basilar portion of the occipital and the petrous portions of the temporal bones. As it descends it diminishes in thickness, and is gradually lost. It is strengthened posteriorly by a strong fibrous band, which is attached above to the pharyngeal spine on the under surface of the basilar portion of the occipital bone, and passes downward, forming a median raphe, which gives attachment to the Constrictor pharyngis.

The mucous coat is continuous with that lining the auditory tubes, the nasal cavities, the mouth, and the larynx. In the nasal part of the pharynx it is covered by columnar ciliated epithelium; in the oral and laryngeal portions the epithelium is stratified squamous. Beneath the mucous membrane are found racemose mucous glands; they are especially numerous at the upper part of the pharynx around the orifices of the auditory tubes.

THE ESOPHAGUS (Fig. 1032).

The esophagus or gullet is a muscular canal, about 23 to 25 cm. long, extending from the pharynx to the stomach. It begins in the neck at the lower border of the cricoid cartilage, opposite the sixth cervical vertebra, descends along the front of the vertebral column, through the superior and posterior mediastinum, passes through the diaphragm, and, entering the abdomen, ends at the cardiac
orifice of the stomach, opposite the eleventh thoracic vertebra. The general direction of the esophagus is vertical; but it presents two slight curves in its course. At its commencement it is placed in the middle line; but it inclines to the left side as far as the root of the neck, gradually passes to the middle line again at the level of the fifth thoracic vertebra, and finally deviates to the left as it passes forward to the esophageal hiatus in the diaphragm. The esophagus also presents antero-posterior flexures corresponding to the curvatures of the cervical and thoracic portions of the vertebral column. It is the narrowest part of the digestive tube, and is most contracted at its commencement, and at the point where it passes through the diaphragm.

![Diagram of the esophagus and its relations](image)

**Fig. 1032.**—The position and relation of the esophagus in the cervical region and in the posterior mediastinum. Seen from behind. (Poupart and Charpy.)

**Relations.**—The **cervical portion** of the esophagus is in relation, in front, with the trachea; and at the lower part of the neck, where it projects to the left side, with the thyroid gland; behind, it rests upon the vertebral column and Longus colli muscles; on either side it is in relation with the common carotid artery (especially the left, as it inclines to that side), and parts of the lobes of the thyroid gland; the recurrent nerves ascend between it and the trachea; to its left side is the thoracic duct.

The **thoracic portion** of the esophagus is at first situated in the superior mediastinum between the trachea and the vertebral column, a little to the left of the median line. It then passes behind and to the right of the aortic arch, and descends in the posterior mediastinum along the right side of the descending aorta, then runs in front and a little to the left of the aorta, and enters the abdomen through the diaphragm at the level of the tenth thoracic vertebra. Just before it perforates the diaphragm it presents a distinct dilatation. It is in
relation, in front, with the trachea, the left bronchus, the pericardium, and the diaphragm; behind, it rests upon the vertebral column, the Longus coli muscles, the right aortic intercostal arteries, the thoracic duct, and the hemiazygous veins; and below, near the diaphragm, upon front of the aorta. On its left side, in the superior mediastinum, are the terminal part of the aortic arch, the left subclavian artery, the thoracic duct, and left pleura, while running upward in the angle between it and the trachea is the left recurrent nerve; below, it is in relation with the descending thoracic aorta. On its right side are the right pleura, and the azygous vein which it overlaps. Below the roots of the lungs the vagi descend in close contact with it, the right nerve passing down behind, and the left nerve in front of it; the two nerves uniting to form a plexus around the tube.

In the lower part of the posterior mediastinum the thoracic duct lies to the right side of the esophagus; higher up, it is placed behind it, and, crossing about the level of the fourth thoracic vertebra, is continued upward on its left side.

The **abdominal portion** of the esophagus lies in the esophageal groove on the posterior surface of the left lobe of the liver. It measures about 1.25 cm. in length, and only its front and left aspects are covered by peritoneum. It is somewhat conical with its base applied to the upper orifice of the stomach, and is known as the **antrum cardiacum**.

**Structure** (Fig. 1033).—The esophagus has four coats: an **external or fibrous**, a **muscular**, a **submucous** or areolar, and an **internal or mucous cost**.

The **muscular cost** (tunica muscularis) is composed of two planes of considerable thickness: an external of longitudinal and an internal of circular fibers.

The **longitudinal fibers** are arranged, at the commencement of the tube, in three fasciculi: one in front, which is attached to the vertical ridge on the posterior surface of the lamina of the cricoid cartilage; and one at each side, which is continuous with the muscular fibers of the pharynx: as they descend they blend together, and form a uniform layer, which covers the outer surface of the tube.

**Accessory slips** of muscular fibers pass between the esophagus and the left pleura, where the latter covers the thoracic aorta, or the root of the left bronchus, or the back of the pericardium.

The **circular fibers** are continuous above with the Constrictor pharyngis inferior; their direction is transverse at the upper and lower parts of the tube, but oblique in the intermediate part.

The muscular fibers in the upper part of the esophagus are of a red color, and consist chiefly of the striped variety; but below they consist for the most part of involuntary fibers.

The **areolar or submucous cost** (tunica submucosae) connects loosely the mucous and muscular coats. It contains bloodvessels, nerves, and mucous glands.

The **mucous coat** (tunica mucosa) is thick, of a reddish color above, and pale below. It is disposed in longitudinal folds, which disappear on distension of the tube. Its surface is studded with minute papillae, and it is covered throughout with a thick layer of stratified squamous epithelium. Beneath the mucous membrane, between it and the areolar cost, is a layer of longitudinally arranged non-striped muscular fibers. This is the **muscularis mucosae**. At the commencement of the esophagus it is absent, or only represented by a few scattered bundles; lower down it forms a considerable stratum.

The **esophageal glands** (glandulae esophageae) are small compound racemose glands of the mucous type: they are lodged in the submucous tissue, and each opens upon the surface by a long excretory duct.

**Vessels and Nerves.**—The arteries supplying the esophagus are derived from the inferior thyroid branch of the thyrocervical trunk, from the descending thoracic aorta, from the left gastric branch of the celiac artery, and from the left inferior phrenic of the abdominal aorta. They have for the most part a longitudinal direction.

The nerves are derived from the vagi and from the sympathetic trunks; they form a plexus, in which are groups of ganglion cells, between the two layers of the muscular coats, and also a second plexus in the submucous tissue.