

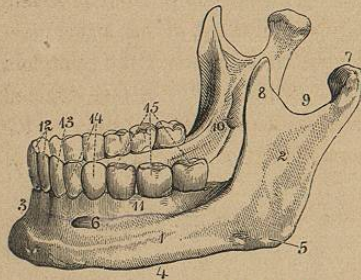
A superior maxillary bone articulates with nine others: by its nasal crest with the frontal, ethmoid, lachrymal, and nasal; by its malar process with the malar; at the intermaxillary suture with the opposite maxilla; by its palate process with the palate and vomer, and by the lower of its lateral crests with the inferior turbinated bone.

Nine muscles have their origin from this bone: the orbicularis palpebrarum, the inferior oblique of orbit, the elevator of superior lip and wing of nose, the proper elevator of lip, the angular elevator, the compressor naris, the depressor of the ala, the masseter, and the buccinator.

INFERIOR MAXILLARY BONE.

The inferior maxilla, Fig. 4, the largest and strongest bone of the face, consists of a body (1), horseshoe in shape, and of two rami (2), joined to the body at right angles. The body, which is the anterior portion, is surmounted by a process of more or less spongy bone, excavated for the reception of the teeth; this is the alveolar process. The basement portion of the body, or that part beneath the alveolar process, is made up of a dense structure, and

FIG. 4.—INFERIOR MAXILLARY BONE.



1, body; 2, ramus; 3, symphysis; 4, base; 5, angle; 6, mental foramen; 7, condyle; 8, coronoid process; 9, semilunar notch; 10, inferior dental foramen, the entrance of the corresponding canal; 11, alveolar border; 12, incisor teeth; 13, canine tooth; 14, premolars; 15, large molars.

is so hard and resisting as to be able to withstand very considerable blows. The rami, curved and angular at the base, terminate above in two processes: the condyloid (7), for articulation with the glenoid cavity in the temporal bone, and the coronoid (8), for the attachment of the temporal muscle. The angle of relation of the perpendicular to the horizontal portion of the bone varies with age. In early infancy it is very obtuse; indeed, the two portions are nearly on the same plane. In adult life a right-angled relation is obtained, and this changes again to the obtuse as age advances, and the teeth are lost. Taking advantage of a knowledge of these changes, the surgeon is enabled to correct, in young life, the great deformity of an unduly projecting lower jaw.

Looking at the external face of the body, attention is first attracted by a prominent foramen situated beneath the bicuspid teeth. This foramen is called the mental (6), from it pass out, to be distributed to the lip and gum, the inferior dental artery and inferior dental nerve (see Fig. 6); the situation of the foramen represents the line of relation between the hard and spongy portions of the bone. It is at this opening that section of the nerve is occasionally made for severe and resisting labial neuralgia. A bristle passed into this foramen, and inclined backward, is directed along a canal at the base of

the teeth, and emerges at a second foramen, the dental, situated on the inner face of the ramus. Passed forward, it enters a smaller canal, which continues under the central teeth, carrying to these organs branches of the nerve and artery. An oblique line—the external oblique, as it is called (Fig. 1 is just below it)—fairly divides the surface of the body into two triangles. This line is for the attachment of muscles, and accommodates, in part, the buccinator, the depressor anguli oris, and the depressor labii inferioris. In old persons, after falling of the teeth, and absorption of the alveolar process, the line is found to run almost along the upper surface. All that portion of the bone which is above the ridge belongs to the facial region proper; all below it, to the cervical region. The centre vertical line, called the symphysis (3), represents the separation, or division, existing in the young bone, union of the two halves not occurring until about the end of the first year. The levator menti muscle has its origin from a fossa at the side of this line. The mental process, the tubercle at the base of the symphysis, is only a thickening, for the greater strength of the part. Viewed from above downward, the body of the lower jaw is concave; from behind forward it is convex.

The external face of the ramus, or perpendicular portion, of the bone, exhibits a quadrilateral aspect, broken above by a notch, the semilunar (9), which separates the two projecting processes. The anterior of these processes (8), the coronoid, is a thin, flattened, triangular eminence, giving attachment to the masseter and temporal muscles. The posterior eminence, the condyloid process (7), is an oval projection, convex and smooth, with its face covered with articular cartilage, and having its greatest width from side to side. This process articulates the bone with the temporal, and is occasionally the seat of fracture and luxation.

The internal face of the bone presents the same general view as the external.

A ridge, the mylo-hyoid, divides the body by its obliquity into two parts. To this ridge is attached, or rather from it has origin, a muscle bearing the same name. This muscle, with its fellow of the opposite side, forms the floor of the mouth, the two joining at the median line, so that looking at the line one sees exactly how much of the bone is within and how much without the oral cavity. Just below the line, about midway of the body of the bone, is seen a fossa or depression, the submaxillary, for the accommodation of the gland of this name. The mesial line, or symphysis, presents on either side two tubercles, called the genial tubercles, to which are attached the genio-hyoglossi and the genio-hyoideus muscles. Outside of these tubercles, on either side, are two fossæ for the lodgment of the sublingual glands; these fossæ are called by the name of the glands. It will be observed that as these fossæ lie above the ridge, the lingual glands must be within the mouth, while the submaxillary fossæ being below it, those glands are without the cavity. One most important feature to remark is the relation of the anterior border of the vertical portion of the bone to the molar teeth. It not infrequently hap-

pens that this border so nearly approximates the second molar that there is no room for the eruption of the third; formidable inflammations sometimes result from such a cause, the crown of the tooth being held down under the ramus.

A marked feature of difference between the internal and external face of the ramus is the existence in the former of a large foramen, the posterior dental, for transmission into the canal alluded to, as passing beneath the teeth, of the inferior maxillary vessels and nerve (see Fig. 5). A groove, the mylo-hyoid, transmits to the muscle of the ridge an artery, which comes from the inferior maxillary just as it is about to enter its canal. Attached to the border and internal face of the coronoid process is the tendinous expansion of the temporal muscle, while to the face of the condyloid process is attached the pterygoideus externus, the internal pterygoid being related to the angle. The semilunar depression, or notch, separating the two condyles, is crossed by the masseteric artery and nerve, while in its immediate proximity are the internal carotid and internal maxillary arteries.

Fig. 5 affords a view of the inner face of this bone, as reference is had to the mylo-hyoid ridge, or line. All that portion of the jaw which is above this line, marked "Facial," is within the mouth, consequently is mucous lined; the part below, marked "Cervical," is without the oral cavity, therefore non-mucous.

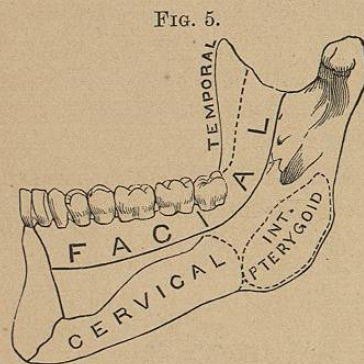


Fig. 6 shows the maxillary region uncovered, the outer or cortical plate both of superior and inferior jaws being removed. In the drawing is to be appreciated the relation of the spongy, or alveolar processes, to body of the bones; also the relation of the roots of teeth to this process and to each other.

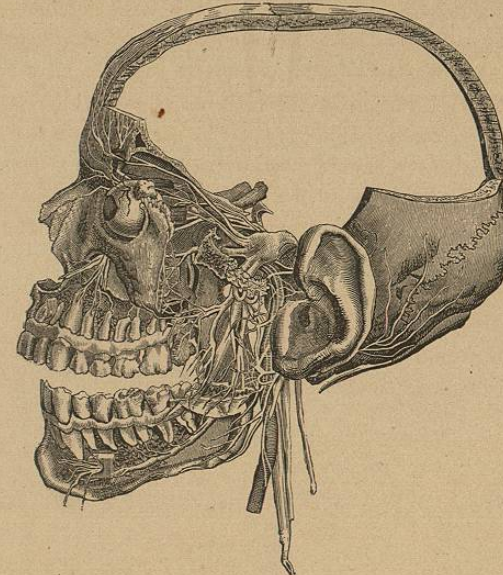
In the lower jaw is exhibited the position of the dental canal occupied by its vessels, a square of plate being left to show the anterior mental foramen, and the manner of escape from the canal of its vessels. The stippled part is alveolar process; the unstippled, bone proper. Alveolar process is to be accepted as related to the teeth rather than to the bone; it disappears on loss of the dental organs.

THE PALATE BONE.

The palate bone, when in position, forms the back part of the hard palate, a portion of the floor and side of a naris, and a part of the orbital cavity. It also enters into the formation of three fossæ: the zygomatic, the sphenomaxillary, and pterygoid. Like the inferior maxilla, the bone consists of two portions: one horizontal, the other at right angles with it, or vertical. The horizontal portion is irregularly quadrilateral, presenting two surfaces and

four borders: the upper of the two surfaces is concave, and forms the back part of the floor of a naris; the lower, or under surface is also concave, and

FIG. 6.

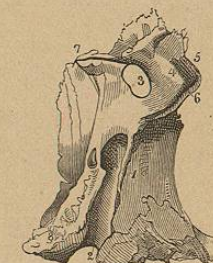


forms the back of the hard palate. The suture of connection with the maxillary bone is always plainly seen; it is called palato-maxillary suture.

FIGS. 7, 8.—PALATE BONE.



POSTERIOR VIEW OF THE RIGHT PALATE BONE.
1, palate plate; 2, nasal plate; 3, pyramidal process; 4, articular border for the left palate bone; 5, palate spine; 6, ridge for junction with the turbinated bone; 7, sphenopalatine notch, between 8, the orbital, and 9, the sphenoidal process; 10, groove for the internal pterygoid process of the sphenoid bone; 11, position of the posterior palatine foramen.



EXTERIOR VIEW OF THE RIGHT PALATE BONE.
1, rough surface articulating with the superior maxillary bone, and diminishing the aperture of the maxillary sinus; 2, posterior palatine canal, completed by the tuberosity of the superior maxillary bone; 3, sphenopalatine notch; 4, 5, 6, orbital process; 4, surface directed toward the pterygo-maxillary fossa; 5, orbital surface; 6, maxillary border; 7, sphenoidal process; 8, pyramidal process.

In glancing at a disarticulated palate bone, holding its posterior face in

profile, it is seen very markedly to resemble the letter L. Studying it from such position in detail, we remark, first, the spine, situated at the base of the interpalatal suture, and which gives attachment to one of the motores uvulæ muscles; passing toward the vertical portion, the concave character of both nasal and palatine faces is observed, the former much more marked than the latter. This nasal concavity is seen to end at a crest, or ridge, on the vertical portion. This ridge is the most posterior articular surface of the inferior turbinated bone; the space below it is a part of the inferior meatus. The base of the vertical portion is pyramidal, and ends in a tuberosity called the pterygoid process, its articulation being with the pterygoid plates of the sphenoid. At the back part of this process are seen three grooves; the middle one, wide and smooth, forms part of the pterygoid fossa, and gives attachment to the internal pterygoid muscle; the two lateral are rough and uneven, and articulate with the anterior border of each pterygoid plate.

Passing upward, a prominent feature is the sphenoid process. This is a comparatively thin plate, made up of an articular and non-articular surface, a groove and a notch. The articular surface associates the plate with the sphenoid bone; the non-articular enters into the composition of the zygomatic fossa. The groove contributes to the formation of the pterygo-palatine canal; and the notch, closed in above by the orbital process, forms the greater part of the sphenopalatine foramen. This process also contributes, by one of its surfaces, to the lateral wall of the nasal fossa.

The orbital process, resting on the sphenoidal, is composed of five plates, or surfaces, and includes a cavity. Of these processes, three are articular, two, free surfaces. The articular are the maxillary, the sphenoidal, and the ethmoidal, associating the process with the bones named. The free surfaces are the orbital, forming a small part of the orbital cavity, and the zygomatic, entering into the composition of the zygomatic fossa.

Looking on the inner face of the bone, we remark, first, the articular process. This process, or surface, associates the bone with its fellow of the opposite side; above, it forms, with its neighboring piece, a ridge receiving the vomer. The body of this face seems made up of two great concavities, with a separating ridge. This ridge articulates the inferior turbinated bone; the concavity above is part of the middle meatus; that below, part of the inferior meatus; the ridge or crest is called the inferior turbinated crest. A second crest, situated at the upper boundary of the middle meatus, articulates the lower scroll of the ethmoid, or the middle turbinated bone. This is called the superior turbinated crest. Just below it is seen the now perfected notch in the sphenoidal process, the sphenopalatine foramen, for the transmission of the vessels and nerve of that name. Above the superior crest is seen the posterior part of the superior meatus, a horizontal groove, bounded above by the lower border of the ethmoidal face of the orbital process.

The orbital process, seen from this side, presents three surfaces: the maxillary in front, the orbital above, and the ethmoidal internally.

The lateral surfaces of the bone are almost entirely articular. That looking forward associates in its full length with the superior maxillary bone; that looking backward, with the sphenoid, through its pterygoid processes. This very full articulation with these two bones leads the anatomist to speak of the palate bone as being wedged between, and supported by them.

The articulations of the palate bone are with seven others: the superior maxillary, the inferior and superior turbinated, the vomer, the sphenoid, the ethmoid, and its fellow of the opposite side.

The muscles attached to it are the tensor palati, the motores uvulæ, and the internal and external pterygoid.

THE VOMER.

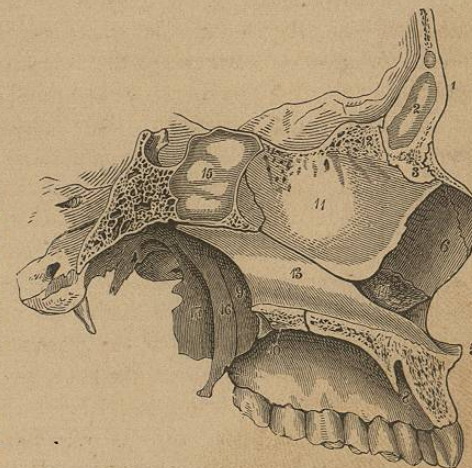
The vomer, ploughshare-shaped, constitutes a portion of the septum of the nose. It articulates below with the interpalatine suture of the superior

FIG. 9.—THE VOMER.



VIEW OF LEFT SIDE. 1, 1, broad groove receiving the rostrum of the sphenoid bone; 2, 2, inferior border articulating with the palate plates of the superior maxillary and palate bones; 3, posterior border, the dividing line of the posterior nares; 4, 4, groove border receiving a narrow slip of cartilage, situated between the vomer and the nasal plate of the ethmoid bone; 5, 5, border for the cartilaginous septum of the nose; 6, 6, nasal surface.

FIG. 10.—ARTICULAR RELATIONS OF VOMER.



VERTICAL SECTION OF THE FACE, exhibiting the osseous nasal septum. 1, frontal bone; 2, frontal sinus; 3, nasal spine of the frontal bone; 4, nasal bone; 5, nasal spine of the superior maxillary bone; 6, nasal process of the same bone; 7, border of the palate plate of the same; 8, incisive foramen; 9, left posterior naris; 10, palate plate of the palate bone; 11, nasal plate of the ethmoid bone; 12, ethmoidal crest; 13, vomer; 14, left turbinated bone; 15, sphenoidal sinus; 16, internal pterygoid process; 17, external pterygoid process.

maxillæ and palate bones; above, with the perpendicular plate of the ethmoid; by its base with the laminae and rostrum of the sphenoid bone; in front it associates with the triangular cartilage. Posteriorly it separates the nares. The naso-palatine groove, seen running from the base, forward and downward, toward the triangular cartilage, transmits the naso-palatine nerve to the interpalatine canal.

Occasionally it is the case that the vomer is found markedly bent to one side or the other, and this to such an extent as completely to obliterate one of the nares, requiring an operation for relief. The vomer is also subject to

syphilitic attacks, and frequently breaks down, allowing the arch of the nose to fall in.

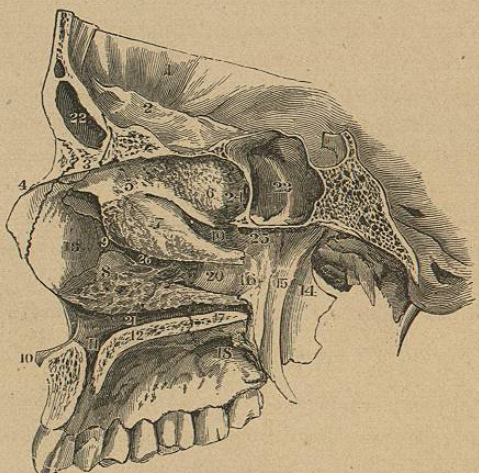
The articulation is seen to be with six bones: the two superior maxillary, the two palate, the sphenoid, and the ethmoid; also with the cartilaginous septum; this last not shown in the view, but occupying the position of the triangular break.

TURBINATED BONES.

Running across the lateral face of each nasal cavity are three scrolls, known as the turbinated bones. Of these scrolls, the two upper are simply processes, or portions of the ethmoid bone; the lower is a distinct piece; it is called the inferior turbinated bone.

Observing the relations of these scrolls, it is remarked that each curves over

FIG. 11.—POSITION AND RELATIONS OF TURBINATED BONES.



VIEW OF THE OUTER WALL OF THE RIGHT NASAL FOSSA. 1, frontal bone; 2, its orbital plate; 3, its nasal spine; 4, nasal bone; 5, ethmoid bone; 6, its upper turbinated process; 7, its lower turbinated process; 8, turbinated bone; 9, process of the lachrymal bone, within the position of which is the lachrymo-nasal duct; 10, nasal spine of the superior maxillary bone; 11, naso-palatine canal; 12, palate plate of the superior maxillary bone; 13, nasal process of the latter; 14, external pterygoid process; 15, internal pterygoid process; 16, nasal plate of the palate bone; 17, its palate plate; 18, posterior palatine foramen; 19, superior meatus of the nose; 20, middle meatus; 21, inferior meatus; 22, frontal sinus; 23, sphenoidal sinus; 24, its communication with the upper back part of the nose; 25, spheno-palatine foramen; 26, orifice of the maxillary sinus.

a portion of the sides of a naris. A space thus enclosed is called a meatus. The lower, or inferior of these cavities is bounded below by the floor of the nose; above by an inferior turbinated bone. An opening seen about its middle is the outlet of a lachrymal canal. The middle meatus is the space bounded below by the upper surface of an inferior scroll; above by the lower surface of a middle scroll. A foramen seen in this meatus is the outlet of the antrum. The superior meatus is the slit seen between two upper scrolls.

The distinct, or inferior turbinated bone, is a thin, spongy scroll; it has a base of attachment the whole length of the lower crest seen on the nasal surfaces of the maxillary and palate bones; the opposite, or inferior edge, is free, and lies in the middle of the inferior meatus. Viewed from its inner surface, the bone presents a most irregular appearance, being perforated with numerous apertures, sulci, and grooves, for the accommodation of arteries and veins. Two processes, the lachrymal and the ethmoid, are seen to break the regularity of the upper convexity. The anterior—the lachrymal—articulates with the inferior angle of the lachrymal bone, and with the nasal crest of the maxillary bone, thus assisting in forming the lachrymal canal. The posterior—the ethmoidal—articulates with the descending unciform process of the ethmoid bone.

Turning here the bone, we see a third process, or division as it were, made in the ethmoidal. This process is called the maxillary. It curves downward within the inferior meatus, assisting in filling up the antral orifice, and in its attachment, steadies the bone firmly on the side of the naris. Externally, the general appearance of the bone is concave; internally, or looking toward the septum narium, it is convex. If the external surface were convex, and the processes absent, the bone might very well be likened in shape to the Indian stone arrow-head.

The turbinated bone is very subject to specific inflammation, which inflammation, if not judiciously combated, is apt to end in its death.

The bone articulates with four others: the ethmoid, the lachrymal, the maxillary, and the palate. No muscles are attached to it.

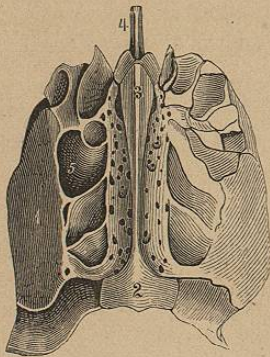
THE ETHMOID BONE.

A horizontal cribriform plate of bone, with a crest along its middle; a perpendicular plate dropping down from the centre of this first piece; two little oblong square boxes, hung on either side of the perpendicular plate, leaving the space of a narrow slit between the boxes on either side and the plate, and we have the complete idea of an ethmoid bone. Looking at the piece from above, we remark, first, the crest—*crista galli* it is called—giving attachment to the *falx cerebri*. On either side of this crest is seen a depression perforated with a number of foramina. These depressions lodge the olfactory bulbs, and the foramina transmit to the nose the olfactory filaments, the three sets having corresponding foramina. A slit seen at the side of the *crista galli* transmits the nasal branch of the ophthalmic nerve. Looked at anteriorly, the crest is seen to terminate in two little horns, or wings; these articulate with depressions in the *os frontis*, and occasionally in a manner so imperfect as to leave an opening, or foramen. When existing, this foramen accommodates a nasal vein, which passes upward, to terminate in the longitudinal sinus; the rupture of this vein, discharging the sinus, has saved many a life in congestive attacks of the brain.

The perpendicular plate, exhibited by the removal of one of the lateral

masses, is simply a thin layer of bone. This, descending in the middle line of the nose, assists the vomer in separating that cavity into two lateral halves. In front, it is received into the groove between the two nasal bones; below, it looks downward and forward, and receives the triangular cartilage; back of this it articulates with the vomer, and still farther back with the sphenoid.

FIG. 12.—ETHMOID BONE.
—GENERAL VIEW.



1, orbital surface of the lateral mass; 2, posterior extremity of the cribriform plate, which unites the lateral masses, and is depressed and perforated with numerous foramina on each side of the ethmoidal crest; 3, the two oblique processes in advance of the latter are the ethmoidal wings; 4, anterior extremity of the nasal plate; 5, the ethmoidal sinuses.

tion and fulness known as "cold in the head."

The outer surface, or face of the boxes, looks very much in color like the common clarified quill, is semi-translucent, is square in shape, and very smooth. Referring to the view of the skull (Fig. 1), this surface will be seen entering into the composition of the orbital cavity.

The portion of the ethmoid which receives and articulates the process passing upward from the inferior turbinated bone is a hook-like projection from the under surface of these lateral masses. It is called the unciform process, and assists in narrowing the orifice of the antrum and supporting the masses.

The internal surface of each lateral mass approaches the perpendicular plate. At the upper part is the narrow fissure, bounded by a scroll-like process on the surface, known as the superior meatus. The scroll has received the name superior turbinated bone. Below this first scroll, on the same surface, is a second. This second scroll is called middle turbinated bone, and the space below it, between it and the inferior turbinated bone, is the middle meatus.

In looking at the ethmoid bone in position, it is seen to be wedged in between the nasal, frontal, lachrymal, and maxillary bones in front, and the

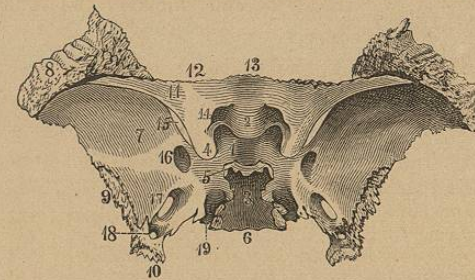
sphenoid behind; below it is supported by the turbinated, vomer, and palate bones. Maxillary diseases find easy road to the base of the cranium through the nasal communication with the ethmoidal cells.

THE SPHENOID BONE.

The sphenoid bone, named from its wedge-like relations to other bones of the cranium, has been frequently and not inaptly compared in appearance to a "bat" with extended wings, and unflexed legs.

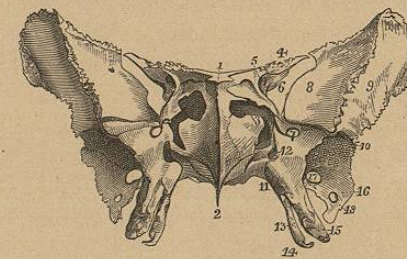
In looking at the disarticulated bone, we first observe a central portion, or body; this body is irregularly square, and marked on all its surfaces with fea-

FIG. 13.—SPHENOID BONE.—UPPER VIEW.



1, pituitary fossa; 2, olivary process; 3, declivity; 4, anterior clinoid process; 5, posterior clinoid process; 6, posterior border of the body; 7, cerebral surface of the great wing; 8, articular surface for the frontal bone; 9, articular border for the temporal bone; 10, spinous process; 11, small wing; 12, border articulating with the orbital plate of the frontal bone; 13, border joining the ethmoid bone; 14, optic foramen; 15, sphenoidal foramen; 16, rotund foramen; 17, oval foramen; 18, spinous foramen; 19, groove for the internal carotid artery.

FIG. 14.—SPHENOID BONE.—FRONT VIEW.



1, 2, sphenoidal crest and rostrum for joining the nasal plate of the ethmoid bone and the vomer; 3, entrance of the sphenoidal sinuses; 4, small wing; 5, optic foramen piercing its base; 6, sphenoidal foramen; 7, rotund foramen; 8, orbital surface of the great wing; 9, temporal surface of the same; 10, ridge separating the temporal and sphenoid-maxillary fossae; 11, position of the pterygo-palatine canal; 12, pterygoid canal; 13, internal pterygoid process, ending in a hook; 14, 15, external pterygoid process; 16, spinous process; 17, oval foramen; 18, spinous foramen.

tures which one at once infers to be possessed of anatomical significance. Extending laterally on either side from the body are two great wings; these wings are made double by a lacerated foramen, and instead of being spoken of and described as a single pair, are mostly viewed as two pairs,—the larger

portion being called the greater, the smaller the lesser wings. The legs, falling from the base of the cranium, are found separated by a notch into two portions,—this separation being much more marked behind than in front: they have received the name of pterygoid processes.

Beginning a study of the body from its superior, or cranial surface, attention is first naturally attracted to a saddle-like depression occupying a large portion of the face. This depression lodges a little body attached to the floor of the third ventricle, the pituitary body; hence it is called by many authors the pituitary depression, or fossa; and from its resemblance to the Turkish saddle it is as frequently named the sella turcica. A number of little pits seen on the floor are foramina transmitting vessels of nutrition. On either side are two processes; these correspond to two others, terminating the plate of bone which represents the back of the saddle. The four have been compared to the posts of a bedstead, and are called clinoid processes. Passing forward, an olive-shaped eminence is next noticed,—the olivary process; and directly in front of this, a groove, or oblong fossa. This groove has resting in it the commissure of the optic nerve, and hence is called the optic groove. Passing directly forward, we find the surface terminate in a spine, or projecting point; this point articulates the surface with the ethmoidal bone, and is called the ethmoidal spine; between this spine and the optic groove is a slight eminence falling off on either side into a line of depression; these lines lodge the olfactory nerves. Two foramina, seen on this surface at either terminus of the optic groove, are called optic foramina; they transmit to the orbital cavities the optic nerves and ophthalmic arteries. From the back of the saddle the surface is seen to slope gradually downward; this concave plane lodges the medulla oblongata, and terminates at a line of union with the occipital bone. On either side is situated a tortuous depression, in which lie the internal carotid artery and the cavernous sinus.

Turning now to the anterior surface, there is first observed a rostrum, or beak, for articulation with the perpendicular plate of the ethmoid. On either side of this beak are seen scrolls of bone, or rather lamellæ,—the sphenoidal turbinated bones, as they are called. These lamellæ imperfectly close sinuses which hollow out the substance of the body, and which, in articulation, are found to communicate with the upper part of the nose, and frequently with the ethmoidal cells; being lined with the mucous membrane of the nares, and subjected consequently to the sympathies of continuity.

The inferior surface presents, first, the rostrum or beak; continued from the anterior face this spine is received into a groove, or fissure, in the vomer. On either side are laminae of bone, which pass to the pterygoid processes; these plates, or laminae, are called vaginal processes. Close to the pterygoid process is seen a groove, which the sphenoidal process of the palate bone converts into a canal; this groove transmits the pterygo-palatine vessels and pharyngeal nerve.

The posterior surface exhibits simply a quadrilateral sawed surface, union

existing with the occipital at this point, which has required the saw for its separation. Because of such union it is common with many writers to consider the sphenoid and occipital as one piece, and to refer to them as the sphenoid-occipital bone.

The wings, claiming attention next, are called the greater and lesser, the separation existing at the lacerated foramen. The greater wings extend laterally, and assist largely in forming the floor of the fossæ which receive the middle lobes of the brain. Looked at from the encranial aspect, the sight is first attracted to six foramina,—three on either side. The first of these is a round hole, and is called the foramen rotundum; it transmits from the brain to the superior maxillary bone the second branch of the fifth nerve. The second hole is oval in shape; hence called foramen ovale: it transmits the third, or inferior maxillary branch of the fifth. The third, the foramen spinosum, transmits the middle meningeal artery. A fourth foramen is occasionally found in the great wing,—the vesalli. When existing it is occupied by a small vein. The general floor of these wings is concave, and is marked with elevations and depressions for the accommodation of neighboring convolutions.

Turning the bone, these wings are seen to be made up of three surfaces: the encranial face, as just described; an external surface, occupying, when in articulation, a place in the base of the skull; and an orbital surface.

The external surface is irregularly convex, and is separated into two portions by a ridge called the pterygoid. The superior of these two faces is seen entering into the composition of the temporal fossa for lodgment of the temporal muscle. The inferior face lies beneath the zygoma, and forms part of the fossa of this name, giving attachment to the external pterygoid muscle. Running from the postero-lateral angle of the surface is seen a prolonged spine: to this are attached the laxator tympani muscle and the internal lateral ligament of the lower jaw.

The orbital face of the wing assists in forming the outer boundary of the orbit; it is quadrilateral in form, smooth, and concave. Below, it has a somewhat rounded border, and enters into the formation of the sphenoid-maxillary fissure; internally, it assists in defining the sphenoidal fissure. At the lower edge of the inner border is a delicate spine, giving origin to one head of the external rectus muscle. The foramina seen on this face are called orbital foramina: they transmit small arteries.

The lesser wings, frequently described as the processes of Ingrassias, are seen on the encranial surface, extending outward, overlying at their apices the great wings. These wings are triangular in shape, having their bases associated with the body of the bone. In articulation they complete the posterior boundary of the anterior fossæ of the cranium, and are lodged in the fissure of Sylvius. The fissure, or slit, which separates them from the great wings, is called the lacerated foramen. It transmits the first, or ophthalmic branch of the fifth nerve, the third, fourth, and sixth nerves, and the ophthalmic vein. The lesser wings are connected with the body by two footstalks, en-