

bimanual examination will have given the physician a fairly accurate idea as to the shape of the uterus, and he should shape his probe or sound accordingly. The instrument is to be held lightly between the thumb and forefinger and the cervix steadied by the tenaculum. The tip is then passed into the external os and allowed to find its way along the canal. It will frequently become obstructed at the internal os by a shoulder or pocket in the mucous membrane, in which case a gentle twisting



Fig. 2434.—Skene's Curette.

motion or withdrawal will enable the sound to pass the obstacle. The probe will pass a constriction at the internal os, while the sound may be arrested. Sometimes, in anteflexion, the constriction may be spasmodic in character: if such is the case, the stricture will relax if the sound is held firmly against it for a few moments. When the instrument reaches the fundus, the forefinger is slid along the shaft until it comes in contact with the cervix. The probe or sound is then withdrawn and the depth of the uterine canal can readily be noted.

The sound should not be used to determine the mobility of the uterus. It is such a powerful lever that the uterine mucosa will be unnecessarily injured even if worse damage is not done. The degree of mobility of the uterus can be determined better and more safely by the bimanual examination. In the healthy uterus the sound, if skilfully passed, should not cause either pain or hemorrhage. The occurrence of one or both of these symptoms denotes a diseased condition of the endometrium. The patency of the external and internal os, irregularities on the uterine mucosa, and the presence of growths in the canal are ascertained by means of the sound. The sense of touch, as communicated through the sound, is here brought into play, and this necessitates that the instrument must be held very lightly between the thumb and fingers in order to appreciate any delicate variation.

The use of the sound as a repositior is to be condemned. Any evidence of acute inflammation of the uterus or its appendages prohibits any intra-uterine manipulations.

**The Curette.**—The curette is a valuable instrument for diagnostic purposes. The curette for this purpose should be small, so as to pass the internal os without difficulty. It should be dull and very flexible, so that no damage can be done with it. The spoon-shaped curette, as shown in Fig. 2434, is especially adapted for diagnosis, although a dull wire curette may be used. The spoon curette enables one to scrape off shreds of tissue and epithelium from the endometrium, which should be examined under water to disclose their gross appearance, while they are to be submitted to microscopic examination for more accurate diagnosis. All that has been said in regard to employing the sound applies equally to the curette. The instrument must be properly sterilized, and given the shape of the canal which has been accurately ascertained by means of the sound or probe. It is to be used with all gentleness. The curette is not to be used in the office to curette the uterus as for an operation; it should serve simply as a means of procuring a small amount of tissue or debris from the uterine canal for diagnosis only.

**Dilatation of the Cervix.**—This is a procedure which is sometimes necessary in order to admit the passage of the examiner's finger into the uterine canal for purposes of diagnosis. As it is of such a nature as to require an anæsthetic for its proper performance, as well as the usual preparations for a surgical operation, its description does not belong in this article.

**Examination of the Urethra and Bladder.**—This subject is fully treated in Volume II. of this work.

**The Aspirating Syringe.**—The ordinary aspirating syringe used in exploring the chest for pleuritic effusions is all that is necessary. It is desirable to have a long curved needle, as the curve greatly facilitates its intro-

duction through the vaginal vault. Cystic or inflammatory masses which are situated low down in the pelvis, and which can be palpated by the examining finger through the vaginal vault, can be safely punctured with the needle and the contents withdrawn by the syringe for examination.

**The Microscope.**—The aid of the microscope for differential diagnosis is of especial value in gynæcological examinations. The recognition of the gonococcus by the

microscope is of prime importance in investigating the character of vaginal or other discharges. In fact it is impossible to be sure of the character of a discharge without its aid. As the important position that the gonococcus holds as an etiological factor in diseases of women becomes better known, the necessity for the use of the microscope by the gynæcologist appears in a clearer light. Commencing epithelioma and carcinoma are to be detected with positiveness only by submitting uterine scrapings or small pieces of cervical tissue to microscopical examination. It must also be resorted to, in many cases, in differentiating malignant from non-malignant growths.

George Gray Ward, Jr.

**HÆMATEMESIS.** See *Stomach, Diseases of.*

**HÆMATIDROSIS** is a functional disturbance of the sweat apparatus whereby blood, through diapedesis into the coils and ducts from their surrounding vascular plexus, becomes mingled with the sweat and appears with it upon the normal skin, producing the phenomenon of so-called "bloody sweat." It is an exceedingly rare occurrence, and when observed the subject has been generally a highly neurotic person undergoing some strong emotional disturbance. In some instances it has seemed to be a form of vicarious menstruation. It has been observed in the newborn. The points where it has been observed to occur are the face, ears, umbilicus, feet and hands in limited areas, giving rise to the term "bleeding stigmata" and other names. Treatment is that of the patient.

Charles Townshend Dudge.

**HÆMATOCELE, RETRO-UTERINE OR PELVIC.** See *Extra-Uterine Pregnancy.*

**HÆMOGALLOL, HÆMOL.**—Two patented compounds prepared from the coloring matter in the blood and thought to be more readily absorbed than other preparations of iron. The first is obtained by the action of pyrogallol, the latter by the action of zinc dust.

Hæmogallol is a brownish-red powder, very soluble in water. The dose is from gr. v. to x. three times a day. Hæmol is a black powder, also very soluble and administered in the same dose. They have been recommended for the treatment of chlorosis and anæmia.

Beaumont Small.

**HÆMOLYMPH GLANDS. (HISTOLOGY AND PATHOLOGY.)**—The hæmolymp glands are lymphadenoid structures occupying a position intermediate between the spleen and ordinary lymphatic glands. In structure they closely resemble the latter, the essential difference between the two being that they possess blood sinuses in place of lymph sinuses. Transition forms between the two, however, exist; a gland may contain both lymph and blood sinuses; but the presence of the latter, however small, is sufficient warrant for its classification as a hæmolymp gland. There are also transition forms between the hæmolymp glands and spleen, many of the former, particularly in the lower animals, possessing a spleen-like pulp. The spleen itself may be regarded as a hæmolymp gland; and undoubtedly many of the so-called accessory spleens fall into the class of hæmolymp glands.

**OCCURRENCE.**—The existence of hæmolymp glands was first noticed in the lower animals, particularly those used for food purposes. In the steer, pig, and sheep these structures are very numerous in the prevertebral fat, and conspicuous because of their deep blood color. From their number and size in these animals it is reasonable to suppose that their function is of importance. Butchers and meat dealers have long been acquainted with their gross appearances, but have usually regarded them as blood clots. From the scientific side they have been strangely neglected, though as early as 1857 Leydig pointed out the close resemblance between these glands and the spleen. More recently they have become objects of scientific investigation, and have been found to be present also in the goat, horse, dog, rat, guinea-pig, common fowl, and turkey.

Their presence in man has only lately become a matter of careful study, though lymph glands with blood-containing sinuses have been many times observed. Such findings were, however, interpreted as ordinary lymph glands into whose lymph sinuses there had been a hemorrhage or backward flow of blood. H. Gibbes, in 1884, was the first observer to consider such glands to be permanent and independent structures. A similar view was taken by Robertson in 1890, and to this observer we owe the designation hæmolymp gland, this name having been suggested to him by Dr. Russell. The constant presence of these glands in the human body

First. Lymph glands containing blood sinuses are constantly present in the human body in all conditions and at all ages.

Second. The structure of such glands differs in many respects from that of ordinary lymphatic glands; and the appearance presented by hemorrhagic lymphatic glands is wholly unlike that of a hæmolymp gland.

Third. These glands in the human body show many points of similarity to the hæmolymp glands found in the steer and sheep, and the latter from their number, size, constant occurrence, and individual structure must be regarded as organs *sui generis* without question.

**LOCATION.**—In the lower animals the hæmolymp glands are found chiefly in the prevertebral fat, along the course of the aorta, renal and adrenal vessels, brim of the pelvis, and in the root of the mesentery. They rarely extend far out into the latter, but are occasionally found in the omentum and epiploica. They are also of rare occurrence in the mediastinal region. In man they are found in greatest numbers in the prevertebral, retroperitoneal, and cervical regions, in the neighborhood of the adrenal vessels, along the brim of the pelvis, in the root of the mesentery, but rarely extending far out into it, and are of very rare occurrence in the epiploica and omentum. They are also rare in the mediastinal tissues and along the thoracic aorta, except under conditions in which there is a general enlargement of all the hæmolymp glands of the body, as in certain forms of anæmia and

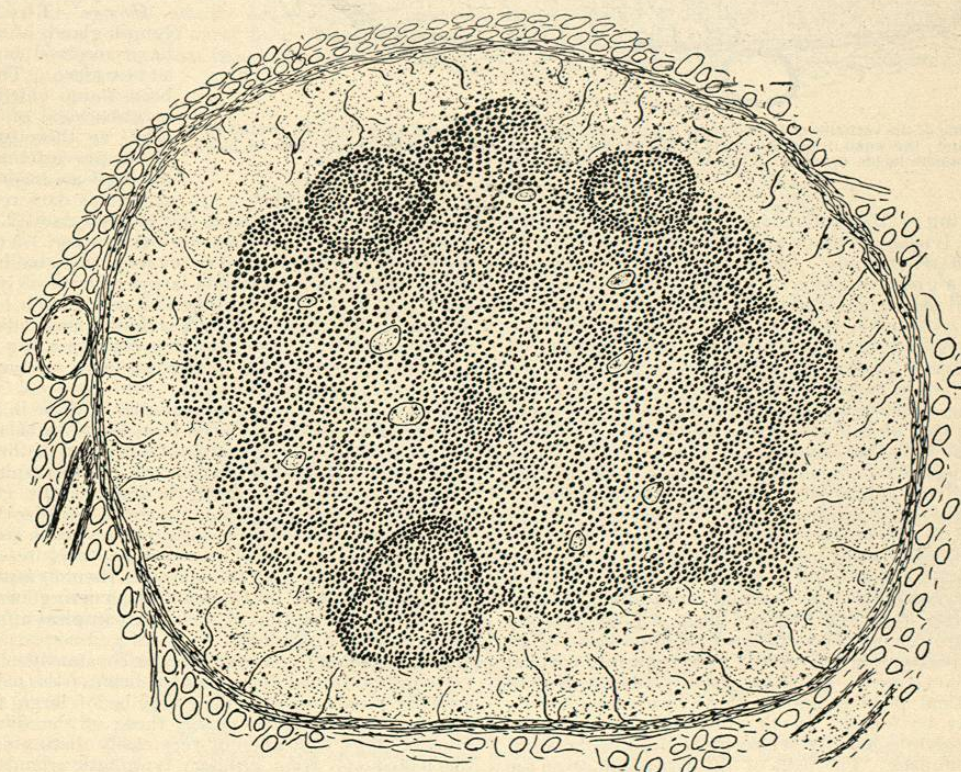


Fig. 2435.—Common Type of Hæmolymp Gland from Steer. Peripheral blood-sinus. Camera lucida drawing. Leitz objective 3; eyepiece No. II. Reduced one-third.

was confirmed later by Gibbes and Vincent, and more recently by the present writer. According to the investigations of the latter, lymph glands containing blood sinuses are found constantly in the human body, at all ages, and in both normal and pathological individuals. That these glands are organs *sui generis* and not hemorrhagic lymphatic glands is evident from the following facts:

leukæmia. This fact suggests the possibility of new formation of these structures in these diseases or their existence as resting glands too small to be found under normal conditions.

**HISTOLOGY.**—*Bullock.*—Hæmolymp glands are found in the prevertebral fat of this animal to the number of several hundred. Their deep red color contrasted with the white fat in which they lie embedded makes them

very conspicuous. They vary in size from a pinpoint to that of a large cherry or almond. In many the blood sinuses occupy so large a part of the gland that they resemble blood clots. Their gross appearance varies

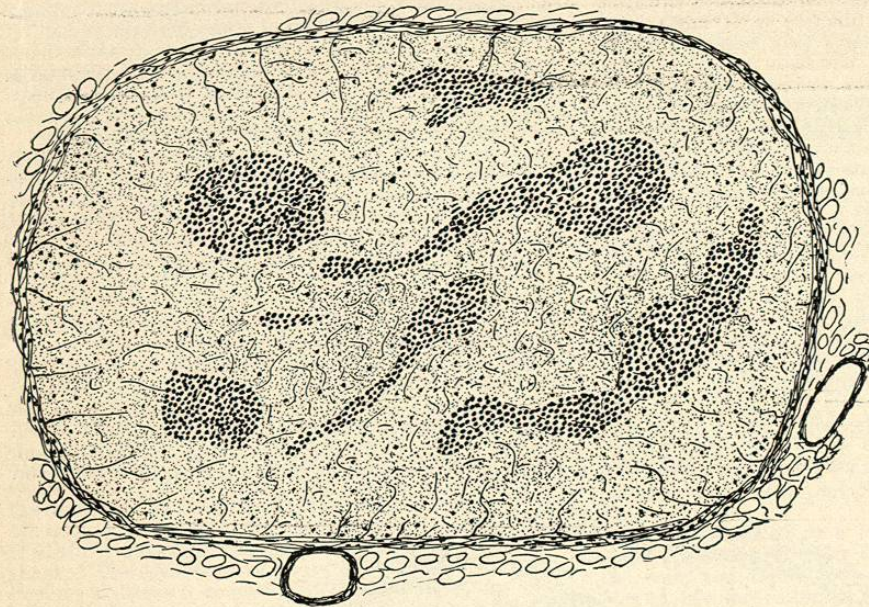


FIG. 2436.—One of the varieties of Hæmolymp Gland from Sheep. The blood-sinuses form the greater part of the gland; the small, irregular islands of lymphadenoid tissue are surrounded on all sides by blood-sinus. Camera lucida drawing. Leitz objective 3; eye-piece No. II. Reduced one-third.

greatly owing to the different proportions between the amount of lymphoid tissue and the size of the blood sinuses in different glands. On microscopical examination they show a great variation of structure in regard to the amount and arrangement of the lymphoid tissues and the number, size, and course of the blood sinuses. The capsule of the gland is usually very thin and contains yellow elastic tissue and unstriped muscle. The lymphoid tissue is often very scanty, consisting of small islands lying in the large blood sinuses, or, on the other hand, the greater part of the gland may be composed of lymphoid cells while the sinuses are small. In the large glands trabeculae of connective tissue pass from the capsule toward the centre of the gland. The sinuses are usually large and prominent, and in the majority of cases make up the greater part of the organ. They are both peripheral and central, with communicating branches, and are traversed by a coarse reticulum, which may be very scanty or so close and mesh-like as to give an appearance resembling spleen pulp. The reticulum is lined throughout with flattened endothelium. The lymphoid portion shows usually a division into cortical and medullary zones. Germinal centres may be present in the cortical portion, and in these numerous mitotic figures may be found. In the medullary portion the lymphoid tissue is usually arranged in columns between the blood sinuses. The cells of the lymphoid areas are chiefly lymphocytes, but large mononuclear cells, mononuclear eosinophiles, transitional and polynuclear forms are numerous. Many of the cells of the reticulum and also of the endothelial cells lining the blood sinuses show a mast-cell granulation. In the central sinuses large mononuclear phagocytes are found in great numbers in the meshes of the reticulum, and these usually contain disintegrating red cells and blood pigment. The glands are supplied by numerous large arteries which on entering the organ quickly break up into small vessels feeding the sinuses.

*Sheep.*—The hæmolymp glands are as large and prom-

inent in this animal as in the steer, and in structure closely resemble those found in that animal. As a rule, they contain more lymphoid tissue, and the sinuses are relatively smaller. Their capsule is also more delicate.

The type with central lymphoid tissue and peripheral sinus is more common than in the ox. Phagocytes containing red cells and pigment are also less common, and the degree of hæmolysis is evidently less. Giant cells resembling those of the bone marrow are not infrequently found in the reticulum. A very remarkable feature is the large number of mast cells present; in many glands nearly all of the cells in the central lymphoid area may show this granulation. Germinal centres are not so numerous as in the glands of the steer. Red blood cells are found throughout the reticulum of the lymphoid areas.

*Horse.*—The hæmolymp glands of the horse have received but slight attention. They have been found chiefly in the neighborhood of the kidneys, no thorough study of the prevertebral region having been made. They appear as dark-red bodies

of varying size and shape, the largest about 2.5 cm. in diameter, the average diameter being about 1.5 cm. On section they resemble very closely the glands of the sheep; but usually contain a larger amount of lymphoid tissue which is grouped in regular nodes, each of which is surrounded by a well-defined blood sinus, usually of uniform width. Cells containing disintegrating red cells and blood pigment are numerous, more so than in the case of the steer and sheep.

*Goat.*—Hæmolymp glands similar to those in the steer and sheep are stated to have been found in this animal, but no detailed description has been given of them.

*Pig.*—The first observations of hæmolymp glands were those made by Leydig in 1857, on the gross appearances of glands lying along the thoracic aorta in the pig, which bore a close resemblance to splenic tissue, and were regarded by him as intermediate structures between lymphatic glands and the spleen. Hæmolymp glands are also mentioned by Clarkson as occurring in this animal, but no description of their microscopical appearance has ever been published.

*Dog.*—Hæmolymp glands occur constantly in the prevertebral peritoneal fat, along the brim of the pelvis, and near the renal vessels. They may be of large size. In puppies they resemble closely those of the sheep; but in older dogs they are not very easily distinguished by the naked eye from ordinary lymphatic glands, in this respect being similar to those of the human body. They may often be recognized by a reddish peripheral zone or by red streaks corresponding to the blood sinuses. Phagocytes are numerous, and hæmolysis may occur to a great degree as shown by the large amounts of blood pigment present.

*Rat.*—Small oval or lenticular hæmolymp glands can almost always be found at the lower border of the pancreas, near the kidneys, and in the gastrosplenic omentum. The sinuses are both peripheral and central; and are of large size. They are usually filled with red cells; but may be partly or wholly empty. Phagocytes are

numerous, and the evidences of hæmolysis are usually marked. The lymphoid tissue consists of both cortical and medullary zones, the former very dense but showing no germinal centres.

*Guinea-Pig.*—Hæmolymp glands have been observed in this animal by workers in the writer's laboratory. They occur in the prevertebral tissues as minute points usually too small to be recognized by the naked eye. Their microscopical appearance is very similar to that of many of the hæmolymp glands in man. The sinuses are small and are usually partly collapsed, the lymphoid areas are dense and only rarely show germinal centres.

*Chicken.*—Dark red glands resembling hæmolymp glands to the naked eye have been found in the abdominal fat, near the stomach, and below the rectum. On microscopical examination the greater part of the gland is found to be composed of blood sinus filled with nucleated red cells. There are numerous communicating branches between the central and peripheral sinuses. Pigment and phagocytes containing red cells are abundant. Red cells are numerous throughout the reticulum of the lymphoid areas.

*Turkey.*—Glands similar to those in the chicken are found also in the turkey.

*Fishes.*—The head kidney of certain Teleostean fishes is analogous in structure to the hæmolymp glands of the higher vertebrates, being composed of irregular masses of lymphoid tissue separated from each other by blood sinuses. The peripheral sinus is of large size.

Hæmolymp glands have also been sought in the monkey, rabbit, cat, squirrel, mouse, hedgehog, mole, pigeon, parrot, duck, frog, toad, and many fishes without success. As these investigations were based almost wholly upon

naked-eye appearances, it is highly probable that careful microscopical investigation of the tissues of these animals will show them to be present.

*Man.*—Lymphoid structures containing sinuses filled with red blood cells are constantly present in the human body. To the naked eye they are not nearly so prominent as the glands of the sheep and steer because of the fact that their blood sinuses under ordinary conditions are more or less collapsed after death. Those possessing large sinuses are dark red in color; those with small or collapsed sinuses are recognized by their dark peripheral zone and red streaks corresponding to the blood sinuses. The search for these glands may be greatly facilitated by fixing the prevertebral tissues in four-per-cent. formalin, which bleaches other tissues, but darkens the blood-containing areas. In this way the blood sinuses are brought out very much more distinctly.

The human hæmolymp glands vary greatly in location, number, and size, seldom occurring in exactly similar manner. They are larger and consequently more easily found in early adult life than in old age, becoming atrophic in late years. They are present in the newborn. No difference has been observed in their occurrence in the sexes. They lie for the greater part deeply

embedded in fat tissue, and possess a very rich vascular supply. The average size is that of a small pea; their relative proportion to ordinary lymphatic glands is 1 to 20-1 to 50, but in some cases they are found in such large numbers as to suggest the possibility of new formation or of resting glands taking on an active state.

On microscopical examination the human hæmolymp glands show an exceedingly great variation in structure. It would seem inadvisable to attempt to classify these variations, inasmuch as confusion would result from the numerous transition forms found. Broadly, two distinct types may, however, be distinguished, and to these I have applied the terms *splenolymp glands* and *marrow-lymp glands* as indicating their structure and probable function. It must be understood that there are no hard-and-fast lines between these types, all possible transition forms existing between them, as also between them and ordinary lymphatic glands.

The splenolymp gland is the more common form and is found chiefly in the neighborhood of the solar plexus, adrenal and renal vessels, and in the deep tissues of the cervical region, and occasionally in the mediastinal region, omentum, and mesentery. These glands are usually round, possessing a distinct hilum into which a large plexus of vessels passes. The capsule of connective tissue contains unstriped muscle and yellow elastic tissue. It may be very thick in proportion to the size of the gland, but not infrequently is very thin and delicate. From the capsule trabeculae of varying size run into the organ cutting it up into irregular lobules; in small glands no distinct trabeculae may be present. Immediately beneath the capsule there is a blood sinus of vary-

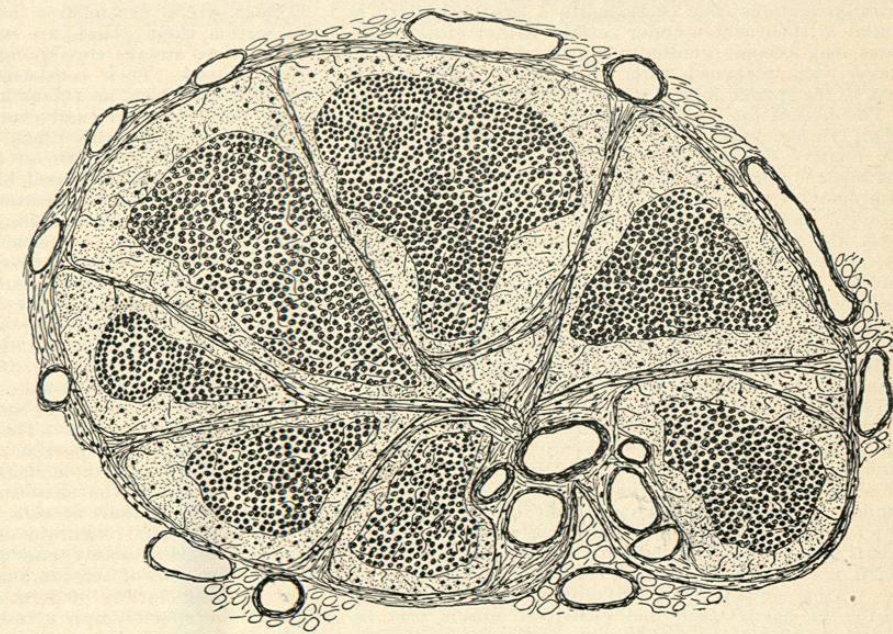


FIG. 2437.—A Common Variety of Hæmolymp Gland from the Human Retroperitoneal Region. Peripheral, communicating and central sinuses, between which lie the masses of lymphadenoid tissue. Camera lucida drawing. Leitz objective 3; eye-piece No. II. Reduced one-third.

ing width which usually runs entirely around the periphery of the gland, but very often only for a portion of the way, being frequently interrupted by masses of lymphoid tissue reaching to the external capsule. Branches of the peripheral sinus run toward the centre of the gland accompanying the trabeculae. In the central portion they often become very large and prominent. The lumen of the sinuses is traversed by a coarse reticulum through the meshes of which the blood circulates. In