industrial success are met by regulations which cure the evils referred to. All remnants are used and are subjected to processes which destroy whatever parasites may be included. Under these conditions one may safely predict the gradual disappearance of parasites, especially with the co-operation of certain factors not yet mentioned.

In addition to municipal features as noted, personal habits play an important part. Cleanliness of person and hands, coupled with careful ablution not only of the person but also of the various articles of food, reduces the percentage of parasitic infection. A simple infection of *Trichocephalus* becomes manyfold greater by the accidental transfer of eggs from the skin near the anus, where they are deposited, to the mouth. The reality of such supposed auto-infection is proved by the high degree of infection among insane and defective classes which are known to exercise little care over personal cleanliness. No doubt many eggs of parasites are introduced on salads and other uncooked foods which are eaten without sufficiently careful cleansing previously.

The employment of footgear and hand coverings is influential also, because it reduces directly the likelihood of infection from eggs of parasites contained in earth, etc., which with uncovered hands become temporarily imprisoned beneath the finger nails of the field laborer. These coverings may also play a considerable part in preventing infection with *Uncinaria* if the observations of Looss are confirmed that the larvæ enter the body by an active migration through the skin, chiefly of the hands and feet, with which they come in contact in the case of field laborers.

Another factor which has tended to reduce the percentage of parasitic infection is the less intimate association of the more highly civilized individuals with domestic animals, especially dogs. The parasites of these animals, and in particular one species, *Tænia echinococcus*, possess great clinical importance for man. Not only is it apparently less frequent than previously, but also its frequence is certainly greatest now in those regions in which the inhabitants live most familiarly with their dogs. It should be noted also that the initial infection of the dog is prevented by keeping from it the offal from slaughtered cattle and sheep.

Probably more influential than any other factor in determining the reduction in degree of parasitism is the use of cooked food. A large part of the flesh food of semicivilized man is eaten raw or only partially cooked, in which condition the larval parasites are capable of development to the adult on reaching the alimentary canal of the new host. Were all animal food eaten only when thoroughly cooked, the common tapeworms and the dreaded *Trichinella* would cease to have clinical importance. The abundance of *Tænia saginata*, the beef tapeworm, where beef is eaten raw, of *T. solium*, the pork tapeworm, where raw ham is a delicacy, and of *Dibothriocephalus latus*, the broad tapeworm, where partly cured fish is eaten uncooked, furnishes the demonstration of the proposition advanced. And so long as pork is eaten uncooked cases of trichinosis will occur, whatever means may be taken to reduce the danger by meat inspection.

That factor which is about to be considered is destined to play the greatest rôle in the limitation of parasitism; it is the intellectual, and by it is brought about the determination of a rational hygiene and its application by the individual. National prejudice or established custom can oppose its introduction only temporarily, and it must ultimately succeed in reducing to lowest terms the parasitic infections of man and the important food animals.

Henry B. Ward.

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PARATHYROIDS. (NORMAL AND PATHOLOGICAL ANATOMY.)—In 1880 Sandström discovered the presence of small glandular organs on the posterior surfaces of the lateral lobes of the thyroid. He found these to be of constant occurrence, and from their structure regarded them as embryonic thyroid tissue; he accordingly named them *glandulæ parathyroideæ*. A year later, the same organs were independently discovered by Stieda in embryos of the pig, and by Baber in different animals. The former regarded them as carotid glands, the latter as embryonic thyroid tissue. But little attention was paid to these glands until 1891, when Gley asserted their importance. In the few years immediately following, his statements were supported by numerous observers. In 1895 the first careful study of the minute anatomy of the parathyroid was given by Schaper. Numerous experimental investigations followed, both in normal and thyroidectomized animals, showing the physiological importance of these structures. Various names have been proposed for them: "*epithelial bodies*," "*accessory glands*," "*accessory thyroids*," "*glandules thymiques*," etc.; the original designation *parathyroid* has the advantage, however, that the organs are not thereby confused with the accessory glands having the true thyroid structure.

As to the physiology of the parathyroids and their function no absolute knowledge has yet been obtained. It was first believed that they had a direct connection with the thyroid, and could compensate for it. Later experimental investigations in transplantation and extirpation, as well as in feeding with gland substance, have shown that the parathyroids have a function distinct from that of the thyroid. The loss of the thyroid leads to a chronic disease, that of the parathyroids to an acutely fatal disease. Feeding with gland substance is effective only in case of the administration of the same gland substance as that of the organ affected; thus thyroid feeding is of value only in case of the loss of the thyroid, and parathyroid feeding only in case of loss of the parathyroids. In transplantation, both thyroid and parathyroid preserve their characteristic structure.

The various investigators are not yet agreed as to the embryology of these glands, but it may be regarded as proved that the parathyroid bodies lying outside of the thyroid have an independent *Anlage* in the fourth gill pouch. In some animals there occurs constantly an epithelial body included in thyroid tissue, which probably arises from the third gill pouch. This internal epithelial body occurs so rarely in man that its presence may be regarded as a probable anomaly of development. Further, the parathyroids arise from single symmetrical *Anlagen*, and their occasional multiplicity is to be ascribed to a secondary snaring off.

The parathyroids occur usually in pairs; sometimes one on each side, or two on one side and one on the other. The writer has also found three upon one side. The total number observed has never been greater than four.

In size they vary greatly, but they are usually very small; the average, as found by the writer, being about 7 mm. long, 2–3 mm. broad, and 1.5 mm. thick. The average weight is about 0.2–0.3 gm. They are often almond-shaped, having one end recurved; but the shape not infrequently suggests the spleen. At other times they may be flat, cylindrical, or round. Their color is usually pale brown, but may be brownish-red or bluish, so that they are easily mistaken for hæmolymph glands. They usually lie behind the lower poles of the lateral lobes of the thyroid, separated from the thyroid tissue by connective tissue, their convex surfaces lying in slight depressions on the under surface of the lobes. Not infrequently they are found below the thyroid, even as low as the level of the clavicle. It is often very difficult to recognize the parathyroids at the autopsy; therefore all of the glandular structures in this region should be removed for microscopical examination. It is of advantage, in case the organs are not easily found, to take out the neck organs *in toto* and fix them in formalin. After fixation the dissection of the region behind and below the thyroids usually results in the determination of the exact location and relations of the parathyroids, their brown color becoming more prominent in contrast to the white adipose tissue about them. By following up the branches given off from the inferior thyroid artery, just before the vessel passes into the thyroid, the parathyroids are usually easily discovered. They derive their blood supply from these branches. Their veins empty into the veins on the surface of the thyroid, or directly into the inferior thyroid vein. But little is known of the nerve supply. Sacerdotti and Anderson have traced nerve fibres along the vessels and between the epithelial cells.

The microscopical appearances are those of a gland having a delicate capsule, from which thin connective-tissue septa pass in, supporting the larger blood-vessels, and separating the imperfectly developed lobules. The general appearance of the gland may vary greatly. Often it appears as a single mass of closely placed cells, between which run numerous delicate capillaries, forming a network in the meshes of which lie the cell groups or alveoli. No connective tissue accompanies the capillaries. In other cases the lobular arrangement is much more marked, the cells showing a more decided cord-like or alveolar arrangement. The anastomosing columns may consist of a single row or of several rows of cells, arranged upon the capillaries. In other specimens the cells may be grouped into round follicles. Not infrequently all three types are found in one gland.

The cells vary in appearance, so that three chief varieties may be distinguished. The majority are somewhat larger than those of the thyroid; the nucleus stains deeply, the protoplasm but slightly. The boundaries of these cells are visible as fine lines. Besides these, there are large polygonal cells with deeply staining nucleus, very granular protoplasm which stains deeply, and with sharp cell outlines. The third type of cell is low, columnar, and is arranged upon a basement membrane in such a way that the cells radiate toward the centre of the group, giving it the appearance of a follicle. In the centre of this a definite lumen may often be made out. It usually contains a finely granular substance, but may contain a colloid-like material. Occasionally the follicles are cystic. Between these three types of cells there are all possible transition forms.

Many of the large polygonal cells stain heavily with eosin, resembling closely the acidophile cells of the hypophysis. In others fine fat droplets are often present. The follicular arrangement of the cells is always more marked when the lumen-like opening, containing granules or colloid-like material, is present. The different appearances presented by the cell indicate most probably different stages of functional activity.

The circulation of the gland is sinusoidal in character, the epithelial cells being separated from the blood by endothelium only, connective tissue as a rule not accompanying the capillaries. The secretion of the gland, as clearly shown in a hypertrophic parathyroid obtained by the writer in a case of acromegaly, is into the lymph vessels.

According to Benjamins colloid is constantly present. The writer has not found this to be the case, but has found constantly in the open follicles a finely granular substance. He agrees with Benjamins that the parathyroids are individual and constant organs, differing in structure and function from both the fœtal and the mature thyroid; and that the differences in size, form, and staining reactions represent different stages of functional activity.

PATHOLOGY.—Variations in size, shape, and number of the glands occur. Cysts lined with columnar or flattened epithelium may be found near or in connection with the parathyroids, as congenital "rests" of the gill pouch or of a diverticulum of the same. Benjamins suggests that this is an analogue of the *ductus thyreoglossus*, and should be designated as the *ductus parathyroideus*. The writer has observed in one case in man a blind duct, lined with low columnar cells, passing into the parathyroid, its epithelium being directly continuous with that of the gland. Near the entrance of the duct into the parathyroid there were several large cystic follicles containing colloid-like material.

Circulatory Disturbances.—In general venous congestion the capillaries of the parathyroids are dilated; in general anæmic conditions they are collapsed and contain but little blood. Local anæmia may be caused by pressure of strumous thyroids. Hemorrhage, œdema, and inflammation may also be caused by struma.

Retrogressive Changes.—*Pressure atrophy* may be caused by struma of the thyroid. *Fatty atrophy* occurs in old age and in cachexias. Benjamins has observed *hydropic degeneration* in groups of cells, occurring in two cases in which the organ was hyperæmic. The writer has obtained a reaction for *mucin* in the cysts found in one case. He further regards the presence of *colloid material* in such cysts as being of the nature of a degeneration.

Hypertrophy.—In a case of acromegaly with adenomatous tumor of the hypophysis the writer found great enlargement of the parathyroids, the right parathyroid weighing 1.5 gm., the left 1.7 gm.; the right one being nearly 2 cm. long. Both were deep bluish-red. The microscopical examination showed the follicles to be for the greater part cystic, and containing finely granular material staining deeply with eosin. No colloid was found. All transition stages could be observed, from the closed follicle to the cystic ones. The dilated cystic follicles could be seen to possess direct communication with the lymph vessels. The thyroid in this case showed interstitial increase of connective tissue.

Benjamins has seen an interstitial hyperplasia of the connective tissue of the parathyroids in a case of Basedow's disease associated with cirrhosis of the liver.

In struma of the thyroid, according to Benjamins, there is no increase of size in the parathyroids; on the contrary, they are often smaller, and are either normal or show retrogressive changes rather than progressive. These changes are to be referred to the pressure of the enlarged thyroid.

With the exception of the one case mentioned above, Benjamins found no changes in the parathyroids in Basedow's disease.

Benjamins describes a tumor attached to the right lobe of the thyroid, which in structure he regards as closely resembling that of the parathyroid, and regards its origin from the latter as possible.

Functional Relation between Thyroid and Parathyroid.—The evidence at present is against the existence of any close functional relationship between these organs. In conditions of extensive thyroid disease the parathyroids are normal or only secondarily affected. In a case of cretinism with total defect of the thyroid, reported by Maresh and Peucker, the parathyroids were normal. Other disturbances of development of the thyroid occur, in which cases the parathyroids are found to be normally developed. In a case of pigment atrophy of the thyroid Benjamins found the parathyroids normal. According to Vassali and Generali, if the parathyroids be removed at the same time with the thyroid tetany results. If the parathyroid on one side alone be removed, the tetany is transitory. If the parathyroids are not removed, cachexia strumipriva or myxœdema follows.

Whether the case of hypertrophy of the parathyroids in acromegaly is to be regarded as a compensatory hypertrophy on the part of these organs for the hypophysis, or is to be explained as a part of the general hypertrophy occurring in the disease, the writer is not able to decide. The evidences of excessive secretory activity would favor the former view. (See Benjamins, "Ueber die Glandulæ parathyroidæ," *Beiträge zur pathologischen Anatomie*, 31, 1902.) *Aldred Scott Warthin.*

PARATYPHOID FEVER.—Up to the time when the Gruber-Durham-Widal reaction came to be used as a routine method in the diagnosis of typhoid fever no hesitation was felt in classing all the cases presenting certain symptoms as typhoid fever; but with the use of this method it has been recently discovered that in some cases the characteristic serum reaction fails. In these it has been found possible to isolate from fæces, urine, blood, and various other situations, organisms which have been carefully described by a number of workers, and which

agree in morphological and cultural characteristics closely enough to be at least classed in one group, if not actually identified with one another. Such organisms have been spoken of as "typhoid-like bacilli" or "paratyphoid bacilli," and the clinical phenomena in such infections may perhaps, from their resemblance to typhoid fever, be suitably spoken of as paratyphoid fever.

The disease has occurred, sometimes in small epidemics, in several places in Europe, notably in Paris, Bremen, etc., and has also been observed in American cities. It seems to attack persons of any age, but the average in a number of cases was about twenty-seven years. The symptoms resemble very closely those of typhoid fever—indeed, one cannot point out any symptom of pathognomonic importance, so far as our knowledge yet extends. The onset is, as a rule, with headache and general malaise, with some stupor. There is a continuous, if irregular, high temperature lasting throughout the illness and terminating gradually by lysis, after a duration generally of about four weeks. The spleen is, as a rule, not markedly swollen, and often is not at all palpable. Intestinal symptoms are not characteristic—there may be diarrhœa, or constipation may persist throughout the course of the illness; in some cases there has been intestinal hemorrhage. The blood shows no typical changes—the leucocytes are, as a rule, not increased. Rose spots are very often—indeed generally—present. Various complications, such as bronchitis, abscesses in various localities, slight hemorrhages, etc., have occurred, and in one case (that of Cushing) there was a costo-chondral osteomyelitis from which the organism was isolated.

The prognosis on the whole seems very good, as of twenty-six or more reported cases only a small number were fatal and two or three autopsy records only are at our command. Most of the cases have terminated by lysis—convalescence progressing much as after typhoid fever, while in one or two described by Kurth a sort of crisis occurred.

At autopsy it is found in these cases that there is no intestinal lesion whatever; the Peyer's patches and solitary follicles are not swollen and show microscopically no lesion. The spleen is somewhat enlarged and soft, and on section has a dull, opaque, grayish-pink color. Microscopically there is no great proliferation of the endothelial cells, and no red-corpuscle-carrying cells are seen, although the lymphoid cells of the splenic pulp are more abundant than normal. In one case focal necroses have been described in the liver.

Little characteristic as the symptoms and pathological lesions are, the bacteriological findings are fairly definite and serve well to outline this group of cases. There have been isolated by various workers (Gwyn,[1] Cushing,[2] Schottmüller,[3] Kurth,[4] Johnston,[5] Hewlett,[6] Longcope,[7] and others) bacilli designated under various names and still closely enough related to be classed, with some approach to unanimity, as a group standing half-way in its properties between the Bacillus typhosus and the B. coli, and very closely related indeed to the so-called group of Gärtner, the type of which is the B. enteritidis, a form associated with the epidemics following meat poisoning. Morphologically these paratyphoid bacilli cannot be distinguished from the typhoid. On the ordinary culture media, such as agar, gelatin, bouillon, etc., their growth is practically identical with that of typhoid. In litmus milk they produce, as a rule, acid at first with terminal alkalinity if exposed to the air and they do not clot the milk. Unlike the B. typhosus they ferment glucose with the production of acid and gas, while with lactose media they produce no gas. In these latter respects they most closely resemble the group of B. enteritidis. The production of indol is very slight and even somewhat doubtful.

Far more definite, however, than the results of these cultural methods of differentiation are the serum reactions. It is found that the serum of such a patient will never agglutinate the typhoid bacilli; it will, however, in great dilutions, agglutinate the bacilli isolated from the patient's blood, and sometimes even the bacilli from other cases. Some of the organisms described, however, such as those of Gwyn and Cushing, practically identical as they are culturally, refuse to be agglutinated by one another's sera. Similarly, while it is possible to immunize laboratory animals from each of these bacilli, so that their serum in the greatest dilution will agglutinate the bacilli used, it is often found that the bacilli from another epidemic or from another case will not be agglutinated by this serum. Nevertheless, it seems justifiable to consider these organisms extremely closely related, if not quite identical, and even if, as has been suggested, they are merely the results of altered environment on typhoid or colon bacilli, they have acquired such characters as to secure them a specific value.

To resume, therefore, we have in this recently described group of cases a disease clinically in every respect resembling a mild typhoid fever, but in which the general septicæmia is not as in typhoid associated, so far as we know, with such definite, localized pathological lesions. The serum reaction fails with the typhoid bacilli, but is positive in great dilution with the characteristic bacilli which can generally be isolated from the blood and fæces, and which morphologically and culturally are closely related to the group of B. enteritidis and to the B. typhosus, and from this relation are designated paratyphoid bacilli. *William G. MacCallum.*

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[4] Kurth: Deutsch. med. Wochenschrift, 1901, Nos. 30 and 31.
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PAREIRA BRAVA.—*Pareira*, U. S. P.; *Pareiræ radix*, B. P. The root of *Chondrodendron tomentosum* Ruiz et Pavon (fam. *Menispermaceæ*).

This drug is derived from a tall woody twiner of Brazil and adjacent parts of tropical South America. It was first introduced to the notice of physicians in Europe about two hundred years ago, and after a period of neglect was again brought forward in the early part of this century. It is very little used at present—at least in this country. During this period several other closely related products from allied genera have been imported as pareira brava, adding much to the botanical confusion in regard to its source. The "false pareiras" appear to have about the same slight degree of usefulness as the genuine.

Pareira occurs in subcylindrical, knotty, and somewhat tortuous, hard, heavy, and tough pieces, of indefinite length and 1–6 cm. ($\frac{1}{2}$ to $2\frac{1}{2}$ in.) thick; externally dark brown or blackish, longitudinally wrinkled and bearing transversely elongated protuberances or incomplete annular ridges, as well as constrictions, or occasionally fine fissures; the dried transverse surfaces exhibit several equilaterally concentric circles of interrupted, porous wood wedges, projecting beyond the markedly retracted intervening tissue of the rather large medullary rays; internally pale brown or yellowish-brown, when freshly cut having a waxy lustre; inodorous and bitter.

Of the several spurious pareiras, all have a gray or grayish-brown surface instead of the blackish color of the genuine, and are less, or not at all, knotty and roughened. None cuts with its waxy lustre, and all are lighter in weight and less solid.

Pareira contains from three-fourths to one per cent. of an alkaloid which is probably pelosine, similar to, if not identical with, buxine of box, and biberine of greenheart bark. A little tannin also exists, together with starch, gum, and about eight per cent. of ether-soluble fat.

Action and Uses.—What we know of the constituents of pareira and their actions does not support the therapeutical ideas upon which its use is based. It is known to be a fairly good bitter tonic, and slight anti-periodic properties may be reasonably assumed. Its use, however, is chiefly as a diuretic, and in inflammatory diseases

of the genito-urinary organs, more especially in orchitis. While it does appear to have a slight diuretic action, the idea of its use in this way probably depends upon administering it in decoction well diluted with water. Certainly, the idea of its having the great diuretic value once ascribed to it has been completely abandoned. There is good clinical evidence of a moderate degree of usefulness in the other directions named, although such action is by no means certain or uniform.

The Pharmacopœia provides a fluid extract made with ten per cent. of glycerin, of which the dose is a fluidrachm. For its diuretic effects, the five-per-cent. decoction is best employed.

Allied Drug.—The drug which is, in the United States and England, regarded as the principal adulterant or substitute of pareira is that wholly or partly specified in some pharmacopœias, namely, the root of *Cissampelos Pareira* L., a plant of similar habit and growing in the same region, though much more widely distributed, and believed also to grow in India. The root is generally smaller than pareira and is of a brown or gray-brown color; longitudinally much grooved and transversely fissured, and readily losing its bark when kept in stock.

The alkaloid of this drug has been proven to be pelosine. Cissampelos is believed to act much like pareira, though it is more generally used as a tonic.

A number of other tropical American drugs are locally known as "pareira," but they bear no resemblance to the genuine article. *Henry H. Rusby.*

PARIS CHALYBEATE SPRINGS.—Lawrence County, Missouri. Post-Office.—Paris Springs. Hotel and cottages.

Access.—Viâ Kansas City, Fort Scott, and Gulf Railroad to Ash Grove, thence two miles by stage to springs.

The springs are delightfully located in the Ozark Mountains, the surrounding country being interspersed with beautiful glens, green meadows, dense forests, and orchards. The elevation (1,500 feet above the sea level) is sufficient to assure freedom from depressing heat in the summer time. The spring yields about one hundred and twenty gallons of water per hour, having a temperature of 52° F. A qualitative examination showed the presence of oxide of iron in solution, besides the carbonates of lime and magnesia, the chlorides of sodium, potassium, and iodine. A complete qualitative analysis is desirable. Patients suffering from disorders of liver, kidneys, stomach, skin, and nervous system have found great benefit from a sojourn at the springs. The tonic properties of the water have been well shown in the debility of anæmia and in various disorders of the female sexual system. *James K. Crook.*

PARIS, PARISETTE.—A European plant, *Paris quadrifolia* Linn., belonging to the order *Liliaceæ*, and closely allied to the *Trillium*, which is so common as an American wild flower. Experiments with an extract prepared from the entire plant show that it exercises a direct action upon the medullary centres. It at first produces a short period of excitation which is followed by a diminution of sensibility and reflex action, and a slowing and weakening of the respiration and heart beats.

It was suggested that it might prove of value as a substitute for aconite, but it has failed to obtain any recognition as a therapeutic agent. *Beaumont Small.*

PARKER MINERAL SPRING.—McKean County, Pennsylvania. Post-Office.—Gardeau. Hotel and sanitarium.

Access.—Gardeau is a station on the Western New York and Pennsylvania Railroad, four passenger trains daily stopping at this point.

This resort is located in the Alleghany Mountains, on the headwaters of a branch of the Susquehanna River. The elevation here is about 2,000 feet above the sea level. The country in this part of Pennsylvania is still wild and sparsely settled. Dense forests of hemlocks are frequent, and bear and deer may yet be found to reward the hunter's pursuit. Mountain trout streams abound. It is scarcely necessary to add that the climate in this wild and rugged region is bracing and salutary. In 1865 the present mineral well was drilled on the site of an oil spring. At 650 feet a vein of water was struck that flows from the top of the well in an unvarying current of about seventy gallons per hour. After some delay a bathhouse, sanitarium and hotel were built, and the place has developed into a very comfortable and attractive resort. An analysis of the water by Henry Trimble, analytical chemist of Philadelphia, resulted as follows: One United States gallon contains: Magnesium chloride, gr. 109.84; calcium carbonate, gr. 11.95; calcium chloride, gr. 221.92; sodium chloride, gr. 282.55; potassium chloride, traces; silica, gr. 1.33. Total, 627.59 grains. Temperature of water at spring, 50° F.

This is a richly impregnated saline water of the magnesic-sodic-calcic variety. When used under proper medical supervision it ought to exert a very beneficial influence in a variety of disordered states of the physical economy. It should always be taken at first in small quantities. The water has been found to possess active cathartic and diuretic properties. It is also a stimulant to the gastric mucous membrane, promoting the flow of gastric juice and aiding the process of digestion. The best effects of the water will be observed in atonic dyspepsia, torpor of the liver, abdominal venosity, constipation, in nephritis with scanty, highly colored urine, and in irritable states of the bladder. At the resort it is also used in the form of baths in a variety of conditions. The water is bottled and shipped to any desired point. *James K. Crook.*

PARK'S SPRINGS.—Caswell County, North Carolina. Post-Office.—Pelham.

These springs are located six miles east of Pelham, but they do not seem to be used much as a resort. The waters, however, are used commercially, and are highly recommended by physicians of North Carolina and the neighboring States in chronic constipation, dyspepsia, and portal congestion. The following analysis was made not long ago by Prof. Albert R. Ledoux, Ph.D., of the State Agricultural Experiment Station at Chapel Hill: One United States gallon contains Magnesium sulphate, gr. 1.50; sodium sulphate, gr. 1.48; iron oxide, gr. 3.50; alumina, gr. 3.50; uncombined sulphur, gr. 0.15; calcium carbonate, gr. 4.80; silica, a trace; sodium chloride, a trace. Total, 14.93 grains.

In its chemical constitution the water bears some slight resemblance to the well-known Hunyadi-Janos water of Hungary. It is a valuable chalybeate, but must be taken in considerable quantities to secure a purgative action. *James K. Crook.*

PARONYCHIA. See *Hands and Fingers, etc.*

PAROTID GLAND, DISEASES AND INJURIES OF.—I. Injuries.—The parotid gland may be injured from the outside through the cheek or from the inside through the mouth or pharynx. The more common injuries in the reported cases have been the result of blows and sword thrusts and have proved of little importance. However, occasionally hemorrhage, venous or arterial, may be alarming, and if it cannot be controlled by pressure one or more vessels will have to be ligated. The internal and external carotid and the vertebral arteries have been severed in such wounds; when this occurs, if it is found impossible to ligate the arteries in the wound, the common carotid should be at once exposed and tied. Hemorrhage may always be temporarily controlled by pressure. Associated injury to the facial nerve may cause a more or less complete unilateral facial paralysis with areas of anæsthesia, and in such a case an attempt should at once be made to suture the ends of the divided nerve.

An injury to the gland substance is usually demonstrated by the flow of saliva from the wound after the hemorrhage has been controlled. The escape of the fluid

secreted is usually augmented, in such a case, by the movements of the jaws in mastication and by the reflex stimulation caused by the ingestion of food.

Injuries to *Stenson's duct* are important on account of the conditions to which they give rise and of the difficulties which stand in the way of successful treatment. The duct is more often divided or lacerated on the masseter, where it is more fixed, than on the buccinator, where it is moderately movable. The fact of its having been divided is made evident by the flow of saliva from the wound. Occasionally spontaneous healing occurs, but the results to be feared are either the formation of a fistula, the common termination, or the obliteration of the duct, a sequel of more rare occurrence. Stenosis of the duct may lead to the formation of a cyst and eventually, as stated by some authorities, to complete atrophy of the gland.

The *treatment* of injuries to the parotid and its duct demands first of all the control of hemorrhage. Ligation of a vessel in the wound is difficult if it is large, and, if it is not possible to ligate the internal and external carotids singly, the common carotid should be tied. The vertebral artery has been ligated in its first part and also in the vertebral canal after removal of a transverse process. If hemorrhage from collaterals persists, pressure and cold applications will be found sufficient to control it. The possibility of the formation of a fistula and the danger of secondary infection of the gland afford us two special reasons for seeking primary union in wounds of this locality.

Immobility of the head and jaw should be secured with starch or plaster splints, and for a few days fluid food only should be administered through a tube. Talking should be forbidden.

II. Parotid Fistula.—Parotid fistula is a condition in which the normal secretions of the gland escape through an abnormal opening on the side of the face or into the mouth; in the latter case the lesion is of no pathological importance. Among the causes may be mentioned wounds involving the gland or Stenson's duct, either accidental or made during the removal of diseased lymphatic glands or tumors, abscess formation and ulceration following calculus or necrosis of the jaw, and involvement of the gland or duct in a tuberculous or syphilitic process.

In a case of fistula there are usually, on the outside of the cheek, a small opening surrounded by a few granulations and a circumscribed area of reddened and irritated skin. If there is no obstruction in the duct the fistula often heals spontaneously; but at times the fistulous condition is very persistent and obstinately resists treatment.

Slight weeping of the gland from injury to the glandular substance heals spontaneously in a few days.

Treatment.—This consists primarily in removal of the cause of the abscess or ulceration by local and constitutional measures, and the reduction of the lesion to a simple fistula. If the patient is seen soon after the injury has been inflicted a small silver probe may be passed through the orifice of the duct in the mouth and into the proximal portion of the severed duct, and an attempt be then made to suture the ends of the duct with fine catgut sutures, this material being more easily absorbed and less liable to become infected than silk. The sutures should not enter the lumen of the duct. The external wound should then be carefully closed.

If the fistula has existed for some time the edges of the artificial opening may be freshened and closed, in the hope of forcing the saliva into its normal channel.

Another method is to pass a stout thread soaked in balsam of Peru through the fistula into the mouth, bringing it out at the angle of the mouth and tying the ends on the cheek. After the lumen is by this means well reëstablished, the duct and external wound may be closed as above. Homer's method is to make a hole with a punch through the cheek into the mouth, this hole including the orifice of the fistula. After this the external wound is closed.

III. New Growths.—There are a certain number of growths which, while they do not involve the substance of the parotid gland, lie in close proximity to it, and should not therefore be passed unnoticed in a consideration of tumors of this region. These, as a rule, lie without the capsular limits of the gland; but at times, particularly when they are of vascular origin, they penetrate the gland substance. These penetrating tumors are sebaceous cysts, dermoids, enlarged lymph nodes, lipomata, nævi, angiomata, and lymphangiomata. They do not differ from similar growths in other regions. The writer has recently seen, in a case of multiple venous angiomata, an angioma occupying the site of the right parotid gland. When the patient was in the recumbent position the tumor was the size of a goose egg and of a deep purplish hue; but with the patient in the erect position the contents were discharged, the tumor entirely disappearing and the skin regaining its normal hue. The left parotid was not similarly affected. These vascular tumors may be removed by pressure, by ligation of the vessels, or by extirpation, the others by extirpation.

Neoplasms of the parotid are very rarely of a single type. Mixed tumors are more common here than in any other part of the body excepting the ovary. "It is not unusual," says Sutton, "in sections from parotid sarcoma to meet with spindle cells, cartilage, myxomatous tissue, and glandular acini in an area two centimetres square." It will be convenient, however, to group these growths according to the tissue which is predominant in each variety and to outline the general characters of each. The neoplasms vary greatly as to their malignancy, but in general it may be stated that the mixed tumors grow rapidly, attain a large size, and tend to infiltrate the adjacent tissues, involving both blood-vessels and lymphatics, thus producing secondary deposits in other parts, and more particularly in the lungs. The growths when small are usually painless; they become painful only when in consequence of their size the pressure on the nerves is considerable, or when the nerve sheath is involved in the process of infiltration. Involvement of the skin with ulceration is characteristic of the later stages of the more malignant varieties. Pressure may cause a facial palsy, occlusion of Stenson's duct, interference with the blood supply of the parts dependent on the carotids, and, when growing deep into the neck, obstruction of the œsophagus and difficulty of deglutition. Facial palsy is more often the result of infiltration than of pressure, and is accordingly more common in malignant growths.

Enchondromata.—Cartilage enters into the formation of nearly all parotid neoplasms. Enchondromata are encountered in two forms: those composed of pure hyaline cartilage, and those in which the cartilage is associated with other tissues. Enchondromata of the first variety are of slow growth, attaining the size of a walnut in the course of several years. It is only in rare cases that they exceed an egg in size. The tumor is firm in consistence with a surface smooth or nodular, at times adherent to surrounding tissues. It is benign, and does not return when removed. Extirpation is usually not difficult. The other variety consists of small masses of cartilage associated with connective, mucous, adenomatous, or carcinomatous tissues. It assumes the character of a mixed tumor, is more malignant than the first variety, grows more rapidly, and tends to recurrence after removal.

Adenomata of the parotid are rare; they are encountered during the period from fifteen to thirty years of age. They have a distinct capsule, and may appear in any part of the gland. They are usually small, painless tumors, easily shelled out. If large they are movable and loosely connected with the parotid tissue. The surface is irregular and nodular, hard in places, but often elastic or fluctuating on account of the presence of associated cysts.

Sarcomata found in this region may be spindle-celled, solid, or cystic. They are rarely pure, and are mixed with cartilaginous, myxomatous, or fibrous growths. They are more common than the carcinomata, and come next to these in malignancy. The soft varieties occur

more commonly in youth, the harder types in middle life. They infiltrate all the surrounding structures, growing deep into the neck, inward behind the pharynx, and backward behind the ear, and involving the sheaths of the blood-vessels. The rapidly advancing ones involve the skin which subsequently ulcerates. A fatal issue follows dysphagia, implication of the pharynx, ulceration into some large vessel, or secondary growths (due to emboli) in more distant organs. They are removed with considerable difficulty and tend to rapid recurrence.

Melanosarcomata occur very rarely. They are rapidly growing neoplasms, early involving the entire parotid gland, and invading the neighboring lymphatics and overlying skin, which latter is prone to ulcerate.

Myxomata, when they occur in the parotid, are usually associated with sarcomatous tissue and cartilage. They contain a thick transparent fluid, and may be definitely circumscribed or they may merge gradually into the surrounding structures. They are soft, gelatinous, and fluctuating.

Carcinomata of this region are rare. They belong to the period of advancing years. Their growth is at first slow, but later very rapid. Usually they have no capsule and infiltrate surrounding structures in very much the same manner as do the rapidly growing sarcomata. Secondary infection usually occurs by way of the lymphatics. Carcinomata are the most malignant tumors found in the gland, and they almost invariably recur after extirpation.

Endotheliomata are also rare. They are derived from a multiplication of the endothelial cells lining the lymphatics and blood-vessels. Some of these endothelial overgrowths are succeeded by fibrous tissue, while in others mucoid degeneration takes place.

Fibromata are usually associated with other neoplastic tissues, but have been met with as pure fibrous growths. Many of them contain cysts. They are hard resistant tumors, usually nodular. They should be excised, and when purely fibrous they do not tend to recur.

Lipomata rarely occur as pure growths in this region, but areas of lipomatous tissue are not infrequently found in the mixed tumors.

Rhabdomyomata.—Prudden has reported a case of rhabdomyoma of the parotid. The tumor was composed of muscle fibres, without sarcolemma, irregularly arranged. In this same tumor there were lobules of small spheroidal or polyhedral cells in a well-marked reticulum of an unusual character.

Treatment.—Excision constitutes the proper treatment of parotid neoplasms. The gravity and difficulty of the operation vary with the size and mobility of the growth, the extent of infiltration of the surrounding tissues, the age and general condition of the patient. Removal of the whole gland is a formidable operation. It was first performed by Warren of Boston in 1798. The removal of a tumor should be undertaken at the earliest possible moment, as this offers the greatest hope of a permanent cure. It should not be forgotten, however, that some tumors, especially the melanosarcomata, are often disseminated by operative procedure. In the case of a tumor which is already advanced in growth the possibility of temporary relief from the dangers and discomforts of ulceration and pressure may justify a partial or total removal of the growth. The production of a salivary fistula and the occurrence of facial palsy are complications which may attend the least of these operations, and of this possibility the patient should be warned in advance.

Cysts.—Cysts of the parotid usually occur in association with other tumors, and, according to their extent in relation to the other tissues, they modify the consistence of the tumor.

Less rarely single salivary cysts are met with. These grow slowly, at times attaining the size of a hen's egg, fluctuating, elastic, slightly movable, and not adherent to the skin. They result from the obstruction of Stenson's duct by a calculus or by a stenosis, and they usually represent a dilatation of one of the branches of this duct. They are lined with cylindrical epithelium which in time becomes tessellated. The salivary cysts are filled with clear, amber-colored, slightly viscid saliva; the contents of the simple cysts are more watery. The diagnosis, if doubtful, may be settled by means of an aspirating needle.

Treatment consists in opening the tumor and destroying the lining membrane with zinc chloride (forty grains to the ounce) or with pure carbolic acid. Cysts may be dissected out, but there is danger of injuring the facial nerve. The calculus or other obstruction to the duct should of course be removed.

Cysts due to the dilatation of Stenson's duct have been met with in glass-blowers. These are best left untreated.

Echinococcus of the parotid is exceedingly rare. Schuh reports a case in a woman eighty-three years of age. The tumor increased to the size of a hen's egg, attaining these dimensions in about one year. The tumor is cystic, and the diagnosis from other cysts can be made only by a microscopical examination of the contents of the tumor. Treatment consists in opening the tumor and destroying the walls of the cysts with the curette.

IV. Calculi.—A few cases of calculi of the parotid have been reported. They are less common than concretions in the submaxillary glands. They are the result of a change in the constitution of the salivary secretion which tends to precipitate the carbonates ordinarily held in solution. The calculi vary greatly in size; they may be as small as a grape seed, while one case has been reported in which the concretion weighed 18.6 gm. The chief constituent is calcium carbonate associated with organic substances, variable in amount, which remain after treating the concretions with hydrochloric acid. The calculus may be located in the gland proper or in the duct where it may be felt with a probe passed up the lumen. It occurs as a nodule of variable size and exceedingly hard. Sometimes it obstructs the flow of saliva from the affected side, and may thus produce a cyst, or it may, by the irritation which its presence causes, set up a chronic parotitis. Calculi of this kind should be removed by an incision, to be made from the inside of the mouth whenever this is practicable.

V. Parotitis.—Mumps, or acute infectious parotitis, has been discussed in another portion of this work. (See article on *Mumps*.) Other inflammatory conditions of the parotid gland include chronic idiopathic parotitis, toxic parotitis, and secondary parotitis.

Chronic Idiopathic Parotitis, or sialodochitis fibrinosa, is an affection of unknown cause. It is sometimes associated with xerostomia, and rarely it complicates gout. It usually commences with a catarrhal inflammation of Stenson's duct, which becomes plugged with mucus, and later develops into a chronic interstitial productive inflammation of the gland, the connective tissue replacing to a greater or lesser degree the secretory cells. The lesion is bilateral. The glands of both sides are swollen, firm, slightly elastic, painless, and not tender. The course is very chronic. The supply of saliva is much diminished so that the mouth may become dry and parched, and as a result swallowing and chewing may become difficult.

Treatment is very unsatisfactory, but the ducts should be kept open by frequent expression of the mucous plugs, and every effort should be made to stimulate the secretory function of the glands by the use of galvanism and the administration of pilocarpine and similar drugs.

Raymond Johnson has described five cases of induration and swelling of the parotids, coming on during a meal, due to a collection of saliva and obstruction of Stenson's duct. There was considerable pain during mastication. In one case there were several relapses, in another suppuration ensued. Massage sometimes caused evacuation of the plug.

Toxic Parotitis.—Hypertrophy and inflammation of the parotid have been reported in a number of toxic conditions such as lead, copper, and mercury poisoning, and in uræmic states. Comby reports the occurrence, in a case of lead poisoning, of a symmetrical enlargement of the parotids, soft, painless, and persistent, and running

a very chronic course. In mercurial poisoning the parotids and submaxillary glands become enlarged and tender and the flow of saliva is excessive. Bilateral enlargement of the parotids following the administration of potassium iodide has been reported by Comby, Miss Bradley, Requier, and Villar. In these cases there were also œdema of the eyelids, coryza, lachrymation, and salivation.

After the withdrawal of the poison the affected glands usually recover their natural size and function.

Secondary Parotitis.—Next to mumps this is the most common form of inflammation of the parotid. It is associated with many local and general infections, such as maxillary osteitis, inflammation of the temporo-maxillary joint, abscesses, erysipelas, typhoid fever, typhus fever, cholera, diphtheria, smallpox, bubonic plague, yellow fever, cerebrospinal fever, relapsing fever, pneumonia, syphilis, influenza, and gout. Paget has collected 101 cases of parotitis complicating various infectious and functional disturbances of the peritoneal and pelvic organs. Of these, 50 occurred in cases of injury, disease, or temporary derangement of the generative organs, without suppuration. In this list were included cases of pregnancy, childbirth, abortion, pelvic cellulitis, hæmatocele, and operations on the vagina and uterus. In 10 instances the disease developed after the introduction of catheters and sounds in male patients and after blows on the testicle; in 18 the disease was associated with injury or disease of the alimentary tract, involving the stomach, pancreas, etc.; and, finally, in 23 there was disease or injury of the abdominal wall. In these cases the course was, as a rule, rapid and suppuration occurred on the fourth or fifth day. Donkin has reported three cases of unilateral parotitis complicating gastric ulcer, and Pepper has also reported a similar case. Debout d'Estrées has collected the reports of twelve cases of parotitis in gouty subjects.

The route of infection is in many cases obscure, but it is probable that in some cases, as in typhoid fever, it is through Stenson's duct, while in others the metastasis takes place through the blood-vessels and lymphatics. Hanau studied the genesis of five cases of suppurative parotitis which occurred as a secondary process in septic infections. In all these instances the organisms present were staphylococci; they were always found in the abscesses and ducts, while the blood-vessels and lymphatics were free. In one fatal case Dietrich found the staphylococcus pyogenes aureus in the ducts, but not in the blood-vessels. The mouth is, without doubt, frequently the direct source of the infection, for in many diseases it offers conditions peculiarly favorable to bacterial multiplication.

In *typhoid* fever parotitis occurs in a variable percentage of cases. Osler reports the complication as occurring 45 times in 2,000 cases in Munich; of 2,000 patients with typhoid fever in the London Fever Hospital, 13 had parotitis; at Basle, of 1,600 cases of typhoid fever there were 16 complicated by suppurative parotitis. Infection is usually through Stenson's duct, and when arising in this manner it is probably not so serious a form as when it occurs as a metastatic process (Osler). Keen has reported two cases in which Eberth's bacillus was recovered from the pus in the glands; in one case there was a mixture of staphylococci. This complication generally begins during the third or fourth week; one case is reported as appearing on the tenth day. It is usually unilateral, but sometimes both glands become infected, coincidently or successively. Suppuration almost invariably ensues.

As a rule, parotitis is seen only in severe cases of typhoid fever; it is in itself a serious complication, the mortality being placed at about thirty per cent. Seven of the Basle cases ended fatally. The complication is said to be less common since the introduction of antipyretic treatment, but it seems to the writer that the attention which has been paid to the care of the mouth in recent years may be the more important prophylactic measure.

In *typhus* fever parotitis occurs in many epidemics to the extent of even twenty per cent. of the cases, being a more frequent and more dangerous complication in this disease than in typhoid fever. Both glands may be affected, but the disease is more commonly unilateral. Suppuration is usual, and the gland breaks down and is discharged in small necrosed fragments. Extensive infiltration and burrowing have caused fatal exhaustion. Pepper has seen death from parotitis after all danger from the original attack of fever seemed over.

Finkler reports 12 cases of parotitis in 55,263 cases of *influenza*. He thinks that in these cases there is probably mixed infection.

Pneumonia is occasionally complicated by parotitis, which is then usually suppurative. Pneumococci have been found in the resulting exudate by Testi and by Fitz. It is a dangerous complication, and the prognosis in these cases is bad.

Parotitis is a rare sequel of *relapsing fever*, *cholera*, *bubonic plague*, *yellow fever*, and *epidemic cerebrospinal meningitis*.

The *symptoms* of secondary parotitis are often masked by those of the primary disease. The parotid region at first becomes hard and swollen; associated with this there is pain on moving the jaw and in swallowing. The area then becomes œdematous, later softening somewhat, and the surface becomes red. At the end of three or four days there is an elastic non-fluctuating tumor. At this point the swelling may begin to subside, but more often it goes on to suppuration. The inflammation may be limited to the gland or it may spread to the surrounding tissues, involving the muscles and the periosteum. The pus burrows beneath the strong fascia for some distance before it points at the skin. The pus may pass downward into the chest, backward along the pharyngeal wall, upward along the sheath of the blood-vessels to the meninges, to the articulation of the jaw, or backward into the middle ear. The blood-vessels may be injured by ulceration, and the facial and jugular veins or the cavernous sinus may become thrombosed. There may be a neuritis with or without destruction of the facial nerve. Rarely the process terminates in gangrene. The pus may discharge spontaneously through the cheek, mouth, or external auditory meatus, more rarely into the œsophagus or anterior mediastinum.

The *prognosis* depends largely upon the condition of the patient at the onset of the complication. In cases in which the patient is much reduced, as in the third week of typhoid fever, a superimposed parotitis is an exceedingly grave matter; in a series of collected cases of this nature the mortality was thirty per cent. If the disease develops after convalescence has been well established, the prognosis is much less grave. Early recognition and evacuation of pus may obviate extensive infiltration and burrowing and distinctly lessen the gravity of the situation. Common sequelæ are induration and enlargement of the glands; less frequently there remains a facial palsy. Death results from general exhaustion, septicæmia, meningitis, or cerebral thrombosis.

The *prophylactic treatment* of secondary parotitis consists in diminishing the danger of infection through Stenson's duct. In typhus, typhoid, and other infectious diseases care should be taken in keeping the mouth clean and as free as possible from bacterial growths. When infection of the gland has occurred, an attempt should be made to obtain resolution or prevent suppuration by the application of ice, leeches, iodine, or mercurial ointment. One should be on the outlook for the formation of pus at all times, and as soon as its presence is recognized it should be evacuated. The gland should be drawn forward and an incision made parallel with the main branches of the facial nerve; the incision should be made well forward so as to avoid injury to the carotid vessels. An efficient drain should be kept in place so that the abscess may heal from the bottom.

VI. Xerostomia, or dryness of the mouth, is caused by a deficient secretion of saliva. It may be physiological in infancy. It occurs in neurotic individuals, particularly in women suffering from hysteria or hypochondriasis. Sometimes a fright may appear to be the main etiological factor, and frequently the cause is entirely unknown. Excessive loss of water by the kidneys, as in diabetes and chronic nephritis, rapid evaporation in mouth-breathers, and febrile diseases often cause a similar condition. It is not infrequent in the aged. Chronic inflammation of the salivary glands and obstruction of their ducts may result in an insufficient supply of saliva and consequent xerostomia. The mouth becomes dry and glazed, and it presents the color of raw beef. The tongue may be parched and deeply fissured, and speaking, mastication, and deglutition become difficult.

In cases due to obstruction of the ducts, relief may be obtained by expressing the tenacious plugs of mucus. In the neurotic cases pilocarpine and the galvanic current have been found helpful; in these cases also general tonic treatment is always of importance, and any causes of reflex nervous irritation should be looked for and removed. Temporary relief may be obtained by moistening the mouth with hot water or with a solution of albolene. Cabot has found that the eating of small pieces of oatmeal cracker gives considerable temporary relief in some cases of xerostomia complicating diabetes.

VII. Ptyalism.—(Synonyms: Salivation, Sialorrhœa.) Ptyalism may be defined as a pathological increase in the secretion of saliva.

In the adult the normal amount of saliva secreted in twenty-four hours is from two to three pints. Pathologically the amount may be increased to ten pints in the twenty-four hours. Such saliva is viscid and glairy; its specific gravity varies from 1.000 to 1.059; it contains little sulphocyanide of potassium and less ptyalin than normally.

Physiologically, the secretion of saliva is increased by the reflex stimulation caused by the taking of food and, in children, during dentition.

Ptyalism is caused by a pathological reflex stimulation of the secretory fibres of the nerves supplying the salivary glands. It is met with in women during pregnancy and at the menstrual period; in psychic disturbances such as hysteria and insanity; in infectious diseases, particularly in rabies and smallpox; in lesions of the medulla and pons. It follows the ingestion of certain drugs, such as mercury, gold, silver, copper, arsenic, lead, pilocarpine, jaborandi, muscarine, potassium iodide, and tobacco. Bohn describes instances, in children, in which the excessive flow of saliva occurred only in the daytime and ceased at night; the cause was unknown, but he believed the ptyalism to be a form of neurosis. Sialorrhœa has been met with in affections of the liver, spleen, pancreas, and genital organs; it is believed to be due to reflex irritation from these parts.

The excessive secretion of saliva necessitates constant swallowing and may interfere with speech, or the fluid may flow from the mouth. In pregnancy it may persist until delivery has occurred. In mercurial poisoning the patient becomes emaciated, the bowels are constipated, and the amount of urine is diminished; the parotid and salivary glands are enlarged and tender. The ptyalism may persist for from one to three weeks after the removal of the drug.

Diagnosis is difficult only when a paralysis exists which interferes with swallowing and thus simulates ptyalism; actual measurement of the amount of saliva will definitely settle the question.

The *prognosis* depends upon the cause and the possibility of its removal.

Treatment consists in the removal of the underlying cause, the use of an astringent mouth wash containing alum, gallic acid, or tincture of myrrh, and the administration of atropine, one-sixtieth of a grain every four hours until there is a sensation of dryness of the throat. In cases of nephritis, the administration of mercurials is especially liable to cause sialorrhœa. During the administration of mercury salivation can be prevented in many cases by keeping the mouth and teeth carefully cleansed; if soreness and tenderness of the gums, tenderness of the teeth on striking, or the "mercurial fœtor" of the breath arises, the administration of mercury should be stopped at once.

T. Stuart Hart.

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PAROVARIUM. (ANATOMICAL.) See *Sexual Organs, Female.*

PAROVARIUM, DISEASES OF.—The term parovarium is applied to a series of from six to eight closed tubules which lie between the two layers of the broad ligament. They radiate out from the ovary toward the Fallopian tube, terminating in a large tubule which runs parallel to and beneath the Fallopian tube.

The pathological changes to which it is liable consist practically of only two varieties, viz.: cystic disease and carcinoma, the latter being secondary to similar disease elsewhere, and so rare as not to merit consideration in so short an article as this.

Parovarian Cysts.—These arise from dilatation of one of the tubules of the parovarium, and are therefore intraligamentous. Frequently they remain so, in which case their removal is an exceedingly grave proceeding, but at times they stretch the ligament to such an extent that they become abdominal with a well-formed pedicle. In the latter case they are freely movable and ovoid in shape, while in the former they are fixed in the pelvis and have often an irregular outline. When pedunculated these cysts have a complete covering of peritoneum; while at the point where they split the layers of the broad ligament only the upper surface is covered by this membrane. This peritoneum is smooth and glistening, and the blood-vessels may be seen beneath it. These cysts are nearly always unilocular and contain, as a general thing, a very thin and limpid fluid; but in the case of older cysts this fluid may be thicker and turbid, especially if any hemorrhage has taken place into the cyst.

The inner surface of the cyst is lined by ciliated columnar epithelium which may be accompanied by some cells of the cylindrical variety. Next comes a layer of connective tissue and unstriped muscular fibres, and lastly comes the peritoneal coat.

Symptoms may be absent in the pedunculated variety until the cysts become sufficiently large to interfere with the heart and respiration, when dyspnœa and palpitation, as well as the swelling of the abdomen, will be complained of. When the cyst is sessile, however, one early gets pelvic discomfort or even pain, and the action of both bladder and bowels will be interfered with.

An abdomino-pelvic examination of the patient, in a case in which the tumor is pedunculated, will give the signs of an ordinary unilocular ovarian tumor, except that the fluidity of the contents will not be so evident in the latter. When the tumor is sessile, however, a fixed and fluctuating mass is felt to one side of the uterus, which is displaced to the opposite side of the pelvis. No hard nodules are to be felt in this mass.

The tumor may rupture, and this may be followed by refilling and repeated rupture, by cure, by hemorrhage, or by sepsis and death.

The *treatment* is removal. In the case of the cyst with a pedicle this is very simple, but when the broad ligament has been split up and the tumor has reached the pelvic floor, the treatment is a difficult matter. Here there is such risk of hemorrhage when one tries to remove the tumor by itself that a clean sweep of the pelvis is advocated by most operators. Hall taps the cyst after hav-