

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 alkalis 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. $\frac{1}{32}$ 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.

Edvard Curtis.

CYCLAMEN.—The tuber of *Cyclamen Europæum* L. (fam. *Primulaceæ*), a plant largely cultivated in the house for ornament. It contains the glucoside *cyclamin* (C₂₀H₃₄O₁₀), 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. *Conifera*) 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 vitae, 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. Nerine*. 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 $\frac{1}{2}$ 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.—(*κῦρτος*, 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, rachitis, 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, rachitis, 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. Inflammation,

mation of the cyst walls may occur as in the true cysts, but is of much less frequent occurrence.

The content of the cysts is usually a clear, slightly stringy or glairy fluid like white of egg, containing mucin, pseudomucin, albumin, albumose, the so-called paralbumin, etc. All of these are the products of the lining epithelium. White or yellowish masses of cells showing fatty degeneration or necrosis may be contained in the fluid. The entire lining epithelium may be converted into goblet cells, and the latter may also be found free in the fluid of the cyst cavity. In the case of inflammation of the wall or secondary infection of the cyst contents the latter, through the addition of inflammatory exudates, become fibrinous, purulent, or gangrenous. In the latter case gas, sometimes of an inflammable nature, may be formed in the cysts. Hemorrhages may also occur into the cyst spaces. As a result of these the contents of the cysts may contain broken-down red blood cells and blood pigment, acquiring from their presence a brown or reddish-brown color. Cholesterol, fatty-acid crystals, concretions of lime salts, corpora amylacea, colloid-like bodies, etc., are not infrequently found in the cyst contents.

Cystadenomata may arise from:

1. Normal glands, most frequently from the ovaries, testis, mammary glands, uterus, liver, and kidneys.
2. Adenomata of any gland, especially from those of the ovary, mammary glands, uterus, testis, liver, and kidneys.
3. From fetal gland structures in normal or abnormal locations, from teratomata, etc.

Between the cystadenoma simplex and the papillary form no sharp line can be drawn, as papillary proliferations are frequently found in the walls of simple dilatation cysts. The two forms usually exist together in combination (cystadenoma partim simplex partim papilliferum). The papillae may be delicate and narrow, or they may develop into thick cauliflower-like growths filling up almost the entire cyst cavity. The smallest papillary excrescences may have to the naked eye a velvet appearance. The larger papillae are usually branched. Occasionally the connective tissue of the papillae is myxomatous, more rarely hyaline in character. Calcification sometimes occurs in it. Tall columnar cells cover the papillae as a rule, and the majority of these are goblet cells. The cyst contents in papillary cystadenomata consist chiefly of pseudomucin. Large numbers of desquamated and degenerating cells may be found in it. The cystadenomata of the ovaries, mammae, and parovarium are usually papilliferous in some parts at least, while those of the liver, testis, and kidney but rarely contain papillae.

The cystadenoma simplex is malignant only through size and position. It produces no metastases and grows only by expansion. Since it may reach an enormous size (fifty to one hundred pounds), the effects of pressure may be very important. The papillary cystadenomata represent a further departure from the normal type of gland growth, and these tumors acquire a certain tendency toward malignancy in that the papillae may break through the cyst walls and continue to grow, spreading themselves over the neighboring tissues (in the case of ovarian cystadenomata, over the broad ligament and peritoneum, while papillary cysts of the mammae may break through the skin). Cystocarcinomata not infrequently arise from the papillary cystadenomata, but may develop also out of the simple smooth-walled form. A gradual transition of development between adenoma, cystadenoma simplex, cystadenoma papilliferum, and cystocarcinoma may often be traced, and this fact is of great importance in so far as the question of etiology of tumors is concerned. Of the direct cause of the formation of the cystadenoma we have as little knowledge as of that of the adenomata in which they arise. They occur more frequently in females, as the ovaries and mammae are the glands most commonly the seat of origin of these growths. They may develop at any age, but are most common at puberty and the menopause. Trauma, prolonged irritation and

inflammation, etc., have, as in the case of other forms of tumors, been supposed to be exciting causes of growth. No satisfactory explanation can be given of the excessive cell secretion in some growths, whereby the tumor has the structure of a cystadenoma from the earliest beginnings; while in other cases the adenoma is but slowly and imperfectly converted into the cystic tumor.

Ovary.—The cystadenoma is the most common form of ovarian tumor, the majority of all the large cystic tumors of this organ arising from the formation of new glandular spaces and their dilatation from the accumulation of the secretions formed by the epithelial cells lining them. They arise partly out of the follicles and partly out of in-growths of the germinal epithelium. In the latter case the in-growths become separated from the surface epithelium and form gland-like structures which gradually become distended through the formation of secretions. As the cyst develops proliferation of portions of the lining epithelium into the cyst wall takes place, these separate themselves from the parent epithelium, become dilated and form daughter cysts lying in the wall of the original cyst. This process may go on indefinitely until large multilocular growths are formed. On cross-section the inner lining of the cyst walls shows furrows and depressions at those points where the in-growth preparatory to the formation of new cysts is taking place. The partition walls of many of the cysts may atrophy, thus leading to a confluence of the chambers. Remains of the atrophic walls may appear as bridge-like projections across the lumen of the cavity. This progressive formation of daughter cysts in the wall of the cystadenoma distinguishes this growth from the degeneration cysts arising from the Graafian follicle and corpus luteum. It is, however, possible that the epithelial lining of these cysts may behave in the same way as that derived from the surface germinal layer, giving rise to epithelial in-growths that lead to the same progressive formation of daughter cysts. A similar process may be set up by proliferating in-growths from the epithelium of a follicle, which is in itself not cystic. The true cystadenoma of the ovary is always in its beginning multilocular, but may become unilocular through the disappearance of the intervening septa and the confluence of the cavities. Most commonly the growth consists of one or more large cavities in the wall of which there are countless small cysts. Traces of the septa can usually be seen in the walls of the larger cysts.

As a rule, the ovarian cystadenomata form round tumors which may be more or less nodular from the unequal development of the smaller cysts. Usually there is one large, round chief cyst in whose walls are small nodules made up of smaller cysts. The whole has a smooth, shining, more or less translucent capsule which corresponds to the tunics of the follicles. Adhesions between the capsule and the peritoneum are very common, and may be very extensive and firm. These tumors may reach a very large size and surpass in weight even that of the body. As they increase in size they usually grow out from the ovary into the abdominal cavity, remaining connected to the original site of formation by a more or less well-developed pedicel; in other cases the growth is into the broad ligament, forming intraligamentous tumors, or between the ovarian ligaments (interligamentous). The ovary, as a rule, undergoes an early pressure atrophy, the pedicel of the growth being formed by the ovarian ligaments, tube, and broad ligament, all of which become very much changed from the stretching to which they are subjected. The nourishment of the growth is to a large extent supplied by the development of blood-vessels in the inflammatory adhesions which are formed between it and the neighboring structures. As the tumor increases in size it gradually rises out of the pelvis into the abdominal cavity. Torsion of the pedicel may lead to complete necrosis of the tumor, and the resulting peritonitis and intoxication caused by the absorption of poisonous products are not infrequently fatal. Retrograde changes are also very common: hemorrhage, suppuration, etc. Thin-walled cysts may burst and discharge their contents

into the abdominal cavity. In this way large masses of mucin or colloid-containing material may be spread all over the peritoneal surface, often to the depth of several inches. This is partly absorbed and partly undergoes a

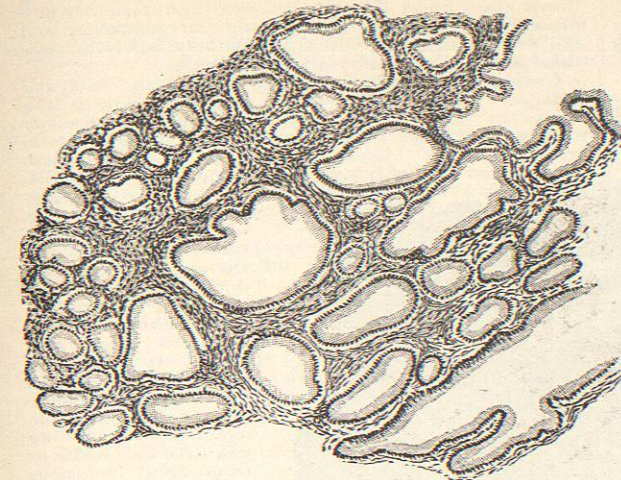


Fig. 1567.—Simple Multilocular Cystadenoma of Ovary. (Eulenberg's "Real-Encyclopaedie.")

partial organization (pseudomyxoma peritonei). Transplanted portions of the cyst epithelium lying in this may undergo proliferation and form cysts similar to the parent growth after the manner of a true metastasis. After rupture the cyst walls may become glued together by fibroblastic adhesions and complete obliteration ultimately take place.

Three forms of ovarian cystadenomata may be recognized: the cystadenoma simplex, the papilliferous form, and the cystic papilloma.

The *simple cystadenoma* has smooth inner walls lined with columnar cells which for the greater part are goblet cells, and also frequently show fatty degeneration, or necrosis. Calcareous plates may be formed in such degenerating epithelium. The contents are usually of the nature of glairy mucus, but may be serous, or thick and colloid-like. They may be much changed in character by products derived from the degenerating epithelium, by hemorrhages, or by inflammatory exudates. Pseudomucin is constantly found in the contents, but the proportion present differs very much in different tumors. It is a mucoid body which, on boiling with acids, yields a reducing substance, does not coagulate on boiling, and differs from mucin in that it is not precipitated by acetic acid. The so-called paralbumin found in the cyst contents is only a mixture of albumin and pseudomucin. The cystadenoma simplex is a benign tumor in that it grows only by expansion, and produces no hematogenous or lymphogenous metastases. Rarely it spreads over the peritoneum by means of implantation metastasis after rupture of its walls.

The *papillary form of the ovarian cystoma* arises in the same manner as the simple form, but differs from it in its tendency toward proliferations of its lining epithelium, not only into the wall in the formation of new cysts but also in the shape of projections into the cyst cavities. The connective tissue of the stroma follows these epithelial buds so that a true papillary formation is brought about. This process may be observed in all stages in different cysts, from the formation of small epithelial buds giving a velvety appearance to the wall when seen by the naked eye, up to the complete filling of the cavity with a cauliflower-like mass of dendritically-

branching papillae. The proliferation of the papillae may go so far as to lead to perforation of the walls of the tumor and the growth of the papillae on the outer surface of the capsule, and over the neighboring peritoneum. All stages of transition forms exist between the pure cystadenoma simplex and the growths showing this excessive development of papillae. The growth of the papillary forms is usually not so rapid as that of the simple form; it differs further from the latter in that its contents are serous, very rarely containing pseudo-mucin; and is most frequently double-sided in its occurrence, and rarely exceeds the size of a man's head. Its epithelium is occasionally ciliated. For this reason this form has been believed to arise from the parovarium rather than from the ovary. It has been shown, however, that the germinal epithelium under certain conditions becomes changed to ciliated epithelium. Psammoma-like concretions and calcareous plates are of very common occurrence in the papillae of these growths. This form has, further, a greater tendency toward malignancy than has the simple cystadenoma. In about thirteen per cent. of cases the papillary cysts give rise to implantation metastases, and the development of carcinoma out of these growths is not infrequent. Sarcomatous changes are also said to take place in the stroma, but these cases are doubtful. Since the growth of the papillary forms is usually interligamentous, their removal is attended by greater difficulties than in the case of the cystadenoma simplex.

The *cystic papilloma* of the ovary (so-called surface papilloma) forms usually a mass about the size of an orange, having a cauliflower-like surface composed of papillae covered with simple or ciliated columnar epithelium. These growths arise for the greater part from papillary proliferations of the surface germinal epithelium; through cystic changes in these and in the ovary the growth takes on the character of a true cystadenoma. In some cases the origin is from a ruptured papilliferous cyst whose papillae spread over the external capsule. This form shows an especial tendency to carcinomatous change, and very frequently sets up implantation metastases. It is more likely to recur than the other forms. It is most frequently one-sided,

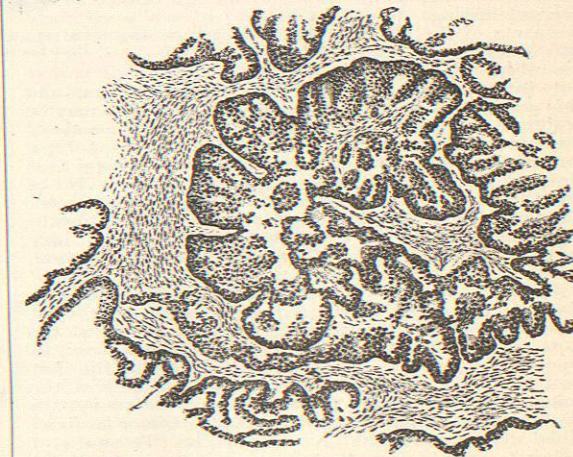


Fig. 1568.—Papilliferous Cystadenoma of Ovary. (Eulenberg's "Real-Encyclopaedie.")

while in the other ovary there is almost always present a papilliferous cystadenoma. Ascites is almost always associated with the surface papilloma.

Cystadenomata of the ovary can also arise from ovarian teratomata, in whose glandular spaces cystic dilata-

tion associated with epithelial proliferation is of frequent occurrence. Dermoid cysts are very often found in association with cystadenomata arising from the germinal epithelium, usually those of the smooth-walled variety.

In the majority of ovarian cystadenomata the chief symptoms arise from pressure upon the neighboring organs. The uterus and tubes are pushed out of their normal positions, and in the case of very large tumors the abdominal organs may suffer a similar displacement. Pressure atrophy may result. Local or general peritonitis, inflammatory adhesions, ascites, hemorrhages, gangrene following torsion of the pedicle, purulent infection of the tumor through aspiration, etc., are among the important sequelæ of these tumors. The treatment is wholly surgical.

Parovarium.—Cystadenomata of the parovarium are of much less frequent occurrence than those of the ovary. They arise through proliferation of the small canals of this organ, are intraligamentous, and seldom reach a large size; very rarely they grow around the tube. Their walls are smooth and lined with ciliated epithelium. They are benign in manner of growth. Occasionally they may rupture, but this event is, as a rule, not attended by serious consequences.

Uterus.—Cystadenomata of the wall of the uterus arising from remnants of the Wolffian duct have been described. They are not infrequently associated with myofibromata, and this association is at times so intimate that they may be designated cystadeno-myofibromata. Cystadenomata of the endometrium develop out of adenomatous polyps, but rarely reach a large size. They may become carcinomatous. Polypoid growths from the cervix, of the nature of cystadenomata, are much more common. They usually follow the glandular hyperplasia resulting from ectropion and laceration of the cervix, but may be of congenital origin. Carcinoma may develop from them.

Mammary Gland.—Next to the ovary the mammary gland is the organ most frequently affected by cystadenoma. The adenoma of the mamma is one of the most common tumors, and its gland spaces show an especial tendency to cystic dilatation. With the formation of new glandular tissue there is usually at the same time an excessive proliferation of the connective tissue of the stroma so that the resulting tumor has been called cystadenofibroma or cystofibroma. The walls of the cysts may be smooth, but are usually more or less papilliferous. The papillæ are characteristic in that they usually take the form of broad, rounded growths into the gland spaces whose lumen they almost entirely fill. On cross-section the cyst cavities appear as narrow tortuous canals lined with epithelium; many of the papillæ may be cut in such a manner that they appear as islands of connective tissue surrounded by epithelium (intra-canalicular cystofibroma). Very frequently the stroma

of the papillæ becomes myxomatous in character, and occasionally it shows such marked tendency toward proliferation that such growths have been designated as cystosarcomata. The cystadenomata of the mamma are more malignant than the adenomata. The papilliferous forms may break through the skin and form surface growths. They very often become carcinomatous, and the present tendency with many pathologists is to class these growths with the malignant tumors.

Cystadenomata occur less frequently in the liver and kidneys. Their origin is either in adenomata arising from the bile ducts or kidney tubules or in cysts arising through some congenital disturbance of development. Cystadenomata of the pancreas are rare. They arise from the acini or collecting ducts. Cystadenomata of the thyroid, prostate, testis, salivary glands, lachrymal gland, skin glands, etc., are all of infrequent occurrence. Further, cystadenomata may arise from teratomata containing glandular tissue or from foetal inclusions of glandular type. The cystic growths found very rarely in the mediastinum and abdominal wall near the umbilicus belong to this class. The latter arises from remains of the omphalo-mesenteric duct.

On the whole, cystadenomata are more malignant growths than adenomata. They cause greater local disturbance from their great size, give rise to secondary inflammatory changes, and are likely to rupture. The papilliferous forms may give rise to implantation metastases, and in all forms of cystadenomata there is a decided tendency toward the development of carcinoma. Recurrence after removal is also more common in the case of the papillary forms than with adenomata. The differential diagnosis is based chiefly upon the presence of an elastic, fluctuating tumor. Aspiration may be of aid in diagnosis and also as a means of decreasing the size of very large cysts so as to admit of their removal. The treatment is wholly surgical. The prognosis after removal of the growth is, on the whole, very favorable, but the tendency of papilliferous cystadenomata to recur must be borne in mind. When rupture of the cyst has occurred implantation metastases should always be looked for, and the same precaution should always be taken in the case of papilliferous growths of the ovary even if rupture into the abdominal cavity has not taken place. The tendency of the cystofibromata of the mammary gland to become carcinomatous makes their early removal desirable.

ALDRED SCOTT WARTHIN.

CYSTICERCUS CELLULOSÆ. See *Cestoda*.

CYSTICERCUS CELLULOSÆ CUTIS.—Multiple cysts of the skin due to cysticerci have been recognized by many observers. This disease consists of small-sized subcutaneous tumors due to the invasion of the cysticercus cellulose telæ (the cystic stage of the *Tænia solium*).

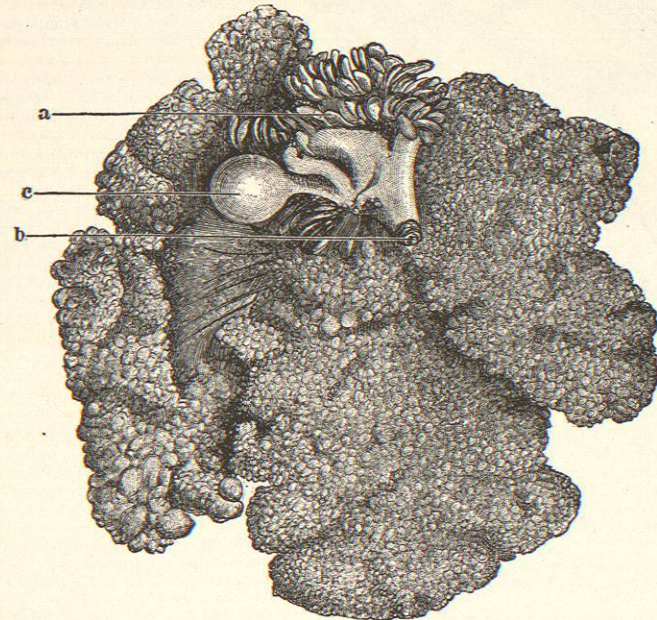


Fig. 1569.—Surface Papilloma (Cystic Papilloma) of Ovary. (Eulenbergs "Real-Encyclopædie.")

Most of the cases occur in countries where half-cooked pork is eaten. It is stated that five per cent. of the cases of *Tænia solium* affect the skin. The reason that few cases have been recorded is probably due to the fact that their presence causes no symptoms, and consequently the integument is not examined.

The tumors range from the size of a pea to that of a hazelnut, and may be single, but are usually multiple. They occur chiefly on the back and sides of the trunk, less frequently on the extremities. They are subcutaneous, but raise the skin into an oval-shaped tumor of a cartilaginous firmness, but withal elastic. The surface is smooth and the skin normal, unless injured by trauma or suppuration of the underlying tissues. While the animal is alive the tumor retains its elasticity, but becomes calcified into a hard nodule after its death. The differential diagnosis practically includes all subcutaneous swellings and growths.

Cysticerci also often involve the brain, and in the diagnosis any encephalopathic affection present (e.g., giddiness, headache, torpor, fits), and the absence of any syphilitic history, should strengthen the suspicion as to the nature of the skin affection.

The diagnosis can always be confirmed by microscopic examination of one of the tumors or of the fluid, which may be obtained through puncture. Such an examination will disclose the hooklets.

WILLIAM A. HARDAWAY.

CYSTINURIA. See *Auto-Intoxications*

CYSTOMA. See *Cysts*.

CYSTOSCOPY.—Cystoscopy may be defined as a method of inspecting the interior of the bladder by means of an instrument introduced through the urethra. This became possible for the male bladder only when, in 1879, Nitze, of Dresden, perfected an instrument by which he could illuminate the interior of the bladder by a platinum wire heated to a white heat by electricity and prevented from burning the bladder wall by a constant current of

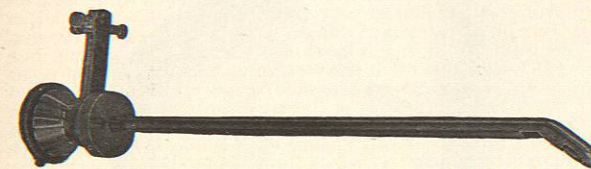


Fig. 1570.—Fenwick-Leiter Cystoscope. Lamp and windows for observation on the concave side of the instrument. Arm attached at a right angle to the handle is the movable switch to which wires from a battery are attached. (Original.)

cold water. The complications of this instrument, however, were such that the white hot wire soon gave place to a small Edison incandescent lamp, which greatly simplified the process and improved the illumination.

The instrument now in use retains the essential features of Nitze's cystoscope, and consists of the follow-

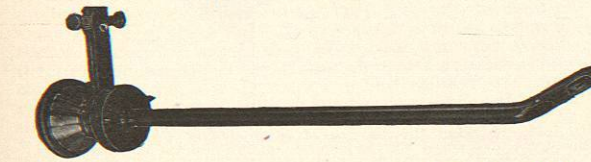


Fig. 1571.—Fenwick-Leiter Cystoscope, Second Variety. Window and lamp on the convex side of the instrument. (Original.)

ing parts: a shaft, a beak, a light, a window through which the bladder wall is seen, and an optical apparatus contained in the shaft, by means of which the image is corrected and brought to the eye. The shaft is a hollow

metal tube, from eight to nine and one-half inches in length, and usually of the calibre No. 22 of the French scale. At the outer end of the shaft is a funnel-shaped enlargement which contains the eyepiece of the optical

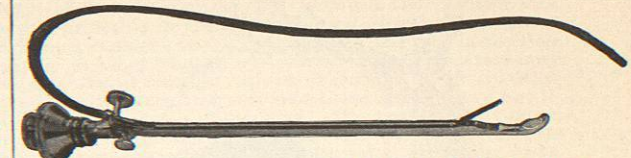


Fig. 1572.—Albarran's Catheterizing and Irrigating Cystoscope. Shows catheter in position and elevated to its full extent by the screw in the handle. (Original.)

apparatus and by which the instrument can be held (see Fig. 1571). The beak is three-fourths of an inch in length, and is fastened to the shaft at an angle of 145°. This beak carries the lamp, and has an aperture through which the light shines. The window, through which

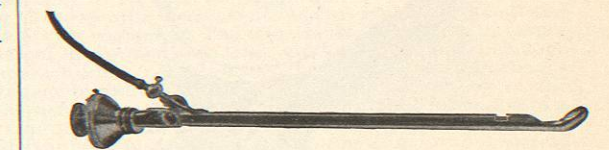


Fig. 1573.—Albarran's Catheterizing and Irrigating Cystoscope. Irrigating attachment. Water is injected into the bladder by the channel previously occupied by the catheter. (Original.)

the bladder wall is seen, is situated on either the convex or the concave side of the angle, between the beak and the shaft. When placed on the convexity of this angle it is in the axis of the shaft and admits of a direct view of the bladder wall toward which it is pointed. When the window is on the concave side of the angle the image of the bladder wall is received by a prism which turns it at a right angle into the axis of the shaft of the instrument.

The optical apparatus contained in a tube within the shaft has a lens just at the window in the bladder, and another at the end toward the observer.

The convergent rays which enter the little window within the bladder are deflected and carried up the axis of the tube to be received by the lens at the upper end; this lens again disperses them and presents to the eye an image equivalent to that received by the first lens. Thus a portion of the bladder wall much larger than the aperture is presented to the eye. The effect is much the same as if the eye were carried down to the lower opening and directly inspected the bladder through it.

In order to connect the lamp with the battery, the shaft is made of two tubes, one within the other, which are separated from each other by insulating material. Through them the current is carried and may be turned on and off by a switch attached to the handle. These tubes take up space and diminish the lumen of the instrument. To obviate this difficulty Otis has recently devised an instrument in which the electricity is conveyed through very fine wires.

While the principle of the cystoscope has not been altered, it has undergone many modifications to enlarge its usefulness. Thus it has been found that one of the most common causes of failure to get a good view of the bladder is the presence of blood or pus in the solution with which the bladder is filled. This may be obviated in a measure by the arrangement of an extra tube in the shaft, connecting with a stopcock in the handle, through which the fluid in the bladder can be changed from time to time without disturbing the instrument or turning off the light. Instruments thus equipped are known as irrigating cystoscopes, and the improvement is in some cases of value.