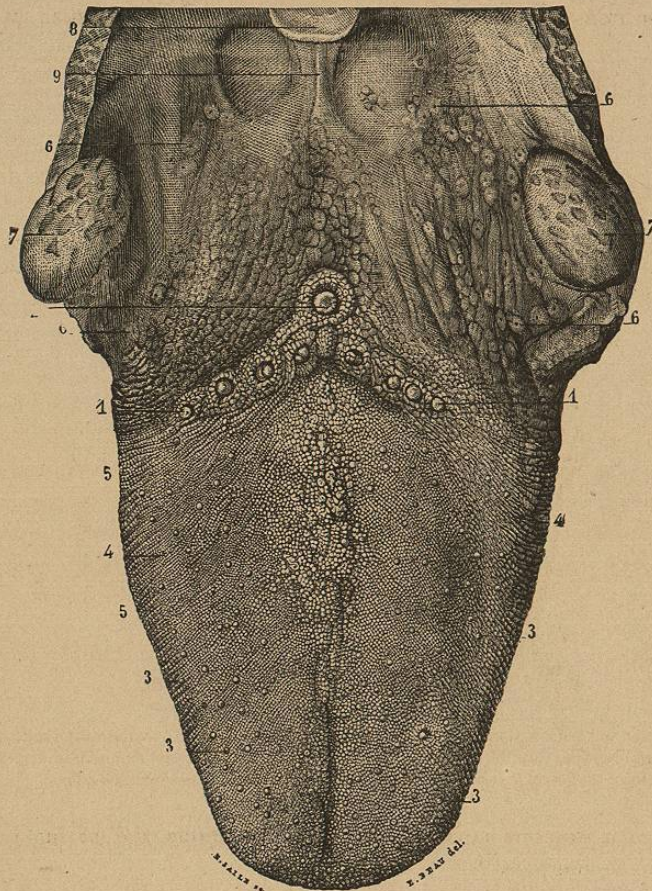


the sides and apex of the organ; they are exceedingly vascular, and closely covered with secondary papillæ; are broad and rounded on their free surfaces, narrow and pointed at their attachment to the tongue; their middle size and

FIG. 29.—UPPER SURFACE OF THE TONGUE.



1, 2, V-like row of the circumvallate papillæ; 3, capitate papillæ; 4, 5, conical papillæ; 6, 6', floor of the fauces, with numerous simple follicular glands; 7, tonsils; 8, summit of the epiglottis; 9, the middle glosso-epiglottic frænum, with depressions on each side bounded externally by the lateral fræna.

red color easily distinguish them. The magnified fungiform papillæ are seen in the drawing.

The smallest, or filiform, papillæ follow somewhat in their arrangement the order of the maximæ, being interspersed among the fungiformes. They are very minute, and covered so deeply with epithelium as to appear quite white; they are enveloped with secondary papillæ, as exhibited in the figure.

In the tongue, besides these papillæ, numerous mucous glands are found;

these bodies, scattered over the whole surface, secrete the ordinary mucus; they differ in no respect from mucous glands wherever situated. In the valleys surrounding the maximæ papillæ they are found in larger number than in any other portion of the organ.

A transverse section exhibits the tongue as composed of symmetrical halves, separated from each other by a fibrous septum, each half consisting, as seen,

FIGS. 30, 31.—PAPILLÆ OF TONGUE.

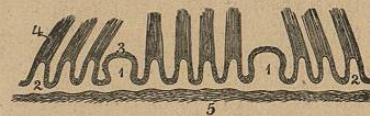


DIAGRAM OF THE PAPILLÆ OF THE TONGUE, moderately magnified. 1, capitate papillæ; 2, conical papillæ; 3, epithelium; 4, the same structure forming bunches of hair-like processes; 5, connective tissue.



PAPILLÆ OF THE TONGUE, highly magnified. 1, conical papillæ; 2, capitate papillæ; 3, simple papillæ, occupying the intervals of the compound papillæ; 4, epithelium ascending from the conical papillæ in hair-like processes; 5, isolated epithelial scales from the latter.

of muscular structure supplied with vessels and nerves, and having, in most cases, much interposed fat.

The tongue, being an organ of both special and common sense, is furnished with nerves of like signification. Thus the papillæ, at the apex and sides, are supplied with gustatory filaments from the third branch of the fifth nerve; the great papillæ and base of the organ, from filaments of the glosso-pharyngeal; the muscular structure, by the hypoglossal.

The arteries of the tongue are the lingual, branches of the facial, and ascending pharyngeal. The one of most signification is the first. This vessel, in its continuation known as the ranine, anastomoses with its fellow, just above the frænum, on the under surface of the organ, and is liable to be opened in the operation for tongue-tie; it is the second branch from the external carotid; it pursues a course parallel, for a short distance, with the

great horn of the hyoid bone lying between it and the hypoglossal nerve. Wounds of the tongue occasionally make the artery at this point the seat of ligation. (See *Ligation of Arteries*.)

The epiglottis, seen by depressing the dorsum, forms, practically, the base of the tongue; it is supported in the centre by a bridle, the frænum epiglottidis, and at either side by two duplications of the lingual mucous membrane, the glosso-epiglottic ligaments, or folds, as they are called; these boundaries form two lateral depressions, or fossæ, fossæ linguales, noticed as being so frequently the seat of the lodgment of foreign particles. (See *Diseases of the Tongue*.)

THE GUMS.—See *Diseases of the Gums*.

THE MUCOUS MEMBRANE.—Practically considered, the oral mucous membrane is to be viewed as commencing at the lips and terminating at the anus, so much is it in sympathy part with part. Anatomically, it is to be described as consisting of a plane of homogeneous tissue, underlaid by a vascular supply, the vessels being supported by and in cellular tissue. This basement membrane affords foundation to a covering of squamæ, or scales, known as the epithelium, and covers in tissues or organs which have offices of a recremental nature.

The tissues, beside the vascular, which underlie the mucous membrane, are the nerves, the lymphatics, and the papillary structure. The epithelium, the covering layer, is singularly various in its character, being in some parts columnar, in others squamous, in still others ciliated.

Commencing at the alveolar margin of the lower jaw, this membrane passes over the floor of the mouth, envelops the tongue on all its free surface, forming beneath, by its duplications, the frænum linguæ; from the back of the organ it is so reflected as to form the three glosso-epiglottic fræna; from this it lines the pharynx and larynx, and is then continued over the digestive and respiratory tracks, lining, in the latter, the very terminal vesicles.

The mucous cysts, or follicles, so plentifully scattered over the oral mucous surface, have, as their office, the secretion of a limpid fluid, which is commonly to be seen standing over the membrane as drops of cold sweat are observed on the forehead in typhoid conditions, the two, indeed, looking very similar. The constituents of mucus are, water, the peculiar organic principle called mucosin, and alkaline salts. Mucous glands are variously named, according to their location, as glandulæ labiales, buccales, etc.

Columnar epithelium consists of rod-like particles, crowded closely together, and bulged near the centre by a nucleus; this variety is found in the air-passages, on the intestinal villi, in the bile duct, and elsewhere. The scaly is found in the alimentary tract, as low as the stomach. The glandular seems to be a constituent of all the glands, being made up of particles bulky and globular. Ciliated epithelium is the columnar variety clothed with secondary particles.

THE SALIVARY GLANDS.

The salivary glands are of the conglomerate order, and are very well represented by an ordinary bunch of grapes. There is, first, a great number of lobules, each lobule being a miniature gland; from these come ducts, or channels of outlet, representing the grape-stems; these are all associated with a common branch or duct, which is the channel of outlet into the mouth.

PAROTID.—The parotid, the largest of the salivary glands, is situated in the hollow between the external ear and ramus of the inferior maxillary bone. Its weight varies considerably in different individuals, the mean being in the neighborhood of an ounce. The boundary of the gland above, is the zygoma; below, a line carried directly across from the angle of the jaw to the sterno-mastoid muscle. Dissected from its bed, the organ is found quite deeply seated; it extends above into the glenoid fossa of the os temporis, and below rests upon the styloid process and muscles, extending forward to the space between the two pterygoid muscles. It is exceedingly vascular, having embedded in it the external carotid artery, which here divides into the temporal, internal maxillary, transverse facial, and posterior auricular. The temporo-maxillary vein also traverses the structure, while the deep jugular and the internal carotid artery lie very close to its inner surface; it is also pierced by the facial and great auricular nerves. Externally, the gland is smooth, and has its lobes protected by a covering, very similar in appearance to the pia mater of the brain. Upon this covering lie two lymphatic bodies, the enlargement of which is often mistaken for disease of the gland itself. Covering the body are the parotid fascia, a reflection of the common deep fascia of the neck, the platysma myoides, fascia superficialis, and skin. The gland empties its secretion into the mouth through a duct known as that of Steno. This duct passes across the face between the superficial fascia and muscles, perforating the buccinator opposite the second molar of the upper jaw: a line, designating its position, and which is most important to be remembered, is drawn from the lobe of the ear to the middle of the upper lip. The duct is composed of firm and resisting tissue, is about the diameter of a crow-quill, and is some two inches in length; it consists of three coats,—an external, or fibro-muscular, an internal, or mucous, lined with ciliated epithelial scales, and a middle, or cellular coat. A glandular body, the associated parotid, is found related with Steno's duct; its location is just outside the perforation of the buccinator muscle by that tube. A tumor associated with the glandular bodies overlying the parotido-masseteric fascia is movable, one situated beneath the fascia is fixed. Tumefaction of the parotid itself shows at the angle of the jaw, otherwise inward toward the throat.

SUBMAXILLARY.—The submaxillary, the second in size of the salivary glands, is situated beneath the lower jaw in the superior cervical, or submaxillary triangle. The gland is somewhat of the size and shape of an almond-hull, and has a weight of two or three drachms; it is completely enclosed

in a triangular envelope, made by two leaves of the deep fascia attached below to the digastric tendon. Directly upon the gland, and within the envelope, are two lymphatic bodies, which are quite liable to take on inflammatory enlargement; these glands I believe to be pretty constant, as I have examined many subjects for them, and mostly with the common result of finding them. The so-called extirpation of the submaxillary gland is, most generally, the removal of one of these bodies enlarged through inflammatory action; these ganglia may be surgically viewed as being strictly non-vascular, a ligature being seldom needed in operations upon them. The gland, itself, on the contrary, is very vascular, the facial artery passing frequently directly through its substance, or so closely connected with the lower surface as to compel the division of it, or some of its large branches, before the body can be raised from its bed; the lingualis also sends branches to it. The veins correspond with the arteries. The gland is closely in relation with the parotid, behind, and the lingual, in front, being separated from the first by the stylo-maxillary ligament, and from the latter by the mylo-hyoid muscle. The duct by which the gland conveys its secretion to the mouth is some two inches in length; it passes between the mylo-hyoid and genio-hyoid muscles, and opens by the side of the frænum linguæ. It is the most common seat of ranula. It is called Wharton's duct.

SUBLINGUAL.—The sublingual is the smallest of the three glands; it rests directly beneath the mucous membrane, being between it and the mylo-hyoid muscle; its weight is about one drachm. The exact position of the gland, as it lies at the lateral aspect of the frænum linguæ, can be seen by raising the tip of the tongue; its bulk will be noticed by elevating the mucous membrane, upon which its excretory ducts, some twenty in number, open; these ducts are named Rivini, and are to be distinguished from one or more, called the Bartholin, opening into or near Wharton's duct. The lingual gland, when diseased, may frequently be removed with very little hemorrhage. The author has extirpated it without using a single ligature.

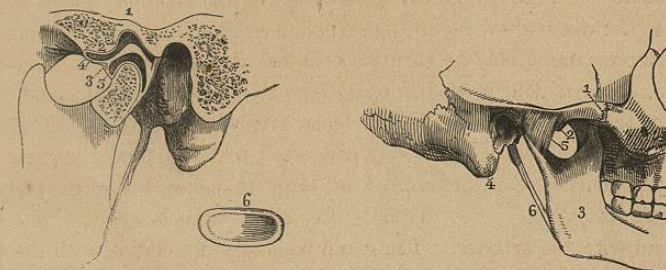
TEMPORO-MAXILLARY ARTICULATION.

The inferior maxillary bone articulates with the anterior portion of the glenoid cavity of the temporal, forming what is known as an arthrodial, or gliding joint. The direct composition of this joint consists of the convex condyloid head of the maxillary bone, the concave surface of the glenoid fossa, interarticular fibro-cartilage, a double synovial membrane, and a loose capsular ligament. (See engraving.)

The double character of the glenoid fossa, with its fissure of division, its articulating eminence in front, and the cartilage-covered condyle of the maxillary bone, is best understood by looking at the bones. The view represents the parts in position and in physiological relation. Above is seen the glenoid cavity; below, the condyle of the inferior maxilla; between, the interarticular fibro-cartilage, with a synovial, or lubricating, membrane lining each aspect

of the joint; the back part of a common capsular ligament is also exhibited, which, if completed, would be seen enveloping the whole joint.

FIGS. 32, 33.—VERTICAL SECTION OF TEMPORO-MAXILLARY ARTICULATION.



VERTICAL SECTION OF THE ARTICULATION OF THE LOWER JAW. 1, is placed above the glenoid cavity; 2, glenoid cavity; 3, interarticular cartilage dividing the joint into two cavities, 4 and 5; 6, an interarticular cartilage separated from a joint, to exhibit its form.

EXTERNAL VIEW OF THE TEMPORO-MAXILLARY ARTICULATION. 1, zygoma; 2, glenoid tubercle; 3, ramus of the inferior maxillary bone; 4, mastoid process; 5, external lateral ligament; 6, stylo-maxillary ligament, a process of the cervical fascia.

Back of the section is that portion of the cavity which lodges the upper part of the parotid gland.

The capsular ligament is an exceedingly loose sac, very much, indeed, like the capsule of the humero-scapular articulation; it is attached above to the circumference of the glenoid cavity, and in front to the articular root of the zygoma; below, it clasps the neck of the bone just beneath the head.

The interarticular fibro-cartilage is an ovoid plate placed between the two bones. It is supported in its position by a more or less perfect circumferential attachment to the common capsule, the external lateral ligament, and to the tendon of the external pterygoid muscle: below, its face is concave, corresponding with the convexity of the condyle; above, it is concave in front, convex behind, corresponding with the glenoid cavity proper, and the eminentia articularis. In composition the circumference is markedly fibrous, shading off to a cartilaginous centre frequently quite soft and sometimes perforated.

The synovial membranes, placed, as seen in the view, one above, the other below the interarticular fibro-cartilage, are the ordinary lubricating membranes of closed cavities; they may very well be likened to two simple bags, with parietal attached faces. These bags secrete the synovia, a fluid which looks not unlike the white of an egg, but which is much more oily and resistive in its nature.

From the spinous process, seen on the great wing of the sphenoid bone, a ligament, the internal lateral, descends to be attached to the inner face of

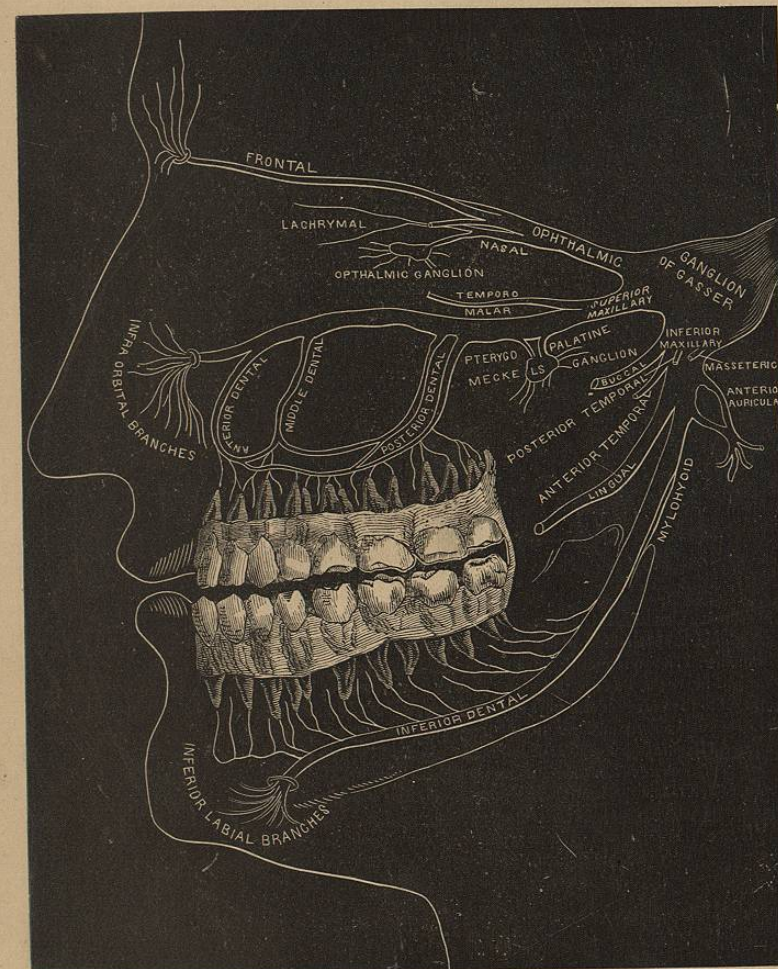
the ramus. Behind, from the styloid process of the os temporis, a second, the stylo-maxillary, passes to be inserted just above the angle.

The external lateral ligament is a short, somewhat triangular-shaped band of fibrous tissue, having origin from the zygoma; passing obliquely downward and backward, and inserted about the neck of the condyle. Just below the head it lies in contact with the lateral aspect of the interarticular fibro-cartilage and assists in forming, or at least in thickening, the common capsule. Externally, it is quite superficial, being covered only by the integuments, except in instances where the upper border of the parotid gland spreads over it. The importance of the character of this articulation renders necessary its careful study by direct dissection.

CHAPTER III.

FIFTH PAIR OF NERVES.

FIG. 34.—OUTLINE DRAWING EXHIBITING AT A COMMON VIEW THE DISTRIBUTION OF THE FIFTH PAIR OF NERVES.



THE Fifth is an encephalic nerve,—that is, it comes off from that portion of the cerebro-spinal centre lying within the cranium. It is called the fifth,