however, cannot be regarded as characteristic of this drug.

ADMINISTRATION.—It may be given in powder, the dose of which is from 4 to 10 gm. (2 to 4 gm. = 3 ss. to i.); the bulk is generally an objection. There are official, besides the oleo-resin, a fluid extract and a twenty-per-cent. tincture, both good, which may be reduced, if desired, by syrup or mucilage. The oleo-resin represents about six times its weight of cubeb. From the oleo-resin are made the troches of cubeb, each containing 0.04 gm. (about gr. ss.), considerably used as a popular "expectorant" in pharyngitis, etc. *Henry H. Rusby.*

CUBEB, OIL OF.—OLEUM CUBEBÆ. The source of this oil is explained above. It varies from colorless to greenish or yellowish, has a specific gravity of about 0.920 and dissolves in an equal volume of alcohol. It has the characteristic odor of cubeb. It consists chiefly of cadinene ($C_{15}H_{24}$), apparently identical with the active portion of oil of copaiba. Upon keeping the oil, a portion of it becomes converted into cubeb camphor ($C_{15}H_{24}.H_2O$). The same change occurs in it in the fruit if the latter becomes old, and this product will be contained in the oil distilled from such fruit. Oil of cubeb has the same properties as cubeb, and is given for the same purposes, in doses of 0.3 to 1 c.c. (♏v. to xv.). *Henry H. Rusby.*

CUCUMBER. See *Cucurbitaceæ.*

CUCURBITACEÆ.—(The Cucumber or Gourd Family.) A family of some ninety genera and more than five hundred species, of great economic interest, both generally and medicinally. The plants are perennial, tendril-bearing herbs or undershrubs, rarely shrubs, and either prostrate or climbing. They inhabit warm, and especially tropical regions, throughout the globe. They are of rather delicate vitality and easily destroyed by accident, yet they are very commonly inhabitants of sandy, arid regions, and the family is noted for its protective provisions. Most common among these are purgative or poisonous constituents. These are very commonly stored in large fleshy and starchy roots, like the bryony, many of which have to endure long periods of rest, subject to decay, against which they can be protected by resins, and to attacks by foraging animals, against which they are protected by poisonous glucosides. The pulpy fruits, like those of colocynth and elaterium, are often similarly protected. The seeds are very commonly anthelmintic and diuretic. Besides the well-known drugs colocynth, elaterium, bryony, and pumpkin seed, separately considered, a very large number are used locally, or in domestic practice, for the same purposes. Among such seeds may be mentioned those of squash, cucumber, and melon; among roots, various species of Wilbrandia, Megarhiza, Cayaponia, Corollocarpus, Kedrostis, Modecca, Melothria, and Lagenaria; among fruits, species of Luffa, Momordica, and Trichosanthus, besides those of some of the above-mentioned genera. The use of the bland pulps of some of these fruits, such as cucumber, for poultices, is to be regarded as chiefly, if not wholly, mechanical. The juice of the stems and fruits frequently carries the drastic principle. Upon the other hand, many of our most useful vegetables are derived from these fruits, as the melons, pumpkins, squashes, cucumbers, citron melons, cayotes, calabashes, and acchocte. The well-known dish-rag gourd is elsewhere considered. *Henry H. Rusby.*

CUDBEAR. See *Litmus.*

CUINCHO.—Michoacan, Mexico. These springs are located 10 kgm. northwest of the city of Morelia. The water has a temperature of 100° F. Dr. Zuñiga, to whom we are indebted for a study of these springs, says, in speaking of the water: "It is perfectly clear, odorless, colorless, its taste is insipid and its reaction neutral." It contains eighteen grains of fixed substances per United States gallon and on analysis yields the following results: Lime, magnesia, soda, chlorine, and carbonic acid. A recent issue of the Mexican Pharmacopœia says the water contains sulphate of lime and magnesia, carbonate of lime, carbonate of potassa, and carbonate of soda and magnesia, with some chloride of lime and magnesia.

Notwithstanding the fact that the bathing facilities are rather primitive in character, large numbers of people employ these waters in the belief that they are useful in such affections as chronic malaria, hypochondriasis, and the uric-acid diathesis. *N. J. Ponce de Léon.*

CUMARIN, or COUMARIN.—*Cumaric Anhydride. Tonka Bean Camphor* ($C_6H_4.O.CO.CH.CH$). This is the odorous principle of a number of plants or plant parts, more especially of the tonka bean, the deer's-tongue, sweet clover or melilot, and a number of species of grasses, notably the *Anthoxanthum odoratum* L. and *Savastana odorata* (L.) Scribn. It is also largely produced artificially in several ways. It occurs in white crystals which melt at 67° C., and which are soluble in alcohol but not in water. In all of these plants it can scarcely be detected in the fresh or growing state, but develops in drying. In the tonka bean it is developed by the action of alcohol, which frequently leaves the beans with a crystalline surface, due to this substance. This is frequently rubbed off, wholly or partly, and even replaced by similarly appearing substances. Cumarin has an odor very similar to that of vanilla, and a burning taste. It is exclusively employed for perfuming and flavoring, chiefly to substitute vanilla. Large doses are said to exert a primary stimulant and a secondary paralyzant action upon the heart. *Henry H. Rusby.*

CUMIN.—CUMMIN. CUMINUM. The fruit of *Cuminum Cyminum* L. (fam. *Umbelliferæ*), a low annual of the caraway type, probably of Asiatic origin, but extensively cultivated in China, India, and parts of Europe for its aromatic fruits. The odor and taste are strongly aromatic, but less pleasant than many others in the family, on which account it is scarcely used in this country.

Cumin yields about three per cent. of a clear, yellow *essential oil* of spicy taste and odor, and having the general medical properties of the innocuous portion of the family. The oil is separable into *cuminol* or cuminaldehyde ($C_{10}H_{12}O$) and *cymol* ($C_{10}H_{14}$). Cumin is used everywhere in the East, and to a less extent in Europe, as a domestic flavor, and is said to be one of the components of curry powder; also an ingredient in some European liqueurs. In plasters and liniments, and in veterinary practice, it is also occasionally employed. It is an excellent carminative. The dose is 0.5 to 2 gm. (gr. viij. to xxx.); of the oil, ♏ij. to viij. *W. P. Bolles.*

CUPREA BARK. See *Cinchona.*

CUPRIASEPTOL.—$Cu(C_6H_4.OH.SO_3)_2.H_2O$. Copper phenolsulfonate, copper sulphocarbolate. This is prepared by heating a mixture of phenol and sulphuric acid, and saturating the product with copper oxide. It occurs either as small light-green needles or as a coarse crystalline powder, and contains 12.4 per cent. of copper. It is recommended as a hæmostatic. *W. A. Bastedo.*

CURARE.—*Woorari. Ourari.* This is a complex mixture of inspissated juices, which, in the relatively fresh state, is used as an arrow poison by the Indians of South America. Its composition is not known, but investigations have shown that there is always present the juice of certain species of *strychnos* which are indigenous to the country. Other species of strychnos are the source of similar poisons. In Java and Borneo, *S. tiente* yields a poison also used by the natives for poisoning their arrows; in Africa, *S. icaega* Baill. and *S. kipapa* Gigl. are the source of a powerful ordeal poison; and many other species supply active poisons, among them the well-known *S. nux vomica* L. The composition of curare varies according to the tribe from which it is obtained, each tribe selecting the tree growing in its immediate neighborhood and preparing the juice according to its tribal custom. Four varieties have been described:

First, that of the Amazon valley, from *S. Castelnæana* Weddell, a large woody climber growing in most parts of Brazil, and also in Colombia and among the Andes. The bark of the stem is the part employed. Secondly, that of the upper Orinoco region, from an imperfectly known species *S. gubleri*, possibly identical with *S. toxifera* Bentham. Thirdly, the curare of British Guiana which is attributed to the just-named *S. toxifera*. And, finally, that of French Guiana, which, on the authority of Dr. Crévaux, is attributed to *S. Crévauxii* Baillon.

The method of preparation has been described by travellers, some of whom spoke only from hearsay, while others were present during its compounding. The bark of the vine is the part employed. It is scraped and cut into small pieces, and the juice is obtained by a crude method of percolation and infusion. To this product are added the juices of several other plants, and, in some specimens, ants are found incorporated, and it is also said that the venom of certain snakes is added. Our knowledge of the manufacture and composition of curare is very obscure, and we are not able to distinguish the various forms that reach the market. It comes in earthenware pots, or in vessels formed from gourds, into which it has been poured when in a liquid state.

It occurs as a dark, brittle extract, with a disagreeable odor and a bitter taste. It is almost entirely soluble in water.

The active principle *curarine*, discovered in 1856 by Preyer, is separated as a colorless crystalline body, very deliquescent, very bitter in taste, and alkaline in reaction. With sulphuric acid it gives a blue color which serves to distinguish it from strychnine.

Curare exercises a depressant action upon the peripheral terminations of the motor nerves, affecting first the voluntary and later the involuntary muscles. When it is administered in small doses the brain and sensory nerves remain unaffected, but when it is given in large doses its effects extend to the central nervous system, producing a general paralysis, with disturbed special senses and loss of consciousness. Death takes place from failure of respiration, the respiratory muscles being affected earlier than the respiratory centre. Curare is rapidly absorbed and as rapidly removed from the system with the urine. In many cases of poisoning, this excretion of the poison favors the adoption of artificial respiration as a very rational mode of treatment. The kidneys begin to act quickly, and the poison may be eliminated in a few hours. If respiration can be maintained for that period the effects of the poison may be readily overcome. During the action of curare the body temperature is raised. After moderate doses there is a gradual failure of muscular power with loss of reflexes, and this may terminate in complete motor paralysis. The respirations are more frequent and become shallow and labored. The pulse is increased in force and frequency. The secretion of urine becomes greater. When the drug is given in larger doses all these symptoms are aggravated. There is also some fever, with marked depression. The heart becomes feeble and the vessels are dilated; and shivering alternates with fever, trembling, and clammy perspiration. According to reports, some specimens of curare produce muscular twitching and spasms.

As a therapeutic agent curare is of little value. Its power of preventing muscular contractions has suggested its employment in all conditions in which muscular spasm is a prominent symptom. In these, however, it cannot prove of much value, as it produces its effect through the peripheral nerves, and has little or no action upon the central nervous system, such as calabar bean and similar drugs exercise. It has been employed in poisoning with strychnine, and in hydrophobia, tetanus, epilepsy, and chorea. A case of hydrophobia has been reported in which the spasms were controlled by curare in doses of from gr. ¼ to ½, administered hypodermically, and recovery ensued. In a case of tetanus, gr. iv. were administered during twenty-four hours with success.

The dose of curare is from gr. $\frac{1}{10}$ to ½, to be administered hypodermically. Its effects require to be carefully watched, the smallest dose being given at first, and the amount being gradually increased until the desired effect is procured. When a new supply of the drug is obtained, the same care in determining the dose is to be observed. On account of the great unreliability of the drug, it has been advised that *curarine* should be employed, the dose of which, to begin with, is gr. $\frac{1}{100}$.

The rapid action of curare, when injected beneath the skin or when applied to the denuded surface, is not evident when it is administered by the stomach or bowel. This slow absorption by mucous surfaces has given rise to the idea that it has no effect when given in this way. When it is administered in larger quantities its action is equally severe. Its diminished activity is explained by the rapid elimination of the poison, which is removed almost as quickly as it is absorbed. Another explanation is that the poison is neutralized as it passes through the liver by way of the portal vein. *Beaumont Small.*

CURCAS. See *Jatrophaie.*

CURCUMA.—TURMERIC. The rhizome of *Curcuma longa* L. (fam., *Zingiberaceæ*), a perennial, flag-like herb of India, where, as well as in other parts of Asia, it has long been cultivated.

Curcuma is distinguished in trade as "long" and "round" varieties, which for a long while were supposed to be from different plants. They are now known to be the principal and lateral rhizomes of the same. Round curcuma is about as large as a pigeon's egg, oval, flattened, rounded at the ends and encircled by the lines of numerous nodes. The long variety, which is more common, is from 3 to 6 cm. long, and from 0.5 to 1 cm. in diameter (2 in. × ¼ in.), encircled by a number of distinctly marked nodular rings. The different varieties range in color, externally, from bright yellow (Madras) to brown (Bengal) or gray (Java); internally from deep yellow through orange and brown to nearly black. Odor strong, peculiar, not disagreeable; taste aromatic, bitterish. It contains a clear yellow *essential oil*, which is its aromatic portion, much fixed oil, resin, and a deep yellow, crystalline coloring matter, *curcumin*, which becomes carmine red with acids, and reddish-brown with alkalies.

Properties similar to those of ginger, but not much used here—either as a medicine or as a condiment. It is extensively consumed in Asia as a spice, and is the basis of curry. In the arts, tumeric is employed to dye cloths yellow; in chemistry, to a slight extent, as a test for alkalies; in pharmacy, now and then to color ointments and other preparations. It is largely employed as an addition to ground mustard, to ameliorate its acridity, generally regarded as too great to admit of the table use of the pure article, and also as an adulterant of the same in its medicinal form. *Henry H. Rusby.*

CUTTLEFISH BONE.—A very light and fragile calcareous skeleton found in the cuttlefish, *Sepia officinalis* L. (order, *Dibranchiata, Loliginea*). The "bone" of this Mediterranean mollusk is found in the dorsal part of the body beneath the mantle. It is obtained by collecting the mollusks and allowing them to putrefy, or by picking up those that wash ashore. When whole it is of oblong or lanceolate outline, strongly flattened, with one surface (the dorsal) hard and smooth, and one very spongy, light, and friable. The structure is very open, laminated, and light, the entire bone when dry floating upon water. Odor, none or slight; taste, saline.

There is a considerable demand for cuttle bones—partly for cage-birds and partly for dentifrices, polishing powders, face powders, etc. It consists almost entirely of carbonate of lime, with a little phosphate of lime and some animal matter. Its early use as an antacid, etc., is now of the past. *W. P. Bolles.*

CYANIDES.—The only cyanides that concern the physician are those, respectively, of *silver, mercury,* and *potas-*

sium. Silver cyanide is a white insoluble powder, official in the United States Pharmacopœia, but solely for pharmaceutical use, the salt being a possible source for obtaining, extemporaneously, diluted hydrocyanic acid (see *Hydrocyanic Acid*). Mercuric cyanide is a soluble salt which will be found discussed in the article *Mercury*, and concerning which it is only necessary to remark in this place, that the salt adds to the irritant properties of the mercuric salts generally, a peculiar virulence due to the acid radicle of its composition. Potassium cyanide is a soluble, and therefore physiologically active, salt, wherein the comparatively mild properties of the basic radicle are entirely overshadowed by the intensely poisonous potency of the acid element; for hydrocyanic acid in combination with the bases of the alkalies proves itself exactly as poisonous as in its free state, so that the alkaline cyanides, in proportion to their weight in acid radicle, are the medicinal or toxic equivalents of the uncombined acid. Potassium cyanide, being therefore practically but a carrier of hydrocyanic acid, is considered under the present heading rather than among the salts of potassium generally.

Potassium Cyanide, KCN.—Potassium cyanide is official in the United States Pharmacopœia under the title *Potassii Cyanidum*, Potassium Cyanide. It occurs in "white, opaque, amorphous pieces, or a white, granular powder, odorless when perfectly dry, but in moist air exhaling the odor of hydrocyanic acid. The taste is sharp and somewhat alkaline, but should be ascertained with great care, as *the salt is very poisonous*. In moist air the salt deliquesces. Soluble in about 2 parts of water at 15° C. (59° F.). Boiling water dissolves its own weight of the salt, but rapidly decomposes it. In alcohol it is but sparingly soluble. At a low red heat the salt fuses" (U. S. P.). It should be kept in well-stoppered bottles, since it tends to a slow decomposition by exposure. Potassium cyanide represents, in sixty-five parts, thirty-nine parts of basic and twenty-six of acid radicle; and so, according to what has been said above concerning the alkaline cyanides generally, about two and a half parts of this salt represent, physiologically, the virtues of one part of anhydrous hydrocyanic acid. The salt in concentrated application is very painful to raw and sensitive parts, and taken internally acts precisely after the manner of hydrocyanic acid (see *Hydrocyanic Acid*), except that it is rather slower of operation. A dose anywhere between 0.20 and 0.30 gm. (gr. iij. to v.) is ordinarily fatal, and death commonly results in from fifteen minutes to two hours. Poisoning can arise also from absorption, externally, through abrasions, and even the inhalation, in a close chamber like a photographer's "dark closet," of the fumes arising from an exposed strong solution may excite symptoms. In case of poisoning by the internal taking of the salt, Taylor (on Poisons) advocates the giving of ferrous sulphate as a special antidote, because of the reaction between the two salts whereby the insoluble and innocent substance *Prussian blue* is formed. The same author cites the case of a photographer who, upon accidentally swallowing a solution of potassium cyanide, immediately drank of a photographic "developing" solution containing ferrous sulphate, vomited Prussian blue, and survived.

Medicinally, potassium cyanide is a possible substitute for hydrocyanic acid, proposed because of greater stability. Internally, it may be given in doses of from 0.005 to 0.008 gm. (from gr. $\frac{1}{12}$ to $\frac{1}{8}$), in water or syrup. Many prescribe it in conjunction with vinegar or lemonade, with the view of setting free hydrocyanic acid from the salt, but the procedure is not necessary. Externally, an aqueous solution ranging from one-fifth to one per cent. in strength is occasionally prescribed as a lotion for the relief of surface pains or itching. A special use of potassium cyanide is to remove stains of silver nitrate from the skin, provided such stains be recent and not yet exposed to strong sunlight. A solution, or a moistened lump of the salt, is rubbed upon the blackened skin, and the part afterward well washed in water. Due regard must be paid to the very poisonous nature of the cyanide, and especially, application of the salt to cut or excoriated parts should carefully be avoided.

Edward Curtis.

CYCLAMEN.—The tuber of *Cyclamen Europæum* L. (fam. *Primulaceæ*), a plant largely cultivated in the house for ornament. It contains the glucoside *cyclamin* ($C_{30}H_{34}O_{19}$), occurring as a white powder, and yielding *cyclamaretin* on decomposition. It is soluble in alcohol and forms a frothy solution with water. It is in other respects very similar to saponin, quickly developing an exceedingly burning and acrid taste, and very highly irritant to mucous membranes. It can be absorbed by rubbing upon the sound skin, and produces thus its characteristic effects. It is an irritant-purgative, emetic in over-doses, and may act as a fatal drastic poison. Its use in domestic practice is as a purgative and anthelmintic, the powdered form being given in doses of 1 to 3 gm. (gr. xv. to xlv.).

Henry H. Rusby.

CYLINDROMA. See *Endothelioma*.

CYPRESS.—*Cupressus* L. A genus (fam. *Coniferæ*) of a dozen species of temperate or subtropical regions of the northern hemisphere. The composition and properties are in general those of juniper, savin, arbor vitæ, and others of the family.

Cypress oil is distilled from the fresh leafy twigs of *C. sempervirens* L., the Oriental cypress of southern Asia. The evidence is conclusive that the inhalation of this oil gives marked relief from the paroxysms of whooping-cough, and favors recovery. The only method recommended for its employment is to scatter a few drops upon the pillow, or to spray it about the room, but it would appear that a suitable solution for use in the inhaler might easily be devised.

Henry H. Rusby.

CYPRIPEDIUM.—Ladies' Slipper. Moccasin Flower. *American Valerian. Nervine.* The rhizome and roots of *Cypripedium hirsutum* Mill. [" *C. pubescens* Swz.," U. S. P.], and of *C. parviflorum* Salisb. (fam. *Orchidaceæ*). These plants are perennial herbs, arising from a horizontal rhizome by a pubescent, leafy, few-flowered stem half a metre or more in height. Leaves also pubescent, broadly oval, acute, parallel-nerved; flowers one to three, the most conspicuous part of which is the large inflated, pouch-like lip, in the former, one and a half to two inches long, in the latter about half as large, from which it and others in the genus derive their name. Rather common in moist woods, the latter more abundant in the Northwest.

The rhizome, with its adhering roots, is collected. It is "horizontal, bent, 4 in. (10 cm.) or less long, about $\frac{1}{8}$ in. (3 mm.) thick; on the upper side beset with numerous circular, cup-shaped scars; closely covered below with simple, wiry roots, varying from 4 to 20 in. in length (10 to 50 cm.); brittle, dark brown or orange-brown; fracture short, white; odor faint, but heavy; taste sweetish, bitter, and somewhat pungent."

It contains a *volatile oil*, a *volatile acid*, *tannic* and *gallic acids*, *resins*, *gum*, *starch*, etc. These constituents make cypripedium a gently stimulant and mild antispasmodic, of the hop and valerian kind. The dose is 0.5 to 2 gm. (gr. viij. to xxx.), and it is best administered in the form of the official fluid extract, or sometimes still better in the form of a twenty-per-cent. tincture.

Henry H. Rusby.

CYRTOMETER.—(κύρτος, curve; μετρον, measure.) The cyrtometer is an instrument which can be so adapted to a given part of the body as to reproduce its curves and inequalities. The word is sometimes, though less correctly, applied to callipers, an instrument used in measuring the diameter or thickness of a body. Under the name of "Wilson's cyrtometer" an instrument has been described for ascertaining the position, length, and direction of the fissure of Sylvius in the living subject; for cuts and a full description of the device, the reader is

referred to the original article on "Cranial Surgery," by Dr. A. W. Hare in the *Lancet*, March 3d, 1888.

The cyrtometer was first described by Andry and Bouillard in 1810, but was not extensively used until 1857, when Woillez, in a paper entitled "Recherches Cliniques sur l'Emploi d'un Nouveau Procédé de Mensuration dans la Pleurésie," described an instrument consisting of two halves of a jointed whalebone, connected by a hinge and capable of being accurately adapted to the shape of the chest. The cyrtometer of Fourmantain was a still later device composed of a circular spring which was applied to the thorax and adjusted by means of a clasp, while the curve was reproduced on paper on the principle of the pantograph.

All the instruments which have been mentioned were unnecessarily complicated, and time and custom have so simplified them that the modern device is easily obtained and is very practical. It consists of two strips of lead, each about one-half inch in width, one-tenth inch in thickness, and from eighteen to twenty inches in length. Such a piece of lead is so malleable that it may easily be moulded to any desired shape by simple manual manipulation, and at the same time it is of sufficient consistency to retain its form if handled with ordinary care, and it may also be straightened and freed from curves by striking vigorously its flat surface once or twice against a hard floor.

The cyrtometer is principally used for determining the character and degree of deformity that have been produced in the chest or abdomen as a result of certain pathological processes such as may occur in pleural exudations, lateral curvatures of the spine, kyphosis and lordosis, rhachitis, etc., or in tumors of the abdomen. It is also useful in tracing in infants the configuration of the head which has been altered as a result of abnormal labor, rhachitis, or hydrocephalus. In short, it is useful whenever it is desired to show the result of any cause so acting as to alter the symmetry of the lateral halves of the body.

If, for instance, it is desired to reproduce the shape of a distorted thorax, one starts by marking on the body anterior and posterior points which shall lie in the antero-posterior median plane of the body and on the same horizontal level. The strips of lead are then moulded by manual manipulation so as to conform to each half of the chest, their anterior ends meeting at the anterior median point, their posterior ends overlapping at the posterior median point, or being so bent that their angles will meet at this posterior point. Each strip is then removed, and the two halves are again adjusted to each other by placing them upon a piece of paper resting upon a flat surface. The inner circumference of the two halves is then traced by pencil upon the paper, the anterior and posterior meeting points are marked, and they are connected by a straight line which will correspond to the median plane of the body. The degree of asymmetry of the lateral halves will then be apparent, and, if desired, the curves may be reproduced upon any desired scale by the use of the pantograph. If, in cases in which there is a lateral deviation of the spine, there be noted, by suitable nicks on the lead strips, not only the anterior and posterior median points, but also the position of the spine of the vertebra and the median point of the sternum at the same level, their positions may be recorded upon the tracing, and the line connecting them will show the relation of the spine and mid-sternum to the antero-posterior plane.

On the same principle one may take tracings of any other part of the body and thus give a more graphic representation of the contour of a deformed part than can be obtained by simple mensuration.

Maynard Ladd.

CYSTADENOMA.—(Cystoma, Adenocystoma.) The dilatation of the glandular spaces of an adenoma through the excessive formation of secretion gives rise to a cystic tumor which from its origin is best designated by the term cystadenoma. The growths belonging to this class are distinguished from the cysts in that in the former the cystic change is always preceded by a new formation of gland tissue which later becomes converted into cysts by the accumulation of secretions and the subsequent proliferation of the walls of the gland spaces. There is consequently in the cystadenoma a progressive formation of cysts out of newly formed glandular tissue, and to this process there is no definite limit of growth. In the true cysts such new growth of gland tissue does not occur, and there is not a continuous formation of new cysts. The difference between a cyst and a cystadenoma is essentially that existing between a gland and an adenoma. Nevertheless, it is at times very difficult to draw sharp lines of distinction between the cyst and the cystadenoma. This is especially the case in regard to the proliferation cysts, since from these the cystadenomata frequently take their origin. The differential diagnosis will rest ultimately upon the establishment of the facts concerning the formation of new gland tissue preceding the cyst development.

The earliest stages of the formation of a cystadenoma are seen in the gradual dilatation of some of the spaces of an adenoma through the over-production of secretions. As soon as the dilatation of the gland space has reached such a point as to become visible to the naked eye on cross-section of the growth, it may be said to be cystic. With a preponderance of such cyst formation the adenoma gradually becomes changed into a cystadenoma. In its first stages of development the cystadenoma consists of numerous small cysts lying in a more or less well-developed connective-tissue stroma. The growth of some of the cysts may be more rapid than that of others, leading to the formation of a tumor containing both large and small cysts, often in such a manner that it may consist of a few large cysts bearing in their walls numerous smaller ones. The cystic change may not involve all of the glandular tissue of the adenoma, so that in or near large cysts there may be found gland tissue which contains only small cysts or appears solid. Not infrequently the gland spaces of an adenoma become cystic as soon as formed, so that the growth bears the character of a cystadenoma from the beginning without passing through a definite intermediate stage of adenoma.

Since the cystadenoma arises from numerous gland spaces it consists of many chambers (multilocular cystoma). Only through the atrophy of the intervening walls does the true cystadenoma become monolocular. The cyst spaces may be separated from each other by a very narrow wall of connective tissue, or by one so thick that they lie at some distance from each other. In the latter case the formation of connective tissue may so preponderate over that of the cysts as to justify the use of the term cystadenofibroma or cystofibroma. If the connective tissue becomes myxomatous in character, as is not infrequently the case, the growth may be styled cystadenomyxoma or cystomyxoma. Occasionally the connective tissue undergoes a rapid proliferation and takes on an embryonic character. The term cystosarcoma has been applied to such tumors, but their manner of growth does not justify their classification as sarcomata. They do not form metastases, and their growth is wholly by expansion. Hyaline change and calcification are not infrequently found in the stroma of cystadenomata, the latter often occurring in the shape of psammoma-like concretions.

The lining of the cysts is simple columnar epithelium in the great majority of cases, occasionally ciliated, and less frequently cubical or flattened. The inner surface of the wall may be smooth (cystoma simplex), or the connective tissue of the wall may extend out into the cavity of the cyst as little papillæ covered with epithelium (cystoma papilliferum or proliferum). These papillæ may be delicate, simple, blunt, or pointed, or they may be dendritically branched (polypoid cystadenoma). If the growth of connective tissue in the papillæ is so extensive as partially or wholly to fill up the cyst cavity, the tumor may be designated intracanalicular cystofibroma. Retrograde changes not infrequently occur in the lining epithelium: mucous, fatty, or colloid-like degenerations, necrosis, desquamation, calcification, etc. Inflam-