A compendium of osteology; being a systematic treatise on the bones of the human body: designed for the use of students; To which is subjoined an improved method of preparing bones for osteological purposes / [George Witt].

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A

COMPENDIUM OF OSTEOLOGY.

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COMPENDIUM OF OSTEOLOGY;

BEING A SYSTEMATIC

TREATISE ON THE BONES OF THE HUMAN BODY:

Designed for the Use of Students.

TO WHICH IS SUBJOINED AN IMPROVED METHOD OF PREPARING BONES FOR OSTEOLOGICAL PURPOSES.

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"PROMETHEVS HVMANI CORPORIS SCELETON FINGENS."—*Montfaucon.*

LONDON:
LONGMAN, REES, ORME, BROWN, GREEN, AND LONGMAN, PATERNOSTER ROW;
AND WHITE, BEDFORD.

MDCCCXXXIII.

PRINTED BY W. WHITE,
HIGH STREET, BEDFORD.

PREFACE.

In professing to set forth a systematic description of the bones, it may be necessary to explain the grounds upon which it is founded.

In the following Tables an attempt has been made to convey a methodical knowledge of Osteology—the result of a practical mode of teaching this branch of anatomy. This mode consists in taking up each bone in succession, and placing and retaining it in one given and fixed position until the different parts presented to the eye—whether processes, foramina, or grooves—are *read off* in this lucid order and succession. The bone is then turned as upon a given axis, to bring into sight a fresh collection of parts. The advantage of this simple plan can scarcely be imagined without actual experiment.

In describing any bone care must be taken not to pass over a single point enumerated, whilst it is retained in its first position; and when every part shall have been described in that view, it then must be turned to its next aspect. Every thing depends upon this careful CONSECUTIVE description; and when the knowledge of a bone shall have been acquired after this method, it will be really difficult for any part to escape notice, or fail to be impressed upon the memory; the eye forms a correct picture of the bone—the mind seizes the arrangement—and the memory retains the classified knowledge thus systematically acquired. In practice, the bone, the os occipitis for instance, should be held steadily with the left hand, presenting to view the first-mentioned part in the table; the right hand should hold a probe or some sharp instrument to point out the parts. In the occiput, the tubercle is the first part to be noticed—hence a posterior aspect of the bone is chosen:

in this view we have exposed the first six parts in the table; then by moving the bone a little, so as to bring the condyles uppermost, the remaining three parts on the external surface will be exposed; the bone must next be turned round to its internal surface, which turn alone will bring into view the remaining seven parts of the os occipitis. Care must be taken to describe from above downwards, and to follow scrupulously the arrangement in the table.

In the description of each of the bones of the head, a certain formula has been steadily observed, commencing with the "*Situation*," "*Connexion*," and "*Use*"; but in that of the bones of the trunk and of the extremities, it has been found expedient now and then to deviate from this arrangement; and here it may be remarked on systems in general, that they are useful only so far as they tend to facilitate the acquirement of any science; but that as soon as this object is lost sight of, they become a clog upon the subject which they were primarily intended to elucidate. Accordingly, a certain system, when available, has been here employed, and regarded as a valuable auxiliary, but immediately that it has been found not to be adapted to the purpose, it has been laid aside, and made to re-appear on a future and more fitting occasion.

The description of each bone is arranged in two columns: in the first are the general parts, as the foramina, ridges, processes, &c.—in the second, a brief and comprehensive enumeration of the uses of those parts. It is not to be understood that all their uses and functions are described; these must be sought in works on general anatomy; such only are noticed as are most important and useful to be remembered in connexion with the osteological structure.

In regard to some bones, and more especially those of the head, it is to be observed that every specimen will not exhibit clearly all the parts described. In some, one part is found well developed, while in others, owing to the varying course of the arteries, and other causes, we find the same object hardly visible. It is therefore only in a large assortment of bones, with various sections, and specimens of different ages, that we can hope to obtain a good view in every case.

In making use of the Questions, which follow each division of the Table, the bones of that division of the skeleton should lie before the student, and the eye should, with each answer, be directed to the spot to prove its correctness: in this way the subject is indelibly fixed on the memory.

All learners in Osteology will admit that the first steps are beset with difficulties, which render the study of this most important branch of anatomy a dry and tedious labour. Among the first of these may be ranked the task of committing to memory a certain number of barbarous inappropriate terms, having scarcely any apparent connexion with each other, and often ill-adapted to the subject; and with however great difficulty this knowledge may have been acquired, it has been considered almost an impossibility to retain it for any useful period, without constantly refreshing the memory. Such knowledge is nothing more than a collection of unconnected sounds—to render them available, and to impress them upon the memory, they must be properly associated with some fixed idea—the mind must instantly, and as if involuntarily, picture to itself the image of the object intended to be described.

There is perhaps no branch of anatomy which more deserves the reproaches that have been cast on the science, generally, as to the barbarism of its terms, than Osteology. It is a matter more to be lamented than wondered at, when we take into consideration the objects from which many of our early anatomical terms were derived. Some are in bad Latin, others in equally bad English; and although it is generally admitted, that it is very desirable to do away with such an opprobrium in the present state of the science, yet the matter is so fraught with difficulty that it hardly seems practicable. The following arrangement was commenced some years ago; and, with a desire to maintain consistency, none but English names were made use of; but the occurrence of such unphilosophical expressions as the "great hole" of the occiput, or the "great bone" of the carpus, induced a trial solely of Latin terms; here similar, if not greater difficulties, were experienced, and this language in its turn was relinquished; and the only alternative was to return into the old beaten track. In the description, however, of the bones of the head and face, both the Latin and English terms have been

preserved, leaving it to the choice of the learner to adopt those which custom has rendered most familiar to his ear.

A tabular view of Dr. Barclay's Nomenclature has been introduced, and occasionally made use of; but the objections against new terms in anatomy, generally, hold good, with respect to this system, however admirable and well adapted it may be.

It is not a matter of surprise that medical men should complain of the difficulty of recollecting their anatomy in after life, since the information on this subject is for the most part very hastily obtained, often very imperfectly, and in many instances dissections are actually commenced before even a mere outline of a knowledge of the bones of the part is acquired, while, in others, the study of the muscular and of the osteological structure of the part has commenced at the same time.

Throughout the whole of the following pages, much pains has been bestowed in condensing the descriptions as much as is consistent with clearness of expression; but the frequent occurrence thereby of the word IT, renders it necessary that the attention of the reader be directed to this subject, and that he should observe, that whenever the meaning appears doubtful, the reference is invariably to the word in the first column of the table. The usurped use of this little word alone has saved the frequent repetition of whole sentences.

If the foregoing description of the system be clearly understood, a thorough knowledge of Osteology may be acquired in an incredibly short period. Very little new matter is here brought forward—the aim has chiefly been to facilitate the acquirement of what is already known. Quotations have been made from various anatomical works, and sometimes in the very language of their authors, whenever it was found sufficiently condensed to answer the purpose of the tables.

It is proposed hereafter to publish a series of Etchings to illustrate every part described throughout the work, with references to the letter-press as it now stands.

ON THE BONES IN GENERAL.

The term OSTEOLOGY, or the Doctrine of the Bones, comprehends a disquisition upon what belongs to bones in common, and upon what is proper to each bone in particular.

The BONES are hard compact substances, assuming various irregular forms, giving stature and support to the body, and affording points of attachment to the numerous muscles necessary to the performance of its varied motions and functions; they enclose and defend the brain and spinal marrow, the heart and lungs, and other viscera; they chiefly constitute all the joints of the body; and afford important levers for the free and powerful actions of the extremities.

The structure of bones corresponds with the structure of other parts of the body: they are abundantly furnished with blood vessels, nerves, and absorbents; and are subject to similar diseases to those which affect the soft parts. Their hardness is the result of atoms of lime imbedded in structure similar to the cellular substance of any other part of the body. Ivory is nothing more than lime deposited in the midst of cellular structure; and thus soft parts and membranes may become bone; that is, the arteries may deposit lime in their structure; the arteries of old people sometimes become like coral.

As to the formation of bone in the fœtus, at first it is a mere vascular jelly; by degrees the outline of the bone is seen, and the gelatinous matter becomes blanched by the deposition of lime: when more perfectly formed, the ends of the long bones are tipped with cartilage. Bones are therefore formed yielding, but with as much elasticity and firmness as will enable them to retain their form.

The component parts of bones vary in proportion in different persons—in different bones of the same person—and in the same bone at different ages. The lime, however, bears a much smaller proportion in children, than in persons of more advanced age. Its excess or deficiency constitutes two opposite diseases of the bones—the one an affection of youth, viz. rickets; and the other a malady not unfrequent in old age, viz. fragilitas ossium. The earthy matter is obtained either by calcination, or by maceration in a dilute acid, from which the lime may be afterwards precipitated; in the latter case, bones thus chemically altered become perfectly flexible, but they retain their original form so long as they are kept wet in spirit.

The following analysis of bone has been given by Bergelius:—

Phosphate of Lime	51 04
Cartilage	34 17

Carbonate of Lime.....	11	30
Fluate of Lime.....	2	00
Phosphate of Magnesia.....	1	16
Soda, Muriate of Soda, and Water....	1	20

Externally, the bones are closely invested by a membrane called the periosteum, which is subservient to various important uses both in their physiology and structure—especially in lodging and supporting the vessels and nerves in their passage to the bones—in strengthening the conjunction of bones with their epiphyses in the young subject—and in furnishing a smooth surface for the action of the muscles. That portion of the membrane which covers the bones of the skull has received the name of pericranium, and that lining the orbits is called periorbitar.

Bones are composed of lamellæ, or plates, which are formed of fibres, running either longitudinally, or in a radiated manner, according to the figure of the bone. This structure may be readily seen, either by calcination, or by maceration in acid. The solidity of the walls of bones is owing to these laminæ being closely impacted, as in the bodies of the long bones; whilst at the extremities they gradually become very thin, and the bone is chiefly formed by the cancellated structure of the interior. The flat bones consist of two thick compact laminæ, separated from each other by a middle layer of spongy structure, called diploë, as in the bones of the cranium. The short bones consist principally of a spongy or cancellous structure, surrounded by a thin lamina of compact bone.

The cancelli communicate everywhere with each other, and by their irregular reticulated form, constitute cells of various shapes and sizes. These are lined throughout by a fine vascular membrane, which secretes the oily substance called marrow. The cancelli in the middle of the long bones are fibrous, but towards the extremities they are lamellated and more numerous; but in some of the flat bones, as the scapula, and the ilium, the solid parts are so much compressed as to leave but little room for any intervening structure; while, on the contrary, in the middle of the long bones, the cavities are so large, and so distributed, as to constitute a hollow cylinder, or tube, in which the marrow is lodged. If bones were formed solid, they would be weighty and cumbrous, and it may be demonstrated mathematically that a hollow cylinder is stronger than a solid. There is another advantage arising from this form of the long bones; by being small in the middle, room is made for the action of the muscles, and the ends are spread out for the purposes of their attachment, and for the formation of joints.

The number of the bones constituting the human skeleton varies in different instances, owing to the irregular distribution of the sesamoid bones; it also varies during youth at the different changes of the teeth, but the number in the adult is most commonly 242. The skeleton is divided into—the Head, the Trunk, the Upper and the Lower Extremities: the head consisting of 61 bones, the trunk of 53, and the extremities of 64 each.

The head comprehends the bones both of the cranium and face, as well as, one bone of the tongue. The bones of the cranium are connected with each other by serrated edges, termed sutures; and those of the face, by less strongly marked sutures, called harmonies.

The trunk comprehends the bones of the spine, thorax, and pelvis.

The upper extremities comprehend the bones of the shoulders, arms, fore-arms, wrists, hands, and fingers.

The lower extremities comprehend the bones of the thighs, legs, tarsus, metatarsus, and toes.

All of which are hereafter severally described.

In describing the relative position of the different bones, it may be necessary to observe that the usual plan made use of by anatomists has been adopted; which supposes the body to be erect, with the palms of the hands forwards, and the thumbs turned outwards. Hence the terms superior, inferior, anterior, or posterior, have direct reference to this position. The median plane is an imaginary perpendicular line, commencing on the top of the head, extending through the middle of the body, dividing it into two lateral halves, and continued between the inferior extremities; the terms inner and outer denote an approach to, or a removal from, this imaginary line.

ERRATA.

Page 16, Line 16 from the top, *for* crita, *read* crista.

—— 16, Line 2 from the bottom, after the word maxillary, *insert* the word vomer.

—— 22, Last line, *for* roof the mouth, *read* roof of the mouth.

—— 40, Line 8 from the bottom, *for* χοχχνξ, *read* κοκκνξ.

—— 40, Line 2 from the bottom, *leave out* 1. BASE.

—— 60, 62, 67, Head-line, *for* Upper, *read* Lower.

—— 67, Leave out the last Question, being a repetition.

A GENERAL TABLE

OF THE

BONES OF THE HUMAN SKELETON.

- **The SKELETON** usually consists of 242 Bones, *comprising* .....
  - 61 Bones of the HEAD and FACE, *consisting of*....
    - 6 Bones proper to the CRANIUM, *viz.* .....
      - 1 Os Frontis.
      - 2 Ossa Parietalia.
      - 2 Ossa Temporalia.
      - 1 Os Occipitis.
    - 2 Bones common to the CRANIUM and FACE, *viz.*
      - 1 Os Ethmoides.
      - 1 Os Sphenoides.
    - 14 Bones of the FACE, *viz.* .....
      - 2 Ossa Nasi.
      - 2 Ossa Maxillaria Superiora.
      - 2 Ossa Lachrymalia.
      - 2 Ossa Malarum.
      - 2 Ossa Spongiosa Inferiora.
      - 2 Ossa Palatina.
      - 1 Os Vomer.
      - 1 Os Maxillare Inferius.
    - 32 TEETH, *viz.* .....
      - 8 Incisores.
      - 4 Cuspides.
      - 8 Bicuspides.
      - 8 Molares.
      - 4 Dentes Sapientiæ.
    - 6 Bones of the INTERNAL EAR, *viz.*.....
      - 2 Mallei.
      - 2 Incudes.
      - 2 Stapides.
    - 1 Bone of the TONGUE, *viz.* ..... 1 Os Hyoides.
  - 53 Bones of the TRUNK, *consisting of* .....
    - 24 Bones of the SPINE, or VERTEBRÆ, *divided into*
      - 7 Cervicales.
      - 12 Dorsales.
      - 5 Lumbares.
    - 25 Bones of the THORAX, *viz.* .....
      - 1 Sternum.
      - 24 Costæ.
    - 4 Bones of the PELVIS, *viz.* .....
      - 2 Ossa Innominata.
      - 1 Sacrum.
      - 1 Coccyx.
  - 64 Bones of the UPPER EXTREMITIES, *consisting of* .....
    - 4 Bones of the SHOULDERS, *viz.* .....
      - 2 Claviculæ.
      - 2 Scapulæ.
    - 2 Bones of the ARMS, *vix.* ..... 2 Humeri.
    - 4 Bones of the FORE-ARMS, *viz.* .....
      - 2 Ulnæ.
      - 2 Radii.
    - 16 Bones of the WRISTS, *viz.* .....
      - 2 Scaphoidea.
      - 2 Lunaria.
      - 2 Cuneiformia.
      - 2 Pisiformia.
      - 2 Trapezia.
      - 2 Trapezoidea.
      - 2 Magna.
      - 2 Unciformia.
    - 38 Bones of the HANDS and FINGERS, *viz.*.....
      - 8 Ossa Metacarpi.
      - 30 Phalanges.
  - 64 Bones of the LOWER EXTREMITIES, *consisting of* .....
    - 2 Bones of the THIGHS, *viz.* ..... 2 Femora.
    - 6 Bones of the LEGS, *viz.* .....
      - 2 Patellæ.
      - 2 Tibiæ.
      - 2 Fibulæ.
    - 14 Bones of the TARSUS, *viz.* .....
      - 2 Astraguli.
      - 2 Ossa Calcum.
      - 2 Navicularia.
      - 2 Cuboidea.
      - 6 Cuneiformia.
    - 10 Bones of the METATARSUS, *viz.*..... 10 Ossa Metatarsi.
    - 32 Bones of the TOES, *viz.* .....
      - 28 Phalanges.
      - 4 Ossa Sesamoidea.

SYNARTHROSIS, Or connexion without intermediate substance	1. SUTURE	Seam. As the bones of the cranium with each other, and with those of the face.
	2. GOMPHOSIS	Like a nail in a board. As the teeth in the alveoli.
	3. SCHINDELYSIS	Or furrowing. As the bones of the septum narium with each other.
SYMPHISIS, Or connexion by intermediate substance.....	4. SYNCHONDROSIS	By the intervention of cartilage. As the bodies of the vertebræ with each other—the ribs with the sternum—the ossa innominata with the sacrum, and with each other.
	5. SYNDESMOSIS	Or connexion by ligament. As the lower jaw and os hyoides with the head—the ribs with the spine—the processes of the vertebræ with each other—the bones of the extremities with each other.

SUTURE.	The sutures are 14 in number, *viz.*
1 SUTURA CORONALIS	Connecting the frontal with the parietal bones.
1 SUTURA SAGITTALIS	Connecting the parietal bones with each other.
2 SUTURÆ SQUAMOSÆ	Connecting the squamous portions of the temporal bones with the parietal bones.
1 SUTURA LAMBDOIDALIS	Connecting the occipital with the parietal bones.
2 ADDITAMENTA SUTURÆ LAMBDOIDALIS	Connecting the petrous portions of the temporal bones with the occipital bone.
2 ADDITAMENTA SUTURARUM SQUAMOSARUM..	Connecting the petrous portions of the temporal bones with the posterior inferior angles of the parietal bones.
1 SUTURA TRANSVERSALIS	Connecting the frontal bone with the nasal, superior maxillary, lachrymal, ethmoid, sphenoid and malar bones.
2 SUTURÆ ZYGOMATICÆ.....	Connecting the zygomatic processes of the temporal and malar bones with each other.
1 SUTURA SPHENOIDALIS.....	Connecting the os sphenoides to those bones of the cranium with which it is in contact, but not with those of the face.
1 SUTURA ETHMOIDALIS	Connecting the ethmoid with the sphenoid and frontal bones.

HARMONY.	The bones of the face are connected with each other by a less marked kind of suture, called Harmony. The harmonies are 18 in number, *viz.*
2 HARMONIÆ LACHRYMALES	Connecting the ossa lachrymalia to those bones of the face with which they are in contact.
1 HARMONIA NASALIS PERPENDICULARIS	Connecting the nasal bones with each other.
2 HARMONIÆ NASALES LATERALES	Connecting the nasal bones with the superior maxillary.
2 HARMONIÆ NASALES LONGITUDINALES	Connecting the inferior spongy bones with the superior maxillary and palatine bones.
1 HARMONIA MYSTACHIALIS	Connecting the superior maxillary bones with each other in front.
2 HARMONIÆ ORBITALES INTERNÆ.....	Connecting the malar bones with the sphenoid and superior maxillary bones in the orbit.

3	ON THE DIFFERENT KINDS OF CONNEXIONS OF BONES.
2 HARMONIÆ ORBITALES EXTERNÆ	Connecting the same bones without the orbit.
1 HARMONIA PALATINA TRANSVERSALIS.....	Extending across the back part of the roof of the mouth—connecting the superior maxillary with the palatine bones.
1 HARMONIA PALATINA LONGITUDINALIS	Extending along the centre of the roof of the mouth—connecting the same bones.
2 HARMONIÆ MAXILLO-PALATINÆ	Extending up the posterior part of the nares to the orbit—connecting the superior maxillary and palatine bones.
1 HARMONIA SPHENOIDALIS	Connecting the os sphenoides to those bones of the face with which it is in contact.
1 HARMONIA ETHMOIDALIS	Connecting the os ethmoides to those bones of the face with which it is in contact.
MOTION.	ON THE DIFFERENT KINDS OF MOTIONS OF BONES.
1. ARTHRODIA	Where the flat ends of the bones are opposed to each other with little motion. As between the clavicle and the scapula—the carpus and the metacarpus—the tibia and the fibula—the greater number of the bones of the tarsus—the tarsus and the metatarsus.
2. GINGLIMUS.....	The bones mutually receiving each other, and the ligaments admitting of a hinge-like motion—which is subdivided into
a.	*Angular.* As the lower jaw with the temporal bone—the joint of the elbow—the first and second joints of the thumbs, and second and third of the fingers and toes—the joint of the knee—the ankle.
b.	*Lateral* or *Circular.* As between the radius and the ulna—the atlas and the processus dentatus.
c.	*Compound.* As between the occipital bone and the atlas—between the different vertebræ—between the ribs and the vertebræ.
3. ENARTHROSIS	Or ball and socket—the ligaments allowing motion in all directions. As the head of the femur in the acetabulum—the head of the humerus in the glenoid cavity of the scapula—between the astragulus and the naviculare—between the fore-arm and the wrist—the head of the os magnum in the scaphoides and lunare—inner end of the clavicle and the sternum—root of the first or proximal phalanx of the fingers and toes.

1.—*General Terms.*

Mesial	Internal.
Lateral	External.
Dextral	Right.
Sinistral	Left.
Peripheral	External (Superficial).
Central	Internal (Deep-seated).

2.—*Terms proper to the Head.*

Coronal	Superior.
Basilar	Inferior.
Glabellar	Anterior.
Inial	Posterior.
Antinial	Anterior and Inferior.

3.—*Terms proper to the Neck and Trunk.*

Atlantal	Superior.
Sacral	Inferior.
Sternal	Anterior.
Dorsal	Posterior.

4.—*Terms proper to both kinds of Extremities.*

Pĕctoral, or Proximal	Superior.
Pelvic, or Distal	Inferior.

5.—*Terms proper to the Pectoral, or Superior Extremities.*

Radial	Either Anterior or External, as the palm of the hand might be turned.
Ulnar	Posterior, or Internal.
Anconal	External, or Posterior.
Thenal	Internal, or Anterior.

6.—*Terms proper to the Pelvic, or Inferior Extremities.*

Tibial	Internal.
Fibular	External.
Rotular	Anterior.
Popliteal	Posterior.

Note.—Most of the above terms are occasionally made to terminate in the adverbial form *ad*, as Atlantad, Dextrad, Peripherad, &c.

On the First Division of the Table, comprehending the 61 Bones of the Cranium and Face.

61
BONES OF THE CRANIUM AND FACE.

6 *Bones proper to the Cranium.*	14 *Bones of the Face.*		6 *Bones of the Internal Ear.*
1 Os Frontis.	2 Ossa Nasi.	2 Ossa Spongiosa Inferiora.	2 Mallei.
2 Ossa Parietalia.	2 Ossa Maxillaria Superiora.	2 Ossa Palatina.	2 Incudes.
2 Ossa Temporalia.	2 Ossa Lachrymalia.	1 Os Vomer.	2 Stapides.
1 Os Occipitis.	2 Ossa Malarum.	1 Os Maxillare Inferius.	
2 *Bones common to the Cranium and Face.*	**32 *Teeth.***		**1 *Bone of the Tongue.***
1 Os Ethmoides.	8 Incisores.	8 Molares.	Os Hyoides.
1 Os Sphenoides.	4 Cuspides.	4 Dentes Sapientiæ.	
	8 Bicuspides.		

OS FRONTIS.

Deriv. frons, the forehead. *Synonima*, os Coronale, os Inverecundum, os Puppis, os Sensus Communis.

Situation. Anteriorly and superiorly, with respect to the other bones of the cranium.

Connexion In general with 12 bones, and occasionally with 14; viz. above, with the parietal bones by the coronal suture; laterally, with the sphenoid bone by the sphenoidal suture; below, with the malar, ethmoid, lachrymal, superior maxillary, and nasal bones, by the transverse suture; and in some instances with the temporal bones, near the long anterior angles of the parietal bones.

Use..... Contains and defends the anterior lobes of the brain, assists in forming the orbits, temporal fossæ, &c.

External Surface. Is convex, and internal surface concave—this bone is said to resemble a cockle-shell.

1. 2 FRONTAL EMINENCES..... *Eminentiæ Frontales.* In the middle of the front surface of the bone—denoting the centres of ossification in the fætus.
2. 2 FRONTAL TUBEROSITIES..... *Protuberantiæ Frontales.* A little below the former, and nearer to the root of the nose—marking the situation of the frontal sinuses. These sinuses are formed by the separation of the two tables of the skull, and are divided by a bony partition, termed the septum.
3. THE NASAL PROCESS..... *Processus Nasalis seu Glabella.* Situated between the superciliary arches; serrated at its edges—on which the nasal bones rest. In a line extending upwards from this process a ridge is often seen marking where the bone was divided in the young subject.
4. 2 SUPERCILIARY RIDGES..... *Arcus Superciliares*, on which the eye-brows are situated—forming the superior margins of the orbits, commencing on the inner side with the
5. 2 INTERNAL ANGULAR PROCESSES..... *Processus Angulares Interni*, and terminating on the outer side with the
6. 2 EXTERNAL ANGULAR PROCESSES..... *Processus Angulares Externi.*

7.	2 Temporal Ridges	*Arcus Temporales.* Commencing just behind the external angular processes—forming part of the origins of the temporal muscles.
8.	2 Temporal Sinuosities	*Fossæ Temporales.* Smooth surfaces below the temporal ridges—for the lodgement of part of the temporal muscles.
9.	2 Lachrymal Pits	*Fossæ Lachrymales.* Just within the ext. angular processes—for the lodgement of the lachrymal glands.
10.	2 Superciliary Foramina	*Foramina Supra-orbitaria.* In the superciliary ridges near to the internal angular processes—which transmit the supra orbitary arteries, veins, and nerves to the forehead—these foramina are often completed by ligament, and appear only a notch in the skull.
11.	2 Troclear Notches	*Fossæ vel Spinæ Trochleares.* Just behind the internal angular processes—for the attachment of the pullies around which the tendons of the superior oblique muscles play—this notch is often indistinct, and in some instances there is a sharp projecting spine.
12.	Openings	into the frontal sinuses, on each side of the nasal process—varying in number, and communicating with the ethmoidal cells.
13.	2 Anterior Orbital Foramina	*Foramina Orbitalia Anteriora.* Frequently common to this bone and to the ethmoid—for the transmission of the nasal branch of the first division of the fifth pair of nerves on its return to the skull, as well as, for the transit of a small branch of the ophthalmic artery to the ethmoidal cells.
14.	2 Posterior Orbital Foramina	*Foramina Orbitalia Posteriora.* Situated deeper in the orbit than the former, along or near to the same line of junction of this bone with the ethmoid—for the transmission of a small branch of the ophthalmic artery (or posterior ethmoidal artery) to the dura mater.
15.	The Ethmoidal Notch	*Fissura Ethmoidea.* Between the orbitar plates—in which the cribriform lamella of the ethmoid bone is lodged.
	Internal Surface.	Concave—except at the orbitar processes.
16.	2 Orbitar Processes	*Lamellæ Orbitales.* Concave below, irregularly convex above, and marked by the convolutions of the anterior lobes of the brain—these processes form the roofs of the orbits.
17.	The Foramen Cœcum	Sometimes common to this bone and to the ethmoid—gives attachment to a process of the falx, and transmission to a vein from the ethmoidal cells into the superior longitudinal sinus.
18.	Internal Spine.....	*Crista Interna.* Commencing immediately in front of the foramen cæcum—for the attachment of the falx major—after proceeding upwards a short distance it divides into
19.	2 Ridges.....	For the attachment of the processes of the dura mater which form the longitudinal sinus.
20.	A Groove.....	*Sulcus Frontalis.* Situated between the above ridges—for the lodgement of the commencement of the superior longitudinal sinus.
21.	Pits.....	*Foveæ Pacchioni.* Varying in number—situated on either side of the above groove—for the lodgement of the glandulæ pacchioni. In some skulls these pits are indistinct, and in others, considerable digitated cavities.
22.	Eminences and Depressions.....	Throughout the whole internal surface—marked by the convolutions of the brain.

	OS PARIETALE.	*Deriv.* Paries, because these bones form as it were the walls of the cranium. *Synonima*, ossa Paria, Sincipitis, Verticis, Arcualia, Nervalia, Bregmatis, Madefactionis, Quadrangularia, &c.
	Situation.	Laterally and superiorly with respect to the other bones of the cranium.
	Connexion	With 5 bones; viz. in front, with the frontal bone by the coronal suture; below, with the temporal bone by the squamous suture and its additamentum, and with the sphenoid bone by the sphenoidal suture; behind, with the occipital bone by the lambdoidal suture; and above, with its fellow by the sagittal suture.
	Use.....	Defends and supports the lateral lobes of the cerebrum, forms with its fellow the superior part of the cranium, affords the principal origin to the temporal muscle, &c.
	External Surface.	Is convex, and internal concave. Has four angles and four edges.
1.	ANTERIOR SUPERIOR ANGLE	*Angulus Frontalis.* Is the last part of the skull where ossification is completed. The opening thus formed by the two bones is called the anterior fontanell or bregma.
2.	ANTERIOR INFERIOR ANGLE.....	*Angulus Sphenoidalis.* Internally, is marked by the ramifications of the spinous artery of the dura mater.
3.	POSTERIOR SUPERIOR ANGLE	*Angulus Occipitalis.* The point where the posterior fontanell is situated in infancy.
4.	POSTERIOR INFERIOR ANGLE	*Angulus Mastoideus.* Internally, is marked by the lateral sinus, and by the posterior meningeal artery.
5.	CORONAL EDGE	*Margo Coronalis.* Serrated—by which it is connected with the frontal bone.
6.	SAGITTAL EDGE	*Margo Sagittalis.* Serrated—by which it is connected with its fellow.
7.	LAMBDOIDAL EDGE	*Margo Lambdoidalis.* Serrated—by which it is connected with the occipital bone.
8.	SQUAMOUS EDGE....	*Margo Squamosa.* Partly serrated and partly a thin plate—by which it is connected with the sphenoid and temporal bones.
9.	PROMINENCE.....	About the middle of the bone—denoting the centre of ossification in the fætus.
10.	TEMPORAL RIDGE	*Arcus Temporalis.* Extending in an arched form, and terminating at the mastoid angle—being part of the origin of the temporal muscle.
11.	PARIETAL FORAMEN	*Foramen Parietale.* Situated, generally, near to the posterior half of the sagittal suture—for the transmission of a vein from the scalp to the superior longitudinal sinus, and occasionally of a branch of the parietal artery to the dura mater—sometimes there are several foramina.
	Internal Surface.	By the union of the two parietal bones, beneath the sagittal suture, a
12.	GROOVE	*(Sulcus Sagittalis)* is formed for the lodgement of the continuation of the superior longitudinal sinus.
13.	2 RIDGES	On either side of the groove—for the attachment of the two layers of the falx forming the superior longitudinal sinus.
14.	PITS	*Foveæ Pacchioni.* Various in number—situated about the longitudinal sinus—in which the glandulæ pacchioni are lodged.

15.	FURROW.....	*Canalis Meningeus seu Spinosus.* Commencing at the sphenoidal angle, and spreading out in an arborescent form—produced by the arteria meningea medea or spinous artery of the dura mater. In some instances it is a complete canal extending some distance up the bone.
16.	DEPRESSION	*Fovea Lateralis.* At the mastoid angle—over which the lateral sinus passes. The bone is also faintly furrowed near to this angle by the posterior meningeal artery.
17.	EMINENCES AND DEPRESSIONS.....	Situated generally throughout the internal surface—marked by corresponding eminences and depressions of the convolutions of the brain.

OS OCCIPITIS.

Deriv. Occiput, ex ob et caput; the hinder part of the head. *Synonima*, os Basilare, os Proræ, os Memoriæ, os Pixidis, os Nervosum, &c. Like the os frontis this is a single bone, therefore many of the parts occur double.

Situation. Posteriorly and inferiorly with respect to the other bones of the cranium.

Connexion With 6 bones; viz. above, with the parietal bones by the lambdoidal suture; laterally, with the temporal bones by the additamenta of that suture; in front, with the sphenoid bone at its basilar process; and below, with the first vertebræ of the neck by ginglimus.

Use..... Defends and supports the posterior lobes of the cerebrum, contains the cerebellum—transmits the medulla oblongata, and various vessels and nerves.

External Surface. Is irregularly convex, and internal surface irregularly concave.

1.	TUBERCLE	*Tuber Occipitalis.* In the centre of the superior part of the bone—to which the ligamentum nuchæ is attached. In some instances this is a sharp projecting process, in others, there is merely a thickening at this part.
2.	PERPENDICULAR SPINE	*Spina Occipitalis.* Descending in a straight line from the tubercle, and situated between the muscles of the opposite sides.
3.	SUPERIOR TRANSVERSE RIDGE.....	*Arcus Transversalis Superior.* Extending across the bone—for the attachment of muscles.
4.	INFERIOR TRANSVERSE RIDGE	*Arcus Transversalis Inferior.* A little below the former—also for the attachment of muscles.
5.	THE OCCIPITAL FORAMEN.....	*Foramen Magnum.* For the transmission of the medulla oblongata—the exit e craneo of the anterior arteries of the medulla spinalis, and the entrance into the skull of the nervi accessorii, and vertebral arteries.
6.	2 CONDYLES	*Processus Condyloidei.* Situated on each side of the foramen magnum towards its front part—by which this bone is connected with the atlas—around the condyles there are ridges for the attachment of the capsules of the joints, and various depressions for the attachment of strong ligaments for the security of the articulation.
7.	2 POSTERIOR CONDYLOID FORAMINA	*Foramina Condyloidea Posteriora.* Situated just behind the condyles—for the transmission of veins from the back of the neck into the lateral sinuses.

9	OS OCCIPITIS *(continued)*.	On the First Division of the Table, comprehending the 61 Bones of the Cranium and Face.
8.	2 ANTERIOR CONDYLOID FORAMINA	*Foramina Condyloidea Anteriora.* Situated in front and above the condyles—for the transmission of the ninth pair, or hypoglossal or lingual nerves.
9.	THE BASILAR PROCESS ..... *Internal Surface.*	*Processus Cuneiformis, seu Basilaris.* By which this bone is connected with the sphenoid. The os occipitis is sometimes described as having six angles, which are best seen by looking at its internal surface; viz. one superior or occipital—two lateral or parietal—two inferior or temporal—and one anterior or sphenoidal.
10.	THE CRUCIAL SPINE	*Crux Interna.* The upper branch of this cross contains a groove for the lodgement of the completion of the superior longitudinal sinus, with ridges on each side for the attachment of the falx major—the two lateral branches are also grooved for the lodgement of the commencement of the lateral sinuses, with ridges on either side for the attachment of the tentorium—to the lower branch the falx minor is attached, which contains the ascending portion of the occipital sinus.
11.	2 CEREBRAL CAVITIES.....	*Fossæ Cerebri.* Situated above the transverse portion of the crucial spine—containing the posterior lobes of the cerebrum.
12.	2 CEREBELLAR CAVITIES.....	*Fossæ Cerebelli.* Situated below the former and more excavated—for the lodgement of the two lobes of the cerebellum.
13.	2 LATERAL GROOVES	*Sulci Laterales.* Through which the lateral sinuses pass just before they emerge.
14.	2 JUGULAR NOTCHES	By the union of this bone with the temporal bones, the two *Foramina Jugularia* are formed—for the passage of the lateral sinuses, at which point they terminate in the internal jugular veins—as well as for the transmission of the pneumo-gastric, glosso-pharyngeal, and accessory nerves. The nerves often pass through distinct foramina to the veins, and the openings altogether are frequently termed the Foramina Lacera Basis Cranii Posteriora.
15.	BASILAR SINUOSITY	*Fossa Basilaris.* An excavation on the internal surface of the basilar process—in which the Pons Varolii rest.
16.	2 PETROSAL GROOVES	*Sulci Petrosi.* On each side of the basilar process—formed by the union of this bone with the petrous portions of the temporal bones—for the lodgement of the inferior petrosal sinuses.
	OSSA TRIQUETRA.	Seu OSSA WORMIANA, vel OSSA TRIANGULARIA. Are small bones most frequently found in the lambdoidal suture, occasionally in the sagittal, and in the other sutures—they are generally larger and more conspicuous on the external surface of the skull than internally. The os occipitis in the fætus is composed of several portions, about four; in most skulls these unite and leave no vestiges of their former separation; while in others, a suture has shot through the divided portions, and has thus formed what has been called a very large os triquetrum.

	OS TEMPORALE.	*Deriv.* Tempora, the temples, ab tempus; because the hair first grows grey at this part. *Synonima,* ossa Petrosa, Mendosa, Lapidosa, Dura, Arcualia, Armalia, &c.
	Situation.	Laterally and inferiorly with respect to the other bones of the cranium.
	Connexion	With 5 bones; viz. in front, with the sphenoid and malar bones by the zygomatic and sphenoidal sutures; above, with the parietal bones by the squamous suture and its additamentum; behind, with the occipital bone by the additamentum suturæ lambdoidalis; and below, with the lower jaw by ginglimus.
	Use	Contains the organ of hearing, receives and transmits various nerves and blood vessels, assists in supporting the middle lobe of the brain, &c.
	Pars Squamosa (externally).	The temporal bone is usually divided into two portions, viz. a Pars Squamosa, and a Pars Petrosa.
1.	SEMICIRCULAR EDGE	*Arcus Squamosus.* Thin, and overlapping the parietal bone.
2.	SMOOTH SURFACE	Below the semicircular edge—formed by the belly of the temporal muscle.
3.	ZYGOMATIC PROCESS	*Processus Zygomaticus, seu Jugalis.* Standing out from the lower and front part of the squamous portion—forming, with the zygomatic process of the malar bone, the zygoma or jugum within which the temporal muscle plays.
4.	TUBERCLE	(*Eminentia Articularis*) at the root of the zygomatic process, and close to the articular cavity.
5.	GLENOID CAVITY	*Fossa Articularis.* For the reception of the condyle of the lower jaw, and of the interarticular cartilage.
6.	GLASSERIAN FISSURE	*Fissura Glasseri.* Immediately behind the glenoid cavity—which divides the squamous and petrous portions of the bone at this part—gives attachment to the capsule of the joint, and passage for the chorda tympani.
	Internally.	The squamous portion is hollowed out for the reception of the middle lobe of the brain, and is marked by the convolutions—towards the front part of it there is a
7.	GROOVE.....	*Sulcus Meningeus,* running upwards—which conducts the middle meningeal artery to the sphenoidal angle of the parietal bone.
	Pars Petrosa (externally).	Has 4 processes, 4 foramina, and 4 fossæ or sulci.
8.	AUDITORY PROCESS	*Processus Auditorius.* Surrounding the external auditory meatus, but imperfect at the upper part—to which the cartilage of the ear is attached. In animals of the ruminating class this process is seen in great perfection.
9.	VAGINAL PROCESS	*Processus Vaginalis.* A flattened projection of bone, situated immediately below and within the foregoing process, and partly surrounds the root of the next process, called the
10.	STYLOID PROCESS	*Processus Styliformis.* Which is situated midway in a straight line drawn from the carotid foramen to the mastoid process—in most instances it is a well marked and long process, as its name implies, but in some it is very short—it affords a point of attachment for several muscles, as well as, for a ligament going to the os hyoides.
11.	MASTOID PROCESS	*Processus Mastoideus, seu Mammilaris.* Containing the mastoid cells, which communicate with the

		cavity of the tympanum—at a short distance above and behind this process, the edge of the bone is rough and deeply serrated, indicating the place of connexion with the parietal and occipital bones, by means of the additamenta of the squamous and lambdoidal sutures.
12.	EXTERNAL AUDITORY FORAMEN	*Meatus Auditorius Externus.* The opening of the canal leading to the organ of hearing, which in the recent subject is terminated at the distance of about an inch from the opening of the ear, by a fine membrane stretched across, called the tympanum.
13.	STYLO-MASTOID FORAMEN.....	*Foramen Stylo-Mastoideum, vel Aquæductus Fallopii.* Situated between the styloid and mastoid processes—the exit of the portio dura of the seventh pair of nerves in order to its distribution to the face.
14.	CAROTID FORAMEN.....	*Foramen Carotideum.* A considerable foramen situated internally to the styloid process; being the entrance of the carotid artery into the skull—it also gives passage to filaments of nerves which form the connexion between the sympathetic and cerebral nerves.
15.	MASTOID FORAMEN	*Foramen Mastoideum.* Situated generally about the additamentum of the lambdoidal suture, but sometimes there are several foramina—for the transmission of veins from the back of the neck into the lateral sinus, and occasionally of a branch of the occipital artery to the dura mater.
16.	PAROTID CAVITY.....	*Fossa Parotidea.* Immediately behind the glenoid cavity, from which it is divided by the glassserian fissure—for the lodgement of a point of the parotid gland.
17.	JUGULAR CAVITY	*Fossa Jugularis.* Separated from the foregoing cavity by the vaginal and styloid processes, and situated immediately behind the carotid foramen—forming by its union with the occipital bone, the foramen jugulare for the transmission of the lateral sinus, &c.
18.	MASTOID GROOVE	*Sulcus Digastricus.* Situated just internally to the mastoid process—the point of attachment of the posterior belly of the digastricus muscle.
19.	OCCIPITAL GROOVE.....	*Sulcus Occipitalis.* Divided from the former by a small ridge—marked by the passage of the occipital artery.
	Pars Petrosa (*internally.*)	The temporal bone is rightly termed the most difficult in the body, inasmuch as it admits of so little classification or arrangement. The petrous portion is of a triangular shape, and may be said to present 4 openings, and 5 canals or furrows.
20.	INTERNAL AUDITORY FORAMEN	*Meatus Auditorius Internus.* A large opening on the posterior aspect of the pars petrosa—into which the conjoined portions of the seventh pair of nerves enter. The portio mollis proceeds to the labyrinth of the internal ear, while the portio dura takes its course along the canal of Fallopius, and emerges at the stylo-mastoid foramen as before mentioned.
21.	OPENING OF THE VESTIBULE	*Aquæductus Vestibuli.* Situated at a short distance externally to the meatus auditorius internus, and nearer to the superior petrosal groove—the opening is generally covered by a sort of scale of bone.
22.	OPENING OF THE COCHLEA.....	*Aquæductus Cochleæ.* Situated lower down on the same aspect of the bone, and also at a short distance from the internal auditory meatus, in a line drawn from this point to the jugular fossa.

12	OS TEMPORALE *(continued)*.	On the First Division of the Table, comprehending the 61 Bones of the Cranium and Face.
23.	SUPERIOR PETROSAL GROOVE	*Canalis Petrosus Superior.* Running along the upper edge of the petrous portion—for the lodgement of the superior petrosal sinus—the ridges on each side of this groove afford attachment to the tentorium—and about the middle of the upper edge an eminence is observed indicating the situation of the superior semicircular canal of the internal ear.
24.	INFERIOR PETROSAL GROOVE	*Canalis Petrosus Inferior.* Situated at the lower edge of the posterior aspect of the petrous portion, and completed by the junction of this bone with the basilar process of the occipital bone—for the lodgement of the inferior petrosal sinus.
25.	LATERAL GROOVE.....	*Sulcus Lateralis.* A deep excavation, on the inner surface of the mastoid process, through which the lateral sinus passes a little before its termination.
26.	CAROTID CANAL	*Canalis Carotideus.* Which commences at the carotid foramen, and terminates at the innermost point of the petrous portion at its anterior aspect. Immediately in front of the internal opening of the carotid canal is seen the
27.	EUSTACHIAN CANAL	*Canalis Eustachianus, vel Iter a Palato ad Aurem.* The bony portion of the eustachian tube, which in the recent subject is completed by cartilage—it terminates in the cavity of the tympannm.
28.	VIDIAN FORAMEN	*Foramen Vidianum, seu Innominatum.* At about the middle of the anterior aspect of the pars petrosa. A groove is seen leading to this foramen which commences at the margin of the internal opening of the carotid canal—for the passage of a branch of the second division of the fifth pair of nerves, or vidian nerve, to join the portio dura.
	THE INTERNAL EAR.	The parts composing the organ of hearing are arranged in three divisions, viz. the External Ear, the Middle Ear or Tympanum, and the Internal Ear or Labyrinth. The meatus auditorius externus is the commencement of the canal leading from the external ear to the membrana tympani—the osseous part of this canal is about half an inch in length.
	THE CAVITY OF THE TYMPANUM	Is of an irregular form, and situated within the petrous portion of the temporal bone—the external boundary of this cavity is formed by the membrana tympani—the other boundaries are formed by the surrounding bone. In the cavity of the tympanum are the following parts, viz. the
1.	FENESTRA OVALIS.....	or *Foramen Ovale.* Situated opposite to the membrana tympani, and a little above the next opening, called the
2.	FENESTRA ROTUNDA	or *Foramen Rotundum.* Both these apertures are covered by thin membranes, which separate the cavity of the tympanum from the internal ear properly so called.
3.	OSSICULA AUDITUS.....	Are three small bones articulated with each other, and extending across the cavity of the tympanum, named the Malleus, Incus, and Stapes—but these will be more particularly described.
4.	THE EUSTACHIAN TUBE.....	Is a canal formed partly of bone and partly of fibro-cartilage, extending from the tympanum to the upper part of the pharynx, of about two inches in length, for the purpose of conveying air into the

		cavity of the tympanum—it begins by a rounded orifice in the anterior side of the tympanum, and thence extends obliquely downwards and forwards to the upper part of the pharynx, where it terminates immediately behind the posterior opening of the nose.
5.	OPENING OF THE MASTOID CELLS	A small opening in the upper and back part of the tympanum, which extends into the mastoid cells—these cells are filled with air which passes into them from the tympanum.
	THE LABYRINTH	or *Internal Ear*, properly so called—consists of several cavities of irregular form and direction, excavated in the petrous portion of the temporal bone. These cavities are arranged in three divisions, viz. the Cochlea, the Vestibule, and the Semicircular Canals—the cochlea is situated in front of the vestibule, and the semicircular canals behind it—the vestibule communicates with the cochlea and semicircular canals, hence it is regarded as the central cavity of the labyrinth. The bony walls of the labyrinth are lined by a membrane, from which a transparent watery fluid is secreted into the several cavities—this membrane is continued through the aquæducts, and at the termination of each passage is expanded beneath the dura mater in the form of a pouch—the sacs and tubes in the labyrinth receive the filaments of the auditory nerve, which terminate on their internal surfaces in soft pulps.
1.	THE VESTIBULE	Is a small cavity, of an elliptical shape, and containing 8 openings—one of these openings is the Fenestra Ovalis, by which the vestibule communicates with the cavity of the tympanum—one opening extends into the Cochlea—one forms the commencement of a passage named the Aquæductus Vestibuli—and the five other openings extend into the Semicircular Canals..
2.	THE SEMICIRCULAR CANALS.....	Are 3 in number, and designated, according to their situation, Superior, Posterior, and External—the two former are vertical in their direction, the latter or external is horizontal—these canals communicate at both their extremities with the vestibule—the superior and posterior canals are joined at one end, hence the three canals present only five openings—the diameter of each canal is such as will just receive the head of a common sized pin.
3.	THE COCHLEA	Derives its name from the resemblance of its external form to the shell of a snail—it has therefore an Apex and a Base—the base is directed towards the bottom of the meatus auditorius internus—internally the cochlea consists of a central pillar named the Modiolus, and of a Convoluted Tube—the tube forms two turns and a half around the modiolus—on opening the tube it is found to consist of two passages called Scalæ, and divided by a transverse partition called the Lamina Spiralis, which is formed partly of bone and partly of membrane, the osseous part consisting of two delicate plates, between which the filaments of the auditory nerve are lodged—at the apex of the cochlea, the two passages or scalæ are continued into each other, while at the base they have separate terminations—one scala communicates with the vestibule by the opening described in that cavity, and hence termed the Scala Vestibuli—the other communicates with the tympanum by the fenestra rotunda, and is called the Scala Tympani—the central pillar of the cochlea, or modiolus, is hollow, and a branch of

		the auditory nerve passes through it—at the apex of the cochlea the modiolus presents an expansion, which is named the Infundibulum.
4.	THE AQUÆDUCTUS VESTIBULI	Is a very small channel, extending from the vestibule to the external surface of the temporal bone, and terminates, as before mentioned, by a small slit-like opening on the posterior side of the petrous portion of the bone.
5.	THE AQUÆDUCTUS COCHLEÆ.....	Is also a very small channel, extending from the cochlea to the external surface—it terminates by a small conical aperture in the posterior border of the petrous portion, just below the internal auditory meatus. *Note.*—To obtain a view of the foregoing parts, several sections of the temporal bones will be necessary, both of the fætus and of the adult, as well as of the dried bone, and of those in a fresh state.
	OSSICULA AUDITUS.	Are 3 small bones extending across the cavity of the tympanum, for the purpose of conveying the impressions of sound produced upon the tympanum, to the internal ear. The Malleus is placed at one end of the chain, and is attached to the membrana tympani; the Stapes at the other end, and is attached to the membrane closing the fenestra ovalis. These bones are very nearly completed in early infancy, and are found in all the Mammalia—in the Amphibia, and in Birds the chain of bones is much simplified, and is reduced to one long thin bone expanded at its extremities, one end of which is attached to the tympanum, and the other to a hole corresponding to the fenestra ovalis.
	MALLEUS.	*Deriv.* Malleus, quasi *mollius*, from *mollio*, to soften—from its resemblance to a hammer.
	Situation.	Immediately within the membrana tympani, to which it is attached.
	Connexion	With 1 bone, viz. internally, with the incus.
1.	THE HANDLE	*Manubrium.* Which is attached lengthways to the tympanum, extending from the circumference to the centre of the membrane.
2.	HEAD	*Caput.* Having a rounded articulating surface adapted to the body of the incus.
3.	NECK	*Cervix.* A contraction just below the head.
4.	LONG PROCESS.....	*Processus Gracilis.* Arising from the neck, and affording attachment to the laxator tympani muscle.
5.	SHORT PROCESS	*Processus Brevis.* Being the projecting point at the proximal end of the manubrium, which is attached to the centre of the tympanum.
	INCUS.	*Deriv.* Incus, from *incudo*, to smite upon—from its resemblance to an anvil—by some it has been compared to a molar tooth.
	Situation.	The second bone of the chain—between the malleus and stapes.
	Connexion	With 2 bones, viz. with the malleus at its body; and with the glenoid cavity of the stapes by its orbicular process.

15 OSSICULA AUDITUS *(continued).*	On the First Division of the Table, comprehending the 61 Bones of the Cranium and Face.
1. BODY	*Corpus.* Having a cavity, and two eminences, adapted to the head of the malleus.
2. LONG LEG	*Crus Longum.* Directed downwards—having a curious rounded process standing out from its extremity, called the
3. ORBICULAR PROCESS	*Processus Orbicularis,* which is furnished with an articulating surface adapted to the glenoid cavity of the stapes. This process is most commonly described as a distinct bone, called the os orbiculare, but a careful inspection of the adult specimen, will exhibit no trace of the separation that existed in the fætal state.
4. SHORT LEG	*Crus Breve.* Extends backwards, and is joined by a ligament to the edge of the mastoid opening.
STAPES.	*Deriv.* Stapes, *in quo pes stat*—from its exact resemblance to a stirrup.
Situation.	The last bone of the chain—between the long leg of the incus and the membrane closing the fenestra ovalis.
Connexion	With 1 bone, viz. with the incus at its glenoid cavity.
1. GLENOID CAVITY	*Fossa Articularis.* Excavated, and adapted to the orbicular process of the incus.
2. NECK	*Cervix.* A contraction just below the glenoid cavity—to which the stapedius muscle is attached.
3. 2 LEGS	*Crura.* Of unequal length, and situated horizontally, being nearly at a right angle with the inferior crus of the incus—the two crura are placed on the same plane, the longest backwards and the shortest forwards; they are grooved on the inner side of each, for the attachment of a membrane stretched between them—at their extremities they unite by a thin, flat, oval-shaped plate of bone, called the
4. BASE	*Basis.* Which is adapted to the fenestra ovalis.
OS ETHMOIDES.	*Deriv.* ηθμος, a sieve, and ειδος, likeness—from its being perforated on its upper surface with many foramina. *Synonima,* os Cribrosum, os Planum, os Spongiforme, os Cribriforme, &c.
Situation.	In the fore part of the base of the cranium, between the orbitar plates of the frontal bone, and behind the nose.
Connexion	With 11 bones; viz. in the orbis; above, with the os frontis by the transverse suture; in front, with the lachrymal bones, and below, with the superior maxillary and palatine bones by harmony; behind, with the sphenoid bone by the sphenoidal suture—in the nose; below, with the vomer; and in front, with the nasal bones by harmony.
Use	Supports, in part, the anterior lobes of the brain, transmits the olfactory nerves, assists materially in the formation of the nose, and of the orbits, and affords the anterior point of attachment to the falx major.
The Cerebral Surface.	The ethmoid bone is of a cuboidal figure, and is described as having 4 surfaces—one upper or cerebral; two lateral or orbitar, and one lower or nasal surface.

	OS ETHMOIDES *(continued)*.	On the First Division of the Table, comprehending the 61 Bones of the Cranium and Face.
1.	CRIBRIFORM PLATE	*Lamella Cribriformis.* On which the bulbous extremities of the olfactory nerves rest—it is of an oval form, with its long axis from before backwards, and is received between the orbitar processes of the frontal bone—it is perforated by many
2.	HOLES	*Foramina Cribrosa.* For the transmission of the filaments of the olfactory nerves, and of the ethmoidal nerves into the nose.
3.	INTERNAL SPINE	*Crista Galli.* Rising out from the anterior part of the cribriform plate, and terminating in a point or apex, to which the falx major is attached.
4.	THE FORAMEN CÆCUM	Completed by the union of this bone with the os frontis, as before described.
	The Orbitar Surfaces.	
5.	2 ORBITAR PLATES	*Lamellæ Planæ.* Forming the greater part of the inner sides of the orbits, and covering the ethmoidal cells.
6.	2 ANTERIOR ORBITAL HOLES	*Foramina Orbitalia Anteriora.* Situated at the upper edges of the lamellæ planæ, and completed by the junction of this bone with the os frontis, as already described.
7.	2 POSTERIOR ORBITAL HOLES	*Foramina Orbitalia Posteriora.* Also at the upper edges of the lamellæ planæ, situated rather deeper in the orbit than the former, and completed by the junction with the frontal bone.
	The Nasal Surface.	
8.	THE NASAL PLATE	*Processus Nasalis.* A broad flat plate of bone, situated in the centre, and descending from the under surface of the crita galli process—by its junction with the vomer it forms the septum narium—it is grooved on its anterior edge for the reception of the cartilage of the nose, and its posterior edge is sharp, and is received into a corresponding groove on the upper edge of the vomer.
9.	2 SUPERIOR SPONGY BONES	*Processus Turbinati.* Are convoluted processes of the ethmoid bone, hanging down on each side of the nasal process—being convex on their inner, or mesial side, and concave on the outer. In animals possessing an acute sense of smelling, the spongy bones are wonderfully convoluted, over which convolutions, the schneiderian membrane is extended to increase the olfactory surface.
10.	ETHMOIDAL CELLS	*Sinus Ethmoidales.* Situated within the body of the bone—opening above the turbinated processes, and communicating with the frontal and sphenoidal cells.
	OS SPHENOIDES.	*Deriv.* from σφην, a wedge, and ειδος, likeness—because it seems to wedge together all the other bones of the skull.
	Situation.	In the centre of the basis of the cranium, and immediately behind the bones of the face.
	Connexion	With all the bones of the cranium, and with 7 of those of the face—in all 14 bones; viz. in the temporal fossæ, with the malar, frontal, parietal, and temporal bones; behind, with the occipital bone at the basilar process; and in the nose, with the ethmoid, superior maxillary, and palatine bones.

	Use	Assists in forming the orbits, the temporal fossæ, and middle cerebral fossæ—and gives passage to many important vessels and nerves.
	An Ala Major, has 3 *Surfaces, viz*.....	The os sphenoides has been said to resemble a bat with its wings extended, and is therefore described as having a Body, two Alæ Majores, and two Alæ Minores—the descending pterygoid processes bear some resemblance to the legs. It is an azygos bone, hence many of the parts occur double.
1.	CEREBRAL SURFACE	*Facies Cerebralis.* Forming part of the middle cerebral fossa, and marked by the convolutions of the brain. There is also a small groove to be seen on this surface, produced by the middle meningeal artery.
2.	TEMPORAL SURFACE	*Facies Temporalis.* On the outer side of the bone—forming part of the temporal fossa.
3.	ORBITAL SURFACE	*Facies Orbitalis.* Forming the outer and back part of the orbit.
4.	FISSURA LACERA	*Foramen Lacerum Orbitale Superius.* A slit-like opening, formed by the junction of the ala major and minor to the body—for the transmission of the third, fourth, first branch of the fifth, and the sixth pairs of nerves into the orbit; and of the ophthalmic vein from the orbit into the cavernous sinus.
5.	FORAMEN ROTUNDUM	Situated below and behind the fissura lacera—for the transmission of the second branch of the fifth pair of nerves, or superior maxillary nerve.
6.	FORAMEN OVALE.....	Situated rather more than half an inch behind the foramen rotundum, and more externally—for the transmission of the third branch of the fifth pair of nerves, or inferior maxillary nerve.
7.	SPINOUS PROCESS	*Processus Spinosus.* Situated behind the foramen ovale, projecting outwards and backwards, and terminating in a sharp point or apex, called the
8.	STYLOID PROCESS	*Processus Styliformis.* Projecting downwards, affording attachment to the circumflexus palati muscle.
9.	SPINOUS FORAMEN	*Foramen Spinosum.* Situated externally and near to the point of the spinous process—for the transmission of the middle meningeal artery, or spinous artery of the dura mater.
	Ala Minor.	Situated between the alæ majores. Between the two alæ minores there is a smooth and somewhat excavated surface, upon which part of the anterior lobes of the cerebrum rest.
10.	TRANSVERSE SPINOUS PROCESS.....	*Processus Transverso-Spinosus.* A sharp slender process extending outwards and terminating in a fine point—it is received into the groove dividing the anterior from the middle lobes of the brain, called the fissura Sylvii.
11.	ANTERIOR CLINOID PROCESS.....	*Processus Clinoides Anterior.* Projecting backwards and inwards, towards the posterior clinoid process —excavated on its inner, or mesial, side for the passage of the carotid artery.
12.	OPTIC FORAMEN	*Foramen Opticum.* Situated in front of the anterior clinoid process, at the root of the ala minor—for the transmission of the optic nerve, and of the ophthalmic artery.
	The Body.	Is situated in the middle of the bone.
13.	TUBERCULUM OLIVARE	An oval-shaped eminence, situated between the two optic foramina, on which the optic nerves decussate before they emerge. Just behind this eminence there is a deep excavation, called the
14.	SELLA TURSICA	*Fossa Pituitaria.* In which the pituitary gland of the brain is seated.

15.	2 Posterior Clinoid Processes	*Processus Clinoides Posteriores.* Situated immediately behind the sella tursica, and projecting forwards—these processes are connected together by an intervening portion of bone, and hence they appear in some instances indistinct—they afford a point of attachment to the tentorium.
16.	2 Carotid Grooves	*Sulci Carotidei.* Situated alongside the sella tursica, but most visible at the root of the posterior clinoid processes.
17.	Rough Surface.....	*Facies Basilaris.* Situated between the foregoing grooves—by which this bone is connected with the basilar process of the occipital bone.
18.	2 Pterygoid Canals.....	*Canales Pterygoideæ, vel Foramina Pterygoidea.* The posterior openings of which are just below the carotid grooves—the anterior openings of these canals are a little below, and within, the foramina rotunda—for the transmission of a branch of the second division of the fifth pair of nerves, which divides into two at the posterior opening of the canal: one branch goes upwards into the skull, and the other downwards, and takes the name of palatine.
19.	2 Eustachian Grooves	*Sulci Eustachiani.* Are small grooves in some instances indistinct, situated at a short distance below the pterygoid foramina—through which part of the eustachian tubes pass.
20.	2 External Pterygoid Processes	*Processus Pterygoidei Externi.* Projecting downwards and outwards from the under surface of the body, broad and flat, affording attachment to the external pterygoid muscles.
21.	2 Internal Pterygoid Processes	*Processus Pterygoidei Interni.* Narrow, and longer than the former—forming the lateral boundaries of the posterior openings of the nares, and terminating in two hooked processes, called the
22.	Hamular Processes	*Processus Hamulares.* Around which the tendons of the tensores palati muscles play.
23.	2 Pterygoid Fossæ	*Fossæ Pterygoideæ.* Situated between the external and internal pterygoid processes—and give lodgement to the internal pterygoid muscles.
24.	The Azygos Process.....	*Processus Azygos.* Situated in the mesial line on the anterior aspect of the body—to which the nasal lamella of the ethmoid bone and the vomer are attached. On each side of the root of this process are two thin plates of bone, which have obtained the name of ossa triangularia.
25.	2 Sphenoidal Cells.....	*Sinus Sphenoidales.* Are two large cavities, communicating with the ethmoidal and other cells, opening in front, on each side of the azygos process, and separated from each other by a bony partition, termed the septum.

	OS NASI.	*Deriv.* Nasus, the nose. *Syn.*, ossa Nasalia.
	Situation.	Upper part of the face, immediately beneath the nasal process of the frontal bone, and between the nasal processes of the superior maxillary bones.
	Connexion	With 4 bones; viz. above, with the os frontis at its nasal process; laterally, with the superior maxillary bone; in front, with its fellow; and behind, with the nasal lamella of the ethmoid bone.
	Use.....	With its fellow, it forms the bridge of the nose; assists in forming the septum narium, &c.

	OS NASI *(continued)*.	On the First Division of the Table, comprehending the 61 Bones of the Cranium and Face.
		The os nasi is an oblong, quadrangular shaped bone, somewhat contracted in its middle and expanded at either extremity—it has an external convex, and an internal concave surface, and is described as having four edges, viz.
1.	SUPERIOR EDGE	*Margo Frontalis.* Thick, and serrated—by which it is connected with the frontal bone.
2.	INFERIOR EDGE	*Margo Alaris.* Thin, and expanded—to which the cartilage of the nose is attached.
3.	ANTERIOR EDGE	*Margo Nasalis.* Flat and straight—by which it is connected with its fellow,
4.	POSTERIOR EDGE	*Margo Maxillaris.* Rough, and irregular—by which it is connected with the nasal process of the superior maxillary bone.
5.	INTERNAL SPINE	*Crista Interna.* Situated on the posterior aspect of the nasal edge, and extending down the whole length of the bone—by which it is connected with the nasal lamella of the ethmoid bone—it thus forms a small share of the septum narium.
6.	FORAMEN	On the anterior aspect, generally near to the line of junction with its fellow—sometimes there are several foramina, for the transmission of the nutrient arteries of the bone.
	OS MAXILLARE SUPERIUS.	*Deriv.* Maxilla, the jaw—from μασσαω, to chew.
	Situation.	The anterior and middle part of the face.
	Connexion	With 10 bones; viz. in the orbit, with the frontal, lachrymal, ethmoid, palatine, and malar; in the nose, with the nasal, inferior spongy, sphenoid, vomer, and its fellow—as well as, with 16 teeth, by gomphosis.
	Use	The two bones form the greater part of the nose, and of the roof of the mouth, a considerable share of the orbits, and contain all the upper teeth.
		It is a very irregular bone, and is described as having a Body, and 4 Surfaces, viz.
1.	SUPERIOR, OR ORBITAL	Or orbitar plate, forming the floor of the orbit.
2.	EXTERNAL, OR MALAR	The whole external surface of the bone—the malar process projects in the centre.
3.	INTERNAL, OR NASAL	Deeply excavated at its lower part.
4.	INFERIOR, OR PALATINE	Flat, and surrounded by the alveolary processes.
5.	THE NASAL PROCESS	*Processus Nasalis.* Projecting from the upper surface—this process is connected with the frontal bone at its apex, with the nasal bone at its front edge, and with the os unguis behind.
6.	LACHRYMAL GROOVE	*Sulcus Lachrymalis.* At the lower and back part of the root of the nasal process, extending downwards into the nose—for the transmission of the lachrymal duct, and terminating just behind the anterior point of the lower spongy bone.
7.	ORBITAR RIDGE	Commencing immediately in front of the lachrymal groove—forming part of the lower margin of the orbit.

8.	INFRA-ORBITAR FORAMEN	*Foramen Infra-Orbitarium.* Situated immediately beneath the outer end of the orbitar ridge—being the anterior opening of the infra obitar canal—for the transmission of the infra-orbitar branch of the second division of the fifth pair of nerves, and of a branch of the internal maxillary artery.
9.	NASAL NOTCH	A semicircular sinuosity at the lower and front part of the bone—for the attachment of the ala nasi.
10.	THE MALAR PROCESS	*Processus Malaris.* A large rough projection on the outer surface, by which this bone is connected with the os malæ—this process is hollowed out behind, for the play of the temporal muscle, and internally, there is a fissure common to this bone, and to the sphenoid, called the
11.	SPHÆNO-MAXILLARY FISSURE	or *Foramen Lacerum Orbitale Inferius.* Which extends along the back part of the orbit, and conducts the infra-orbitar nerve and artery to the posterior opening of the infra-orbitar canal—this canal proceeds forwards directly beneath the orbitar plate, and emerges as before mentioned at the infra-orbitar foramen.
12.	THE ALVEOLI.	Are cavities, or sockets, situated around the palatine surface of the bone, and corresponding in number to the teeth, which they lodge.
13.	ALVEOLARY FORAMINA	*Foramina Alveolaria.* Are numerous small holes abounding near the alveoli, for the transmission of vessels for the supply of the membrane lining the sockets of the teeth.
14.	PALATAL PROCESS	*Processus Palatinus.* Projecting horizontally inwards, towards the corresponding process in the other bone, with which it unites and forms the greater part of the roof of the mouth.
15.	ANTERIOR PALATINE FORAMEN.....	*Foramen Incisivum.* Situated just behind and between the two middle incisor teeth, and therefore common to the two superior maxillary bones—for the transmission of the anterior palatine nerves and vessels. The foramen after proceeding a short distance, subdivides into two or three canals which open into the nostrils—this communication in animals is very conspicuous.
16.	POSTERIOR PALATINE FORAMEN.....	*Foramen Spheno-Palatinum.* Situated just withinside the last tooth, and common to this bone, to the palatine, and to the sphenoid—for the transmission of the palatine nerve, or the palato-maxillary branch of the second division of the fifth pair of nerves, and of a corresponding artery from the internal maxillary.
17.	LONGITUDINAL RIDGE.....	Formed by the union of this bone with its fellow—commencing in front, and running backwards over the line of junction with the palatine bones, along which bones it is continued.
18.	LONGITUDINAL GROOVE.....	*Sulcus Longitudinalis.* On the top of the foregoing ridge, which receives the lower sharp edge of the vomer.
19.	SEMICIRCULAR RIDGE.....	*Arcus Semicircularis.* On the nasal surface of the bone, extending in an arched form from before backwards across the antrum—on which the inferior spongy bone hangs.
20.	SUPERIOR MAXILLARY SINUS	*Antrum Highmorianum, seu Sinus Maxillaris Pituitarius.* A very large cavity occupying the centre of the body of the bone, and communicating with the nose, by an opening situated between the superior and inferior spongy bones.

	OS LACHRYMALE.	*Deriv.* Lachryma, a tear, from its holding the lachrymal sac. *Syn.*, os Unguis.
	Situation.	The fore and lower part of the inner side of the orbit, and behind the nasal process of the superior maxillary bone.
	Connexion	With 4 bones; viz. in the orbit, above, with the frontal; below and in front, with the superior maxillary; behind, with the ethmoid;—and in the nose, with the inferior spongy bone, close to the termination of the lachrymal canal.
	Use.....	Assists in forming the orbit, the lachrymal canal, the ethmoidal cells, &c.
		That part of the lachrymal bone forming the orbit is of an oblong shape, and very thin, hence it has been compared to a finger nail.
1.	PERPENDICULAR RIDGE	Situated near to the middle of the external side of the bone, dividing it into two surfaces, viz.
2.	THE LACHRYMAL SURFACE.....	*Sulcus Lachrymalis.* Grooved—for the lodgement of the lachrymal sac and the transmission of the ductus ad nasum.
3.	THE ORBITAR SURFACE	*Lamella Orbitalis.* Smooth, and somewhat excavated—forming part of the orbit.
4.	2 CONVEX SURFACES	On the inner, or mesial side, corresponding with the anterior ethmoidal cells, which this bone partly conceals.
5.	THE LOWER EDGE	Which is in contact with the inferior spongy bone just at the termination of the lachrymal canal.

	OS MALÆ.	*Deriv.* Mala, (ex *Malus*, an apple,) the cheek; so called from its roundness. *Syn.*, os Jugale, os Zygomaticum.
	Situation.	Upper and outer side of the face.
	Connexion	With 4 bones; viz. in the orbit, above, with the frontal; behind, with the sphenoid; and below, with the superior maxillary; and at its zygomatic process, with the temporal bone.
	Use.....	Assists in forming the orbit, the zygomatic arch, the temporal fossa, &c.
		The malar bone is of an irregular quadrangular form, and is sometimes described as having four angles, viz. a Superior or Frontal, an Internal or Orbital, an Inferior or Maxillary, and an External or Zygomatic; which angles are also called processes, viz.
1.	SUPERIOR ORBITAL PROCESS	*Processus Orbitalis Superior.* Forming, with the frontal bone, the outer edge of the orbit.
2.	INFERIOR ORBITAL PROCESS	*Processus Orbitalis Inferior.* Forming, with the superior maxillary bone, the lower edge of the orbit.
3.	INTERNAL ORBITAL PROCESS	*Processus Orbitalis Internus, vel Posterior.* Projecting backwards, and assisting to form the orbit on its inner, or mesial side, and the temporal fossa, on its outer side.
4.	MALAR FORAMEN	*Foramen Malare.* On the outer surface of the bone—for the transmission of a branch of the second division of the fifth pair of nerves, together with a branch of the internal maxillary artery, from the orbit to the cheek. Sometimes there are two foramina.

5.	MAXILLARY PROCESS.....	*Processus Maxillaris.* Serrated and rough—by which this bone is connected with the superior maxillary; at which point it forms the prominence of the cheek.
6.	ZYGOMATIC PROCESS.....	*Processus Zygomaticus.* By which this bone is connected with the zygomatic process of the temporal bone, forming an arch over the temporal muscle.
7.	TEMPORAL SINUOSITY	*Fossa Temporalis.* An excavation at the outer and back part of the bone—in which the lower or tendinous portion of the temporal muscle plays.

	OS SPONGIOSUM INFERIUS.	*Deriv.* Spongia, sponge; from its porous or sponge-like texture. *Syn.*, ossa Turbinata, Conchæ Inferiores, Convoluta, &c.
	Situation.	Lower part of the cavity of the nose.
	Connexion	With 3 bones; viz. with the superior maxillary and palatine bones along the semicircular ridge; and with the os unguis just at the termination of the lachrymal duct.
	Use.....	From its convoluted form, it augments the olfactory surface, it assists in forming the antrum Highmori, the ductus ad nasum, &c.
1.	LACHRYMAL PROCESS	*Processus Lachrymalis.* A thin scale of bone, extending upwards, and forming the inner parietes of the lachrymal duct near to its termination.
2.	MAXILLARY PROCESS.....	*Processus Maxillaris.* Also a thin scale of bone, smaller than the former, and extending upwards and backwards—forming part of the inner parietes of the superior maxillary sinus—it is divided from the foregoing process by a
3.	GROOVE.....	Which in the recent subject is a foramen—being the opening of the antrum Highmori into the cavity of the nostrils.
4.	ANTERIOR EXTREMITY	Covering the inferior opening of the lachrymal canal.
5.	MAXILLO-PALATINE EDGE	Or superior edge, by which this bone hangs upon the semicircular ridge of the superior maxillary and palatine bones.
6.	INFERIOR EDGE	Rounded, and projecting downwards into the cavity of the nostrils—presenting a convex surface mesially, and a concave surface externally or opposite to the antrum.
7.	POSTERIOR EXTREMITY	Forming a more acute point than the anterior extremity.

	OS PALATINUM.	*Deriv.* Palo, to hedge in, because the palatal bones are staked in as it were by the teeth.
	Situation.	Back part of the palate or roof of the mouth, being continued up the posterior nares to the orbit.
	Connexion	With 6 bones; viz. in the orbit, with the ethmoid and superior maxillary bones; and in the nose, with its fellow, the vomer, the sphenoid, and the inferior spongy bones.
	Use.....	It assists in forming the orbit, the nose, and the roof of the mouth.

23	OS PALATINUM *(continued).*	On the First Division of the Table, comprehending the 61 Bones of the Cranium and Face.
1.	Palatal Process.....	Lying horizontally with the palatal plate of the superior maxillary bone, with which it is connected, and thus contributes to the formation of the roof of the mouth.
2.	Longitudinal Ridge and Furrow....	Formed by the union with its fellow—for the lodgement of the posterior part of the vomer. This ridge terminates behind in a projection common to the two bones, called the
3.	Azygos Process.....	*Processus Azygos, seu Spinosus.* To which the azygos uvulæ muscle is attached.
4.	Pterygoid Process	*Processus Pterygoideus.* Projecting outwards and backwards, and joining the internal pterygoid process of the sphenoid bone—the spheno-palatine foramen is in front of this process, and common to the superior maxillary, sphenoid, and palatine bones, as before described.
5.	Nasal Process	*Processus Nasalis.* Rising up laterally, at the back part of the cavity of the nostrils, and forming a considerable share of the inner parietes of the antrum. On the middle of this process a
6.	Ridge	*(Arcus Semicircularis)* is seen, being a continuation of the ridge on the superior maxillary bone, to which the inferior spongy bone is attached.
7.	Sphenoidal Process.....	*Processus Sphenoidalis.* A projection at the upper and back part of the nasal process—the point where this bone joins the body of the os sphenoides.
8.	Orbitar Process	*Processus Orbitalis.* The small portion of this bone which contributes to form the floor of the orbit—it is of a triangular shape, and connected at that point with the ethmoid and superior maxillary bones.
	OS VOMER.	*Deriv.* Vomer, (ex *Vomo*, to cast up, quod terram vomat.) from its supposed resemblance to the old coulter or plough-share.
	Situation.	The under and back part of the septum narium.
	Connexion	With 6 bones; viz. in front, with the nasal lamella of the ethmoid bone; above, with the sphenoid bone; and below, with the two superior maxillary and two palatine bones.
	Use.....	Forms, by its junction with the nasal lamella of the ethmoid bone, the septum narium.
1.	Anterior Edge.....	or Ethmoidal, grooved, for the reception of the sharp edge of the nasal plate of the ethmoid bone at its back part, and of the cartilaginous septum of the nose in front.
2.	Superior Edge	or Sphenoidal, the thickest, and deeply grooved to receive the azygos process of the sphenoid bone.
3.	Posterior Edge.....	or Pharyngeal, rounded and concave, facing towards the pharynx—forming the line of separation between the posterior openings of the nares.
4.	Inferior Edge.....	or Maxillo-Palatine,—sharp, and received into the groove formed along the ridge, or line of junction of the superior maxillary and palatine bones with each other.

	OS MAXILLARE INFERIUS.	Is an azygos bone, and is usually described as having a Chin, a Base, two Angles, and two Rami.
	Situation.	Lowermost of the bones of the face.
	Connexion	With 2 bones; viz. at its condyles with the temporal bones, by ginglimus.
	Use	Important, in mastication, deglutition, and speech.
1.	The Symphisis	The line of junction of the two separate portions of bone in the young subject, which becomes obliterated in the adult. This junction of the two portions of the lower jaw is peculiar to man, and to some few of the animals.
2.	2 Mental Foramina	*Foramina Mentalia, seu Foramina Maxillaria Anteriora.* The anterior openings of the dental canal, situated on each side of the chin, out of which branches of the dental nerves and arteries emerge.
3.	The Alveoli	Situated along the upper margin of the anterior portion of the bone—for the reception of the teeth.
4.	2 Coronoid Processes.....	*Processus Coronoides.* Are strongly marked angular projections, rising upwards and forwards, just behind the termination of the alveoli—the points of insertion for the temporal muscles.
5.	2 Semilunar Notches.....	Are excavations extending backwards, dividing the coronoid from the next processes, called the
6.	Condyles	*Processus Condyloides.* Are two oblong articulating surfaces, with their long axes situated transversely, and adapted to the glenoid cavities of the temporal bones—around the condyles are orbicular ridges for the attachment of the capsules of the joints.
7.	Cervix	A contraction just below the condyles where the bone becomes round and thin.
8.	2 Posterior Maxillary Foramina....	*Foramina Maxillaria Posteriora.* Situated on the inner surface of the bone, a little below the semilunar notches, and protected by a sort of scale of bone—being the commencement of the Dental Canal, which extends along the bottom of the fangs of the teeth. The Dental nerves and vessels after supplying in their course a branch to each fang of the teeth, subdivide at the mental foramina into two branches, one of which is continued along the canal, and anastamoses freely with the corresponding branch on the other side; the other escapes, and is distributed to the chin.
9.	Internal Spine.....	*Crista Interna.* A sharp projection behind, in the line of the symphisis—for the attachment of the frænulum linguæ and of other muscles. The posterior surface of the bone is also marked by two prominent ridges, denoting the points of attachment of the mylo-hyoidei muscles.
	THE TEETH.	Are hard firm bodies, situated in the upper and lower jaws—assuming different characters in the different species of animals, indicating the nature of the food of each—making their appearance in one shape in infancy, and giving way to an entire new set in boyhood: others again appearing at the age of puberty—in the adult they are 32 in number, 16 in each jaw, viz.
	4 Incisores	*Deriv.* Incido, to cut. Situated in front of the jaw, having one fang, and terminating in a cutting edge.
	2 Cuspides.....	*Deriv.* Cuspis, a spear, from the resemblance to the point of a spear—called also the Dentes Canini. Situated one on each side of the incisors, having one fang, but the body terminating in a pointed form.

	4 BICUSPIDES	or Bicuspidati. Adjoining the canine teeth, two on each side, having somewhat of a double form, but only one proper fang.
	4 MOLARES	*Deriv.* Mola, a mill, because these teeth grind the food. Situated behind the bicuspides, having a more distinct double form; the crown expanded for mastication—having 2, 3, and even 4 fangs.
	2 DENTES SAPIENTIÆ	*Deriv.* Sapiens, wise, because these teeth do not make their appearance until the age of puberty. Possessing the characteristic of a small molar tooth—their fangs for the most part consolidated.
	A TOOTH,	generally, is described as having a
1.	BODY, OR CROWN	That part of the tooth appearing above the gums, and covered with enamel.
2.	CERVIX	Between the body and the fangs, to which the gum is attached, where the enamel ceases, and the periosteum commences.
3.	FANGS, OR RAMI	Varying in number, fixed in the alveoli, and covered with periosteum—the fangs of the upper teeth are in general more expanded than the lower, to allow of a firmer attachment.
4.	FORAMEN	or Foramina, at the lower end of each fang, for the passage of the blood vessels and nerves of the tooth.
	OS HYOIDES.	*Deriv.* from the Greek letter *υ*, and *ειδος*, from the resemblance which this bone bears to the letter ypsilon. *Syn.*, os Linguale.
	Situation.	Between the root of the tongue, and the upper part of the larynx.
	Connexion	Properly speaking, it can hardly be said to be connected with any bone, unless it be with the styloid processes of the temporal bones, by the intervention of ligaments, which not unfrequently become ossified in the whole of their extent, in advanced age.
	Use	Forms a solid point for the attachment of the muscles of speech and deglutition.
		The os Hyoides consists of three distinct bones, the centre of which is termed the Body, and the two long thin portions projecting backwards, are called Cornua.
1.	BODY	Is the large central broad portion, convex before and concave behind—marked by the attachments of many muscles—in the middle of its anterior surface there is a projection, termed the
2.	PERPENDICULAR SPINE	Which forms a division between the muscles of the opposite sides.
3.	2 CORNUA	Extending backwards, and terminating in tubercles, which form the points of attachment to the stylo-hyoidean ligaments, as well as to the superior processes of the thyroid cartilage.
4.	2 APPENDICES	Sometimes called the *Processus Styliformes.* Are little projections, arising upwards and outwards from the point of junction of the body with the cornua—for the attachment of muscles connecting this bone with the tongue and lower jaw.
5.	INTERNAL CONCAVITY	*Cavitas Thyroidea.* Behind the body—for the reception of the upper edge of the thyroid cartilage.

	THE SINUSES.	In order to the proper comprehension of the parts in the interior of the Cranium, it is necessary that the sinuses of the dura mater should be understood—they are formed by the separation of this membrane into layers, which are so disposed as to leave spaces between them, generally of a triangular form. The course of the sinuses may be pointed out by external marks, and are 16 in number, viz.
1	The Superior Longitudinal Sinus...	Commences directly opposite the point of junction of the nasal bones with the frontal, thence ascending upwards and backwards along the middle of the concave surface of the bone, it is continued backwards along the convex border of the falx major in the line of the sagittal suture, and down the upper portion of the os occipitis to the superior transverse ridge, where it branches out into
2	The Two Lateral Sinuses	Directly opposite to the tubercle of the occiput. The lateral sinuses are continued transversely along the line of the foregoing ridge, passing over the posterior inferior angles of the parietal bones, to the mastoid processes of the temporal bones, here forming an obtuse angle, they proceed directly inwards, again taking their course upon the occipital bone, at which point they form a second angle, and advance forwards towards the jugular foramina, where they terminate in the internal jugular veins.
1	The Inferior Longitudinal Sinus ...	Commences and terminates at the same points with regard to the skull as the superior, but it is continued along the lower or concave border of the falx, and ends at the point where the falx expands into the tentorium, forming
1	The Torcula Herophili, the Fourth, or the Straight Sinus	Which proceeds in a straight course, along and within the line of junction of the falx with the tentorium, and empties itself at the point where the superior longitudinal sinus bifurcates into the lateral sinuses.
2	The Occipital Sinuses	Are situated on each side of the foramen magnum, which proceeding backwards to the falx cerebelli, unite and form
1	The Ascending Sinus	Which proceeding upwards along the lower branch of the internal crucial spine of the os occipitis, and opposite to the perpendicular ridge of that bone, terminates in the lateral sinuses at the same point as the fourth sinus.
1	The Circular Sinus	Is situated around the pituitary gland, and empties itself into
2	The Cavernous Sinuses.....	Which are short broad sinuses, situated on each side of the sella tursica, upon the body of the os sphenoides; they receive the ophthalmic veins from the orbit and communicate with the petrosal sinuses.
2	The Superior Petrosal Sinuses	Are situated in the grooves on the upper edge of the petrous portions of the temporal bones, and communicate with
2	The Inferior Petrosal Sinuses	Which are lodged in the grooves formed by the union of the petrous portions of the temporal bones with the basilar process of the os occipitis, and empty themselves into the lateral sinuses just before they emerge at the jugular foramina.
1	The Transverse Sinus	Extends across the basilar process of the occipital bone, forming a communication between the petrosal sinuses of each side.

THE ORBITS

Are two irregular conical cavities, situated under the forehead, on each side of the root of the nose, having their apices directed backwards and inwards, and their bases forwards and outwards. Each orbit is formed by 7 bones, viz.

1. Os Frontis	Superiorly, or Coronally.
2. Os Lachrymale 3. Os Ethmoides	Internally, or Mesially.
4. Os Malæ 5. Os Sphenoides	Externally, or Laterally.
6. Os Maxillare Superius 7. Os Palatinum	Inferiorly, or Basilarly.

The frontal, ethmoid, and sphenoid are single bones, and enter into the formation of both orbits, which are thus formed by 11 bones only.

The Openings into each orbit are 7 in number, viz.

1. The Superior Opening of the Nasal Duct.
2. The Superciliary Foramen.
3. The Anterior Orbital Foramen.
4. The Posterior Orbital Foramen.
5. The Fissura Lacera.
6. The Spheno-Maxillary Fissure.
7. The Posterior Opening of the Infra-Orbital Canal.

THE MOUTH

Is situated between the upper and lower jaws, and in the adult is formed by 38 bones, viz.

2 Ossa Maxillaria Superiora 2 Ossa Palatina 1 Os Sphenoides	Above, forming the Palate.
1 Os Maxillare Inferius	Below.
32 Teeth	In front, and laterally.

The Openings, or Foramina of the Palate, are 3 in number, viz.

1 Foramen Incisivum.
2 Foramina Palatina Posteriora.

THE NOSTRILS

Are two pyramidal cavities, situated in the middle of the bones of the face, covered anteriorly by the nose. 14 Bones enter into the formation of the nostrils, viz.

2 Ossa Nasi	Anteriorly, or Glabellarly.
1 Os Frontis 1 Os Ethmoides 2 Ossa Lachrymalia	Superiorly, or Coronally.
1 Os Sphenoides 2 Ossa Palatina	Posteriorly, or Inially.
2 Ossa Maxillaria Superiora 2 Ossa Spongiosa Inferiora	Externally, or Laterally.
1 Os Vomer	Inferiorly, or Mesially.

A back view of the nostrils exhibits three pairs of openings, leading into cavities which are commonly termed Chambers, viz.

Meatus Superiores	Situate above the turbinated processes of the os ethmoides.
Meatus Medii	Situate between the superior and inferior spongy bones.
Meatus Inferiores	Situate between the inferior spongy bones and the floor of the nostrils.

In each of these chambers are the following Openings, viz.

In the Superior Chamber	Are the openings from the posterior ethmoidal, and the sphenoidal sinuses.
In the Middle Chamber	Are the openings from the frontal, the anterior ethmoidal, and the superior maxillary sinuses.
In the Inferior Chamber	Is the lower opening of the nasal duct.

THE BASIS OF THE CRANIUM

Is generally divided into six large cavities, viz.

2 ANTERIOR CEREBRAL FOSSÆ.—Formed principally by the orbitar plates of the frontal bone, and bounded behind by the transverse spinous processes of the sphenoid bone—supporting the anterior lobes of the cerebrum.

2 MIDDLE CEREBRAL FOSSÆ.—Chiefly formed by the sphenoid and temporal bones, and bounded behind by the posterior clinoid processes, and by the petrous portions of the temporal bones—supporting the middle lobes of the cerebrum.

2 POSTERIOR CEREBRAL FOSSÆ.—Formed by the occipital and temporal bones, and situated behind the posterior boundaries of the middle cavity—containing the cerebellum. The posterior lobes of the cerebrum rest upon the tentorium, and in the superior cerebral cavities of the occiput.

A Recapitulation of the principal parts IN *the Base of the Cranium, enumerated as they present themselves to view:—*

1. Ridge for the attachment of the Falx.
2. Foramen Cæcum.
3. Crista Galli Process.
4. Cribriform Lamella.
5. Orbitar Plates.
6. Tuberculum Olivare.
7. Foramina Optica.
8. Anterior Clinoid Processes.
9. Tranverse Spinous Process.
10. Fissura Lacera.
11. Foramen Rotundum.
12. Foramen Ovale.
13. Foramen Spinale.
14. Meningeal Groove.
15. Sella Tursica.
16. Posterior Clinoid Processes.
17. Carotid Canal.
18. Vidian Foramen.
19. Petrous Portion of the Temporal Bone.
20. Superior Petrosal Groove.
21. Ridges for the attachment of the Tentorium.
22. Internal Auditory Meatus.
23. Opening of the Vestibule.
24. Opening of the Cochlea.
25. Foramen Jugulare.
26. Inferior Petrosal Groove.
27. Fossa Basilaris.
28. Anterior Condyloid Foramen.
29. Grooves for the Lateral Sinuses.
30. Foramen Magnum.
31. Internal Crucial Spine.
32. Ridge for attachment of Falx Cerebelli.
33. Groove for the Superior Longitudinal Sinus.

The Base of the Cranium EXTERNALLY, *omitting the parts before enumerated:—*

34. The Lambdoidal Suture.
35. Tubercle of the Occiput.
36. Superior Transverse Ridge.
37. Perpendicular Ridge.
38. Inferior Transverse Ridge.
39. Posterior Condyloid Foramen.
40. Condyles of the Occipital Bone.
41. Occipital Groove.
42. Digastric Groove.
43. Mastoid Process.
44. Mastoid Foramina.
45. Stylo-Mastoid Foramen.
46. Fossa Jugularis.
47. Foramen Carotideum.
48. Styloid Process.
49. Vaginal Process.
50. Auditory Process.
51. Meatus Auditorius Externus.
52. Fissura Glasseri.
53. Fossa Parotidea.
54. Glenoid Cavity of the Temporal Bone.
55. Eminentia Articularis.
56. Zygomatic Process of the Temporal Bone.
57. Temporal Fossa.
58. The Squamous Suture.
59. The Sphenoidal Suture.
60. Spinous Process of the Sphenoid Bone.
61. Pterygoid Foramen.
62. Eustachian Groove.
63. External Pterygoid Process.
64. Pterygoid Fossa.
65. Internal Pterygoid Process.
66. Hamular Process.
67. Posterior Openings of the Nares.
68. The Septum Narium.
69. Azygos Process of the Palatine Bones.
70. Pterygoid Process of the Palatine Bone.
71. Posterior Palatine Foramen.
72 Palatal Process of the Sup. Max. Bone.
73. The Alveoli.
74. Two Dentes Sapientiæ.
75. Four Molares.
76. Four Bicuspides.
77. Two Cuspides.
78. Four Incisores.
79. Foramen Incisivum.
80. Alveolary Foramina.
81. Infra-Orbitar Foramen.
82. Malar Process of the Sup. Max. Bone.
83. Maxillary Process of the Malar Bone.
84. Zygomatic Process of the Malar Bone.
85. Malar Foramen.
86. Orbital Processes of the Malar Bone.
87. Spheno-Maxillary Fissure.
88. Infra-Orbitar Canal.
89. Posterior Orbital Foramen.
90. Anterior Orbital Foramen.
91. The seven Bones of the Orbit.
92. Superior Opening of the Nasal Duct.
93. Nasal Process of the Sup. Max. Bone.
94. The Transverse Suture.
95. Notch for the Trochlear Tendon.
96. Lachrymal Fossa.
97. Superciliary Ridge.
98. Supra-Orbitar Foramen.
99. Nasal Process of the Frontal Bone.
100. The Frontal Sinuses.

How many bones proper to the head.
How many common to the head and face.
How many bones of the face.
How many teeth in both jaws.
How many and what bones form an orbit.
What is the use of the foramen parietale.
What does the cribriform lamella transmit.
Where are the lachrymal glands situated.
What does the foramen ovale transmit.
What bones form the temporal fossæ.
Where are the hamular processes? and what is their use.
What is lodged in the sella tursica.
How many and what bones form the nostrils.
What are the connexions of the parietal bone.
What does the for. stylo-mastoideum transmit.
Where and for what purpose is the foramen cæcum.
What do the ant. condyloid foramina transmit.
What is attached to the tubercle of the occiput.
Where is the superior longitudinal sinus.
What are the connexions of the malar bone.
How is the lachrymal canal formed.
Where is the falx minor attached.
Where is the foramen incisivum? and how does it terminate above.
Enumerate the teeth with their divisions.
How many ossicula auditus are there? and where are they situated.
What are the connexions of the os frontis.
Where are the posterior palatine foramina.
What bones form the post. openings of the nares.
What do the alveolary foramina transmit.
Where is the fissura glasseri? and what does it transmit.

What are the attachments of the os unguis.
What is there observable at the posterior inferior angle of the parietal bone.
How is the septum narium formed.
What are the connexions of the ethmoid bone.
Where are the fossæ cerebelli.
What does the auditory process surround.
What are the connexions of the vomer.
What does the int. auditory meatus transmit.
To what bone are the condyles of the os occipitis attached.
How many and what bones does the transverse suture connect.
By the union of the parietal bones internally what is formed.
What does the foramen rotundum transmit.
What are the connexions of the os occipitis.
What does the vidian foramen transmit.
Where are the connexions of the inferior spongy bone.
Where is the fourth sinus? and in what does it terminate.
Where is the spheno-maxillary fissure.
What does the infra-orbitar foramen transmit.
What are the connexions of the temporal bone.
What are the superior spongy bones.
Where is the trochlear notch.
Where are the depressions for the glandulæ pacchioni chiefly to be found.
What are the connexions of the palatine bones.
What are the connexions of the sup. max. bone.
How many bones form *both* orbits.
Where are the pterygoid fossæ.
Where is the foramen spinale? and what does it transmit.

What are the connexions of the sphenoid bone.
To what bones is the tentorium attached.
What are the surfaces of the os unguis termed.
What is there observable at the long anterior angle of the parietal bone.
What are the connexions of the nasal bone.
On what bones of the skull is a processus azygos to be found.
What runs along the inferior margin of the falx major? and in what does it terminate.
What bones do the lambdoidal suture and its additamenta connect.
Where is the max. process of the malar bone.
Where and for what purpose are the superior and inferior petrosal grooves.
Is the maxillary or the lachrymal process of the inferior spongy bone the larger.
Where is the tuberculum olivare; and its use.
What passes through the excavations on the inner sides of the ant. clinoid processes.
For what purpose is the groove on the inferior spongy bone.
What is attached to the internal spine of the ossa nasi.
Where and for what purpose is the styloid process of the sphenoid bone.
What is attached to the post. clinoid processes.
What are the four surfaces of the superior maxillary bone called.
What does the fissura lacera transmit.
For what purpose is the occipital groove.
Which extremity of the inferior spongy bone is the more acute.
What is the use of the mental foramina.
Which edge of the vomer is sharp.

Where and for what purpose is the semicircular ridge on the superior maxillary bone.

To which leg of the incus is the orbicular process attached.

Where is the superior maxillary sinus.

Where are the pterygoid foramina.

Where is the dental canal? and what does it lodge.

Where and for what purpose is the malar foram.

What is attached to the crista galli process of the ethmoid bone.

What is received in the glenoid cavity of the stapes.

How is the vomer connected with the superior maxillary and palatine bones.

Describe a tooth generally.

Where is the infra-orbitar canal.

Where do the sphenoidal cells open.

What does the base of the stapes cover.

Where are the frontal sinuses? how are they formed? and where do they open.

By what bones is the lower margin of the orbit formed.

What is attached to the coronoid process of the lower jaw.

Which bone of the internal ear is connected with the membrana tympani.

What is attached to the auditory process.

Is the mastoid process solid.

For what purpose is the internal crucial spine of the os occipitis.

How many and what are the openings into the middle chamber of the nostrils.

What is the use of the post. condyloid foramina.

Enumerate the sutures.

What are the boundaries of the middle cerebral fossa.

Where is the lower opening of the nasal duct.

Where is the transverse sinus.

What bones does the coronal suture connect.

Where is the nasal process of the palatine bone.

How are the bones of the face connected with each other.

Where are the appendices of the os hyoides.

Where are the cavernous sinuses.

What bones does the sagittal suture connect.

Where is the exit e craneo of the ninth pair of nerves.

What is there found between the two crura of the stapes.

How are the lateral sinuses formed? and where is their exit from the skull.

Where are the occipital sinuses? and in what do they terminate.

How many and what are the openings into the superior chamber of the nostrils.

What bones do the squamous sutures and their additamenta connect.

How many and what openings are there into each orbit.

How many bones contribute to the formation of the mouth.

Where is the mystachial harmony? and what does it connect.

What bones does the transverse palatine harmony connect.

What is lodged in the fossa basilaris.

By what bones are the anterior and posterior orbital foramina formed.

Where is the short leg of the incus attached.

What is received into the concavity behind the body of the os hyoides.

Where are the circular sinuses? and in what do they terminate.

Where is the sphenoid process of the pal. bones.

What bones does the ethmoidal suture connect.

What does the foramen magnum transmit.

Where is the parotid fossa? and what does it lodge.

What do the mastoid foramina transmit.

What are the 6 angles of the os occipitis called.

How is the jugular foramen formed? and what does it transmit.

What is attached to the processus gracilis of the malleus.

Where are the optic foramina? and what do they transmit.

What are the diff. kinds of motions of bones.

Into what part of the cerebrum are the transverse pro. of the sphenoid bone received.

Where is the orbitar process of the pal. bone.

How many edges of the vomer are grooved.

What are attached to the extremities of the cornua of the os hyoides.

How are the anterior cerebral fossæ formed.

What does the symphisis of the lower jaw denote? and what is attached to the internal spine of that bone.

What is the use of the eustachian tube? and where are its two extremities.

What is attached to the azygos process of the sphenoid bone.

Where are the ossa triquetra mostly found.

Where are the exits e craneo of the nine pairs of cerebral nerves.

On the Second Division of the Table, comprehending the 53 Bones of the Trunk.

53

BONES OF THE TRUNK.

24 *Bones of the Spine.*	25 *Bones of the Thorax.*	4 *Bones of the Pelvis.*
7 Cervical Vertebræ.	24 Ribs, or Costæ.	2 Ossa Innominata.
12 Dorsal Vertebræ.	1 Sternum.	1 Sacrum.
5 Lumbar Vertebræ.		1 Coccyx.

THE SPINE

Is a column of bones, situate at the posterior part of the trunk, extending from the head to the pelvis, and forming by its union with the sacrum, an important canal for the lodgement and protection of the spinal marrow. If the spine be regarded from before backwards, it is straight; but if it be viewed laterally, it will be seen to present four distinct curves; viz. one forwards in the neck, a second backwards in the chest, a third forwards in the abdomen, and a fourth backwards to join the sacrum, which brings the first and the last vertebræ in the same perpendicular line.

In the description of the spine, a Dorsal Vertebra has been selected, as containing the greatest number of the characteristics of a vertebra generally. The individual varieties, and the peculiarities of the cervical and lumbar vertebræ, are afterwards described.

A DORSAL VERTEBRA.

Deriv. Verto, to turn. *Syn.*, ossa Spondyli, ossa Orbiculata, ossa Vertebrata, &c.

Has a Body, a Foramen or Ring, 7 Processes, 4 Notches, and 12 Articulating Surfaces.

Connexion With 6 bones; viz. with the vertebra above and below; and with two ribs on each side.

1. THE BODY ..... Convex before, concave behind—its upper and lower surfaces somewhat excavated, for the reception of the intervertebral substances.
2. THE RING ..... *Foramen Spinale.* Formed by the union of the roots of the processes to the body—through which the spinal chord passes.
3. 2 ASCENDING PROCESSES ..... or Articulating Surfaces, *Processus Articulares.* On the upper surface of the bone, and facing backwards—by which it is connected with the descending articulating surfaces of the vertebra above.
4. 2 DESCENDING PROCESSES..... or Articulating Surfaces; situated just beneath the former processes and facing forwards—by which it is connected with the ascending articulating surfaces of the vertebra below.
5. 2 TRANSVERSE PROCESSES..... *Processus Transversi.* Projecting laterally, just between the ascending and descending processes—to which the tubercles of the ribs are attached.
6. 1 SPINOUS PROCESS..... Projecting obliquely backwards and downwards, and overlapping the corresponding process of the vertebra below.
7. 2 UPPER INTERCOSTAL NOTCHES ..... Indistinct—situated between the body and the ascending processes.
8. 2 LOWER INTERCOSTAL NOTCHES..... Deeply excavated—situated beneath the root of the transverse processes, and between the body of the bone and the descending processes—by its union with the vertebra above and below, these notches form the Intervertebral Foramina, for the transmission of the intercostal nerves.
9. 2 ARTICULATING SURFACES ..... On the body, above and below—by which it is connected with the bodies of the two next vertebræ.

32	DORSAL VERTEBRA *(continued)*.	On the Second Division of the Table, comprehending the 53 Bones of the Trunk.
10.	4 Articulating Surfaces	Either small tubercles or depressions, two on each side of the body of the bone, above and below, close to the roots of the transverse processes—for the reception of the heads of the ribs—the articulation of the head of a rib is formed by the bodies of two vertebræ, and by the intervertebral substance.
11.	2 Articulating Surfaces	On the ends of the transverse processes—for the connexion with the tubercles of the ribs; the heads of which ribs are connected with the superior depressions on the side of the body of the bone.
12.	Ridge	Along the upper margin of the spinous process.
13.	Groove	Along the under surface of the spinous process, which receives the corresponding ridge of the vertebra below.
14.	Foramina.....	Varying in number and size—entering chiefly on the anterior surface of the body—for the transmission of the nutrient arteries of the bone.
	The First Dorsal Vertebra	Receives the whole of the head of the first rib—its spinous process is frequently bifurcated, and it is less oblique in its direction than the subsequent dorsal vertebræ.
	The Fourth Dorsal Vertebra	Is said to be the smallest, and that the spinal column thus forms from this point a double cone.
	The Tenth Dorsal Vertebra.....	Often receives the whole of the head of the tenth rib, and has no articulating surfaces on the lower edge of its body—the transverse processes are rather shorter than those of the ninth—the spinous processes of the tenth, eleventh, and twelfth dorsal vertebræ are shorter and less oblique than of those above, and their extremities are expanded into a sort of bulb.
	The Eleventh and Twelfth Dorsal Vertebræ	Approach in character near to that of a lumbar vertebra—the transverse processes are much shorter, and have no articulating surfaces at their extremities for the tubercles of the ribs—they each form, independently of the vertebra above, a complete articulating surface for the reception of the head of a floating rib, and consequently, they have no articulating surfaces (for this purpose) at the lower edge of the body—their descending articulating surfaces are oblique in their direction; and the under surface of the last dorsal vertebra, presents the ordinary characteristics of a lumbar vertebra. The first dorsal vertebra is connected with the last cervical, and the last dorsal vertebra with the first lumbar.
	THE CERVICAL VERTEBRÆ	Are 7 in number. In their general character they are smaller than the dorsal vertebræ, and the long axis of their bodies is from side to side—the spinous processes are short and bifurcated, and much less oblique in their direction than the dorsal—they have obviously no articulating surfaces for the ribs, and hence have only 6 instead of 12 articulating surfaces—the transverse processes are frequently bifid, and are perforated at their roots by foramina, for the transmission of the vertebral arteries and veins—sometimes there are separate holes for the artery and vein—the ascending and descending arti-

		culating surfaces are more oblique than those of the dorsal vertebræ, and are placed behind the spinous processes—the large articulating surfaces on the body are more excavated, and are also oblique. The first cervical vertebra is connected with the condyles of the os occipitis, and the last with the first dorsal vertebra—the two uppermost cervical vertebræ have distinct names and characters, viz. the Atlas, and the Dentata. The Seventh has also one or two peculiarities.
	THE ATLAS.	*Deriv.* from αταλαω, to sustain ; because this bone sustains the head. It has no body, nor spinous process properly so called, but a much larger ring than the other cervical vertebræ.
1.	2 Excavated Articulating Surfaces	Above, which receive the condyles of the os occipitis, and allow of a ginglimoid motion between the head and the atlas—they correspond, as to situation, with the ascend. art. surfaces of the other vertebræ.
2.	2 Flattened Articulating Surfaces	Below, by which it is connected with the next vertebra, the dentata, and which allow of a rotatory motion between it and the atlas, thus forming with the articulation above a very secure kind of joint admitting of every variety of motion—these surfaces correspond with the desc. art. surfaces of the other vert.
3.	An Articulating Surface	Within the ring anteriorly—for its connexion with the odontoid process of the dentata.
4.	2 Tubercles.....	One on each side of the above surface, situated a little posteriorly to it—for the attachment of the transverse ligament, which confines the processus dentatus in its situation, and divides the cavity of the ring into two compartments, the anterior or smaller being occupied with the foregoing process, and the posterior or larger containing the medulla oblongata.
5.	The Transverse Processes	Are somewhat larger than those of the other cervical vertebræ, and are very rarely forked—they are perforated by holes, called the
6.	2 Vertebral Foramina.....	For the transmission of the vertebral vessels—in many instances there are notches instead of foramina, which are completed in the recent subject by ligament.
7.	2 Grooves.....	Running along the upper and back part of the transverse processes, and continued across the ring, at the point where the vertebral arteries take a turn just before their entrance into the skull—in some instances these grooves are complete foramina.
8.	A Roughness, or Spine.....	At the posterior part of the ring, corresponding to the spinous process—to which the ligamentum nuchæ is attached.
	THE DENTATA.	*Deriv.* Dens, a tooth ; so called from its tooth-like process. *Syn.*, Epistrophæus, Axis, &c.
		The under surface of this bone presents all the characteristics of an ordinary cervical vertebra, but from its upper and front surface there arises a marked projection, called the
1.	Odontoid Process	*Processus Dentatus.* Which is received into the anterior part of the ring of the atlas—the apex of this process gives attachment to ligaments connecting it with the edges of the foramen magnum ; and on its front surface there is an oblong convex

34	THE CERVICAL VERTEBRÆ, *(continued).*	On the Second Division of the Table, comprehending the 53 Bones of the Trunk.
2.	ARTICULATING SURFACE	Adapted to a corresponding articulating surface within the ring of the atlas. At the root of the odontoid process there is a contraction called the
3.	CERVIX	Which has also a smooth surface behind, furnished with cartilage, to facilitate its play upon the transverse ligament.
4.	THE ARTICULATING SURFACES	On the upper part are flat, and adapted to the corresponding articulating surfaces on the lower part of the atlas.
5.	THE UPPER INTERCOSTAL NOTCHES	Are indistinct, and placed behind the articular surfaces.
6.	THE VERTEBRAL GROOVES	Are situated directly beneath the superior articulating surfaces, and
7.	THE TRANSVERSE PROCESSES	Are shorter considerably, and more pointed than those of the atlas.
	THE SEVENTH CERVICAL VERTEBRA.....	Approaches in form and size to a dorsal vertebra—the body is larger, the transverse processes are longer and broader, and the spinous process is also longer, rarely bifurcated, and more oblique in its direction than those of the other cervical vertebræ—independently of the foramina within the transverse processes which transmit the vertebral veins, there are grooves on the anterior surfaces of these processes over which the vert. arteries pass in their course to enter the vert. foramina of the sixth cer. vert.
	THE LUMBAR VERTEBRÆ	Are 5 in number. They are much larger than the other vertebræ, and the long axis of their bodies is from side to side—the transverse processes are slender, and are neither perforated by foramina, nor marked by articulating surfaces for the ribs—the spinous process stands out almost at a right angle, it is large and flattened laterally—the ascending processes are somewhat excavated, and are directed backwards and inwards—the descending processes are rather convex, and face forwards and outwards —the foramen or ring is perfectly triangular—the intercostal notches form deep grooves. The First Lumbar Vertebra is the smallest, and is noted by the bulb at the extremity of its spinous process, similar to those on the three last dorsal vertebræ. The Fifth Lumbar Vertebra may be distinguished by the obliquity of its under surface, which is adapted to the sacrum, so that the anterior part of its body is much deeper than the posterior—the spinous process also is somewhat curved downwards towards the sacrum. The first lumbar vertebra is connected with the last dorsal, and the last lumbar with the sacrum.
	Use.....	By the union of the 24 bones just described the spinal column is formed—which constitutes the great medium of connexion between all the parts of the body—the mechanism of the spine is admirably adapted to its purpose, affording every variety of motion, combined with the greatest security to the important nervous projection which it contains—the spinal column supports the head, forms a part of the chest, and affords an extended and complicated surface for the attachment of the multitude of muscles, necessary to the performance of its various motions.

	THE THORAX.	*Deriv.* from θωρεω, to leap, because in it the heart beats. The thorax is composed of 37 bones, and is bounded by the ribs and the dorsal vertebræ posteriorly and laterally, and by the sternum and the cartilages of the ribs anteriorly.
	THE RIBS, OR COSTÆ.	*Deriv.* a custodiendo, because the ribs surround and keep the viscera. They are 24 in number, 12 on each side, and are divided into
	7 STERNO-DORSAL	or True Ribs—those which are attached by a proper cartilage to the sternum, and
	5 DORSAL	or False Ribs, (*Nothæ Costæ*), the cartilages of which are joined successively with the cartilage of the rib above. The two lowermost of these ribs are furnished with very short cartilages, and are connected only with the surrounding muscles, they are hence termed Floating Ribs.
	A RIB *(generally)*,	As in the description of the spinal column, one rib, for instance the sixth, is selected as a standard; and the varieties and peculiarities of individual ribs are afterwards described.
	Situation.	Transversely and obliquely on the back and sides of the thorax.
	Connexion	With 3 bones; viz. at its head with the bodies of two vertebræ, as well as with the transverse process of the lower vertebra of the two, at its tubercle; and with the sternum intermediately by cartilage.
	Use.....	The ribs principally contribute to the formation of the thorax, they cover and defend the heart and lungs, assist in respiration, &c.
1.	HEAD.....	The rounded extremity which is articulated with the dorsal vertebræ—the articular surface is marked by a ridge, and adapted to the articular surfaces on the bodies of the vertebræ—the ridge corresponds with the intervertebral substance.
2.	NECK	A contraction of the bone between the head and the tubercle.
3.	TUBERCLE	Behind, and at the lower edge of the bone—furnished with a small convex articulating surface adapted to the concave articulating surface on the transverse processes of the vertebræ.
4.	ANGLE.....	Situated at a short distance externally to the tubercle, where the rib bends to form the side of the thorax.
5.	UPPER, OR ROUNDED EDGE.....	Affording attachment to the intercostal muscles.
6.	LOWER, OR SHARP EDGE.....	Also for the attachment of the intercostal muscles—internally, the lower edge is marked by the
7.	INTERCOSTAL GROOVE	Which commences at the tubercle, and is lost as it approaches the sternal extremity—for the lodgement of the intercostal artery, vein, and nerve.
8.	STERNAL EXTREMITY.....	Excavated for the reception of the cartilage, through the medium of which the rib is connected with the sternum.
	THE FIRST RIB.....	Is flat and semicircular, and considerably smaller than any of the other ribs—the articular surface on the head is undivided by any ridge, and connected with the body of the first dorsal vertebra only—the tubercle and angle are just at the same point, and it is to be observed that the distance between

		the angles and the tubercles of the ribs gradually increases, from above downwards, until it arrives at about the ninth or tenth; in the eleventh and twelfth the angle is indistinct—on the upper part of the first rib there are two smooth and somewhat excavated surfaces, divided from each other by a slight projection or roughness, (to which the scalenus anticus muscle is attached,) for the passage of the subclavian artery and vein—just at the sternal extremity of the bone there is a tubercle or thickening for the attachment of a ligament going to the clavicle—there is no groove beneath, for the intercostal vessels, and its outer edge, which corresponds to the upper or rounded edge of any other rib, is as sharp as the inner edge—the two first ribs and the sternum form the superior aperture of the thorax.
	THE SEVENTH RIB	Is the longest, from which point both above and below the ribs gradually decrease in length—the cartilages of the eighth, ninth, and tenth ribs are connected with the sternum by means of the cartilage of the seventh.
	THE ELEVENTH AND TWELFTH	or Floating Ribs, are merely tipped with cartilage, and unconnected with any other ribs—their heads are attached to the body of the one vertebra only, and consequently, the articular surface is simple—they have no tubercles, and are therefore unconnected with the transverse processes of the vertebræ—the intercostal grooves are indistinct, and these ribs are much less curved than those above.
		The ribs, although extremely irregular in their general contour, are well adapted to their office in respiration—there is a peculiar twisted appearance about them, which gives the idea that the two extremities look in different directions when the rib is laid upon its lower edge, but this notion disappears when the rib is turned round, and the two extremities are placed on the same plane.
	STERNUM.	*Deriv.* from sterno, to pave or make flat, because this bone forms the anterior flat part of the thorax. *Syn.*, os Ensiforme, Scutum Cordis, os Pectoris, &c.
	Situation.	In the median line of the body, at the upper and anterior aspect of the thorax.
	Connexion	With 16 bones; viz. above with the clavicles, and laterally and below with the 14 sterno-dorsal ribs by means of their cartilages.
	Use	By its union with the cartilages of the ribs it completes the cavity of the thorax, defends the thoracic viscera, and affords a fixed point for the action of the clavicles.
	The Triangular Portion.	The sternum is divided into an upper or Triangular Portion, and a lower or Oblong Portion, which have no bony union with each other until the adult period of life. By some Anatomists the Ensiform Cartilage is described as a third portion.
1.	AN EXCAVATION	or Notch, in the centre, above and behind—for the reception of the trachea.
2.	2 ARTICULAR CAVITIES	Situated on each side of the notch—for its connection with the sternal extremities of the clavicles.
3.	2 ARTICULAR CAVITIES	Close beneath the clavicular cavities—for the reception of the cartilages of the two first ribs.

37	STERNUM *(continued)*.	On the Second Division of the Table, comprehending the 53 Bones of the Trunk.
4.	2 ARTICULAR CAVITIES	About an inch below the former—for the reception of a part of the cartilages of the second ribs—this articulation is completed by the oblong portion.
5.	ROUGH SURFACE	At the lower end—by which the upper portion is connected with the lower.
	The Oblong Portion.	Forming the most considerable share of the sternum.
6.	2 SMALL DEPRESSIONS	On each side of the upper end, which complete the articular cavities for the cartilages of the second ribs.
7.	2 ARTICULAR CAVITIES	About an inch below the foregoing depressions—for the cartilages of the third ribs.
8.	2 ARTICULAR CAVITIES	At a short distance below the former, and distinct—for the cartilages of the fourth ribs.
9.	6 ARTICULAR CAVITIES	At the lower end of the bone, indistinct and close to each other—for the cartilages of the remaining six sterno-dorsal ribs.
10.	INFERIOR EXTREMITY	Sometimes called the *Apex*—to which the ensiform cartilage is attached.
	THE PELVIS.	*Deriv.* from πελυς, a basin. Is a large irregular cavity, situate at the lowermost part of the trunk, and in the adult subject consists of 4 bones; viz. two ossa Innominata, the os Sacrum, and the os Coccygis—in childhood however the pelvis is formed of no less than 14 or 15 bones; the ossa innominata consist of three bones each, the sacrum of five, and the coccyx of three or four—the lines of union of the bones forming the ossa innominata become obliterated in the adult, but those of the sacrum and coccyx are seen until the remotest period of life. It is this division of the sacrum and coccyx which has obtained for these bones the designation of the False Spine, inasmuch as many of the separated portions in the young subject resemble in some degree a vertebra.
	OS INNOMINATUM.	*Syn.*, ossa Tripartita, ossa Coxarum, ossa Anonyma, ossa Coxendicis, &c. To facilitate the description of this bone, Anatomists have adopted the plan of describing separately the three portions that exist in the young subject. They are severally termed Ilium, Ischium, and Pubis.
	Connexion	Each os innominatum is connected with 3 bones; viz. with the sacrum behind, at the sacro-iliac symphisis; with its fellow in front, at the symphisis pubis; and with the thigh-bone below, at the acetabulum.
	Use.....	The ossa innominata form the sides and front of the pelvis—they afford an important point of attachment for muscles, and connect the trunk with the lower extremities.
	THE ILIUM.	*Deriv.* from Ilia, the small intestines, because this bone supports the ilia; which name is derived from ειλεω, to turn, from the convolutions of the small intestines. It is the uppermost of the three bones.
1.	THE CRISTA	The superior semicircular margin of the bone; which is marked by an indistinct
2.	GROOVE	Running along its centre, which affords attachment to the obliquus internus muscle—on each side of this groove there are two ridges, more or less elevated, termed Labia.

	THE ILIUM *(continued)*.	On the Second Division of the Table, comprehending the 53 Bones of the Trunk.
3.	The External Labium	Affords attachment to the obliquus externus muscle.
4.	The Internal Labium	Gives attachment to the iliacus internus, and quadratus lumborum muscles. The crista commences in front by the
5.	Anterior Superior Spine	Which forms the superior point of attachment for Poupart's ligament—at a short distance below this, there is another projection, termed the
6.	Anterior Inferior Spine.....	For the attachment of the rectus femoris muscle—the crista terminates behind in the
7.	Posterior Superior Spine.....	And at a short distance below this, there is another process, called the
8.	Posterior Inferior Spine	Both of which points afford attachment to strong ligaments connecting this bone with the sacrum.
9.	The Ischiatic Notch.....	Situated immediately below the posterior inferior spine—formed partly by the ilium and partly by the ischium. In the recent subject it is a foramen, for the transmission of the great sciatic nerve, &c.
10.	Sacro-Iliac Symphisis	A large rough irregularly excavated surface, situated above and behind the ischiatic notch—the articulating surface is divided by a groove or ridge for the attachment of a strong ligament; and is adapted to a corresponding articulating surface on the sacrum.
11.	Iliac Fossa	*Fossa Iliaca, seu Venter.* A large smooth excavation on the inner surface of the bone, for the lodgement of the iliacus internus muscle—the whole posterior surface of the bone is called the
12.	Dorsum.....	Which is marked by semicircular ridges, denoting the different points of attachm. of the glutei muscles.
13.	The Acetabulum	Is the large cavity which receives the head of the os femoris—it is formed by the three bones constituting the os innominatum, in the following proportions, viz. rather less than two-fifths of the ilium, rather more than two-fifths of the ischium, and one-fifth of the pubis.
14.	Brim of the Acetabulum.....	Is deepest at the upper and back part—in its whole circumference it gives attachment to the capsule of the joint.
15.	Foramina.....	Varying in number—situated chiefly about the acetabulum—for the transmission of the nutrient arteries of the bone.
	THE ISCHIUM.	(*Deriv.* from ισχις,) the loin, the hip-bone: so called, because it is near the loin. It is the lowermost of the three bones forming the os innominatum.
1.	The Body	Constitutes the thickest portion of the bone, and forms the lower and back part of the acetabulum.
2.	Notch.....	In the brim of the acetabulum, formed partly by this bone and partly by the os pubis—across which the transverse ligament is stretched, to which the ligamentum teres of the thigh-bone is attached—beneath the transverse ligament there is a foramen, for the passage of vessels to the joint.
3.	Fossa.....	Within the acetabulum—for the lodgement of the fatty cushion of the joint—the surface of this excavation is rough, and not covered by cartilage.
4.	The Neck	A contraction of the bone just below the body—around the outer side of which the tendon of the obturator externus muscle turns.

39	THE ISCHIUM *(continued.)*	On the Second Division of the Table, comprehending the 53 Bones of the Trunk.
5.	OBTURATOR FORAMEN	*Foramen Thyroideum, vel Obturatorium.* A large hole, of an oval shape, formed by the ischium and pubis, which in the recent subject is filled by an expanse of ligament, excepting a small hole at the upper part for the transmission of the obturator vessels and nerve.
6.	TUBEROSITY	*Tuber Ischii.* The lowermost part of the bone—upon which the body rests in a sitting posture—it is expanded and rough for the attachment of condensed cellular substance.
7.	GROOVE	On the inner side of the tuber ischii, for the passage of the internal pudic artery, which in general is not very clearly marked.
8.	THE RAMUS	Continued upwards and inwards from the tuber, and uniting with the descending ramus of the pubis, to form the anterior boundary of the thyroid foramen.
9.	SPINOUS PROCESS	A sharp projection arising from the posterior part of the body of the bone—giving attachment to the sacro-ischiatic ligament.
	THE PUBIS.	*Deriv.* a Pubeo, unde *pubens,* from *βουϵων* inguen. *Syn.* os Pecten. The smallest of the three bones, situated on the anterior aspect of the os innominatum.
1.	THE BODY	The thickest part of the bone—forming the anterior and inner fifth of the acetabulum.
2.	SYMPHISIS	The point of connexion with its fellow, which is rough for the attachment of the intervening cartilage.
3.	ANGLE	The superior corner of the symphisis—at a short distance from the angle there is a projection, called the
4.	SPINOUS PROCESS	Which affords the lower point of attachment to Poupart's ligament.
5.	THE ASCENDING RAMUS	Extending from the angle to the body—it forms the superior boundary of the obturator foramen, and is smooth on its upper surface for the passage of the inguinal vessels.
6.	THE LINEA ILIO-PECTINEA	Is formed by a ridge commencing at the spinous process of the pubis, and continued along that bone and the ilium to the sacro-iliac symphisis—it forms the line of separation between the cavities of the abdomen and of the pelvis.
7.	THE DESCENDING RAMUS	Commencing at the symphisis, is continued downwards to join the ramus of the ischium, and thus forms the inner boundary of the obturator foramen.
	OS SACRUM.	*Deriv.* from Sacer, sacred; because this bone was once offered in sacrifices. *Syn.* os Latum, os Clunium. It is a triangular bone, with the basis upwards and the apex downwards, and presents an anterior concave, and a posterior convex surface.
	Situation.	Posteriorly, with regard to the bones of the pelvis; and, inferiorly, with respect to those of the spine.
	Connexion	With 4 bones; viz. above, with the last lumbar vertebra; laterally, with the two ossa innominata; and below, with the os coccygis.

	OS SACRUM *(continued)*.	
	Use.....	Supports the spine, defends the cauda equina, transmits many nerves, and forms the posterior part of the pelvis.
	Anterior Concave Surface.	The upper surface of the sacrum resembles the upper surface of a lumbar vertebra.
1.	ARTICULATING SURFACE.....	Adapted to the lower articulating surface on the body of the last lumbar vertebra.
2.	THE PROMONTORY.....	of the sacrum—the anterior and upper projecting part of the bone—important in connexion with the obstetric art.
3.	ANTERIOR CONVEX SURFACE.....	Which lodges the intestinum rectum.
4.	4 TRANSVERSE RIDGES.....	Denoting the lines of separation of this bone into five pieces in the young subject.
5.	8 ANTERIOR SACRAL FORAMINA.....	4 on each side—for the transmission of the great sacral nerves.
6.	APEX.....	The lower extremity of the bone—furnished with an art. surface, for the connexion with the os coccygis.
7.	TWO NOTCHES.....	One on each side of the apex—forming with the coccyx the fifth pair of anterior sacral foramina.
	Posterior Convex Surface.	
8.	THE INFERIOR OPENING..... ...	of the sacral canal, which, in the recent subject, is closed by an expanse of ligament.
9.	A CHAIN OF SPINOUS PROCESSES.....	Extending down the middle of the posterior surface of the bone, connected with each other, and corresponding with the spinous processes of the vertebræ.
10.	POSTERIOR SACRAL FORAMINA.....	Corresponding in number to the anterior foramina—situated on each side of the spinous processes—which are nearly closed in the recent subject by strong ligamentous fibres, excepting small holes for transmission of some small nervous filaments and vessels.
11.	TWO RIDGES.....	One on either side of the above foramina—corresponding with the transverse processes of the vertebræ.
12.	ARTICULATING SURFACES.....	On each side of the bone—for the junction with the ossa innominata, forming the sacro-iliac symphisis. Each articular surface is divided by a ridge or groove for the attachment of an interarticular ligament to strengthen the joint.
13.	2 ASCENDING ARTICULAR SURFACES....	On the upper surface, by which this bone is connected with the descending processes of the last lumbar vertebra.
14.	FORAMEN AND CANAL.....	Extending down the centre of the bone, for the lodgement of the cauda equina.

	OS COCCYGIS.	
		Deriv. from χοιρος, the cuckoo, the bill of which bird it is said to represent. *Syn.*, os Caudæ, os Spondylium.
	Situation.	Lower part of the sacrum, converging forwards beneath the cavity of the pelvis.
	Connexion	With 1 bone only; viz. above with the sacrum.
	Use.....	Supports the extremity of the last intestine, and affords attachment to the sphincter ani, and other muscles.
1.	BASE.....	Like the sacrum the os coccygis is of a triangular form, and consists of three or four portions in the young subject, the upper of which is the largest, and the lower the smallest.

41	OS COCCYGIS *(continued)*.	On the Second Division of the Table, comprehending the 53 Bones of the Trunk.
1.	BASE	Above—forming the articulation with the sacrum, and allowing of considerable motion.
2.	2 CORNUA.....	Rising up on each side of the base, going to join the sacrum to form the fifth pair of sacral foramina.
3.	APEX	Below—the point of attachment of the sphincter ani muscle.
4.	TRANSVERSE RIDGES	Marking the lines of separation of the bone into three or four pieces in the young subject—these portions are not hollowed out for the continuation of the cauda equina, and therefore cannot be said to resemble the caudal vertebræ of animals.
5.	LATERAL TUBERCLES	Which bear a faint resemblance to the transverse processes.

DIFFERENCE BETWEEN THE MALE AND FEMALE SKELETON.

The differences between the male and female skeleton chiefly exist in the bones composing the second division of the Table, and especially in those of the pelvis. It is to be remarked generally, that the bones of women are smaller and more slender in proportion to their length than those of men; and that the processes, depressions, ridges, scabrous surfaces, and other inequalities produced by the muscles, are not so conspicuous—the os frontis is more frequently divided by a continuation of the sagittal suture—the frontal sinuses are less strongly marked—the cartilages of the true ribs are longer in proportion to the osseous part, and broader and flatter to support the mammæ—the clavicles are less crooked—the scapulæ are smaller, and placed more backwards and closer to the thorax—the sternum is more raised, the cartilages of the lower ribs are longer, and the whole thorax is driven upwards, in order to enlarge the cavity of the abdomen. This observation does not apply to the unnatural and injurious contraction of the chest produced by tight lacing. The sternum is sometimes perforated by a large hole in the centre, and the ensiform cartilage is frequently bifurcated—the ossa femorum are more curved, and the neck of the thigh-bone forms a greater angle with its body.

As to the PELVIS. The whole cavity in women is more expanded, and its outlets are larger—the os sacrum is more turned backwards—the os coccygis is more moveable and less bent forwards—the ossa ilia are flattened, and more reflected outwards—the cartilage in the symphisis of the pubis is thicker—the tuberosities of the ossa ischia are flatter, arising from the sedentary life of women—and in consequence of the greater width of the pelvis, the articulations of the thigh-bones are farther removed from each other, from which reason women walk less firmly than men. The female pelvis is altogether more lightly constructed than that of the male, and all the lateral dimensions are greater, while in the male the perpendicular dimensions are the most considerable—the superior aperture is large and oval, the long diameter extending between the ossa ilia—the inferior aperture is much wider, and of an oval form, but the oval is the reverse of that at the brim. The male pelvis, on the other hand, is characterised by its greater depth and contracted diameter, its more strongly ossified bones, its erect ossa ilia, its curved sacrum, and its more closely approximated acetabula, which brings the thighs in a more direct line with the body, and renders the walk of man firm and secure.

How many bones form the trunk.
How many bones of the spine.
How many bones of the thorax.
How many bones of the pelvis.
With how many, and what bones is the atlas connected.
For what purpose is the groove on the inner side of the tuber ischii.
What are the names of the two upper cervical vertebræ.
How many articulating surfaces are there on the dentata.
What are the connexions of the os coccygis.
How are the vertebræ subdivided.
How do the transverse processes of a lumbar vertebra differ from those of a dorsal.
What joins the descending ramus of the pubis.
What is there peculiar to the transverse processes of the cervical vertebræ.
Where are the intercostal grooves of the ribs? and what do they lodge.
What does the iliac fossa contain.
With how many bones is each os innominatum connected.
Where is the linea-ileo pectinea.
What is lodged in the fossa in the acetabulum.
What are the general characteristics of a dorsal vertebra.
How, and where does the vertebral artery enter the skull.
How many ribs are there? and how are they subdivided.
For what purpose are the foramina about the acetabulum.
Why is the upper surface of the ascending ramus of the pubis smooth.
Is the os coccygis hollow?
What is the division of the os innominatum in the young subject.
What is the direction of the spinous processes of the lumbar vertebræ.
For what purpose is the smooth surface on the first rib.
Which is said to be the smallest of the dorsal vertebræ.
What plays around the neck of the ischium.
What is received into the groove on the under surface of the spinous process of a dorsal vertebra.
For what purpose is the sacral canal.
How is the articulation of the cartilage of the second rib formed.
Which vertebræ are the largest.
What is there peculiar to the eleventh and twelfth dorsal vertebræ.
For what purpose is the rough surface on the upper part of the first rib.
How many articulating surfaces are there on the sacrum.
Where is the body of the os pubis.
What is attached to the inferior extremity of the sternum.
Which is the longest rib? and which the most circular.
Is there ever more than one hole in the transverse process of a cervical vertebra? and for what purpose.
What do the ridges on the front surface of the sacrum denote.
What is attached to the spinous process of the pubis.
Where is the brim of the acetabulum the deepest.
What is the use of the anterior sacral foramina.
How many articulating surfaces are there on a lumbar vertebra.
What is there peculiar to the spinous processes of the cervical vertebræ.
With how many bones is the sixth rib connected.
How many articulating surfaces are there on the upper triangular portion of the sternum.
Is the foramen thyroideum, in the recent subject, open; or completely closed.
Where is the promontory of the sacrum.
What is attached to the apex of the os coccygis.
With how many bones is the sternum connected.
Which is the lowermost of the three bones of the os innominatum.
With how many bones is a dorsal vertebra connected.
What is the difference between the upper and under surfaces of the vertebra dentata.
To what is the tubercle of a rib attached.
Where is the angle of the os pubis.
What is attached to the posterior spines of the ilium.
How are the cartilages of the eighth, ninth, and tenth ribs connected with the sternum.
What is the nature of the upper articulating surfaces of the atlas.
How is the spinal column formed.
What is there peculiar to the last lumbar vert.
How is the acetabulum formed.
How are the oppos. portions of the pubis joined.
What is the use of the posterior sacral foramina.

How is the canalis spinalis formed.

What is stretched across the neck of the odontoid process.

In what direction is the long axis of the body of a lumbar vertebra.

How is the thorax bounded.

What is there peculiar to the sacro-iliac symphisis.

With how many bones is the sacrum connected.

Where are the spinous processes of the sacrum.

Why is a dorsal vert. selected for description.

Has the atlas a spinous process? For what purpose is the roughness.

What is the meaning of a floating rib? and have they cartilages.

What is there peculiar to the articulating surface on the head of a rib.

What is the nature of the under articulating surfaces of the atlas.

With what are the ascending articulating surfaces of the sacrum connected.

How many articulating surfaces are there on a dorsal vertebra.

What are the occasional peculiarities of the tenth dorsal vertebra.

By what bones is the obturator foramen formed.

How many ridges are there on the os coccygis? and what do they denote.

What is there peculiar to the first dorsal vert.

How many articulating surfaces are there on the atlas.

What is there peculiar to the seventh cervical vertebra? and what do its vertebral foramina transmit.

For what purpose are the intercostal notches on the dorsal vertebræ.

How many articulating surfaces are there on the lower portion of the sternum.

What is attached to the spinous process of the ischium.

What is attached to the notch in the brim of the acetabulum.

What is attached to the anterior superior spine of the ilium.

To what do the parallel ridges on each side of the spinous processes of the sacrum correspond.

On the Third Division of the Table, comprehending the 64 Bones of the Upper Extremities.

64
BONES OF THE UPPER EXTREMITIES.

4 *Bones of the Shoulders.*	2 *Bones of the Arms.*	4 *Bones of the Fore-Arms.*	16 *Bones of the Wrists.*
2 Claviculæ. 2 Scapulæ.	2 Humeri.	2 Ulnæ. 2 Radii.	2 Scaphoidea. 2 Lunaria. 2 Cuneiformia. 2 Pisiformia. 2 Trapezia. 2 Trapezoidea. 2 Magna. 2 Unciformia.

38 *Bones of the Hands and Fingers.* { 8 Ossa Metacarpi. / 30 Phalanges.

The Upper Extremities are situated at the posterior and lateral parts of the chest, and consist of the Shoulder, Arm, Fore-Arm, and Hand, which are connected with the trunk by one bony union only, viz. by the clavicle to the sternum.

CLAVICULA.

Deriv. the diminitive of clavis, a key, from its said resemblance to the ancient key. *Syn.*, Ligula, Furcula, Clavis, os Jugale. The clavicle is shaped somewhat like the italic letter *ſ*, and is divided into a body and two extremities, viz. the inner or sternal, and the outer or scapular extremity.

Situation. At the root of the neck, extending horizontally from the sternum to the shoulder.

Connexion With 2 bones; viz. internally with the sternum, and externally with the scapula.

Use..... Connects the superior extremity with the trunk, affords a point of attachment for many muscles, and protection to the subclavian vessels. The clavicle is altogether wanting in many animals.

1. Greater Convexity, or Arch ..... Projecting anteriorly.
2. Lesser Convexity, or Arch ..... Near to the scapula end, pointing posteriorly.
3. Triangular Articular Surface ..... At its sternal end—connecting it with the sternum by the intervention of an interarticular cartilage.
4. Tubercle ..... Situated beneath the sternal extremity—for the attachment of a ligament going to the first rib.
5. Oblong Articular Surface..... ... At its outer flattened extremity—connecting this bone with the acromion scapulæ.
6. Tubercle ..... Beneath the scapular extremity—for the attach. of a ligament going to the coracoid process of the scapula.
7. Foramen, or Foramina ..... Situated on the posterior and inferior aspect of the bone—for the transmission of the nutrient vessels.

SCAPULA.

Deriv. from schipha (Hebr.), the shoulder-blade. *Syn.*, Omoplata, Scoptula.

Situation. The upper and back part of the thorax, extending from the second to the seventh or eighth rib.

Connexion With 2 bones; viz. above, with the clavicle at its acromion process; and in front, with the humerus at its glenoid cavity.

	Use	Affords an extended irregular surface for the attachment of muscles, forms the socket for the head of the humerus, &c.
		The scapula is of a triangular form, and to facilitate the description, it may be arranged in five parts, each of which parts is triple, with some few additional parts; viz. 3 Processes, 3 Notches, 3 Fossæ, 3 Angles, and the 3 Costæ, which form the three sides of the triangle.
1.	Acromion Process	Projecting over the shoulder joint—to the inner side of which the clavicle is connected.
2.	Coracoid Process	Situate on the upper and inner side of the shoulder joint—affording attachment to the short head of the biceps, and to other muscles.
3.	Spinous Process	or Spine, commencing at the root of the acromion process, and extending across the bone to the base—an important point for the attachment of muscles.
4.	Acromion Notch	Situate beneath the acromion process.
5.	Coracoid Notch	Situate within the hook of the coracoid process.
6.	Semilunar Notch	or Supra-scapular Notch—situate in the superior costa, near to the root of the coracoid process. In the recent subject it is a foramen for the passage of the superior dorsal artery and nerve.
7.	Fossa Supra-Spinata	The hollow situate above the spine—for the lodgement of the supra-spinatus muscle.
8.	Fossa Infra-Spinata	The surface of the bone beneath the spine—for the lodgement of the infra-spinatus muscle.
9.	Fossa Subscapularis	*seu Venter*. The whole cavity on the inner side of the bone—for the lodgement of the subscapularis muscle.
10.	Anterior Angle	Contains the glenoid cavity—the superior margin of this cavity affords attachment to the long head of the biceps muscle.
11.	Superior Angle	or Posterior Angle. The uppermost part of the bone—affords attachment to the levator scapulæ muscle.
12.	Inferior Angle	The lowermost part of the bone—which reaches down to about the eighth rib.
13.	Superior Costa	Is the shortest, and extends from the glenoid cavity to the superior angle.
14.	Inferior Costa	or Anterior Costa, commences at the glenoid cavity and terminates at the inferior angle.
15.	Posterior Costa	or Base, extends from the superior to the inferior angles, and in the recent subject is tipped by a broad border of cartilage. Each of these costæ afford points of attachment to many important muscles.
16.	Glenoid Cavity	A superficial excavation, situate at the anterior angle, of an oval form, smaller above than below, which in the recent subject is rendered deeper by the fibro-cartilaginous substance that surrounds it—it receives the head of the humerus.
17.	Cervix	A contraction of the bone just below the glenoid cavity—for the attachment of the capsule of the joint.
18.	Foramen, or Foramina	Most numerous about the neck—for the transmission of the nutrient arteries.
19.	Articular Surface	On the acromion process—by which this bone is connected with the clavicle.
20.	Tubercle	At the root of the coracoid process—for the attachment of a ligament going to the clavicle.
21.	Dorsum	The smooth convex surface of the bone, beneath the spine.
22.	Smooth Surface	Of a triangular form, on the inferior angle, over which part of the latissimus dorsi muscle plays.

	HUMERUS.	*Deriv.* from ωμος, (or hamah, Hebr. quasi humerus,) the shoulder. *Syn.*, os Brachii.
	Situation.	Between the scapula above, and the radius and ulna below.
	Connexion	With 3 bones; viz. above, with the scapula by its head; and below, with the radius and ulna by its trochlea.
	Use.....	Constitutes the arm. It is described as having a body, a proximal, and distal extremity.
1.	THE HEAD.....	Directed inwards, upwards, and backwards—furnished with an almost spherical articulating surface, by which this bone is articulated with the glenoid cavity of the scapula.
2.	NECK.....	A contraction just below the head, which extends upwards and outwards between the head and the tubercles—it is rough for the attachment of the capsule of the joint.
3.	GREATER TUBERCLE.....	Situate on the outer side of the head—it is marked above by three smooth surfaces, being the points of attachment of the supra-spinatus, infra-spinatus, and teres minor muscles.
4.	LESSER TUBERCLE.....	Situate on the anterior part of the head—the point of attachment of the subscapularis muscle.
5.	BICIPITAL GROOVE.....	Running between the two tubercles, which is furnished with cartilage and synovial membrane—for the transmission or play of the tendon of the long head of the biceps muscle.
6.	ANTERIOR, OR RADIAL EDGE.....	of the Bicipital Groove—for the attachment of the tendon of the pectoralis major muscle.
7.	POSTERIOR, OR ULNAR EDGE.....	of the Bicipital Groove—for the attachment of the tendon of the latissimus dorsi muscle.
8.	ROUGHNESS.....	On the radial aspect of the bone, in a line between the greater tubercle and the external condyle—for the attachment of the deltoid muscle.
9.	ROUGHNESS.....	On the ulnar aspect of the bone, in a line between the lesser tubercle and the internal condyle—for the attachment of the coraco brachialis muscle.
10.	FORAMEN.....	On the inner or ulnar aspect of the bone, entering obliquely downwards—for the transmission of the medullary artery.
	Inferiorly.	The bone expands and becomes flatter—on the anterior surface, the flexor muscles are lodged; and on the posterior convex surface, the extensor muscles are lodged.
11.	RIDGE.....	leading to the Internal Condyle, } both giving attachment to the intermuscular fasciæ, which divide the
12.	RIDGE.....	leading to the External Condyle, } flexor muscles from the extensors.
13.	TROCHLEA.....	The articulating surface at the lower end of the bone, adapted to the sigmoid cavity of the ulna, and to the head of the radius.
14.	CORONOID FOSSA.....	An excavation just above the trochlea, in front, which receives the coronoid process of the ulna, in flexion of the arm.
15.	INTERNAL CONDYLE.....	A marked projection on the ulna side of the lower end of the bone—it affords an important point of attachment to the flexor and pronator muscles of the fore-arm. It is to be remarked, that this condyle differs from the other parts of bones so called, inasmuch as it is not furnished with an articulating surface.
16.	ULNAR GROOVE.....	Situate just behind the internal condyle—for the passage of the ulnar nerve.

17.	ANCONOID FOSSA	A deep excavation on the lower and posterior part of the bone, which receives the anconoid process (or olecranon) of the ulna, during extension of the arm.
18.	EXTERNAL CONDYLE	A projection on the radial side of the lower end of the bone, but much shorter than the internal—by some anatomists the external condyle is described as containing the articulating surface for the head of the radius ; in which case, a
19.	TUBERCLE.....	must be mentioned, situate just above the external condyle—the superior point of attachment of the extensor and supinator muscles of the fore-arm.

ULNA.

Deriv. from ωλενη, the cubit : *cubitus* signifies the elbow, as well as the measure. *Syn.*, Focile Majus, Cubitus, Canna Major.

Situation. On the inner side of the fore-arm, extending from the elbow to the wrist.

Connexion With 2 bones; viz. above, with the pulley of the os brachii, and laterally with both extremities of the radius. By some anatomists this bone is said to be connected with the os cuneiforme of the wrist by means of an interarticular cartilage.

Use..... Assists materially in the formation of the elbow joint, and in forming the fore-arm, &c.

Proximal Extremity. The ulna is the longer of the two bones of the fore-arm—it is described as having a body, a proximal, and a distal extremity; the latter is sometimes called the head, and the distal, or larger end, the base.

1.	OLECRANON.....	The large projecting process at the upper end of the bone, which forms the elbow, and is the grand point of attachment for the extensor muscles of the fore-arm.
2.	BURSAL FOSSA..... ...	A smooth surface on the upper part of the olecranon—for the lodgement of a bursa, just above the insertion of the tendon of the triceps extensor cubiti muscle.
3.	CORONOID PROCESS	On the front surface of the bone, a little below the olecranon, which enters the coronoid fossa of the humerus, when the fore-arm is bent upon the arm. Between the olecranon and coronoid process there is a deep semilunar excavation, called the
4.	SIGMOID CAVITY.....	Which is furnished with cartilage, and adapted to the pulley of the humerus—the perpendicular ridge in this cavity divides it into two surfaces of unequal size, the inner of which is the larger.
5.	TUBERCLE	At the root of the coronoid process—for the attachment of the tendon of the brachialis internus muscle.
6.	SEMILUNAR CAVITY.....	or Lesser Sigmoid Cavity. On the outer side of the proximal end of the bone—for the reception of the head of the radius.
7.	INTEROSSEOUS RIDGE	or Spine. A sharp edge, commencing a little below the semilunar cavity, and extending down the radial aspect of the bone—for the attachment of the interosseous ligament.
8.	MEDULLARY FORAMEN.....	Entering obliquely upwards, about one-third from the proximal end of the bone, on its anterior aspect.

	Distal Extremity.	or Head, is much smaller than the base, and rounded. The body of the bone is triangular; hence, anatomists have spoken of the three angles of the ulna, one of which is the sharp interosseous ridge above described—the other two are rounder, and afford attachment to muscles.
9.	STYLOID PROCESS	A conical projection on the inner side of the distal end of the bone, affording attachment to the internal lateral ligament of the wrist joint. In front and behind this process there are two grooves; viz. the
10.	ANTERIOR GROOVE	Which is an indistinct excavation—for the passage of the ulnar artery and nerve. The
11.	POSTERIOR GROOVE	Is more strongly marked—for the passage of the tendon of the flexor carpi ulnaris muscle.
12.	OBLONG ARTICULAR SURFACE	On the outer side of the distal extremity—adapted to the semilunar cavity of the radius.
13.	EXCAVATION	On the lower surface of the head—for the reception of the interarticular cartilage.
	RADIUS.	*Deriv.* from ῥαβδος, a staff, or spoke, from its said resemblance to the spoke of a wheel. *Syn.*, Manubrium Manus, Focile Minus, Canna Minor.
	Situation.	On the outer side of the fore-arm, extending from the elbow to the wrist.
	Connexion	With 4 bones; viz. above, with the humerus; laterally, with both ends of the ulna; and below, with the scaphoides and lunare.
	Use	Assists in forming the elbow and wrist joints, and performs the motions of pronation and supination.
	Proximal Extremity.	The radius is the smaller of the two bones of the fore-arm—it is described as having a body, a proximal and a distal extremity; the latter of which is the base, and the proximal end is called
1.	THE HEAD	Which has an excavated articular surface on its top, adapted to the articular surface of the os brachii.
2.	OBLONG ARTICULAR SURFACE	On the inner side of the head, adapted to the semilunar cavity of the ulna.
3.	ORBICULAR RIDGE	Surrounding the head—for the attachment of the capsule of the joint.
4.	NECK	A contraction of the bone just below the head, around which the coronary or annular ligament plays.
5.	TUBERCLE	On the inner side of the bone just below the head—for the attachment of the tendon of the biceps flexor cubiti muscle. There is a bursal fossa on the tubercle just above the insertion of the tendon.
6.	INTEROSSEOUS RIDGE	Commencing just below the tubercle, and extending down the ulnar aspect of the bone—for the attachment of the interosseous ligament.
7.	MEDULLARY FORAMEN	Entering obliquely upwards, about one-third from the proximal end of the bone, on its anterior aspect.
	Distal Extremity.	or Base, is broad and expanded to form the articulation with the bones of the wrist—before and behind it is marked by grooves for the passage of the tendons of the flexor and extensor muscles.
8.	SEMILUNAR CAVITY	On the inner side of the distal extremity—for the reception of the distal end of the ulna.
9.	SCAPHOID CAVITY	At the lower end of the bone—divided by a superficial ridge, for the reception of the os scaphoides and os lunare.
10.	STYLOID PROCESS	Projecting from the outer side of the distal extremity—for the attachment of the external lateral ligament of the wrist joint.

THE CARPUS.

SCAPHOIDES.
LUNARE.
CUNEIFORME.
PISIFORME.
TRAPEZIUM.
TRAPEZOIDES.
MAGNUM, ET
UNCIFORME.

Deriv. either from carpo, to seize; or from καρπος, a seed, which the small bones of the wrist have been said to resemble. The bones of the carpus are eight in number, and are placed in two rows, or phalanges—the first row consists of the os Scaphoides, os Lunare, os Cuneiforme, and os Pisiforme; the second row consists of the os Trapezium, os Trapezoides, os Magnum, and os Unciforme. The articulation of the carpus with the radius is formed by the scaphoides and lunare only, which admits of free motion in every direction—there is also some degree of motion between the first and second rows of the carpus, afforded by the play of the head of the os magnum in the cavities of the scaphoides and lunare—there is however little or no motion between the carpal and metacarpal bones. The bones of the carpus are so disposed, that the back of the wrist is convex, and the front, or palmar aspect, is concave, forming a cavity through which the flexor tendons pass in order to their attachment to the phalanges of the fingers—these tendons are confined in their proper situation by the transverse carpal ligament, which is stretched across from the bony projections, situated on each side of the front of the carpus.

As the carpal bones are small, and have but few marked processes, fossæ, or sulci, their chief description must necessarily consist in the enumeration of their articulating surfaces.

SCAPHOIDES.

Deriv. from σκαφη, a skiff, and ειδος, likeness, from its said resemblance to a little boat. *Syn.*, os Naviculare. It is of an oblong form, convex above, and concave below.

Situation. Horizontally, on the radial side of the wrist, being the first bone of the proximal row of the carpus.

Connexion With 5 bones; viz. above, with the radius; on its ulnar side, with the lunare; and below, with the trapezium, trapezoides, and os magnum.

1. LARGE CONVEX ARTICULAR SURFACE ... Above—which is received into the scaphoid cavity of the radius.
2. OBLONG ARTICULAR SURFACE ..... At the ulnar extremity of the foregoing surface—for the connexion with the lunare.
3. EXCAVATED ARTICULAR SURFACE..... Externally—which receives more than half of the head of the os magnum.
4. SMALLER CONVEX ARTICULAR SURFACE Below—which is marked by an indistinct ridge, and adapted to the trapezium and trapezoides.
5. PROCESS..... At the radial extremity of the bone—a point of attachment for the external lateral ligament of the wrist.

LUNARE.

Deriv. Luna, the moon, from its crescent shape. *Syn.*, os Lunatum.

Situation. The second bone of the first row of the carpus—between the scaphoides and os cuneiforme.

Connexion With 5 bones; viz. above, with the radius; below, with the head of the os magnum and with a point of the os unciforme; externally, with the scaphoides; and internally, with the os cuneiforme.

1. CONVEX ARTICULAR SURFACE..... Above—adapted to the scaphoid cavity of the radius.
2. SEMILUNAR CAVITY..... Below—which forms with the scaphoides the cup for the head of the os magnum.

LUNARE *(continued)*.	On the Third Division of the Table, comprehending the 64 Bones of the Upper Extremities.
3. NARROW OBLONG ARTICULAR SURFACE	Adjoining the semilunar cavity—where it is in contact with the os unciforme.
4. FLATTENED ARTICULAR SURFACE.....	Internally—adapted to the os cuneiforme.
5. SMALL CONCAVE ARTICULAR SURFACE..	Externally—adapted to the scaphoides.
CUNEIFORME.	*Deriv.* from cuneus, a wedge, and forma, likeness, because it is somewhat wedge-shaped. *Syn.*, os Triquetrum. This bone may possibly be confounded with the trapezoides, but the fossa on its back surface will form a distinguishing mark ; it is also altogether larger than the trapezoid.
Situation.	The third bone of the first row of the carpus, between the lunare and pisiforme.
Connexion	With 3 bones ; viz. externally, with the lunare ; below, with the os unciforme ; and in front, with the os pisiforme ; it is also connected with the interarticular cartilage of the ulna.
1. SLIGHTLY CONCAVE ARTICULAR SURFACE	Externally—adapted to the lunare.
2. LARGE IRREGULAR ART. SURFACE.....	Below—by which it is connected with the os unciforme.
3. SMALL CIRCULAR ARTICULAR SURFACE..	In front—adapted to the os pisiforme.
4. CONVEX SMOOTH SURFACE	On its upper part—adapted to the interarticular cartilage of the ulna.
5. FOSSA.....	On the back surface of the bone—for the attachment of the ligament going to the styloid process of the ulna.
PISIFORME.	*Deriv.* pisum, from its resemblance to a pea. *Syn.*, os Subrotundum, os Orbiculare, &c.
Situation.	On the ulnar side of the carpus, in front of the os cuneiforme—the smallest bone of the wrist.
Connexion	With 1 bone only; viz. with the front surface of the os cuneiforme.
1. ROUND FLAT ARTICULAR SURFACE.....	Behind—adapted to the os cuneiforme.
2. TUBEROSITY	The projecting portion of the bone, which forms a marked point of attachment for the internal lateral, and transverse carpal ligaments.
TRAPEZIUM.	*Deriv.* from τραπεζιον, a four-sided figure. It might be inferred that this bone is of a square shape, but it is in fact the most irregular of all the carpal bones. *Syn.*, Multangulum Majus.
Situation.	The first bone of the distal row of the carpus, below the scaphoides, above the proximal phalanx of the thumb, and adjoining the trapezoides.
Connexion	With 4 bones ; viz. above, with the scaphoides ; internally, with the trapezoides; externally, with the first phalanx of the thumb ; and below, with the metacarpal bone of the fore-finger.
Use.....	Supports the first phalanx of the thumb, and partly the metacarpal bone of the fore-finger.
1. EXCAVATED ARTICULAR SURFACE.....	Above—adapted to the scaphoides.

51	TRAPEZIUM *(continued)*.	On the Third Division of the Table, comprehending the 64 Bones of the Upper Extremities.
2.	Less Excavated Articular Surface..	Internally—adapted to the trapezoides.
3.	Small Articular Surface.....	Just below, and adjoining the trapezoid surface—adapted to the outer side of the carpal end of the metacarpal bone of the fore-finger.
4.	Trochlea.....	Facing downwards and outwards—for the articulation with the first phalanx of the thumb.
5.	Oblong Process.....	On the ulnar aspect of the bone, opposite to the hamular process of the os unciforme—for the attachment of the external lateral, and transverse carpal ligaments.
	TRAPEZOIDES.	Is of a very irregular form, but the name implies that it is less of a quadrangular figure than the preceding bone. *Syn.*, Multangulum Minus.
	Situation.	The second bone of the distal row of the carpus—situate between the trapezium and the os magnum, below the scaphoides, and above the metacarpal bone of the fore-finger.
	Connexion	With 4 bones; viz. above, with the scaphoides; externally, with the trapezium; internally, with the os magnum; and below, with the metacarpal bone of the fore-finger.
	Use.....	Supports the metacarpal bone of the fore-finger.
1.	Slightly Concave Articular Surface	Above—adapted to the scaphoides.
2.	Slightly Convex Articular Surface	Externally—adapted to the trapezium.
3.	Large Articular Surface.....	Below—divided by a ridge, adapted to the excavation on the upper end of the metacarpal bone of the fore-finger.
4.	Small Articular Surface.....	Internally—adapted to the os magnum.
	OS MAGNUM.	The largest of the bones of the carpus. *Syn.*, os Capitatum.
	Situation.	In the centre of the bones of the wrist.
	Connexion	With 7 bones; viz. above, with the scaphoides and lunare; externally, with the trapezoides; internally, with the os unciforme; and below, with the metacarpal bones of the first, second, and third fingers.
	Use.....	Supports the metacarpal bone of the second finger.
1.	Head.....	The rounded articular surface, which is received into the hollow formed by the scaphoides and lunare—this surface is marked by a slight ridge corresponding to the line of union of the two bones, with which it is articulated.
2.	Oblong Concave Articular Surface	Externally—adapted to the trapezoides.
3.	Oblong Articular Surface.....	Internally—adapted to the os unciforme.
4.	Large Flattened Articular Surface	Below—adapted to the metacarpal bone of the second finger.

	MAGNUM *(continued)*.	
5.	SMALL ARTICULAR SURFACE	On the posterior and Outer corner of the foregoing articular surface—touching a corresponding small articular surface on the metacarpal bone of the fore-finger.
6.	SMALL ARTICULAR SURFACE	On the posterior and Inner corner of the fourth articular surface—touching the metacarpal bone of the third or ring-finger.
7.	FORAMEN	On the palmar aspect of the bone, just below the head—for the passage of the nutrient artery.
	UNCIFORME.	*Deriv.* from uncus, a hook. It is somewhat of a triangular bone, with a prominent hooked-like process on its anterior aspect. *Syn.*, os Cuneiforme.
	Situation.	Above the metacarpal bones of the third and fourth fingers, and between the os magnum, and the cuneiform and pisiform bones.
	Connexion	With 5 bones; viz. above, with a point of the lunare; externally, with the os magnum; internally, with the os cuneiforme; and below, with the metacarpal bones of the ring and little fingers.
	Use.....	Supports the metacarpal bones of the two last fingers.
1.	SMALL CONVEX ART. SURFACE.....	Above—adapted to the lower point of the lunare.
2.	OBLONG FLAT ARTICULAR SURFACE	Externally—adapted to the os magnum.
3.	IRREGULAR CONCAVE ART. SURFACE....	Internally—adapted to the os cuneiforme.
4.	LARGE ARTICULAR SURFACE	Below—divided by a ridge, adapted to the metacarpal bones of the ring and little fingers.
5.	UNCIFORM, OR HAMULAR PROCESS	On the palmar aspect of the bone—a marked point of attachment for the ligaments of the carpus.
	THE METACARPUS.	*Deriv.* μετα, after, and καρπος, the wrist. That part of the hand between the wrist and the fingers. The metacarpus consists of eight cylindrical bones, four to each hand, but by some anatomists the first phalanx of the thumb has been regarded as a fifth metacarpal bone—it however possesses none of the attributes of a metacarpal bone in the skeleton.
		The metacarpal bones are described, generally, as having a Body, a Proximal Extremity or Base, and a Distal Extremity or Head. The posterior surface is flattened, and the anterior or palmar aspect is sharp, thus giving them a triangular form—on each side of the head of a metacarpal bone there are tubercles and depressions, for the attachment of the transverse or interosseous ligaments. The metacarpal bones are altogether shorter and stronger than the bones of the metatarsus.
	FIRST METACARPAL BONE	Or that supporting the fore-finger, is connected with 5 bones; viz. at its base, above, with the trapezium, trapezoides, and os magnum; on the ulnar side, it is in contact with the metacarpal bone of the second finger; and at its head, it supports the proximal phalanx of the fore-finger. This bone may be distinguished from the rest by the deep groove its base, which receives the corresponding projecting portion of the trapezoides.

53 THE METACARPUS *(continued).*	On the Third Division of the Table, comprehending the 64 Bones of the Upper Extremities.
SECOND METACARPAL BONE.....	Is the longest of the four, and is further distinguished by the obliquity of the articulating surface at its base—it is connected with 4 bones; viz. at the base, above, with the os magnum, and laterally, with the metacarpal bones of the first and third fingers; and at its head, it supports the proximal phalanx of the second finger.
THIRD METACARPAL BONE.....	Ranks as third, both in size and situation—it is connected with 5 bones; viz. at its base, above, with the os unciforme; externally, with a point of the os magnum and with the metacarpal bone of the second finger; internally, with the metacarpal bone of the little finger; and at its head, it supports the proximal phalanx of the third or ring finger.
FOURTH METACARPAL BONE	Is the shortest, and somewhat rounded at its base—it is connected with 3 bones; viz. at its base, above, with the os unciforme; externally, with the metacarpal bone of the third finger; and at its head, it supports the proximal phalanx of the little finger.
PHALANGES DIGITORUM.	*Deriv.* from $\phi\alpha\lambda\alpha\gamma\xi$, a regiment of soldiers—the bones of the fingers are so called from their regular disposition. They are 30 in number, 15 to each hand. The thumb and the four fingers are each furnished with three bones or phalanges, of which the proximal is the largest, the middle second in size, and the inferior, or distal phalanx, is the smallest—a phalanx is described as having a Body, a Proximal, and a Distal Extremity—the body is convex on its posterior surface, and rather concave on its anterior or palmar aspect—the proximal extremity or base is furnished with an excavated articular surface—and the distal extremity or head has an articular surface, which is convex laterally, and concave from before backwards.
THE PROXIMAL PHALANGES.....	Are severally connected with two bones each, and are distinguished by their large size, and by the deeply excavated articular surface at the base, which receives the head of the metacarpal bone—on each side of the base there are tubercles for the attachment of ligaments—the articular surface at the distal extremity is smaller than that at the base, and presents two slight eminences divided by a groove, which may be compared to small condyles—they are connected with the corresponding articular surfaces on the proximal ends of the next phalanges. The proximal phalanx of the thumb is connected with the trapezium, and differs somewhat from the corresponding phalanges of the fingers—the body of the bone is flattened on its posterior surface, and its upper articular surface is so constructed as to admit of a much greater lateral motion than those of the fingers—the articular surface at the distal end differs in being round, and undivided by any groove.
THE MIDDLE PHALANGES.....	Are each connected with two bones, and rank as second in size, and correspond as to length with the fingers, that of the second finger being the longest, and that of the little finger being the shortest and thinnest—the proximal extremity is furnished with an articular surface, having two lateral depres-

	sions, divided from each other by a ridge, and adapted to the eminences on the distal ends of the first phalanges—the distal extremity is small, and precisely similar to the distal ends of the foregoing phalanges.
	The middle phalanx of the thumb is stronger and thicker than those of the fingers, and the articular surface at the proximal end is cup-shaped like those on the upper end of the first phalanges of the fingers —it is adapted to the rounded articular surface on the distal end of the first phalanx of the thumb.
THE DISTAL PHALANGES.....	Are each connected with one bone only, and are the smallest—the articular surface at the proximal end presents two small concave articular surfaces, divided from each other by a groove, and adapted to the distal extremities of the middle phalanges—the distal end is covered with nail posteriorly, and its anterior surface is rough for the attachment of the tendon of the flexor profundus muscle.

QUESTIONS on the Third Division of the Table, comprehending the 64 Bones of the Upper Extremities.

How many bones form the fore-arm.
How many bones of the shoulder.
How many bones of the arm.
How many bones of the wrist.
How many bones of the metacarpus.
How many phalanges of the fingers.
Where is the coronoid fossa.
What encircles the neck of the radius.
What is lodged in the fossa supra-spinata of the scapula.
In what direction is the lesser convexity of the clavicle.
Where is the lower attachment of the deltoid muscle.
What does the bicipital groove transmit.
What is the form of the sternal end of the clavicle.
Which is the more internal, the greater or the lesser tubercle of the humerus.
Is the ulna or the radius on the outer side of the arm.
For what purpose is the oblong articular surface at the distal end of the ulna.
What bone of the carpus supports the second metacarpal bone.
What is there particular in the articulation of the clavicle with the sternum.
What are the five principal divisions of the scapula.
What is attached to the styloid process of the radius.
What bone of the carpus supports the metacarpal bone of the ring finger.
Which condyle of the humerus is the larger.
On what aspects of the clavicle are the medullary foramina most commonly found.
Where, and for what purpose is the sigmoid cavity of the ulna.
With how many, and what bones is the humerus connected.
What passes over the smooth surface on the inferior angle of the scapula.
Where is the coracoid process of the ulna.
How many articulating surfaces are there on the os unciforme.
What does the glenoid cavity of the scapula receive.
For what purpose are the tubercles and depressions on each side of the heads of the metacarpal bones.
With how many, and what bones is the clavicle connected.
Where is the olecranon? and to what does it give attachment.
What are the points which distinguish the trapezoides from the os cuneiforme.
For what purpose is the tubercle at the root of the coracoid process of the scapula.
With how many, and what bones is the ulna connected.
In what direction does the foramen for the nutrient artery of the humerus enter the bone.
What is the use of the supra-scapular notch.

What is attached to the ridges leading to the external and internal condyles of the humerus.

What bones constitute the distal row of the carpus.

Where is the cervix of the scapula.

With how many, and what bones is the lunare connected.

How is the second metacarpal bone distinguished from the rest.

To which end of the clavicle is the ligament going to the first rib attached.

With how many, and what bones is the os magnum connected.

What is received into the semilunar cavity of the radius.

Where, and for what purpose is the anconoid fossa.

In what direction do the medullary foramina enter the radius and ulna? and on what aspect of the bones.

Where, and for what purpose is the cervix of the humerus.

What is observable at the lower points of attachment of the tendons of most large muscles.

Where is the acromion process of the scapula.

In what direction is the greater convexity or arch of the clavicle.

What is attached to the tubercle of the radius.

With how many, and what bones is the trapezoides connected.

What bones does the trochlea of the humerus receive.

Where, and for purpose is the cervix of the scapula.

What is attached to the ulnar edge of the bicipital groove.

On what aspect of the bone is the interosseous ridge of the radius.

What bone supports the first phalanx of the thumb.

In what direction is the head of the humerus.

Where is the spine of the scapula.

With how many, and what bones is the scaphoides connected.

What bones form the cup for the head of the os magnum.

What supports the metacarpal bones of the ring and little fingers.

Where and for purpose is the fossa on the os cuneiforme.

How many articulating surfaces are there on the ulna.

How is the proximal phalanx of the thumb distinguished from those of the fingers.

What is the form of the scapular extremity of the clavicle.

With how many, and what bones is the scaphoides connected.

On what aspect of the bone is the interosseous ridge of the ulna.

What is attached to the radial edge of the bicipital groove.

With how many, and what bones is the metacarpal bone of the fore-finger connected.

Is the convexity, or the concavity of the lunare upwards.

In what respect does the middle phalanx of the thumb differ from the corresponding phalanges of the fingers.

Which costa of the scapula is the shortest.

Where is the os pisiforme? and to what does its tuberosity give attachment.

With what part of the acromion process is the clavicle connected.

Where is the dorsum scapulæ.

What is attached to the styloid process of the ulna.

What does the scaphoid cavity of the radius receive.

How is a proximal phalanx of a finger distinguished from a middle phalanx.

On the Fourth Division of the Table, comprehending the 64 Bones of the Lower Extremities.

64

BONES OF THE LOWER EXTREMITIES.

2 *Bones of the Thighs.*	14 *Bones of the Tarsus.*	10 *Bones of the Metatarsus.*
2 Femora.	2 Astraguli. 2 Ossa Calcum. 2 Navicularia. 2 Cuboidea. 6 Cuneiformia.	10 Ossa Metatarsi.
6 *Bones of the Legs.*		**32 *Bones of the Toes.***
2 Patellæ. 2 Tibiæ. 2 Fibulæ.		28 Phalanges. 4 Ossa Sesamoidea.

FEMUR.

Deriv. Femur, signifies, properly, the outside of the thigh, and femen, the inner side—both terms are derived from feo, unde fetus, fecundus, femina, &c. ab φυω, produco: femur is also said to be derived from fero, to bear, because the thighs support the trunk.

Situation. Beneath the pelvis, extending from the hip to the knee.

Connexion With 3 bones; viz. above, with the os innominatum at the acetabulum; below, with the head of the tibia by its condyles; and in front, it is in contact with the patella at its trochlea.

The femur is the longest bone in the body, and is the most regular specimen of a cylindrical bone—it has a Body, a Proximal, and a Distal Extremity.

1. THE HEAD ..... The rounded articular surface, adapted to the acetabulum of the os innominatum. At about the middle of the inner side of the head, there is a
2. FOSSA ..... For the attachment of the ligamentum teres of the hip-joint.
3. NECK ..... Descending obliquely from the head to the shaft of the bone—it is very porous for the transmission of vessels to the cancellous structure, and is covered by a reflection of the synovial membrane.
4. TROCHANTER MAJOR ..... The large rough apophysis, projecting from the upper end of the shaft of the bone—for the attachment of the gluteus medius and minimus muscles. At the upper part of the great trochanter there is a
5. SMOOTH SURFACE ..... For the lodgement of a bursa; and just withinside the root of the trochanter major there is a deep
6. CAVITY ..... For the attachment of the rotator muscles of the thigh outwards.
7. TROCHANTER MINOR ..... Is a rounded process, situated on the posterior and inner side of the bone, at the root of the great trochanter—it affords attachment to the psoas magnus and iliacus internus muscles.
8. ORBICULAR RIDGE ..... Extending round the root of the neck, both in front and behind, from the greater to the lesser trochanter—for the attachment of the orbicular ligament of the hip joint.
9. FORAMEN ..... For the passage of the medullary artery, on the posterior aspect of the bone, entering obliquely upwards about one-third from the proximal extremity.
10. LINEA ASPERA ..... Commences near to the lesser trochanter, and extends down the posterior part of the bone—for the

		attachment of the quadratus femoris and triceps muscles. Towards the lower end of the bone the linea aspera terminates in
11.	Two Diverging Ridges	Going to either condyle—and these ridges again terminate in
12.	Two Tubercles	Which form points of attachment for the two heads of the gastrocnemius muscle, &c.
13.	The Internal Condyle	Is the larger and longer of the two, owing to the oblique position of the bone, and is adapted to the inner concavity on the head of the tibia.
14.	The External Condyle	Is adapted to the outer concavity on the head of the tibia. Between the condyles there is a deep
15.	Notch	Through which the popliteal vessels and nerves pass in their course to the leg. Just withinside the condyles there are
16.	Two Depressions	For the superior attachment of the crucial ligaments of the knee-joint. In front, the two condyles are united, and present a smooth articular surface, or
17.	Pulley	On which the patella plays.
18.	The Orbicular Ridge	Extending round the edges of the condyles—for the attachment of the capsule of the joint. About the condyles the bone is rough, for the attachment of ligaments, and is perforated by numerous small holes for the transmission of vessels to the cancellous structure.

	PATELLA.	*Deriv.* from patina, a dish, the knee-pan, so named from its shape. *Syn.*, Rotula.
	Situation.	It is a bone situated in a tendon, which extends over the front surface of the knee-joint.
	Connexion	It lies in contact with the front surface of the condyles of the femur, and is connected with the anterior tubercle of the tibia by means of the tendon in which it is situated: it corresponds precisely to the sesamoid bones in the tendons of the flexor muscles of the toes.
	Use	It forms an important defence to the joint in flexion of the leg, and acts as a pulley to the great extensor muscles.
1.	The Base	The superior edge of the bone—the point of attachment for the united tendons of the rectus and cruralis muscles.
2.	Fossa	On the base—for the lodgement of a bursa.
3.	The Anterior Surface	Of the bone is convex, and rough for the attachment of the tendinous and ligamentous fibres—it is also perforated by foramina for the transmission of the nutrient vessels.
4.	The Apex	A pointed projection at the lower margin of the bone, being the superior point of attachment of the ligamentum patellæ. The posterior surface of the bone is smooth and covered with cartilage, and is divided by a perpendicular ridge into two unequal cavities, viz. the
5.	Greater Condyloid Fossa	On the outer side—adapted to the outer, or lesser condyle of the femur; and the
6.	Lesser Condyloid Fossa	On the inner side—adapted to the inner condyle of the femur.

	TIBIA.	*Deriv.* quasi tubia, from tuba, a pipe or flute, from its said resemblance to the old musical pipe.
	Situation.	Inner side of the leg, extending from the knee to the ankle.
	Connexion	With 3 bones; viz. above, with the condyles of the femur; laterally, with both extremities of the fibula; and below, with the astragulus.
	Use.....	By its junction with the fibula it forms the leg, and enters into the formation of the knee and ankle joints.
	Proximal Extremity.	The tibia is described, like other cylindrical bones, as having a Body, a Proximal, and a Distal Extremity.
1.	THE HEAD	The superior expanded part of the bone, which is rough all round for the attachment of ligaments, and contains on its upper surface the articular cavities for the condyles of the femur; viz. the
2.	EXTERNAL CONDYLOID FOSSA	Superficial and round, adapted to the outer condyle of the os femoris.
3.	INTERNAL CONDYLOID FOSSA	Oblong and more excavated, for the reception of the inner condyle of the femur. These articular cavities give lodgement to two interarticular cartilages, which are of such a form as very much to increase the concavity for receiving the condyles. Between the condyloid fossæ there is an irregular projection, or
4.	INTERARTICULAR PROCESS	Which is divided on its top by a groove running from before backwards; and in front of and behind this projection there are
5.	TWO DEPRESSIONS	For the inferior attachment of the crucial ligaments, as well as of the ligaments of the interarticular cartilages.
6.	ARTICULAR SURFACE	Facing downwards, on the outer and back part of the head—for the upper connexion with the fibula. On the inner and back part of the head of the bone, corresponding in some measure as to situation with the articular surface, there is a roughness or
7.	TUBEROSITY	For the attachment of the tendons forming the inner ham-string. Just below and behind this protuberance there is a triangular excavation for the lodgement of the popliteus muscle; and in front of it, there is a somewhat similar concavity for the upper attachment of the tibialis anticus muscle.
8.	THE ANTERIOR TUBERCLE	Situate immediately in front of the head of the bone—the point of attachment of the tendon of the extensor muscles of the leg, i. e. the ligamentum patellæ. At the upper part of the anterior tubercle there is a smooth surface, or
9.	BURSAL FOSSA	For the lodgement of the bursa, which is frequently the subject of inflammation in those who work much upon their knees.
10.	SHIN, SPINE, OR ANTERIOR ANGLE	A marked ridge extending down the front surface of the bone, commencing just below the anterior tubercle, and terminating at the internal malleolus—for the attachment of the fascia covering the muscles of the leg.
11.	INNER ANGLE	Situate on the tibial aspect of the bone, which is less strongly marked than the preceding—it commences just below the tuberosity for the attachment of the inner ham-string, and affords attachment to the fascia of the leg.

59	TIBIA *(continued).*	On the Fourth Division of the Table, comprehending the 64 Bones of the Lower Extremities.
12.	THE INTEROSSEOUS RIDGE.....	or External Angle. On the fibular aspect of the bone—for the attachment of the interosseous ligament.
13.	FORAMEN	For the passage of the medullary artery, on the posterior aspect of the bone—entering obliquely downwards about one-third from the proximal extremity.
	The Distal Extremity.	Is much smaller than the head, and contains the articulating surface with the tarsus. On the inner side of this extremity there is a marked projection, extending downwards, called the
14.	MALLEOLUS INTERNUS	Which forms the inner parieties of the ankle joint, and affords attachment to the deltoid ligament, &c. The external or fibular side of this process is covered with the cartilage, and adapted to a corresponding articular surface on the inner side of the astragulus.
15.	GROOVE	Behind the malleolus internus, which is more or less marked in different instances—for the passage of the tendon of the tibialis posticus muscle.
16.	SEMILUNAR CAVITY	On the outer side of the bone—for the reception of the lower end of the fibula, which is retained in its situation by strong ligamentous fibres—the surface of this concavity is rough, and neither furnished with cartilage nor synovial membrane.
17.	CONCAVE ARTICULAR SURFACE	*Fossa Scaphoidea.* At the inferior part—adapted to the upper articular surface of the astragulus, and surrounded by a ridge for the attachment of the orbicular ligament.
	FIBULA.	*Deriv.* from fibula, an ancient clasp or buckle, ab figo, or fibulo, to fasten; because this bone is fixed to both ends of the tibia. *Syn.*, Perone, Arundo Minor, Sura.
	Situation.	On the outer side of the leg, extending from the knee to the ankle.
	Connexion	With 2 bones; viz. laterally, at both extremities, with the tibia; and below, with the outer side of the astragulus.
	Use.....	By its union with the tibia it forms the leg, and assists in the formation of the ankle-joint.
	Proximal Extremity.	It is a long slender bone, and the Body is marked by numerous irregular ridges or angles, denoting different points of attachment for muscles.
1.	THE HEAD	Is of a triangular form—its outer side forms a point of attachment for the ligaments of the knee-joint, and of the tendon forming the outer ham-string: its inner side is furnished with an
2.	ARTICULAR SURFACE	Facing upwards—adapted to the articular surface on the outer side of the head of the tibia.
3.	THE INTEROSSEOUS RIDGE.....	Commences just below the articular surface, and extends down the tibial aspect of the bone—it is the sharpest and most strongly marked of the many ridges of the fibula, and affords attachment to the interosseous ligament.
4.	THE FORAMEN.....	For the passage of the medullary artery enters obliquely downwards, at about the middle of the posterior aspect of the bone—sometimes there are several small foramina.

	The Distal Extremity.	Is broader and larger altogether than the head, and forms the
5.	MALLEOLUS EXTERNUS.....	Which is the lower projecting part of the bone, forming the outer parietes of the ankle joint—its apex affords an important point of attachment for ligaments.
6.	GROOVE.....	Behind the malleolus externus, for the passage of the tendons of the peronei muscles.
7.	ARTICULAR SURFACE.....	On the inner side of the malleolus externus, adapted to the articular surface on the outer side of the astragulus. Just above this articular surface there is a
8.	ROUGHNESS.....	Marking the connexion of this bone with the semilunar cavity of the tibia.

THE TARSUS.

Deriv. from ταρσος, the flat part of the foot.

The FOOT is composed of the bones of the Tarsus, of the Metatarsus, and of the Toes. The Tarsus forms the posterior part of the foot, and consists of 7 bones, which are very strongly connected with each other, and form an arch, the convexity of which is upwards, constituting the dorsum of the foot, and the concavity downwards, lodging the numerous muscles of the sole of the foot—the tarsus is connected, above, with the bones of the leg; and in front, with the metatarsus. The seven bones are placed in the following order, viz. the

ASTRAGULUS.....	Above,	
OS CALCIS.....	Below, and behind,	forming the posterior row, or phalanx.
NAVICULARE.....	On the inside,	
CUBOIDES.....	In front, and on the outer side,	
CUNEIFORME EXTERNUM....	In front, and adjoining the cuboides,	forming the anterior, or distal phalanx.
CUNEIFORME MEDIUM.....	In front, and adjoining the cuneiforme externum,	
CUNEIFORME INTERNUM.....	In front, and on the inner side,	

ASTRAGULUS.

Deriv. from αστραγαλος, a cockal, or die; so called, because it is shaped like the die used in ancient games. *Syn.*, Talus, Balistæ os.

	Situation.	The uppermost of the bones of the tarsus, beneath the bones of the leg, and above the os calcis.
	Connexion	With 4 bones; viz. above, with the tibia; externally, with the fibula; below, with the os calcis; and in front, with the os naviculare.
1.	CONVEX ARTICULAR SURFACE.....	Above—adapted to the scaphoid cavity of the tibia.
2.	FLATTENED ARTICULAR SURFACE.....	Externally—adapted to the outer malleolus.
3.	OBLONG ARTICULAR SURFACE.....	Internally—adapted to the inner malleolus.

4.	THE HEAD	In front—the rounded articular surface, which is received into the glenoid cavity of the naviculare—this articulation corresponds to that of the os magnum with the scaphoides and lunare, in the carpus; and the contraction just behind the head has been called the neck.
5.	TWO INFERIOR ARTICULAR SURFACES	Adapted to corresponding articular surfaces on the upper part of the os calcis, and divided from each other by a
6.	FOSSA, OR GROOVE	Running diagonally between them—for the attachment of a strong ligament going to the corresponding groove in the os calcis in order to strengthen the articulation.
7.	SMOOTH SURFACE	At the lower and inner part of the head, which rests upon a ligament stretched between the os calcis and the naviculare.
8.	GROOVE	On the posterior and inner aspect of the bone—for the passage of the tendon of the flexor longus pollicis muscle. Just in front of this groove there is a
9.	TUBERCLE	Which is one of the points of attachment for the deltoid ligament coming from the malleolus internus.

OS CALCIS.

Deriv. calx, the heel, from calco, to tread upon. *Syn.*, Calcaneum, Calcar Pedis.

Situation. The under and back part of the foot, beneath the astragulus, and behind the cuboides.

Connexion With 2 bones; viz. above, by its double articulating surface with the astragulus; and in front, with the cuboides.

1.	TWO SUPERIOR ARTICULAR SURFACES	Corresponding with those on the under surface of the astragulus.
2.	FOSSA	Between them—for the attachment of the interarticular ligament going to the astragulus.
3.	TUBERCLE	On the inner side of the articular surfaces—being a continuation, as it were, of the tubercle on the astragulus, for the attachment of the deltoid ligament. Just beneath this tubercle there is a
4.	GROOVE	Continuous with that on the astragulus—for the passage of the tendon of the flexor longus pollicis muscle.
5.	SINUOSITY	The large excavation on the inner surface of the bone—for the transmission of the vessels and nerves to the sole of the foot, as well as, of the tendons of the flexor muscles.
6.	TUBEROSITY	The large rounded posterior part of the bone, forming the heel—the posterior point of the tripod—the lower part is rough, for the attachment of the tendo achillis, and on its upper part there is a
7.	SMOOTH SURFACE	For the lodgement of a large bursa. The anterior aspect of the bone contains an
8.	IRREGULAR ARTICULAR SURFACE	Adapted to a corresponding articular surface on the posterior aspect of the cuboides.

OS NAVICULARE.

Deriv. from navicula, the diminutive of navis, a little boat, from its said resemblance to a boat. *Syn.*, Scaphoides, os Cymbæ.

Situation. On the inner side of the foot, before the astragulus, and behind the three ossa cuneiformia.

	OS NAVICULARE *(continued)*.	
	Connexion	With 5 bones; viz. behind, with the astragulus; on the outer side, with the cuboides; and in front, with the three cuneiform bones.
1.	THE DORSUM	The superior convex surface of the bone—the most prominent part of the instep.
2.	GLENOID CAVITY	Behind—being the excavated articular surface which receives the head of the astragulus.
3.	TUBERCLE	The projecting part of the bone, on the inner side of the glenoid cavity—which affords attachment to the ligament stretched between this bone and the os calcis, &c.
4.	SMALL ARTICULAR SURFACE	On the outer side of the glenoid cavity—adapted to a corresponding small articular surface on the cuboides.
5.	TRIPLE ARTICULAR SURFACE	In front—which is divided by two oblique ridges into three wedge-shaped articular surfaces, adapted to the three cuneiform bones.

	CUBOIDES.	
		Deriv. from κυβος, a cube, and εἶδος, resemblance; because this bone is irregularly square-shaped. *Syn.*, os Cubiforme, Quadratum, Varium, Grandinosum, &c.
	Situation.	On the outer side of the foot, before the os calcis, and behind the metatarsal bones of the fourth and fifth toes, which it supports.
	Connexion	With 5 bones; viz. behind, with the os calcis; internally, with the naviculare and external cuneiform bone; and in front, with the fourth and fifth metatarsal bones.
1.	LARGE IRREGULAR ARTICULAR SURFACE	Behind—adapted to the front extremity of the os calcis.
2.	SMALL ARTICULAR SURFACE	Internally, and near to the last—sometimes indistinct or altogether wanting—adapted to the naviculare.
3.	FLAT OVAL ARTICULAR SURFACE	On the upper margin of the inner side of the bone—adapted to the os cuneiforme externum.
4.	DOUBLE ARTICULAR SURFACE	In front—divided by a perpendicular ridge into two surfaces of unequal size, the larger of which is adapted to the metatarsal bone of the little toe, and the smaller to that of the toe next to it.
5.	GROOVE	On the outer side, and continued underneath the bone—for the passage of the tendon of the peroneus longus muscle in its course across the sole of the foot. Just behind this groove there is a marked
6.	RIDGE	For the attachment of the inferior plantar ligament.

	OS CUNEIFORME EXTERNUM.	
		Deriv. from cuneus, a wedge, which these bones do resemble. The upper surface is broad and flat, and the lower or palmar aspect is sharp.
	Situation.	Between the cuboides and the middle cuneiform bone, in front of the naviculare, and behind the metatarsal bone of the third toe, which it supports.
	Connexion	With 6 bones; viz. behind, with the os naviculare; externally, with the cuboides; internally, with the middle cuneiform bone; and in front, with the metatarsal bones of the second, third and fourth toes.
1.	FLATTENED ARTICULAR SURFACE	Posteriorly—adapted to the os naviculare.

OS CUNEIFORME EXTERNUM, *(continued).*	On the Fourth Division of the Table, comprehending the 64 Bones of the Lower Extremities.
2. Oblong Articular Surface.....	Externally, and behind—adapted to the cuboides.
3. Irregular Articular Surface.....	Internally, and behind—it is frequently divided by a ridge or fossa into two, which are adapted to corresponding articular surfaces on the outer side of the middle cuneiform bone.
4. Wedge-Shaped Articular Surface...	In front—adapted to the tarsal end of the metatarsal bone of the third toe.
5. Small Articular Surface	Externally, and in front—adapted to the inner side of the proximal end of the metatarsal bone of the fourth toe.
6. Small Articular Surface.....	Internally, and in front—adapted to the outer side of the proximal end of the metatarsal bone of the second toe.
OS CUNEIFORME MEDIUM.	Is medium as to situation, and minimum as to size.
Situation.	Between the external and internal cuneiform bones, in front of the naviculare, and behind the metatarsal bone of the second toe, which it supports.
Connexion	With 4 bones; viz. behind, with the naviculare; externally, with the os cuneiforme externum; internally, with the os cuneiforme internum; and in front, with the metatarsal bone of the second toe.
1. Concave Wedge-Shaped Art. Surface	Behind—adapted to the middle articular surface on the front aspect of the naviculare.
2. Small Articular Surface	Externally and posteriorly—adapted to the articular surface on the inner side of the external cuneiform bone.
3. Flattened Articular Surface	Internally and anteriorly—adapted to the internal cuneiform bone.
4. Convex Wedge-Shaped Art. Surface	In front—adapted to the tarsal end of the metatarsal bone of the second toe.
OS CUNEIFORME INTERNUM.	Is the largest of the three cuneiform bones.
Situation.	On the inner and front part of the tarsus, adjoining the middle cuneiform bone, in front of the naviculare, and behind the metatarsal bone of the great toe, which it supports.
Connexion	With 4 bones; viz. behind, with the naviculare; externally, with the middle cuneiform bone, and with the metatarsal bone of the second toe; and in front, with the metatarsal bone of the great toe, which it supports.
1. Concave Wedge-Shaped Art. Surf.	Behind—adapted to the inner articular surface on the front aspect of the naviculare.
2. Oblong Articular Surface.....	Externally and posteriorly—adapted to the inner side of the middle cuneiform bone.
3. Irregular Articular Surface	Externally and anteriorly—adapted to the inner side of the tarsal end of the metatarsal bone of the second toe—the two foregoing articular surfaces are sometimes continuous with each other, and sometimes, either partially or totally divided by a ridge or groove.
4. Large Convex Articular Surface ...	In front—adapted to the concavity at the tarsal end of the metatarsal bone of the great toe.
5. Tubercle	At the under and back part—for the attachment of the tendon of the tibialis anticus muscle.

64	OS CUNEIFORME INTERNUM, *(continued).*	On the Fourth Division of the Table, comprehending the 64 Bones of the Lower Extremities.
6.	THE BASE	Or broadest part of this bone is directed downwards, and the apex upwards, while in the two other cuneiform bones the reverse of this takes place. The articular surface on the posterior aspect of each cuneiform bone is somewhat excavated, and by the union of the three bones with each other, a considerable concavity is formed for the reception of the naviculare.
	THE METATARSUS.	Is composed of five cylindrical bones, situated between the tarsus and the toes—they are longer, rounder, and more slender than the metacarpal bones; and are connected, behind, with the four front bones of the tarsus; in front, with the proximal phalanges of the toes; and laterally, with each other in such a manner as to form an arch corresponding to that formed by the cuboid and the three cuneiform bones. A metatarsal bone is described, generally, as having a
1.	BODY	Broader above and sharpened below—hollowed out on each side for the lodgement of the interossei muscles.
2.	PROXIMAL EXTREMITY, OR BASE	The larger end of the bone—by which it is connected with the tarsus.
3.	DISTAL EXTREMITY, OR HEAD	Which is rounded, and adapted to the convexity of the proximal end of the first phalanges.
	FIRST METATARSAL BONE	Or that supporting the great toe, is by far the largest bone of the five, as well as the shortest—it is connected with 5 bones; viz. at its base, with the internal cuneiform bone; externally, it is in contact with the metatarsal bone of the second toe; the front part of its head supports the proximal phalanx of the great toe; and the under surface of the head is marked by two grooves for the play of the two sesamoid bones. The head is very large and round, and forms the internal point of the tripod, and there is a tubercle at the under part of the tarsal end, for the attachment of the tendon of the peroneus longus muscle.
	SECOND METATARSAL BONE	Is the longest of the five, and is connected with 6 bones; viz. at its base, behind, with the middle cuneiform bone; internally, with the internal cuneiform bone and the metatarsal bone of the great toe; externally, with the external cuneiform bone and the metatarsal bone of the third toe; and at its head, it supports the proximal phalanx of the second toe.
	THIRD METATARSAL BONE	Is the second in length, and is connected with 4 bones; viz. at its base, behind, with the external cuneiform bone; on the inside, with the second metatarsal bone, on the outside with the fourth metatarsal bone; and at its head, it supports the proximal phalanx of the third toe.
	FOURTH METATARSAL BONE	Is nearly as long as the former, and is connected with 4 bones; viz. at its base, behind, with the inner articular surface on the front aspect of the cuboides; internally, with the third metatarsal bone; externally, with the fifth metatarsal bone; and at its head, it supports the proximal phalanx of the fourth toe.

65 THE METATARSUS *(continued).*	On the Fourth Division of the Table, comprehending the 64 Bones of the Lower Extremities.
FIFTH METATARSAL BONE.....	Is of a peculiar shape, and readily distinguished by the tubercle at its base, projecting outwards and backwards, for the attachment of a ligament coming from the os calcis. It is connected with 3 bones; viz. at its base, behind, with the cuboides; internally, with the fourth metatarsal bone; and at its head, it supports the proximal phalanx of the little toe. The head of this bone forms the external point of the tripod.
PHALANGES DIGITORUM PEDIS	Are 28 in number, 14 to each foot—two to the great toe, and three to each of the lesser toes. The phalanges of the toes are thinner and altogether smaller than those of the fingers, excepting the great toe; like the bones of the fingers, each phalanx of the toes is described, generally, as having a Body, a Proximal, and a Distal Extremity.
THE PROXIMAL PHALANGES.....	Are much longer than any of the rest, and are the only ones that can possibly be confounded with the bones of the fingers, but they may be readily distinguished by their being much thinner, by their rounded form, and by their more expanded extremities. They are each furnished with an excavated articular surface at the base, by which they are connected with the heads of the metatarsal bones—the articular surface at the distal extremity corresponds with that of the phalanges of the fingers, in presenting two slight eminences divided by a groove, and adapted to the proximal ends of the next phalanges.
THE MIDDLE PHALANGES	Are very small and irregular, and those of the lesser toes are frequently united with the distal phalanges; it is in this row that the injurious effects of cramping the feet in unnaturally formed shoes is most conspicuous—instead of preserving the regular phalangeal appearance of the bones of the fingers, they frequently overlap each other, and are otherwise so distorted, that their original use is altogether lost. The proximal end is furnished with an articular surface adapted to the distal end of the last-mentioned phalanx, and the distal extremity supports the extreme phalanx. There is no middle phalanx of the great toe.
THE DISTAL PHALANGES	Are smaller than those of the fingers, but they correspond with them in every other respect—they are however longer than the middle phalanges. The distal phalanx of the great toe is of considerable size as compared with the other phalanges of the toes; and it may be said of both phalanges of the great toe, that they are stronger, but not so long as those of the thumb.
OSSA SESAMOIDEA.	*Deriv.* from σησαμη, an eastern grain, and ειδος, likeness—from their resemblance to the grains of indian corn. The sesamoid bones vary in their number and situation—like the patella, they are bones situated in a tendon, and increase the power of the muscle to which they are attached; the most general

situation is beneath the ball of the great toe, sliding in two grooves adapted to them on the under surface of the distal end of the metatarsal bone, where they are rarely found wanting; but they are also occasionally found in the thumb, in the lesser toes, in the tendon of the peroneus longus as it turns round the cuboides, in the tendinous attachments of the two heads of the gastrocnemii muscles, and in the tendons of the flexor muscles generally, wherever there is great muscular developement; but the bones found in these irregular situations are often globular, and do not preserve the oval characteristic figure of the sesamoid bones of the great toe, which are furnished with excavated articular surfaces adapted to the grooves in which they play.

QUESTIONS on the Fourth Division of the Table, comprehending the 64 Bones of the Lower Extremities.

How many bones form the leg.
How many bones of the thigh.
How many bones of the tarsus.
How many bones of the metatarsus.
How many phalanges of the toes of one foot.
How many sesamoid bones are ordinarily found? and what is their common situation.
What forms the malleolus externus.
Which condyloid fossa of the tibia is the larger.
Where is the tendo achillis attached.
With how many, and what bones is the os cuneiforme externum connected.
What is the form of the head of the fibula.
With what bones is the fifth metatarsal bone connected.
Where is the linea aspera of the femur.
For what purpose are the depressions in front of, and behind the interarticular process of the tibia.
With how many, and what bones is the os calcis connected.
In what direction does the medullary artery enter the tibia, and on what aspect of the bone.
What bones form the tripod.
With how many, and what bones is the astragulus connected.
Which ridge of the fibula is the sharpest? and on what aspect of the bone is it.
What forms the malleolus internus.
Which condyloid fossa of the patella is the larger.
What is there peculiar in the articulation of the astragulus with the os calcis.
With how many bones is the second metatarsal bone connected.
For what purpose is the pit on the head of the femur.
How many articulating surfaces are there on the distal phalanges of the toes.
With how many, and what bones is the cuboides connected.
What is attached to the anterior tubercle of the tibia.
What does the glenoid cavity of the naviculare contain.
With how many bones is the femur connected.
Which metatarsal bone is the longest.
What are the characteristics of the middle phalanges of the toes.
What does the notch between the condyles of the femur give passage to.
Which cuneiform bone is the smallest.
With how many bones is the fibula connected.
What passes through the groove at the back of the malleolus externus.
For what purpose is the sinuosity on the inner side of the os calcis.
In what direction is the base of the patella.
In what situations are sesamoid bones to be found, besides the ball of the great toe.
Where are the trochanters of the femur.
What are the characteristics of a metatarsal bone as distinguishing it from a metacarpal.
What are the proper connexions of the patella.
Which cuneiform bone is the largest.

With how many bones is the naviculare connected.

What is there observable on the trochanter major.

How are the proximal phalanges of the toes distinguished from those of the fingers.

What passes through the groove behind the malleolus internus.

With how many bones is the tibia connected.

Where is the medullary foramen of the fibula.

With what bones is the os cuneiforme externum connected.

How are the fourth and fifth metatarsal bones supported.

Which condyle of the femur is the larger.

How many phalanges of the great toe are there.

How is the fibula connected with the tibia at the distal extremity.

With how many bones is the os cuneiforme internum connected.

For what purpose is the groove on the os cuboides.

What is attached to the apex of the patella.

What are the characteristics of the fifth metatarsal bone.

Where is the ridge for the attachment of the capsule of the hip-joint.

For what purpose is the smooth surface on the anterior tubercle of the tibia.

What forms the point of attachment for the outer ham-string.

With how many bones is the metatarsal bone of the great toe connected.

What is the character of the anterior articular surface of the os naviculare.

What bones form the anterior row of the tarsus.

For what purpose is the smooth surface on the inner side of the head of the astragulus.

Where is the interosseous ridge of the fibula.

For what purpose is the tuberosity on the inner side of the head of the tibia.

What is attached to the tubercle on the inner side of the astragulus.

What are the three angles of the tibia.

Are the articulating surfaces of the condyles of the femur united both in front and behind.

For what purpose is the cavity, or pit, at the inner side of the root of the trochanter major.

With how many bones is the os cuneiforme medium connected.

In what direction are the bases of the three cuneiforme bones placed.

How many articular surfaces are there on the tibia.

Of how many bones is the foot composed.

What is attached to the tubercle of the os naviculare.

With how many bones is the fourth metatarsal bone connected.

What bone forms the highest part of the instep.

How are the proximal phalanges of the toes distinguished from the digital phalanges.

APPENDIX.

OBSERVATIONS ON THE MODE OF PREPARING BONES FOR OSTEOLOGICAL PURPOSES.

HAVING been repeatedly solicited by various friends, who have seen the bones in my collection, to explain to them the manner in which they were prepared, I now gladly avail myself of an opportunity of making it more generally known.

About twelve years since my attention was particularly directed to this subject, by finding that some bones which I had macerated were unusually white, and free from smell. I continued for several subsequent years to macerate and prepare bones, as I conceived, precisely upon the same plan as that in which the maceration had been so successful; but although some proved tolerably white, the majority were cleaned with much difficulty, and when the ligamentous attachments were removed by dint of hard scraping, the bones were ever after yellow at the extremities, and had a more or less offensive smell. After much thought on the subject, I could not discover wherein my method differed from that in general use, but the preparation of another skeleton, about four years back, furnished me with materials whereupon to build something like a tangible theory; and this theory having been verified by repeated subsequent trials, I feel confident in recommending the practice founded upon it, although perhaps the reasons advanced may not be altogether conclusive. Two words, however, if properly understood, will furnish all the information that is necessary, viz. UNINTERRUPTED PUTREFACTION; for if the putrefactive process be in any way interrupted, the bones will never be clean. In order to obtain this end, the following directions must be scrupulously observed:—It is desirable to get the animal, of which a skeleton is to be made, as few hours after death as possible, while the blood is in an almost fluid state, and having taken off the muscles tolerably clean, and separated every bone, they should be immediately thrown into cold water; the water should be changed every twelve hours for three or four days, until it becomes no longer tinged with blood. A tub, or large earthenware vessel, must then be procured—if a tub, it must be well made to secure it from leaking during the long period required for maceration, and of such a size as to hold a sufficient quantity of water, over and above that which covers the bones, to allow for the waste by evaporation. Evaporation entails two difficulties, for if it go so far as to leave the ends of some of the longer bones projecting out of the water, they immediately become quite black, and if fresh water be added to cover them, the whole putrefactive process is arrested: hence the vessel must stand in some covered out-house, secure from the admission of rain, and from the danger of the water being drunk by rats. So far as I have observed, the vessels should be merely lightly covered over, as a certain access of air appears necessary—for, on one occasion, being without a convenient

place, I buried some tubs during the usual period, when the bones proved the most offensive that I ever prepared, and it was an endless task to get off the ligaments.

Should all go on successfully, and the process be in no way interrupted, either by evaporation or by leakage, in the space of about six months, the bones may be washed perfectly clean with a common brush, the ligaments and muscular attachments may be pushed off like a cake from the ends of the bones, and then if they be held up, a thick fluid will be seen to exude through every aperture from the interior, proving that the putrefactive process has gone on in the interior with the same happy result as on the exterior. It is hardly necessary to observe, that the internal and external putrefaction must go hand in hand in order to procure a clean bone, and this I apprehend to be the general source of difficulty A vertical section of any of the cylindrical bones in my collection exhibits the interior, even whiter than the exterior; and the cancellous structure is a beautiful white net-work, unsoiled by any medullary matter. After the bones have been well brushed, they should be soaked in clean water twenty-four hours, and then carefully cleaned with a scalpel from all ligamentous and cartilaginous matter that may be found still adhering, but the bone should in no way be scraped more than is absolutely necessary, as it is deprived of all its minute processes and distinctive characteristics. The long cylindrical bones should be placed upright upon their extremities for a short time, in order to allow of the entire escape of the medullary fluid. To cleanse them from any oleaginous matter, whether external or internal, I have generally soaked them for the next forty-eight hours in a solution of subcarbonate of potass, in the proportion of about a pound to each gallon of water, after which, they should again be well washed and left for a short time in a large quantity of clean water, and then wiped with a dry cloth. The bones after this should be carefully laid upon a clean deal board, and exposed for a few days and nights in the open air, taking the precaution to turn them now and then.

As to the exact period for maceration, six months has been stated as a general time; but this is found to vary, as a set of bones will macerate in almost half the time during the summer months, to what will be required in the winter. The bones of small animals, and of birds also, require a comparatively short period; and it may be observed that the bones of the ruminating class of animals always macerate more speedily than those of the carnivorous.

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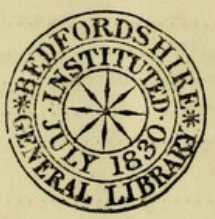

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