

## CHAPTER II.

### THE MOUTH.

STUDYING the mouth from the living subject, we remark, first, an entrance of two fleshy folds, the lips; separating these, we are met by a second portal, the teeth; the space existing between these two entrances is called the hall, or vestibule; opening this inner gateway, by depressing the lower jaw, we are introduced into the oral cavity proper.

The mouth is the commencement of the alimentary canal. It has as offices, the reception of food, gustation, mastication, insalivation, and expression in sound; consequently must possess organs and agencies pertinent to these ends.

Looking into the cavity, it is observed to be an oval archway, bounded posteriorly by a veil, or curtain. This curtain falls obliquely into the pharynx; it has a central pendulum, and terminates laterally in curves. We can see beneath this veil, or between it and the base, and thereby recognize the part being viewed as simply the commencement of a canal. Every part of the cavity is seen to be covered by a common membrane, which membrane is found to associate externally on the lips with the skin; internally with the throat,—this is mucous membrane; examination reveals it to be continuous from the lips to the outlet of the rectum. The teeth, thirty-two in number in the adult, are placed in two harmonizing, or articulating arches, and are, in shape and character, correspondent with omnivorous habits. Thus certain of their number, the incisors, are so arranged as to cut, or incise. Certain others, the cuspidati, or canines, are spear-shaped; these tear, or lacerate. Still others, the bicuspidati and molars, have broad and roughened surfaces; they act the part of grinders. The tongue, a muscular body, rests within the lower dental arch; it evidently is fitted and suited to preside over the labor of the teeth, to receive or reject articles to be comminuted, to place and retain articles in a position to be masticated, and, when ready to be swallowed, to roll up masses into a bolus, and pass this into the pharynx.

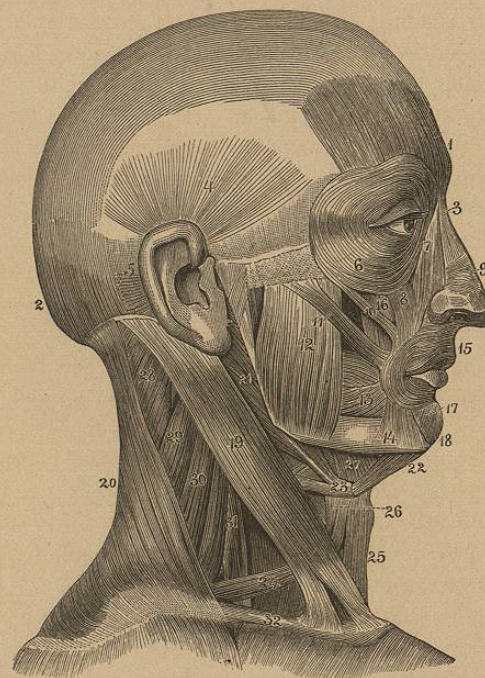
The roof of the mouth, beginning with the palatal faces of the teeth, is made up of hard and soft tissues. The hard portion is the flesh-colored alveolar and palate processes of the superior maxillary bones and the palate processes of the palate bones. The soft part dissection reveals to be a simple attached basement tissue covered with the common membrane.

The uvula, the central pendulous termination of the soft palate, consists of two symmetrical muscles enclosed in a common envelope of mucous mem-

brane. The office of this body is to act as an agent excitve of the act of deglutition. It draws the veil against the upper wall of the pharynx, thus closing the posterior nares during the process of swallowing. In the production of loud declamation and in the guttural forms of language, it is supposed to modify speech by lessening the pharyngo-nasal passage when it acts as an elevator; this elevating force being most exhibited in the highest ranges of the singing voice, and least in the lower keys.

Looking for a short period into the mouth, it is observed that jets of fluid

FIG. 21.—MUSCLES OF THE FACE.



MUSCLES OF THE HEAD AND NECK. 1, 2, occipito-frontal muscle; 1, its frontal belly; 2, its occipital belly; 3, nasal pyramidal muscle; 4, superior, and 5, posterior auricular muscles; 6, palpebral orbicular muscle; 7, labio-nasal elevator; 8, elevator of the upper lip; 9, nasal compressor; 10, 11, zygomatic muscles; 12, masseter muscle; 13, buccinator; 14, depressor of the oral angle; 15, oral orbicular muscle; 16, elevator of the oral angle; 17, 18, depressor of the lower lip; 19, sterno-mastoid muscle; 20, trapezius; 21, posterior belly of the digastric and the stylo-hyoid muscle; 22, anterior belly of the former; 23, loop of fibrous tissue attaching the tendon of the digastric muscle to the hyoid bone; 24, omo-hyoid muscle; 25, sterno-hyoid; 26, sterno-thyroid, seen to the outer side and behind the anterior belly of the omo-hyoid; 27, mylo-hyoid; 28, splenius; 29, elevator of the scapular angle; 30, 31, middle and anterior scalene muscles; 32, clavicle.

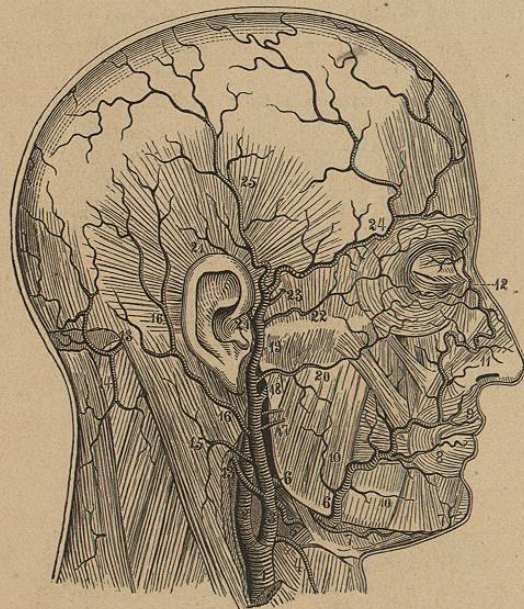
are occasionally sent up from the anterior floor just back of the lower central teeth. We also see drops constantly issuing from an orifice situated on the cheek by the side of the superior second molar tooth. This fluid is the salivary secretion, and comes from glands situated in the immediate neighbor-

hood. Besides this salivary fluid, pearly drops are seen, more or less plainly, over the surface of the common mucous membrane. This is mucus, and is the product of the follicles, crypts, or glands of the common membrane.

The mouth, then, we are to say, is made up of, and invites a study of, the lips, cheeks, gums, teeth, mucous membrane, tongue, hard and soft palate, and salivary glands; and if we accept, as indeed surgically we must, that the cavity begins with the lips and ends at the posterior wall of the pharynx, then we include in the study all the relations which exist between inlet and outlet.

Lips and cheeks are alike in their composition, and are truly part and parcel of each other. First, in the dissection, we have a layer of skin on

FIG. 22.—ARTERIES OF THE FACE.



THE EXTERNAL CAROTID ARTERY AND ITS BRANCHES. 1, right common carotid; 2, internal carotid; 3, external carotid; 4, superior thyroid; 5, lingual; 6, facial; 7, submental; 8, inferior coronary; 9, superior coronary; 10, muscular branches; 11, lateral nasal artery; 12, angular artery; 13, occipital artery; 14, descending cervical; 15, muscular branch; 16, posterior auricular artery; 17, parotid branches; 18, internal maxillary; 19, temporal; 20, transverse facial; 21, anterior auricular; 22, supraorbital; 23, middle temporal; 24, anterior temporal; 25, posterior temporal artery.

the outside and a layer of mucous membrane on the inside. Removing the skin, which here is thin as compared with that upon other parts of the body, we expose a layer of cellular fascia, in which is more or less fatty tissue. This, superficial fascia, as it is called, differs from other fasciæ of the same signification, in not being distinct, or laminated. It is intimately connected with the skin, and closely associated with the muscles. Removing this, a

complex grouping of muscles is exposed,—the muscles of expression. (For names of these, refer to description under Fig. 21.)

The view (Fig. 21) expresses so fully the position and signification of these muscles that it scarcely seems necessary to enter on any description of them. The orbicular, or sphincter of the lips, may, however, be specially noted, as its influence is concerned in retracting wounds of the part. In studying the muscles of the face, it will be observed that they naturally arrange themselves into groups. Thus we have a group that are elevators, another that are depressors. Then groups that pertain to particular regions, as the nasal, superior maxillary, inferior maxillary, intermaxillary, etc. Surgically, however, information pertaining to the muscles is sufficiently elicited in comprehending their general plan and arrangement.

Situated upon, and running among these muscles, we have the arteries of the face. These are all branches of the external division of the common

FIG. 23.—THE COMMON CAROTID, WITH ITS DIVISIONS.

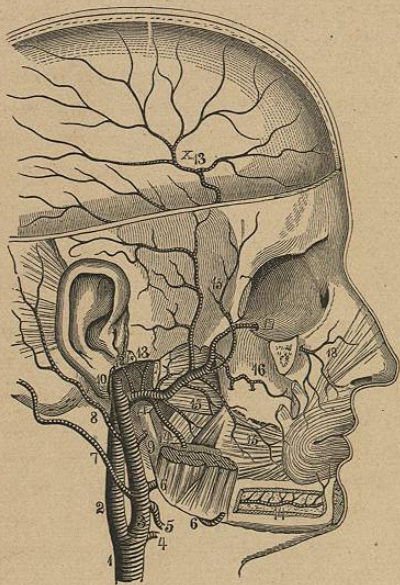


LEFT COMMON CAROTID DIVIDING INTO THE EXTERNAL AND INTERNAL CAROTID ARTERIES. 1, common carotid artery; 2, internal carotid; 3, external carotid; 4, superior thyroid; 5, lingual; 6, pharyngeal artery; 7, facial; 8, inferior palatine and tonsillar arteries; 9, submaxillary; 10, submental; 11, occipital; 12, posterior auricular; 13, parotid branches; 14, internal maxillary; 15, temporal artery; 16, subclavian artery; 17, axillary; 18, vertebral artery; 19, thyroid axis; 20, inferior thyroid giving off the ascending cervical; 21, transverse cervical; 22, suprascapular; 23, internal mammary artery.

carotid, and will be found, in a dissection, distributed exactly as seen in the view. The facial, the third branch of the carotid externus, is observed to cross over the lower jaw just in front of the masseter muscle; and, in the

subject, is seen to emerge from or beneath the submaxillary gland, generally passing through its substance. Its branches are ten in number; four are offshoots from its cervical portion; six are facial. The facial branches are: first, the inferior labial—which passes forward under the depressor anguli oris, and supplies the lower part of the lip, anastomosing with all the subjacent vessels; with the submental, inferior coronary, and inferior dental arteries. The coronaries—the second and third of the branches of the facial—penetrate the substance of the underlying muscles, and pass around the lips immediately beneath the mucous membrane; their pulsation is to be felt very plainly; in many persons these vessels are of such large size as to render hemorrhage from them a matter of trouble to control. The lateralis nasi, the fourth of the branches, ascends along the side of the nose, supplying the

FIG. 24.



INTERNAL MAXILLARY ARTERY. 1, right common carotid; 2, internal carotid; 3, external carotid; 4, superior thyroid; 5, lingual; 6, facial; 7, occipital; 8, posterior auricular; 9, parotid branch; 10, temporal artery; 11, internal maxillary; 12, tympanic; 13, the great and small meningeal arteries from a common branch; 14, inferior dental artery; 15, muscular branches; 16, superior maxillary, or alveolar, artery giving off the posterior dental arteries; 17, 18, infra-orbital artery.

ing behind the neck of the lower jaw, and running horizontally forward between the pterygoid muscles; its relation with the neck of the jaw is a point of special interest and of importance to remember. The artery, almost

the alæ and dorsum. The fifth, the angular artery, passes between the inner canthus and nasal bridge; it gives off sub-branches to the orbicularis muscle, to the lachrymal sac, and to the integument of the suborbital region, and finally loses itself in an anastomosis with the ophthalmic artery. A point in the diagram to observe is, that the inferior and all the mesial line of the face is supplied by branches of a common trunk, and that this trunk is compressible on the lower jaw just in front of the masseter muscle, facial hemorrhage being thus perfectly under control by compression. Observation is also to be extended to the internal anastomosis that exists between the branches of the facial and neighboring vessels.

#### Deep Arteries of Facial Region.

—The deep circulation relates with the internal maxillary artery.

This is a terminal branch, or division, of the external carotid, which division occurs in the substance of the parotid gland; the vessel passing

immediately on its origin from the carotid, gives off the inferior maxillary vessel (14), which, entering the posterior dental foramen, supplies all the lower teeth. Passing inward, it terminates in two branches; one of these, the infraorbital (17), enters the orbit at the sphenomaxillary fissure, passes into the infraorbital canal, emerges from the foramen externus of this canal, lying here beneath the levator labii superioris muscle, and breaks up into vessels which supply the lachrymal sac and inner angle of the orbit; while in the canal branches are given off which descend through foramina in the bone to the anterior teeth and to the mucous membrane of the antrum. The other terminal branch, the alveolar, the origin of which lies in the sphenomaxillary fossa, passes along the maxillary tuberosity, breaking into branches, which supply the molar and bicuspid teeth, the mucous membrane of the antrum, and the gums. Besides the three named, the internal maxillary gives off eleven other branches; 12, tympanic; this supplies the tympanum: it enters the bone at the Glasserian fissure; 13, great and small meningeal: the first passes into the cranial cavity through the foramen spinosum, the second through the oval foramen; both supply the dura mater; the latter sends a branch to Casserio's ganglion; 15, muscular branches, known as "deep temporal," "pterygoid," "masseteric," "buccinator." The other branches—not distinguished in the diagram—are descending palatine, pterygo-palatine, sphenopalatine, and vidian. (See *Anatomy*.)

#### THE VEINS OF THE FACE.

The veins of the face are seen to correspond closely with the arterial distribution. Surgically, these vessels are of little import, as it is seldom that wounds of any of them are sufficiently consequential to demand special attention; the blood is passed by them into one or another of the two jugulars, being not by any means constant in the selection. Between all, however, the most thorough anastomosis always exists, thus rendering it really of little consequence what may be the direct downward course of the current. The veins of the antero-exterior head are the facial, the temporal, the internal maxillary, and the temporo-maxillary.

The facial (5), commencing at the inner angle of the orbit, is formed by the confluence of vessels from the supraorbital, palpebral, nasal, and angular regions. It commences its course downward and outward, passing beneath the zygomatic muscles, taking the superior and inferior lip veins, the buccal, and the masseteric; passes to the base of the jaw, receiving just below it the circulation from the submental, the inferior palatine, the submaxillary, and the ranine localities, and, finally, with a great branch, received from the temporo-maxillary vein, loses itself in the deep jugular.

The temporal commences by a plexus upon the side of the head and vertex, passes downward in front of the ear, receives the transverse facial, posterior auricular, occipital, and deep maxillary veins, enters the substance of the

parotid gland, and, finally, being enlarged by these various branches, becomes the external jugular.

The internal, or deep maxillary, is, in its origin, a series of veins collecting the blood from the parts supplied by the internal maxillary artery and ad-

FIG. 25.—VEINS OF THE FACE.



VEINS OF THE HEAD AND NECK. 1, frontal vein; 2, nasal vein; 3, 4, labial veins; 5, facial vein; 6, lingual vein; 8, internal jugular vein; 8, 9, posterior and anterior temporal veins; 10, transverse facial vein; 11, internal maxillary vein; 12, posterior auricular vein; 13, external jugular vein; 14, posterior, 15, anterior jugular veins. *a*, external carotid artery; *b*, sternomastoid muscle; *c*, trapezius; *d*, pectoral muscles; *e*, deltoid muscle.

jacent parts. These various veins, the middle meningeal, deep temporal, pterygoid, masseteric, buccal, and inferior dental, forming the common trunk, empty into the temporal.

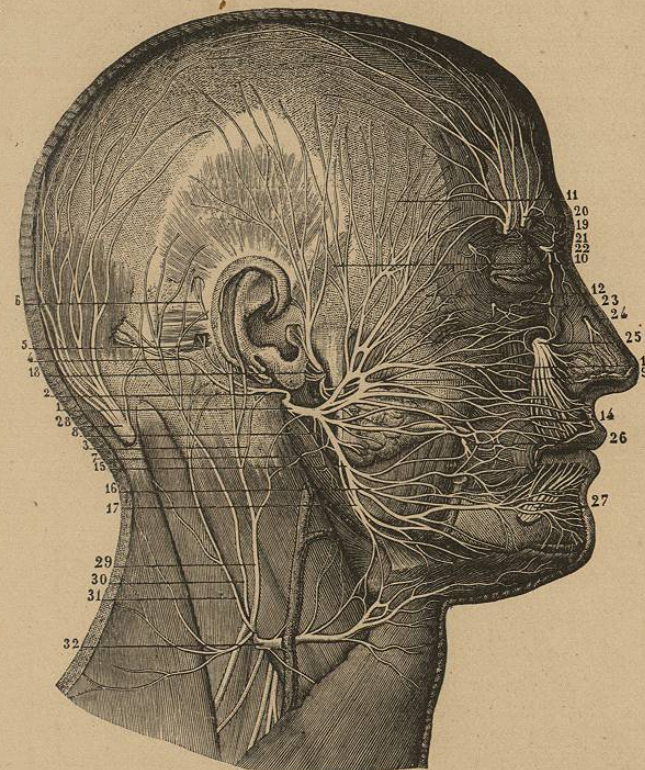
The temporo-maxillary is simply the name given to that part of the tem-

poral vein below the point of entrance of the maxillary—either name is used with equal propriety. (For an elaborate dissection of the veins of the face, see chapter on *Face Operations*.)

## THE NERVES OF THE FACE.

The nerves of the face belong to two classes, sensor and motor. The

FIG. 26.—NERVES OF THE FACE.



1, trunk of the nerve emerging at the stylo-mastoid foramen; 2, its deep auricular branch; 3, anastomosis of the latter with the great auricular nerve of the cervical plexus; 4, 5, 6, branches to the contiguous muscles; 7, 8, branches of the facial to the digastric and stylo-hyoid muscles; 9, temporo-facial division of the nerve; 10, branch to the temple, anastomosing with the auriculo-temporal nerve; 11, temporal branches; 12, zygomatic branches; 13, infraorbital branches; 14, 15, cervico-facial division of the facial nerve; 14, buccal branches; 16, inferior maxillary branches; 17, cervical branches; 18, auriculo-temporal nerve; 19, 20, terminal branches of the frontal nerve; 21, terminal branch of the lachrymal nerve; 22, external nasal nerve; 23, branch of the temporo-malar nerve; 24, terminal branch of the internal nasal nerve; 25, infraorbital nerves; 26, anastomosis between the buccal branch of the inferior maxillary nerve and the buccal branches of the facial nerve; 27, terminal branches of the inferior dental nerve; 28, great occipital nerve; 29, 30, branches of the great auricular nerve; 30, small occipital nerve; 31, 32, superficial cervical nerve, anastomosing with the facial nerve.

first is known as the fifth, or trifacial nerve, the second as the facial nerve. The first pertains to sensation, the second exclusively to motion.

The view (Fig. 26) exhibits beautifully the distribution of the branches of the facial nerve. The main trunk, seen emerging just below the lobe of the ear, in front of the anterior border of the sterno-cleido-mastoideus, is the portio dura, or hard portion of the seventh nerve, the motor nerve acting on the muscles of expression. It arises from the medulla oblongata, passes outward over the crus cerebelli, and enters the auditory meatus with the soft, or auditory, portion. Passing to the bottom of this meatus, it enters the Fallopian aqueduct, follows the serpentine course of that canal until it arrives at the stylo-mastoid foramen, whence it emerges, as seen, upon the outside of the face; while, however, in the temporal bone, the nerve connects with several others, and forms a ganglion, the *intumescencia gangli-formis*, as it is called.

Issuing from the stylo-mastoid foramen, the facial associates with the pneumogastric, glosso-pharyngeal, auricularis magnus, and auriculo-temporal nerves, and with the carotid plexus. Passing to the face, it unites with the three divisions of the fifth nerve.

In front of the ear the nerve is seen to divide into two primary divisions, or trunks, the temporo-facial and cervico-facial. The first, the larger of the two, passes through the parotid gland, crosses the neck of the lower jaw, and divides into three sets of branches, distributed to the temporal, malar, and infraorbital regions. The cervico-facial passes downward and forward through the gland, and divides into buccal, supra- and inframaxillary branches. The manner of distribution and anastomosis is shown in the dissection. The facial, being a motor nerve, has its apportionment exclusively in muscular tissue: injury to this nerve exhibits its results in altered expression of the face; paralysis follows its destruction. (For full description of trifacial nerve, see chapter on *Fifth Pair of Nerves*.)

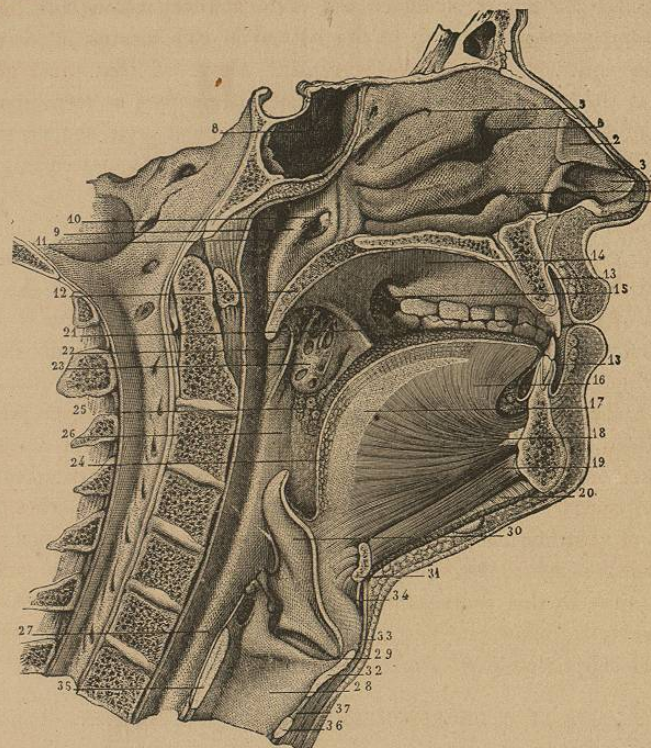
#### SECTIONAL EXPRESSION OF THE MOUTH.

The view (Fig. 27) represents a section directly through the centre of the skull from before backward, and exhibits perfectly the character of the mouth and its associations. Below is seen the tongue and its relations; in front, to the genial tubercles; behind, to the epiglottis. A fossa between the root of this organ and the epiglottis, one on each side of a common centre, the *frænum epiglottidis*, is particularly worthy of note, as it is a not infrequent receptacle for fish-bones and other foreign bodies, which give sometimes much trouble in their removal. The free surface of the tongue is seen to be convex, while the section reveals its common body to be triangular; the apex looks forward.

The roof of the mouth, seen above, is remarked to be a quite thin plane, forming as well the floor of the nares. Its relation to the oral cavity is concave, but differs widely in various persons, being in some almost flat, in others very deep. The anterior portion, bony, will be recognized as being formed by the palatine processes of the maxillary and palate bones. The

posterior part, soft, veil-like, and movable, is the velum, terminating in the uvula in the centre, just above and in front of the tip of the epiglottis. Laterally are two pillars, or half arches, called respectively the anterior and

FIG. 27.—SECTIONAL VIEW OF THE NOSE, MOUTH, AND PHARYNX.

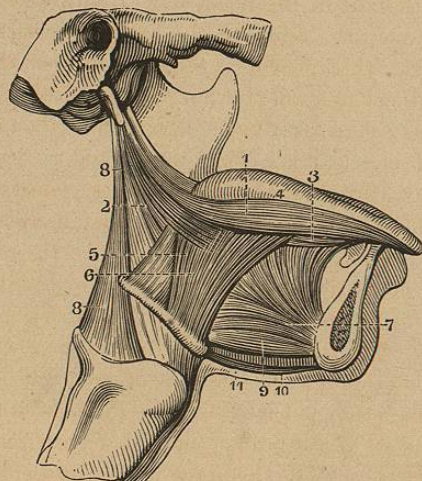


VERTICAL SECTION OF THE FACE AND NECK, THROUGH THE MEDIAN LINE ANTERO-POSTERIORLY, EXPOSING TO VIEW THE NOSE, MOUTH, PHARYNX, AND LARYNX. 1, oval cartilage of the left nostril; 2, triangular cartilage; 3, line of separation between the two; 4, prolongation of the oval cartilage along the column of the nose; 5, superior meatus of the nose; 6, middle meatus; 7, inferior meatus; 8, sphenoidal sinus; 9, posterior part of the left nasal cavity, communicating with the pharynx; 10, orifice of the Eustachian tube; 11, upper extremity of the pharynx; 12, soft palate, ending below in the uvula; 13, interval of the mouth between the lips and jaws; 14, roof of the mouth, or hard palate; 15, communication of the cavity of the mouth with the interval between the jaws and the cheek; 16, tongue; 17, fibrous partition in the median line of the latter; 18, genio-glossal muscle; 19, genio-hyoid muscle; 20, mylo-hyoid muscle; 21, anterior half arch of the palate; 22, posterior half arch of the palate; 23, tonsil; 24, 25, floor of the fauces; 26, 27, pharynx; 28, cavity of the larynx; 29, ventricle of the larynx; 30, epiglottis; 31, hyoid bone; 32, 33, thyroïd cartilage; 34, thyro-hyoid membrane; 35, 36, cricoid cartilage; 37, vocal membrane.

posterior pillars. The first of these—the one seen in the view as associating itself with the tongue—is formed by a projection of the palato-glossus muscle; the second, or posterior, is likewise the projection of a muscle, the palato-pharyngeus, passing from the veil to the pharynx. The fossa existing

between these pillars lodges the tonsil gland. The hard portion of the oral roof, or nasal floor, is frequently the seat of necrosis; it will be remarked that only a very small loss of substance is required to associate the two cavities. The oro-pharyngeal space, the space between the two arches, is bounded, above, by the margin of the palate, below, by the base of the tongue, laterally, by the half arches and amygdalæ. (See *Diseases of the Pharynx*.)

FIG. 28.—SIDE VIEW OF THE MUSCLES OF THE TONGUE.



1, 2, stylo-glossal muscle; 3, lingual muscle; 4, upper part of the tongue; 5, 6, hyoglossal muscle; 7, genio-glossal muscle; 8, stylo-pharyngeal muscle; 9, genio-hyoid muscle; 10, 11, median line of the mylo-hyoid muscles.

**THE TONSILS.**—The tonsils (Figs. 27, 29) are glandular organs, situated one on either side of the oro-pharyngeal space. These bodies are made up of many lobules, having many sulci lined by involutions of the common mucous membrane. They are not infrequently the seat of such hypertrophy as to make necessary their amputation, while in their sulci is apt to be lodged débris, which, in its retention and decomposition, becomes one of the sources of an unpleasant breath. Externally these bodies are in very close relation with the internal carotid arteries, a point necessary to be kept in remembrance in performing operations on them. (See *Tonsil Glands*.)

The relationship of a bolus of food with the pharynx, and with its direction, over the chink of the glottis into the œsophagus, by the epiglottis, are clearly exhibited by the drawing.

**THE TONGUE.**—Dissection of the tongue reveals it to be a somewhat complex body, although made up in the great mass of its bulk by muscular substance. Attached to the inferior maxillary bone in front, and to the hyoid behind, it yet moves with the greatest freedom and latitude in either direction, affording the idea that if it be muscular substance, it must be free

muscle set upon fixed muscle, and this is practically the case, as is understood by studying a dissection.

The muscular structure of the tongue is made up of five distinct pairs and certain non-attached fasciculi. The body, as its surface is concerned, is seen with a base looking backward into the pharynx, and a tip, which represents the apex of a pyramid. Beginning the study of the organ with its relations to the hyoid bone, we observe, first, that from that bone arises a muscle, the hyoglossus, which, passing almost directly upward, enters, with the stylo-glossus, the root of the body, and expands itself laterally and forward. Passing toward the centre of the bone, we remark a second muscle, the genio-hyoglossus, which, having apparent origin from the genial tubercles, radiates downward and upward, attaching one of its wings to the os hyoides, the other spreading out to assist in the formation of the tongue. The stylo-glossus, the third muscle, arises from the styloid process of the temporal bone, passes downward and forward, and occupies, or makes up, either lateral aspect from the tip to the bone. The fourth, the lingualis, seen between the stylo-glossus and genio-hyoglossus, passes from the tip to the base, having, indeed, some few of its fibres continued to the os hyoides. The fifth, the palato-glossus, is the muscle of the anterior half arch; it assists in forming the base and side. The unattached fibres are certain longitudinal and transverse bands running through the substance of the organ. The tongue, as an organ of nutrition, is adapted most happily, through its muscular character, to preside over the act of mastication, and, this process completed, to transfer the comminuted mass back into the grasp of the pharyngeal constrictors. Its ability and variety of action are comprehended by a moment's observation of the dissection.

Fig. 29, exhibiting the enlarged upper surface of the organ, discovers it covered with mucous membrane, dotted here and there with more or less regularly located papillæ, of varying size and character.

The mucous membrane envelops the tongue wherever the body has free surface. Above, it is dense, and affords support to the papillæ; below, it is exceedingly delicate, and is traceable through the ducts of the submaxillary and sublingual glands.

The papillæ, seen upon the dorsum, are cone-shaped projections of homogeneous tissue, holding arteries, veins, and nerves in plexiform arrangement; they are located in three separate sets, each having distinctive features.

The most posterior are the largest, and occupy a position which very much resembles the letter V; they may be likened to inverted cones, the apices resting in cup-shaped depressions of the mucous membrane, hence surrounded each by a valley. They are variously named, the maximæ or circumvallatæ. Of this class there are some fifteen. The elevated margins of the fossa surrounding these papillæ are studded with secondary papillæ. The structure of the bodies is accurately exhibited in the magnified drawing.

The papillæ fungiformes, or mediæ, are scattered somewhat irregularly over