucose. (See *A. J. P.*, xxiv. 240.) Of these principles saligenin and glucose have been found in salicin; and it was inferred that, by separating benzoic acid, populin might be converted into salicin. This has been effected by Piria. When populin is boiled with baryta-water or milk of lime, the benzoic acid precipitated by ferric chloride, the excess of iron removed by lime, and the excess of lime by carbonic acid, the remaining liquid yields salicin on evaporation. The same conversion may be effected by heating populin with an alcoholic solution of ammonia to 100° C. (212° F.). Populin is therefore simply *benzoyl-salicin*, $C_{13}H_{17}(C_7H_5O)O_7$. Piria obtained from populin 28·9 per cent. of benzoic acid. (*P. J. Tr.*, xv. 378.) Dr. T. L. Phipson, basing his experiments upon the results of Piria, has succeeded in preparing populin artificially by combining salicin and benzoic acid. Nothing more is necessary than to dissolve the two substances in alcohol, and to concentrate the solution. Crystals are formed having all the characters of populin, and consisting of salicin and benzoic acid combined in the proportion of their equivalents. (*Chem. News*, Dec. 6, 1862, p. 278.)

PORTULACA OLERACEA. *Garden Purslane.* An annual succulent weed of our gardens, which has an herbaceous, slightly saline taste, and is often used as greens, being boiled with meat, or with other vegetables. It is considered a cooling diuretic, and is recommended in scurvy, and affections of the urinary passages. The seeds have been thought to be anthelmintic; but they are tasteless and inert.

POTENTILLA REPTANS. *Cinquefoil.* A perennial, creeping, European herb, whose root has a bitterish, styptic, slightly sweetish taste, and was formerly used in diarrhœa, and other complaints for which astringents are usually prescribed.

POWDER OF ALGAROTH. *Pulvis Algarothi. Oxychloride of Antimony. Nitro-muriatic Oxide of Antimony.* A powder rarely used now. For a description of its uses, properties, etc., see 14th edition U. S. Dispensatory.

PRENANTHES SERPENTARIA. *Lion's Foot.* This is a perennial herb, growing in the mountainous districts of Virginia and North Carolina. Dr. Darlington considers it a variety of *Prenanthes alba*. Pursh speaks of it as in great repute among the inhabitants of the regions it inhabits as a remedy for the bite of poisonous serpents, and relates a case in which he had seen it used effectively. The milky juice of the plant was taken internally, and the leaves steeped in water were applied to the wound and frequently changed. In October, 1849, Dr. Geo. B. Wood received a specimen of it from Dr. Newsom J. Pittman, of North Carolina, with the information that he had employed the decoction in ten or twelve cases of the bite of the rattlesnake with uniform success.

PRINOS VERTICILLATUS. The *black alder* is an indigenous shrub, with a stem six or eight feet high, furnished with alternate, spreading branches, and covered with a bluish gray bark. The leaves, which stand alternately or irregularly on short petioles, are oval, pointed, tapering at the base, acutely serrate, of a dark green color, smooth above, but downy on the veins beneath. The flowers are small, white, nearly sessile, and grow three or four together at the axils of the leaves. They are often diœcious. The calyx is persistent; the segments of the corolla obtuse; the stamens usually six, and furnished with oblong anthers; the germ large, green, and roundish, with a short style, terminating in an obtuse stigma. The fruit when ripe consists of glossy, scarlet, roundish berries, about the size of a pea, containing six cells and six seeds. Several of these berries are clustered, so as to form little bunches at irregular intervals on the stem. In the latter part of autumn, after the leaves have fallen, they still remain attached to the

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stem, and render the shrub a striking object in the midst of the general nakedness of vegetation. Hence the plant is often called *winterberry*.

It grows in all parts of the United States, from Canada to Florida, frequenting low wet places, such as swamps, and the borders of ponds, ditches, and streams. Its flowers appear in June. The berries, which have a bitter, sweetish, somewhat acrid taste, are sometimes used medicinally for the same purposes with the bark, which was formerly in the U. S. secondary list.

The dried bark is in slender pieces, more or less rolled, brittle, greenish white internally, and covered with a smooth epidermis, easily separable, and of a whitish ash color, alternating or mingled with brown. It has no smell, but a bitter and slightly astringent taste. Boiling water extracts its virtues. Mr. Thos. J. Lerch (*A. J. P.*, 1873, p. 251) has made a careful but unsuccessful search for berberina in the bark.

Black alder is usually considered tonic and astringent; and is among the remedies proposed as substitutes for Peruvian bark, with which, however, it has very little analogy. It has been recommended in intermittent fever, diarrhœa, and other diseases connected with debility, especially gangrene and mortification. It is a popular remedy in gangrenous or flabby and ill-conditioned ulcers, and in chronic cutaneous eruptions, in which it is given internally, and applied locally in the form of a wash or poultice. It may be used in substance or decoction. The dose of the powder is from thirty grains to a drachm, to be repeated several times a day. The decoction, which is usually preferred both for internal and external use, may be prepared by boiling two ounces of the bark with three pints of water to a quart, and given in the dose of two or three fluid-ounces. A saturated tincture, as well of the berries as of the bark, is sometimes employed.

PROPYLAMINE. *Propylamia. Trimethylamine. Secalia. Secalin.* Wertheim in 1850 prepared from narcotine a substance having the formula C_3H_9N, and gave it the name *metacetamine*. In the same year Anderson prepared from codeine, and Hofmann from methyl, substances having the same formula, giving respectively the names of propylamine and trimethylamine. Other chemists have obtained similarly constituted principles from cod-liver oil, ergot, herring-pickle, putrid calf's blood, codeine, etc., and have even found them in saline combination in the flowers of *Cratægus oxycantha*, *Sorbus aucuparia*, and of one or more species of Chenopodium. Under the names of propylamine some of these principles were introduced into medicine by Dr. Awenarius, of St. Petersburg, and met for a time with considerable favor; so that several processes for preparing propylamine were published before the 13th edition of the U. S. Dispensatory. Prominent among these was that of Prof. Procter (*A. J. P.*, 1859, p. 127), as follows. Herring-pickle procured from the dealers in salt fish, having been mixed with sufficient potassa to render the liquid strongly alkaline, is introduced into a retort or alembic, and heated. The vapors are condensed in a receiver containing distilled water duly refrigerated, and the heat is continued until the distillate, as it forms, ceases to have the odor of herrings. The condensed liquid, which contains the propylamine separated by the potassa from its saline combination in the pickle, is now neutralized with hydrochloric acid, and carefully evaporated to dryness. Ammonia, which comes over and is condensed with the propylamine, combines like it with the hydrochloric acid, and the dry salt obtained is a mixture of the hydrochlorates of both of these bases. This is exhausted with absolute alcohol, which dissolves the chloride of propylamine, and leaves the chloride of ammonium. If the alcoholic solution be treated with hydrate of lime, propylamine in vapor is given out abundantly with very little heat, and may be condensed in a receiver, which should be kept well cooled. The process may be simplified as suggested by Prof. Procter in a subsequent number of the journal (1859, p. 222), by acidulating the liquid in the receiver with hydrochloric acid, added gradually as the acid becomes neutralized, thus directly forming the hydrochlorate, which may be obtained crystallized by subsequent concentration, and, if necessary, freed from the accompanying chloride of ammonium in the manner already mentioned. Since the 13th edition of the U. S. Dispensatory it has been very clearly shown that these various substances, although containing the same number of atoms, have them differently arranged, are consequently possessed of diverse properties, and are hence only *isomeric*. The material obtained from herring-pickle and other sources and sold as propylamine is indeed not propylamine at all, but a more or less impure solution of trimethylamine; it is, in truth, doubtful whether propylamine has ever been procured from a natural source, or made in any other way than by treating iodide of propyl with ammonia. Both principles are derived ammonias or *amines*, but propylamine is a primary compound ammonia (monamine), and trimethylamine is a tertiary compound ammonia (triamine). In the first body the nitrogen is combined with two atoms of hydrogen and one propyl group, C_3H_7, in the second with three methyl groups $(CH_3)_3$.

Propyl, C_3H_7 } H } H } $N = C_3H_9N$, Propylamine. Methyl, CH_3 } CH_3 } CH_3 } $N = C_3H_9N$, Trimethylamine.

The physical differences are very marked. Thus, propylamine boils at 49° C. (120·2° F.), trimethylamine at 6° C. (42·8° F.). The commercial propylamine contains other

ammonia compounds besides trimethylamine, the latter substance indeed being sometimes present in very small quantity.

M. E. Perret (*P. J. Tr.*, 1873, p. 884) states that a very pure preparation may be made by the following process. The digestive apparatus of cows, oxen, or sheep is to be cut up, washed, mixed with four to six times its weight of water, and one-fifteenth of carbonate of potassium or dry soda, and allowed to ferment at a temperature of from 59° to 64·5° F. during thirty-two to thirty-six hours. The liquid is then drained through a wire sieve, and to it is added half its weight of caustic soda (soap-maker lees at 40°), and the whole distilled very slowly. Gas very rapidly escapes, and the mass swells; the heat is then moderated. When this reaction is ended propylamine comes over, mixed very slightly with methylic and ammoniacal gases. It is contained in the earlier portions of the distillate. This should now be saturated with hydrochloric acid, filtered and evaporated to dryness. The dry hydrochlorate is pounded with three times its weight of caustic soda (lees at 40°), then distilled in a retort provided with a tube which reaches to near the bottom of distilled water placed in the recipient. The trimethylamine is absorbed by the water. So soon as this is saturated and the bubbles pass off at the surface, the contents of the receiver should be replaced by fresh water. Messrs. Ferris & Co., of Bristol, England, are said to produce the drug upon a large scale, as follows. Herring-brine is distilled with soda-lime, the alkaline distillate saturated with hydrochloric acid and evaporated; the residue treated with alcohol, the alcohol drawn off. What remains is distilled with caustic lime or potash, and the products, condensed in cold water, sold as "propylamine." If a purer article is desired, the distilled products are condensed in hydrochloric acid, this evaporated to dryness, the residue treated with absolute alcohol and again distilled with lime. This last process is repeated until a pure product is obtained.

The best form of trimethylamine for use is probably the hydrochlorate, which may be prepared in a state of purity as a very deliquescent salt, crystallizing in long needles. Mr. Frederick Wurtz makes it artificially by converting methylic alcohol into iodide of methyl, heating this under pressure with ammonia, washing the crystals of iodide of tetramethylammonium with distilled water, distilling this with chalk, receiving the gas of trimethylamine in hydrochloric acid, and freeing the chloride of trimethylamine by solution in absolute alcohol from chloride of ammonium, which is insoluble in such menstruum. (*Ann. de Thérap.*, 1874, p. 98.) To form the chloride naturally the distillatory products in M. Perret's process may be received into hydrochloric acid and separated from any chloride of ammonium by means of absolute alcohol. *Commercial propylamine, i.e.* impure solution of trimethylamine, is a colorless transparent liquid, of a characteristic odor, usually attended with some pungency, which may possibly be ascribed to the ammonia frequently mixed with it. It is soluble in water and alcohol, has a strong alkaline reaction, and forms crystallizable salts with the acids. If the end of a glass rod, previously dipped into hydrochloric acid, be held over the open mouth of a vial containing it, a white cloud of the chloride will be seen, as in the case of ammonia. *Pure propylamine* is said to be a perfectly clear, strongly refractive fluid, with the odor of ammonia; a boiling point of 49° C. (120·2° F.); a sp. gr. (at 20° C. (67° F.)) of 0·7186; inflammable; miscible with water. With hydrochloric acid it makes a deliquescent salt, soluble in alcohol, forming with chloride of platinum a double salt, which crystallizes in large, dark, golden-yellow clino-rhombic plates, somewhat soluble in hot water and alcohol. *Pure trimethylamine* is a gas at ordinary temperatures.

Dr. Awenarius, of St. Petersburg, Russia, first called attention to the use of commercial propylamine in rheumatism, for which he considered it a specific; so much so that a case of doubtful rheumatism might be diagnosticated by the successful use of this remedy in the course of a few days. Between March, 1854, and June, 1856, he treated in the Hospital Kalinkin, in St. Petersburg, 250 cases of rheumatism with success. Some of the cases were acute, some chronic, many metastatic, with pericardial, pleuritic, and meningeal complications; and hemiplegic and paraplegic cases were not wanting; but all recovered. In the acute cases the pain and fever disappeared in a day or two. He mixed 25 drops of propylamine with six fluidounces of distilled water, flavored if necessary with sugar and oil of peppermint, and gave a tablespoonful every two or three hours, taking care that the drug was pure and freshly prepared. (*Ann. de Thérap.*, 1859, p. 74.) In this city some years since the remedy was extensively employed by various practitioners both in hospital and private practice, and finally abandoned as not yielding as good results as the ordinary alkaline treatment. Whether the disrepute was caused by the impurity of the drug employed, by the insufficiency of the dose, or by the real want of power in the remedy, we do not know. Recently it has come largely into vogue in France and to a less extent in other European countries, and much testimony has been brought forward both as to its value and to its want of value, though on the whole the evidence as to its usefulness is in the ascendant.

Locally applied, trimethylamine acts as a powerful irritant or, if in sufficient concentration, even as a mild caustic. According to M. Laborde, in its physiological action it resembles the chloride or carbonate of ammonium, though differing in not causing convulsions in animals fatally poisoned with it. (*Med. Times and Gazette*, 1874, p. 241.) The chloride was found to act in the same way as the trimethylamine, but to be scarcely

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more than half as powerful. The irritant action of the drug is very apparent in man, so that doses of over half a drachm of the commercial propylamine, even if freely diluted, are almost sure to produce decided symptoms of gastro-intestinal irritation. In a case recorded by Dr. B. F. Eaton, after using it for about three days, the patient was seized with vomiting, accompanied with faintness, and excessive thirst; but whether these phenomena were the effects of the propylamine could not be determined. (See *A. J. P.*, 1862, p. 277.) Large doses are said in rheumatism to reduce the pulse very decidedly in force and frequency, and also the temperature and the elimination of urea. (*Ann. de Thérap.*, 1874, p. 104.) Hamdy and Dujardin-Beaumetz (*Ibid.*, pp. 104, 97) state that in animals the circulation is much depressed by it, but M. Laborde affirms (*Med. Times and Gaz.*, 1874, p. 246) that the drug, unless given in such doses as to endanger serious results from its local action, increases both in man and animals the force of the circulation. There is probably no better plan of administering the remedy than that recommended by Dr. Awenarius; namely, in watery solution. A solution of twenty-four to forty-eight drops of commercial propylamine in six fluidounces of peppermint-water, with two drachms of sugar, may be given in the dose of half a fluidounce, equivalent to two to four drops of the commercial solution, every two hours in the more acute cases. Or thirty-six grains of the chloride may be substituted in the mixture for the twenty-four drops, and six fluidrachms of the solution of potassa added. This would give, with each dose of the propylamine, three or four grains of chloride of potassium, which could have no material effect, and certainly none of an injurious character. In France the chloride of trimethylamine is preferred. The following is a favorite formula. Chloride of trimethylamine ten grammes, tincture of orange-peel twenty-eight grammes, syrup nine hundred and seventy grammes. A tablespoonful contains about three and a half grains. The dose of the chloride of trimethylamine is 7 to 15 grains.

PRUNELLA VULGARIS *Self-heal. Heal-all.* A small perennial labiate plant, common both in Europe and the United States. It is inodorous, but has an austere bitterish taste. The herb in flower was formerly used, in the state of infusion or decoction, in hemorrhages and diarrhœa, and as a gargle in sore throat.

PSORALEA EGLANDULOSA. (*Elliot.*) P. MELILOTOIDES. (*Michaux.*) *Congo Root, Bob's Root. Samson's Snakeroot.* (See Psoralea melilotoides, *Gray's Manual of Botany.*) This leguminous plant, a foot or two high, which grows wild in Ohio westward to Illinois, and in Virginia southward, has been brought into notice as a remedy by Dr. John P. Mettauer, of Prince Edward's Court-House, Va. The root, according to Dr. Mettauer, is the most active part of the plant. Both root and leaves yield their virtues to water and to alcohol; but the latter is the most efficient menstruum. The season for collecting the plant is when it is in flower, which, in Virginia, is from the first of June to the middle of July.

Dr. Mettauer states that the psoralea is a gently stimulant tonic, with some influence over the nervous system analogous to that produced by tea. He considers it as peculiarly applicable to subacute irritations of the alimentary mucous membrane, especially when in some degree involving the mesenteric glands, and attended with diarrhœa. For further details see U. S. Dispensatory, 14th ed., or original article in *Bost. Med. and Surg. Journ.*, Oct. 1867.

PTELEA TRIFOLIATA. *Wafer-ash. Wingseed. Shrubby Trefoil. Hop-tree.* (See *Gray's Manual of Botany*, revised edition, p. 75.) This is a shrub, six or eight feet in height, growing in rocky places from Pennsylvania to Wisconsin, and southward. General attention has been called to it by Drs. O. F. Potter and Justus Steer. The bark of the root is the part used in medicine. When dried, it comes in cylindrical rolls or quills, one or two lines in diameter, and from one to several inches long, of a light brownish color, irregularly wrinkled, and covered with a thin epidermis. Internally it is yellowish white, but darkens by exposure. It has a peculiar somewhat aromatic smell, and a bitter, persistently pungent, and slightly acrid, yet not disagreeable taste. It yields its virtues to water, but more readily to alcohol. It is said to have been much employed of late, among the physicians of the Western States, in the treatment of dyspepsia, and generally in diseases requiring tonics, to which class the ptelea belongs. Dr. Potter considers it a valuable and reliable remedy. He has long used it in the debility following low fevers, and especially connected with gastro-intestinal irritation, to which it seems to be peculiarly applicable from its mild and unirritating qualities. It exercises a soothing influence on the stomach, which receives it when rejecting other tonics; while it promotes the appetite, invigorates digestion, and helps greatly to re-establish health in convalescence. Dr. Potter uses a tincture, made by macerating six ounces of the bark and half an ounce of ginger in two quarts of whisky, which he gives in the dose of one or two tablespoonfuls three times a day. (*N. Y. Med. Journ.*, ii. 184.) The bark has been examined chemically by Mr. Steer, who found it to contain, besides other ingredients, an oleoresin, of an acrid and bitter taste, and an odor recalling that of the bark, starch, albumen, a yellow coloring substance, and salts of lime, potassa, and iron. He also extracted from it the alkaloid berberine, which is probably the tonic principle, while the

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oleoresin may impart to the bark somewhat stimulant properties. (*A. J. P.*, 1867, p. 337.) See also a paper by Mr. G. M. Smyser, in the same journal (1862, p. 198).

PTOMAÏNES. Within the past few years a class of very interesting compounds have been described and are known under this name. They are alkaloid-like bases obtained from animal tissue after decomposition has commenced, hence sometimes called *cadaveric alkaloids*. Bence Jones and Dupré (*Pharm. Centralhalle*, 16, No. 10) first published a notice of the finding of an alkaloid-like base from a decomposing human liver. Its sulphate solution fluoresced, and in other ways resembled quinine, yielding precipitates also with the usual alkaloidal reagents, iodohydrargyrate of potassium, phosphopolybdic acid, gold and platinic chlorides. It appears, however, that Marquardt had isolated such bases even previous to this. The chief investigator of this class of alkaloids has been Leline, who has described several groups of them. From cadavers which had been buried 1, 3, 6, and 10 months in different cases, he obtained bases of strong alkaline reaction, all of which formed characteristic crystalline compounds, with a solution of hydrogen iodide containing dissolved iodine. Three were soluble in ether but not poisonous, one insoluble in ether but soluble in amyl alcohol was in the highest degree poisonous, producing in rabbits tetanus, strong dilatation of the pupil, paralysis of the heart, and death. All of these bodies give the general alkaloid reactions, but change rapidly when exposed to the air. Hager found an alkaloid of volatile character which he named *septicine;* Liebermann found one resembling conine in reactions, but without the characteristic odor of conine; Dragendorff obtained another resembling closely in its reactions morphine and narcine; and Leline, lastly, has quite recently described a number of these volatile bases containing arsenic, and derived from bodies in which poisoning by white arsenic had taken place. These arsines, as they may be termed, were very much more poisonous in their character than arsenious acid or any of its simple solutions.

The formation of these volatile and frequently actively poisonous bases in the cadaver would seem to make the task of the toxicologist very difficult when the search for poisonous bases has been delayed until decomposition has set in. Any reagent or reagents, therefore, which will enable the chemist to decide between vegetable bases and these ptomaïnes becomes very important. Brouardel and Bontury (*Comptes-Rendus*, 92, 1056) claim to have found such a decisive reagent in ferricyanide of potassium. This compound when treated with a solution of a pure vegetable alkaloid is unacted upon by it; while, under the same conditions, it is instantly reduced to the state of ferrocyanide by a ptomaïne, and thus becomes capable of forming Prussian blue with a ferric salt. Up to the present but two exceptions to this general rule have been found,—morphine, which readily reduces potassium ferricyanide, and veratrine, which gives traces of such reduction. It is possible, however, that in this last case the reducing action is due to certain impurities which the investigators were unable to remove completely from the veratrine employed by them.

Ptomaïnes are probably devoid of medical properties, but are of great interest to the toxicologist, not only from a chemical stand-point, but also from the fact that they are excessively fatal in their effects upon the animal economy. The well-known action of putrefactive flesh, the curious poisonings sometimes produced by lobsters and other animals which feed upon carrion, are in all probability caused by them. It is probable that different members of the class have different physiological effects, but at present we have no definite information, so that a most inviting field is opened to the investigator. In regard to treatment of poisoning by putrefactive animal matters, our present knowledge only justifies the immediate evacuation of the stomach and bowels, and the meeting of the various indications as they arise.

PULMONARIA OFFICINALIS. *Lungwort.* An herbaceous perennial, European plant, sometimes cultivated in this country in gardens. The leaves are inodorous, and have an herbaceous, somewhat mucilaginous, and feebly astringent taste. They have been considered pectoral and demulcent, and employed in catarrh, hæmoptysis, consumption, and other affections of the chest; but their virtues are doubtful, and they were probably used in pectoral complaints as much on account of the supposed resemblance of their speckled surface to that of the lungs, as from the possession of any positively useful properties.

PUMICE STONE. *Pumex. Obsidian.* A very light porous stone, found in the vicinity of active and extinct volcanoes, and believed to have been thrown up during their eruption. The spongy structure of pumice is believed to be due to the effects of aqueous vapor upon lava whilst in a fluid state. The pumice stone of commerce is said to be obtained chiefly from Lipari. It is used whole, in the manner of a file, for removing the outer surfaces of bodies, or for rubbing down inequalities, and, in the state of powder, for polishing glass, metals, stones, etc.; purposes to which it is adapted by the hardness of its particles.

PYRETHRUM PARTHENIUM. (Willd.) *Matricaria Parthenium.* (Linn.) *Chrysanthemum Parthenium.* (Persoon.) *Feverfew.* A perennial herbaceous plant, about two feet high, with an erect, branching stem, pinnate leaves, oblong, obtuse, gashed, and dentate leaflets, and compound flowers in a corymb upon branching peduncles. It is a

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native of Europe, but cultivated in our gardens. The whole herbaceous part is used. The plant has an odor and taste analogous to those of chamomile, which it resembles also in the appearance of its flowers, and in its medical virtues. According to Zeller, a pound of it yields 4·8 grains of volatile oil. (*Centralbatt*, 1855, p. 205.) The volatile oil is greenish, boils between 165° C. (329° F.) and 220° C. (428° F.), and separates on standing. *Pyrethrum camphor*, $C_{10}H_{16}O$, contains in addition a hydrocarbon and an oxidized oil. (Dessaignes and Chautard, *Journ. de Pharm.*, (3,) 13, 241.) Though little employed, it is undoubtedly possessed of useful tonic properties. The flowers of this and of a closely resembling species, *Matricaria parthenoides* (Desf.), are said to be used in France, to a considerable extent, indiscriminately with those of the true chamomile plant, *Anthemis nobilis*, which they closely resemble, especially when double. They may, however, be distinguished, in this state, by their peculiar odor, their smaller receptacle, which is, moreover, rounded and flattened above, instead of being conical and somewhat pointed as in the Anthemis, and by the tubular five-toothed central florets, which in the chamomile are small, few, and scarcely visible, but, in the two species of Pyrethrum, are large, very numerous, and very long.

PYROACETIC SPIRIT. *Pyroacetic Ether. Acetone.* (C_3H_6O.) This substance may be obtained by carefully distilling acetate of calcium, and rectifying the product by repeated distillations from quicklime in a water-bath, until the boiling point becomes stationary, whereby it is freed from water and empyreumatic oil. It may also be prepared by heating gum, citric and tartaric acids, sugar, and other vegetable substances in contact with lime. It is a colorless, volatile, inflammable liquid, having a peculiar penetrating smell, and a pungent taste like that of peppermint. Its sp. gr. is 0·792 at 18° C. (64·4° F.), and boiling point 56° C. (132·8° F.). As found in the shops, its density is not generally lower than 0·820. It is miscible in all proportions with water, ether, and alcohol, without disturbing its transparency. If it becomes turbid when mixed with water, the fact shows that it contains empyreumatic oil. It has been confounded with pyroxylic spirit, from which it is distinguished by its inability to dissolve a saturated solution of chloride of calcium, which is instantly dissolved in pyroxylic spirit. (*Scanlan.*) It was thought at one time that the substance brought to the notice of the profession by Dr. John Hastings, of London, under the name of naphtha, as a remedy for pulmonary consumption, was pyroacetic spirit; but it now appears to be settled that what he intended was pyroxylic spirit. (See *Methylic Alcohol*, page 1698.) There is no doubt that these spirits were used indiscriminately in the therapeutic trials which grew out of the publication of Dr. Hastings's book; but no exact experiments have been made, so far as we know, to determine the precise physiological action of pyroacetic spirit. In the arts, it is proposed to use acetone for the preparation of varnishes from mastic and sandarac; also in the restoration of oil paintings. (See *Chem. News*, March 17, 1865.)

PYROGALLIC ACID. *Pyrogallol. Galline* (Rosing). ($C_6H_6O_3$.) This substance has acquired great importance as an agent in photography. It is one of the results of the igneous decomposition of gallic acid, and may be obtained by submitting extract of galls to the same treatment as that used for preparing benzoic acid from benzoin, the reaction being $C_7H_6O_5 - C_6H_6O_3 + CO_2$. The vapors of pyrogallic acid rise, and condense on the upper surface of the paper diaphragm. The chief difficulty in the process is properly to regulate the heat; as at a high temperature this acid passes rapidly into metagallic acid, and thus the product is diminished. According to Löwig, it is best prepared by heating gallic acid, previously dried at 100° C. (212° F.), in a glass retort, by means of a chloride of zinc bath, to 210° C. (410° F.), when the pure acid sublimes. It is stated by MM. de Luynes and Espandieu that, in the ordinary method of obtaining pyrogallic acid, much of the acid is lost. According to Pelouze, the proportion of pyrogallic acid produced ought to be very nearly 75 per cent., but the processes in use yield only 25 per cent.; the pyrogallic acid itself undergoing rapid decomposition at an elevated temperature. MM. de Luynes and Espandieu have succeeded in preventing this loss by decomposing gallic acid in water under pressure, instead of dry sublimation. Gallic acid is introduced into a bronze boiler with twice or three times its weight of water; the temperature is raised to a point from 200° C. (392° F.) to 210° C. (410° F.), and maintained at that point for half an hour, when the liquid is allowed to cool. The boiler now contains a slightly colored solution of pyrogallic acid. This is heated with a little pure animal charcoal, filtered, evaporated sufficiently, and set aside to crystallize. The crystalline mass obtained is somewhat colored. To obtain it entirely white, nothing more is necessary than to distil in a vacuum. The product is quite 75 per cent. The carbonic acid escapes through the joinings of the apparatus, while the watery vapor is retained. (*A. J. P.*, 1866, p. 22.) Another equally satisfactory procedure is that of Thorpe, for details of which see *A. J. P.*, 1881, pp. 53, 236.

Pyrogallic acid is in white, shining scales, inodorous, very bitter, soluble in three and a half parts of water, readily dissolved by alcohol and ether, fusible at 115° C. (239° F.), and sublimable at 210° C. (410° F.)in irritating vapors. According to Rosing, of Christiania, it is always partially converted, when sublimed, into metagallic acid, to which probably it owes its acid reaction as generally found in commerce; for, when quite pure,

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it has no influence on litmus-paper. It is a triatomic phenol, $C_6H_3(OH)_3$, and is therefore, properly speaking, not an acid at all. One of its characteristic properties is its strong affinity for oxygen, in consequence of which it instantly undergoes change by contact with chlorine, iodine, bromine, and the acids which readily yield oxygen. Through the same property it rapidly reduces some of the metallic oxides; and its use in photography is based on this effect exercised on the salts of silver. Though unalterable in the air when quite dry, it is rapidly changed in solution by the absorption of oxygen, so that it may be used for ascertaining the proportion of this gas in a mixture of gases. M. J. Personne, believing that phosphorus acts as a poison on account of its affinity for oxygen, was led to make experiments with pyrogallic acid. (*Comptes-Rendus*, Oct. 1869.) He found that in doses of 30 grains it produced in dogs ymptoms and post-mortem lesions similar to those caused by phosphorus.

QUEBRACHO BARK. *Quebracho Blanco.* The bark of the apocynaceous tree of Chili, *Aspidosperma quebracho*, is said to appear in European commerce in two varieties, the one coming from the province of Salta, of a lighter, clearer color, the other from the province of Cordoba, much darker. As we have seen the bark, it occurs in large pieces, half to three-quarters of an inch in thickness, covered on the outside with a very thick and rough corky layer, which is of a grayish brown color, and deeply divided by furrows and excavations. The inner side of the bark is grayish or yellowish, smooth or somewhat fibrous, often with small black spots. Upon section, the outer layer of the bark is red, with small yellowish spots; the inner, light grayish, and minutely marked by the ends of the bark fibres. The taste of the bark is intensely bitter. (For microscopical description of the bark, see *A. J. P.*, 1881, p. 238.) The wood of the tree is not met with in commerce, but is said to be very hard, distinctly marked with rings of growth, and of a bright chocolate-brown color, except the very young wood, which is yellowish or reddish. According to the experiments of Heise and Penzoldt, the wood is inactive, and contains no alkaloids; it is used for tanning purposes in South America.

In 1878, Fraude (*Ber. Deuts. Chem. Ges.*, 1878, p. 2189; 1879, p. 1560) discovered in the quebracho blanco an alkaloid, *aspidospermine*, $C_{22}H_{30}N_2O_2$; but a series of experiments have led Dr. F. Penzoldt to the conclusion that it does not represent the whole medical activity of the bark, and O. Hesse is said to have found four other alkaloids, one of which, *quebrachine* ($C_{21}H_{26}N_2O_3$), he has described. (*Ber. Deuts. Chem. Ges.*, xiii. 2308.) *Aspidospermine* is soluble in about 6000 parts of water at 15° C. (59° F.), and the solution has a decidedly bitter taste, soluble in about 48 parts of absolute alcohol, in 106 parts of ether, insoluble in glycerin; it dissolves readily in fats and fixed oils, cod-liver oil dissolving a larger proportion than it does of quinine. Its *sulphate* and *hydrochlorate* are very soluble. The citrate is crystallizable, and very soluble. The yield of aspidospermine is very small, 0·33 per cent. of the bark. Quebracho bark is said to be used as an antiperiodic in Chili, and has recently attracted attention and been highly lauded as a remedy in cardiac and asthmatic dyspnœa. (*Die Wirkungen Quebrachodrogin*, Dr. F. Penzoldt, Erlangen, 1881.) The alcoholic extract has been given in asthma, uræmic dyspnœa, fatty heart, etc., in doses of 5 grains, with asserted surprising advantage. (See *Berlin. Klin. Wochens.*, xvi., 1879; *Prag. Med. Wochenschrift*, 1879, iv.) In the lower animals large doses of the bark produce motor palsy, with dyspnœa, and finally death, apparently from asphyxia. The breathing early becomes slower in rate, but deeper; the blood-pressure is not until late much affected. Dr. F. Penzoldt (*loc. cit.*) believes that the relief of dyspnœa obtained clinically by the use of the drug is caused by its increasing the power of the blood to take oxygen, and the dyspnœa caused by poisonous doses he attributes to its preventing the blood yielding the oxygen to the tissues, but he does not clearly prove his theory.

Quebracho colorado and *Quebracho Gum* are respectively the wood and the dried juice or watery extract of the *Loxopterygium Lorentzii*, a large tree growing in the Argentine Republic. The wood is very heavy, hard, and of a reddish brown color. (See *A. J. P.*, 1879, p. 152; also, Penzoldt, *loc. cit.*; *P. J. Tr.*, xii.) Quebracho colorado has been used as a substitute for the true quebracho, but is essentially different from it, and probably is a simple astringent and gastro-intestinal stimulant, although Dr. Penzoldt claims that it is similar in its action, but much weaker than quebracho blanco. A *tincture of quebracho* has been made: 1 part to 5 parts of alcohol sp. gr. ·923. *Wine of quebracho*: 1 part quebracho bark, 2 parts alcohol sp. gr. ·923, white wine 16 parts.

QUINOA. The *Chenopodium quinoa* is largely cultivated in Southern Peru and Southern Chili, often above the height at which barley and rye will ripen, for the sake of its seeds. These are about the size of white mustard-seeds, but flatter, and afford a flour resembling somewhat oat-meal. The starch grains are very small, and constitute about 40 per cent. of the grain, which also contains 5 per cent. of sugar, 7½ of casein, and 11 of albumen and other protein compounds. One variety, the red quinoa, contains a bitter principle in the seed-husks, and is used to some extent as an emetic and antiperiodic. (*A. J. P.*, 1872, p. 559.)

RANUNCULUS. *Crowfoot.* Most of the plants belonging to the genus Ranunculus

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