autumn, split longitudinally, and rapidly dried. It is then furrowed and wrinkled, with a black surface and bluish-gray section. It occurs mostly in pieces from one to four inches in length and of the thickness of a lead-pencil or less. Its texture is hard and horny; fracture, cellular; taste, mucilaginous, slightly bitter, and astringent.

Comfrey has been long in use, first as a vuinerary, and afterward as a demulcent and "pectoral"; its constituents are similar to most others of its class: *mucilage, sugar, asparagin, tannic* and *gallic acids*, and *starch*. Dose—a decoction may be taken *ad libitum*.

The *leaves* have a similar composition and use.

Henry H. Rusby.

COMMONWEALTH MINERAL SPRINGS.—Middlesex County, Massachusetts.

Post-Office.—Waltham.

This spring is located in the extreme northern part of the town of Waltham. It yields ten gallons of water per minute, having a temperature of 48° F. the year round. An analysis by Prof. S. Dana Hayes, the State assayer, in 1879, resulted as follows:

One United States Gallon Contains:

Solids.	Grains.
Sodium bicarbonate	0.50
Magnesium bicarbonate	.18
Lime bicarbonate	.45
Potassium sulphate	.61
Sodium chloride	.34
Silicic acid (in solution)	.37
Iron and alumina	Merest traces.
Total	2.45

The water is naturally charged with oxygen, nitrogen, and carbonic-acid gases. It is clear and sparkling and quite free from any appreciable organic matter. The water is bottled and sold extensively in Massachusetts. It is also used in making a number of pleasant beverages. The water is said to have a satisfactory influence in some of the functional disturbances of the liver, kidneys, stomach, and blood.

James K. Crook.

COMPOSITÆ.—(*The Daisy Family.*) Taken in its broad sense, as generally regarded, this is our largest family of plants, comprising more than eight hundred genera and more than ten thousand species, though some authorities reduce the number by separating, as distinct families, a number of our sub-orders. There is scarcely any flora of the earth where these plants are not found, or even where they are not abundant. Their economic importance is great, as ornamental plants and to some extent as foods. Among the latter are the artichokes, salsify, burdock, several plants of the thistle group, lettuce, and chicory. Starch is largely wanting in the family, its place being filled by the closely related *inulin*, and this is the important nutrient constituent. Medicinally, the family represents three classes of agents, dependent upon distinct classes of constituents. We have first, stomachics and tonics, dependent upon volatile oils and bitter substances. In some cases, as in the iron weeds (*Vernonia*), the bitter element is almost alone; in others, like Erigeron, the volatile oil is nearly devoid of bitter association. In some cases, moderate quantities of tannin are also present. Occasionally, these substances are anthelmintic, as in santonica, or insecticidal, as in the insect flowers.

The second class of remedies depend upon resins or powerful volatile oils for their counter-irritant properties. Internally they are powerfully irritant, to the extent of being poisonous, like arnica, pyrethrum, or tansy.

Thirdly we have a few milky juiced plants of the sub-order *Cichoraceæ*, with laxative and alterative properties, like dandelion and chicory, or even narcotic like lactucarium. A few, like absinthium, possess peculiar properties, due to special constituents. An enumeration of all the drugs of this family in domestic and aboriginal use would carry us far into the hundreds, yet the total medicinal importance of the family cannot be regarded as other than minor.

Henry H. Rusby.

CONCA.—Queretaro, Mexico. These waters, besides being employed in rheumatism and leprosy, are supposed to be of benefit in menstrual derangements.

N. J. Ponce de Léon.

CONCRETIONS AND CALCULI.—Concretions and calculi are terms applied in medicine to aggregations of solid, more or less hard substances, which form in the body tissues or fluids and act as foreign bodies. The substances composing the aggregations are usually such as are formed in the tissues and fluids normally or pathologically, and may be either organic or inorganic substances, or a mixture of both; occasionally, however, foreign matter finds its way into some part of the body and acts as a nucleus for a calculus. Crystalline, granular, or amorphous masses may be deposited in a tissue and thus cause it to assume a hardened state; or the latter condition may result from the absorption of fluid. The terms petrifaction and calcification are applied to such hardenings so long as the tissue in which the change occurs bears its normal relation to the surrounding parts; but when this relationship ceases and the hardened area acts as a foreign body, then it is proper to employ the terms concretion or calculus, whether the mass is embedded in the tissues or lies free in some cavity.

Chemically, the change most frequently results from a deposit of calcium carbonate or phosphate with perhaps in addition a small amount of magnesium salts. The process is apt to accompany or follow degeneration or death of tissue; in fact, it seems as though tissue undergoing necrobiosis has a special attraction for calcium salts. Connective tissue undergoing hyaline degeneration with accompanying calcification is often encountered in the walls of the blood-vessels, in the endocardium, in the thyroid, and in the thickened pleura, and may be found in other portions of the body. Calcification of tuberculous areas, uterine fibroids, and ovarian and other cysts is also frequent. Under exceptional conditions, and more particularly in advanced age, the process occurs in tissue in which degenerative changes are not recognizable. In rare instances calcareous infiltration is believed to be due to an absolute increase of calcium salts in the blood, such as perhaps occurs in extensive caries and in osteomalacia. This is certainly unusual, but some observations seem to support the view.

Amyloid concretions, or corpora amylacea, are small, oval, homogeneous or laminated bodies that frequently occur in the tissues of the nervous system and in the prostate. In the nervous system they are especially apt to occur in conditions of atrophy or softening. The ependyma of the ventricles, the white substance of the brain, the choroid plexus, the optic nerve, and the spinal cord are their favorite seats. They are occasionally met with in the lungs, in mucous and serous membranes, and in extravasations of blood. Amyloid bodies were formerly believed to consist of amyloid substance. While it is true that they may assume a bluish color on treatment with solution of iodine or iodine and sulphuric acid, and resemble somewhat in structure the product of progressive amyloid change, it is now recognized that their formation is dependent on local changes, and it is not believed that they are similar to the product of amyloid degeneration. Redlich considers the corpora amylacea of the nervous system, which stain similarly to nuclei with hæmatoxylin, to be made up of the nuclei of neuroglia cells and to be a senile retrograde development of the tissue. Stroebe believes them to be composed of fragments of swollen axis cylinders, while Siegert believes them to have originated from cells. In the choroid plexus and lateral ventricles they frequently become calcified and then constitute one form of "*brain sand*."

Biliary concretions are both frequent and of clinical importance. Europeans have found gall stones in from five to ten per cent. of all autopsies; in the East, on the contrary, they are extremely rare, only one or two cases being recorded.

The stones are usually found within the gall bladder, less frequently in the cystic or common duct and in the alimentary tract, having passed down from the gall bladder, and in rare instances they occur in the intrahepatic ducts. Biliary fistulæ are not uncommon, and through these abnormal communications gall stones have been known to pass to the outside of the body, into the abdominal cavity, into the stomach or intestines, into a liver abscess, into the portal vein, or into the urinary passages, and records are not rare in which they have entered the lungs. A single calculus may be present in the gall bladder, in which case it is usually ovoid and may be quite large; or the number may be very great, 7,802 having been reported in one case. The usual number is between four and fifty, and the average size is apt to vary inversely with the number, from that of a pinhead to a cherry. When numerous they may be the size of small grains, while, on the other hand, Meckel has described a single biliary calculus 15 cm. long and 6 broad. When more than a few are present they commonly lose their ovoid shape and show signs of mutual pressure, having a polygonal form with smooth facets. All those present in the same individual commonly have the same chemical composition and present the same physical characters, but may vary considerably in size.

Chemical analysis has shown that the vast majority of biliary calculi are composed chiefly of either or both of two substances, viz., cholesterin and the calcium salt of bile pigment, known as bilirubin-calcium. Either of the two substances may be the sole constituent or they may together form the mixed varieties, with the two substances in almost any proportion. Certain materials only occasionally enter into the composition of gall stones or do so commonly only in very small amount: such are inorganic calcium salts, notably the carbonate, sulphate, and phosphate, small quantities of copper, traces of iron, zinc and manganese, globules of mercury, fats, silica, uric acid, and foreign bodies. Of these latter the round worm, a portion of distoma hepaticum, a needle and a plum stone have each been recorded as being the nucleus of a calculus. The presence of calcium salts in mixed calculi, particularly the carbonate, contributes hardness; in rare instances the concretion may be chiefly or entirely calcareous. The bile acids and other constituents of bile are found in calculi only in such traces as are explained by the absorption of this fluid in the interstices. Again, the bile pigment in combination with calcium is not always bilirubin, but frequently in part biliverdin or bilifuscin.

It may be said that in general cholesterin predominates in the larger stones, while the smaller are more apt to contain considerable bilirubin-calcium. Naunyn, in his admirable treatise on cholelithiasis, recognizes six classes of gall stones:

1. *Pure Cholesterin.*—Usually pure white or yellowish, translucent: in rare instances dark colored. Ordinarily oval or roughly spherical in form, hard, seldom exhibit facets, not stratified or only feebly so and vary in size from a cherry to a pigeon egg.

2. *Laminated Cholesterin.*—Contain ninety per cent. or more of cholesterin, the other constituents being calcium compounds of the bile colors and calcium carbonate. Are usually hard, but occasionally when dry, brittle, and friable, more frequently faceted than the first variety, more or less distinctly laminated, with the layers perhaps differing in color, often with those nearer the centre more crystalline in structure and those nearer the surface hardened by the presence of calcium carbonate. They resemble pure cholesterin stones in form and size, but are apt to be somewhat darker in color.

3. *Common Gall Stones.*—These comprise the great bulk of gall stones, varying in size (pinhead to cherry), in composition, and in form and tint. Usually facetted and laminated. The soft nucleus may consist of bilirubin-calcium, or the centre may consist of a cavity holding a yellowish alkaline liquid. If soft when removed they harden and shrink on drying, without developing fissures.

4. *Mixed Bilirubin-calcium.*—Usually the size of a cherry, occur in groups of three or four, and are facetted. They are twenty-five per cent. or less cholesterin, the remainder being chiefly bilirubin-calcium. They have a brown color, are seldom hard, and develop fissures when they dry.

5. *Pure Bilirubin-calcium.*—Common in cattle, rare in man. Vary in size from a grain of sand to a pea, being the stones that are sometimes observed in the intrahepatic bile ducts. The smaller ones may have a wax-like consistence, with brownish-black, rough, irregular surface, while the larger ones usually are brittle, have a smooth surface, and a gray to black color with a metallic lustre. In calculi of this class bilifuscin is practically always present.

6. *Rarer Forms.*—(*a*) Amorphous and incompletely crystalline cholesterin gravel: small, often resembling pearls, and always with a nucleus of different structure. (*b*) Calcareous, consisting almost entirely of calcium carbonate. (*c*) Concretions which include foreign bodies and conglomerate stones. (*d*) Casts of bile ducts.

As to the source of cholesterin in bile, Austin Flint more than a third of a century ago presented the view that the separation of this constituent from the blood by the liver is a regular and important function of this organ. Since, however, it is not increased in bile by the character of the diet or the administration or subcutaneous injection of cholesterin, recent observers have come to believe that it is independent of the amount in the blood. It may be that small amounts are regularly separated, as Flint held, by this organ, but the observations of Naunyn, confirmed by Hunter, present considerable evidence that at least most of the cholesterin of calculi is formed *in situ*, being a product of the diseased mucous membrane of the biliary passages. This conclusion accords with its frequent formation as a product of degenerative conditions in other locations, *e.g.*, in cysts and in the secretions of other diseased mucous membranes, as, for example, its occurrence in the sputum of bronchitis. Naunyn observed myelin globules within the degenerating epithelial cells of the biliary passages, and especially of the gall bladder, which escape in a viscous condition and are to be seen floating about in the bile. On the addition of acetic acid these masses solidify into a mass of cholesterin crystals. According to this view, then, the cholesterin of concretions has never been in solution in bile at all. In further support of the local origin is the fact that although the small amount normally present in bile is held in solution by the bile salts, soaps and fats, the formation of cholesterin-containing calculi does not appear to be associated with their diminution.

Bilirubin-calcium is not a normal biliary constituent, and its occurrence in concretions, therefore, demands a further explanation than the mere presence of bile color. The exact origin has not yet been conclusively demonstrated. If lime be added to bile the formation of this compound, being hindered by the presence of bile salts, is not accomplished until large quantities have been added; the mere secretion of calcium in excess does not therefore adequately explain the formation. Moreover, calcium is not secreted in excess when it is present in increased amount in the food and drinking water, as has been held. What has been observed is that the presence of albumin overcomes the retarding influence of bile salts on bilirubin-calcium-formation; and it seems in all probability that this condition, viz., the presence of albumin in bile, is the deciding factor. Whether its presence is dependent on the disintegration of epithelium resulting from catarrh of the mucous surfaces, as was suggested by Naunyn, is not known, but it is not unreasonable to believe that at times albumin may pass from the blood through the hepatic cells into the bile in much the same way as in nephritis it passes into the urine in the kidney. If the explanations advanced are correct, it will be seen that the conditions leading to the separation of the two chief constituents of gall stones are essentially local, namely,