

lowed, this organ is a favorite object for study. The lymphatics extend from the peritoneal to the pleural surface, hence it is upon the thoracic face that the great trunks are found (Fig. 3276). These are arranged into three paired and one azygos group. The lymphatic trunks of the diaphragm practically surround the whole organ and the openings through it. From the ventral group, occupying somewhat more than the ventral half, the trunks extend toward the sternum, traverse a gland

about opposite the seventh rib, and then extend to the sternal plexus, those of the right going to the right lymphatic trunk, and those of the left going to the thoracic duct (Fig. 3276). The azygos group appears opposite the xiphisternum, and is represented by three glands (supraxiphoid of Sappey, anterior mediastinal of authors), and their efferent trunks. These are not properly diaphragmatic lymphatics, for they come from the surface of the liver and suspensory

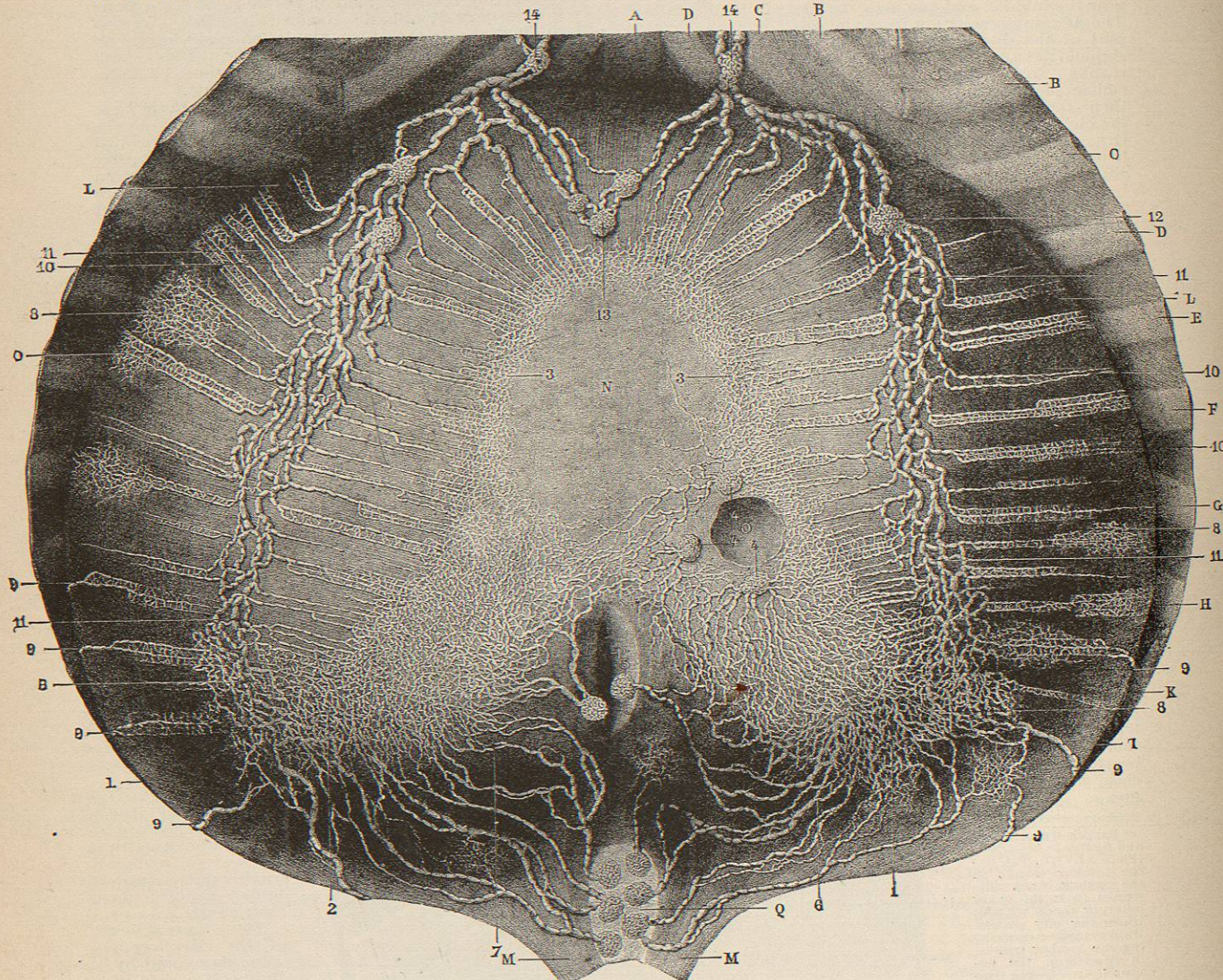


FIG. 3276.—The Lymphatic Vessels and Glands on the Pleural or Thoracic Aspect of the Human Diaphragm. (Sappey, Atlas.) A, Xiphisternum; B, C, D, E, F, G, H, K, 5, 6, 7, 8, 9, 10, 11, and 12, ribs; L, L, muscular part of the diaphragm next the ribs; M, M, pillars of the diaphragm; N, the three parts of the central tendon of the diaphragm; O, passage for the postcava; P, oesophageal orifice; Q, hiatus aortic between the two pillars of the diaphragm. The glands in the opening are in the abdomen and belong to the coeliac lymphatic plexus. 1 and 2, The network in the right and left dorsal points of the central tendon; 3, 3, network around the border of the ventral or mesal part of the central tendon; 4, 4, 4, glands around the postcaval opening for the reception of part of the lymphatics of the Central tendon; 5, 5, two glands at the oesophageal opening, they receive the neighboring lymphatics; 6, 7, trunks coming from the dorsal part of the central tendon along the pillars of the diaphragm to enter the glands in the aortic opening at (Q); 8, 8, 8, fine lymphatic network of the muscular part of the diaphragm; 9, 9, 9, 9, lymphatic trunks winding around the edge of the diaphragm to enter the coeliac lymphatic glands; 10 and 11, trunks and trunks extending toward the sternal plexus; 12, lymphatic gland on the diaphragm near its ventral attachment opposite the seventh rib; it is double on the left side; 13, three lymphatic glands ventrad of the pericardium, and usually buried in fat. To them extend the lymphatics from the suspensory ligament of the liver; 14, 14, glands of the sternal plexus receiving the efferent vessels from 12 and 13 (cf. Fig. 3275).

ligament (see Liver). The efferent trunks join the sternal plexus.

From the dorsal part of the diaphragm the trunks converge to the aortic or oesophageal opening (dorsal group), and enter the glands there situated. Other trunks wind round the pillars of the diaphragm and enter the abdomen. As part of the glands in the aortic, and also in the oesophageal opening, are in the abdomen, it follows that part of the lymphatics starting on the peritoneal or abdominal side of the diaphragm extend to the pleural or thoracic side, and then turn back through these trunks into the abdomen before finally terminating in the thoracic duct.

The deep structures of the thoracic walls are drained by lymphatics following the intercostal spaces. As will be seen by consulting Figs. 3275 and 3280, the collecting trunks form a half-circle, the vessels extending both toward the sternal and toward the intercostal plexus. In their course along the intercostal spaces they usually traverse one or more glands. Near the spinal column is a row of glands whose efferent trunks may extend directly to the thoracic duct, but usually two or three of them unite to form a common trunk, which opens into the thoracic duct. It is a remarkable fact that those from the last three intercostal spaces unite to form

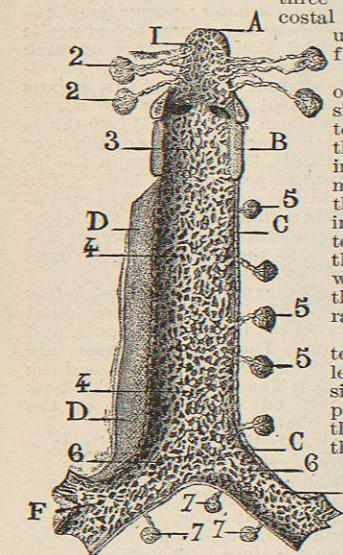


FIG. 3277.—Trachea and Bronchi Opened on the Dorsal Side to Show the Abundant Lymphatic Network of the Mucosa; from a Child at Birth. (Sappey, Atlas.) A, epiglottis; B, section of the cricoid cartilage to expose the interior of the larynx; C, C, trachea; D, D, the membranous portion of the trachea drawn to the left, exposing the interior; E and F, the two bronchi. 1, The lymphatic network of the epiglottis; 2, 2, ental cervical lymphatic glands (cf. Plate XLII., 13); subglottic network in the larynx; this is very sparing in the adult; 4, 4, network of the tracheal mucosa; 5, 5, ental cervical glands along the trachea into which the collecting trunks enter; 6, 6, the lymphatic network in the bronchi; it will be seen from this figure that the lymphatic network from the epiglottis into the bronchi is uninterruptedly dense; in the adult there are comparatively few lymphatics in the larynx proper and in the trachea; 7, 7, bronchial lymphatic glands.

form trunks on each side, which extend through the diaphragm into the abdomen to join the chylocyst, instead of entering the thoracic duct in the thorax (cf. Fig. 3280, where vessels pass from the abdomen to the thorax).

From the first few intercostal spaces the collecting trunks on the right side pass to the right lymphatic trunk; and from the sternal half of all of the spaces the collecting trunks join the sternal plexus, those on the right extending therefrom to the right lymphatic trunk, and those on the left to the thoracic duct.

This offers a very striking illustration of the close connection between the right and left lymphatic trunks in man, a condition much more fully realized in many of the lower animals. The lymphatics of the spinal canal and the muscles of the back follow their blood-vessels and enter the intercos-

tal plexus, the greater number finally reaching the thoracic duct.

Oesophagus.—The lymphatics of the oesophagus are in

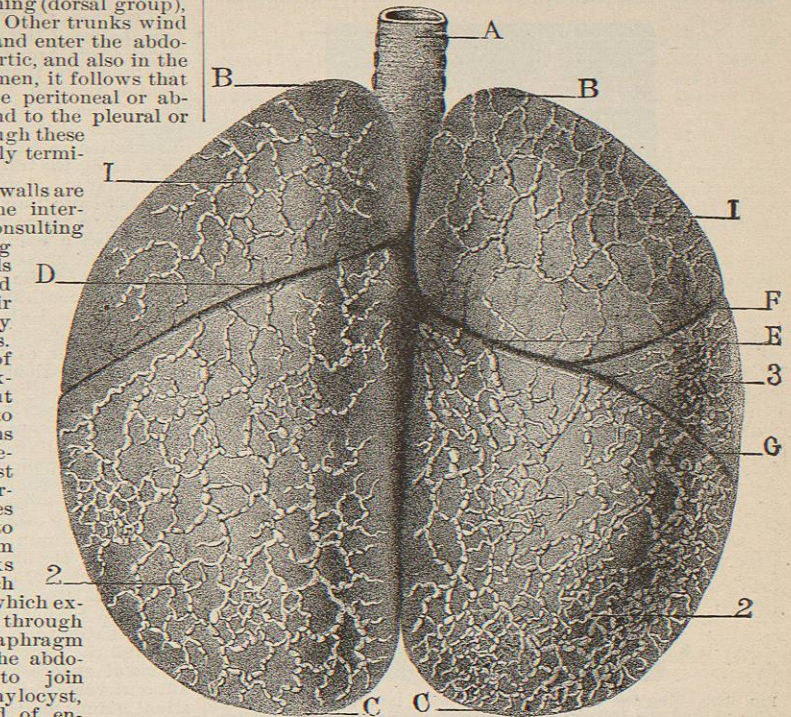


FIG. 3278.—Ental or Subserous Lymphatics of the Dorsal Surface of the Lungs of a Child at Birth. (Sappey, Atlas.) A, trachea—the line points to the membranous portion; B, B, summit or cephalic lobes of the two lungs; D, the fissure dividing the left lung into two lobes; E, F, G, fissures dividing the right lung into three lobes. 1, Lymphatic network on the cephalic lobe; 2, 2, network on the caudal lobe; network on the middle lobe of the right lung. The fine network surrounding and covering the pulmonary lobules is not shown in this figure.

two sets, as in the rest of the alimentary canal, viz., those of the muscularis and those of the mucosa; they penetrate the muscular wall and enter the small glands scattered along its course. The lymphatics are directly continuous with those of the pharynx at one end and with those of the stomach at the other. At the gastric end the collecting trunks, after reaching the surface, extend toward the stomach, and part of them traverse the oesophageal opening and enter the glands around the cardia of the stomach (Plate XLIII.). Those of the middle region enter the dorsal (posterior) mediastinal glands, while those in the neck join the internal jugular plexus. Up to the present time the lymphatics of the muscularis have been actually demonstrated only in the larger domestic animals (horse and ox), but the probability is very strong, that they exist in the human oesophageal muscularis.

Heart.—The cardiac lymphatics are in two groups—a subpericardial and a subendocardial network—but in both cases they are derived from the muscular substance, and not from the serosa. The ental or subpericardial network commences with the apex of the heart and extends over the whole surface, but the larger trunks occupy the dorsal and ventral grooves or depressions containing the large cardiac blood-vessels. The ental or subendocardial vessels unite into collecting trunks which penetrate the myocardium near the apex and near the auriculo-ventricular groove, and anastomose with the

ectal lymphatics, and all together extend to the groove between the auricles and ventricles, and form an anastomosing circle around the base of the ventricles. The rather few lymphatics of the auricles mostly extend tow-

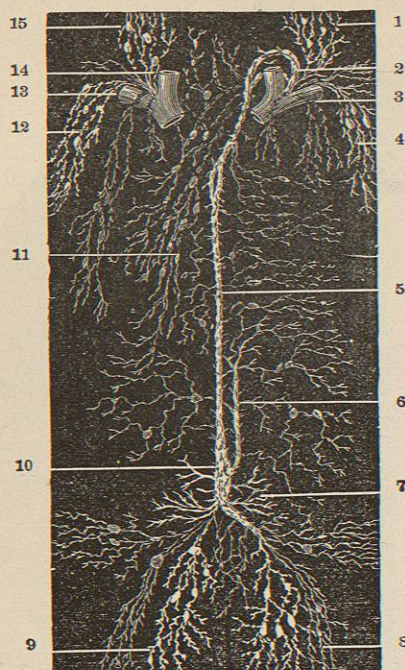


Fig. 3279.—Diagram of the Thoracic Duct, the Right Lymphatic Trunk, and the Lymphatic Plexuses of the Human Body. (After Quain.) 1, Left jugular plexus; 2, arch of the thoracic duct near its entrance into the angle between the subclavian and internal jugular veins; 3, left subclavian vein; 4, left axillary lymphatic plexus; 5, the thoracic duct in the thorax; 6, trunk from the intercostal plexus to the abdomen where it joins the chylocyst; there should be a similar trunk on the left (cf. Fig. 3280); 7, lacteals; 8 and 9, inguinal and iliac plexuses on the left and right; 10, chylocyst or chyle receptacle; 11, the sternal, bronchial, and mediastinal plexuses; 12, axillary plexus on the right; 13 and 14, right subclavian and internal jugular veins; the right lymphatic trunk enters the vein at the angle between the subclavian and internal jugular, as does the thoracic duct on the left; 15, right jugular lymphatic plexus.

ard the auriculo-ventricular groove and join the anastomosing ring, but some extend directly to the main trunks along the two sides of the pulmonary artery. From the anastomosing ring in the auriculo-ventricular groove two trunks arise, the one representing the left heart extends along the left side of the pulmonary artery, and between it and the left auricle to the left bronchial glands, and therefore finally to the thoracic duct. The trunk representing the right heart follows the right side of the pulmonary artery, and passes between this vessel and the arch of the aorta to reach the right bronchial glands, ultimately to terminate in the right common lymphatic trunk.

Lungs.—The lymphatics of the lungs are exceedingly numerous. They arise in the lung substance between the alveoli, and in the bronchial mucosa. Those near the surface extend toward the periphery and become subserous, and then extend to the root of the lung to enter the bronchial glands (Figs. 3277 and 3278). The ental lymphatics follow the bronchi and finally, after traversing a few small glands on the bronchi (the so-called pulmonary lymphatic glands), they enter the bronchial glands. From these glands extend trunks to the left to enter the thoracic duct, and to the right to enter the right common lymphatic trunk.

Trachea and Bronchi.—As seen above, the epiglottis and entire laryngeal opening possess an almost infinite number of lymphatics (Plate XLII.). In the infant this wealth of vessels continues throughout the entire larynx, and trachea and its branches; but as age advances the lymphatics of the larynx, commencing at the level of the vocal cords, and the trachea become less and less, until in the adult they are comparatively few; but in the smaller bronchi the abundant lymphatic network persists. The vessels arise in the mucosa and the intercartilaginous tissue, penetrate the tracheal wall, and are distributed to the glands so abundantly supplied to the neck along the trachea and bronchi (Fig. 3287).

THORACIC LYMPHATIC GLANDS.—The lymphatic glands of the thorax are only second in importance and number to those in the abdomen. Within the thorax they form a continuous network, and are closely connected with those of the abdomen on the one hand, and with those of the neck on the other. Those without the cavity are continuous with the axillary glands.

The pectoral glands (*glandula lymphatica pectorales, s. thoracica superficiales*) are situated along the caudal (inferior) border of the great pectoral muscle, and some more deeply along the *vasa thoracica longa*. Through them pass many of the trunks following the long thoracic blood-vessels, and many of those from the thoracic region on their way to the axillary lymphatic glands.

Within the thorax there are several named groups with corresponding plexuses. The sternal glands and plexus (*glandulae lymphaticae sternales, s. substernales, s. thoracica profunda, s. mammaria, s. presternales; plexus lymphaticus sternalis, s. mammarius internus*) commence opposite the xiphisternum and extend along the sternal blood-vessels (Fig. 3275). The afferent vessels of this plexus come from the deep abdominal muscles in the supra-umbilical region of the abdomen, the ventral two-thirds of the diaphragm, part of the convex surface of the liver through the suprahyoid glands, the structures in the intercostal spaces in the ventral part of the body. The afferent vessels usually join the ventral (anterior) mediastinal glands, and with their trunks pass to the two great common lymph-trunks. Sometimes one or more, or all, of the trunks pass directly to the great lymph-trunks without traversing the mediastinal glands.

The intercostal glands and plexus (*glandulae lymphaticae intercostales; plexus lymphaticus intercostalis*) are found on each side of the thorax, in the intercostal spaces, and along the vertebral column. The afferent vessels are from the intercostal structures, the spinal canal, and the deep muscles of the back. The efferent trunks pass mostly to the thoracic duct, but part of those on the right pass to the right lymphatic trunk.

The dorsal or posterior mediastinal glands and plexus (*glandulae lymphaticae mediastinales dorsales, s. posteriores; plexus lymphaticus mediastinalis dorsalis, s. posterior*) are situated along the thoracic aorta and the oesophagus, in the dorsal or posterior mediastinal folds. The afferent vessels are from the oesophagus, the dorsal third of the diaphragm, and some from the liver. The efferent vessels enter the thoracic duct, directly, or join the bronchial glands.

The ventral (anterior) mediastinal glands and plexus (*glandulae lymphaticae mediastinales ventrales, s. anteriores, s. gl. l. cardiacae; plexus lymphaticus mediastinalis ventralis, s. anterior*) are in the ventral mediastinal fold, and are principally concentrated around the arch of the aorta and the roots of the great blood-vessels. The glands called supra-xiphoid by Sappey (14 of Fig. 3275) are frequently assigned to this group. The afferent vessels are from the sternal plexus, and through this many vessels from the convex surface of the liver; the lymphatics of the thymus, and, according to some authors, the lymphatics of the heart. The efferent vessels either go to the bronchial glands or join the vessels from these, and extend from the right half to the right lymphatic trunk, and from the left half to the thoracic duct.

The bronchial glands and plexus (*glandulae lymphaticae*

bronchiales; plexus lymphaticus bronchialis) are situated in the bifurcation of the trachea, and extend upon the trachea (where they are called tracheal lymphatic glands) to the internal jugular plexus, and others extend out along the bronchi into the lungs (pulmonary lymphatic glands). In childhood and youth they are pink, but with advancing age they become dark and even black, if the individual has inhaled a plentiful supply of coal dust or other carbonaceous matter. These glands are very large and important. The afferent vessels are from the lungs, and, according to some authors, the heart, the bronchi, the efferent vessels of the dorsal mediastinal glands, and sometimes the ventral mediastinal glands also. The efferent vessels extend from the left side to the thoracic duct, and from the right to the right lymphatic trunk. Frequently the efferent vessels of the sternal, ventral, mediastinal, and bronchial glands unite to form a large single or multiple trunk (*truncus lymphaticus bronchomediastinalis, s. bronchomediastinus, s. bronchomediastinicus*), which extends to the common lymphatic trunk of the right or left. Such a trunk is more common on the right. On the left the efferent trunks are usually smaller and less concentrated.

COMMON LYMPHATIC TRUNKS.—In man and the mammals there are but two common lymphatic trunks, one on the right and one on the left side; and these trunks terminate at two points in the great veins of the neck, usually at the junction of the jugular and subclavian veins—that is, just before the formation of the brachiocephalic venous trunks, or in animals like the rabbit (Fig. 3287) with a right and left precava, just before the formation of these. In man and the higher animals these trunks are of different length and size, and receive the lymphatics of very unequal portions of the body, that on the left side being normally much the more extensive. In the lowest mammals the tendency is very strong to equalize these trunks, and also the area drained by them; and in the animals below mammals, the two are approximately equal.

Thoracic Duct (*chyloductus, ductus thoracicus, s. truncus, s. canalis lymphaticus communis sinister, s. major, s. ductus chyloferus, s. lumbothoracicus; vena alba thoracis* [Eustachius, 1564]).—The common lymphatic duct, canal, or trunk of the left side collects and empties into the venous system, the lymph of the pelvic limbs, the reproductive and urinary organs, the alimentary canal, pancreas, spleen, much of that of the liver, of the left half of the body cephalad of (above) the umbilicus and a part of that from the right half of the thoracic wall (Figs. 3279 to 3287).

In man the thoracic duct is formed in the abdomen opposite the first, second, or third lumbar vertebra by the union of the trunks of the lumbar and mesenteric lymphatic plexuses. The caudal end is formed by the union of the right and left lumbar trunk (*truncus lymphaticus lumbalis dexter et sinister*). The large trunk thus formed is then increased by the addition of the unpaired or azygous trunk (*truncus intestinalis*) from the stomach and intestines, part of the liver, the spleen and pancreas, and the right and left trunk from the intercostal plexuses (Fig. 3279). At the beginning of the duct where all these confluent unite there is usually a marked dilatation, the chylocyst, or cistern of Pecquet (*chylocystis, s. receptaculum chyli, s. cisterna chyli*). This is sometimes absent in man as the confluent form a kind of network instead of one large trunk. In this case the thoracic duct is formed by the union of the network without there being present a special enlargement or chylocyst. This condition is said by Owen to be normal in the marsupials examined by him, but in the dog, cat, rabbit, and most of the higher animals there is usually a very well-marked chylocyst. From the chylocyst the thoracic duct traverses the diaphragm with the aorta, usually on the

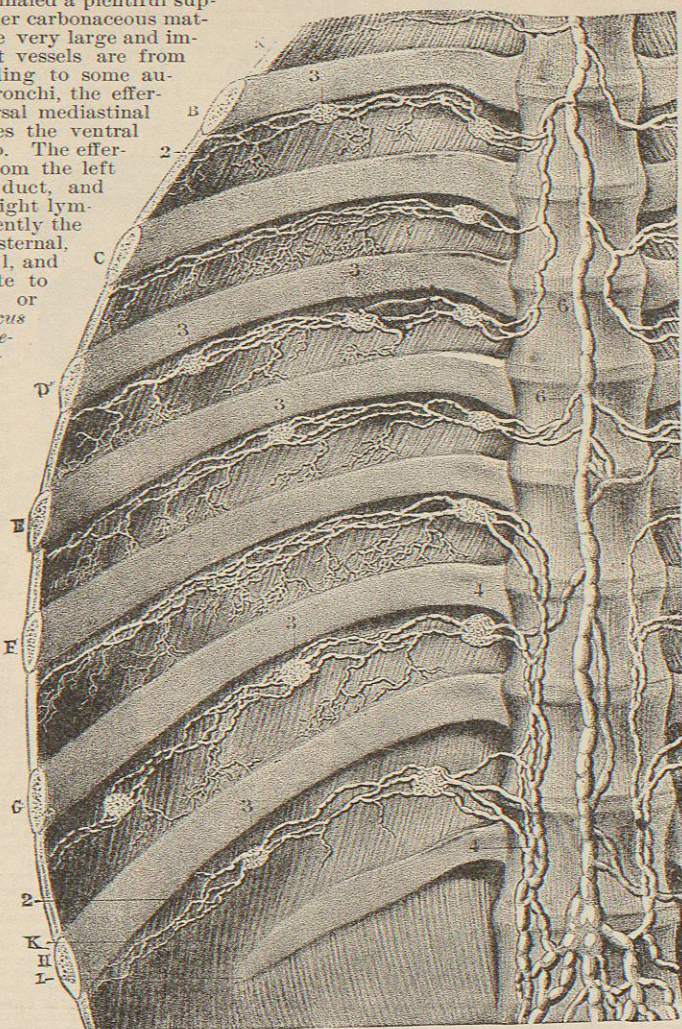


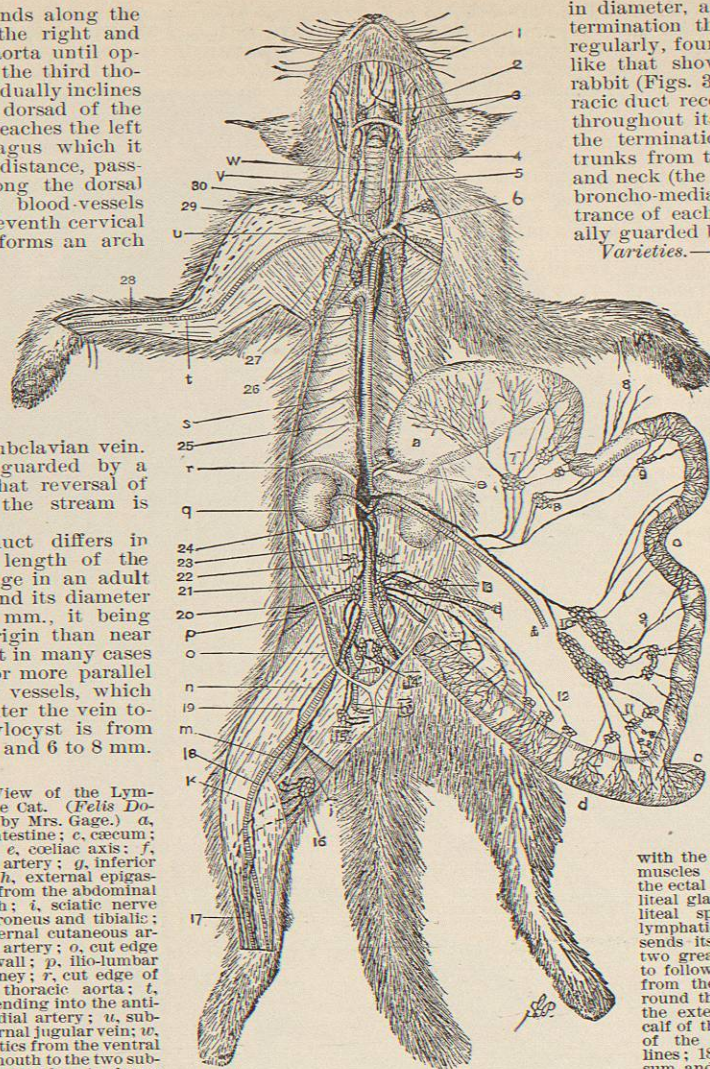
Fig. 3280.—Part of the Thoracic Duct and Intercostal Lymphatics. (Sappey, Atlas.) A, vertebral column opposite the first lumbar vertebra; B, C, D, E, F, G, H, I, fifth to the twelfth ribs inclusive; K, ectal intercostal muscles between the ribs; the ental or internal intercostals have been removed to show the intercostal lymphatic plexus; 1, the thoracic duct near the chylocyst; it extends along the vertebral column nearly on the meson; 2, 2, trunks arising in the intercostal spaces; 3, 3, 3, lymphatic glands in the course of the vessels; 4, 4, large trunk conveying the lymph from the three or four intercostal spaces into the abdomen and then pouring it into the chylocyst; 5, 5, similar trunk on the left side; 6, 6, and 7, trunks on the right and left, from the intercostal spaces to the thoracic duct.

tion is said by Owen to be normal in the marsupials examined by him, but in the dog, cat, rabbit, and most of the higher animals there is usually a very well-marked chylocyst. From the chylocyst the thoracic duct traverses the diaphragm with the aorta, usually on the

right side, and extends along the thorax mostly on the right and dorsal side of the aorta until opposite the sixth to the third thoracic vertebra it gradually inclines to the left, passes dorsad of the arch of the aorta, reaches the left side of the oesophagus which it follows for a short distance, passing on with it along the dorsal side of the great blood-vessels until opposite the seventh cervical vertebra when it forms an arch something like the arch of the aorta, curving ventrad and to the left between the vertebral blood-vessels and the jugular vein to terminate at the junction of the left internal jugular and the subclavian vein. The opening is guarded by a double valve, so that reversal of the direction of the stream is avoided.

The thoracic duct differs in length with the length of the trunk. The average in an adult is about 40 cm., and its diameter is about 2 to 3 mm., it being greater near its origin than near its termination. It in many cases divides into two or more parallel and anastomosing vessels, which finally unite to enter the vein together. The chylocyst is from 40 to 50 mm. long and 6 to 8 mm.

FIG. 3281.—General View of the Lymphatic System of the Cat. (*Felis Domestica*). (Drawn by Mrs. Gage.) a, Stomach; b, small intestine; c, caecum; d, large intestine; e, coeliac axis; f, superior mesenteric artery; g, inferior mesenteric artery; h, external epigastric artery reflected from the abdominal wall upon the thigh; i, sciatic nerve dividing into the peroneus and tibial; k, saphenous or internal cutaneous artery; m, n, femoral artery; o, cut edge of the abdominal wall; p, ilio-lumbar artery; q, right kidney; r, cut edge of the diaphragm; s, thoracic aorta; t, brachial artery, extending into the antibrachium as the radial artery; u, subclavian vein; v, external jugular vein; w, trachea. 1, Lymphatics from the ventral lip and floor of the mouth to the two submaxillary lymphatic glands. As shown in the figure, these trunks cross to the opposite side from which they arose; 2, trunks from the facial region injected from the bare spot on the snout and dorsal lip; 3, the two submaxillary lymphatic glands, one on each side of the facial vein; 4, single ental cervical gland on the side of the trachea and next the carotid artery; into this enter most of the efferent trunks from the submaxillary lymphatic glands; 5, *truncus lymphaticus jugularis* from the ental cervical glands to the thoracic duct on the left, and the right common lymphatic trunk on the right; 6, termination of the thoracic duct at the junction of the subclavian and external jugular veins; 7, lymphatics from the stomach to the coeliac glands; 8, lymphatics from the liver to a coeliac gland; 9, gland near the duodenum into which many of the duodenal lymphatics enter; 10, the two enormous mesenteric glands near the caecum, often called the glands or pancreas of Aesclius, into which most of the lymphatics of the small intestine, caecum, and part of the colon empty. From these glands extends the great *truncus lymphaticus intestinalis* to the chylocyst, receiving the trunks from the duodenum, liver, and stomach on its way; in the cat, as shown in the figure, the *truncus intestinalis* is very long and usually single, making it very easy to insert a cannula for a starch or plaster injection; 11, trunks and glands in the caecal region; 12, lymphatics from the colon, there are usually several small glands near the attachment of the mesentery; 13, glands in the mesocolon around the inferior mesenteric blood-vessels; 14, hypogastric lymphatic glands; 15, gland at the side of the external epigastric blood-vessels. It receives the lymphatics from the abdominal wall, part of the mammary gland and the external genitalia, its efferent ves-



sels go partly to the hypogastric and partly to the lumbar lymphatic glands; the gland has been reflected from the abdominal wall with the external epigastric artery to the muscles of the thigh. It may represent the ectal inguinal group of man; 16, popliteal space. It receives most of the lymphatics of the foot and crus, and sends its efferent trunks between the two great branches of the sciatic nerve to follow the femoral artery; 17, trunks from the dorsum of the foot, winding round the fibular side of the crus with the external saphenous vein across the calf of the leg to the popliteal gland, part of the course is indicated by broken lines; 18, lymphatic trunk from the dorsum and tibial side of the foot following the saphenous or internal cutaneous artery, about opposite to the middle of the thigh it anastomoses freely with those following the femoral vessels; 19, lymphatic trunks accompanying the femoral blood-vessels and finally entering the lumbar glands, no inguinal glands being present; 20, lymphatic trunk accompanying the ilio-lumbar blood-vessels and entering the lumbar lymphatic glands; 21, lumbar lymphatic glands; 22, lumbar glands into which pass the lymphatic trunks from the internal genitalia, these are frequently merged with the preceding; 23, *truncus lymphaticus lumbalis*, there is one on each side, but frequently the trunks are multiple, and the branches of the two sides anastomose, they form principal constituents of the chylocyst; 24, chylocyst formed by the junction of the intestinal and lumbar trunks; 25, thoracic duct, a small branch is indicated as going to the right side of the body; 26, lymphatic glands in the thorax, near the arch of the aorta and bronchi; 27, pectoral lymphatic glands in course of the long thoracic blood-vessels; 28, lymphatics from the dorsum of the manus following the radial nerve and cephalic vein, and finally terminating in the prescapular gland. The course in the brachium, where not visible in this view, is indicated by broken lines, occasionally one or more branches turn at the elbow to follow the brachial vessels into the axilla; in this case they enter the pectoral gland opposite the third rib, true axillary glands appearing to be absent; 29, termination of the right common lymphatic trunk at the junction of the subclavian and external jugular vein; 30, prescapular gland receiving the lymphatics of the arm and shoulder, and usually an anastomosing branch from the jugular trunk, its efferent vessels join the jugular trunk.

in diameter, and in the arch near the termination there is sometimes, if not regularly, found a dilatation something like that shown in the dog and the rabbit (Figs. 3285 and 3287). The thoracic duct receives confluent branches throughout its entire course, and near the termination enter the important trunks from the arm, lungs, and head and neck (the jugular, subclavian, and broncho-mediastinal trunks). The entrance of each of these vessels is usually guarded by a paired valve.

Varieties.—There are sometimes two ducts—one opening into the right, and one into the left veins of the neck. Sometimes a single duct divides, sending one branch to the right and one to the left, as shown in the figure of the cat and rabbit (Figs. 3282 and 3287). Rarely there is a transposition, the left thoracic duct opening on the right. "In two instances the thoracic duct has been seen to terminate in the vena azygos." Multiple openings into the veins are not uncommon (cf. Fig. 3283).

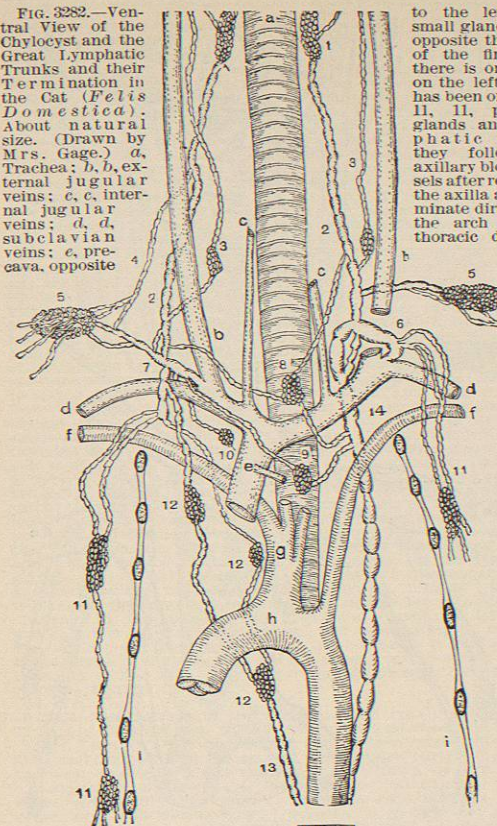
Right common lymphatic trunk (*truncus lymphaticus communis dexter*, s. minor; vena

sels go partly to the hypogastric and partly to the lumbar lymphatic glands; the gland has been reflected from the abdominal wall

with the external epigastric artery to the muscles of the thigh. It may represent the ectal inguinal group of man; 16, popliteal space. It receives most of the lymphatics of the foot and crus, and sends its efferent trunks between the two great branches of the sciatic nerve to follow the femoral artery; 17, trunks from the dorsum of the foot, winding round the fibular side of the crus with the external saphenous vein across the calf of the leg to the popliteal gland, part of the course is indicated by broken lines; 18, lymphatic trunk from the dorsum and tibial side of the foot following the saphenous or internal cutaneous

artery, about opposite to the middle of the thigh it anastomoses freely with those following the femoral vessels; 19, lymphatic trunks accompanying the femoral blood-vessels and finally entering the lumbar glands, no inguinal glands being present; 20, lymphatic trunk accompanying the ilio-lumbar blood-vessels and entering the lumbar lymphatic glands; 21, lumbar lymphatic glands; 22, lumbar glands into which pass the lymphatic trunks from the internal genitalia, these are frequently merged with the preceding; 23, *truncus lymphaticus lumbalis*, there is one on each side, but frequently the trunks are multiple, and the branches of the two sides anastomose, they form principal constituents of the chylocyst; 24, chylocyst formed by the junction of the intestinal and lumbar trunks; 25, thoracic duct, a small branch is indicated as going to the right side of the body; 26, lymphatic glands in the thorax, near the arch of the aorta and bronchi; 27, pectoral lymphatic glands in course of the long thoracic blood-vessels; 28, lymphatics from the dorsum of the manus following the radial nerve and cephalic vein, and finally terminating in the prescapular gland. The course in the brachium, where not visible in this view, is indicated by broken lines, occasionally one or more branches turn at the elbow to follow the brachial vessels into the axilla; in this case they enter the pectoral gland opposite the third rib, true axillary glands appearing to be absent; 29, termination of the right common lymphatic trunk at the junction of the subclavian and external jugular vein; 30, prescapular gland receiving the lymphatics of the arm and shoulder, and usually an anastomosing branch from the jugular trunk, its efferent vessels join the jugular trunk.

FIG. 3282.—Ventral View of the Chylocyst and the Great Lymphatic Trunks and their Termination in the Cat (*Felis Domestica*). About natural size. (Drawn by Mrs. Gage.) a, Trachea; b, b, external jugular veins; c, c, internal jugular veins; d, d, subclavian veins; e, e, pre-cava, opposite



to the left; 10, small gland about opposite the head of the first rib, there is one also on the left but it has been omitted; 11, 11, pectoral glands and lymphatic vessels, they follow the axillary blood-vessels after reaching the axilla and terminate directly in the arch of the thoracic duct on

the entrance of the common trunk of the sternal veins; f, f, subclavian arteries; g, brachiocephalic artery opposite its division into the right subclavian, the right and left carotids; h, h, arch of the aorta and abdominal aorta; i, i, cut edges of the thoracic walls and the ends of the ribs; k, k, pillars of the diaphragm; m, coeliac axis; n, superior mesenteric artery; o, o, the renal arteries. 1, Ental cervical gland; 2, *truncus lymphaticus jugularis*; 3, 3, trunk and gland along the external jugular vein, the trunk is one of the efferent vessels from the lateral of the two submaxillary lymphatic glands (cf. Fig. 3281); 4, anastomosing branches between the jugular trunk and the efferents from the prescapular gland; 5, 5, the right and left prescapular gland; 6, termination of the thoracic duct in the veins at the angle of the subclavian and external jugular, a short segment has been removed from the external jugular to show more clearly the arch of the terminal part of the thoracic duct; 7, the right common lymphatic trunk at its termination; 8, lymphatic gland on the trachea, its efferent vessels extend both to the right and to the left; 9, large gland in the ventral mediastinum around the sternal vessels, its efferent vessels extend both to the right and

the left, but join other trunks on the right before entering the common trunk; 12, 12, 12, lymphatic glands and trunk near the arch of the aorta, the efferent vessels form prominent constituents of the right lymphatic trunk; 13, branch of the thoracic duct turning to the right and finally terminating in the right lymphatic trunk; 14, 14, thoracic duct. As indicated by the constrictions the valves are considerably farther apart in the cephalic half; 15, 15, chylocyst on the right side of the aorta and extending for a considerable distance into the thorax; 16, *truncus intestinalis*, the common trunk from the stomach, liver, and intestines (cf. Fig. 3281). Before terminating in the chylocyst it divides into several branches, one of which winds round the left side of the

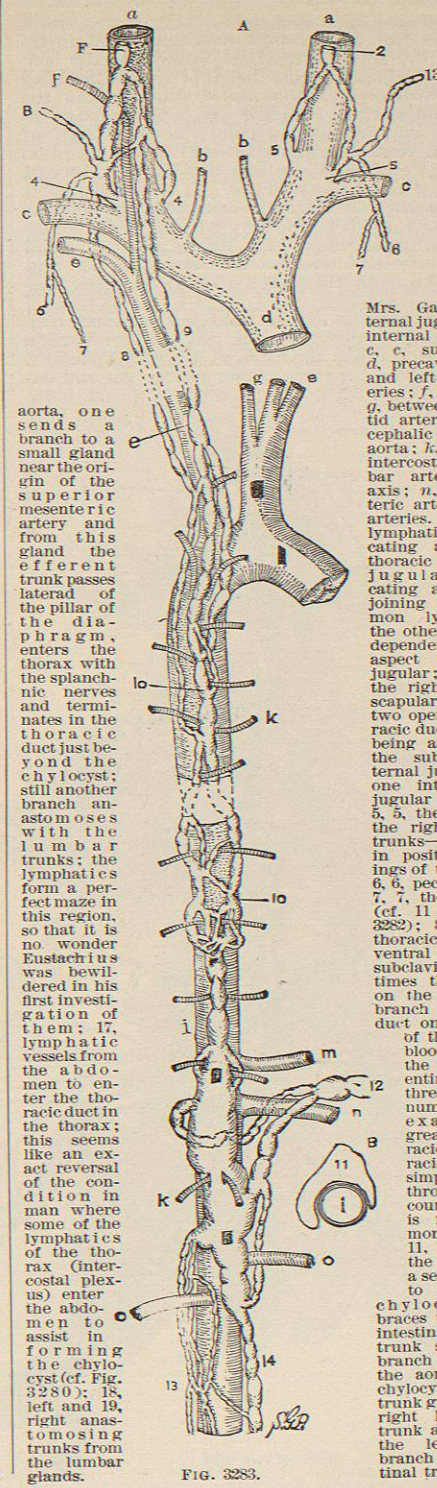


FIG. 3283.—Dorsal View of the Chylocyst and the Great Lymphatic Trunks in their Relation to the Blood-vessels of the Cat (*Felis Domestica*). Slightly more than natural size. The blanks and dotted lines indicate the omission of a part of the length. (Drawn by Mrs. Gage.) a, a, External jugular veins; b, b, internal jugular veins; c, c, subclavian veins; d, d, pre-cava; e, e, the right and left subclavian arteries; f, f, left thyroid axis; g, g, between the two carotid arteries; h, h, brachiocephalic artery; i, i, k, k, aorta; h, k, upper one an intercostal, lower a lumbar artery; m, coeliac axis; n, superior mesenteric artery; o, o, renal arteries. 1, Left jugular lymphatic trunk, bifurcating and joining the thoracic duct; 2, right jugular trunk, bifurcating and one branch joining the right common lymphatic trunk, the other terminating independently in the mesal aspect of the external jugular; 3, 3, trunks from the right and left prescapular glands; 4, 4, the two openings of the thoracic duct, the lateral one being at the junction of the subclavian and external jugular, the mesal one into the external jugular about opposite; 5, 5, the two openings of the right lymphatic trunks—they are similar in position to the openings of the thoracic duct; 6, 6, pectoral lymphatics; 7, 7, thoracic lymphatics (cf. 11 and 12 of Fig. 3282); 8, branch of the thoracic duct on the ventral side of the great subclavian vessels, sometimes the entire duct is on the ventral side; 9, branch of the thoracic duct on the dorsal side of the subclavian blood-vessels—this is the position of the entire duct in about three-fourths of the numerous specimens examined; 10, 10, greatly divided thoracic duct. The thoracic duct is never simple in the cat throughout its whole course, but this one is more than commonly divided; 11, 11, chylocyst. On the right is drawn a section at this point to show that the chylocyst nearly embraces the aorta; 12, intestinal lymphatic trunk sending a large branch on both sides of the aorta; 13, enter the chylocyst; 14, left lumbar trunk greatly divided; 15, right lumbar lymphatic trunk anastomosing with the left and with a branch from the intestinal trunk.

FIG. 3283.