lead by sulphuric acid, and then recombined with soda. Both of the acids are decomposed by the alkalies, with the aid of heat, into *cholalic acid*, which contains neither nitrogen nor sulphur, and into another complex body, which, in the case of cholic acid, is a nitrogenous basic substance named *glycocine* (the glycocoll or sugar of gelatin of other chemists), and in that of choleic acid, a neuter substance called *taurine*, which contains both nitrogen and sulphur, the latter in the extraordinary proportion of 24 per cent. Acids with a boiling heat have an analogous effect, though the nature of the acid produced is different, the cholic acid being resolved into *choloidic acid* and glycocine, and the choleic into the same acid and taurine. Hence, it has been inferred that the characteristic acids of bile consist of one acid, associated in the cholic with glycocine, and in the choleic with taurine; so that they have now received the more distinctive names of *glycocholic* and *taurocholic acids*, the former nitrogenous, the latter containing nitrogen and additionally two eqs. of sulphur. (See Gregory's *Organic Chemistry*, 4th ed., Lond., p. 513; also a paper by Dr. J. C. Dalton in the *Am. Journ. of Med. Sci.*, N. S., xxxiv. 305.) Since the examination of bile by Strecker, which ended in these results, further researches have led him to the discovery of other new principles in that part of bile which is soluble both in alcohol and ether. Independent of the fatty matters (glycerides) and cholesterin, he has detected 1. *lecithin*, a substance previously noticed by M. Gobley, which is resolved under the influence of baryta water into fatty acids, and *phosphoglyceric* acid, 2. *sarcolactic* acid, and 3. an energetic base which he calls *cholin*. For the methods of isolating these substances, we must content ourselves with referring to the *Journal de Pharmacie* (Nov. 1861, p. 374). Besides soda, it is said that there are small but variable quantities of potassa and ammonia combined with the glycocholic and taurocholic acids. In relation to the fatty matters of bile, M. Gobley has shown that they consist of olein, margarin, cholesterin, and especially *lecithin*, a fatty principle the characters of which were made known by M. Gobley, and that the oleic and margaric acids, generally supposed to exist in bile combined with soda, are the results of the decomposition of the last-mentioned principle, through the influence of putrefaction or chemical reagents. (*Journ. de Pharm.*, xxx. 246.)

Bile was formerly highly valued as a remedy in numerous complaints, and was considered peculiarly applicable to cases attended with deficient biliary secretion. It is supposed to be tonic and laxative. It is prepared for use by evaporating it to the consistence of an extract. The dose is from five to ten grains. Dr. Bonorden has found the most extraordinary effects, in the resolution of hypertrophies, from bile applied directly to the parts affected. Hypertrophy of the mamma and that of the tonsils are particularly mentioned as yielding with surprising facility to this application; but good may be expected from it in all cases of the affection, in which the part can be reached. He employs a mixture of 3 parts of inspissated bile, 1 part of extract of conium, 2 of soda soap, and 8 of olive oil, to be rubbed on the part four times a day. He has also found advantage in similar affections of the eye, as opacity of the cornea, pannus, and staphyloma, from bile dropped into the eye, or applied by a hair pencil, several times a day. (*Med. Times and Gaz.*, Oct. 1858, p. 353.) *Refined ox-gall*, much used by limners and painters, is prepared, according to Gray, in the following manner. Take of "fresh ox-gall one pint; boil, skim, add one ounce of alum, and keep it on the fire for some time; to another pint, add one ounce of common salt in the same manner; keep them bottled up for three months, then decant off the clear; mix them in an equal proportion; a thick yellow coagulum is immediately formed, leaving the refined gall clear and colourless." A formula is given in the Br. Pharmacopœia for purifying bile. (See *Fel Bovinum Purificatum*, page 1123.) W.

PÆONIA OFFICINALIS. *Peony.* This well-known plant is a native of Southern Europe, but is everywhere cultivated in gardens for the beauty of its flowers. The root, flowers, and seeds were formerly officinal. The *root* 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 odour, and a nauseous taste, which is at first sweetish, and afterwards bitter and somewhat acrid. The odour 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. In modern times it has also been given in epilepsy and various nervous affections, but is at present seldom used. Dr. A. Livezey, of Lumberville, Penn., states that it is much used in the convulsions of children in his neighbourhood, 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 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 odour, and very disagreeable taste. The *flowers* are usually of a deep-red colour, though in some varieties of a light-red, and even whitish. They have, when fresh, an odour similar to that of the root, but feebler, and an astringent, sweetish, herbaceous taste. When dry they are inodorous. As a medicine they have little power. The *seeds* are roundish-oval, about as large as a pea, externally smooth, shining,

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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 with the root, but are not used in regular practice. W.

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 palms contribute to the supply of this article of commerce.

Palm oil has the consistence of butter, a rich, orange-yellow colour, a sweetish taste, and an agreeable odour, 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 colour. 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. According to M. Henry, it consists of 31 parts of stearin and 69 of olein. But, from the experiments of Frémy and Stenhouse, it appears that the stearin has peculiar properties entitling it to be considered as a distinct principle; and it has accordingly received the name of *palmitin*. This is converted into *palmitic acid* by saponification. (*Kane's Chemistry.*) 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 464° F., and keeping it for ten minutes at that temperature. It loses for a time its peculiar odour by the process, acquiring an empyreumatic smell; but this after a while ceases to be perceived, and the characteristic odour returns. (See *Am. Journ. of Pharm.*, xxvii. 346.) Palm oil is said to be frequently imitated by a mixture of lard and suet, coloured with turmeric, and scented with Florentine orris. It is much employed in the manufacture of a toilet soap, which retains its pleasant odour. Palm oil is emollient, and has sometimes been employed in friction or embrocation, though not superior for this purpose to many other oleaginous substances. W.

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 tumours. W.

PARTHENIUM INTEGRIFOLIUM. *Prairie Dock.* This is an herbaceous perennial, growing abundantly in the prairies of our South-western States. It is recommended by Dr. Mason Houlton as a powerful antiperiodic. The flowering tops are the part used. They have an intensely bitter taste; and two ounces of them in the dried state, given in the form of infusion, are thought by Dr. Houlton to be equivalent to twenty grains of sulphate of quinia. Thirty successive cases of periodic fever were cured by this remedy, without any unpleasant effect on the nervous system. (*Med. Exam.*, N. S., ix. 719, from *Memphis Med. Recorder;* and *Pharm. Journ.*, xii. 602, from *N. Y. Journ. of Pharm.*) W.

PATENT YELLOW. *Mineral Yellow.* A pigment, consisting of chloride combined with protoxide 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. W.

PAULLINIA. *Guarana.* This is a new medicine introduced into Europe from Brazil, which has attracted some attention from the asserted fact, that it contains a principle identical with caffein. The name of *paullinia* has been bestowed upon it from the generic title of the plant from which it is obtained. That of *guarana*, by which it was previously known, was derived from a tribe of aborigines, called Guaranis, who are said to use it extensively as a corrigent of their vegetable diet. It is prepared from the seeds of the *Paullinia sorbilis* of Martius, a climbing shrub, belonging to the class and order Octandria Trigynia of the Linnæan system, and the natural family of the Sapindaceæ. Another species, the *P. Cupana*, growing on the banks of the Orinoco River, is also said to yield it. (*Ann. de Thérap.*, 1858, p. 70.) The seeds, which are contained in a three-celled, three-valved, coriaceous capsule, are lenticular and almost thorny, and invested with a flesh-coloured arillus, which is easily separable when dry. They are prepared by powdering

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them in a mortar, or upon a chocolate stone previously heated, mixing the powder with a little water, exposing it for some time to the dew, then kneading it into a paste, mixing with this some of the seeds either whole or merely bruised, and finally forming the mixture into cylindrical or globular masses, which are dried and hardened in the sun, or by the smoke of a fire. These masses are of a reddish-brown colour, rugose on the surface, very hard, and of a marbled appearance when broken. Paullinia is of a somewhat astringent and bitterish taste, and, in this as well as in its odour, bears some resemblance to chocolate, though not oleaginous. It swells up and softens in water, which partially dissolves it. Martius found in it a crystallizable principle, which he named *guaranin*, but which has been proved by MM. Berthemot and Dechastelus to be identical with *caffein*. The discovery of caffein in four plants belonging to distinct natural families, namely, the coffee and tea plants, the Paraguay tea, and the Paullinia, is a highly interesting result of recent chemical investigations. It is said to be more abundant in the Paullinia than in either of the other vegetables; 5·07 per cent. having been found by Dr. Stenhouse in paullinia, while he got only 2·13 from good black tea, 1·00 per cent. from coffee, and 1·2 from Paraguay tea. (*Pharm. Journ.*, xvi. 213.) According to Berthemot and Dechastelus, it exists in the seeds united with tannic acid, with which it appears to form two compounds, one crystallizable and soluble in water, the other of a resinoid appearance and insoluble. Besides these ingredients, the seeds contain also free tannic acid, gum, albumen, starch, and a greenish fixed oil. (*Journ. de Pharm.*, xxvi. 514.) More recently M. Fournier has found in paullinia, besides tannate of caffein, the following principles; gum, starch, an acrid green fixed oil, a concrete volatile oil, an aromatic liquid volatile oil soluble in water with a little alcohol, another liquid volatile oil scarcely soluble in water, a peculiar principle not precisely determined, and tannic acid. (*Ibid.*, Avril, 1861, p. 291.)

It is said to have been by mistake that *paullinia* and *guarana* have been considered identical; the former term being applicable exclusively to the product of the two species of Paullinia above referred to, while the latter belongs properly to a preparation made by the aborigines, which, though it contains the seeds of the Paullinia, is a mixture of various substances, among them chocolate and farina, but the precise composition of which is most carefully kept secret by the natives. (*Ann. de Thérap.*, 1858, p. 70.)

The effects of paullinia upon the system are said to be those of a tonic; but they do not appear to have been very accurately investigated. It is highly probable, both from its composition and the use made of it by the natives of Brazil, that it has an influence over the nervous system similar to that of tea and coffee. It is habitually employed by the Indians, either mixed with articles of diet, as with cassava or chocolate, or in the form of drink, prepared by scraping it, and suspending the powder in sweetened water. It is considered by them useful in the prevention and cure of bowel complaints. Dr. Gavrelle, who was formerly physician to Don Pedro, in Brazil, and there became acquainted with the virtues of this medicine, called the attention of the profession to it some years since in France. He had found it advantageous in the diarrhœa of phthisis, sick-headache, paralysis, tedious convalescence, and generally as a tonic. By Dr. Ritchie, Surgeon in the British navy, it is highly recommended in irritation of the urinary passages. (*Ed. Month. Journ. of Med. Sci.*, N. S., v. 467.) Dr. Hervé has been in the habit of using it daily for five or six years, and has never failed to derive advantage from it in idiopathic diarrhœa, even in the most obstinate cases. (*B. and F. Med.-Chir. Rev.*, Jan. 1858, p. 192.) It may be given in substance, in the quantity of one or two drachms, scraped into powder and mixed with sweetened water; but the most convenient form of administration is that of spirituous extract. According to M. Dechastelus, alcohol is the only agent which completely extracts its virtues; ether and water effecting this object but partially. Of the extract eight or ten grains may be given during the day in the form of pill. Paullinia may also be taken along with chocolate as a drink. W.

PEACH LEAVES. *Leaves of Amygdalus Persica.* (Willd. *Sp. Plant.* ii. 982.) *Persica vulgaris.* (Miller, Lamarck.) Every one is familiar with the appearance of the common peach tree. It is characterized specifically by having "all the serratures of the leaves acute, and by its sessile solitary flowers." Though its native country is not certainly known, it is generally supposed to have been brought originally from Persia. In no country, perhaps, does it attain greater perfection, as regards the character of its fruit, than in the United States. Peaches are among the most grateful and wholesome of our summer fruits. They abound in saccharine matter, which renders their juice 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 bear a close resemblance in appearance and properties, and probably in chemical nature, to bitter almonds, for which they are frequently, and without inconvenience, substituted in our shops. They are employed by distillers in the preparation of *liqueurs*, and by cake-bakers to give flavour to various productions of their ovens; and are said to yield as much amygdalin as bitter almonds. The flowers, leaves, and bark also have the peculiar odour and taste of bitter almonds, and yield hydrocyanic acid. The leaves afford a volatile oil by distillation. The distilled water

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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 may be inferred that the proportion of acid is greatest where there is the least fruit. (See *Am. Journ. of Pharm.*, 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 as an anthelmintic with great reported success. More recently their infusion has been recommended in irritability of the bladder, in sick stomach, and hooping-cough. Half an ounce of the dried leaves may be infused in a pint of boiling water, and half a fluidounce 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 hot water, they form an emulsion well adapted to coughs depending on or associated with nervous irritation. The bruised leaves, flowers, or kernels may be used by the apothecary for cleansing his vessels from disagreeable odours. (See *page* 109.) The dried fruit, stewed with sugar, is an excellent laxative article of diet, suitable to cases of convalescence attended with torpid bowels. W.

PEARL WHITE. *Pearl Powder.* This is identical with the subnitrate of bismuth, described at *page* 1025, and is made by adding a solution of the ternitrate of teroxide of bismuth to distilled water. It is used as a cosmetic. B.

PELARGONIUM ODORATISSIMUM. *Rose Geranium.* This well-known plant, so much a favourite for its odour 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, *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. (Mérat et De Lens, *Dict. de Mat. Méd.*, iii. 368.) According to Septimus Piesse, 1 cwt. yields about two ounces. (See *Am. Journ. of Pharm.*, xxvi. 368.) As we have seen the oil in our shops, purporting to be the oil of P. odoratissimum, it is perfectly fluid at ordinary temperatures, of a pale brownish-yellow colour, and the characteristic smell of the plant, recalling merely that of the rose. Gregory states that pelargonic acid was first obtained from the oil of *P. roseum*, which is probably the same as that under consideration. (*Organic Chem.*, 4th ed., Lond., p. 274.) 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. (*Am. Journ. of Pharm.*, xxvi. 368.) W.

PEROXIDE OF HYDROGEN. 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 equivalent of this element has combined with the hydrogen forming the deutoxide (HO_2). It was discovered by Thenard in 1818. To prepare it, peroxide of barium 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 muriatic acid, contained in a vessel immersed in a freezing mixture. The peroxide of barium (BaO_2) gives up one of its eqs. of oxygen to one eq. of the water (HO), forming an eq. of deutoxide or peroxide of hydrogen (HO_2); while the protoxide of barium left reacts with an eq. of muriatic acid to form one eq. of chloride of barium and one of water. When the muriatic acid is saturated, a fresh quantity of the acid in a concentrated state is added, and then 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 baryta and chloride of silver. The liquid being now filtered, is concentrated by exposing it in vacuo in a shallow vessed placed over another containing sulphuric acid. The water rises in vapour which is absorbed by the acid, and at last the peroxide of hydrogen is left nearly pure. (*Regnault.*) Thus procured it is a colourless liquid of a fluid consistence, of the sp. gr. 1·452, remaining liquid at zero, beginning to give out oxygen when heated above 60°, 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 100°. The great facility

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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 is 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.

The profession is indebted to Dr. B. W. Richardson, of London, for 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 colour to red. Fibrin and cellular tissue 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 tumours 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 favourably 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.) W.

PETROLEUM. *Rock Oil.* This was recognised 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 belongs to the class of native inflammable substances, called *bitumens*. These are liquids or readily fusible solids, which emit, when heated, a peculiar smell, burn easily, and leave a very small carbonaceous residue. They exist in nature either isolated, or combined with carbon in various proportions, forming the different kinds of bituminous coal. Formerly the lighter coloured, purer, and more liquid forms of petroleum were distinguished by the name of *naphtha*, which was defined to be a transparent, yellowish-white, very light and inflammable, limpid liquid, of the bituminous character; but as this name has been conferred of late upon the lighter liquid resulting from the distillation of coal tar or petroleum at a comparatively low temperature, and as there is no sufficient line of distinction between the native naphtha and the impure forms of rock oil, it is, we think, desirable that the name should be confined to the artificial product, while the term petroleum is considered as embracing all the native liquid substances belonging to this class. When the bitumen is in the solid state it is called *asphaltum*. This is black, dry, friable, and insoluble 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*. Exposed to the air, petroleum gradually passes into the state of asphaltum.

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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. Till recently 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 was 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 Kenhawa in Virginia, it attracted some local attention; and a certain locality in Western Canada had acquired some notoriety by its burning spring. But little attention was paid to it until about eight years since; when, the preparation of oil for burning, distilled from coal tar, having proved very profitable, and a strong resemblance if not identity having been proved to exist between this and petroleum, enterprise was directed towards some of the known sources of the latter liquid, which was greatly stimulated by success, and soon led to further and astonishing discoveries. Hitherto the most productive locality of rock oil has been in Western Pennsylvania; but it has been found to exist in great quantities elsewhere, and in fact occupies great 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 the latest accounts it appears that petroleum exists also abundantly in California, and promises to vie with gold as a source of wealth to that country. Establishments for purifying the petroleum have multiplied with great rapidity, and the quantity of oil collected, and either exported or consumed at home, would be incredible, considering the short time since the trade in it may be said to have begun, were it not attested by positive returns. The quantity of petroleum exported, either crude or refined, independently of that consumed in this country, from the ports of Boston, New York, Philadelphia, and Baltimore, amounted in 1862 to 10,887,701 gallons; in 1863, to 28,250,721; and in 1864, to 31,772,972. (*N. Y. Times*, Feb. 16, 1865.)

Petroleum sometimes exists in overflowing springs, as in Canada, N. W. Virginia, and very largely in California, issuing along with the water, and spreading itself over the surface of streams for a considerable distance. It is, however, much more abundantly obtained by digging or boring wells. In this case, if the point struck be below some underground reservoir of the oil, it may rise, as in artesian wells, to the surface. Sometimes it is driven up with considerable though variable force, probably by the expansive power of compressed gas, which not unfrequently escapes along with the oil, and in some places so copiously and steadily as to be used for lighting purposes in the immediate vicinity: the gas being some form of carburetted hydrogen. But in most instances it is necessary to raise the oil by pumps. The distance at which it is found beneath the surface is very different, the depth of boring in Western Pennsylvania varying from 71 to 600 feet. (D. Murray, *Trans. Albany Instit.*, iv. 149.) It is necessary to bore through an overlying rock before reaching it. The oil is generally collected in the fissures and pores of some spongy rock as sandstone or shale. Its original source was probably an underground distillation of vegetable matter, carried on upon a vast scale by nature, by means of subterranean heat. Its close resemblance to the tar resulting from destructive distillation of organic matter can be explained only upon this supposition.

Crude petroleum is variable in character, being sometimes transparent and of an amber colour, but more generally brown or almost black and opaque in mass, or of various shades between the two, in some instances very thin and mobile, in others thicker, and occasionally almost semi-solid, of a peculiar characteristic odour, always lighter than water, and in great measure volatilizable by heat. A specimen of *Pennsylvania petroleum*, fresh from the wells, was found by Mr. E. S. Wayne, of Cincinnati, to have the sp. gr. 0·815, which, however, after the petroleum had been exposed to the air for 24 hours, rose to 0·825. When subjected to fractional distillation, it yielded liquid products varying in sp. gr. from 0·668 to 0·825; the lightest coming over first. The paraffin obtained from this petroleum Mr. Wayne believes to be very different from that obtained from coal tar, having both a lower boiling point and lower sp. gr., and, besides, differing in chemical constitution. (*The Druggist*, Cincinnati, June 15, 1860.) In the purer form of naphtha, petroleum is a carbohydrogen, and, on account of the absence of oxygen, has been used for the preservation of potassium. The crude oil consists of a large number of distinct substances, generally carbohydrogens, of various sp. gr. and boiling points, which may be separated by distillation, and by the action of sulphuric acid and soda or potassa. Mr. Schorlemmer states, as the result of his examination of refined American petroleum, the product of the first rectification, that it contains benzol and toluol in small proportion, but consists mainly of hydrides (hydrurets) of the alcohol radicals, of which he isolated four; namely, *hydride of amyl*, $C_{10}H_{12}$, boiling at 92° F.; *hydride of hexyl*, $C_{12}H_{14}$, boiling at 154° F.; *hydride of heptyl*, $C_{14}H_{16}$, boiling at

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208° F., and *hydride of octyl*, $C_{16}H_{18}$, boiling at 236°. (*Chem. News*, April 4, 1863, p. 157.) MM. Pelouze and Cahors have isolated seven distinct carbohydrogens from rectified American petroleum, of a lower boiling point than 392° F.; viz., *butyl hydride* C_8H_{10}, *amyl hydride* $C_{10}H_{12}$, *caproyl hydride* $C_{12}H_{14}$, *œnanthyl hydride* $C_{14}H_{16}$, *capryl hydride* $C_{16}H_{18}$, *pelargonyl hydride* $C_{18}H_{20}$, and *rutyl hydride* $C_{20}H_{22}$. (*Ibid.*, April 25, 1863, p. 197.) W.

Barbadoes petroleum is a black, nearly opaque, inflammable liquid, of the consistence of molasses, unctuous to the touch, and possessing a bituminous taste, and strong and tenacious odour. 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 colour, a peculiar, rather fragrant odour, and the consistence of goose-fat. It is lighter than water. Heated to 90° it becomes a very mobile liquid. By distilling it in a current of steam, first at 212°, and afterwards super-heated, Drs. W. De la Rue and H. Müller obtained 96 per cent. of volatile products, solid and liquid. The solid product (*varaffin*) amounted to from 10 to 11 per cent., and was found resolvable by these chemists, by fractional crystallization from hot alcohol, into at least two polymeric carbohydrogens, having the probable formula C_nH_n. The liquid product, usually called naphtha, is separable by sulphuric and nitric acids into two sets of carbohydrogens; one set removable by these acids, the other resisting their action. The former set contain fewer eqs. of hydrogen than of carbon, and embrace, among other carbohydrogens, benzole and toluole. The latter, which form by far the larger portion of the liquid product, are perfectly colourless, almost inodorous, very mobile liquids, not congealable by intense cold. Their probable formula, according to Drs. De la Rue and Müller, is C_nH_{n+1}. (See *Chem. Gaz.*, Oct. 1, 1856, p. 375.) B.

The method of purifying petroleum is very nearly the same as that already described for purifying coal tar. The following description is taken chiefly from a communication of Mr. David Murray to the Albany Institute, Dec. 1862, and published in its Transactions (vol. iv. p. 149). Much water is often pumped up with the petroleum, but separates from it on standing, the oil rising to the surface. The crude oil is put into large retorts of cast or wrought iron and exposed to a heat between 600° and 800°, by which all the volatile ingredients are distilled, leaving 10 or 12 per cent. of solid residue, constituting a sort of coke. The liquid thus obtained is comparatively colourless, though still retaining the strong odour of the crude oil. To separate various organic alkaloids and acids with which it is mixed, the distilled petroleum is agitated first with sulphuric acid, and afterwards with a strong solution of soda or potassa; the sulphuric acid with its dissolved impurities being drawn off, and the oil well washed with water, before the addition of the alkali, and afterwards again washed when the alkali has performed its function. The purified petroleum is now submitted to another distillation, but at first at a temperature not exceeding 120° (*Murray*), in order that only the more volatile carbohydrogens may be driven over, which are unsuitable for lamp-oil. These, being condensed, constitute what is now commonly called *naphtha*, which is used as a solvent for varnishes and caoutchouc, and for mixture with paints, a purpose which it answers as well as oil of turpentine, except for its offensive smell. It is unsuitable for lamps from its extreme volatility, its liability to smoke when burned, and the danger of explosion from the admixture of its vapour with atmospheric air. After the *naphtha*, which is equivalent to the benzine of coal tar, has all come over, the heat is increased and the distillation continued until the distilled liquid attains the sp. gr. 0·820. This is the part sold for lighting, and is by far the most important product of petroleum. The quantity of it obtained varies greatly, sometimes not exceeding 30 per cent., sometimes amounting to 80 or 90. It is clear, and of a fine deep amber colour, and answers admirably for lighting, yielding a brighter and purer flame than perhaps any other kind of lamp-oil. If the distillation be now continued, a darker and heavier product comes over, which upon cooling deposits paraffin. The part remaining liquid, which is too impure for burning, is employed for lubricating machinery. W.

Medical Properties and Uses. Petroleum is accounted a stimulating antispasmodic, expectorant, and diaphoretic. 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. It is an ingredient in the popular remedy called *British oil*. (See *note*, p. 602.) 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. The *New York petroleum*, called *Seneca oil*, is used to a considerable extent as an external application in domestic practice. It is lighter coloured, 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

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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. B.

PHLORIDZIN. 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, φλοιός 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, scarcely soluble in ether cold or hot, dissolved without change by solutions of the alkalies, especially by ammonia, deprived of its water of crystallization at 212°, and fusible at a somewhat higher temperature. It is without acid or alkaline reaction, and consists of carbon, hydrogen, and oxygen; its formula being, according to G. Roser, when dry, $C_{42}H_{25}O_{20}$, with the addition of 4 eqs. of water when crystallized. When heated with dilute muriatic or sulphuric acid, it is converted into sugar and a peculiar substance called *phloretin*. (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 coloured phloridzin, 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 phloridzin 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.

Phloridzin is said to possess the anti-intermittent property in a high degree, and to have proved successful where quinia 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 quinia 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.) W.

PHOSPHATE OF POTASSA. *Potassæ Phosphas.* The phosphate of potassa, which has of late come into use as a medicine, is the neutral tribasic phosphate, having the formula $2KO,HO,PO_5$, and, therefore, a composition precisely analogous to that of the medicinal phosphates of soda and ammonia. It is derived from the variety of phosphoric acid containing three eqs. of water, by the substitution of two eqs. of potassa for two of water, and, notwithstanding its slight alkaline reaction, is called *neutral*, in order to distinguish it from the decidedly *alkaline* tribasic phosphate, $3KO,PO_5$. It may be formed precisely as phosphate of soda is prepared (see *page* 1336); or by saturating, by means of carbonate of potassa, glacial phosphoric acid (HO,PO_5), changed by solution in water and ebullition into common phosphoric acid ($3HO,PO_5$). The medicinal phosphate of potassa is a white, amorphous, deliquescent salt, incapable of crystallization. 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. B.

PHOSPHATE OF ZINC. *Zinci Phosphas.* 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 may be prepared by the mutual reaction of sulphate of zinc and an alkaline phosphate. It is white, insoluble in water, but soluble in an excess of phosphoric acid. Dr. Barnes has found it peculiarly useful in the insanity occurring in the convalescence from fevers, in which he associates it with quinia, 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. W.

PHYSALIS ALKEKENGI. *Alkekengi. Common Winter Cherry.* A perennial herbaceous plant, 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 colour. The bitter principle has been isolated by MM. Dessaignes and Chautard, and named by them *physalin*.

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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. It consists of carbon, hydrogen, and oxygen. (*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 lately published a pamphlet on gout, in which he strongly recommends alkekengi as more efficacious even than colchicum. 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 soda 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. W.

PICHURIM BEANS. 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, has 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. (*Am. Journ. of Pharm.*, 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 colour externally, chocolate-coloured within, of an aromatic odour 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 colour. The former are 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 colouring matter, fecula, gum, sugar, and lignin. Their virtues depend on the volatile oil. In the *American Journal of Pharmacy* for Jan. 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 oleo-resin, of the sp. gr. 0·898, of a light auburn colour, a peculiar penetrating odour, and an aromatic, bitterish, pungent, and somewhat camphorous taste. On distillation, almost the whole passes over in the shape of a colourless volatile oil; a small proportion only of resinous matter being left behind. This oleo-resin 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 with it a specimen of oil presented to him as obtained from the same tree with the fruit above mentioned, has no hesitation in considering them as identical, and, therefore, in referring the so-called native oil of laurel to Nectandra Puchury. 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 odour to the perspiration and urine, and to be useful in rheumatism, gout, &c. The bark is sometimes employed as a tonic and febrifuge. W.

PIMPINELLA SAXIFRAGA. *Small Burnet Saxifrage. Saxifraga.* A perennial umbelliferous European plant, growing on sunny hills, and in dry meadows and pastures. The root is officinal in some parts of Europe. It has a strong, aromatic, yet unpleasant odour, 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, &c. The dose in substance is about

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half a drachm, and in infusion two drachms. The root is used also as a masticatory in toothache, as a gargle in palsy of the tongue and in collections of viscid mucus in the throat, and externally to remove freckles. W.

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 Cinchonæ, with which it was formerly ranked by some botanists. The bark is bitter, and has been used with advantage in intermittent fever. Dr. Law, of Georgia, cured six out of seven cases in which he administered it. The dose and mode of preparation are the same with those of cinchona. The chemical composition and medical properties of this bark deserve a fuller investigation than they have yet received. W.

PISCIDIA ERYTHRINA. *Jamaica Dogwood.* Dr. William Hamilton, of Plymouth, England, in a communication to the *Pharmaceutical Journal* (iv. 76, August, 1844), speaks of this plant as a powerful narcotic, capable of producing sleep and relieving pain in an extraordinary manner. He had noticed, when resident in the West Indies, the use of the bark of the root in the taking of fish, upon which, even when of a large size, it exercised a very strong narcotic effect. He was induced to try it as an anodyne in toothache, and found a saturated tincture 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. The bark of the root, to be effectual, should be gathered during the period of inflorescence in April. When chewed it has an unpleasant acrimony like that of mezereon. It yields its virtues to alcohol, but not to water. The formula employed by him in preparing the tincture was to macerate an ounce of the bark, in coarse powder, in four fluidounces of rectified spirit, for twenty-four hours, and then to filter. The dose is a fluidrachm. He first tried it on himself, when labouring under severe toothache, taking the quantity mentioned in cold water 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. W.

PLANTAGO MAJOR. *Plantain.* A well-known perennial herb, growing in fields, by the roadsides, and in grass-plots, and abounding both in Europe and in this country. The leaves are saline, bitterish, and austere to the taste; the root saline and sweetish. The plant has been considered refrigerant, diuretic, deobstruent, and somewhat astringent. The ancients esteemed it highly, and employed it in visceral obstructions, hemorrhages, particularly from the lungs, consumption, dysentery, and other complaints. In modern times it has been applied to similar purposes, and the root is said to have proved useful in intermittents. At present, however, it is generally believed to be very feeble, and is little used internally. As an external application it has been recommended in ulcers of various kinds and in indolent scrofulous tumours. Among the vulgar it is still much used as a vulnerary and as a dressing for blisters and sores. The dose of the expressed juice is from one to four fluidounces. Two ounces of the fresh root or leaves may be boiled in a pint of water, and given during the day. Externally the leaves are applied whole, or in decoction. *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.

Under the name of *semen psyllii*, the seeds of several species of Plantago, growing in Europe, are sometimes kept in the shops. The best are those of *Plantago Psyllium* or *fleawort*, which grows in the south of Europe and Barbary. They are small, about a line long by half a line in breadth, convex on one side, concave on the other, flea-coloured, 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. W.

PLATINUM. In 1826 Prof. Gmelin, of Tubingen, 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 bichloride, and the double chloride of platinum and sodium. They are both poisonous; the bichloride in the dose of 15 grains, the double chloride in that of 30 grains. When a concentrated solution of the bichloride 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 bichloride. 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 bichloride to cases of long standing and inveterate, the double chloride to those which are recent. The dose of the bichloride 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

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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 bichloride and eight of pure chloride of sodium in seven fluidounces of gum-water; and the whole may be taken by tablespoonfuls in the course of twenty-four hours. For frictions on indolent ulcers, Dr. Hoefer used an ointment composed of sixteen grains of the bichloride, thirty-two grains of extract of belladonna, and an ounce of lard. (*Journ. de Pharm.*, xxvii. 213.) B.

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. W.

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 colour is reddish-brown with a tinge of yellow, its odour disagreeably oleaginous, its taste peculiar, sweetish, somewhat bitter, and nauseoous. 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 humours 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. W.

POLYTRICHUM JUNIPERINUM. *Hair-cap Moss. Robin's Rye.* This moss is a native of the United States, and abounds in New England. For a particular description of it, the reader is referred to a communication in the *Am. Journ. of Med. Sci.*, N. S. (xxvii. 267), by Dr. Wm. Wood, of East Windsor Hill, Connecticut, who speaks in very strong terms of its efficacy as a diuretic, having found it the most successful remedy which he has employed in the treatment of dropsy. He infuses a large handful of the whole plant in water, and allows the patient to drink freely of the tea, "the more so the better." Dr. Ariel Hunter, of Hyde Park, Vermont, has subsequently given additional testimony in its favour as a diuretic, doing good service in dysury. (*N. J. Med. and Surg. Reporter*, ix. 417.) W.

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 odour, 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 N. 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 of 1837, 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, 375 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 are capable of imparting a principle to ointments, which in a considerable 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*, and another crystallizable principle which he named *populin*. 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

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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 potassa, 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 colourless 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*, and glucose. (See *Am. Journ. of Pharm.*, 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 sesquichloride of iron, 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 212°. Piria obtained from populin 28·9 per cent. of benzoic acid. (*Pharm. Journ.*, 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.) W.

PORTULACA OLERACEA. *Garden Purslane.* An annual succulent plant, growing in gardens and cultivated grounds, in the United States, Europe, and most other parts of the globe. It has an herbaceous, slightly saline taste, and is often used as greens, being boiled with meat, or 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. W.

POTENTILLA REPTANS. *Cinquefoil.* A perennial, creeping, European herb, with leaves which are usually quinate, and have thus given origin to the ordinary name of the plant. The root has a bitterish, styptic, slightly sweetish taste, and was formerly used in diarrhœa, and other complaints for which astringents are usually prescribed. W.

POWDER OF ALGAROTH. *Pulvis Algarothi. Oxychloride of Antimony. Nitromuriatic Oxide of Antimony.* This powder is formed by dissolving tersulphuret of antimony in muriatic acid, assisting the action, at first, by a gentle heat, which must be gradually increased to ebullition; and then pouring the resulting solution, when cold, into a large quantity of water. By a double decomposition between the tersulphuret and acid, sulphuretted hydrogen is given off copiously by effervescence, and a solution of terchloride of antimony is formed. When this is thrown into water, the greater part of the terchloride is converted, by the elements of that liquid, into muriatic acid, which remains in solution, and teroxide of antimony, which precipitates in union with the remainder of the terchloride as the powder of Algaroth.

Properties, &c. This is a white powder, having a crystalline appearance if left long in contact with the solution from which it is precipitated. When exposed to a red heat it fuses, and forms a yellow liquid, which, on cooling, concretes into a grayish crystalline mass of a pearly aspect. Its usual composition is represented by the formula $2SbO_3,SbCl_3 + HO$. It was formerly used in the preparation of tartar emetic, but has been superseded for this purpose by the pure teroxide. It has also been used in medicine; but, owing to its unequal operation, has been properly laid aside. It is liable to contain tersulphuret of arsenic (orpiment), unless when obtained from the distilled concrete terchloride of antimony. (Larocque, *Journ. de Pharm.*, March, 1849.) B.

PRENANTHES SERPENTARIA. *Lion's Foot.* This is a perennial indigenous herb, growing in the mountainous districts of Virginia and North Carolina. It belongs to *Syngenesia Æqualis* in the sexual system, and to the natural family of *Chicoraceæ*. The genus is characterized by its "four-flowered nodding *heads*, its cylindric *involucre* calyculate at the base, its subterete unbeaked *akenes*, its scabrous *pappus* in several series, and its naked *receptacle*" This particular species has rough dentate leaves, of which the radical are palmate, the cauline with long footstalks, sinuate pinnatifid, disposed to be three-lobed, with the middle lobe three-parted, the upper lanceolate. The racemes are terminal, somewhat panicled, short, and nodding, with an eight-cleft calyx, and twelve florets. (*Pursh.*) Dr. Darlington considers this a variety of *Prenanthes alba*. It is about two feet high, with purple flowers Pursh speaks of it as in great repute among the inhabitants of the re-

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gions 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, the author received a specimen of a plant from Dr. Newsom J. Pittman, of N. Carolina, with the information that he had employed it in ten or twelve cases of the bite of the rattlesnake with uniform success. He gave internally a decoction of the root, which is extremely bitter. This plant was the *Prenanthes Serpentaria* of Pursh. W.

PROPYLAMIA. *Propylamin. Secalia. Secalin.* Under the head of Ergota (*page* 368) allusion has been already made to a volatile alkaloid discovered by Winckler in the ergot of rye, and therefore denominated by him secalin. This has since been identified with propylamia previously discovered in herring pickle; a fact which explains the fishy odour long known as one of the characteristics of ergot. The same alkaloid has been obtained as an artificial product from narcotina (see *page* 619), codeia, cod-liver oil, and other substances, and has been found in saline combination in the flowers of Crætagus oxycantha, Sorbus aucuparia, and one or more species of Chenopodium. The mode of obtaining it from ergot has been described in Part I. (*page* 368). The following method of procuring it from herring pickle has been published by Prof. Procter in the *American Journal of Pharmacy* (March, 1859, p. 127). 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 vapours 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 odour of herrings. The condensed liquid, which contains the propylamia separated by the potassa from its saline combination in the pickle, is now neutralized with muriatic acid, and carefully evaporated to dryness. Ammonia, which comes over and is condensed with the propylamia, combines like it with the muriatic acid, and the dry salt obtained is a mixture of the muriates of both these bases. This is exhausted with absolute alcohol, which dissolves the muriate of propylamia, and leaves the muriate of ammonia. If the alcoholic solution be treated with hydrate of lime, propylamia in vapour 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 (May, 1859, p. 222), by acidulating the liquid in the receiver with muriatic acid, added gradually as the acid becomes neutralized, thus directly forming the muriate, which may be obtained crystallized by subsequent concentration, and, if necessary, freed from the accompanying muriate of ammonia in the manner already mentioned. In consequence of the volatility of propylamia, it is better kept in the state of the muriate; and this may either be used by the physician, or extemporaneously converted into propylamia, should it be wanted, by adding an equivalent of solution of potassa. The pure muriate may be obtained by the concentration of the alcoholic solution, formed as one of the steps of the preceding process. Propylamia is a colourless transparent liquid, of a characteristic odour, 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 muriatic acid, be held over the open mouth of a vial containing it, a white cloud of the muriate will be seen, as in the case of ammonia. Though most of the salts of propylamia are soluble in water and alcohol, the sulphate is wholly insoluble in the latter of these menstrua. (*Winckler.*) Propylamia consists of carbon, hydrogen, and nitrogen; and its formula is C_6H_9N, which is represented by one eq. of propylene and one of ammonia C_6H_6,NH_3, or one of propyl and one of amidogen NH_2,C_6H_7.

Dr. Awenarius of St. Petersburg, Russia, first called attention to the use of propylamia in rheumatism, for which he considered it as 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 propylamia with six fluidounces of distilled water, flavoured if necessary with sugar and oil of peppermint, and gave a tablespoonful every two or three hours, taking care that the alkaloid was pure and freshly prepared. (*Ann. de Thérap.*, 1859, p. 74.) Confirmatory statements from various sources have since been published; and the remedy has been found serviceable in other painful affections. Dr. B. F. Eaton, of Barnet, Vermont, has given in the *Boston Medical and Surgical Journal* an account of a severe case of neuralgia of the face, in which the pain appeared to have been entirely subdued by it in less than 24 hours. 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 propylamia could not be determined. (See *Am. Journ. of Pharm.*, May, 1862, p. 277.) Experiments are wanting to show the precise physiological properties of this alkaloid: and how far or

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in what manner it may prove deleterious in overdoses. There is probably no better plan of administering the remedy than that recommended by Dr. Awenarius; namely in watery solution. A solution of 24 drops in six fluidounces of peppermint water, with two drachms of sugar, may be given in the dose of half a fluidounce, equivalent to two drops of the alkaloid, every two hours in the more acute cases. Or 36 grains of the muriate may be substituted in the mixture for the 24 drops of the alkaloid, and 6 fluidrachms of the solution of potassa added. This would give, with each dose of the propylamia, three or four grains of chloride of potassium, which could have no material effect, and certainly none of an injurious character. W.

PRUNELLA VULGARIS. *Self-heal. Heal-all.* A small perennial labiate plant, common both in Europe and the United States, growing especially by the waysides. 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 sorethroat. In this country it is not employed in regular practice. W.

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. W.

PUMICE STONE. *Pumex.* 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 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, &c.; purposes to which it is adapted by the hardness of its particles. W.

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 native of Europe, but cultivated in our gardens. The whole herbaceous part is used. The plant has an odour 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. (*Cent. Blatt*, 1855, p. 205.) 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 odour, 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 Parthenium, are large, very numerous, and very long. Two other species of Parthenium, *P. roseum* and *P. carneum*, have recently come into notice, as the source of the Persian insect powder. (See *Insect Powder*, page 1537.) W.

PYROACETIC SPIRIT. *Pyroacetic Ether. Acetone.* This substance may be obtained by carefully distilling acetate of lime, 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 is a colourless, volatile, inflammable liquid, having a peculiar penetrating smell, and a pungent taste like that of peppermint. Its specific gravity is 0·792, and boiling point 132°. 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.*) Its formula is C_3H_3O; while that of pyroxylic spirit is $C_2H_4O_2$. In constitution it bears considerable resemblance to alcohol. Thus, its formula doubled is $C_6H_6O_2$, and that of alcohol is $C_4H_6O_2$. 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 *Spiritus Pyroxilicus Rectificatus*, page 803.) There is no doubt that these spirits were used indiscriminately in the therapeutic trials which grew out of the publication of Dr. Hastings' book; but no exact experiments have been made, so far as we know, to determine the precise physiological action of pyroacetic spirit. B.

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PYROGALLIC ACID. *Pyrogalline* or *Galline* (Rosing). This substance has recently acquired some 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 vapours 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 212° F., in a glass retort, by means of a chloride of zinc bath, to 410° F., when the pure acid sublimes. Liebig recommends another method, calculated especially to obviate the effects of heat, which, with all the details, may be seen in the *Am. Journ. of Pharm.* for July, 1857 (p. 338). In the same journal (July, 1854, p. 362) are the details of a process by H. Gruneberg, of the character of the one first referred to above, by which he obtained from 50 pounds of Chinese galls 2 pounds of the acid.

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 239° F., and sublimable at 410° in irritating vapours. 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, it has no influence on litmus paper. Rosing denied altogether its claims to be considered as an acid, and proposed to call it *pyrogalline* or *galline*. (*Journ. de Pharm.*, Juillet, 1857, p. 53.) In a subsequent memoir, however, he admits its neutralizing power, and gives as its formula $C_{12}H_6O_6$. 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. W.

REALGAR. This is the bisulphuret of arsenic, consisting of one eq. of arsenic 75, and two of sulphur 32 = 107. It is found native in Saxony, Bohemia, Transylvania, and in various volcanic regions. Realgar is artificially made by melting arsenious acid with about half its weight of sulphur. (*Turner.*) Thus prepared, it is of a crystalline texture, of a beautiful ruby-red colour, of a uniform conchoidal fracture, somewhat transparent in thin layers, and capable of being sublimed without change. Native realgar is said to be innocent when taken internally, while that artificially prepared is poisonous, in consequence, according to Guibourt, of containing a little arsenious acid. Realgar is used only as a pigment. W.

RED CHALK. *Reddle.* A mineral substance of a deep-red colour, of a compact texture, dry to the touch, adhering to the tongue, about as hard as chalk, soiling the fingers when handled, and leaving a lively red trace when drawn over paper. It consists of clay and oxide of iron, and is intermediate between *bole* and *red ochre*, containing more oxide of iron than the former, and less than the latter. It is used for drawing lines upon wood, &c., and is sometimes made into crayons by levigating and elutriating it, then forming it into a paste with mucilage of gum arabic, moulding this into cylinders, and drying it in the shade. It has been used internally as an absorbent and astringent. W.

RENNET. GASTRIC JUICE. PEPSINE. As a remedial agent, the gastric juice of the inferior animals has been used in three forms; 1. that of the fresh liquid taken from the stomach, 2. that of rennet, or an infusion of the dried stomach, in wine or water, and 3. that of a preparation called pepsine.

1. *Gastric juice* is a liquid secretion of the mucous membrane of the stomach, whereby nitrogenous food is rendered soluble and capable of being absorbed, and other changes are effected essential to healthful digestion. Various methods have been employed for extracting it from the stomach for experiment, which it is unnecessary here to describe. For use in medicine, the most convenient method is to collect it from the stomachs of animals killed fasting, as the hog, sheep, and calf, and then deprive it, by filtration, of the mucus and undigested alimentary matters mingled with it. In this state it is a limpid liquid, slightly yellowish or brownish-yellow, heavier than water, of a somewhat saltish taste, and a characteristic odour, which, when the juice is heated, resembles that of soup. It usually has an acid reaction. At the temperature of 100° or lower, it has the property of dissolving nitrogenous articles of food, and, without affecting starch, of changing glucose or the sugar of grapes into lactic acid. When separated from its attendant acid, it loses in a greater or less degree this solvent power, which it recovers upon the addition of lactic or muriatic acid. The idea has been advanced that, in normal digestion, it supplies itself with the requisite lactic acid, by converting into that substance the glucose taken into the stomach, or resulting from the reaction of saliva or the gastric mucus upon starch. But in cases where no starch is taken, there must be other means of supplying the neces-

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